VSB UUSIUTUVA ENERGIA SUOMI OY

Puutionsaaren tuulivoimahanke, Haapavesi

Melu- ja varjostusmallinnukset

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Rintamäki, Henna-Riikka

25.11.2020

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Puutionsaaren tuulivoimahanke, Haapavesi

1 MELU- JA VARJOSTUSMALLINNUKSEN TAVOITTEET

Haapaveden kunnassa sijaitsevan Puutionsaaren tuulivoimahankkeen hankeomistaja suunnittelee 43 voimalan rakentamista. Varjostusmallinnuksissa hankkeen voimaloiden kokonaiskorkeus on 300 metriä, roottorin halkaisija 200 metriä ja napakorkeus 200 metriä. Melumallinnuksissa voimaloiden kokonaiskorkeus on 279 metriä, roottorin halkaisija 158 metriä ja napakorkeus 200 metriä. Voimaloiden GE158-5,3MW melupäästö on 106,0 dB(A)+ 2,0 dB(A).

Mallinnuksissa on otettu huomioon hankkeen lähellä sijaitsevien Tuomiperän ja Rahkolan tuulivoimapuistojen yhteisvaikutukset.

Tuulivoimaloiden aiheuttamia meluvaikutuksia on arvioitu melun laskentamallin avulla, joiden mukaan on tehty melumallinnus WindPRO-ohjelmalla tuulivoimapuistosta DECIBEL-modulilla. Tuulivoimaloiden aiheuttamat varjostusvaikutukset on mallinnettu WindPro-ohjelman SHADOW-moduulilla.

Melu- ja varjostusmallinnukset on laatinut ins Henna-Riikka Rintamäki FCG Suunnittelu ja tekniikka Oy:stä ja laaduntarkistuksen on tehnyt FM Liisa Karhu FCG Suunnittelu ja tekniikka Oy:stä.

2 LÄHTÖTIEDOT JA MENETELMÄT

2.1 Melu

2.1.1 Melumallinnus

Tuulivoimaloiden aiheuttamat äänenpainetasot on mallinnettu WindPRO-laskentaohjelmalla ISO 9613-2 standardin mukaisesti. Ympäristöhallinnon tuulivoimaloiden melun mallintamista koskevan ohjeen 2/2014 mukaisesti tuulen nopeutena käytettiin 8 m/s, ilman lämpötilana 15 °C, ilmanpaineena 101,325 kPa, ilman suhteellisena kosteutena 70 % ja maanpinnan kovuutena arvoa 0,4. Laskenta on tehty 4,0 m maan pinnan tasosta. Laskennan pystysuora resoluutio on 0,5 m ja vaakasuora resoluutio on 1 m.

Melumallinnusten laskentatuloksia on havainnollistettu ns. keskiäänitasokarttojen avulla. Keskiäänitasokartoissa on melun keskiäänitaso- eli ekvivalenttiäänitasokäyrät (LAeq) 5 dB välein.

Taulukko 1. Käytetyt mallinnusparametrit ISO 9613-2 laskelmissa sekä melulle altistuvat kohteet

MALLINNUSOHJELMA JA VERSIO:			
WindPRO version 3.3		Mallinnusmenetelmä: ISO 9613-2	
AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT			
Laskenta korkeus		Laskentaruudun koko [m·m]	
4,0 m		25x25 m	
Suhteellinen kosteus		Lämpötila	
70 %	Muu, mikä ja miksi:	15 C°	
Maastomallin lähde ja tarkkuus			
Maastomallin lähde: MML maastotietokanta		Vaakaresoluutio:1,0	Pystyresoluutio:0,5
Maan- ja vedenpinnan absorption ja heijastuksen huomioiminen, käytetyt kertoimet			
Maa	0,4		HUOM
Vesistö	0,0		
Ilmakehän stabiilius laskennassa/meteorologinen korjaus			
Neutraali, (0): Neutraali		Muu, mikä ja miksi:	
Sääolosuhteiden huomiointi; laskennassa käytetty tuulen suunnat ja nopeus			
Tuulen suunta: 0-360°		Tuulennopeus: 8 m/s	
Voimalan äänen suuntaavuus ja vaimentuminen			
Vapaa avaruus: kyllä	Muu, mikä, miksi:		

2.1.2 Yhteismelumallinnus

Yhteismelumallinnuksessa on mallinnettu tuulivoimahankkeiden Tuomiperä ja Rahkola yhteisvaikutukset. Tuomiperän voimaloiden melupäästö on 106,0 dB(A) + 1,8 dB(A). Voimaloiden kokonaiskorkeus on 240 metriä, roottorin halkaisija 175 metriä ja napakorkeus 152,5 metriä.

Rahkolan voimaloiden V150-4,2MW melupäästö on 104,9 dB(A). Voimalan kokonaiskorkeus on 230 metriä, roottorin halkaisija 150 metriä ja napakorkeus 155 metriä.

2.1.3 Matalataajuinen melu

Matalataajuinen melu laskettiin Ympäristöministeriön ohjeen 2/2014 mukaisin menetelmin käyttäen voimalavalmistajilta saatuja arvioita niiden äänitehotasoista.

Ohje 2/2014 antaa menetelmän matalataajuisen melun laskentaan rakennusten ulkopuolelle. Sosiaali- ja terveysministeriön Asumisterveysasetus 2015 antaa matalataajuiselle melulle toimenpiderajat asuinhuoneissa. Rakennusten sisälle kantautuva äänitaso arvioitiin Turun AMK:n (Keränen, Hakala ja Hongisto, 2017) julkistamien ääneneristävyysarvoin ja tuloksia verrattiin toimenpiderajoihin.

YM 2/2014 ohjeistaa arvioimaan rakennusten sisälle kantautuvat äänitasot DSO 1284 mukaisesti. Keräsen, Hakalan ja Hongiston (2017) antamat eristysarvot, tersseille 20-200 Hz, ovat 0,6-10,2 dB heikommat kuin vastaavat arvot DSO 1284:ssa. On siten perusteltu arvioida, mikäli melutasot sisällä alittavat asumisterveysasetuksessa annetut toimenpiderajat asuinhuoneissa Keräsen, Hakalan ja Hongiston (2017) arvoilla, ne myös alittuisivat DSO 1284 eristysarviolla.

Taulukko 2. Turun AMK:n eristysarvot pienitaajuisen melun mallinnuksessa. (Keränen, Hakala ja Hongisto, 2017).

Terssin keskitaajuus hz	10	12,5	16	20	25	31,5	40	50	63	80	100	125	160	200
Äänen eristävyysarvo hz (Keränen, Hakala ja Hongisto, 2017)	4	5	5	6	6	7	7	8	9	10	11	12	13	14

Matalataajuisen melun laskelmassa huomioitiin maanpinnan muodon vaikutus ohjeen 4/2014 mukaisesti. Tulokset on esitetty taajuuskohtaisena taulukkona hankealuetta ympäröiville asuin- ja lomarakennuksille.

2.2 Varjostusmallinnus

2.2.1 Varjostusmallinnus

Tuulivoimaloiden varjostusvaikutuksia mallinnettiin WindPRO-ohjelman Shadow-moduulilla. Laskennoissa varjot huomioidaan, jos aurinko on yli 3 astetta horisontin yläpuolella ja varjoksi lasketaan, kun siipi peittää vähintään 20 % auringosta.

Varjostusmallin laskennassa on huomioitu hankealueen korkeustiedot, tuulivoimaloiden sijainnit, tuulivoimalan napakorkeudet ja roottorin halkaisija ja hankealueen aikavyöhyke. Mallinnuksessa otettiin huomioon auringon asema horisontissa eri kellon- ja vuodenaikoina, pilvisyys kuukausittain eli kuinka paljon aurinko paistaa ollessaan horisontin yläpuolella sekä tuulivoimalaitosten arvioitu vuotuinen käyntiaika.

Varjostuksen tarkastelukorkeutena lähialueen asuin- tai lomarakennusten pihapiirissä käytettiin 1,0 metriä ja laskenta-alueen koko oli 5,0 x 5,0 metriä. Laskentaikkunoiden suunnat asennettiin voimaloita kohti ns ”greenhouse mode”.

Auringon keskimääräiset paistetunnit perustuvat Uumajan sääaseman pitkäaikaisiin mitattuihin säätietoihin 1981-2010, (Ilmatieteenlaitos raportti 2012:1. Laskentojen tuulen suunta ja nopeusjakaumana käytettiin NASA:n MERRA-dataa (Modern Era Retrospective-analysis for Research and Applications) hankealueen läheisyydeltä.

Varjostusmallinnuksen tuloksia on havainnollistettu kartan avulla. Kartalla esitetään varjostusvaikutuksen (1, 8 ja 20 tuntia vuodessa) laajuus. Sen lisäksi mallinnuksessa on erikseen laskettu vaikutus tuulivoimahankkeen ympäristössä oleviin herkkiin kohteisiin.

Varjostusmallinnuksessa on huomioitu puuston suojaava vaikutus käyttäen Luonnonvarakeskuksen aineistoa vuodelta 2017.

2.2.2 Varjostuksen yhteisvaikutusmallinnus

Yhteismelumallinnuksessa on mallinnettu tuulivoimahankkeiden Tuomiperä ja Rahkola yhteisvaikutukset. Tuomiperän voimaloiden koko on (RD) 175 metriä, napakorkeus (HH) 152,5 metriä ja kokonaiskorkeus on 240 metriä.

Rahkolan voimaloiden V150-4,2MW kokonaiskorkeus on 230 metriä, roottorin halkaisija 150 metriä ja napakorkeus 155 metriä.

Voimaloiden käyttötuntimäärä on ilman yhteisvaikutusvoimaloita 8674 tuntia vuodessa ja yhteisvaikutusvoimaloilla mallinnettuna 8673 tuntia vuodessa. Yhteisvaikutusmallinnusten varjostuslaskelmien vaikutukset ovat mallinnuksen mukaan joidenkin laskentapisteiden osalta vähäisemmät, koska voimaloiden käyttötuntimäärä on mallinnuksessa pienempi.

Yhteisvarjostusmallinnuksessa on huomioitu puuston suojaava vaikutus käyttäen Luonnonvarakeskuksen vuoden 2017 aineistoa.

2.3 Kartta-aineisto

Korkeustiedot perustuvat Maanmittauslaitoksen (MML) maastotietokannan korkeuskäyrät-aineistoon. Korkeusaseman intrapoloitimenetelmänä kohteille on käytetty WindPro TIN menetelmää.

Rakennusten käyttötarkoitus on arvoitu MML:n maastotietokannan asuin-, liike- tai julkisen-, loma- teollisen-, kirkollisen, tai muun rakennuksen mukaisesti.

Laskentapisteissä A, B, C ja L sijaitsevat rakennukset eivät ole loma-asunto- tai asuinkäytössä. Laskentapiste A rakennus 71-403-74-129 on metsästysmaja (Ennakkolausunto 12.11.2020, rakennustarkastaja Teijo Hyvärinen, Haapaveden kaupunki).

Laskentapiste B rakennuksen 71-403-46-0 käyttötarkoitus on ”ei mitään”. Laskentapiste C rakennus 71-403-30-19 käyttötarkoitus on yhden asunnon talot, käyttötilanne: tyhjillään. Laskentapiste L rakennus 71-403-30-14 käyttötarkoitus on vapaa-ajan asunnot ja saunarakennukset, käyttötilanne ”muu” (Haapaveden kaupungin käyttötarkoitusselvitys rakennuksista).

Tulokset asuin- ja lomarakennuskäytössä oleville rakennuksille on esitetty taajuuskohtaisena taulukkona hankealueen ympäröidyille taloille.

2.4 Voimalat

Tuulivoimaloiden melumallinnuksen lähtöarvoina on käytetty valmistajan ilmoittamia tuulivoimaloiden melupäästön arvoja.

Taulukko 3. Hankkeen tuulivoimaloiden kokotiedot varjostusmallinnuksissa Generic RD200 HH200.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)					
Tuulivoimalan valmistaja: Generic				Tyyppi: RD200	Sarjanumero/t:-
Nimellisteho:		Napakorkeus: 200 m		Roottorin halkaisija: 200 m	Tornin tyyppi: teräs
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun					
Lapakulman säätö		Pyörimisnopeus		Muu, mikä	
Kyllä	- dB	Kyllä	- dB	Noise mode säätö:	-
~~Ei~~		~~Ei~~		Noise mode, lähtömelutaso	-

Taulukko 4. Hankkeen tuulivoimaloiden GE158-5.3MW HH200 tyyppitiedot ja äänitehotasot sekä melun erityispiirteet.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)					
Tuulivoimalan valmistaja: General Electric				Tyyppi: GE158	Sarjanumero/t:-
Nimellisteho: 5,3 MW		Napakorkeus: 200 m		Roottorin halkaisija: 158 m	Tornin tyyppi: teräs
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun					
Lapakulman säätö		Pyörimisnopeus		Muu, mikä	
Kyllä	- dB	Kyllä	- dB	Noise mode säätö:	Mode 0 STE – Level 06
~~Ei~~		~~Ei~~		Noise mode, lähtömelutaso	106,0 dB(A)

AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT

Melupäästötiedot perustuvat dokumenttiin:
Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01.pdf

Valmistajan ilmoittama tuulivoimalan tuottama äänitehotaso vastaa keskiäänitasoa, jolloin voimalan lähtöarvoihin lisätään mallinnuksissa +2 dB vastaamaan ylempää luottamusväliä 95%.

Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
31,5	-	20	63,1	200	90,8	2000	94,3
63	87,2	25	67,8	250	92,3	2500	92,3
125	92,6	31,5	72,2	315	93,6	3150	89,7
250	97,2	40	76,1	400	94,1	4000	85,9
500	99,7	50	79,4	500	94,9	5000	81,8
1000	101,3	63	82,2	630	95,5	6300	75,5
2000	99,1	80	84,4	800	96	8000	65,9
4000	91,7	100	86,1	1000	96,5	10000	53,3
8000	76	125	87,7	1250	97		
106,0 dB(A)		160	89,2	1600	95,7		

Melun erityispiirteiden mittaus ja havainnot:

Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
~~kyllä~~	Ei	~~kyllä~~	ei	~~kyllä~~	ei	~~kyllä~~	ei

Taulukko 5. Rahkolan hankkeen tuulivoimaloiden V150-4.2MW HH155 tyyppitiedot ja äänitehotasot sekä melun erityispiirteet.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)					
Tuulivoimalan valmistaja: Vestas				Tyyppi: V150-4.2	Sarjanumero/t:-
Nimellisteho:4,2 MW		Napakorkeus: 155 m		Roottorin halkaisija: 150 m	Tornin tyyppi: teräs
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun					
Lapakulman säätö		Pyörimisnopeus		Muu, mikä	
Kyllä	- dB	Kyllä	- dB	Noise mode säätö:	Mode PO1 – Mode 0S
~~Ei~~		~~Ei~~		Noise mode, lähtömelutaso	104,9 – 108,0 dB(A)

AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT							
Melupäästötiedot perustuvat dokumenttiin ” DMS 0067-4767_V03_V150-4.0/4.2 MW- Third Octave noise emission. Valmistajan ilmoittama tuulivoimalan tuottaman äänitehotaso perustuu todellisiin mittaustuloksiin ja vastaa ylempää luottamusväliä 95%,							
Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
31,5	-	20	62,2	200	92,2	2000	90,2
63	86,5	25	66,5	250	93,4	2500	88,3
125	93,7	31,5	70,6	315	94,3	3150	86,0
250	98,2	40	74,6	400	94,9	4000	83,4
500	99,9	50	77,9	500	95,2	5000	80,5
1000	98,9	63	81,1	630	95,2	6300	77,3
2000	95,1	80	84,1	800	94,8	8000	73,6
4000	88,6	100	86,5	1000	94,2	10000	69,8
8000	79,4	125	88,6	1250	93,2		
104,9 dB(A)		160	90,7	1600	91,8		
Melun erityispiirteiden mittaus ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
~~kyllä~~	Ei	~~kyllä~~	ei	~~kyllä~~	ei	~~kyllä~~	ei

Taulukko 6. Tuomiperän hankkeen tuulivoimaloiden GE158-5.3MW RD175 HH152,5 tyyppitiedot ja äänitehotasot sekä melun erityispiirteet.

TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)					
Tuulivoimalan valmistaja: General Electric				Tyyppi: GE158	Sarjanumero/t:-
Nimellisteho: 5,3 MW		Napakorkeus: 152,5 m		Roottorin halkaisija: 175 m	Tornin tyyppi: hybridi
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun					
Lapakulman säätö		Pyörimisnopeus		Muu, mikä	
Kyllä	- dB	Kyllä	- dB	Noise mode säätö:	Mode 0 STE – Level 06
~~Ei~~		~~Ei~~		Noise mode, lähtömelutaso	107,8 dB(A)

AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT							
Melupäästötiedot perustuvat dokumenttiin: Technical Documentation Wind Turbine Generator Systems 5.3-158 - 50 Hz, Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01.docx. Voimalan valmistajan ohjeiden mukaisesti äänitehotasoon on lisätty 1,8 dB, että saadaan äänitehotaso vastaamaan takuuarvoja.							
Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
31,5	-	20	64,9	200	92,6	2000	96,1
63	79,8	25	69,6	250	94,1	2500	94,1
125	89	31,5	74	315	95,4	3150	91,5
250	94,4	40	77,9	400	95,9	4000	87,7
500	99	50	81,2	500	96,7	5000	83,6
1000	101,5	63	84	630	97,3	6300	77,3
2000	103,1	80	86,2	800	97,8	8000	67,7
4000	100,9	100	87,9	1000	98,3	10000	55,1
8000	93,5	125	89,5	1250	98,8		
107,8 dB(A)		160	91	1600	97,5		
Melun erityispiirteiden mittaus ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
~~kyllä~~	Ei	~~kyllä~~	ei	~~kyllä~~	ei	~~kyllä~~	ei

2.5 Raja- ja ohjearvot

2.5.1 Melu

Valtioneuvoston asetuksessa (1107/2015) tuulivoimaloille on määritelty ohjearvot päivä- ja yöajan keskiäänitasojen maksimiarvolle. Asetus tuli voimaan 1.9.2015. Jos tuulivoimalan melu sisältää tonaalisia, kapeakaistaisia tai impulssimaisia komponentteja, tai se on selvästi amplitudimoduloitunutta, mallinnustuloksiin tulee ohjeen mukaan lisätä viisi desibeliä ennen ohjearvoon vertaamista. Koska ohjearvo sisältää jo tyypillisen tuulivoimamelun piirteet, edellä mainitut äänenpiirteiden tulee olla tuulivoimalalle epätyypillisen voimakkaita, jotta mallinnustuloksissa täytyy huomioida viiden desibelin lisä äänenvoimakkuuteen.

Taulukko 7. Valtioneuvoston asetuksen mukaiset tuulivoimaloiden melutason ohjearvot (Valtioneuvoston asetus 1107/2015).

Vaikutuskohde	Päivä (7-22)	Yö (22-7)
Pysyvä asutus	45 dB	40 dB
Loma-asutus	45 dB	40 dB
Hoitolaitokset	45 dB	40 dB
Oppilaitokset	45 dB	—
Virkistysalueet	45 dB	—
Leirintäalueet	45 dB	40 dB
Kansallispuistot	40 dB	40 dB

Sosiaali- ja terveysministeriön asetuksessa (545/2015) on annettu matalataajuiselle melulle toimenpiderajoja. Asetus tuli voimaan 15.5.2015. Toimenpiderajat koskevat asuinhuoneita ja ne on annettu taajuuspainottamattomina yhden tunnin keskiäänitasoina tersseittäin. Toimenpiderajat koskevat yöaikaa ja päivällä sallitaan 5 dB suuremmat arvot.

Taulukko 8. Matalataajuisen sisämelun tunnin keskiäänitason toimenpiderajat nukkumiseen tarkoitetuissa tiloissa.

Terssikaista Hz	20	25	31,5	40	50	63	80	100	125	160	200
Keskiäänitaso LZeq,1h, dB	74	64	56	49	44	42	40	38	36	34	32
Edellisestä laskettu keski-äänitaso A-painotettuna LAeq,1h, dB	24	19	17	14	14	16	18	19	20	21	21

Lisäksi yöaikainen mahdollisesti unihäiriötä aiheuttava melu, joka erottuu selvästi taustamelusta, ei saa ylittää 25 dB yhden tunnin keskiäänitasona LAeq,1h mitattuna niissä tiloissa, jotka on tarkoitettu nukkumiseen.

2.5.2 Varjostus

Suomessa ei ole viranomaisten antamia yleisiä määräyksiä tuulivoimaloiden muodostaman varjostuksen enimmäiskestoista eikä varjonmuodostuksen arviointiperusteista. Ympäristöministeriön tuulivoimarakentamisen suunnitteluohjeistuksessa esitetään käytettäväksi muiden maiden suosituksia välkkeen rajoittamisesta (Ympäristöministeriö 2012).

Useissa maissa on annettu raja-arvoja tai suosituksia hyväksyttävän välkevaikutuksen määrästä. Esimerkiksi Ruotsissa suositus on kahdeksan tuntia vuodessa ja 30 minuuttia päivässä.

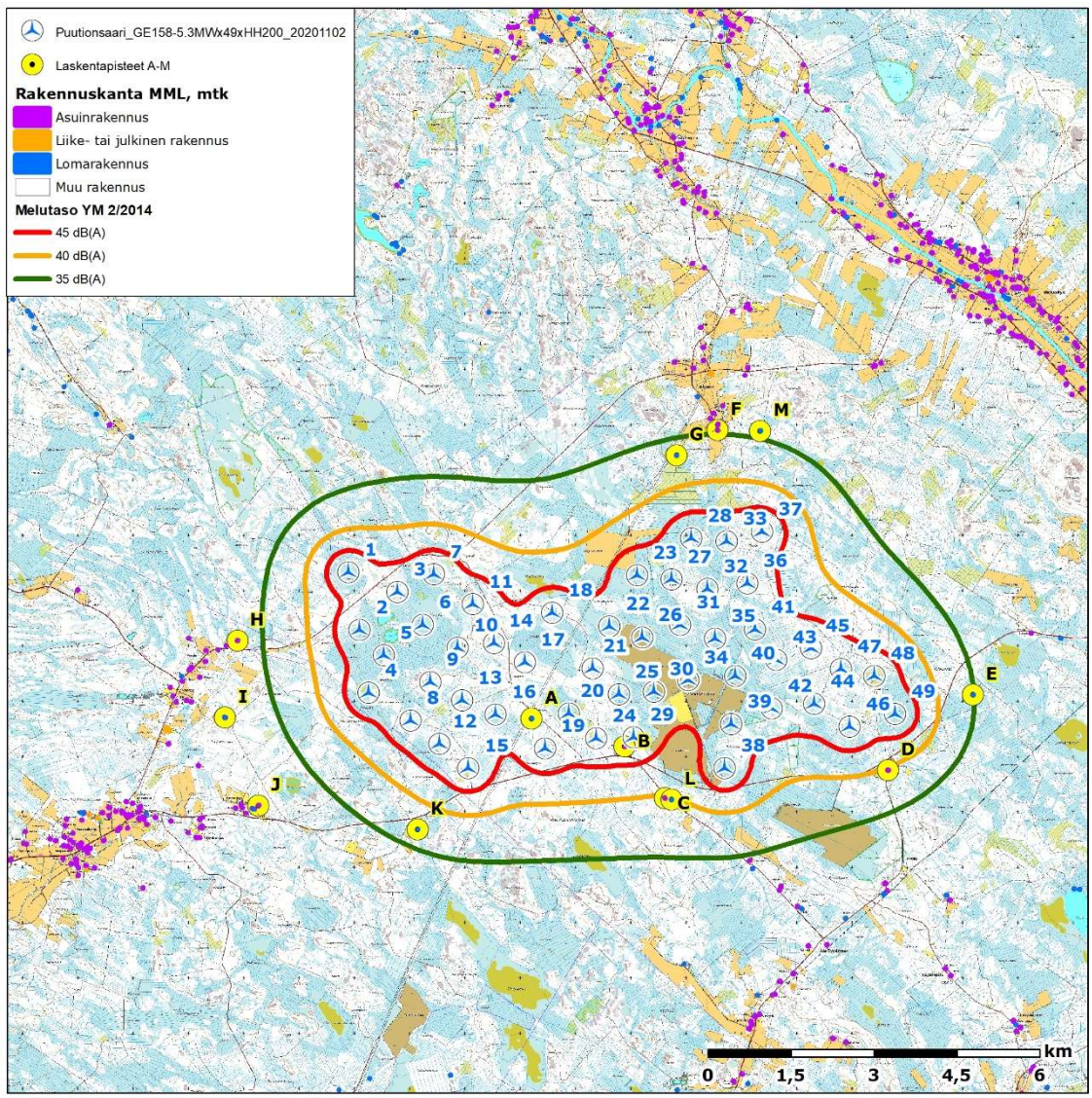
Arvioinnissa on tarkasteltu vaikutuksia alueella, jossa varjoja tai välkettä mallinnuksen mukaisessa todellisessa tilanteessa (”real case”) esiintyy vähintään kahdeksan tuntia vuodessa.

3 MELU- JA VARJOSTUSMALLINNUSTEN TULOKSET

3.1 Melun laskentatulokset ISO 9613-2

3.1.1 Melumallinnus

Tuulivoimamelu ei ylitä 40 dB tuulivoimahankkeen läheisyydessä sijaitsevissa asuin- ja lomarakennusten laskentapisteissä.



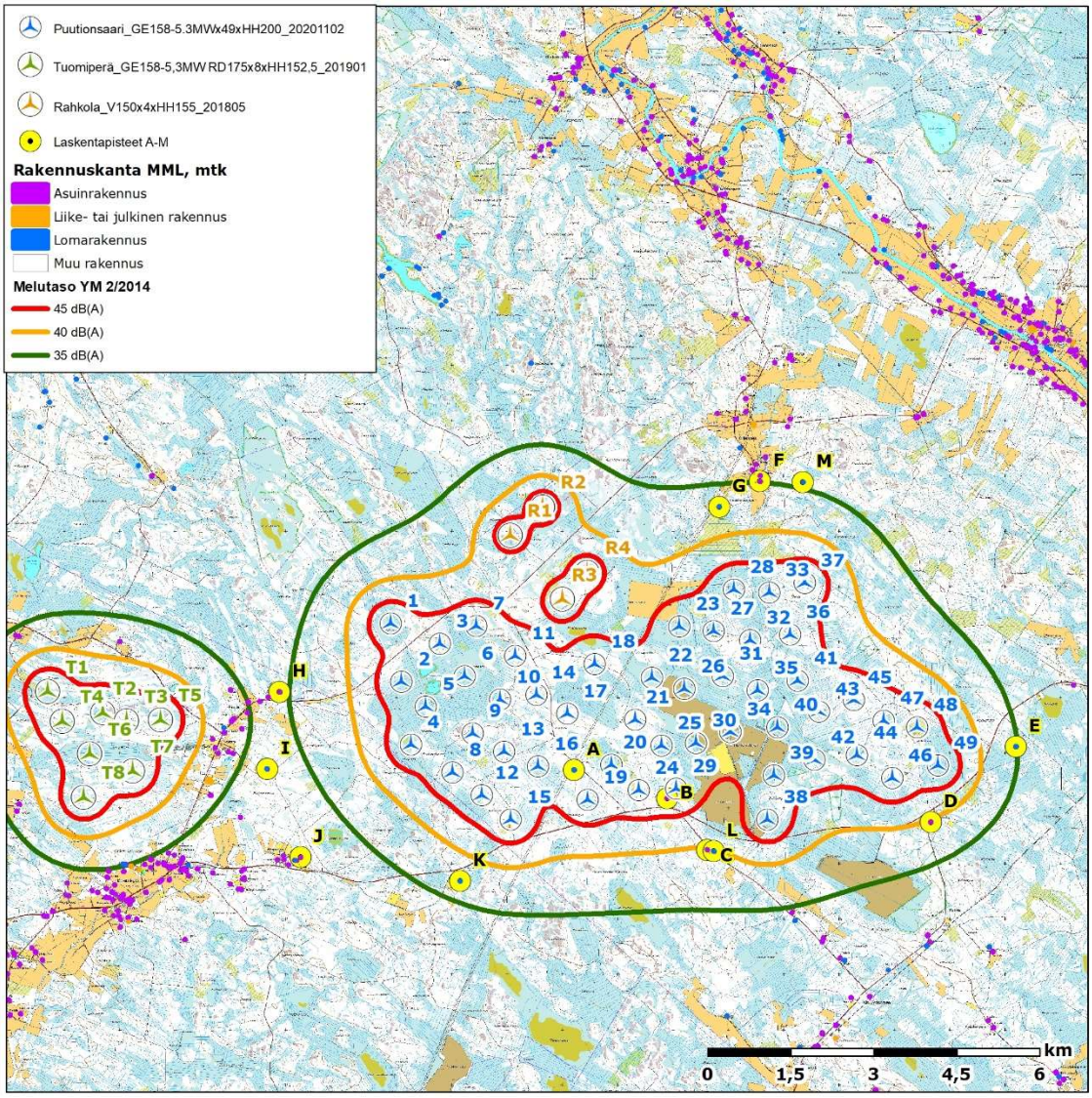
Kuva 1. Laskennalliset melutasot standardin ISO 9613-2 mukaisesti.

Taulukko 9. Laskennalliset melutasot standardin ISO 9613-2 mukaisesti.

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema (m)	Melutaso dB(A)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	39,8
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	39,5
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	35,1
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	34,6
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	36,5
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	32,9
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	31,2
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	30,5
Lomarakennus K (Kurunoja)	400152	7107685	102,3	36,8
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	39,7
Lomarakennus M (Riskalan metsatie)	406348	7114887	102,7	34,3

3.1.2 Yhteismelumallinnus

Tuulivoimamelu ei ylitä 40 dB tuulivoimahankkeen läheisyydessä sijaitsevissa asuin- ja lomarakennusten laskentapisteissä.



Kuva 2. Laskennalliset yhteismelutasot standardin ISO 9613-2 mukaisesti.

Taulukko 10. Laskennalliset yhteismelumallinnuksen melutasot standardin ISO 9613-2 mukaisesti.

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema (m)	Melutaso dB(A)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	39,8
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	39,6
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	35,1
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	34,9
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	36,8
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	34,7
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	34,0
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	31,9
Lomarakennus K (Kurunoja)	400152	7107685	102,3	36,9
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	39,7
Lomarakennus M (Riskalan metsatie)	406348	7114887	102,7	34,5

3.2 Matalataajuiset melutasot

3.2.1 Matalataajuinen melutaso

Matalataajuisen melun ohjearvo ylittyy kahdessa laskentakohteessa. Eniten ohjearvo ylittyy sisätiloissa kohteessa autiotalo C, missä melu on 0,7 dB yli ohjearvon taajuudella 50 Hz. Sisätilojen ohjearvo ylittyy myös kohteessa Muu käyttötarkoitus L. Melun ohjearvo ei ylity käytössä olevissa asuin- tai lomarakennuksissa.**Taulukko 11. Matalataajuisen melun mallinnustulokset herkissä kohteissa verrattuna Sosiaali- ja terveysministeriön asumisterveysohjearvoon.**

Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	Verraten Asumisterveysohjeen L eq,1h ohjearvoon sisällä	Hz	L eq,1h - Asumisterveys- ohje sisällä	Hz
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	-	-	Ei oteta huomioon	-
Autiotalo B (Ylivieskantie, Pöhlölä)	-	-	Ei oteta huomioon	-
Autiotalo C (Perkkiöntie 382)	9,0	63	0,7	50
Asuinrakennus D (Alakyläntie 243)	8,0	63	-0,3	50
Lomarakennus E (Kellokankaan metsätie)	5,2	63	-3,0	50
Asuinrakennus F (Ollilantie 112)	5,6	63	-2,6	50
Lomarakennus G (Ollilantie, Siliäkuru)	6,8	63	-1,4	50
Asuinrakennus H (Pinolantie 406)	4,2	63	-4,0	50
Asuinrakennus I (Kortenevantie 116)	3,3	63	-4,9	50
Asuinrakennus J (Haapavesitie 1406)	3,0	63	-5,2	50
Lomarakennus K (Kurunoja)	6,8	63	-1,5	50
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	8,9	63	0,6	50
Lomarakennus M (Riskalan metsatie)	5,3	63	-2,9	50

3.2.2 Matalataajuinenmelu yhteismallinnus

Matalataajuisen melun ohjearvo ylittyy kahdessa laskentakohteessa. Eniten ohjearvo ylittyy sisätiloissa kohteessa autiotalo C, missä melu on 0,7 dB yli ohjearvon taajuudella 50 Hz. Sisätilojen ohjearvo ylittyy myös kohteessa Muu käyttötarkoitus L. Melun ohjearvo ei ylity käytössä olevissa asuin- tai lomarakennuksissa.**Taulukko 12. Matalataajuisen melun yhteismallinnuksen tulokset herkissä kohteissa verrattuna Sosiaali- ja terveysministeriön asumisterveysohjearvoon.**

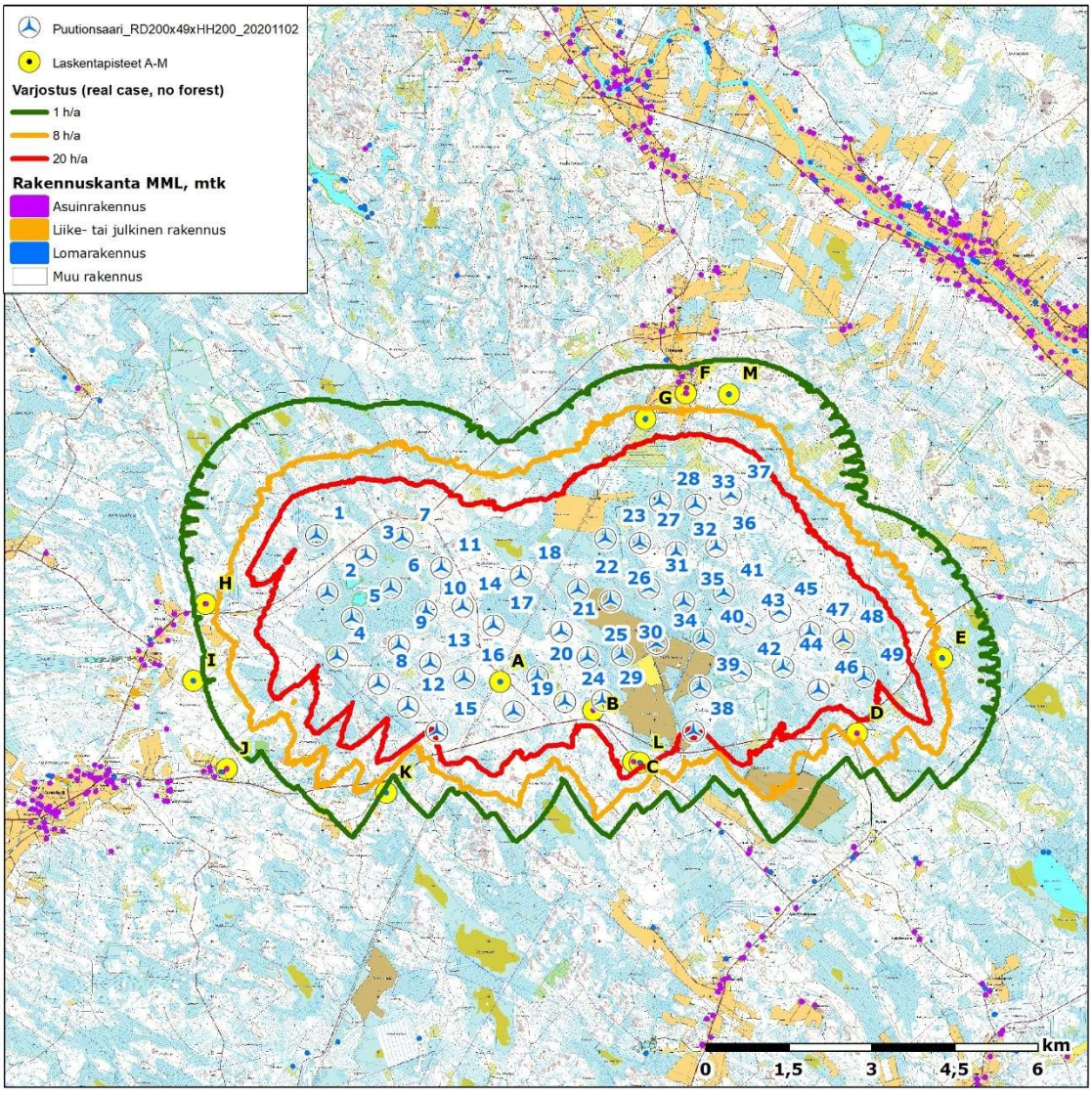
Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	Verraten Asumisterveysohjeen L eq,1h ohjearvoon sisällä	Hz	L eq,1h - Asumisterveys- ohje sisällä	Hz
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	-	-	Ei oteta huomioon	-
Autiotalo B (Ylivieskantie, Pöhlölä)	-	-	Ei oteta huomioon	-
Autiotalo C (Perkkiöntie 382)	9,1	63	0,8	50
Asuinrakennus D (Alakyläntie 243)	8,1	63	-0,2	50
Lomarakennus E (Kellokankaan metsätie)	5,3	63	-2,9	50
Asuinrakennus F (Ollilantie 112)	5,9	63	-2,3	50
Lomarakennus G (Ollilantie, Siliäkuru)	7,1	63	-1,1	50
Asuinrakennus H (Pinolantie 406)	5,8	63	-2,4	50
Asuinrakennus I (Kortenevantie 116)	5,4	63	-2,8	50
Asuinrakennus J (Haapavesitie 1406)	4,2	63	-4,0	50
Lomarakennus K (Kurunoja)	7,0	63	-1,2	50
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	9,0	63	0,7	50
Lomarakennus M (Riskalan metsatie)	5,5	63	-2,7	50

3.3 Varjostusmallinnuksen tulokset

3.3.1 Varjostusmallinnus

Tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia), ja lomarakennus G (12 tuntia 50 minuuttia) on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (26 tuntia 0 minuuttia). Mallinnuksessa ei otettu huomioon puustoa.



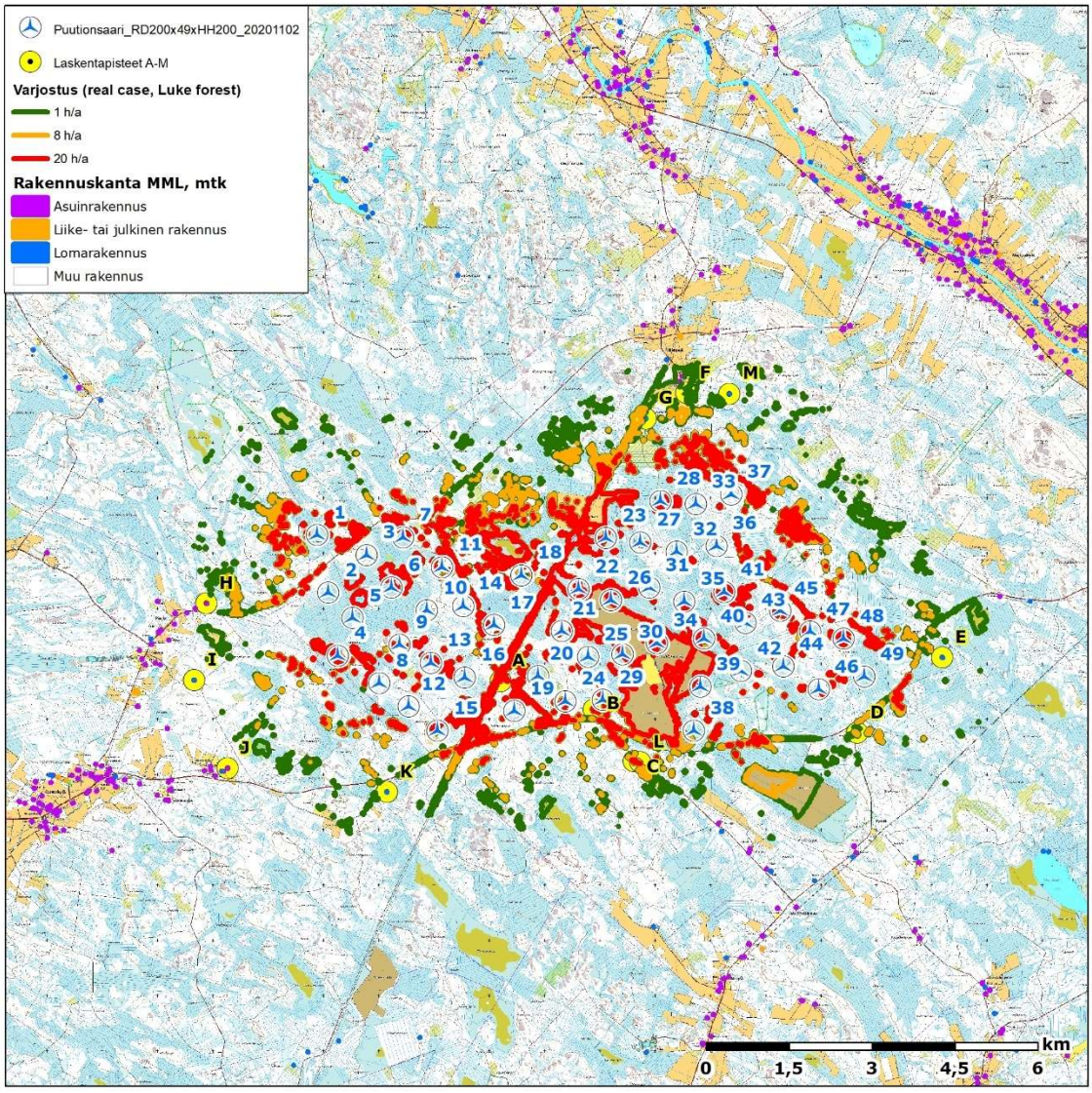
Kuva 3. Laskennalliset varjostusmallinnuksen tulokset ”real case, no forest”.

Taulukko 13. Laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutusta ei ole huomioitu "real case, no forest".

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	6:19
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	7:04
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	12:50
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	4:31
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	0:00
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	26:00
Lomarakennus M (Riskalan metsatie)	406348	7114887	102,7	6:35

Kun puuston suojaava vaikutus huomioitiin, tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia) on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (25 tuntia 16 minuuttia)



Kuva 4. Laskennalliset varjostusmallinnuksen tulokset ”real case, Luke forest”.

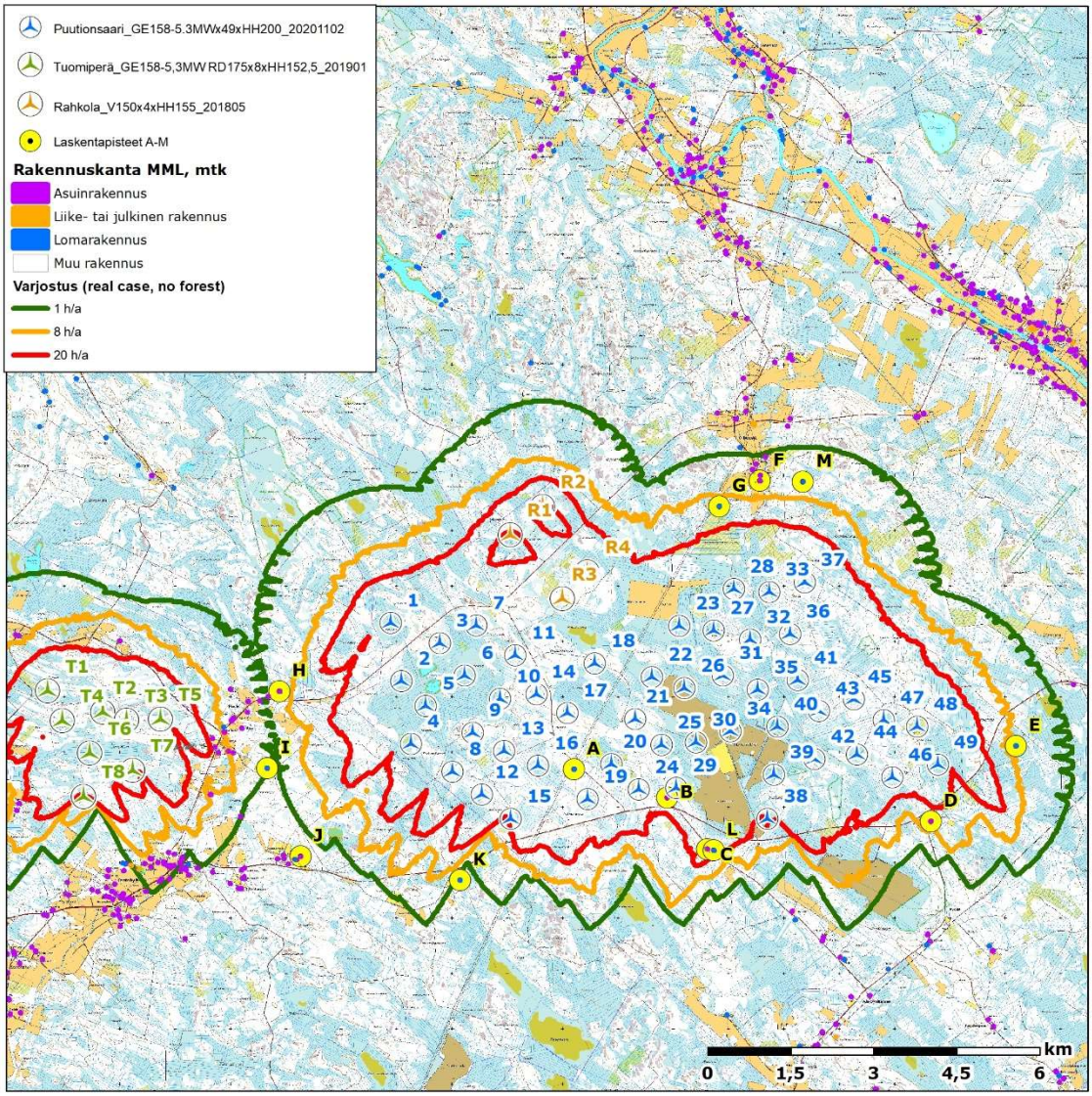
Taulukko 14. Laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutus on huomioitu ”real case, Luke forest”.

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	0:00
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	4:51
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	0:00
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	0:00
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	0:00
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	25:16
Lomarakennus M (Riskalan metsatie)	406348	7114887	102,7	0:00

3.3.2 Varjostuksen yhteismallinnus

Tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia), ja lomarakennus G (12 tuntia 50 minuuttia) on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (26 tuntia 0 minuuttia). Mallinnuksessa ei otettu huomioon puustoa.



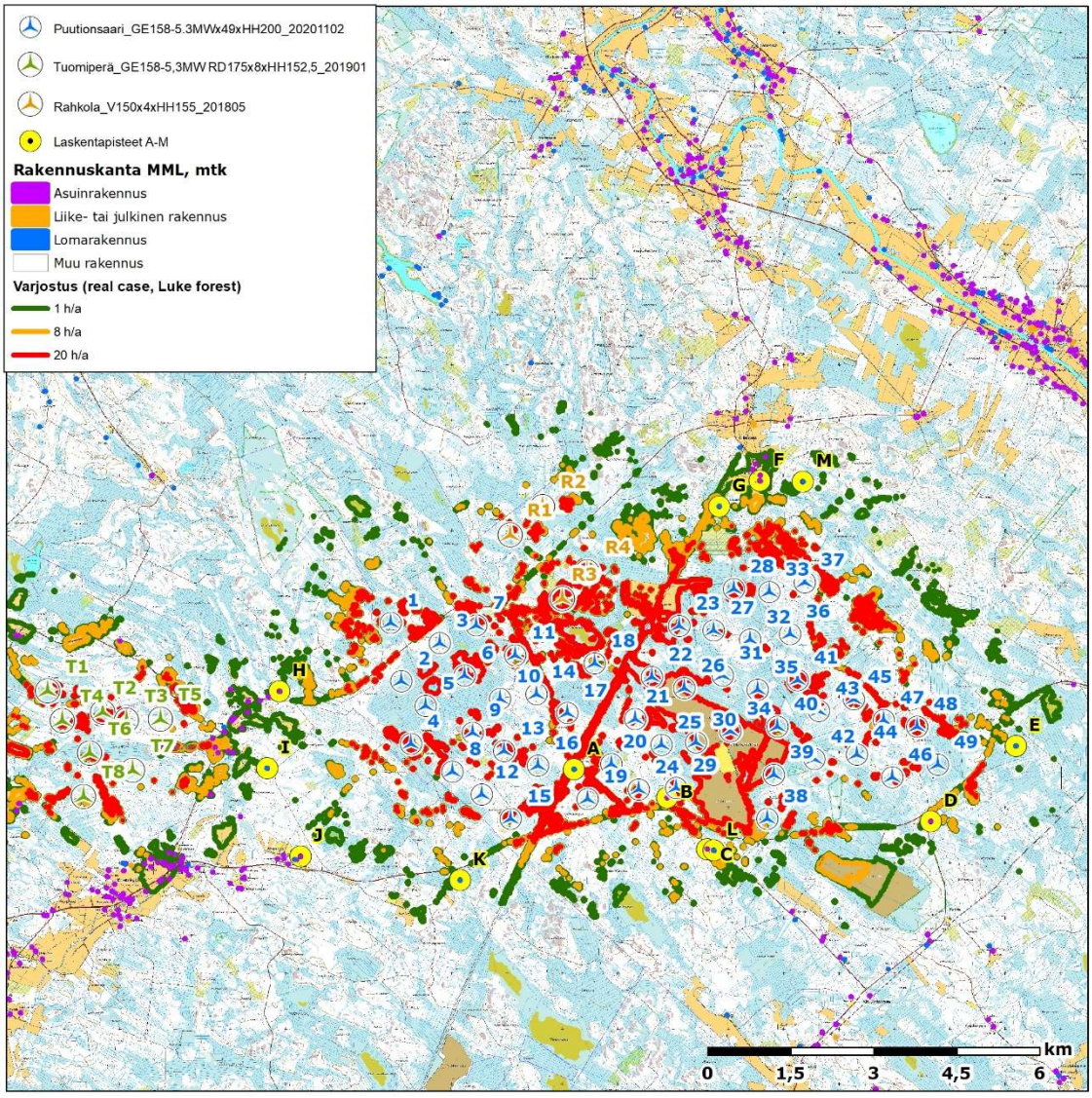
Kuva 4. Laskennalliset yhteisvarjostusmallinnuksen tulokset.

Taulukko 15. Yhteismallinnuksen laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutusta ei ole huomioitu "real case, no forest".

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	6:19
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	7:04
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	12:50
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	4:31
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	1:25
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	26:00
Lomarakennus M (Riskalan metsatie)	406348	7114887	102,7	6:35

Kun puuston suojaava vaikutus huomioitiin, tuulivoimapuistoa lähimpien asuin- ja lomarakennusten pihapiirissä kohteissa asuinrakennus D (12 tuntia 35 minuuttia), on varjostusvaikutusta yli 8 tuntia vuodessa.

Muissa kohteissa varjostusvaikutus ylittää 8 h vuodessa autiotalo C (30 tuntia 25 minuuttia) ja Muu käyttötarkoitus L (25 tuntia 16 minuuttia)



Kuva 5. Laskennalliset yhteisvarjostusmallinnuksen tulokset, kun huomioitiin puuston suojaava vaikutus.

Taulukko 16. Yhteismallinnuksen laskennalliset varjostustunnit vuodessa lähialueen laskentapisteissä, kun puuston suojaavaa vaikutus on huomioitu ”real case, Luke forest”.

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Kohteen korkeus-asema	Varjostus (h/a)
Metsästysmaja A (Vesiperän metsätie, Kivikaarto)	402212	7109691	-	Ei oteta huomioon
Autiotalo B (Ylivieskantie, Pöhlölä)	403894	7109182	-	Ei oteta huomioon
Autiotalo C (Perkkiöntie 382)	404620	7108247	113,6	30:25
Asuinrakennus D (Alakyläntie 243)	408659	7108752	119,4	12:35
Lomarakennus E (Kellokankaan metsätie)	410199	7110115	122,5	0:00
Asuinrakennus F (Ollilantie 112)	405573	7114900	87,7	4:51
Lomarakennus G (Ollilantie, Siliäkuru)	404837	7114441	100	0:00
Asuinrakennus H (Pinolantie 406)	396893	7111098	88,1	0:00
Asuinrakennus I (Kortenevantie 116)	396670	7109704	87,5	1:25
Asuinrakennus J (Haapavesitie 1406)	397273	7108116	89,3	0:00
Lomarakennus K (Kurunoja)	400152	7107685	102,3	0:00
Muu käyttötarkoitus L (Perkkiontie, Ilmola)	404739	7108222	113,7	25:16
Lomarakennus M (Riskalan metsatie)	406348	7114887	102,7	0:00

Laatija

FCG Suunnittelu ja tekniikka Oy

Tarkastaja

FCG Suunnittelu ja tekniikka Oy

Liite 1: Puutionsaari - Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2/2014

Project:
Puutionsaari_Riskalankangas_2020 0327

Description:
VSB

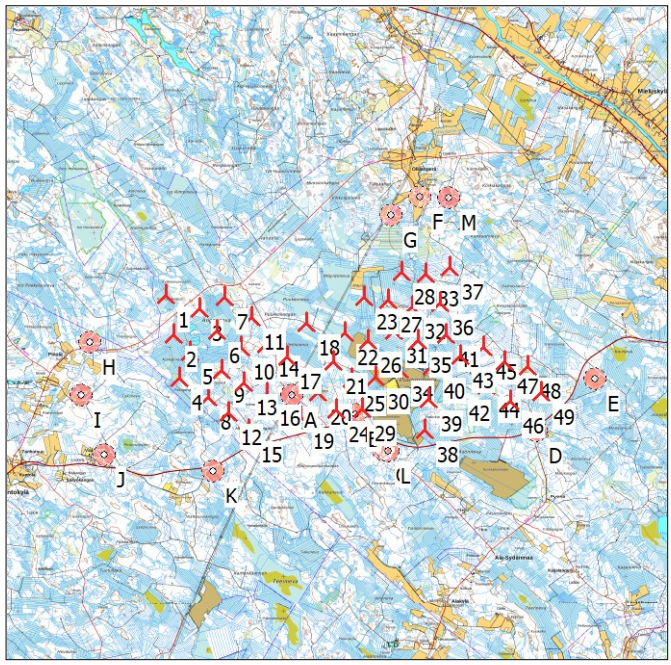
Licensed user:
FCG Suunnittelu ja tekniikka Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200_20201102

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (vesistot): (5)
Area type with hard ground: Vesistot
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:200 000

New WTG Noise sensitive area

WTGs

	East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]
1	398 896	7 112 332	92,5	PUU01	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
2	399 097	7 111 286	95,0	PUU02	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
3	399 784	7 111 972	97,5	PUU03	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
4	399 264	7 110 151	97,1	PUU04	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
5	399 536	7 110 832	96,4	PUU05	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
6	400 239	7 111 382	97,5	PUU06	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
7	400 444	7 112 292	97,0	PUU07	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
8	400 019	7 109 649	100,0	PUU08	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
9	400 380	7 110 348	100,0	PUU09	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
10	400 876	7 110 966	99,5	PUU10	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
11	401 152	7 111 752	100,0	PUU11	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
12	400 549	7 109 232	102,5	PUU12	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
13	400 953	7 110 020	102,5	PUU13	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
14	401 537	7 111 046	104,5	PUU14	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
15	401 068	7 108 792	105,3	PUU15	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
16	401 564	7 109 758	103,4	PUU16	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
17	402 089	7 110 702	107,5	PUU17	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
18	402 589	7 111 603	106,8	PUU18	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
19	402 455	7 109 148	112,5	PUU19	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
20	402 889	7 109 778	110,0	PUU20	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
21	403 318	7 110 593	108,0	PUU21	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
22	403 622	7 111 352	106,9	PUU22	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
23	404 117	7 112 276	103,6	PUU23	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
24	403 379	7 109 327	115,0	PUU24	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
25	403 790	7 110 129	108,4	PUU25	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
26	404 210	7 111 152	105,6	PUU26	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
27	404 739	7 112 199	105,0	PUU27	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
28	405 100	7 112 943	100,4	PUU28	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
29	404 061	7 109 351	110,0	PUU29	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
30	404 420	7 110 174	107,1	PUU30	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
31	404 900	7 111 381	105,1	PUU31	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
32	405 395	7 112 030	102,4	PUU32	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
33	405 740	7 112 891	100,2	PUU33	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
34	405 042	7 110 380	105,8	PUU34	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
35	405 532	7 111 130	103,9	PUU35	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
36	406 114	7 112 133	103,1	PUU36	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
37	406 380	7 113 067	107,2	PUU37	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
38	405 707	7 108 791	110,8	PUU38	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
39	405 822	7 109 587	108,8	PUU39	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
40	405 893	7 110 455	104,9	PUU40	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
41	406 257	7 111 298	103,9	PUU41	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
42	406 558	7 109 872	106,6	PUU42	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0

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Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200_20201102

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	East	North	Z [m]	WTG type Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]
43	406 638	7 110 744	105,9	PUU43	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
44	407 324	7 109 954	108,4	PUU44	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
45	407 269	7 110 957	112,6	PUU45	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
46	407 963	7 109 542	113,6	PUU46	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
47	407 809	7 110 582	116,1	PUU47	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
48	408 414	7 110 457	120,0	PUU48	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
49	408 786	7 109 772	117,5	PUU49	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0

Calculation Results

Sound level

Noise sensitive area					Demands	Sound level		
No.	Name	East	North	Z [m]	Immission height [m]	Noise [dB(A)]	From WTGs [dB(A)]	Distance to noise demand [m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	4,0	40,0	46,4	-1 555
B	Autiotalo B (Ylivieskantie, Pöhlölä)	403 894	7 109 182	114,4	4,0	40,0	49,4	-945
C	Autiotalo C (Perkkiöntie 382)	404 620	7 108 247	113,8	4,0	40,0	39,8	48
D	Asuinrakennus D (Alakyläntie 243)	408 659	7 108 752	119,4	4,0	40,0	39,5	56
E	Lomarakennus E (Kellokankaan metsätie)	410 199	7 110 115	122,5	4,0	40,0	35,1	651
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	4,0	40,0	34,6	920
G	Lomarakennus G (Ollilantie, Siliäkuru)	404 837	7 114 441	100,0	4,0	40,0	36,5	554
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	4,0	40,0	32,9	1 268
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	4,0	40,0	31,2	1 726
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	4,0	40,0	30,5	1 946
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	4,0	40,0	36,8	487
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	4,0	40,0	39,7	55
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	4,0	40,0	34,3	929

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
1	4239	5908	7032	10398	11518	7154	6304	2353	3444	4518	4813	7143	7877
2	3500	5238	6304	9892	11164	7417	6550	2212	2897	3657	3752	6420	8096
3	3332	4968	6104	9441	10579	6488	5624	3021	3852	4602	4302	6214	7182
4	2984	4730	5684	9498	10935	7897	7033	2553	2632	2847	2621	5805	8521
5	2909	4660	5703	9357	10687	7280	6413	2657	3080	3535	3206	5821	7927
6	2599	4266	5387	8821	10040	6390	5523	3359	3944	4412	3698	5498	7043
7	3145	4645	5814	8945	9995	5754	4891	3747	4576	5244	4616	5917	6449
8	2193	3903	4810	8686	10191	7644	6795	3446	3349	3145	1968	4931	8215
9	1946	3702	4732	8431	9822	6906	6051	3567	3765	3826	2672	4849	7498
10	1847	3506	4627	8091	9362	6127	5269	3986	4391	4594	3360	4738	6732
11	2318	3758	4931	8084	9194	5428	4562	4309	4928	5317	4188	5032	6068
12	1725	3345	4188	8124	9690	7575	6747	4105	3908	3461	1597	4310	8100
13	1301	3058	4073	7809	9247	6720	5885	4201	4295	4144	2468	4191	7266
14	1514	3005	4164	7482	8712	5581	4735	4645	5049	5174	3635	4269	6156
15	1455	2853	3593	7591	9226	7590	6791	4770	4492	3855	1437	3715	8064
16	651	2400	3409	7166	8642	6521	5714	4860	4894	4595	2508	3527	7014
17	1019	2360	3526	6853	8131	5456	4640	5211	5510	5467	3585	3629	5971
18	1949	2750	3923	6706	7754	4447	3621	5719	6216	6358	4614	4006	4991
19	595	1439	2345	6216	7804	6543	5804	5894	5812	5284	2728	2464	6935
20	683	1168	2311	5860	7318	5783	5054	6140	6219	5857	3446	2417	6170
21	1428	1524	2683	5649	6898	4862	4137	6445	6707	6533	4299	2764	5255
22	2179	2187	3261	5668	6692	4049	3319	6734	7145	7126	5048	3323	4464
23	3212	3102	4060	5748	6454	3001	2282	7320	7879	8009	6066	4101	3434
24	1222	535	1645	5311	6865	5990	5318	6724	6720	6225	3621	1752	6303
25	1638	953	2057	5060	6409	5094	4437	6965	7133	6821	4383	2130	5402
26	2476	1995	2934	5055	6078	3989	3348	7318	7678	7573	5337	2977	4304
27	3561	3133	3954	5219	5844	2827	2244	7923	8446	8510	6436	3977	3133
28	4350	3950	4721	5498	5831	2014	1521	8412	9031	9196	7220	4734	2310
29	1880	238	1237	4636	6185	5752	5149	7378	7399	6900	4249	1316	5990
30	2260	1123	1937	4471	5779	4865	4287	7584	7764	7438	4941	1977	5092
31	3175	2418	3147	4587	5448	3583	3061	8012	8399	8297	6017	3163	3793
32	3950	3219	3862	4625	5172	2876	2475	8553	9030	9016	6809	3864	3012
33	4763	4143	4777	5064	5252	2016	1794	9027	9614	9721	7637	4775	2087
34	2913	1659	2174	3966	5164	4552	4066	8181	8399	8092	5584	2179	4692

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DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200_20201102

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WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
35	3619	2545	3024	3928	4776	3771	3383	8640	8976	8792	6388	3014	3845
36	4604	3693	4163	4231	4556	2820	2638	9279	9751	9711	7438	4145	2764
37	5364	4612	5131	4879	4827	2003	2066	9690	10276	10366	8231	5115	1820
38	3609	1855	1216	2952	4683	6111	5717	9111	9083	8461	5664	1123	6130
39	3612	1970	1800	2957	4409	5319	4953	9056	9153	8675	5981	1742	5326
40	3760	2370	2549	3248	4319	4457	4124	9023	9253	8932	6374	2513	4455
41	4353	3172	3463	3500	4116	3667	3449	9367	9719	9531	7094	3430	3590
42	4350	2752	2529	2380	3649	5124	4882	9743	9889	9450	6769	2456	5020
43	4550	3157	3211	2837	3616	4291	4112	9752	10022	9727	7171	3157	4153
44	5119	3516	3198	1796	2880	5247	5130	10494	10657	10218	7522	3112	5029
45	5213	3813	3790	2606	3049	4293	4249	10377	10673	10392	7833	3726	4037
46	5753	4085	3585	1052	2308	5867	5811	11179	11294	10785	8029	3484	5584
47	5668	4158	3953	2017	2435	4863	4871	10929	11174	10821	8187	3872	4546
48	6249	4696	4391	1722	1817	5274	5354	11539	11768	11385	8715	4301	4888
49	6575	4927	4436	1028	1454	6052	6115	11967	12116	11632	8883	4334	5667

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Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Laskentapiste A (Metsästysmaja)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 239	4 243	**16,39**	106,0	2	0,00	83,55	-	-	0,00	0,00	-
10	1 847	1 856	**27,56**	106,0	2	0,00	76,37	-	-	0,00	0,00	-
11	2 318	2 325	**24,63**	106,0	2	0,00	78,33	-	-	0,00	0,00	-
12	1 725	1 735	**28,42**	106,0	2	0,00	75,79	-	-	0,00	0,00	-
13	1 301	1 314	**31,84**	106,0	2	0,00	73,37	-	-	0,00	0,00	-
14	1 514	1 526	**30,02**	106,0	2	0,00	74,67	-	-	0,00	0,00	-
15	1 455	1 467	**30,51**	106,0	2	0,00	74,33	-	-	0,00	0,00	-
16	651	678	**39,42**	106,0	2	0,00	67,62	-	-	0,00	0,00	-
17	1 019	1 037	**34,65**	106,0	2	0,00	71,31	-	-	0,00	0,00	-
18	1 949	1 959	**26,87**	106,0	2	0,00	76,84	-	-	0,00	0,00	-
19	595	626	**40,28**	106,0	2	0,00	66,93	-	-	0,00	0,00	-
2	3 500	3 504	**19,06**	106,0	2	0,00	81,89	-	-	0,00	0,00	-
20	683	710	**38,92**	106,0	2	0,00	68,02	-	-	0,00	0,00	-
21	1 428	1 440	**30,73**	106,0	2	0,00	74,17	-	-	0,00	0,00	-
22	2 179	2 187	**25,44**	106,0	2	0,00	77,80	-	-	0,00	0,00	-
23	3 212	3 217	**20,25**	106,0	2	0,00	81,15	-	-	0,00	0,00	-
24	1 222	1 239	**32,56**	106,0	2	0,00	72,86	-	-	0,00	0,00	-
25	1 638	1 649	**29,05**	106,0	2	0,00	75,35	-	-	0,00	0,00	-
26	2 476	2 483	**23,76**	106,0	2	0,00	78,90	-	-	0,00	0,00	-
27	3 561	3 566	**18,82**	106,0	2	0,00	82,04	-	-	0,00	0,00	-
28	4 350	4 354	**16,03**	106,0	2	0,00	83,78	-	-	0,00	0,00	-
29	1 880	1 890	**27,33**	106,0	2	0,00	76,53	-	-	0,00	0,00	-
3	3 332	3 336	**19,74**	106,0	2	0,00	81,47	-	-	0,00	0,00	-
30	2 260	2 268	**24,96**	106,0	2	0,00	78,11	-	-	0,00	0,00	-
31	3 175	3 181	**20,40**	106,0	2	0,00	81,05	-	-	0,00	0,00	-
32	3 950	3 955	**17,38**	106,0	2	0,00	82,94	-	-	0,00	0,00	-
33	4 763	4 767	**14,75**	106,0	2	0,00	84,56	-	-	0,00	0,00	-
34	2 913	2 919	**21,58**	106,0	2	0,00	80,30	-	-	0,00	0,00	-
35	3 619	3 624	**18,60**	106,0	2	0,00	82,18	-	-	0,00	0,00	-
36	4 604	4 607	**15,23**	106,0	2	0,00	84,27	-	-	0,00	0,00	-
37	5 364	5 368	**13,07**	106,0	2	0,00	85,60	-	-	0,00	0,00	-
38	3 609	3 614	**18,63**	106,0	2	0,00	82,16	-	-	0,00	0,00	-
39	3 612	3 617	**18,62**	106,0	2	0,00	82,17	-	-	0,00	0,00	-
4	2 984	2 989	**21,25**	106,0	2	0,00	80,51	-	-	0,00	0,00	-
40	3 760	3 764	**18,07**	106,0	2	0,00	82,51	-	-	0,00	0,00	-
41	4 353	4 357	**16,02**	106,0	2	0,00	83,78	-	-	0,00	0,00	-
42	4 350	4 354	**16,02**	106,0	2	0,00	83,78	-	-	0,00	0,00	-
43	4 550	4 554	**15,39**	106,0	2	0,00	84,17	-	-	0,00	0,00	-
44	5 119	5 123	**13,73**	106,0	2	0,00	85,19	-	-	0,00	0,00	-
45	5 213	5 217	**13,48**	106,0	2	0,00	85,35	-	-	0,00	0,00	-
46	5 753	5 756	**12,09**	106,0	2	0,00	86,20	-	-	0,00	0,00	-
47	5 668	5 671	**12,30**	106,0	2	0,00	86,07	-	-	0,00	0,00	-
48	6 249	6 253	**10,97**	106,0	2	0,00	86,92	-	-	0,00	0,00	-

To be continued on next page...

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
49	6 575	6 578	**10,36**	106,0	2	0,00	87,36	-	-	0,00	0,00	-
5	2 909	2 915	**21,60**	106,0	2	0,00	80,29	-	-	0,00	0,00	-
6	2 599	2 605	**23,12**	106,0	2	0,00	79,32	-	-	0,00	0,00	-
7	3 145	3 150	**20,53**	106,0	2	0,00	80,97	-	-	0,00	0,00	-
8	2 193	2 201	**25,36**	106,0	2	0,00	77,85	-	-	0,00	0,00	-
9	1 946	1 955	**26,90**	106,0	2	0,00	76,82	-	-	0,00	0,00	-
Sum			**46,42**									

- Data undefined due to calculation with octave data

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 908	5 910	**11,72**	106,0	2	0,00	86,43	-	-	0,00	0,00	-
10	3 506	3 511	**19,04**	106,0	2	0,00	81,91	-	-	0,00	0,00	-
11	3 758	3 763	**18,07**	106,0	2	0,00	82,51	-	-	0,00	0,00	-
12	3 345	3 350	**19,68**	106,0	2	0,00	81,50	-	-	0,00	0,00	-
13	3 058	3 064	**20,92**	106,0	2	0,00	80,72	-	-	0,00	0,00	-
14	3 005	3 011	**21,15**	106,0	2	0,00	80,57	-	-	0,00	0,00	-
15	2 853	2 859	**21,86**	106,0	2	0,00	80,12	-	-	0,00	0,00	-
16	2 400	2 407	**24,17**	106,0	2	0,00	78,63	-	-	0,00	0,00	-
17	2 360	2 367	**24,39**	106,0	2	0,00	78,49	-	-	0,00	0,00	-
18	2 750	2 757	**22,35**	106,0	2	0,00	79,81	-	-	0,00	0,00	-
19	1 439	1 452	**30,63**	106,0	2	0,00	74,24	-	-	0,00	0,00	-
2	5 238	5 241	**13,41**	106,0	2	0,00	85,39	-	-	0,00	0,00	-
20	1 168	1 184	**33,09**	106,0	2	0,00	72,47	-	-	0,00	0,00	-
21	1 524	1 536	**29,94**	106,0	2	0,00	74,73	-	-	0,00	0,00	-
22	2 187	2 195	**25,39**	106,0	2	0,00	77,83	-	-	0,00	0,00	-
23	3 102	3 108	**20,72**	106,0	2	0,00	80,85	-	-	0,00	0,00	-
24	535	570	**41,28**	106,0	2	0,00	66,12	-	-	0,00	0,00	-
25	953	971	**35,40**	106,0	2	0,00	70,75	-	-	0,00	0,00	-
26	1 995	2 004	**26,58**	106,0	2	0,00	77,04	-	-	0,00	0,00	-
27	3 133	3 139	**20,58**	106,0	2	0,00	80,93	-	-	0,00	0,00	-
28	3 950	3 954	**17,38**	106,0	2	0,00	82,94	-	-	0,00	0,00	-
29	238	305	**47,66**	106,0	2	0,00	60,69	-	-	0,00	0,00	-
3	4 968	4 971	**14,16**	106,0	2	0,00	84,93	-	-	0,00	0,00	-
30	1 123	1 139	**33,55**	106,0	2	0,00	72,13	-	-	0,00	0,00	-
31	2 418	2 425	**24,07**	106,0	2	0,00	78,70	-	-	0,00	0,00	-
32	3 219	3 225	**20,21**	106,0	2	0,00	81,17	-	-	0,00	0,00	-
33	4 143	4 147	**16,71**	106,0	2	0,00	83,35	-	-	0,00	0,00	-
34	1 659	1 670	**28,90**	106,0	2	0,00	75,45	-	-	0,00	0,00	-
35	2 545	2 552	**23,39**	106,0	2	0,00	79,14	-	-	0,00	0,00	-
36	3 693	3 697	**18,32**	106,0	2	0,00	82,36	-	-	0,00	0,00	-
37	4 612	4 616	**15,20**	106,0	2	0,00	84,29	-	-	0,00	0,00	-
38	1 855	1 865	**27,50**	106,0	2	0,00	76,41	-	-	0,00	0,00	-
39	1 970	1 979	**26,74**	106,0	2	0,00	76,93	-	-	0,00	0,00	-
4	4 730	4 734	**14,85**	106,0	2	0,00	84,50	-	-	0,00	0,00	-
40	2 370	2 377	**24,34**	106,0	2	0,00	78,52	-	-	0,00	0,00	-
41	3 172	3 177	**20,42**	106,0	2	0,00	81,04	-	-	0,00	0,00	-
42	2 752	2 758	**22,35**	106,0	2	0,00	79,81	-	-	0,00	0,00	-
43	3 157	3 163	**20,48**	106,0	2	0,00	81,00	-	-	0,00	0,00	-
44	3 516	3 521	**19,00**	106,0	2	0,00	81,93	-	-	0,00	0,00	-
45	3 813	3 818	**17,87**	106,0	2	0,00	82,64	-	-	0,00	0,00	-
46	4 085	4 090	**16,91**	106,0	2	0,00	83,23	-	-	0,00	0,00	-
47	4 158	4 162	**16,66**	106,0	2	0,00	83,39	-	-	0,00	0,00	-
48	4 696	4 701	**14,95**	106,0	2	0,00	84,44	-	-	0,00	0,00	-
49	4 927	4 931	**14,27**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
5	4 660	4 663	**15,06**	106,0	2	0,00	84,37	-	-	0,00	0,00	-
6	4 266	4 270	**16,30**	106,0	2	0,00	83,61	-	-	0,00	0,00	-
7	4 645	4 648	**15,10**	106,0	2	0,00	84,35	-	-	0,00	0,00	-
8	3 903	3 907	**17,54**	106,0	2	0,00	82,84	-	-	0,00	0,00	-
9	3 702	3 707	**18,28**	106,0	2	0,00	82,38	-	-	0,00	0,00	-
Sum			**49,44**									

- Data undefined due to calculation with octave data

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise sensitive area: C Laskentapiste C (Perkkiöntie 382)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 032	7 034	**9,55**	106,0	2	0,00	87,94	-	-	0,00	0,00	-
10	4 627	4 631	**15,16**	106,0	2	0,00	84,31	-	-	0,00	0,00	-
11	4 931	4 934	**14,26**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
12	4 188	4 192	**16,56**	106,0	2	0,00	83,45	-	-	0,00	0,00	-
13	4 073	4 077	**16,95**	106,0	2	0,00	83,21	-	-	0,00	0,00	-
14	4 164	4 168	**16,64**	106,0	2	0,00	83,40	-	-	0,00	0,00	-
15	3 593	3 598	**18,69**	106,0	2	0,00	82,12	-	-	0,00	0,00	-
16	3 409	3 414	**19,42**	106,0	2	0,00	81,67	-	-	0,00	0,00	-
17	3 526	3 531	**18,96**	106,0	2	0,00	81,96	-	-	0,00	0,00	-
18	3 923	3 927	**17,47**	106,0	2	0,00	82,88	-	-	0,00	0,00	-
19	2 345	2 353	**24,47**	106,0	2	0,00	78,43	-	-	0,00	0,00	-
2	6 304	6 306	**10,86**	106,0	2	0,00	87,00	-	-	0,00	0,00	-
20	2 311	2 319	**24,67**	106,0	2	0,00	78,31	-	-	0,00	0,00	-
21	2 683	2 690	**22,69**	106,0	2	0,00	79,59	-	-	0,00	0,00	-
22	3 261	3 267	**20,03**	106,0	2	0,00	81,28	-	-	0,00	0,00	-
23	4 060	4 065	**16,99**	106,0	2	0,00	83,18	-	-	0,00	0,00	-
24	1 645	1 657	**29,00**	106,0	2	0,00	75,39	-	-	0,00	0,00	-
25	2 057	2 066	**26,18**	106,0	2	0,00	77,30	-	-	0,00	0,00	-
26	2 934	2 940	**21,48**	106,0	2	0,00	80,37	-	-	0,00	0,00	-
27	3 954	3 958	**17,36**	106,0	2	0,00	82,95	-	-	0,00	0,00	-
28	4 721	4 724	**14,88**	106,0	2	0,00	84,49	-	-	0,00	0,00	-
29	1 237	1 252	**32,42**	106,0	2	0,00	72,95	-	-	0,00	0,00	-
3	6 104	6 107	**11,25**	106,0	2	0,00	86,72	-	-	0,00	0,00	-
30	1 937	1 947	**26,95**	106,0	2	0,00	76,79	-	-	0,00	0,00	-
31	3 147	3 152	**20,53**	106,0	2	0,00	80,97	-	-	0,00	0,00	-
32	3 862	3 866	**17,69**	106,0	2	0,00	82,75	-	-	0,00	0,00	-
33	4 777	4 781	**14,71**	106,0	2	0,00	84,59	-	-	0,00	0,00	-
34	2 174	2 183	**25,46**	106,0	2	0,00	77,78	-	-	0,00	0,00	-
35	3 024	3 030	**21,07**	106,0	2	0,00	80,63	-	-	0,00	0,00	-
36	4 163	4 168	**16,64**	106,0	2	0,00	83,40	-	-	0,00	0,00	-
37	5 131	5 135	**13,70**	106,0	2	0,00	85,21	-	-	0,00	0,00	-
38	1 216	1 231	**32,63**	106,0	2	0,00	72,80	-	-	0,00	0,00	-
39	1 800	1 810	**27,88**	106,0	2	0,00	76,16	-	-	0,00	0,00	-
4	5 684	5 687	**12,26**	106,0	2	0,00	86,10	-	-	0,00	0,00	-
40	2 549	2 556	**23,37**	106,0	2	0,00	79,15	-	-	0,00	0,00	-
41	3 463	3 468	**19,21**	106,0	2	0,00	81,80	-	-	0,00	0,00	-
42	2 529	2 536	**23,48**	106,0	2	0,00	79,08	-	-	0,00	0,00	-
43	3 211	3 216	**20,25**	106,0	2	0,00	81,15	-	-	0,00	0,00	-
44	3 198	3 204	**20,30**	106,0	2	0,00	81,11	-	-	0,00	0,00	-
45	3 790	3 795	**17,95**	106,0	2	0,00	82,58	-	-	0,00	0,00	-
46	3 585	3 591	**18,72**	106,0	2	0,00	82,10	-	-	0,00	0,00	-
47	3 953	3 958	**17,37**	106,0	2	0,00	82,95	-	-	0,00	0,00	-
48	4 391	4 395	**15,89**	106,0	2	0,00	83,86	-	-	0,00	0,00	-
49	4 436	4 441	**15,75**	106,0	2	0,00	83,95	-	-	0,00	0,00	-
5	5 703	5 706	**12,21**	106,0	2	0,00	86,13	-	-	0,00	0,00	-
6	5 387	5 390	**13,01**	106,0	2	0,00	85,63	-	-	0,00	0,00	-
7	5 814	5 817	**11,94**	106,0	2	0,00	86,29	-	-	0,00	0,00	-
8	4 810	4 813	**14,61**	106,0	2	0,00	84,65	-	-	0,00	0,00	-
9	4 732	4 735	**14,84**	106,0	2	0,00	84,51	-	-	0,00	0,00	-
Sum			**39,75**									

- Data undefined due to calculation with octave data

Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	10 398	10 400	**4,81**	106,0	2	0,00	91,34	-	-	0,00	0,00	-
10	8 091	8 093	**7,85**	106,0	2	0,00	89,16	-	-	0,00	0,00	-
11	8 084	8 086	**7,86**	106,0	2	0,00	89,15	-	-	0,00	0,00	-
12	8 124	8 126	**7,80**	106,0	2	0,00	89,20	-	-	0,00	0,00	-
13	7 809	7 811	**8,28**	106,0	2	0,00	88,85	-	-	0,00	0,00	-
14	7 482	7 484	**8,80**	106,0	2	0,00	88,48	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
15	7 591	7 593	**8,62**	106,0	2	0,00	88,61	-	-	0,00	0,00	-
16	7 166	7 168	**9,32**	106,0	2	0,00	88,11	-	-	0,00	0,00	-
17	6 853	6 855	**9,86**	106,0	2	0,00	87,72	-	-	0,00	0,00	-
18	6 706	6 708	**10,12**	106,0	2	0,00	87,53	-	-	0,00	0,00	-
19	6 216	6 219	**11,03**	106,0	2	0,00	86,87	-	-	0,00	0,00	-
2	9 892	9 893	**5,43**	106,0	2	0,00	90,91	-	-	0,00	0,00	-
20	5 860	5 863	**11,83**	106,0	2	0,00	86,36	-	-	0,00	0,00	-
21	5 649	5 652	**12,35**	106,0	2	0,00	86,04	-	-	0,00	0,00	-
22	5 668	5 671	**12,30**	106,0	2	0,00	86,07	-	-	0,00	0,00	-
23	5 748	5 751	**12,10**	106,0	2	0,00	86,20	-	-	0,00	0,00	-
24	5 311	5 314	**13,21**	106,0	2	0,00	85,51	-	-	0,00	0,00	-
25	5 060	5 063	**13,90**	106,0	2	0,00	85,09	-	-	0,00	0,00	-
26	5 055	5 058	**13,91**	106,0	2	0,00	85,08	-	-	0,00	0,00	-
27	5 219	5 223	**13,46**	106,0	2	0,00	85,36	-	-	0,00	0,00	-
28	5 498	5 501	**12,73**	106,0	2	0,00	85,81	-	-	0,00	0,00	-
29	4 636	4 640	**15,13**	106,0	2	0,00	84,33	-	-	0,00	0,00	-
3	9 441	9 442	**5,98**	106,0	2	0,00	90,50	-	-	0,00	0,00	-
30	4 471	4 475	**15,64**	106,0	2	0,00	84,01	-	-	0,00	0,00	-
31	4 587	4 590	**15,28**	106,0	2	0,00	84,24	-	-	0,00	0,00	-
32	4 625	4 629	**15,16**	106,0	2	0,00	84,31	-	-	0,00	0,00	-
33	5 064	5 067	**13,89**	106,0	2	0,00	85,10	-	-	0,00	0,00	-
34	3 966	3 970	**17,32**	106,0	2	0,00	82,98	-	-	0,00	0,00	-
35	3 928	3 932	**17,46**	106,0	2	0,00	82,89	-	-	0,00	0,00	-
36	4 231	4 235	**16,41**	106,0	2	0,00	83,54	-	-	0,00	0,00	-
37	4 879	4 883	**14,41**	106,0	2	0,00	84,77	-	-	0,00	0,00	-
38	2 952	2 958	**21,40**	106,0	2	0,00	80,42	-	-	0,00	0,00	-
39	2 957	2 963	**21,37**	106,0	2	0,00	80,43	-	-	0,00	0,00	-
4	9 498	9 500	**5,90**	106,0	2	0,00	90,55	-	-	0,00	0,00	-
40	3 248	3 253	**20,09**	106,0	2	0,00	81,25	-	-	0,00	0,00	-
41	3 500	3 504	**19,06**	106,0	2	0,00	81,89	-	-	0,00	0,00	-
42	2 380	2 387	**24,28**	106,0	2	0,00	78,56	-	-	0,00	0,00	-
43	2 837	2 843	**21,94**	106,0	2	0,00	80,08	-	-	0,00	0,00	-
44	1 796	1 805	**27,91**	106,0	2	0,00	76,13	-	-	0,00	0,00	-
45	2 606	2 613	**23,08**	106,0	2	0,00	79,34	-	-	0,00	0,00	-
46	1 052	1 069	**34,29**	106,0	2	0,00	71,58	-	-	0,00	0,00	-
47	2 017	2 026	**26,43**	106,0	2	0,00	77,13	-	-	0,00	0,00	-
48	1 722	1 733	**28,43**	106,0	2	0,00	75,78	-	-	0,00	0,00	-
49	1 028	1 046	**34,55**	106,0	2	0,00	71,39	-	-	0,00	0,00	-
5	9 357	9 358	**6,09**	106,0	2	0,00	90,42	-	-	0,00	0,00	-
6	8 821	8 822	**6,80**	106,0	2	0,00	89,91	-	-	0,00	0,00	-
7	8 945	8 947	**6,63**	106,0	2	0,00	90,03	-	-	0,00	0,00	-
8	8 686	8 688	**6,99**	106,0	2	0,00	89,78	-	-	0,00	0,00	-
9	8 431	8 433	**7,35**	106,0	2	0,00	89,52	-	-	0,00	0,00	-
Sum			**39,55**									

- Data undefined due to calculation with octave data

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	11 518	11 520	**3,57**	106,0	2	0,00	92,23	-	-	0,00	0,00	-
10	9 362	9 363	**6,08**	106,0	2	0,00	90,43	-	-	0,00	0,00	-
11	9 194	9 196	**6,30**	106,0	2	0,00	90,27	-	-	0,00	0,00	-
12	9 690	9 692	**5,66**	106,0	2	0,00	90,73	-	-	0,00	0,00	-
13	9 246	9 248	**6,23**	106,0	2	0,00	90,32	-	-	0,00	0,00	-
14	8 712	8 714	**6,95**	106,0	2	0,00	89,80	-	-	0,00	0,00	-
15	9 226	9 228	**6,26**	106,0	2	0,00	90,30	-	-	0,00	0,00	-
16	8 642	8 644	**7,05**	106,0	2	0,00	89,73	-	-	0,00	0,00	-
17	8 131	8 133	**7,79**	106,0	2	0,00	89,21	-	-	0,00	0,00	-
18	7 754	7 756	**8,36**	106,0	2	0,00	88,79	-	-	0,00	0,00	-
19	7 804	7 806	**8,29**	106,0	2	0,00	88,85	-	-	0,00	0,00	-
2	11 164	11 165	**3,96**	106,0	2	0,00	91,96	-	-	0,00	0,00	-
20	7 318	7 320	**9,07**	106,0	2	0,00	88,29	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
21	6 898	6 900	**9,78**	106,0	2	0,00	87,78	-	-	0,00	0,00	-
22	6 692	6 695	**10,14**	106,0	2	0,00	87,51	-	-	0,00	0,00	-
23	6 454	6 457	**10,58**	106,0	2	0,00	87,20	-	-	0,00	0,00	-
24	6 865	6 868	**9,84**	106,0	2	0,00	87,74	-	-	0,00	0,00	-
25	6 409	6 412	**10,66**	106,0	2	0,00	87,14	-	-	0,00	0,00	-
26	6 078	6 081	**11,32**	106,0	2	0,00	86,68	-	-	0,00	0,00	-
27	5 844	5 847	**11,87**	106,0	2	0,00	86,34	-	-	0,00	0,00	-
28	5 831	5 833	**11,90**	106,0	2	0,00	86,32	-	-	0,00	0,00	-
29	6 185	6 188	**11,09**	106,0	2	0,00	86,83	-	-	0,00	0,00	-
3	10 579	10 581	**4,60**	106,0	2	0,00	91,49	-	-	0,00	0,00	-
30	5 779	5 782	**12,02**	106,0	2	0,00	86,24	-	-	0,00	0,00	-
31	5 448	5 451	**12,86**	106,0	2	0,00	85,73	-	-	0,00	0,00	-
32	5 172	5 175	**13,59**	106,0	2	0,00	85,28	-	-	0,00	0,00	-
33	5 252	5 255	**13,37**	106,0	2	0,00	85,41	-	-	0,00	0,00	-
34	5 164	5 167	**13,61**	106,0	2	0,00	85,26	-	-	0,00	0,00	-
35	4 776	4 779	**14,71**	106,0	2	0,00	84,59	-	-	0,00	0,00	-
36	4 556	4 560	**15,38**	106,0	2	0,00	84,18	-	-	0,00	0,00	-
37	4 827	4 830	**14,56**	106,0	2	0,00	84,68	-	-	0,00	0,00	-
38	4 683	4 687	**14,99**	106,0	2	0,00	84,42	-	-	0,00	0,00	-
39	4 409	4 413	**15,84**	106,0	2	0,00	83,89	-	-	0,00	0,00	-
4	10 935	10 936	**4,20**	106,0	2	0,00	91,78	-	-	0,00	0,00	-
40	4 319	4 323	**16,13**	106,0	2	0,00	83,72	-	-	0,00	0,00	-
41	4 116	4 119	**16,80**	106,0	2	0,00	83,30	-	-	0,00	0,00	-
42	3 649	3 654	**18,48**	106,0	2	0,00	82,25	-	-	0,00	0,00	-
43	3 616	3 621	**18,61**	106,0	2	0,00	82,18	-	-	0,00	0,00	-
44	2 880	2 885	**21,74**	106,0	2	0,00	80,20	-	-	0,00	0,00	-
45	3 049	3 054	**20,96**	106,0	2	0,00	80,70	-	-	0,00	0,00	-
46	2 308	2 316	**24,68**	106,0	2	0,00	78,29	-	-	0,00	0,00	-
47	2 435	2 443	**23,98**	106,0	2	0,00	78,76	-	-	0,00	0,00	-
48	1 817	1 828	**27,76**	106,0	2	0,00	76,24	-	-	0,00	0,00	-
49	1 454	1 467	**30,51**	106,0	2	0,00	74,33	-	-	0,00	0,00	-
5	10 687	10 688	**4,48**	106,0	2	0,00	91,58	-	-	0,00	0,00	-
6	10 040	10 042	**5,23**	106,0	2	0,00	91,04	-	-	0,00	0,00	-
7	9 995	9 996	**5,29**	106,0	2	0,00	91,00	-	-	0,00	0,00	-
8	10 191	10 192	**5,05**	106,0	2	0,00	91,17	-	-	0,00	0,00	-
9	9 822	9 823	**5,50**	106,0	2	0,00	90,85	-	-	0,00	0,00	-
Sum			**35,09**									

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 154	7 157	**9,34**	106,0	2	0,00	88,09	-	-	0,00	0,00	-
10	6 127	6 131	**11,20**	106,0	2	0,00	86,75	-	-	0,00	0,00	-
11	5 428	5 432	**12,91**	106,0	2	0,00	85,70	-	-	0,00	0,00	-
12	7 575	7 577	**8,65**	106,0	2	0,00	88,59	-	-	0,00	0,00	-
13	6 720	6 724	**10,09**	106,0	2	0,00	87,55	-	-	0,00	0,00	-
14	5 581	5 585	**12,51**	106,0	2	0,00	85,94	-	-	0,00	0,00	-
15	7 590	7 593	**8,62**	106,0	2	0,00	88,61	-	-	0,00	0,00	-
16	6 521	6 524	**10,46**	106,0	2	0,00	87,29	-	-	0,00	0,00	-
17	5 456	5 460	**12,83**	106,0	2	0,00	85,74	-	-	0,00	0,00	-
18	4 447	4 452	**15,71**	106,0	2	0,00	83,97	-	-	0,00	0,00	-
19	6 543	6 547	**10,41**	106,0	2	0,00	87,32	-	-	0,00	0,00	-
2	7 417	7 419	**8,92**	106,0	2	0,00	88,41	-	-	0,00	0,00	-
20	5 783	5 787	**12,01**	106,0	2	0,00	86,25	-	-	0,00	0,00	-
21	4 862	4 867	**14,46**	106,0	2	0,00	84,75	-	-	0,00	0,00	-
22	4 049	4 055	**17,02**	106,0	2	0,00	83,16	-	-	0,00	0,00	-
23	3 001	3 009	**21,16**	106,0	2	0,00	80,57	-	-	0,00	0,00	-
24	5 990	5 994	**11,52**	106,0	2	0,00	86,55	-	-	0,00	0,00	-
25	5 094	5 098	**13,80**	106,0	2	0,00	85,15	-	-	0,00	0,00	-
26	3 989	3 994	**17,24**	106,0	2	0,00	83,03	-	-	0,00	0,00	-
27	2 827	2 835	**21,97**	106,0	2	0,00	80,05	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
28	2 014	2 025	**26,44**	106,0	2	0,00	77,13	-	-	0,00	0,00	-
29	5 752	5 756	**12,09**	106,0	2	0,00	86,20	-	-	0,00	0,00	-
3	6 488	6 491	**10,52**	106,0	2	0,00	87,25	-	-	0,00	0,00	-
30	4 865	4 870	**14,45**	106,0	2	0,00	84,75	-	-	0,00	0,00	-
31	3 583	3 590	**18,73**	106,0	2	0,00	82,10	-	-	0,00	0,00	-
32	2 876	2 884	**21,74**	106,0	2	0,00	80,20	-	-	0,00	0,00	-
33	2 016	2 027	**26,43**	106,0	2	0,00	77,14	-	-	0,00	0,00	-
34	4 552	4 557	**15,38**	106,0	2	0,00	84,17	-	-	0,00	0,00	-
35	3 771	3 777	**18,02**	106,0	2	0,00	82,54	-	-	0,00	0,00	-
36	2 820	2 828	**22,01**	106,0	2	0,00	80,03	-	-	0,00	0,00	-
37	2 003	2 015	**26,51**	106,0	2	0,00	77,08	-	-	0,00	0,00	-
38	6 111	6 115	**11,24**	106,0	2	0,00	86,73	-	-	0,00	0,00	-
39	5 319	5 324	**13,19**	106,0	2	0,00	85,52	-	-	0,00	0,00	-
4	7 897	7 900	**8,14**	106,0	2	0,00	88,95	-	-	0,00	0,00	-
40	4 457	4 462	**15,68**	106,0	2	0,00	83,99	-	-	0,00	0,00	-
41	3 667	3 673	**18,41**	106,0	2	0,00	82,30	-	-	0,00	0,00	-
42	5 124	5 128	**13,72**	106,0	2	0,00	85,20	-	-	0,00	0,00	-
43	4 291	4 296	**16,21**	106,0	2	0,00	83,66	-	-	0,00	0,00	-
44	5 247	5 252	**13,38**	106,0	2	0,00	85,41	-	-	0,00	0,00	-
45	4 293	4 298	**16,21**	106,0	2	0,00	83,67	-	-	0,00	0,00	-
46	5 867	5 871	**11,81**	106,0	2	0,00	86,37	-	-	0,00	0,00	-
47	4 863	4 868	**14,45**	106,0	2	0,00	84,75	-	-	0,00	0,00	-
48	5 274	5 279	**13,31**	106,0	2	0,00	85,45	-	-	0,00	0,00	-
49	6 052	6 056	**11,37**	106,0	2	0,00	86,64	-	-	0,00	0,00	-
5	7 280	7 283	**9,13**	106,0	2	0,00	88,25	-	-	0,00	0,00	-
6	6 390	6 393	**10,70**	106,0	2	0,00	87,11	-	-	0,00	0,00	-
7	5 754	5 758	**12,08**	106,0	2	0,00	86,21	-	-	0,00	0,00	-
8	7 644	7 647	**8,54**	106,0	2	0,00	88,67	-	-	0,00	0,00	-
9	6 906	6 909	**9,76**	106,0	2	0,00	87,79	-	-	0,00	0,00	-
Sum			**34,64**									

- Data undefined due to calculation with octave data

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 304	6 307	**10,86**	106,0	2	0,00	87,00	-	-	0,00	0,00	-
10	5 269	5 273	**13,32**	106,0	2	0,00	85,44	-	-	0,00	0,00	-
11	4 562	4 566	**15,36**	106,0	2	0,00	84,19	-	-	0,00	0,00	-
12	6 747	6 750	**10,04**	106,0	2	0,00	87,59	-	-	0,00	0,00	-
13	5 885	5 888	**11,77**	106,0	2	0,00	86,40	-	-	0,00	0,00	-
14	4 735	4 739	**14,83**	106,0	2	0,00	84,51	-	-	0,00	0,00	-
15	6 791	6 794	**9,97**	106,0	2	0,00	87,64	-	-	0,00	0,00	-
16	5 714	5 717	**12,18**	106,0	2	0,00	86,14	-	-	0,00	0,00	-
17	4 640	4 645	**15,11**	106,0	2	0,00	84,34	-	-	0,00	0,00	-
18	3 621	3 626	**18,59**	106,0	2	0,00	82,19	-	-	0,00	0,00	-
19	5 804	5 808	**11,96**	106,0	2	0,00	86,28	-	-	0,00	0,00	-
2	6 550	6 553	**10,42**	106,0	2	0,00	87,33	-	-	0,00	0,00	-
20	5 054	5 058	**13,91**	106,0	2	0,00	85,08	-	-	0,00	0,00	-
21	4 137	4 142	**16,73**	106,0	2	0,00	83,34	-	-	0,00	0,00	-
22	3 319	3 326	**19,79**	106,0	2	0,00	81,44	-	-	0,00	0,00	-
23	2 282	2 290	**24,83**	106,0	2	0,00	78,20	-	-	0,00	0,00	-
24	5 318	5 322	**13,19**	106,0	2	0,00	85,52	-	-	0,00	0,00	-
25	4 437	4 442	**15,74**	106,0	2	0,00	83,95	-	-	0,00	0,00	-
26	3 348	3 354	**19,67**	106,0	2	0,00	81,51	-	-	0,00	0,00	-
27	2 244	2 253	**25,05**	106,0	2	0,00	78,06	-	-	0,00	0,00	-
28	1 521	1 534	**29,96**	106,0	2	0,00	74,71	-	-	0,00	0,00	-
29	5 149	5 153	**13,65**	106,0	2	0,00	85,24	-	-	0,00	0,00	-
3	5 624	5 627	**12,41**	106,0	2	0,00	86,01	-	-	0,00	0,00	-
30	4 287	4 292	**16,23**	106,0	2	0,00	83,65	-	-	0,00	0,00	-
31	3 061	3 067	**20,90**	106,0	2	0,00	80,74	-	-	0,00	0,00	-
32	2 475	2 483	**23,76**	106,0	2	0,00	78,90	-	-	0,00	0,00	-
33	1 794	1 805	**27,92**	106,0	2	0,00	76,13	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
34	4 066	4 071	**16,97**	106,0	2	0,00	83,19	-	-	0,00	0,00	-
35	3 383	3 389	**19,53**	106,0	2	0,00	81,60	-	-	0,00	0,00	-
36	2 638	2 645	**22,91**	106,0	2	0,00	79,45	-	-	0,00	0,00	-
37	2 066	2 076	**26,12**	106,0	2	0,00	77,34	-	-	0,00	0,00	-
38	5 717	5 720	**12,18**	106,0	2	0,00	86,15	-	-	0,00	0,00	-
39	4 953	4 957	**14,20**	106,0	2	0,00	84,90	-	-	0,00	0,00	-
4	7 033	7 036	**9,54**	106,0	2	0,00	87,95	-	-	0,00	0,00	-
40	4 124	4 128	**16,77**	106,0	2	0,00	83,32	-	-	0,00	0,00	-
41	3 449	3 455	**19,26**	106,0	2	0,00	81,77	-	-	0,00	0,00	-
42	4 882	4 887	**14,40**	106,0	2	0,00	84,78	-	-	0,00	0,00	-
43	4 112	4 117	**16,81**	106,0	2	0,00	83,29	-	-	0,00	0,00	-
44	5 130	5 134	**13,70**	106,0	2	0,00	85,21	-	-	0,00	0,00	-
45	4 249	4 254	**16,35**	106,0	2	0,00	83,58	-	-	0,00	0,00	-
46	5 811	5 815	**11,94**	106,0	2	0,00	86,29	-	-	0,00	0,00	-
47	4 871	4 875	**14,43**	106,0	2	0,00	84,76	-	-	0,00	0,00	-
48	5 354	5 359	**13,10**	106,0	2	0,00	85,58	-	-	0,00	0,00	-
49	6 115	6 119	**11,23**	106,0	2	0,00	86,73	-	-	0,00	0,00	-
5	6 413	6 416	**10,66**	106,0	2	0,00	87,15	-	-	0,00	0,00	-
6	5 523	5 526	**12,66**	106,0	2	0,00	85,85	-	-	0,00	0,00	-
7	4 891	4 894	**14,38**	106,0	2	0,00	84,79	-	-	0,00	0,00	-
8	6 795	6 798	**9,96**	106,0	2	0,00	87,65	-	-	0,00	0,00	-
9	6 051	6 055	**11,38**	106,0	2	0,00	86,64	-	-	0,00	0,00	-
Sum			**36,54**									

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2 353	2 362	**24,43**	106,0	2	0,00	78,46	-	-	0,00	0,00	-
10	3 986	3 991	**17,25**	106,0	2	0,00	83,02	-	-	0,00	0,00	-
11	4 309	4 314	**16,18**	106,0	2	0,00	83,70	-	-	0,00	0,00	-
12	4 105	4 110	**16,83**	106,0	2	0,00	83,28	-	-	0,00	0,00	-
13	4 201	4 206	**16,51**	106,0	2	0,00	83,48	-	-	0,00	0,00	-
14	4 645	4 650	**15,10**	106,0	2	0,00	84,35	-	-	0,00	0,00	-
15	4 770	4 774	**14,73**	106,0	2	0,00	84,58	-	-	0,00	0,00	-
16	4 860	4 864	**14,46**	106,0	2	0,00	84,74	-	-	0,00	0,00	-
17	5 211	5 216	**13,48**	106,0	2	0,00	85,35	-	-	0,00	0,00	-
18	5 719	5 723	**12,19**	106,0	2	0,00	86,15	-	-	0,00	0,00	-
19	5 894	5 898	**11,74**	106,0	2	0,00	86,41	-	-	0,00	0,00	-
2	2 212	2 222	**25,23**	106,0	2	0,00	77,93	-	-	0,00	0,00	-
20	6 140	6 144	**11,18**	106,0	2	0,00	86,77	-	-	0,00	0,00	-
21	6 445	6 449	**10,59**	106,0	2	0,00	87,19	-	-	0,00	0,00	-
22	6 734	6 738	**10,07**	106,0	2	0,00	87,57	-	-	0,00	0,00	-
23	7 320	7 323	**9,06**	106,0	2	0,00	88,29	-	-	0,00	0,00	-
24	6 724	6 727	**10,09**	106,0	2	0,00	87,56	-	-	0,00	0,00	-
25	6 965	6 968	**9,66**	106,0	2	0,00	87,86	-	-	0,00	0,00	-
26	7 318	7 321	**9,06**	106,0	2	0,00	88,29	-	-	0,00	0,00	-
27	7 923	7 926	**8,10**	106,0	2	0,00	88,98	-	-	0,00	0,00	-
28	8 412	8 415	**7,39**	106,0	2	0,00	89,50	-	-	0,00	0,00	-
29	7 378	7 381	**8,96**	106,0	2	0,00	88,36	-	-	0,00	0,00	-
3	3 021	3 028	**21,08**	106,0	2	0,00	80,62	-	-	0,00	0,00	-
30	7 584	7 587	**8,63**	106,0	2	0,00	88,60	-	-	0,00	0,00	-
31	8 012	8 015	**7,97**	106,0	2	0,00	89,08	-	-	0,00	0,00	-
32	8 553	8 556	**7,19**	106,0	2	0,00	89,65	-	-	0,00	0,00	-
33	9 027	9 030	**6,54**	106,0	2	0,00	90,11	-	-	0,00	0,00	-
34	8 181	8 184	**7,71**	106,0	2	0,00	89,26	-	-	0,00	0,00	-
35	8 640	8 642	**7,05**	106,0	2	0,00	89,73	-	-	0,00	0,00	-
36	9 279	9 282	**6,20**	106,0	2	0,00	90,35	-	-	0,00	0,00	-
37	9 690	9 692	**5,68**	106,0	2	0,00	90,73	-	-	0,00	0,00	-
38	9 111	9 114	**6,41**	106,0	2	0,00	90,19	-	-	0,00	0,00	-
39	9 056	9 059	**6,48**	106,0	2	0,00	90,14	-	-	0,00	0,00	-
4	2 553	2 562	**23,34**	106,0	2	0,00	79,17	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
40	9 023	9 026	**6,53**	106,0	2	0,00	90,11	-	-	0,00	0,00	-
41	9 367	9 369	**6,07**	106,0	2	0,00	90,43	-	-	0,00	0,00	-
42	9 743	9 745	**5,60**	106,0	2	0,00	90,78	-	-	0,00	0,00	-
43	9 752	9 754	**5,58**	106,0	2	0,00	90,78	-	-	0,00	0,00	-
44	10 494	10 496	**4,70**	106,0	2	0,00	91,42	-	-	0,00	0,00	-
45	10 377	10 380	**4,83**	106,0	2	0,00	91,32	-	-	0,00	0,00	-
46	11 179	11 181	**3,93**	106,0	2	0,00	91,97	-	-	0,00	0,00	-
47	10 929	10 931	**4,20**	106,0	2	0,00	91,77	-	-	0,00	0,00	-
48	11 539	11 541	**3,55**	106,0	2	0,00	92,25	-	-	0,00	0,00	-
49	11 967	11 969	**3,11**	106,0	2	0,00	92,56	-	-	0,00	0,00	-
5	2 657	2 665	**22,81**	106,0	2	0,00	79,51	-	-	0,00	0,00	-
6	3 359	3 365	**19,63**	106,0	2	0,00	81,54	-	-	0,00	0,00	-
7	3 747	3 753	**18,11**	106,0	2	0,00	82,49	-	-	0,00	0,00	-
8	3 446	3 452	**19,27**	106,0	2	0,00	81,76	-	-	0,00	0,00	-
9	3 567	3 573	**18,79**	106,0	2	0,00	82,06	-	-	0,00	0,00	-
Sum			**32,94**									

- Data undefined due to calculation with octave data

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	3 444	3 450	**19,28**	106,0	2	0,00	81,76	-	-	0,00	0,00	-
10	4 391	4 396	**15,89**	106,0	2	0,00	83,86	-	-	0,00	0,00	-
11	4 928	4 932	**14,27**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
12	3 908	3 913	**17,52**	106,0	2	0,00	82,85	-	-	0,00	0,00	-
13	4 295	4 300	**16,20**	106,0	2	0,00	83,67	-	-	0,00	0,00	-
14	5 049	5 053	**13,93**	106,0	2	0,00	85,07	-	-	0,00	0,00	-
15	4 492	4 497	**15,57**	106,0	2	0,00	84,06	-	-	0,00	0,00	-
16	4 894	4 899	**14,36**	106,0	2	0,00	84,80	-	-	0,00	0,00	-
17	5 510	5 514	**12,69**	106,0	2	0,00	85,83	-	-	0,00	0,00	-
18	6 216	6 220	**11,03**	106,0	2	0,00	86,88	-	-	0,00	0,00	-
19	5 812	5 816	**11,94**	106,0	2	0,00	86,29	-	-	0,00	0,00	-
2	2 897	2 904	**21,65**	106,0	2	0,00	80,26	-	-	0,00	0,00	-
20	6 219	6 223	**11,02**	106,0	2	0,00	86,88	-	-	0,00	0,00	-
21	6 707	6 711	**10,12**	106,0	2	0,00	87,54	-	-	0,00	0,00	-
22	7 145	7 148	**9,35**	106,0	2	0,00	88,08	-	-	0,00	0,00	-
23	7 879	7 881	**8,17**	106,0	2	0,00	88,93	-	-	0,00	0,00	-
24	6 720	6 723	**10,09**	106,0	2	0,00	87,55	-	-	0,00	0,00	-
25	7 133	7 136	**9,37**	106,0	2	0,00	88,07	-	-	0,00	0,00	-
26	7 678	7 681	**8,48**	106,0	2	0,00	88,71	-	-	0,00	0,00	-
27	8 446	8 449	**7,33**	106,0	2	0,00	89,54	-	-	0,00	0,00	-
28	9 031	9 033	**6,52**	106,0	2	0,00	90,12	-	-	0,00	0,00	-
29	7 399	7 403	**8,93**	106,0	2	0,00	88,39	-	-	0,00	0,00	-
3	3 852	3 858	**17,72**	106,0	2	0,00	82,73	-	-	0,00	0,00	-
30	7 764	7 767	**8,35**	106,0	2	0,00	88,81	-	-	0,00	0,00	-
31	8 399	8 402	**7,39**	106,0	2	0,00	89,49	-	-	0,00	0,00	-
32	9 030	9 032	**6,52**	106,0	2	0,00	90,12	-	-	0,00	0,00	-
33	9 614	9 616	**5,76**	106,0	2	0,00	90,66	-	-	0,00	0,00	-
34	8 399	8 402	**7,39**	106,0	2	0,00	89,49	-	-	0,00	0,00	-
35	8 976	8 978	**6,59**	106,0	2	0,00	90,06	-	-	0,00	0,00	-
36	9 751	9 754	**5,59**	106,0	2	0,00	90,78	-	-	0,00	0,00	-
37	10 276	10 278	**4,95**	106,0	2	0,00	91,24	-	-	0,00	0,00	-
38	9 083	9 086	**6,45**	106,0	2	0,00	90,17	-	-	0,00	0,00	-
39	9 153	9 155	**6,35**	106,0	2	0,00	90,23	-	-	0,00	0,00	-
4	2 632	2 640	**22,94**	106,0	2	0,00	79,43	-	-	0,00	0,00	-
40	9 253	9 256	**6,22**	106,0	2	0,00	90,33	-	-	0,00	0,00	-
41	9 719	9 721	**5,63**	106,0	2	0,00	90,75	-	-	0,00	0,00	-
42	9 889	9 892	**5,41**	106,0	2	0,00	90,91	-	-	0,00	0,00	-
43	10 022	10 024	**5,25**	106,0	2	0,00	91,02	-	-	0,00	0,00	-
44	10 657	10 659	**4,51**	106,0	2	0,00	91,55	-	-	0,00	0,00	-
45	10 673	10 675	**4,49**	106,0	2	0,00	91,57	-	-	0,00	0,00	-
46	11 294	11 296	**3,81**	106,0	2	0,00	92,06	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
47	11 174	11 176	**3,94**	106,0	2	0,00	91,97	-	-	0,00	0,00	-
48	11 768	11 770	**3,31**	106,0	2	0,00	92,42	-	-	0,00	0,00	-
49	12 116	12 118	**2,96**	106,0	2	0,00	92,67	-	-	0,00	0,00	-
5	3 080	3 087	**20,81**	106,0	2	0,00	80,79	-	-	0,00	0,00	-
6	3 944	3 949	**17,42**	106,0	2	0,00	82,93	-	-	0,00	0,00	-
7	4 576	4 581	**15,31**	106,0	2	0,00	84,22	-	-	0,00	0,00	-
8	3 349	3 356	**19,66**	106,0	2	0,00	81,52	-	-	0,00	0,00	-
9	3 765	3 771	**18,04**	106,0	2	0,00	82,53	-	-	0,00	0,00	-
Sum			**31,17**									

- Data undefined due to calculation with octave data

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 518	4 522	**15,49**	106,0	2	0,00	84,11	-	-	0,00	0,00	-
10	4 594	4 599	**15,25**	106,0	2	0,00	84,25	-	-	0,00	0,00	-
11	5 317	5 321	**13,20**	106,0	2	0,00	85,52	-	-	0,00	0,00	-
12	3 461	3 467	**19,21**	106,0	2	0,00	81,80	-	-	0,00	0,00	-
13	4 144	4 149	**16,70**	106,0	2	0,00	83,36	-	-	0,00	0,00	-
14	5 174	5 178	**13,58**	106,0	2	0,00	85,28	-	-	0,00	0,00	-
15	3 855	3 861	**17,71**	106,0	2	0,00	82,73	-	-	0,00	0,00	-
16	4 595	4 600	**15,25**	106,0	2	0,00	84,25	-	-	0,00	0,00	-
17	5 467	5 471	**12,80**	106,0	2	0,00	85,76	-	-	0,00	0,00	-
18	6 358	6 361	**10,76**	106,0	2	0,00	87,07	-	-	0,00	0,00	-
19	5 284	5 289	**13,28**	106,0	2	0,00	85,47	-	-	0,00	0,00	-
2	3 657	3 663	**18,45**	106,0	2	0,00	82,28	-	-	0,00	0,00	-
20	5 857	5 861	**11,83**	106,0	2	0,00	86,36	-	-	0,00	0,00	-
21	6 533	6 537	**10,43**	106,0	2	0,00	87,31	-	-	0,00	0,00	-
22	7 126	7 130	**9,38**	106,0	2	0,00	88,06	-	-	0,00	0,00	-
23	8 009	8 012	**7,97**	106,0	2	0,00	89,07	-	-	0,00	0,00	-
24	6 225	6 229	**11,01**	106,0	2	0,00	86,89	-	-	0,00	0,00	-
25	6 821	6 824	**9,91**	106,0	2	0,00	87,68	-	-	0,00	0,00	-
26	7 573	7 576	**8,65**	106,0	2	0,00	88,59	-	-	0,00	0,00	-
27	8 510	8 512	**7,24**	106,0	2	0,00	89,60	-	-	0,00	0,00	-
28	9 196	9 198	**6,30**	106,0	2	0,00	90,27	-	-	0,00	0,00	-
29	6 900	6 903	**9,77**	106,0	2	0,00	87,78	-	-	0,00	0,00	-
3	4 602	4 606	**15,26**	106,0	2	0,00	84,27	-	-	0,00	0,00	-
30	7 438	7 441	**8,87**	106,0	2	0,00	88,43	-	-	0,00	0,00	-
31	8 297	8 299	**7,54**	106,0	2	0,00	89,38	-	-	0,00	0,00	-
32	9 016	9 019	**6,54**	106,0	2	0,00	90,10	-	-	0,00	0,00	-
33	9 721	9 723	**5,62**	106,0	2	0,00	90,76	-	-	0,00	0,00	-
34	8 092	8 095	**7,85**	106,0	2	0,00	89,16	-	-	0,00	0,00	-
35	8 792	8 795	**6,84**	106,0	2	0,00	89,88	-	-	0,00	0,00	-
36	9 711	9 713	**5,64**	106,0	2	0,00	90,75	-	-	0,00	0,00	-
37	10 366	10 368	**4,84**	106,0	2	0,00	91,31	-	-	0,00	0,00	-
38	8 461	8 464	**7,30**	106,0	2	0,00	89,55	-	-	0,00	0,00	-
39	8 675	8 678	**7,00**	106,0	2	0,00	89,77	-	-	0,00	0,00	-
4	2 847	2 855	**21,88**	106,0	2	0,00	80,11	-	-	0,00	0,00	-
40	8 932	8 935	**6,65**	106,0	2	0,00	90,02	-	-	0,00	0,00	-
41	9 531	9 533	**5,86**	106,0	2	0,00	90,59	-	-	0,00	0,00	-
42	9 450	9 452	**5,97**	106,0	2	0,00	90,51	-	-	0,00	0,00	-
43	9 727	9 729	**5,62**	106,0	2	0,00	90,76	-	-	0,00	0,00	-
44	10 218	10 220	**5,02**	106,0	2	0,00	91,19	-	-	0,00	0,00	-
45	10 392	10 394	**4,81**	106,0	2	0,00	91,34	-	-	0,00	0,00	-
46	10 785	10 787	**4,36**	106,0	2	0,00	91,66	-	-	0,00	0,00	-
47	10 821	10 823	**4,32**	106,0	2	0,00	91,69	-	-	0,00	0,00	-
48	11 385	11 387	**3,71**	106,0	2	0,00	92,13	-	-	0,00	0,00	-
49	11 632	11 634	**3,45**	106,0	2	0,00	92,31	-	-	0,00	0,00	-
5	3 535	3 541	**18,92**	106,0	2	0,00	81,98	-	-	0,00	0,00	-
6	4 412	4 417	**15,82**	106,0	2	0,00	83,90	-	-	0,00	0,00	-
7	5 244	5 248	**13,41**	106,0	2	0,00	85,40	-	-	0,00	0,00	-
8	3 145	3 152	**20,53**	106,0	2	0,00	80,97	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
9	3 826	3 831	**17,82**	106,0	2	0,00	82,67	-	-	0,00	0,00	-
Sum			**30,53**									

- Data undefined due to calculation with octave data

Noise sensitive area: K Lomarakennus K (Kurunoja)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 813	4 817	**14,60**	106,0	2	0,00	84,66	-	-	0,00	0,00	-
10	3 360	3 365	**19,62**	106,0	2	0,00	81,54	-	-	0,00	0,00	-
11	4 188	4 192	**16,56**	106,0	2	0,00	83,45	-	-	0,00	0,00	-
12	1 597	1 609	**29,36**	106,0	2	0,00	75,13	-	-	0,00	0,00	-
13	2 468	2 476	**23,80**	106,0	2	0,00	78,88	-	-	0,00	0,00	-
14	3 635	3 640	**18,53**	106,0	2	0,00	82,22	-	-	0,00	0,00	-
15	1 437	1 450	**30,64**	106,0	2	0,00	74,23	-	-	0,00	0,00	-
16	2 508	2 516	**23,58**	106,0	2	0,00	79,01	-	-	0,00	0,00	-
17	3 585	3 591	**18,72**	106,0	2	0,00	82,10	-	-	0,00	0,00	-
18	4 614	4 618	**15,20**	106,0	2	0,00	84,29	-	-	0,00	0,00	-
19	2 728	2 736	**22,46**	106,0	2	0,00	79,74	-	-	0,00	0,00	-
2	3 752	3 757	**18,09**	106,0	2	0,00	82,50	-	-	0,00	0,00	-
20	3 446	3 452	**19,27**	106,0	2	0,00	81,76	-	-	0,00	0,00	-
21	4 299	4 304	**16,19**	106,0	2	0,00	83,68	-	-	0,00	0,00	-
22	5 048	5 052	**13,93**	106,0	2	0,00	85,07	-	-	0,00	0,00	-
23	6 066	6 069	**11,34**	106,0	2	0,00	86,66	-	-	0,00	0,00	-
24	3 621	3 627	**18,58**	106,0	2	0,00	82,19	-	-	0,00	0,00	-
25	4 383	4 387	**15,92**	106,0	2	0,00	83,84	-	-	0,00	0,00	-
26	5 337	5 341	**13,14**	106,0	2	0,00	85,55	-	-	0,00	0,00	-
27	6 436	6 439	**10,61**	106,0	2	0,00	87,18	-	-	0,00	0,00	-
28	7 220	7 223	**9,23**	106,0	2	0,00	88,17	-	-	0,00	0,00	-
29	4 249	4 254	**16,35**	106,0	2	0,00	83,58	-	-	0,00	0,00	-
3	4 302	4 307	**16,18**	106,0	2	0,00	83,68	-	-	0,00	0,00	-
30	4 941	4 945	**14,23**	106,0	2	0,00	84,88	-	-	0,00	0,00	-
31	6 017	6 020	**11,46**	106,0	2	0,00	86,59	-	-	0,00	0,00	-
32	6 809	6 812	**9,93**	106,0	2	0,00	87,67	-	-	0,00	0,00	-
33	7 637	7 640	**8,55**	106,0	2	0,00	88,66	-	-	0,00	0,00	-
34	5 584	5 587	**12,51**	106,0	2	0,00	85,94	-	-	0,00	0,00	-
35	6 388	6 392	**10,70**	106,0	2	0,00	87,11	-	-	0,00	0,00	-
36	7 438	7 441	**8,87**	106,0	2	0,00	88,43	-	-	0,00	0,00	-
37	8 231	8 234	**7,64**	106,0	2	0,00	89,31	-	-	0,00	0,00	-
38	5 664	5 668	**12,31**	106,0	2	0,00	86,07	-	-	0,00	0,00	-
39	5 981	5 984	**11,54**	106,0	2	0,00	86,54	-	-	0,00	0,00	-
4	2 621	2 628	**23,00**	106,0	2	0,00	79,39	-	-	0,00	0,00	-
40	6 374	6 377	**10,73**	106,0	2	0,00	87,09	-	-	0,00	0,00	-
41	7 094	7 097	**9,44**	106,0	2	0,00	88,02	-	-	0,00	0,00	-
42	6 769	6 772	**10,01**	106,0	2	0,00	87,61	-	-	0,00	0,00	-
43	7 171	7 174	**9,31**	106,0	2	0,00	88,12	-	-	0,00	0,00	-
44	7 522	7 525	**8,73**	106,0	2	0,00	88,53	-	-	0,00	0,00	-
45	7 833	7 836	**8,24**	106,0	2	0,00	88,88	-	-	0,00	0,00	-
46	8 029	8 032	**7,94**	106,0	2	0,00	89,10	-	-	0,00	0,00	-
47	8 187	8 189	**7,70**	106,0	2	0,00	89,27	-	-	0,00	0,00	-
48	8 715	8 717	**6,95**	106,0	2	0,00	89,81	-	-	0,00	0,00	-
49	8 883	8 885	**6,72**	106,0	2	0,00	89,97	-	-	0,00	0,00	-
5	3 206	3 212	**20,27**	106,0	2	0,00	81,14	-	-	0,00	0,00	-
6	3 698	3 703	**18,30**	106,0	2	0,00	82,37	-	-	0,00	0,00	-
7	4 616	4 620	**15,19**	106,0	2	0,00	84,29	-	-	0,00	0,00	-
8	1 968	1 978	**26,75**	106,0	2	0,00	76,92	-	-	0,00	0,00	-
9	2 672	2 680	**22,74**	106,0	2	0,00	79,56	-	-	0,00	0,00	-
Sum			**36,77**									

- Data undefined due to calculation with octave data

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 143	7 145	**9,36**	106,0	2	0,00	88,08	-	-	0,00	0,00	-
10	4 738	4 741	**14,82**	106,0	2	0,00	84,52	-	-	0,00	0,00	-
11	5 032	5 036	**13,98**	106,0	2	0,00	85,04	-	-	0,00	0,00	-
12	4 310	4 314	**16,16**	106,0	2	0,00	83,70	-	-	0,00	0,00	-
13	4 191	4 195	**16,55**	106,0	2	0,00	83,45	-	-	0,00	0,00	-
14	4 269	4 273	**16,29**	106,0	2	0,00	83,61	-	-	0,00	0,00	-
15	3 715	3 719	**18,23**	106,0	2	0,00	82,41	-	-	0,00	0,00	-
16	3 527	3 532	**18,95**	106,0	2	0,00	81,96	-	-	0,00	0,00	-
17	3 629	3 634	**18,56**	106,0	2	0,00	82,21	-	-	0,00	0,00	-
18	4 006	4 011	**17,18**	106,0	2	0,00	83,06	-	-	0,00	0,00	-
19	2 464	2 472	**23,82**	106,0	2	0,00	78,86	-	-	0,00	0,00	-
2	6 420	6 422	**10,64**	106,0	2	0,00	87,15	-	-	0,00	0,00	-
20	2 417	2 425	**24,08**	106,0	2	0,00	78,69	-	-	0,00	0,00	-
21	2 764	2 770	**22,29**	106,0	2	0,00	79,85	-	-	0,00	0,00	-
22	3 323	3 328	**19,78**	106,0	2	0,00	81,44	-	-	0,00	0,00	-
23	4 101	4 105	**16,85**	106,0	2	0,00	83,27	-	-	0,00	0,00	-
24	1 752	1 763	**28,21**	106,0	2	0,00	75,93	-	-	0,00	0,00	-
25	2 130	2 138	**25,73**	106,0	2	0,00	77,60	-	-	0,00	0,00	-
26	2 977	2 983	**21,28**	106,0	2	0,00	80,49	-	-	0,00	0,00	-
27	3 977	3 981	**17,28**	106,0	2	0,00	83,00	-	-	0,00	0,00	-
28	4 734	4 738	**14,83**	106,0	2	0,00	84,51	-	-	0,00	0,00	-
29	1 316	1 331	**31,70**	106,0	2	0,00	73,48	-	-	0,00	0,00	-
3	6 214	6 216	**11,04**	106,0	2	0,00	86,87	-	-	0,00	0,00	-
30	1 977	1 987	**26,69**	106,0	2	0,00	76,96	-	-	0,00	0,00	-
31	3 163	3 168	**20,46**	106,0	2	0,00	81,02	-	-	0,00	0,00	-
32	3 864	3 868	**17,69**	106,0	2	0,00	82,75	-	-	0,00	0,00	-
33	4 775	4 778	**14,71**	106,0	2	0,00	84,59	-	-	0,00	0,00	-
34	2 179	2 187	**25,44**	106,0	2	0,00	77,80	-	-	0,00	0,00	-
35	3 014	3 020	**21,11**	106,0	2	0,00	80,60	-	-	0,00	0,00	-
36	4 145	4 150	**16,70**	106,0	2	0,00	83,36	-	-	0,00	0,00	-
37	5 115	5 119	**13,74**	106,0	2	0,00	85,18	-	-	0,00	0,00	-
38	1 123	1 139	**33,55**	106,0	2	0,00	72,13	-	-	0,00	0,00	-
39	1 742	1 753	**28,29**	106,0	2	0,00	75,87	-	-	0,00	0,00	-
4	5 805	5 807	**11,96**	106,0	2	0,00	86,28	-	-	0,00	0,00	-
40	2 513	2 520	**23,56**	106,0	2	0,00	79,03	-	-	0,00	0,00	-
41	3 430	3 435	**19,34**	106,0	2	0,00	81,72	-	-	0,00	0,00	-
42	2 456	2 463	**23,87**	106,0	2	0,00	78,83	-	-	0,00	0,00	-
43	3 157	3 162	**20,48**	106,0	2	0,00	81,00	-	-	0,00	0,00	-
44	3 112	3 117	**20,68**	106,0	2	0,00	80,88	-	-	0,00	0,00	-
45	3 726	3 731	**18,19**	106,0	2	0,00	82,44	-	-	0,00	0,00	-
46	3 484	3 489	**19,12**	106,0	2	0,00	81,85	-	-	0,00	0,00	-
47	3 872	3 877	**17,65**	106,0	2	0,00	82,77	-	-	0,00	0,00	-
48	4 301	4 306	**16,18**	106,0	2	0,00	83,68	-	-	0,00	0,00	-
49	4 334	4 338	**16,08**	106,0	2	0,00	83,75	-	-	0,00	0,00	-
5	5 821	5 823	**11,92**	106,0	2	0,00	86,30	-	-	0,00	0,00	-
6	5 498	5 501	**12,73**	106,0	2	0,00	85,81	-	-	0,00	0,00	-
7	5 917	5 919	**11,69**	106,0	2	0,00	86,45	-	-	0,00	0,00	-
8	4 931	4 934	**14,26**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
9	4 849	4 853	**14,50**	106,0	2	0,00	84,72	-	-	0,00	0,00	-
Sum			**39,72**									

- Data undefined due to calculation with octave data

Noise sensitive area: M Lomarakennus M (Riskalan metsatie)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	7 877	7 880	**8,17**	106,0	2	0,00	88,93	-	-	0,00	0,00	-
10	6 732	6 734	**10,07**	106,0	2	0,00	87,57	-	-	0,00	0,00	-
11	6 068	6 071	**11,34**	106,0	2	0,00	86,67	-	-	0,00	0,00	-
12	8 100	8 102	**7,84**	106,0	2	0,00	89,17	-	-	0,00	0,00	-
13	7 266	7 268	**9,15**	106,0	2	0,00	88,23	-	-	0,00	0,00	-
14	6 156	6 159	**11,15**	106,0	2	0,00	86,79	-	-	0,00	0,00	-

To be continued on next page...

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Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200_20201102**Noise calculation model:** ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
15	8 064	8 066	**7,89**	106,0	2	0,00	89,13	-	-	0,00	0,00	-
16	7 014	7 016	**9,58**	106,0	2	0,00	87,92	-	-	0,00	0,00	-
17	5 971	5 974	**11,56**	106,0	2	0,00	86,53	-	-	0,00	0,00	-
18	4 991	4 995	**14,09**	106,0	2	0,00	84,97	-	-	0,00	0,00	-
19	6 935	6 938	**9,71**	106,0	2	0,00	87,82	-	-	0,00	0,00	-
2	8 096	8 098	**7,86**	106,0	2	0,00	89,17	-	-	0,00	0,00	-
20	6 170	6 173	**11,12**	106,0	2	0,00	86,81	-	-	0,00	0,00	-
21	5 255	5 259	**13,36**	106,0	2	0,00	85,42	-	-	0,00	0,00	-
22	4 464	4 468	**15,66**	106,0	2	0,00	84,00	-	-	0,00	0,00	-
23	3 434	3 440	**19,32**	106,0	2	0,00	81,73	-	-	0,00	0,00	-
24	6 303	6 306	**10,86**	106,0	2	0,00	87,00	-	-	0,00	0,00	-
25	5 402	5 406	**12,97**	106,0	2	0,00	85,66	-	-	0,00	0,00	-
26	4 304	4 308	**16,17**	106,0	2	0,00	83,69	-	-	0,00	0,00	-
27	3 133	3 139	**20,58**	106,0	2	0,00	80,94	-	-	0,00	0,00	-
28	2 310	2 318	**24,67**	106,0	2	0,00	78,30	-	-	0,00	0,00	-
29	5 990	5 993	**11,52**	106,0	2	0,00	86,55	-	-	0,00	0,00	-
3	7 182	7 184	**9,29**	106,0	2	0,00	88,13	-	-	0,00	0,00	-
30	5 092	5 096	**13,81**	106,0	2	0,00	85,14	-	-	0,00	0,00	-
31	3 793	3 798	**17,94**	106,0	2	0,00	82,59	-	-	0,00	0,00	-
32	3 012	3 018	**21,12**	106,0	2	0,00	80,59	-	-	0,00	0,00	-
33	2 087	2 096	**26,00**	106,0	2	0,00	77,43	-	-	0,00	0,00	-
34	4 692	4 697	**14,96**	106,0	2	0,00	84,44	-	-	0,00	0,00	-
35	3 845	3 850	**17,75**	106,0	2	0,00	82,71	-	-	0,00	0,00	-
36	2 764	2 771	**22,28**	106,0	2	0,00	79,85	-	-	0,00	0,00	-
37	1 820	1 831	**27,73**	106,0	2	0,00	76,26	-	-	0,00	0,00	-
38	6 130	6 133	**11,20**	106,0	2	0,00	86,75	-	-	0,00	0,00	-
39	5 326	5 330	**13,17**	106,0	2	0,00	85,53	-	-	0,00	0,00	-
4	8 521	8 523	**7,22**	106,0	2	0,00	89,61	-	-	0,00	0,00	-
40	4 455	4 460	**15,69**	106,0	2	0,00	83,99	-	-	0,00	0,00	-
41	3 590	3 596	**18,70**	106,0	2	0,00	82,12	-	-	0,00	0,00	-
42	5 020	5 024	**14,01**	106,0	2	0,00	85,02	-	-	0,00	0,00	-
43	4 153	4 158	**16,67**	106,0	2	0,00	83,38	-	-	0,00	0,00	-
44	5 029	5 033	**13,98**	106,0	2	0,00	85,04	-	-	0,00	0,00	-
45	4 037	4 042	**17,07**	106,0	2	0,00	83,13	-	-	0,00	0,00	-
46	5 584	5 588	**12,51**	106,0	2	0,00	85,94	-	-	0,00	0,00	-
47	4 546	4 551	**15,40**	106,0	2	0,00	84,16	-	-	0,00	0,00	-
48	4 888	4 893	**14,38**	106,0	2	0,00	84,79	-	-	0,00	0,00	-
49	5 667	5 671	**12,30**	106,0	2	0,00	86,07	-	-	0,00	0,00	-
5	7 927	7 930	**8,10**	106,0	2	0,00	88,98	-	-	0,00	0,00	-
6	7 043	7 045	**9,53**	106,0	2	0,00	87,96	-	-	0,00	0,00	-
7	6 449	6 452	**10,59**	106,0	2	0,00	87,19	-	-	0,00	0,00	-
8	8 215	8 217	**7,66**	106,0	2	0,00	89,29	-	-	0,00	0,00	-
9	7 498	7 500	**8,77**	106,0	2	0,00	88,50	-	-	0,00	0,00	-
Sum			**34,30**									

- Data undefined due to calculation with octave data

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Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200_20201102

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (vesistot): (5)
Area type with hard ground: Vesistot
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)
Octave data required
Frequency dependent air absorption

63 [dB/km]	125 [dB/km]	250 [dB/km]	500 [dB/km]	1 000 [dB/km]	2 000 [dB/km]	4 000 [dB/km]	8 000 [dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: GE WIND ENERGY 5.3-158 Thrust 700 5300 158.0 !O!
Noise: 5.3-158 106.0 +2 dB HH200

Source	Source/Date	Creator	Edited
Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01	12.3.2018	USER	12.11.2020 15.16

						Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Penalty [dB]	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	200,0	8,0	106,0	Yes	2,0	87,2	92,6	97,2	99,6	101,3	99,1	91,7	76,0

Noise sensitive area: A Laskentapiste A (Metsästysmaja)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: C Laskentapiste C (Perkkiöntie 382)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200_20201102

Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Lomarakennus K (Kurunoja)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

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Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200_20201102
Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: M Lomarakennus M (Riskalan metsatie)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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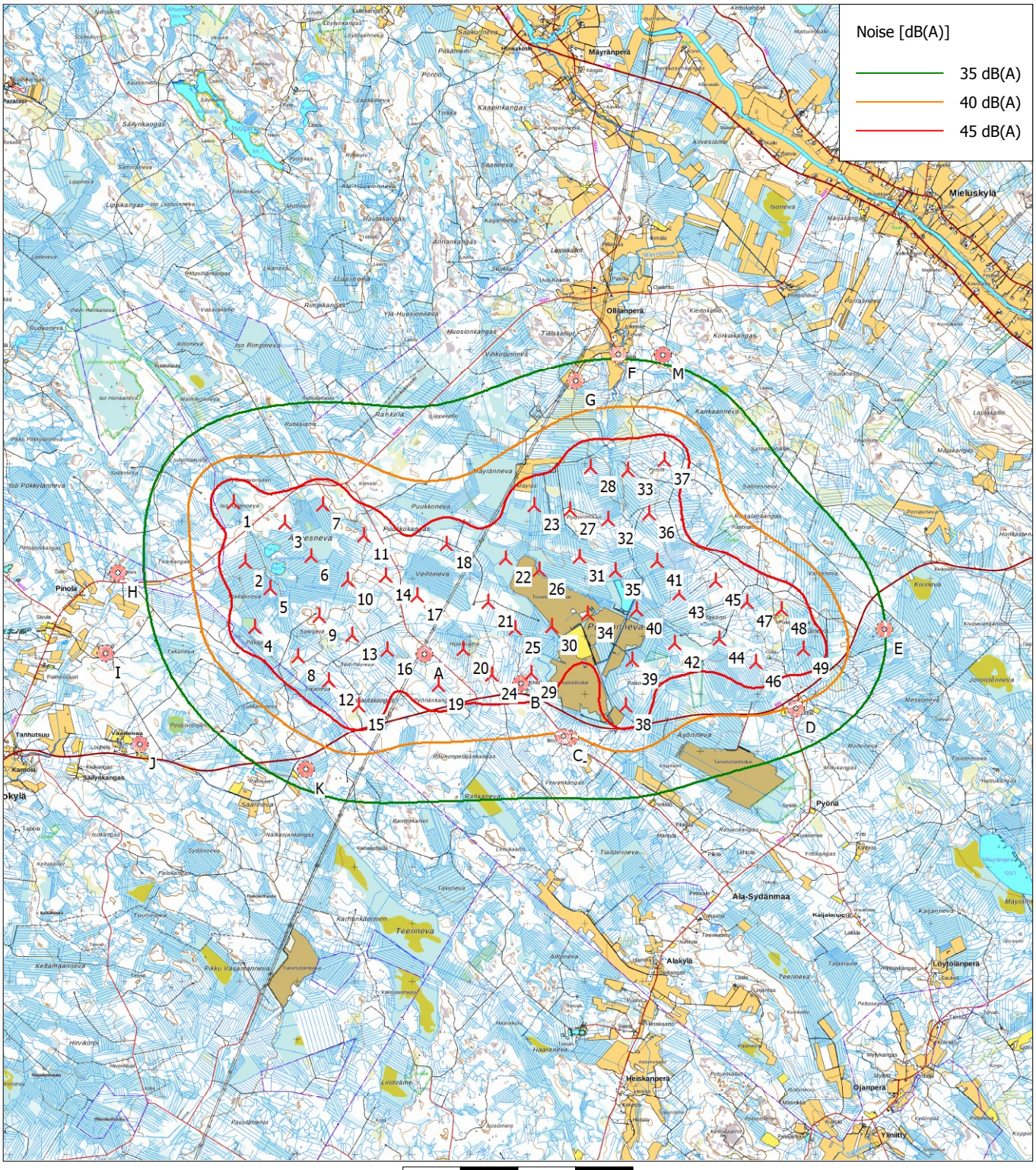
Calculated:
18.11.2020 14.41/3.4.388

DECIBEL - Map 8,0 m/s

Calculation: Puutionsaari_GE158x49xHH200_20201102



Map: Maastokarttarasteri50K , Print scale 1:100 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 403 841 North: 7 110 929

New WTG Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
Height above sea level from active line object

Liite 2: Puutionsaari - Yhteismelun leviämismallinnuksen tulokset ISO 9613-2, YM 2/2014

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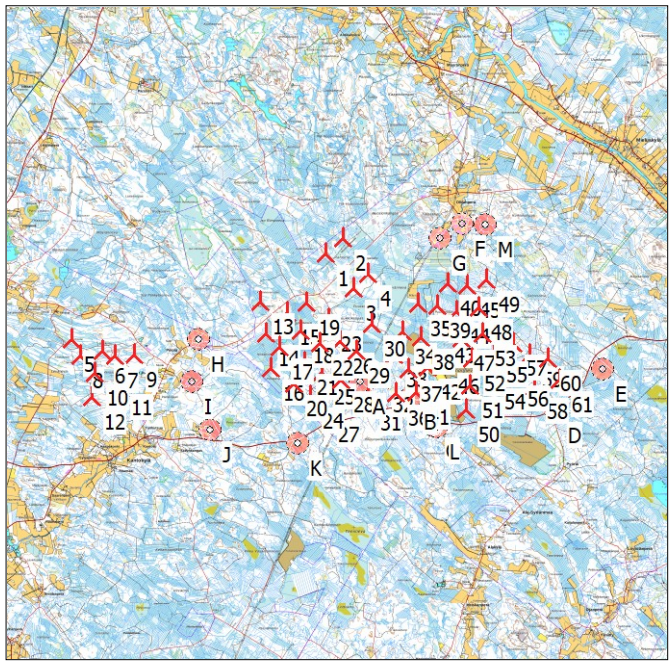
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (vesistot): (5)
Area type with hard ground: Vesistot
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]
1	401 061	7 113 928	105,0	VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
2	401 644	7 114 439	105,4	VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
3	401 997	7 112 772	109,3	VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
4	402 450	7 113 258	106,6	VESTAS V150-4.2 HH155 4200 ...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	USER	Level 00 - Measured - Mode PO1 - 03-2018	8,0	104,9
5	392 697	7 111 104	81,0	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
6	393 696	7 110 723	85,7	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
7	394 124	7 110 573	88,7	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
8	392 964	7 110 572	83,6	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
9	394 736	7 110 600	89,9	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
10	393 462	7 109 982	84,9	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
11	394 233	7 109 674	87,5	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
12	393 349	7 109 200	83,7	GE WIND ENERGY 5.3-158 RD...	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	USER	5.3-158 NO_107,8 dB	8,0	107,8
13	398 896	7 112 332	92,5	PUU01	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
14	399 097	7 111 286	95,0	PUU02	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
15	399 784	7 111 972	97,5	PUU03	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
16	399 264	7 110 151	97,1	PUU04	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
17	399 536	7 110 832	96,4	PUU05	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
18	400 239	7 111 382	97,5	PUU06	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
19	400 444	7 112 292	97,0	PUU07	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
20	400 019	7 109 649	100,0	PUU08	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
21	400 380	7 110 348	100,0	PUU09	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
22	400 876	7 110 966	99,5	PUU10	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
23	401 152	7 111 752	100,0	PUU11	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
24	400 549	7 109 232	102,5	PUU12	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
25	400 953	7 110 020	102,5	PUU13	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
26	401 537	7 111 046	104,5	PUU14	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
27	401 068	7 108 792	105,3	PUU15	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
28	401 564	7 109 758	103,4	PUU16	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
29	402 089	7 110 702	107,5	PUU17	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
30	402 589	7 111 603	106,8	PUU18	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
31	402 455	7 109 148	112,5	PUU19	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
32	402 889	7 109 778	110,0	PUU20	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
33	403 318	7 110 593	108,0	PUU21	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
34	403 622	7 111 352	106,9	PUU22	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
35	404 117	7 112 276	103,6	PUU23	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
36	403 379	7 109 327	115,0	PUU24	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
37	403 790	7 110 129	108,4	PUU25	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
38	404 210	7 111 152	105,6	PUU26	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
39	404 739	7 112 199	105,0	PUU27	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
40	405 100	7 112 943	100,4	PUU28	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
41	404 061	7 109 351	110,0	PUU29	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
42	404 420	7 110 174	107,1	PUU30	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
43	404 900	7 111 381	105,1	PUU31	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
44	405 395	7 112 030	102,4	PUU32	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
45	405 740	7 112 891	100,2	PUU33	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
46	405 042	7 110 380	105,8	PUU34	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
47	405 532	7 111 130	103,9	PUU35	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
48	406 114	7 112 133	103,1	PUU36	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
49	406 380	7 113 067	107,2	PUU37	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
50	405 707	7 108 791	110,8	PUU38	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
51	405 822	7 109 587	108,8	PUU39	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0

To be continued on next page...

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

...continued from previous page

	East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]
52	405 893	7 110 455	104,9	PUU40	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
53	406 257	7 111 298	103,9	PUU41	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
54	406 558	7 109 872	106,6	PUU42	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
55	406 638	7 110 744	105,9	PUU43	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
56	407 324	7 109 954	108,4	PUU44	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
57	407 269	7 110 957	112,6	PUU45	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
58	407 963	7 109 542	113,6	PUU46	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
59	407 809	7 110 582	116,1	PUU47	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
60	408 414	7 110 457	120,0	PUU48	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0
61	408 786	7 109 772	117,5	PUU49	Yes	GE WIND ENERGY	5.3-158 Thrust 700-5 300	5 300	158,0	200,0	USER	5.3-158 106.0 +2 dB HH200	8,0	106,0

Calculation Results

Sound level

Noise sensitive area No.	Name	East	North	Z [m]	Immission height [m]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	4,0	40,0	46,4	-1 563
B	Autiotalo B (Ylivieskantie, Pöhlölä)	403 894	7 109 182	114,4	4,0	40,0	49,5	-952
C	Autiotalo C (Perkkiöntie 382)	404 620	7 108 247	113,8	4,0	40,0	39,8	43
D	Asuinrakennus D (Alakyläntie 243)	408 659	7 108 752	119,4	4,0	40,0	39,6	54
E	Lomarakennus E (Kellokankaan metsätie)	410 199	7 110 115	122,5	4,0	40,0	35,1	650
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	4,0	40,0	34,9	908
G	Lomarakennus G (Ollilantie, Siliäkuru)	404 837	7 114 441	100,0	4,0	40,0	36,8	535
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	4,0	40,0	34,7	1 244
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	4,0	40,0	34,0	1 321
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	4,0	40,0	31,9	1 931
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	4,0	40,0	36,9	480
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	4,0	40,0	39,7	49
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	4,0	40,0	34,5	922

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
1	4391	5527	6703	9193	9901	4616	3811	5038	6092	6937	6308	6788	5373
2	4782	5718	6870	9030	9586	3956	3193	5809	6867	7687	6917	6944	4725
3	3089	4061	5231	7781	8622	4162	3294	5372	6147	6633	5411	5312	4838
4	3575	4324	5461	7672	8362	3529	2665	5962	6785	7296	6028	5531	4225
5	9619	11361	12260	16134	17530	13424	12590	4196	4212	5465	8201	12382	14165
6	8578	10314	11201	15092	16514	12590	11745	3218	3144	4426	7135	11322	13319
7	8136	9869	10751	14648	16082	12240	11390	2818	2690	3994	6684	10872	12963
8	9290	11018	11886	15800	17241	13331	12488	3964	3806	4960	7746	12007	14062
9	7531	9267	10160	14045	15471	11659	10807	2213	2131	3550	6150	10281	12378
10	8755	10463	11292	15246	16738	13072	12218	3607	3220	4243	7073	11413	13788
11	7979	9674	10484	14455	15972	12487	11626	3017	2437	3416	6244	10606	13189
12	8876	10545	11311	15316	16875	13488	12627	4020	3359	4071	6969	11432	14188
13	4239	5908	7032	10398	11518	7154	6304	2353	3444	4518	4813	7143	7877
14	3500	5238	6304	9892	11164	7417	6550	2212	2897	3657	3752	6420	8096
15	3332	4968	6104	9441	10579	6488	5624	3021	3852	4602	4302	6214	7182
16	2984	4730	5684	9498	10935	7897	7033	2553	2632	2847	2621	5805	8521
17	2909	4660	5703	9357	10687	7280	6413	2657	3080	3535	3206	5821	7927
18	2599	4266	5387	8821	10040	6390	5523	3359	3944	4412	3698	5498	7043
19	3145	4645	5814	8945	9995	5754	4891	3747	4576	5244	4616	5917	6449
20	2193	3903	4810	8686	10191	7644	6795	3446	3349	3145	1968	4931	8215
21	1946	3702	4732	8431	9822	6906	6051	3567	3765	3826	2672	4849	7498
22	1847	3506	4627	8091	9362	6127	5269	3986	4391	4594	3360	4738	6732
23	2318	3758	4931	8084	9194	5428	4562	4309	4928	5317	4188	5032	6068
24	1725	3345	4188	8124	9690	7575	6747	4105	3908	3461	1597	4310	8100
25	1301	3058	4073	7809	9247	6720	5885	4201	4295	4144	2468	4191	7266
26	1514	3005	4164	7482	8712	5581	4735	4645	5049	5174	3635	4269	6156
27	1455	2853	3593	7591	9226	7590	6791	4770	4492	3855	1437	3715	8064
28	651	2400	3409	7166	8642	6521	5714	4860	4894	4595	2508	3527	7014
29	1019	2360	3526	6853	8131	5456	4640	5211	5510	5467	3585	3629	5971
30	1949	2750	3923	6706	7754	4447	3621	5719	6216	6358	4614	4006	4991
31	595	1439	2345	6216	7804	6543	5804	5894	5812	5284	2728	2464	6935
32	683	1168	2311	5860	7318	5783	5054	6140	6219	5857	3446	2417	6170
33	1428	1524	2683	5649	6898	4862	4137	6445	6707	6533	4299	2764	5255
34	2179	2187	3261	5668	6692	4049	3319	6734	7145	7126	5048	3323	4464

To be continued on next page...

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DECIBEL - Main Result

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M
35	3212	3102	4060	5748	6454	3001	2282	7320	7879	8009	6066	4101	3434
36	1222	535	1645	5311	6865	5990	5318	6724	6720	6225	3621	1752	6303
37	1638	953	2057	5060	6409	5094	4437	6965	7133	6821	4383	2130	5402
38	2476	1995	2934	5055	6078	3989	3348	7318	7678	7573	5337	2977	4304
39	3561	3133	3954	5219	5844	2827	2244	7923	8446	8510	6436	3977	3133
40	4350	3950	4721	5498	5831	2014	1521	8412	9031	9196	7220	4734	2310
41	1880	238	1237	4636	6185	5752	5149	7378	7399	6900	4249	1316	5990
42	2260	1123	1937	4471	5779	4865	4287	7584	7764	7438	4941	1977	5092
43	3175	2418	3147	4587	5448	3583	3061	8012	8399	8297	6017	3163	3793
44	3950	3219	3862	4625	5172	2876	2475	8553	9030	9016	6809	3864	3012
45	4763	4143	4777	5064	5252	2016	1794	9027	9614	9721	7637	4775	2087
46	2913	1659	2174	3966	5164	4552	4066	8181	8399	8092	5584	2179	4692
47	3619	2545	3024	3928	4776	3771	3383	8640	8976	8792	6388	3014	3845
48	4604	3693	4163	4231	4556	2820	2638	9279	9751	9711	7438	4145	2764
49	5364	4612	5131	4879	4827	2003	2066	9690	10276	10366	8231	5115	1820
50	3609	1855	1216	2952	4683	6111	5717	9111	9083	8461	5664	1123	6130
51	3612	1970	1800	2957	4409	5319	4953	9056	9153	8675	5981	1742	5326
52	3760	2370	2549	3248	4319	4457	4124	9023	9253	8932	6374	2513	4455
53	4353	3172	3463	3500	4116	3667	3449	9367	9719	9531	7094	3430	3590
54	4350	2752	2529	2380	3649	5124	4882	9743	9889	9450	6769	2456	5020
55	4550	3157	3211	2837	3616	4291	4112	9752	10022	9727	7171	3157	4153
56	5119	3516	3198	1796	2880	5247	5130	10494	10657	10218	7522	3112	5029
57	5213	3813	3790	2606	3049	4293	4249	10377	10673	10392	7833	3726	4037
58	5753	4085	3585	1052	2308	5867	5811	11179	11294	10785	8029	3484	5584
59	5668	4158	3953	2017	2435	4863	4871	10929	11174	10821	8187	3872	4546
60	6249	4696	4391	1722	1817	5274	5354	11539	11768	11385	8715	4301	4888
61	6575	4927	4436	1028	1454	6052	6115	11967	12116	11632	8883	4334	5667

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Laskentapiste A (Metsästysmaja)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 391	4 393	**14,38**	104,9		0,00	83,86	-	-	0,00	0,00	-
10	8 755	8 756	**7,06**	107,8		0,00	89,85	-	-	0,00	0,00	-
11	7 979	7 980	**8,21**	107,8		0,00	89,04	-	-	0,00	0,00	-
12	8 876	8 877	**6,89**	107,8		0,00	89,97	-	-	0,00	0,00	-
13	4 239	4 243	**16,39**	106,0	2	0,00	83,55	-	-	0,00	0,00	-
14	3 500	3 504	**19,06**	106,0	2	0,00	81,89	-	-	0,00	0,00	-
15	3 332	3 336	**19,74**	106,0	2	0,00	81,47	-	-	0,00	0,00	-
16	2 984	2 989	**21,25**	106,0	2	0,00	80,51	-	-	0,00	0,00	-
17	2 909	2 915	**21,60**	106,0	2	0,00	80,29	-	-	0,00	0,00	-
18	2 599	2 605	**23,12**	106,0	2	0,00	79,32	-	-	0,00	0,00	-
19	3 145	3 150	**20,53**	106,0	2	0,00	80,97	-	-	0,00	0,00	-
2	4 782	4 784	**13,21**	104,9		0,00	84,60	-	-	0,00	0,00	-
20	2 193	2 201	**25,36**	106,0	2	0,00	77,85	-	-	0,00	0,00	-
21	1 946	1 955	**26,90**	106,0	2	0,00	76,82	-	-	0,00	0,00	-
22	1 847	1 856	**27,56**	106,0	2	0,00	76,37	-	-	0,00	0,00	-
23	2 318	2 325	**24,63**	106,0	2	0,00	78,33	-	-	0,00	0,00	-
24	1 725	1 735	**28,42**	106,0	2	0,00	75,79	-	-	0,00	0,00	-
25	1 301	1 314	**31,84**	106,0	2	0,00	73,37	-	-	0,00	0,00	-
26	1 514	1 526	**30,02**	106,0	2	0,00	74,67	-	-	0,00	0,00	-
27	1 455	1 467	**30,51**	106,0	2	0,00	74,33	-	-	0,00	0,00	-
28	651	678	**39,42**	106,0	2	0,00	67,62	-	-	0,00	0,00	-
29	1 019	1 037	**34,65**	106,0	2	0,00	71,31	-	-	0,00	0,00	-
3	3 089	3 093	**19,10**	104,9		0,00	80,81	-	-	0,00	0,00	-
30	1 949	1 959	**26,87**	106,0	2	0,00	76,84	-	-	0,00	0,00	-
31	595	626	**40,28**	106,0	2	0,00	66,93	-	-	0,00	0,00	-
32	683	710	**38,92**	106,0	2	0,00	68,02	-	-	0,00	0,00	-
33	1 428	1 440	**30,73**	106,0	2	0,00	74,17	-	-	0,00	0,00	-
34	2 179	2 187	**25,44**	106,0	2	0,00	77,80	-	-	0,00	0,00	-
35	3 212	3 217	**20,25**	106,0	2	0,00	81,15	-	-	0,00	0,00	-
36	1 222	1 239	**32,56**	106,0	2	0,00	72,86	-	-	0,00	0,00	-
37	1 638	1 649	**29,05**	106,0	2	0,00	75,35	-	-	0,00	0,00	-
38	2 476	2 483	**23,76**	106,0	2	0,00	78,90	-	-	0,00	0,00	-
39	3 561	3 566	**18,82**	106,0	2	0,00	82,04	-	-	0,00	0,00	-
4	3 575	3 578	**17,17**	104,9		0,00	82,07	-	-	0,00	0,00	-
40	4 350	4 354	**16,03**	106,0	2	0,00	83,78	-	-	0,00	0,00	-
41	1 880	1 890	**27,33**	106,0	2	0,00	76,53	-	-	0,00	0,00	-
42	2 260	2 268	**24,96**	106,0	2	0,00	78,11	-	-	0,00	0,00	-
43	3 175	3 181	**20,40**	106,0	2	0,00	81,05	-	-	0,00	0,00	-
44	3 950	3 955	**17,38**	106,0	2	0,00	82,94	-	-	0,00	0,00	-
45	4 763	4 767	**14,75**	106,0	2	0,00	84,56	-	-	0,00	0,00	-
46	2 913	2 919	**21,58**	106,0	2	0,00	80,30	-	-	0,00	0,00	-
47	3 619	3 624	**18,60**	106,0	2	0,00	82,18	-	-	0,00	0,00	-
48	4 604	4 607	**15,23**	106,0	2	0,00	84,27	-	-	0,00	0,00	-

To be continued on next page...

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
49	5 364	5 368	**13,07**	106,0	2	0,00	85,60	-	-	0,00	0,00	-
5	9 619	9 620	**5,89**	107,8		0,00	90,66	-	-	0,00	0,00	-
50	3 609	3 614	**18,63**	106,0	2	0,00	82,16	-	-	0,00	0,00	-
51	3 612	3 617	**18,62**	106,0	2	0,00	82,17	-	-	0,00	0,00	-
52	3 760	3 764	**18,07**	106,0	2	0,00	82,51	-	-	0,00	0,00	-
53	4 353	4 357	**16,02**	106,0	2	0,00	83,78	-	-	0,00	0,00	-
54	4 350	4 354	**16,02**	106,0	2	0,00	83,78	-	-	0,00	0,00	-
55	4 550	4 554	**15,39**	106,0	2	0,00	84,17	-	-	0,00	0,00	-
56	5 119	5 123	**13,73**	106,0	2	0,00	85,19	-	-	0,00	0,00	-
57	5 213	5 217	**13,48**	106,0	2	0,00	85,35	-	-	0,00	0,00	-
58	5 753	5 756	**12,09**	106,0	2	0,00	86,20	-	-	0,00	0,00	-
59	5 668	5 671	**12,30**	106,0	2	0,00	86,07	-	-	0,00	0,00	-
6	8 578	8 579	**7,31**	107,8		0,00	89,67	-	-	0,00	0,00	-
60	6 249	6 253	**10,97**	106,0	2	0,00	86,92	-	-	0,00	0,00	-
61	6 575	6 578	**10,36**	106,0	2	0,00	87,36	-	-	0,00	0,00	-
7	8 136	8 137	**7,97**	107,8		0,00	89,21	-	-	0,00	0,00	-
8	9 290	9 291	**6,32**	107,8		0,00	90,36	-	-	0,00	0,00	-
9	7 531	7 532	**8,93**	107,8		0,00	88,54	-	-	0,00	0,00	-
Sum			**46,44**									

- Data undefined due to calculation with octave data

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 527	5 529	**11,47**	104,9		0,00	85,85	-	-	0,00	0,00	-
10	10 463	10 463	**4,85**	107,8		0,00	91,39	-	-	0,00	0,00	-
11	9 674	9 674	**5,82**	107,8		0,00	90,71	-	-	0,00	0,00	-
12	10 545	10 546	**4,75**	107,8		0,00	91,46	-	-	0,00	0,00	-
13	5 908	5 910	**11,72**	106,0	2	0,00	86,43	-	-	0,00	0,00	-
14	5 238	5 241	**13,41**	106,0	2	0,00	85,39	-	-	0,00	0,00	-
15	4 968	4 971	**14,16**	106,0	2	0,00	84,93	-	-	0,00	0,00	-
16	4 730	4 734	**14,85**	106,0	2	0,00	84,50	-	-	0,00	0,00	-
17	4 660	4 663	**15,06**	106,0	2	0,00	84,37	-	-	0,00	0,00	-
18	4 266	4 270	**16,30**	106,0	2	0,00	83,61	-	-	0,00	0,00	-
19	4 645	4 648	**15,10**	106,0	2	0,00	84,35	-	-	0,00	0,00	-
2	5 718	5 720	**11,05**	104,9		0,00	86,15	-	-	0,00	0,00	-
20	3 903	3 907	**17,54**	106,0	2	0,00	82,84	-	-	0,00	0,00	-
21	3 702	3 707	**18,28**	106,0	2	0,00	82,38	-	-	0,00	0,00	-
22	3 506	3 511	**19,04**	106,0	2	0,00	81,91	-	-	0,00	0,00	-
23	3 758	3 763	**18,07**	106,0	2	0,00	82,51	-	-	0,00	0,00	-
24	3 345	3 350	**19,68**	106,0	2	0,00	81,50	-	-	0,00	0,00	-
25	3 058	3 064	**20,92**	106,0	2	0,00	80,72	-	-	0,00	0,00	-
26	3 005	3 011	**21,15**	106,0	2	0,00	80,57	-	-	0,00	0,00	-
27	2 853	2 859	**21,86**	106,0	2	0,00	80,12	-	-	0,00	0,00	-
28	2 400	2 407	**24,17**	106,0	2	0,00	78,63	-	-	0,00	0,00	-
29	2 360	2 367	**24,39**	106,0	2	0,00	78,49	-	-	0,00	0,00	-
3	4 061	4 063	**15,45**	104,9		0,00	83,18	-	-	0,00	0,00	-
30	2 750	2 757	**22,35**	106,0	2	0,00	79,81	-	-	0,00	0,00	-
31	1 439	1 452	**30,63**	106,0	2	0,00	74,24	-	-	0,00	0,00	-
32	1 168	1 184	**33,09**	106,0	2	0,00	72,47	-	-	0,00	0,00	-
33	1 524	1 536	**29,94**	106,0	2	0,00	74,73	-	-	0,00	0,00	-
34	2 187	2 195	**25,39**	106,0	2	0,00	77,83	-	-	0,00	0,00	-
35	3 102	3 108	**20,72**	106,0	2	0,00	80,85	-	-	0,00	0,00	-
36	535	570	**41,28**	106,0	2	0,00	66,12	-	-	0,00	0,00	-
37	953	971	**35,40**	106,0	2	0,00	70,75	-	-	0,00	0,00	-
38	1 995	2 004	**26,58**	106,0	2	0,00	77,04	-	-	0,00	0,00	-
39	3 133	3 139	**20,58**	106,0	2	0,00	80,93	-	-	0,00	0,00	-
4	4 324	4 327	**14,59**	104,9		0,00	83,72	-	-	0,00	0,00	-
40	3 950	3 954	**17,38**	106,0	2	0,00	82,94	-	-	0,00	0,00	-
41	238	305	**47,66**	106,0	2	0,00	60,69	-	-	0,00	0,00	-
42	1 123	1 139	**33,55**	106,0	2	0,00	72,13	-	-	0,00	0,00	-
43	2 418	2 425	**24,07**	106,0	2	0,00	78,70	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
44	3 219	3 225	**20,21**	106,0	2	0,00	81,17	-	-	0,00	0,00	-
45	4 143	4 147	**16,71**	106,0	2	0,00	83,35	-	-	0,00	0,00	-
46	1 659	1 670	**28,90**	106,0	2	0,00	75,45	-	-	0,00	0,00	-
47	2 545	2 552	**23,39**	106,0	2	0,00	79,14	-	-	0,00	0,00	-
48	3 693	3 697	**18,32**	106,0	2	0,00	82,36	-	-	0,00	0,00	-
49	4 612	4 616	**15,20**	106,0	2	0,00	84,29	-	-	0,00	0,00	-
5	11 361	11 361	**3,83**	107,8		0,00	92,11	-	-	0,00	0,00	-
50	1 855	1 865	**27,50**	106,0	2	0,00	76,41	-	-	0,00	0,00	-
51	1 970	1 979	**26,74**	106,0	2	0,00	76,93	-	-	0,00	0,00	-
52	2 370	2 377	**24,34**	106,0	2	0,00	78,52	-	-	0,00	0,00	-
53	3 172	3 177	**20,42**	106,0	2	0,00	81,04	-	-	0,00	0,00	-
54	2 752	2 758	**22,35**	106,0	2	0,00	79,81	-	-	0,00	0,00	-
55	3 157	3 163	**20,48**	106,0	2	0,00	81,00	-	-	0,00	0,00	-
56	3 516	3 521	**19,00**	106,0	2	0,00	81,93	-	-	0,00	0,00	-
57	3 813	3 818	**17,87**	106,0	2	0,00	82,64	-	-	0,00	0,00	-
58	4 085	4 090	**16,91**	106,0	2	0,00	83,23	-	-	0,00	0,00	-
59	4 158	4 162	**16,66**	106,0	2	0,00	83,39	-	-	0,00	0,00	-
6	10 314	10 315	**5,03**	107,8		0,00	91,27	-	-	0,00	0,00	-
60	4 696	4 701	**14,95**	106,0	2	0,00	84,44	-	-	0,00	0,00	-
61	4 927	4 931	**14,27**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
7	9 869	9 869	**5,57**	107,8		0,00	90,89	-	-	0,00	0,00	-
8	11 018	11 019	**4,21**	107,8		0,00	91,84	-	-	0,00	0,00	-
9	9 267	9 268	**6,35**	107,8		0,00	90,34	-	-	0,00	0,00	-
Sum			**49,45**									

- Data undefined due to calculation with octave data

Noise sensitive area: C Laskentapiste C (Perkkiöntie 382)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 703	6 705	**9,07**	104,9		0,00	87,53	-	-	0,00	0,00	-
10	11 292	11 293	**3,91**	107,8		0,00	92,06	-	-	0,00	0,00	-
11	10 484	10 485	**4,82**	107,8		0,00	91,41	-	-	0,00	0,00	-
12	11 311	11 312	**3,89**	107,8		0,00	92,07	-	-	0,00	0,00	-
13	7 032	7 034	**9,55**	106,0	2	0,00	87,94	-	-	0,00	0,00	-
14	6 304	6 306	**10,86**	106,0	2	0,00	87,00	-	-	0,00	0,00	-
15	6 104	6 107	**11,25**	106,0	2	0,00	86,72	-	-	0,00	0,00	-
16	5 684	5 687	**12,26**	106,0	2	0,00	86,10	-	-	0,00	0,00	-
17	5 703	5 706	**12,21**	106,0	2	0,00	86,13	-	-	0,00	0,00	-
18	5 387	5 390	**13,01**	106,0	2	0,00	85,63	-	-	0,00	0,00	-
19	5 814	5 817	**11,94**	106,0	2	0,00	86,29	-	-	0,00	0,00	-
2	6 870	6 872	**8,76**	104,9		0,00	87,74	-	-	0,00	0,00	-
20	4 810	4 813	**14,61**	106,0	2	0,00	84,65	-	-	0,00	0,00	-
21	4 732	4 735	**14,84**	106,0	2	0,00	84,51	-	-	0,00	0,00	-
22	4 627	4 631	**15,16**	106,0	2	0,00	84,31	-	-	0,00	0,00	-
23	4 931	4 934	**14,26**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
24	4 188	4 192	**16,56**	106,0	2	0,00	83,45	-	-	0,00	0,00	-
25	4 073	4 077	**16,95**	106,0	2	0,00	83,21	-	-	0,00	0,00	-
26	4 164	4 168	**16,64**	106,0	2	0,00	83,40	-	-	0,00	0,00	-
27	3 593	3 598	**18,69**	106,0	2	0,00	82,12	-	-	0,00	0,00	-
28	3 409	3 414	**19,42**	106,0	2	0,00	81,67	-	-	0,00	0,00	-
29	3 526	3 531	**18,96**	106,0	2	0,00	81,96	-	-	0,00	0,00	-
3	5 231	5 233	**12,14**	104,9		0,00	85,37	-	-	0,00	0,00	-
30	3 923	3 927	**17,47**	106,0	2	0,00	82,88	-	-	0,00	0,00	-
31	2 345	2 353	**24,47**	106,0	2	0,00	78,43	-	-	0,00	0,00	-
32	2 311	2 319	**24,67**	106,0	2	0,00	78,31	-	-	0,00	0,00	-
33	2 683	2 690	**22,69**	106,0	2	0,00	79,59	-	-	0,00	0,00	-
34	3 261	3 267	**20,03**	106,0	2	0,00	81,28	-	-	0,00	0,00	-
35	4 060	4 065	**16,99**	106,0	2	0,00	83,18	-	-	0,00	0,00	-
36	1 645	1 657	**29,00**	106,0	2	0,00	75,39	-	-	0,00	0,00	-
37	2 057	2 066	**26,18**	106,0	2	0,00	77,30	-	-	0,00	0,00	-
38	2 934	2 940	**21,48**	106,0	2	0,00	80,37	-	-	0,00	0,00	-
39	3 954	3 958	**17,36**	106,0	2	0,00	82,95	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
4	5 461	5 463	**11,61**	104,9		0,00	85,75	-	-	0,00	0,00	-
40	4 721	4 724	**14,88**	106,0	2	0,00	84,49	-	-	0,00	0,00	-
41	1 237	1 252	**32,42**	106,0	2	0,00	72,95	-	-	0,00	0,00	-
42	1 937	1 947	**26,95**	106,0	2	0,00	76,79	-	-	0,00	0,00	-
43	3 147	3 152	**20,53**	106,0	2	0,00	80,97	-	-	0,00	0,00	-
44	3 862	3 866	**17,69**	106,0	2	0,00	82,75	-	-	0,00	0,00	-
45	4 777	4 781	**14,71**	106,0	2	0,00	84,59	-	-	0,00	0,00	-
46	2 174	2 183	**25,46**	106,0	2	0,00	77,78	-	-	0,00	0,00	-
47	3 024	3 030	**21,07**	106,0	2	0,00	80,63	-	-	0,00	0,00	-
48	4 163	4 168	**16,64**	106,0	2	0,00	83,40	-	-	0,00	0,00	-
49	5 131	5 135	**13,70**	106,0	2	0,00	85,21	-	-	0,00	0,00	-
5	12 260	12 261	**2,89**	107,8		0,00	92,77	-	-	0,00	0,00	-
50	1 216	1 231	**32,63**	106,0	2	0,00	72,80	-	-	0,00	0,00	-
51	1 800	1 810	**27,88**	106,0	2	0,00	76,16	-	-	0,00	0,00	-
52	2 549	2 556	**23,37**	106,0	2	0,00	79,15	-	-	0,00	0,00	-
53	3 463	3 468	**19,21**	106,0	2	0,00	81,80	-	-	0,00	0,00	-
54	2 529	2 536	**23,48**	106,0	2	0,00	79,08	-	-	0,00	0,00	-
55	3 211	3 216	**20,25**	106,0	2	0,00	81,15	-	-	0,00	0,00	-
56	3 198	3 204	**20,30**	106,0	2	0,00	81,11	-	-	0,00	0,00	-
57	3 790	3 795	**17,95**	106,0	2	0,00	82,58	-	-	0,00	0,00	-
58	3 585	3 591	**18,72**	106,0	2	0,00	82,10	-	-	0,00	0,00	-
59	3 953	3 958	**17,37**	106,0	2	0,00	82,95	-	-	0,00	0,00	-
6	11 201	11 202	**4,01**	107,8		0,00	91,99	-	-	0,00	0,00	-
60	4 391	4 395	**15,89**	106,0	2	0,00	83,86	-	-	0,00	0,00	-
61	4 436	4 441	**15,75**	106,0	2	0,00	83,95	-	-	0,00	0,00	-
7	10 751	10 751	**4,51**	107,8		0,00	91,63	-	-	0,00	0,00	-
8	11 886	11 886	**3,28**	107,8		0,00	92,50	-	-	0,00	0,00	-
9	10 160	10 161	**5,21**	107,8		0,00	91,14	-	-	0,00	0,00	-
Sum			**39,78**									

- Data undefined due to calculation with octave data

Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	9 193	9 194	**5,05**	104,9		0,00	90,27	-	-	0,00	0,00	-
10	15 246	15 247	**0,21**	107,8		0,00	94,66	-	-	0,00	0,00	-
11	14 455	14 456	**0,87**	107,8		0,00	94,20	-	-	0,00	0,00	-
12	15 316	15 317	**0,16**	107,8		0,00	94,70	-	-	0,00	0,00	-
13	10 398	10 400	**4,81**	106,0	2	0,00	91,34	-	-	0,00	0,00	-
14	9 892	9 893	**5,43**	106,0	2	0,00	90,91	-	-	0,00	0,00	-
15	9 441	9 442	**5,98**	106,0	2	0,00	90,50	-	-	0,00	0,00	-
16	9 498	9 500	**5,90**	106,0	2	0,00	90,55	-	-	0,00	0,00	-
17	9 357	9 358	**6,09**	106,0	2	0,00	90,42	-	-	0,00	0,00	-
18	8 821	8 822	**6,80**	106,0	2	0,00	89,91	-	-	0,00	0,00	-
19	8 945	8 947	**6,63**	106,0	2	0,00	90,03	-	-	0,00	0,00	-
2	9 030	9 031	**5,28**	104,9		0,00	90,11	-	-	0,00	0,00	-
20	8 686	8 688	**6,99**	106,0	2	0,00	89,78	-	-	0,00	0,00	-
21	8 431	8 433	**7,35**	106,0	2	0,00	89,52	-	-	0,00	0,00	-
22	8 091	8 093	**7,85**	106,0	2	0,00	89,16	-	-	0,00	0,00	-
23	8 084	8 086	**7,86**	106,0	2	0,00	89,15	-	-	0,00	0,00	-
24	8 124	8 126	**7,80**	106,0	2	0,00	89,20	-	-	0,00	0,00	-
25	7 809	7 811	**8,28**	106,0	2	0,00	88,85	-	-	0,00	0,00	-
26	7 482	7 484	**8,80**	106,0	2	0,00	88,48	-	-	0,00	0,00	-
27	7 591	7 593	**8,62**	106,0	2	0,00	88,61	-	-	0,00	0,00	-
28	7 166	7 168	**9,32**	106,0	2	0,00	88,11	-	-	0,00	0,00	-
29	6 853	6 855	**9,86**	106,0	2	0,00	87,72	-	-	0,00	0,00	-
3	7 781	7 782	**7,19**	104,9		0,00	88,82	-	-	0,00	0,00	-
30	6 706	6 708	**10,12**	106,0	2	0,00	87,53	-	-	0,00	0,00	-
31	6 216	6 219	**11,03**	106,0	2	0,00	86,87	-	-	0,00	0,00	-
32	5 860	5 863	**11,83**	106,0	2	0,00	86,36	-	-	0,00	0,00	-
33	5 649	5 652	**12,35**	106,0	2	0,00	86,04	-	-	0,00	0,00	-
34	5 668	5 671	**12,30**	106,0	2	0,00	86,07	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
35	5 748	5 751	**12,10**	106,0	2	0,00	86,20	-	-	0,00	0,00	-
36	5 311	5 314	**13,21**	106,0	2	0,00	85,51	-	-	0,00	0,00	-
37	5 060	5 063	**13,90**	106,0	2	0,00	85,09	-	-	0,00	0,00	-
38	5 055	5 058	**13,91**	106,0	2	0,00	85,08	-	-	0,00	0,00	-
39	5 219	5 223	**13,46**	106,0	2	0,00	85,36	-	-	0,00	0,00	-
4	7 672	7 673	**7,37**	104,9		0,00	88,70	-	-	0,00	0,00	-
40	5 498	5 501	**12,73**	106,0	2	0,00	85,81	-	-	0,00	0,00	-
41	4 636	4 640	**15,13**	106,0	2	0,00	84,33	-	-	0,00	0,00	-
42	4 471	4 475	**15,64**	106,0	2	0,00	84,01	-	-	0,00	0,00	-
43	4 587	4 590	**15,28**	106,0	2	0,00	84,24	-	-	0,00	0,00	-
44	4 625	4 629	**15,16**	106,0	2	0,00	84,31	-	-	0,00	0,00	-
45	5 064	5 067	**13,89**	106,0	2	0,00	85,10	-	-	0,00	0,00	-
46	3 966	3 970	**17,32**	106,0	2	0,00	82,98	-	-	0,00	0,00	-
47	3 928	3 932	**17,46**	106,0	2	0,00	82,89	-	-	0,00	0,00	-
48	4 231	4 235	**16,41**	106,0	2	0,00	83,54	-	-	0,00	0,00	-
49	4 879	4 883	**14,41**	106,0	2	0,00	84,77	-	-	0,00	0,00	-
5	16 134	16 134	**-0,48**	107,8		0,00	95,16	-	-	0,00	0,00	-
50	2 952	2 958	**21,40**	106,0	2	0,00	80,42	-	-	0,00	0,00	-
51	2 957	2 963	**21,37**	106,0	2	0,00	80,43	-	-	0,00	0,00	-
52	3 248	3 253	**20,09**	106,0	2	0,00	81,25	-	-	0,00	0,00	-
53	3 500	3 504	**19,06**	106,0	2	0,00	81,89	-	-	0,00	0,00	-
54	2 380	2 387	**24,28**	106,0	2	0,00	78,56	-	-	0,00	0,00	-
55	2 837	2 843	**21,94**	106,0	2	0,00	80,08	-	-	0,00	0,00	-
56	1 796	1 805	**27,91**	106,0	2	0,00	76,13	-	-	0,00	0,00	-
57	2 606	2 613	**23,08**	106,0	2	0,00	79,34	-	-	0,00	0,00	-
58	1 052	1 069	**34,29**	106,0	2	0,00	71,58	-	-	0,00	0,00	-
59	2 017	2 026	**26,43**	106,0	2	0,00	77,13	-	-	0,00	0,00	-
6	15 092	15 092	**0,34**	107,8		0,00	94,58	-	-	0,00	0,00	-
60	1 722	1 733	**28,43**	106,0	2	0,00	75,78	-	-	0,00	0,00	-
61	1 028	1 046	**34,55**	106,0	2	0,00	71,39	-	-	0,00	0,00	-
7	14 648	14 649	**0,71**	107,8		0,00	94,32	-	-	0,00	0,00	-
8	15 800	15 800	**-0,22**	107,8		0,00	94,97	-	-	0,00	0,00	-
9	14 045	14 045	**1,22**	107,8		0,00	93,95	-	-	0,00	0,00	-
Sum			**39,56**									

- Data undefined due to calculation with octave data

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	9 901	9 902	**4,10**	104,9		0,00	90,91	-	-	0,00	0,00	-
10	16 738	16 738	**-0,93**	107,8		0,00	95,47	-	-	0,00	0,00	-
11	15 972	15 973	**-0,36**	107,8		0,00	95,07	-	-	0,00	0,00	-
12	16 875	16 875	**-1,03**	107,8		0,00	95,54	-	-	0,00	0,00	-
13	11 518	11 520	**3,57**	106,0	2	0,00	92,23	-	-	0,00	0,00	-
14	11 164	11 165	**3,96**	106,0	2	0,00	91,96	-	-	0,00	0,00	-
15	10 579	10 581	**4,60**	106,0	2	0,00	91,49	-	-	0,00	0,00	-
16	10 935	10 936	**4,20**	106,0	2	0,00	91,78	-	-	0,00	0,00	-
17	10 687	10 688	**4,48**	106,0	2	0,00	91,58	-	-	0,00	0,00	-
18	10 040	10 042	**5,23**	106,0	2	0,00	91,04	-	-	0,00	0,00	-
19	9 995	9 996	**5,29**	106,0	2	0,00	91,00	-	-	0,00	0,00	-
2	9 586	9 586	**4,52**	104,9		0,00	90,63	-	-	0,00	0,00	-
20	10 191	10 192	**5,05**	106,0	2	0,00	91,17	-	-	0,00	0,00	-
21	9 822	9 823	**5,50**	106,0	2	0,00	90,85	-	-	0,00	0,00	-
22	9 362	9 363	**6,08**	106,0	2	0,00	90,43	-	-	0,00	0,00	-
23	9 194	9 196	**6,30**	106,0	2	0,00	90,27	-	-	0,00	0,00	-
24	9 690	9 692	**5,66**	106,0	2	0,00	90,73	-	-	0,00	0,00	-
25	9 246	9 248	**6,23**	106,0	2	0,00	90,32	-	-	0,00	0,00	-
26	8 712	8 714	**6,95**	106,0	2	0,00	89,80	-	-	0,00	0,00	-
27	9 226	9 228	**6,26**	106,0	2	0,00	90,30	-	-	0,00	0,00	-
28	8 642	8 644	**7,05**	106,0	2	0,00	89,73	-	-	0,00	0,00	-
29	8 131	8 133	**7,79**	106,0	2	0,00	89,21	-	-	0,00	0,00	-
3	8 622	8 623	**5,88**	104,9		0,00	89,71	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
30	7 754	7 756	**8,36**	106,0	2	0,00	88,79	-	-	0,00	0,00	-
31	7 804	7 806	**8,29**	106,0	2	0,00	88,85	-	-	0,00	0,00	-
32	7 318	7 320	**9,07**	106,0	2	0,00	88,29	-	-	0,00	0,00	-
33	6 898	6 900	**9,78**	106,0	2	0,00	87,78	-	-	0,00	0,00	-
34	6 692	6 695	**10,14**	106,0	2	0,00	87,51	-	-	0,00	0,00	-
35	6 454	6 457	**10,58**	106,0	2	0,00	87,20	-	-	0,00	0,00	-
36	6 865	6 868	**9,84**	106,0	2	0,00	87,74	-	-	0,00	0,00	-
37	6 409	6 412	**10,66**	106,0	2	0,00	87,14	-	-	0,00	0,00	-
38	6 078	6 081	**11,32**	106,0	2	0,00	86,68	-	-	0,00	0,00	-
39	5 844	5 847	**11,87**	106,0	2	0,00	86,34	-	-	0,00	0,00	-
4	8 362	8 364	**6,27**	104,9		0,00	89,45	-	-	0,00	0,00	-
40	5 831	5 833	**11,90**	106,0	2	0,00	86,32	-	-	0,00	0,00	-
41	6 185	6 188	**11,09**	106,0	2	0,00	86,83	-	-	0,00	0,00	-
42	5 779	5 782	**12,02**	106,0	2	0,00	86,24	-	-	0,00	0,00	-
43	5 448	5 451	**12,86**	106,0	2	0,00	85,73	-	-	0,00	0,00	-
44	5 172	5 175	**13,59**	106,0	2	0,00	85,28	-	-	0,00	0,00	-
45	5 252	5 255	**13,37**	106,0	2	0,00	85,41	-	-	0,00	0,00	-
46	5 164	5 167	**13,61**	106,0	2	0,00	85,26	-	-	0,00	0,00	-
47	4 776	4 779	**14,71**	106,0	2	0,00	84,59	-	-	0,00	0,00	-
48	4 556	4 560	**15,38**	106,0	2	0,00	84,18	-	-	0,00	0,00	-
49	4 827	4 830	**14,56**	106,0	2	0,00	84,68	-	-	0,00	0,00	-
5	17 530	17 530	**-1,50**	107,8		0,00	95,88	-	-	0,00	0,00	-
50	4 683	4 687	**14,99**	106,0	2	0,00	84,42	-	-	0,00	0,00	-
51	4 409	4 413	**15,84**	106,0	2	0,00	83,89	-	-	0,00	0,00	-
52	4 319	4 323	**16,13**	106,0	2	0,00	83,72	-	-	0,00	0,00	-
53	4 116	4 119	**16,80**	106,0	2	0,00	83,30	-	-	0,00	0,00	-
54	3 649	3 654	**18,48**	106,0	2	0,00	82,25	-	-	0,00	0,00	-
55	3 616	3 621	**18,61**	106,0	2	0,00	82,18	-	-	0,00	0,00	-
56	2 880	2 885	**21,74**	106,0	2	0,00	80,20	-	-	0,00	0,00	-
57	3 049	3 054	**20,96**	106,0	2	0,00	80,70	-	-	0,00	0,00	-
58	2 308	2 316	**24,68**	106,0	2	0,00	78,29	-	-	0,00	0,00	-
59	2 435	2 443	**23,98**	106,0	2	0,00	78,76	-	-	0,00	0,00	-
6	16 514	16 515	**-0,77**	107,8		0,00	95,36	-	-	0,00	0,00	-
60	1 817	1 828	**27,76**	106,0	2	0,00	76,24	-	-	0,00	0,00	-
61	1 454	1 467	**30,51**	106,0	2	0,00	74,33	-	-	0,00	0,00	-
7	16 082	16 082	**-0,44**	107,8		0,00	95,13	-	-	0,00	0,00	-
8	17 241	17 241	**-1,30**	107,8		0,00	95,73	-	-	0,00	0,00	-
9	15 471	15 471	**0,04**	107,8		0,00	94,79	-	-	0,00	0,00	-
Sum			**35,12**									

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4 616	4 619	**13,69**	104,9		0,00	84,29	-	-	0,00	0,00	-
10	13 072	13 073	**2,10**	107,8		0,00	93,33	-	-	0,00	0,00	-
11	12 487	12 487	**2,67**	107,8		0,00	92,93	-	-	0,00	0,00	-
12	13 488	13 489	**1,72**	107,8		0,00	93,60	-	-	0,00	0,00	-
13	7 154	7 157	**9,34**	106,0	2	0,00	88,09	-	-	0,00	0,00	-
14	7 417	7 419	**8,92**	106,0	2	0,00	88,41	-	-	0,00	0,00	-
15	6 488	6 491	**10,52**	106,0	2	0,00	87,25	-	-	0,00	0,00	-
16	7 897	7 900	**8,14**	106,0	2	0,00	88,95	-	-	0,00	0,00	-
17	7 280	7 283	**9,13**	106,0	2	0,00	88,25	-	-	0,00	0,00	-
18	6 390	6 393	**10,70**	106,0	2	0,00	87,11	-	-	0,00	0,00	-
19	5 754	5 758	**12,08**	106,0	2	0,00	86,21	-	-	0,00	0,00	-
2	3 956	3 960	**15,80**	104,9		0,00	82,95	-	-	0,00	0,00	-
20	7 644	7 647	**8,54**	106,0	2	0,00	88,67	-	-	0,00	0,00	-
21	6 906	6 909	**9,76**	106,0	2	0,00	87,79	-	-	0,00	0,00	-
22	6 127	6 131	**11,20**	106,0	2	0,00	86,75	-	-	0,00	0,00	-
23	5 428	5 432	**12,91**	106,0	2	0,00	85,70	-	-	0,00	0,00	-
24	7 575	7 577	**8,65**	106,0	2	0,00	88,59	-	-	0,00	0,00	-
25	6 720	6 724	**10,09**	106,0	2	0,00	87,55	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
26	5 581	5 585	**12,51**	106,0	2	0,00	85,94	-	-	0,00	0,00	-
27	7 590	7 593	**8,62**	106,0	2	0,00	88,61	-	-	0,00	0,00	-
28	6 521	6 524	**10,46**	106,0	2	0,00	87,29	-	-	0,00	0,00	-
29	5 456	5 460	**12,83**	106,0	2	0,00	85,74	-	-	0,00	0,00	-
3	4 162	4 165	**15,11**	104,9		0,00	83,39	-	-	0,00	0,00	-
30	4 447	4 452	**15,71**	106,0	2	0,00	83,97	-	-	0,00	0,00	-
31	6 543	6 547	**10,41**	106,0	2	0,00	87,32	-	-	0,00	0,00	-
32	5 783	5 787	**12,01**	106,0	2	0,00	86,25	-	-	0,00	0,00	-
33	4 862	4 867	**14,46**	106,0	2	0,00	84,75	-	-	0,00	0,00	-
34	4 049	4 055	**17,02**	106,0	2	0,00	83,16	-	-	0,00	0,00	-
35	3 001	3 009	**21,16**	106,0	2	0,00	80,57	-	-	0,00	0,00	-
36	5 990	5 994	**11,52**	106,0	2	0,00	86,55	-	-	0,00	0,00	-
37	5 094	5 098	**13,80**	106,0	2	0,00	85,15	-	-	0,00	0,00	-
38	3 989	3 994	**17,24**	106,0	2	0,00	83,03	-	-	0,00	0,00	-
39	2 827	2 835	**21,97**	106,0	2	0,00	80,05	-	-	0,00	0,00	-
4	3 529	3 533	**17,33**	104,9		0,00	81,96	-	-	0,00	0,00	-
40	2 014	2 025	**26,44**	106,0	2	0,00	77,13	-	-	0,00	0,00	-
41	5 752	5 756	**12,09**	106,0	2	0,00	86,20	-	-	0,00	0,00	-
42	4 865	4 870	**14,45**	106,0	2	0,00	84,75	-	-	0,00	0,00	-
43	3 583	3 590	**18,73**	106,0	2	0,00	82,10	-	-	0,00	0,00	-
44	2 876	2 884	**21,74**	106,0	2	0,00	80,20	-	-	0,00	0,00	-
45	2 016	2 027	**26,43**	106,0	2	0,00	77,14	-	-	0,00	0,00	-
46	4 552	4 557	**15,38**	106,0	2	0,00	84,17	-	-	0,00	0,00	-
47	3 771	3 777	**18,02**	106,0	2	0,00	82,54	-	-	0,00	0,00	-
48	2 820	2 828	**22,01**	106,0	2	0,00	80,03	-	-	0,00	0,00	-
49	2 003	2 015	**26,51**	106,0	2	0,00	77,08	-	-	0,00	0,00	-
5	13 424	13 425	**1,78**	107,8		0,00	93,56	-	-	0,00	0,00	-
50	6 111	6 115	**11,24**	106,0	2	0,00	86,73	-	-	0,00	0,00	-
51	5 319	5 324	**13,19**	106,0	2	0,00	85,52	-	-	0,00	0,00	-
52	4 457	4 462	**15,68**	106,0	2	0,00	83,99	-	-	0,00	0,00	-
53	3 667	3 673	**18,41**	106,0	2	0,00	82,30	-	-	0,00	0,00	-
54	5 124	5 128	**13,72**	106,0	2	0,00	85,20	-	-	0,00	0,00	-
55	4 291	4 296	**16,21**	106,0	2	0,00	83,66	-	-	0,00	0,00	-
56	5 247	5 252	**13,38**	106,0	2	0,00	85,41	-	-	0,00	0,00	-
57	4 293	4 298	**16,21**	106,0	2	0,00	83,67	-	-	0,00	0,00	-
58	5 867	5 871	**11,81**	106,0	2	0,00	86,37	-	-	0,00	0,00	-
59	4 863	4 868	**14,45**	106,0	2	0,00	84,75	-	-	0,00	0,00	-
6	12 590	12 591	**2,57**	107,8		0,00	93,00	-	-	0,00	0,00	-
60	5 274	5 279	**13,31**	106,0	2	0,00	85,45	-	-	0,00	0,00	-
61	6 052	6 056	**11,37**	106,0	2	0,00	86,64	-	-	0,00	0,00	-
7	12 240	12 241	**2,91**	107,8		0,00	92,76	-	-	0,00	0,00	-
8	13 331	13 332	**1,86**	107,8		0,00	93,50	-	-	0,00	0,00	-
9	11 659	11 660	**3,51**	107,8		0,00	92,33	-	-	0,00	0,00	-
Sum			**34,88**									

- Data undefined due to calculation with octave data

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	3 811	3 814	**16,31**	104,9		0,00	82,63	-	-	0,00	0,00	-
10	12 218	12 219	**2,94**	107,8		0,00	92,74	-	-	0,00	0,00	-
11	11 626	11 627	**3,55**	107,8		0,00	92,31	-	-	0,00	0,00	-
12	12 627	12 628	**2,53**	107,8		0,00	93,03	-	-	0,00	0,00	-
13	6 304	6 307	**10,86**	106,0	2	0,00	87,00	-	-	0,00	0,00	-
14	6 550	6 553	**10,42**	106,0	2	0,00	87,33	-	-	0,00	0,00	-
15	5 624	5 627	**12,41**	106,0	2	0,00	86,01	-	-	0,00	0,00	-
16	7 033	7 036	**9,54**	106,0	2	0,00	87,95	-	-	0,00	0,00	-
17	6 413	6 416	**10,66**	106,0	2	0,00	87,15	-	-	0,00	0,00	-
18	5 523	5 526	**12,66**	106,0	2	0,00	85,85	-	-	0,00	0,00	-
19	4 891	4 894	**14,38**	106,0	2	0,00	84,79	-	-	0,00	0,00	-
2	3 193	3 197	**18,66**	104,9		0,00	81,09	-	-	0,00	0,00	-
20	6 795	6 798	**9,96**	106,0	2	0,00	87,65	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
21	6 051	6 055	**11,38**	106,0	2	0,00	86,64	-	-	0,00	0,00	-
22	5 269	5 273	**13,32**	106,0	2	0,00	85,44	-	-	0,00	0,00	-
23	4 562	4 566	**15,36**	106,0	2	0,00	84,19	-	-	0,00	0,00	-
24	6 747	6 750	**10,04**	106,0	2	0,00	87,59	-	-	0,00	0,00	-
25	5 885	5 888	**11,77**	106,0	2	0,00	86,40	-	-	0,00	0,00	-
26	4 735	4 739	**14,83**	106,0	2	0,00	84,51	-	-	0,00	0,00	-
27	6 791	6 794	**9,97**	106,0	2	0,00	87,64	-	-	0,00	0,00	-
28	5 714	5 717	**12,18**	106,0	2	0,00	86,14	-	-	0,00	0,00	-
29	4 640	4 645	**15,11**	106,0	2	0,00	84,34	-	-	0,00	0,00	-
3	3 294	3 298	**18,25**	104,9		0,00	81,37	-	-	0,00	0,00	-
30	3 621	3 626	**18,59**	106,0	2	0,00	82,19	-	-	0,00	0,00	-
31	5 804	5 808	**11,96**	106,0	2	0,00	86,28	-	-	0,00	0,00	-
32	5 054	5 058	**13,91**	106,0	2	0,00	85,08	-	-	0,00	0,00	-
33	4 137	4 142	**16,73**	106,0	2	0,00	83,34	-	-	0,00	0,00	-
34	3 319	3 326	**19,79**	106,0	2	0,00	81,44	-	-	0,00	0,00	-
35	2 282	2 290	**24,83**	106,0	2	0,00	78,20	-	-	0,00	0,00	-
36	5 318	5 322	**13,19**	106,0	2	0,00	85,52	-	-	0,00	0,00	-
37	4 437	4 442	**15,74**	106,0	2	0,00	83,95	-	-	0,00	0,00	-
38	3 348	3 354	**19,67**	106,0	2	0,00	81,51	-	-	0,00	0,00	-
39	2 244	2 253	**25,05**	106,0	2	0,00	78,06	-	-	0,00	0,00	-
4	2 665	2 669	**21,01**	104,9		0,00	79,53	-	-	0,00	0,00	-
40	1 521	1 534	**29,96**	106,0	2	0,00	74,71	-	-	0,00	0,00	-
41	5 149	5 153	**13,65**	106,0	2	0,00	85,24	-	-	0,00	0,00	-
42	4 287	4 292	**16,23**	106,0	2	0,00	83,65	-	-	0,00	0,00	-
43	3 061	3 067	**20,90**	106,0	2	0,00	80,74	-	-	0,00	0,00	-
44	2 475	2 483	**23,76**	106,0	2	0,00	78,90	-	-	0,00	0,00	-
45	1 794	1 805	**27,92**	106,0	2	0,00	76,13	-	-	0,00	0,00	-
46	4 066	4 071	**16,97**	106,0	2	0,00	83,19	-	-	0,00	0,00	-
47	3 383	3 389	**19,53**	106,0	2	0,00	81,60	-	-	0,00	0,00	-
48	2 638	2 645	**22,91**	106,0	2	0,00	79,45	-	-	0,00	0,00	-
49	2 066	2 076	**26,12**	106,0	2	0,00	77,34	-	-	0,00	0,00	-
5	12 590	12 591	**2,57**	107,8		0,00	93,00	-	-	0,00	0,00	-
50	5 717	5 720	**12,18**	106,0	2	0,00	86,15	-	-	0,00	0,00	-
51	4 953	4 957	**14,20**	106,0	2	0,00	84,90	-	-	0,00	0,00	-
52	4 124	4 128	**16,77**	106,0	2	0,00	83,32	-	-	0,00	0,00	-
53	3 449	3 455	**19,26**	106,0	2	0,00	81,77	-	-	0,00	0,00	-
54	4 882	4 887	**14,40**	106,0	2	0,00	84,78	-	-	0,00	0,00	-
55	4 112	4 117	**16,81**	106,0	2	0,00	83,29	-	-	0,00	0,00	-
56	5 130	5 134	**13,70**	106,0	2	0,00	85,21	-	-	0,00	0,00	-
57	4 249	4 254	**16,35**	106,0	2	0,00	83,58	-	-	0,00	0,00	-
58	5 811	5 815	**11,94**	106,0	2	0,00	86,29	-	-	0,00	0,00	-
59	4 871	4 875	**14,43**	106,0	2	0,00	84,76	-	-	0,00	0,00	-
6	11 745	11 746	**3,42**	107,8		0,00	92,40	-	-	0,00	0,00	-
60	5 354	5 359	**13,10**	106,0	2	0,00	85,58	-	-	0,00	0,00	-
61	6 115	6 119	**11,23**	106,0	2	0,00	86,73	-	-	0,00	0,00	-
7	11 390	11 391	**3,80**	107,8		0,00	92,13	-	-	0,00	0,00	-
8	12 488	12 488	**2,67**	107,8		0,00	92,93	-	-	0,00	0,00	-
9	10 807	10 808	**4,45**	107,8		0,00	91,67	-	-	0,00	0,00	-
Sum			**36,84**									

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 038	5 041	**12,59**	104,9		0,00	85,05	-	-	0,00	0,00	-
10	3 607	3 610	**18,45**	107,8		0,00	82,15	-	-	0,00	0,00	-
11	3 017	3 020	**20,91**	107,8		0,00	80,60	-	-	0,00	0,00	-
12	4 020	4 022	**16,94**	107,8		0,00	83,09	-	-	0,00	0,00	-
13	2 353	2 362	**24,43**	106,0	2	0,00	78,46	-	-	0,00	0,00	-
14	2 212	2 222	**25,23**	106,0	2	0,00	77,93	-	-	0,00	0,00	-
15	3 021	3 028	**21,08**	106,0	2	0,00	80,62	-	-	0,00	0,00	-
16	2 553	2 562	**23,34**	106,0	2	0,00	79,17	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
17	2 657	2 665	**22,81**	106,0	2	0,00	79,51	-	-	0,00	0,00	-
18	3 359	3 365	**19,63**	106,0	2	0,00	81,54	-	-	0,00	0,00	-
19	3 747	3 753	**18,11**	106,0	2	0,00	82,49	-	-	0,00	0,00	-
2	5 809	5 811	**10,85**	104,9		0,00	86,29	-	-	0,00	0,00	-
20	3 446	3 452	**19,27**	106,0	2	0,00	81,76	-	-	0,00	0,00	-
21	3 567	3 573	**18,79**	106,0	2	0,00	82,06	-	-	0,00	0,00	-
22	3 986	3 991	**17,25**	106,0	2	0,00	83,02	-	-	0,00	0,00	-
23	4 309	4 314	**16,18**	106,0	2	0,00	83,70	-	-	0,00	0,00	-
24	4 105	4 110	**16,83**	106,0	2	0,00	83,28	-	-	0,00	0,00	-
25	4 201	4 206	**16,51**	106,0	2	0,00	83,48	-	-	0,00	0,00	-
26	4 645	4 650	**15,10**	106,0	2	0,00	84,35	-	-	0,00	0,00	-
27	4 770	4 774	**14,73**	106,0	2	0,00	84,58	-	-	0,00	0,00	-
28	4 860	4 864	**14,46**	106,0	2	0,00	84,74	-	-	0,00	0,00	-
29	5 211	5 216	**13,48**	106,0	2	0,00	85,35	-	-	0,00	0,00	-
3	5 372	5 375	**11,81**	104,9		0,00	85,61	-	-	0,00	0,00	-
30	5 719	5 723	**12,19**	106,0	2	0,00	86,15	-	-	0,00	0,00	-
31	5 894	5 898	**11,74**	106,0	2	0,00	86,41	-	-	0,00	0,00	-
32	6 140	6 144	**11,18**	106,0	2	0,00	86,77	-	-	0,00	0,00	-
33	6 445	6 449	**10,59**	106,0	2	0,00	87,19	-	-	0,00	0,00	-
34	6 734	6 738	**10,07**	106,0	2	0,00	87,57	-	-	0,00	0,00	-
35	7 320	7 323	**9,06**	106,0	2	0,00	88,29	-	-	0,00	0,00	-
36	6 724	6 727	**10,09**	106,0	2	0,00	87,56	-	-	0,00	0,00	-
37	6 965	6 968	**9,66**	106,0	2	0,00	87,86	-	-	0,00	0,00	-
38	7 318	7 321	**9,06**	106,0	2	0,00	88,29	-	-	0,00	0,00	-
39	7 923	7 926	**8,10**	106,0	2	0,00	88,98	-	-	0,00	0,00	-
4	5 962	5 964	**10,53**	104,9		0,00	86,51	-	-	0,00	0,00	-
40	8 412	8 415	**7,39**	106,0	2	0,00	89,50	-	-	0,00	0,00	-
41	7 378	7 381	**8,96**	106,0	2	0,00	88,36	-	-	0,00	0,00	-
42	7 584	7 587	**8,63**	106,0	2	0,00	88,60	-	-	0,00	0,00	-
43	8 012	8 015	**7,97**	106,0	2	0,00	89,08	-	-	0,00	0,00	-
44	8 553	8 556	**7,19**	106,0	2	0,00	89,65	-	-	0,00	0,00	-
45	9 027	9 030	**6,54**	106,0	2	0,00	90,11	-	-	0,00	0,00	-
46	8 181	8 184	**7,71**	106,0	2	0,00	89,26	-	-	0,00	0,00	-
47	8 640	8 642	**7,05**	106,0	2	0,00	89,73	-	-	0,00	0,00	-
48	9 279	9 282	**6,20**	106,0	2	0,00	90,35	-	-	0,00	0,00	-
49	9 690	9 692	**5,68**	106,0	2	0,00	90,73	-	-	0,00	0,00	-
5	4 196	4 198	**16,34**	107,8		0,00	83,46	-	-	0,00	0,00	-
50	9 111	9 114	**6,41**	106,0	2	0,00	90,19	-	-	0,00	0,00	-
51	9 056	9 059	**6,48**	106,0	2	0,00	90,14	-	-	0,00	0,00	-
52	9 023	9 026	**6,53**	106,0	2	0,00	90,11	-	-	0,00	0,00	-
53	9 367	9 369	**6,07**	106,0	2	0,00	90,43	-	-	0,00	0,00	-
54	9 743	9 745	**5,60**	106,0	2	0,00	90,78	-	-	0,00	0,00	-
55	9 752	9 754	**5,58**	106,0	2	0,00	90,78	-	-	0,00	0,00	-
56	10 494	10 496	**4,70**	106,0	2	0,00	91,42	-	-	0,00	0,00	-
57	10 377	10 380	**4,83**	106,0	2	0,00	91,32	-	-	0,00	0,00	-
58	11 179	11 181	**3,93**	106,0	2	0,00	91,97	-	-	0,00	0,00	-
59	10 929	10 931	**4,20**	106,0	2	0,00	91,77	-	-	0,00	0,00	-
6	3 218	3 222	**20,03**	107,8		0,00	81,16	-	-	0,00	0,00	-
60	11 539	11 541	**3,55**	106,0	2	0,00	92,25	-	-	0,00	0,00	-
61	11 967	11 969	**3,11**	106,0	2	0,00	92,56	-	-	0,00	0,00	-
7	2 818	2 822	**21,84**	107,8		0,00	80,01	-	-	0,00	0,00	-
8	3 964	3 966	**17,14**	107,8		0,00	82,97	-	-	0,00	0,00	-
9	2 213	2 218	**25,05**	107,8		0,00	77,92	-	-	0,00	0,00	-
Sum			**34,67**									

- Data undefined due to calculation with octave data

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 092	6 095	**10,27**	104,9		0,00	86,70	-	-	0,00	0,00	-
10	3 220	3 223	**20,02**	107,8		0,00	81,17	-	-	0,00	0,00	-
11	2 437	2 442	**23,78**	107,8		0,00	78,75	-	-	0,00	0,00	-

To be continued on next page...

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DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
12	3 359	3 362	**19,44**	107,8		0,00	81,53	-	-	0,00	0,00	-
13	3 444	3 450	**19,28**	106,0	2	0,00	81,76	-	-	0,00	0,00	-
14	2 897	2 904	**21,65**	106,0	2	0,00	80,26	-	-	0,00	0,00	-
15	3 852	3 858	**17,72**	106,0	2	0,00	82,73	-	-	0,00	0,00	-
16	2 632	2 640	**22,94**	106,0	2	0,00	79,43	-	-	0,00	0,00	-
17	3 080	3 087	**20,81**	106,0	2	0,00	80,79	-	-	0,00	0,00	-
18	3 944	3 949	**17,42**	106,0	2	0,00	82,93	-	-	0,00	0,00	-
19	4 576	4 581	**15,31**	106,0	2	0,00	84,22	-	-	0,00	0,00	-
2	6 867	6 869	**8,77**	104,9		0,00	87,74	-	-	0,00	0,00	-
20	3 349	3 356	**19,66**	106,0	2	0,00	81,52	-	-	0,00	0,00	-
21	3 765	3 771	**18,04**	106,0	2	0,00	82,53	-	-	0,00	0,00	-
22	4 391	4 396	**15,89**	106,0	2	0,00	83,86	-	-	0,00	0,00	-
23	4 928	4 932	**14,27**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
24	3 908	3 913	**17,52**	106,0	2	0,00	82,85	-	-	0,00	0,00	-
25	4 295	4 300	**16,20**	106,0	2	0,00	83,67	-	-	0,00	0,00	-
26	5 049	5 053	**13,93**	106,0	2	0,00	85,07	-	-	0,00	0,00	-
27	4 492	4 497	**15,57**	106,0	2	0,00	84,06	-	-	0,00	0,00	-
28	4 894	4 899	**14,36**	106,0	2	0,00	84,80	-	-	0,00	0,00	-
29	5 510	5 514	**12,69**	106,0	2	0,00	85,83	-	-	0,00	0,00	-
3	6 147	6 150	**10,15**	104,9		0,00	86,78	-	-	0,00	0,00	-
30	6 216	6 220	**11,03**	106,0	2	0,00	86,88	-	-	0,00	0,00	-
31	5 812	5 816	**11,94**	106,0	2	0,00	86,29	-	-	0,00	0,00	-
32	6 219	6 223	**11,02**	106,0	2	0,00	86,88	-	-	0,00	0,00	-
33	6 707	6 711	**10,12**	106,0	2	0,00	87,54	-	-	0,00	0,00	-
34	7 145	7 148	**9,35**	106,0	2	0,00	88,08	-	-	0,00	0,00	-
35	7 879	7 881	**8,17**	106,0	2	0,00	88,93	-	-	0,00	0,00	-
36	6 720	6 723	**10,09**	106,0	2	0,00	87,55	-	-	0,00	0,00	-
37	7 133	7 136	**9,37**	106,0	2	0,00	88,07	-	-	0,00	0,00	-
38	7 678	7 681	**8,48**	106,0	2	0,00	88,71	-	-	0,00	0,00	-
39	8 446	8 449	**7,33**	106,0	2	0,00	89,54	-	-	0,00	0,00	-
4	6 785	6 787	**8,92**	104,9		0,00	87,63	-	-	0,00	0,00	-
40	9 031	9 033	**6,52**	106,0	2	0,00	90,12	-	-	0,00	0,00	-
41	7 399	7 403	**8,93**	106,0	2	0,00	88,39	-	-	0,00	0,00	-
42	7 764	7 767	**8,35**	106,0	2	0,00	88,81	-	-	0,00	0,00	-
43	8 399	8 402	**7,39**	106,0	2	0,00	89,49	-	-	0,00	0,00	-
44	9 030	9 032	**6,52**	106,0	2	0,00	90,12	-	-	0,00	0,00	-
45	9 614	9 616	**5,76**	106,0	2	0,00	90,66	-	-	0,00	0,00	-
46	8 399	8 402	**7,39**	106,0	2	0,00	89,49	-	-	0,00	0,00	-
47	8 976	8 978	**6,59**	106,0	2	0,00	90,06	-	-	0,00	0,00	-
48	9 751	9 754	**5,59**	106,0	2	0,00	90,78	-	-	0,00	0,00	-
49	10 276	10 278	**4,95**	106,0	2	0,00	91,24	-	-	0,00	0,00	-
5	4 212	4 215	**16,28**	107,8		0,00	83,50	-	-	0,00	0,00	-
50	9 083	9 086	**6,45**	106,0	2	0,00	90,17	-	-	0,00	0,00	-
51	9 153	9 155	**6,35**	106,0	2	0,00	90,23	-	-	0,00	0,00	-
52	9 253	9 256	**6,22**	106,0	2	0,00	90,33	-	-	0,00	0,00	-
53	9 719	9 721	**5,63**	106,0	2	0,00	90,75	-	-	0,00	0,00	-
54	9 889	9 892	**5,41**	106,0	2	0,00	90,91	-	-	0,00	0,00	-
55	10 022	10 024	**5,25**	106,0	2	0,00	91,02	-	-	0,00	0,00	-
56	10 657	10 659	**4,51**	106,0	2	0,00	91,55	-	-	0,00	0,00	-
57	10 673	10 675	**4,49**	106,0	2	0,00	91,57	-	-	0,00	0,00	-
58	11 294	11 296	**3,81**	106,0	2	0,00	92,06	-	-	0,00	0,00	-
59	11 174	11 176	**3,94**	106,0	2	0,00	91,97	-	-	0,00	0,00	-
6	3 144	3 147	**20,35**	107,8		0,00	80,96	-	-	0,00	0,00	-
60	11 768	11 770	**3,31**	106,0	2	0,00	92,42	-	-	0,00	0,00	-
61	12 116	12 118	**2,96**	106,0	2	0,00	92,67	-	-	0,00	0,00	-
7	2 690	2 694	**22,46**	107,8		0,00	79,61	-	-	0,00	0,00	-
8	3 806	3 809	**17,70**	107,8		0,00	82,62	-	-	0,00	0,00	-
9	2 131	2 137	**25,54**	107,8		0,00	77,59	-	-	0,00	0,00	-
Sum			**34,01**									

- Data undefined due to calculation with octave data

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 937	6 939	**8,66**	104,9		0,00	87,83	-	-	0,00	0,00	-
10	4 243	4 246	**16,18**	107,8		0,00	83,56	-	-	0,00	0,00	-
11	3 416	3 419	**19,20**	107,8		0,00	81,68	-	-	0,00	0,00	-
12	4 071	4 073	**16,76**	107,8		0,00	83,20	-	-	0,00	0,00	-
13	4 518	4 522	**15,49**	106,0	2	0,00	84,11	-	-	0,00	0,00	-
14	3 657	3 663	**18,45**	106,0	2	0,00	82,28	-	-	0,00	0,00	-
15	4 602	4 606	**15,26**	106,0	2	0,00	84,27	-	-	0,00	0,00	-
16	2 847	2 855	**21,88**	106,0	2	0,00	80,11	-	-	0,00	0,00	-
17	3 535	3 541	**18,92**	106,0	2	0,00	81,98	-	-	0,00	0,00	-
18	4 412	4 417	**15,82**	106,0	2	0,00	83,90	-	-	0,00	0,00	-
19	5 244	5 248	**13,41**	106,0	2	0,00	85,40	-	-	0,00	0,00	-
2	7 687	7 689	**7,35**	104,9		0,00	88,72	-	-	0,00	0,00	-
20	3 145	3 152	**20,53**	106,0	2	0,00	80,97	-	-	0,00	0,00	-
21	3 826	3 831	**17,82**	106,0	2	0,00	82,67	-	-	0,00	0,00	-
22	4 594	4 599	**15,25**	106,0	2	0,00	84,25	-	-	0,00	0,00	-
23	5 317	5 321	**13,20**	106,0	2	0,00	85,52	-	-	0,00	0,00	-
24	3 461	3 467	**19,21**	106,0	2	0,00	81,80	-	-	0,00	0,00	-
25	4 144	4 149	**16,70**	106,0	2	0,00	83,36	-	-	0,00	0,00	-
26	5 174	5 178	**13,58**	106,0	2	0,00	85,28	-	-	0,00	0,00	-
27	3 855	3 861	**17,71**	106,0	2	0,00	82,73	-	-	0,00	0,00	-
28	4 595	4 600	**15,25**	106,0	2	0,00	84,25	-	-	0,00	0,00	-
29	5 467	5 471	**12,80**	106,0	2	0,00	85,76	-	-	0,00	0,00	-
3	6 633	6 635	**9,20**	104,9		0,00	87,44	-	-	0,00	0,00	-
30	6 358	6 361	**10,76**	106,0	2	0,00	87,07	-	-	0,00	0,00	-
31	5 284	5 289	**13,28**	106,0	2	0,00	85,47	-	-	0,00	0,00	-
32	5 857	5 861	**11,83**	106,0	2	0,00	86,36	-	-	0,00	0,00	-
33	6 533	6 537	**10,43**	106,0	2	0,00	87,31	-	-	0,00	0,00	-
34	7 126	7 130	**9,38**	106,0	2	0,00	88,06	-	-	0,00	0,00	-
35	8 009	8 012	**7,97**	106,0	2	0,00	89,07	-	-	0,00	0,00	-
36	6 225	6 229	**11,01**	106,0	2	0,00	86,89	-	-	0,00	0,00	-
37	6 821	6 824	**9,91**	106,0	2	0,00	87,68	-	-	0,00	0,00	-
38	7 573	7 576	**8,65**	106,0	2	0,00	88,59	-	-	0,00	0,00	-
39	8 510	8 512	**7,24**	106,0	2	0,00	89,60	-	-	0,00	0,00	-
4	7 296	7 298	**8,00**	104,9		0,00	88,26	-	-	0,00	0,00	-
40	9 196	9 198	**6,30**	106,0	2	0,00	90,27	-	-	0,00	0,00	-
41	6 900	6 903	**9,77**	106,0	2	0,00	87,78	-	-	0,00	0,00	-
42	7 438	7 441	**8,87**	106,0	2	0,00	88,43	-	-	0,00	0,00	-
43	8 297	8 299	**7,54**	106,0	2	0,00	89,38	-	-	0,00	0,00	-
44	9 016	9 019	**6,54**	106,0	2	0,00	90,10	-	-	0,00	0,00	-
45	9 721	9 723	**5,62**	106,0	2	0,00	90,76	-	-	0,00	0,00	-
46	8 092	8 095	**7,85**	106,0	2	0,00	89,16	-	-	0,00	0,00	-
47	8 792	8 795	**6,84**	106,0	2	0,00	89,88	-	-	0,00	0,00	-
48	9 711	9 713	**5,64**	106,0	2	0,00	90,75	-	-	0,00	0,00	-
49	10 366	10 368	**4,84**	106,0	2	0,00	91,31	-	-	0,00	0,00	-
5	5 465	5 467	**12,90**	107,8		0,00	85,75	-	-	0,00	0,00	-
50	8 461	8 464	**7,30**	106,0	2	0,00	89,55	-	-	0,00	0,00	-
51	8 675	8 678	**7,00**	106,0	2	0,00	89,77	-	-	0,00	0,00	-
52	8 932	8 935	**6,65**	106,0	2	0,00	90,02	-	-	0,00	0,00	-
53	9 531	9 533	**5,86**	106,0	2	0,00	90,59	-	-	0,00	0,00	-
54	9 450	9 452	**5,97**	106,0	2	0,00	90,51	-	-	0,00	0,00	-
55	9 727	9 729	**5,62**	106,0	2	0,00	90,76	-	-	0,00	0,00	-
56	10 218	10 220	**5,02**	106,0	2	0,00	91,19	-	-	0,00	0,00	-
57	10 392	10 394	**4,81**	106,0	2	0,00	91,34	-	-	0,00	0,00	-
58	10 785	10 787	**4,36**	106,0	2	0,00	91,66	-	-	0,00	0,00	-
59	10 821	10 823	**4,32**	106,0	2	0,00	91,69	-	-	0,00	0,00	-
6	4 426	4 428	**15,59**	107,8		0,00	83,92	-	-	0,00	0,00	-
60	11 385	11 387	**3,71**	106,0	2	0,00	92,13	-	-	0,00	0,00	-
61	11 632	11 634	**3,45**	106,0	2	0,00	92,31	-	-	0,00	0,00	-
7	3 994	3 997	**17,03**	107,8		0,00	83,03	-	-	0,00	0,00	-
8	4 960	4 962	**14,09**	107,8		0,00	84,91	-	-	0,00	0,00	-
9	3 550	3 554	**18,67**	107,8		0,00	82,01	-	-	0,00	0,00	-
Sum			**31,86**									

- Data undefined due to calculation with octave data

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise sensitive area: K Lomarakennus K (Kurunoja)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 308	6 310	**9,83**	104,9		0,00	87,00	-	-	0,00	0,00	-
10	7 073	7 074	**9,71**	107,8		0,00	87,99	-	-	0,00	0,00	-
11	6 244	6 245	**11,26**	107,8		0,00	86,91	-	-	0,00	0,00	-
12	6 969	6 971	**9,89**	107,8		0,00	87,87	-	-	0,00	0,00	-
13	4 813	4 817	**14,60**	106,0	2	0,00	84,66	-	-	0,00	0,00	-
14	3 752	3 757	**18,09**	106,0	2	0,00	82,50	-	-	0,00	0,00	-
15	4 302	4 307	**16,18**	106,0	2	0,00	83,68	-	-	0,00	0,00	-
16	2 621	2 628	**23,00**	106,0	2	0,00	79,39	-	-	0,00	0,00	-
17	3 206	3 212	**20,27**	106,0	2	0,00	81,14	-	-	0,00	0,00	-
18	3 698	3 703	**18,30**	106,0	2	0,00	82,37	-	-	0,00	0,00	-
19	4 616	4 620	**15,19**	106,0	2	0,00	84,29	-	-	0,00	0,00	-
2	6 917	6 918	**8,68**	104,9		0,00	87,80	-	-	0,00	0,00	-
20	1 968	1 978	**26,75**	106,0	2	0,00	76,92	-	-	0,00	0,00	-
21	2 672	2 680	**22,74**	106,0	2	0,00	79,56	-	-	0,00	0,00	-
22	3 360	3 365	**19,62**	106,0	2	0,00	81,54	-	-	0,00	0,00	-
23	4 188	4 192	**16,56**	106,0	2	0,00	83,45	-	-	0,00	0,00	-
24	1 597	1 609	**29,36**	106,0	2	0,00	75,13	-	-	0,00	0,00	-
25	2 468	2 476	**23,80**	106,0	2	0,00	78,88	-	-	0,00	0,00	-
26	3 635	3 640	**18,53**	106,0	2	0,00	82,22	-	-	0,00	0,00	-
27	1 437	1 450	**30,64**	106,0	2	0,00	74,23	-	-	0,00	0,00	-
28	2 508	2 516	**23,58**	106,0	2	0,00	79,01	-	-	0,00	0,00	-
29	3 585	3 591	**18,72**	106,0	2	0,00	82,10	-	-	0,00	0,00	-
3	5 411	5 414	**11,72**	104,9		0,00	85,67	-	-	0,00	0,00	-
30	4 614	4 618	**15,20**	106,0	2	0,00	84,29	-	-	0,00	0,00	-
31	2 728	2 736	**22,46**	106,0	2	0,00	79,74	-	-	0,00	0,00	-
32	3 446	3 452	**19,27**	106,0	2	0,00	81,76	-	-	0,00	0,00	-
33	4 299	4 304	**16,19**	106,0	2	0,00	83,68	-	-	0,00	0,00	-
34	5 048	5 052	**13,93**	106,0	2	0,00	85,07	-	-	0,00	0,00	-
35	6 066	6 069	**11,34**	106,0	2	0,00	86,66	-	-	0,00	0,00	-
36	3 621	3 627	**18,58**	106,0	2	0,00	82,19	-	-	0,00	0,00	-
37	4 383	4 387	**15,92**	106,0	2	0,00	83,84	-	-	0,00	0,00	-
38	5 337	5 341	**13,14**	106,0	2	0,00	85,55	-	-	0,00	0,00	-
39	6 436	6 439	**10,61**	106,0	2	0,00	87,18	-	-	0,00	0,00	-
4	6 028	6 030	**10,40**	104,9		0,00	86,61	-	-	0,00	0,00	-
40	7 220	7 223	**9,23**	106,0	2	0,00	88,17	-	-	0,00	0,00	-
41	4 249	4 254	**16,35**	106,0	2	0,00	83,58	-	-	0,00	0,00	-
42	4 941	4 945	**14,23**	106,0	2	0,00	84,88	-	-	0,00	0,00	-
43	6 017	6 020	**11,46**	106,0	2	0,00	86,59	-	-	0,00	0,00	-
44	6 809	6 812	**9,93**	106,0	2	0,00	87,67	-	-	0,00	0,00	-
45	7 637	7 640	**8,55**	106,0	2	0,00	88,66	-	-	0,00	0,00	-
46	5 584	5 587	**12,51**	106,0	2	0,00	85,94	-	-	0,00	0,00	-
47	6 388	6 392	**10,70**	106,0	2	0,00	87,11	-	-	0,00	0,00	-
48	7 438	7 441	**8,87**	106,0	2	0,00	88,43	-	-	0,00	0,00	-
49	8 231	8 234	**7,64**	106,0	2	0,00	89,31	-	-	0,00	0,00	-
5	8 201	8 202	**7,87**	107,8		0,00	89,28	-	-	0,00	0,00	-
50	5 664	5 668	**12,31**	106,0	2	0,00	86,07	-	-	0,00	0,00	-
51	5 981	5 984	**11,54**	106,0	2	0,00	86,54	-	-	0,00	0,00	-
52	6 374	6 377	**10,73**	106,0	2	0,00	87,09	-	-	0,00	0,00	-
53	7 094	7 097	**9,44**	106,0	2	0,00	88,02	-	-	0,00	0,00	-
54	6 769	6 772	**10,01**	106,0	2	0,00	87,61	-	-	0,00	0,00	-
55	7 171	7 174	**9,31**	106,0	2	0,00	88,12	-	-	0,00	0,00	-
56	7 522	7 525	**8,73**	106,0	2	0,00	88,53	-	-	0,00	0,00	-
57	7 833	7 836	**8,24**	106,0	2	0,00	88,88	-	-	0,00	0,00	-
58	8 029	8 032	**7,94**	106,0	2	0,00	89,10	-	-	0,00	0,00	-
59	8 187	8 189	**7,70**	106,0	2	0,00	89,27	-	-	0,00	0,00	-
6	7 135	7 136	**9,60**	107,8		0,00	88,07	-	-	0,00	0,00	-
60	8 715	8 717	**6,95**	106,0	2	0,00	89,81	-	-	0,00	0,00	-
61	8 883	8 885	**6,72**	106,0	2	0,00	89,97	-	-	0,00	0,00	-
7	6 684	6 685	**10,41**	107,8		0,00	87,50	-	-	0,00	0,00	-
8	7 746	7 747	**8,58**	107,8		0,00	88,78	-	-	0,00	0,00	-
9	6 150	6 152	**11,45**	107,8		0,00	86,78	-	-	0,00	0,00	-
Sum			**36,88**									

- Data undefined due to calculation with octave data

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	6 788	6 789	**8,92**	104,9		0,00	87,64	-	-	0,00	0,00	-
10	11 413	11 414	**3,78**	107,8		0,00	92,15	-	-	0,00	0,00	-
11	10 606	10 606	**4,68**	107,8		0,00	91,51	-	-	0,00	0,00	-
12	11 432	11 432	**3,76**	107,8		0,00	92,16	-	-	0,00	0,00	-
13	7 143	7 145	**9,36**	106,0	2	0,00	88,08	-	-	0,00	0,00	-
14	6 420	6 422	**10,64**	106,0	2	0,00	87,15	-	-	0,00	0,00	-
15	6 214	6 216	**11,04**	106,0	2	0,00	86,87	-	-	0,00	0,00	-
16	5 805	5 807	**11,96**	106,0	2	0,00	86,28	-	-	0,00	0,00	-
17	5 821	5 823	**11,92**	106,0	2	0,00	86,30	-	-	0,00	0,00	-
18	5 498	5 501	**12,73**	106,0	2	0,00	85,81	-	-	0,00	0,00	-
19	5 917	5 919	**11,69**	106,0	2	0,00	86,45	-	-	0,00	0,00	-
2	6 944	6 946	**8,63**	104,9		0,00	87,83	-	-	0,00	0,00	-
20	4 931	4 934	**14,26**	106,0	2	0,00	84,86	-	-	0,00	0,00	-
21	4 849	4 853	**14,50**	106,0	2	0,00	84,72	-	-	0,00	0,00	-
22	4 738	4 741	**14,82**	106,0	2	0,00	84,52	-	-	0,00	0,00	-
23	5 032	5 036	**13,98**	106,0	2	0,00	85,04	-	-	0,00	0,00	-
24	4 310	4 314	**16,16**	106,0	2	0,00	83,70	-	-	0,00	0,00	-
25	4 191	4 195	**16,55**	106,0	2	0,00	83,45	-	-	0,00	0,00	-
26	4 269	4 273	**16,29**	106,0	2	0,00	83,61	-	-	0,00	0,00	-
27	3 715	3 719	**18,23**	106,0	2	0,00	82,41	-	-	0,00	0,00	-
28	3 527	3 532	**18,95**	106,0	2	0,00	81,96	-	-	0,00	0,00	-
29	3 629	3 634	**18,56**	106,0	2	0,00	82,21	-	-	0,00	0,00	-
3	5 312	5 314	**11,95**	104,9		0,00	85,51	-	-	0,00	0,00	-
30	4 006	4 011	**17,18**	106,0	2	0,00	83,06	-	-	0,00	0,00	-
31	2 464	2 472	**23,82**	106,0	2	0,00	78,86	-	-	0,00	0,00	-
32	2 417	2 425	**24,08**	106,0	2	0,00	78,69	-	-	0,00	0,00	-
33	2 764	2 770	**22,29**	106,0	2	0,00	79,85	-	-	0,00	0,00	-
34	3 323	3 328	**19,78**	106,0	2	0,00	81,44	-	-	0,00	0,00	-
35	4 101	4 105	**16,85**	106,0	2	0,00	83,27	-	-	0,00	0,00	-
36	1 752	1 763	**28,21**	106,0	2	0,00	75,93	-	-	0,00	0,00	-
37	2 130	2 138	**25,73**	106,0	2	0,00	77,60	-	-	0,00	0,00	-
38	2 977	2 983	**21,28**	106,0	2	0,00	80,49	-	-	0,00	0,00	-
39	3 977	3 981	**17,28**	106,0	2	0,00	83,00	-	-	0,00	0,00	-
4	5 531	5 533	**11,46**	104,9		0,00	85,86	-	-	0,00	0,00	-
40	4 734	4 738	**14,83**	106,0	2	0,00	84,51	-	-	0,00	0,00	-
41	1 316	1 331	**31,70**	106,0	2	0,00	73,48	-	-	0,00	0,00	-
42	1 977	1 987	**26,69**	106,0	2	0,00	76,96	-	-	0,00	0,00	-
43	3 163	3 168	**20,46**	106,0	2	0,00	81,02	-	-	0,00	0,00	-
44	3 864	3 868	**17,69**	106,0	2	0,00	82,75	-	-	0,00	0,00	-
45	4 775	4 778	**14,71**	106,0	2	0,00	84,59	-	-	0,00	0,00	-
46	2 179	2 187	**25,44**	106,0	2	0,00	77,80	-	-	0,00	0,00	-
47	3 014	3 020	**21,11**	106,0	2	0,00	80,60	-	-	0,00	0,00	-
48	4 145	4 150	**16,70**	106,0	2	0,00	83,36	-	-	0,00	0,00	-
49	5 115	5 119	**13,74**	106,0	2	0,00	85,18	-	-	0,00	0,00	-
5	12 382	12 382	**2,77**	107,8		0,00	92,86	-	-	0,00	0,00	-
50	1 123	1 139	**33,55**	106,0	2	0,00	72,13	-	-	0,00	0,00	-
51	1 742	1 753	**28,29**	106,0	2	0,00	75,87	-	-	0,00	0,00	-
52	2 513	2 520	**23,56**	106,0	2	0,00	79,03	-	-	0,00	0,00	-
53	3 430	3 435	**19,34**	106,0	2	0,00	81,72	-	-	0,00	0,00	-
54	2 456	2 463	**23,87**	106,0	2	0,00	78,83	-	-	0,00	0,00	-
55	3 157	3 162	**20,48**	106,0	2	0,00	81,00	-	-	0,00	0,00	-
56	3 112	3 117	**20,68**	106,0	2	0,00	80,88	-	-	0,00	0,00	-
57	3 726	3 731	**18,19**	106,0	2	0,00	82,44	-	-	0,00	0,00	-
58	3 484	3 489	**19,12**	106,0	2	0,00	81,85	-	-	0,00	0,00	-
59	3 872	3 877	**17,65**	106,0	2	0,00	82,77	-	-	0,00	0,00	-
6	11 322	11 323	**3,87**	107,8		0,00	92,08	-	-	0,00	0,00	-
60	4 301	4 306	**16,18**	106,0	2	0,00	83,68	-	-	0,00	0,00	-
61	4 334	4 338	**16,08**	106,0	2	0,00	83,75	-	-	0,00	0,00	-
7	10 872	10 873	**4,37**	107,8		0,00	91,73	-	-	0,00	0,00	-
8	12 007	12 007	**3,15**	107,8		0,00	92,59	-	-	0,00	0,00	-
9	10 281	10 282	**5,06**	107,8		0,00	91,24	-	-	0,00	0,00	-
Sum			**39,75**									

- Data undefined due to calculation with octave data

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Detailed results

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102 **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise sensitive area: M Lomarakennus M (Riskalan metsatie)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Pure tones [dB]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5 373	5 375	**11,81**	104,9		0,00	85,61	-	-	0,00	0,00	-
10	13 788	13 788	**1,45**	107,8		0,00	93,79	-	-	0,00	0,00	-
11	13 189	13 189	**2,00**	107,8		0,00	93,40	-	-	0,00	0,00	-
12	14 188	14 189	**1,10**	107,8		0,00	94,04	-	-	0,00	0,00	-
13	7 877	7 880	**8,17**	106,0	2	0,00	88,93	-	-	0,00	0,00	-
14	8 096	8 098	**7,86**	106,0	2	0,00	89,17	-	-	0,00	0,00	-
15	7 182	7 184	**9,29**	106,0	2	0,00	88,13	-	-	0,00	0,00	-
16	8 521	8 523	**7,22**	106,0	2	0,00	89,61	-	-	0,00	0,00	-
17	7 927	7 930	**8,10**	106,0	2	0,00	88,98	-	-	0,00	0,00	-
18	7 043	7 045	**9,53**	106,0	2	0,00	87,96	-	-	0,00	0,00	-
19	6 449	6 452	**10,59**	106,0	2	0,00	87,19	-	-	0,00	0,00	-
2	4 725	4 727	**13,37**	104,9		0,00	84,49	-	-	0,00	0,00	-
20	8 215	8 217	**7,66**	106,0	2	0,00	89,29	-	-	0,00	0,00	-
21	7 498	7 500	**8,77**	106,0	2	0,00	88,50	-	-	0,00	0,00	-
22	6 732	6 734	**10,07**	106,0	2	0,00	87,57	-	-	0,00	0,00	-
23	6 068	6 071	**11,34**	106,0	2	0,00	86,67	-	-	0,00	0,00	-
24	8 100	8 102	**7,84**	106,0	2	0,00	89,17	-	-	0,00	0,00	-
25	7 266	7 268	**9,15**	106,0	2	0,00	88,23	-	-	0,00	0,00	-
26	6 156	6 159	**11,15**	106,0	2	0,00	86,79	-	-	0,00	0,00	-
27	8 064	8 066	**7,89**	106,0	2	0,00	89,13	-	-	0,00	0,00	-
28	7 014	7 016	**9,58**	106,0	2	0,00	87,92	-	-	0,00	0,00	-
29	5 971	5 974	**11,56**	106,0	2	0,00	86,53	-	-	0,00	0,00	-
3	4 838	4 840	**13,07**	104,9		0,00	84,70	-	-	0,00	0,00	-
30	4 991	4 995	**14,09**	106,0	2	0,00	84,97	-	-	0,00	0,00	-
31	6 935	6 938	**9,71**	106,0	2	0,00	87,82	-	-	0,00	0,00	-
32	6 170	6 173	**11,12**	106,0	2	0,00	86,81	-	-	0,00	0,00	-
33	5 255	5 259	**13,36**	106,0	2	0,00	85,42	-	-	0,00	0,00	-
34	4 464	4 468	**15,66**	106,0	2	0,00	84,00	-	-	0,00	0,00	-
35	3 434	3 440	**19,32**	106,0	2	0,00	81,73	-	-	0,00	0,00	-
36	6 303	6 306	**10,86**	106,0	2	0,00	87,00	-	-	0,00	0,00	-
37	5 402	5 406	**12,97**	106,0	2	0,00	85,66	-	-	0,00	0,00	-
38	4 304	4 308	**16,17**	106,0	2	0,00	83,69	-	-	0,00	0,00	-
39	3 133	3 139	**20,58**	106,0	2	0,00	80,94	-	-	0,00	0,00	-
4	4 225	4 228	**14,91**	104,9		0,00	83,52	-	-	0,00	0,00	-
40	2 310	2 318	**24,67**	106,0	2	0,00	78,30	-	-	0,00	0,00	-
41	5 990	5 993	**11,52**	106,0	2	0,00	86,55	-	-	0,00	0,00	-
42	5 092	5 096	**13,81**	106,0	2	0,00	85,14	-	-	0,00	0,00	-
43	3 793	3 798	**17,94**	106,0	2	0,00	82,59	-	-	0,00	0,00	-
44	3 012	3 018	**21,12**	106,0	2	0,00	80,59	-	-	0,00	0,00	-
45	2 087	2 096	**26,00**	106,0	2	0,00	77,43	-	-	0,00	0,00	-
46	4 692	4 697	**14,96**	106,0	2	0,00	84,44	-	-	0,00	0,00	-
47	3 845	3 850	**17,75**	106,0	2	0,00	82,71	-	-	0,00	0,00	-
48	2 764	2 771	**22,28**	106,0	2	0,00	79,85	-	-	0,00	0,00	-
49	1 820	1 831	**27,73**	106,0	2	0,00	76,26	-	-	0,00	0,00	-
5	14 165	14 166	**1,12**	107,8		0,00	94,02	-	-	0,00	0,00	-
50	6 130	6 133	**11,20**	106,0	2	0,00	86,75	-	-	0,00	0,00	-
51	5 326	5 330	**13,17**	106,0	2	0,00	85,53	-	-	0,00	0,00	-
52	4 455	4 460	**15,69**	106,0	2	0,00	83,99	-	-	0,00	0,00	-
53	3 590	3 596	**18,70**	106,0	2	0,00	82,12	-	-	0,00	0,00	-
54	5 020	5 024	**14,01**	106,0	2	0,00	85,02	-	-	0,00	0,00	-
55	4 153	4 158	**16,67**	106,0	2	0,00	83,38	-	-	0,00	0,00	-
56	5 029	5 033	**13,98**	106,0	2	0,00	85,04	-	-	0,00	0,00	-
57	4 037	4 042	**17,07**	106,0	2	0,00	83,13	-	-	0,00	0,00	-
58	5 584	5 588	**12,51**	106,0	2	0,00	85,94	-	-	0,00	0,00	-
59	4 546	4 551	**15,40**	106,0	2	0,00	84,16	-	-	0,00	0,00	-
6	13 319	13 320	**1,87**	107,8		0,00	93,49	-	-	0,00	0,00	-
60	4 888	4 893	**14,38**	106,0	2	0,00	84,79	-	-	0,00	0,00	-
61	5 667	5 671	**12,30**	106,0	2	0,00	86,07	-	-	0,00	0,00	-
7	12 963	12 963	**2,21**	107,8		0,00	93,25	-	-	0,00	0,00	-
8	14 062	14 063	**1,21**	107,8		0,00	93,96	-	-	0,00	0,00	-
9	12 378	12 378	**2,78**	107,8		0,00	92,85	-	-	0,00	0,00	-
Sum			**34,46**									

- Data undefined due to calculation with octave data

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Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (vesistot): (5)
Area type with hard ground: Vesistot
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Fixed penalty added to source noise of WTGs with pure tones
WTG catalogue
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)
Octave data required
Frequency dependent air absorption

63 [dB/km]	125 [dB/km]	250 [dB/km]	500 [dB/km]	1 000 [dB/km]	2 000 [dB/km]	4 000 [dB/km]	8 000 [dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V150-4.2 HH155 4200 150.0 !O!
Noise: Level 00 - Measured - Mode PO1 - 03-2018

Source	Source/Date	Creator	Edited
Manufacturer	15.3.2018	USER	12.11.2020 15.41

Document n. 0067-4767 V06.

					Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	155,0	8,0	104,9	No	86,5	93,7	98,2	99,9	98,9	95,1	88,6	79,4

WTG: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O!
Noise: 5.3-158 NO_107,8 dB

Source	Source/Date	Creator	Edited
Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01	12.3.2018	USER	12.11.2020 15.40

					Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	152,5	8,0	107,8	No	89,0	94,4	99,0	101,4	103,1	100,9	93,5	77,8

WTG: GE WIND ENERGY 5.3-158 Thrust 700 5300 158.0 !O!
Noise: 5.3-158 106.0 +2 dB HH200

Source	Source/Date	Creator	Edited
Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01	12.3.2018	USER	12.11.2020 15.16

						Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Penalty [dB]	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	200,0	8,0	106,0	Yes	2,0	87,2	92,6	97,2	99,6	101,3	99,1	91,7	76,0

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DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

Noise sensitive area: A Laskentapiste A (Metsästysmaja)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: B Laskentapiste B (Ylivieskantie, Pöhlölä)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: C Laskentapiste C (Perkkiöntie 382)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: D Asuinrakennus D (Alakyläntie 243)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: E Lomarakennus E (Kellokankaan metsätie)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: F Asuinrakennus F (Ollilantie 112)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: G Lomarakennus G (Ollilantie, Siliäkuru)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: H Asuinrakennus H (Pinolantie 406)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: I Asuinrakennus I (Kortenevantie 116)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

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DECIBEL - Assumptions for noise calculation

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102
Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Asuinrakennus J (Haapavesitie 1406)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Lomarakennus K (Kurunoja)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: L Laskentapiste L (Perkkiontie, Ilmola)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: M Lomarakennus M (Riskalan metsatie)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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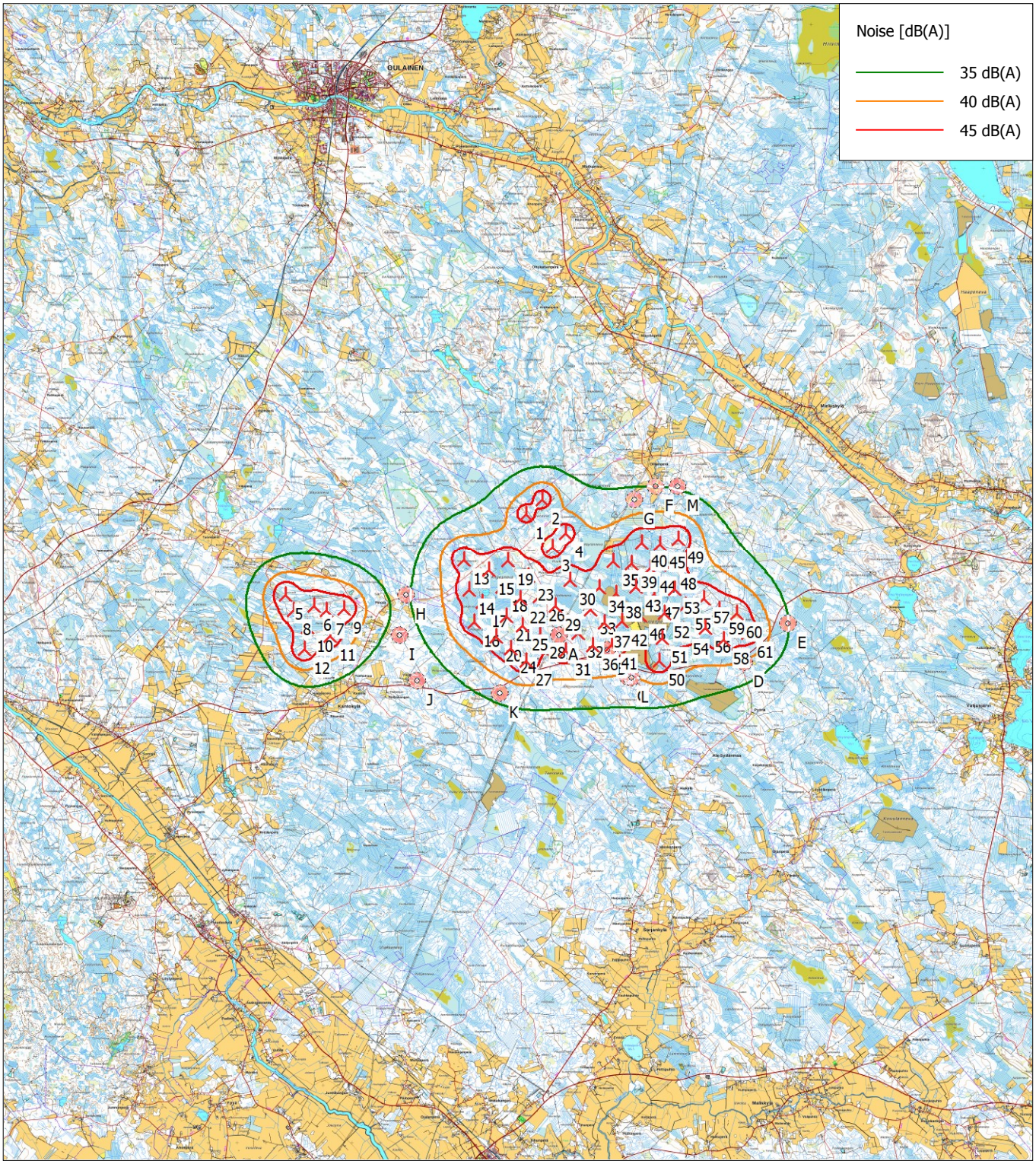
Calculated:
18.11.2020 14.46/3.4.388

DECIBEL - Map 8,0 m/s

Calculation: Puutionsaari_GE158x49xHH200+Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_20201102

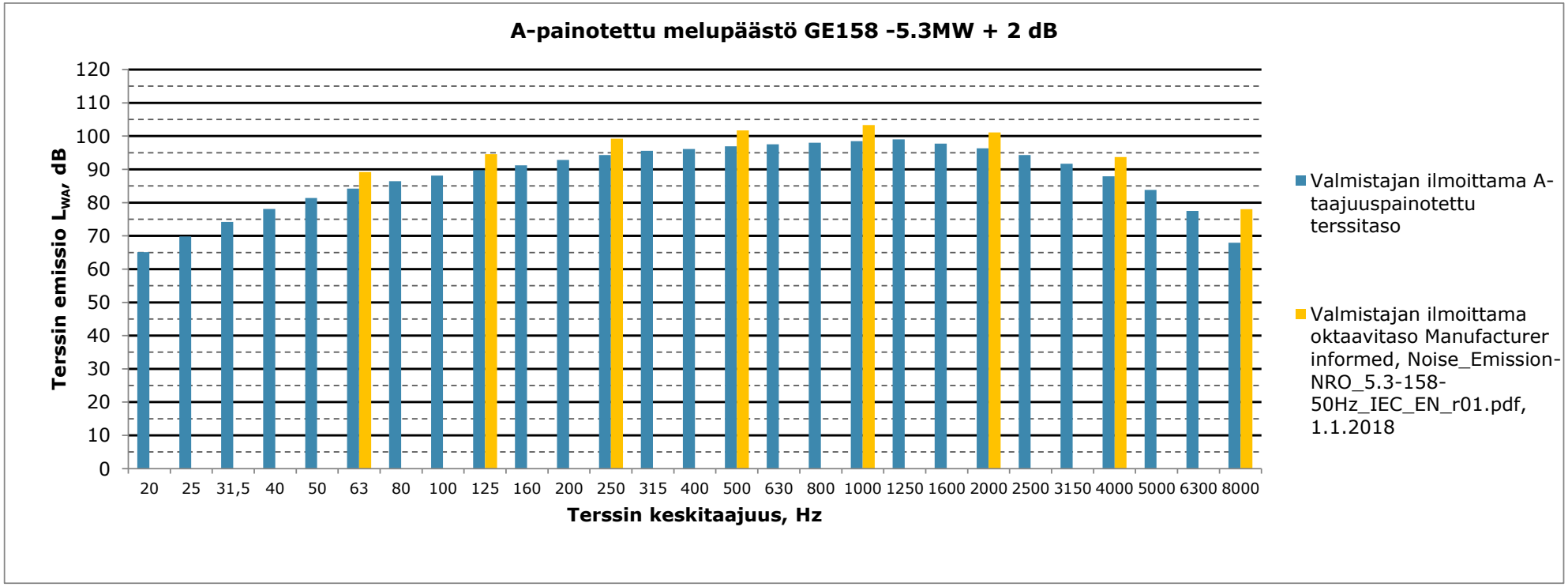


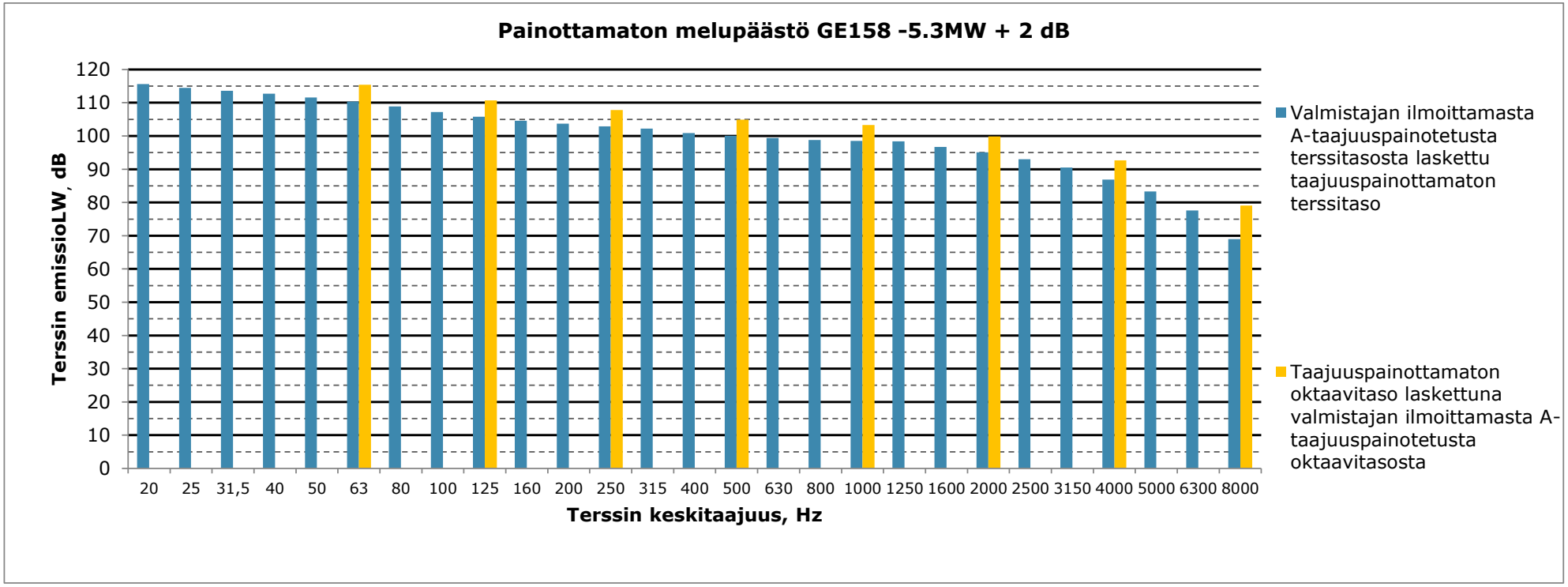
Map: Maastokarttarasteri50K , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 400 742 North: 7 111 615

New WTG Noise sensitive area

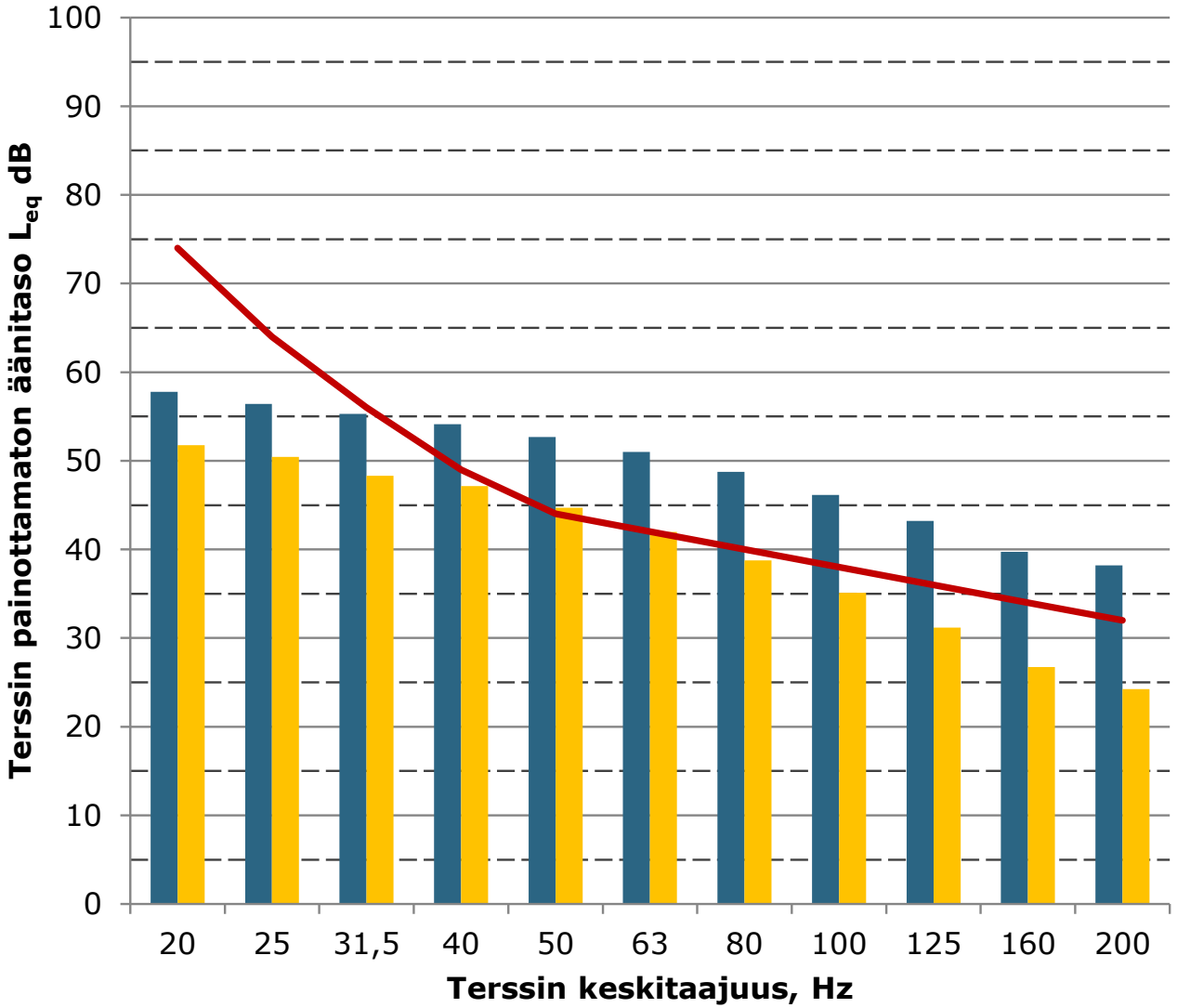
Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
Height above sea level from active line object

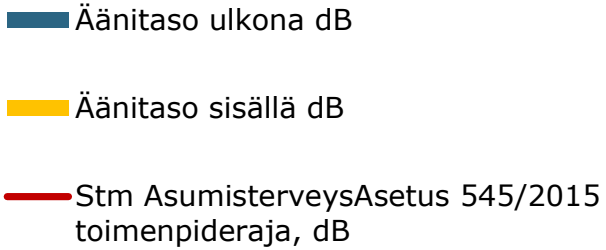
Liite 3: Puutionsaari - Matalataajuisen melun rakennuskohtaiset arvot


A-painotettu melupäästö GE158 -5.3MW + 2 dB
Terssin emissio L_{WA}, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittama A-taajuuspainotettu terssitaso
Valmistajan ilmoittama oktaavitaso Manufacturer informed, Noise_Emission-NRO_5.3-158-50Hz_IEC_EN_r01.pdf, 1.1.2018


Painottamaton melupäästö GE158 -5.3MW + 2 dB
Terssin emissioLW, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittamasta A-taajuuspainotetusta terssitasosta laskettu taajuuspainottamaton terssitaso
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta

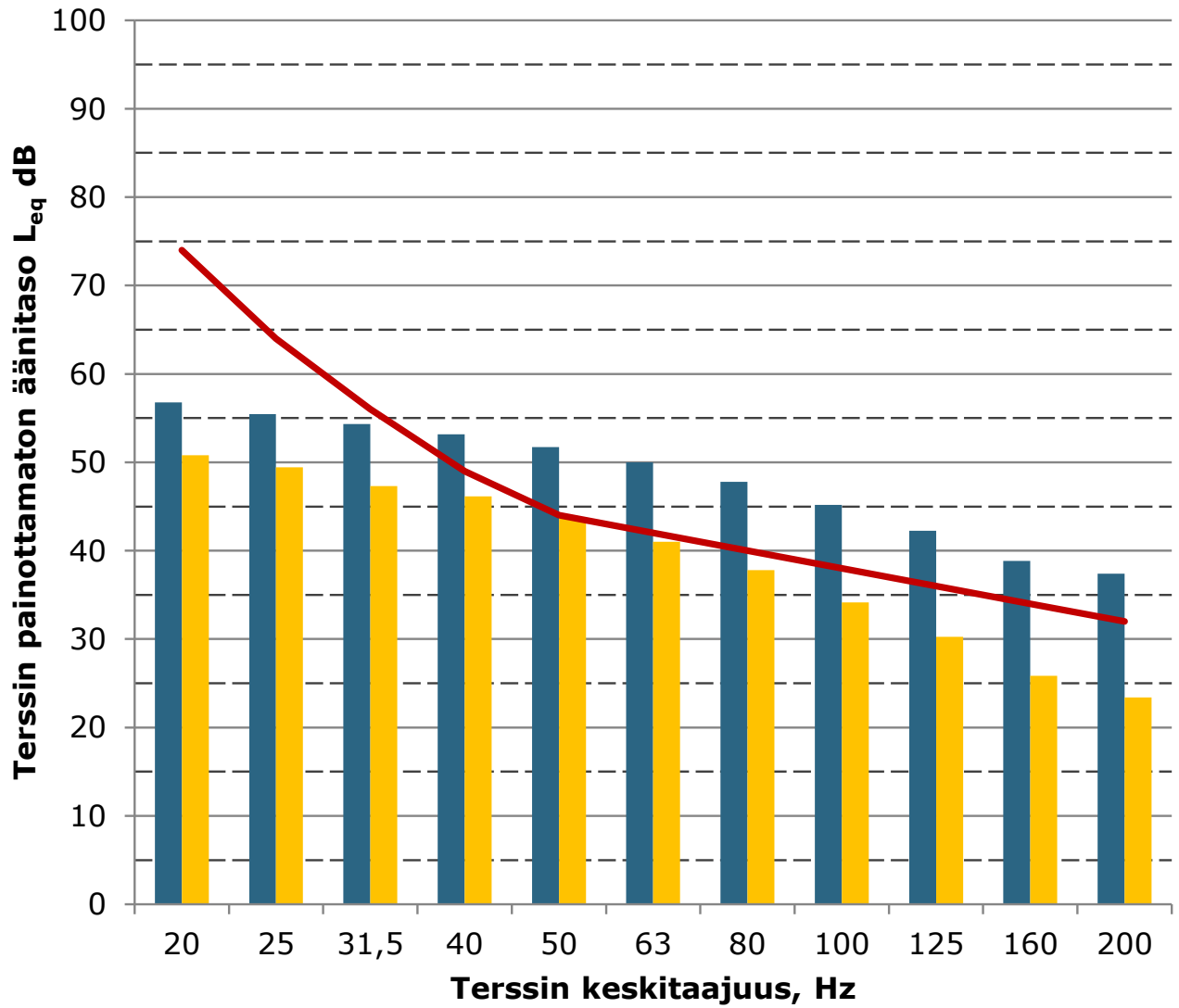
Matalien taajuuksien äänitasot ulkona ja sisällä, autiotalo C (Perkkiöntie 382), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

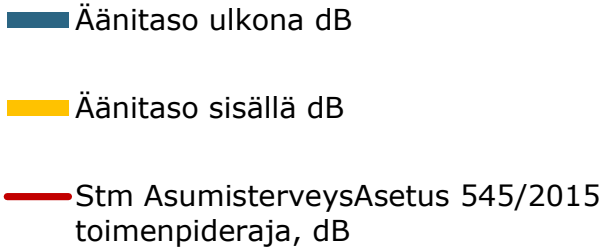




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

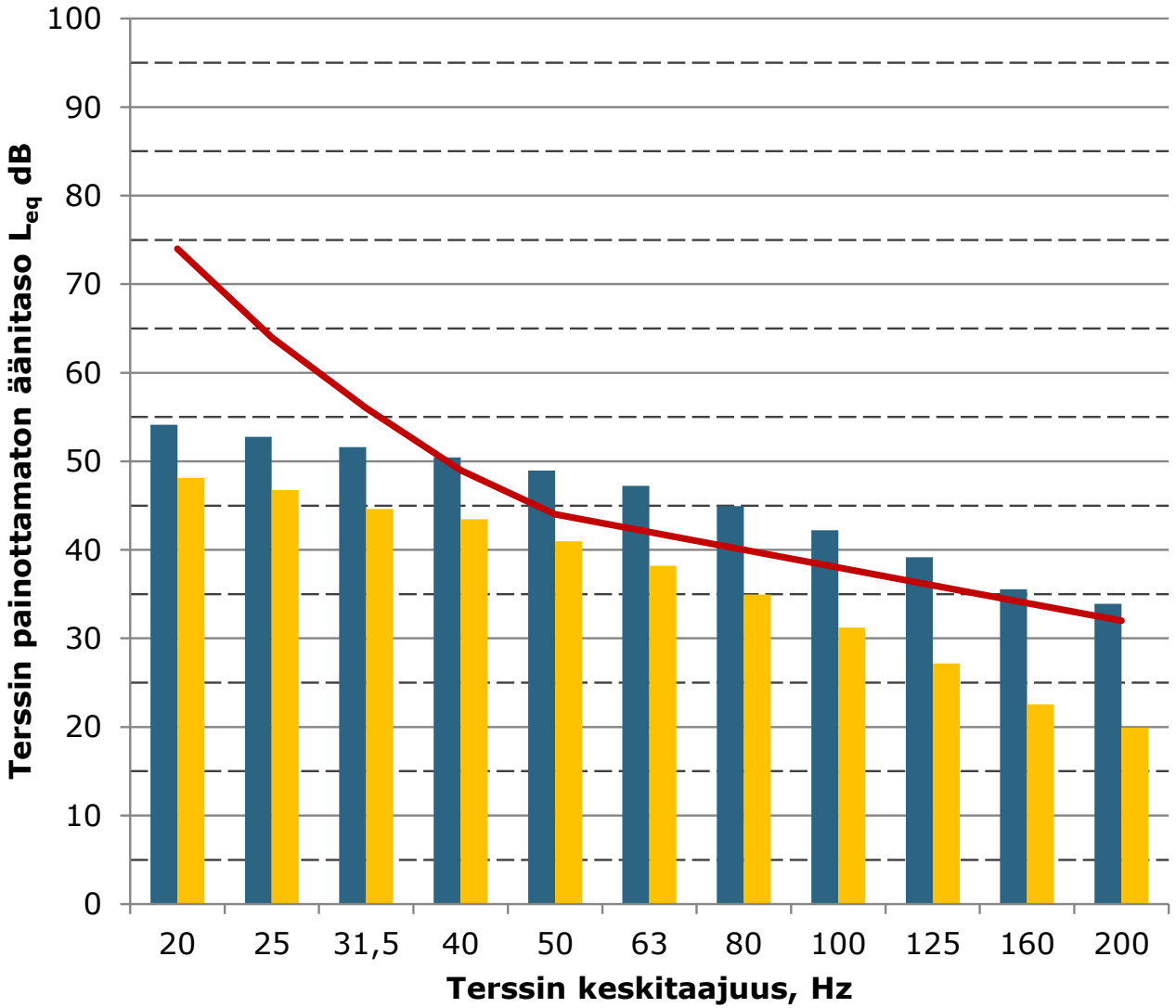
Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus D (Alakyläntie 243), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

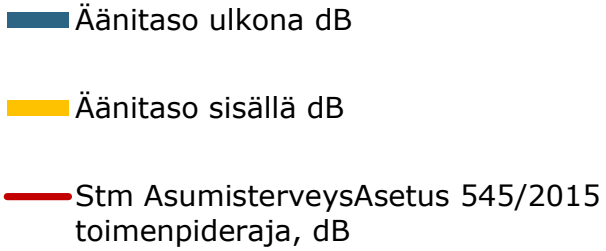




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

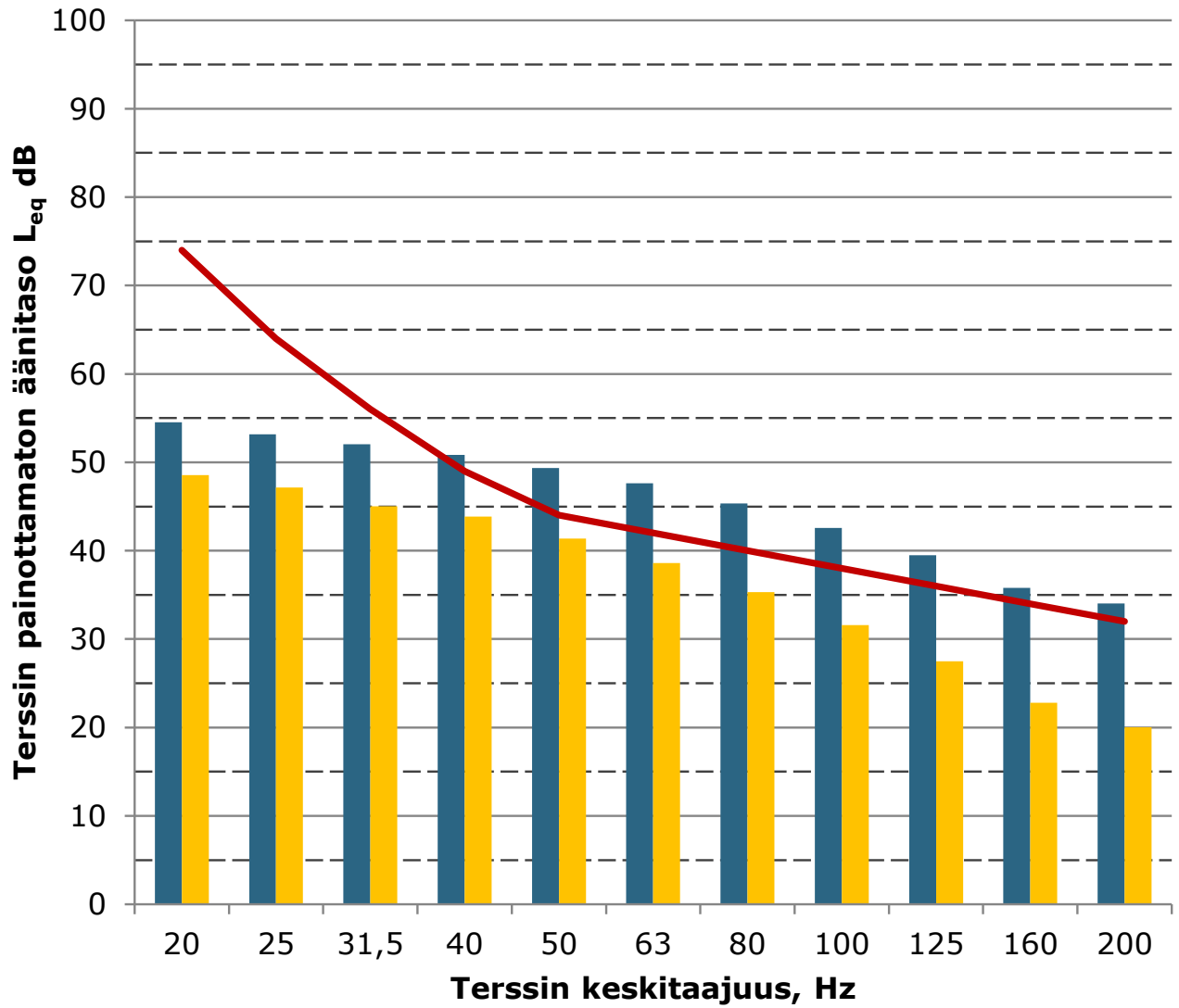
Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus E (Kellokankaan metsätie), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

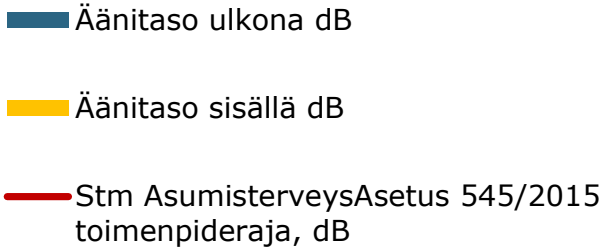




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

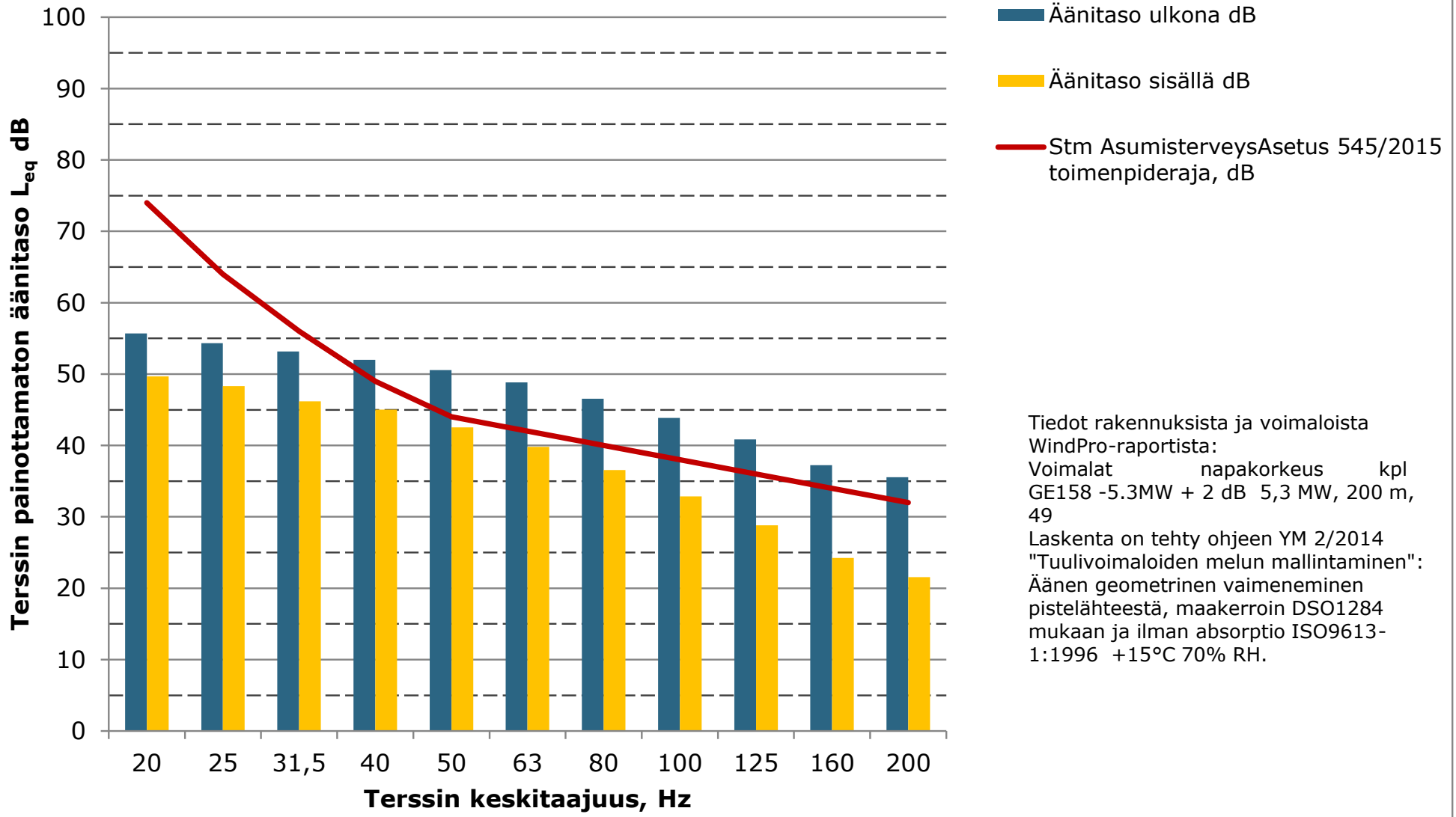
Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus F (Ollilantie 112), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan





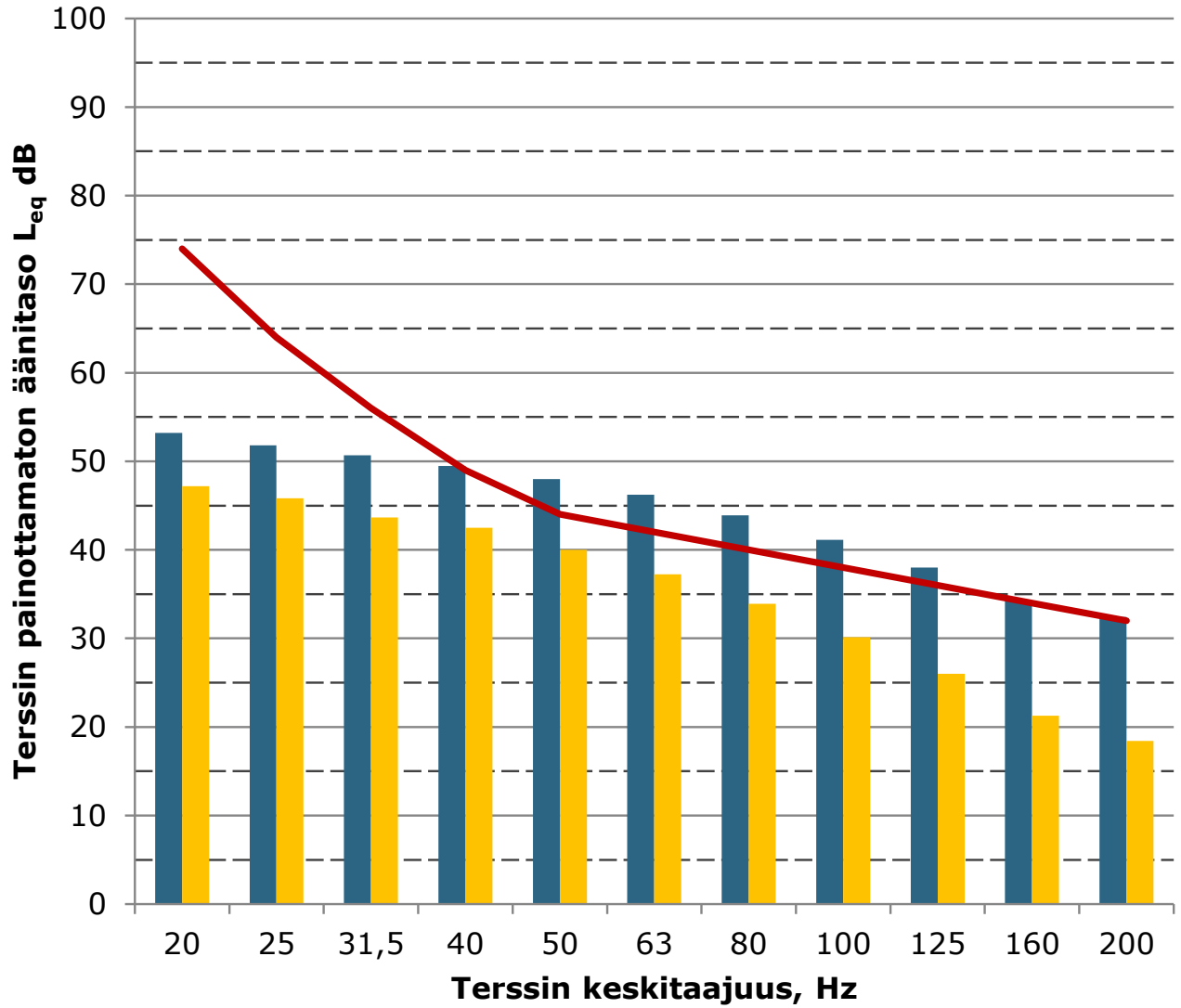
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

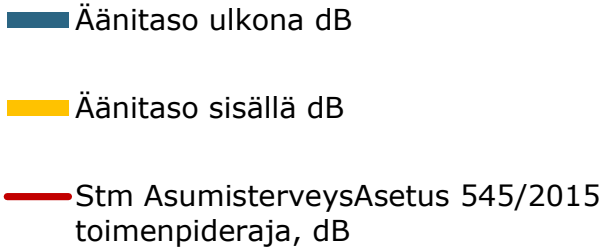
Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus G (Ollilantie, Siliäkuru), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

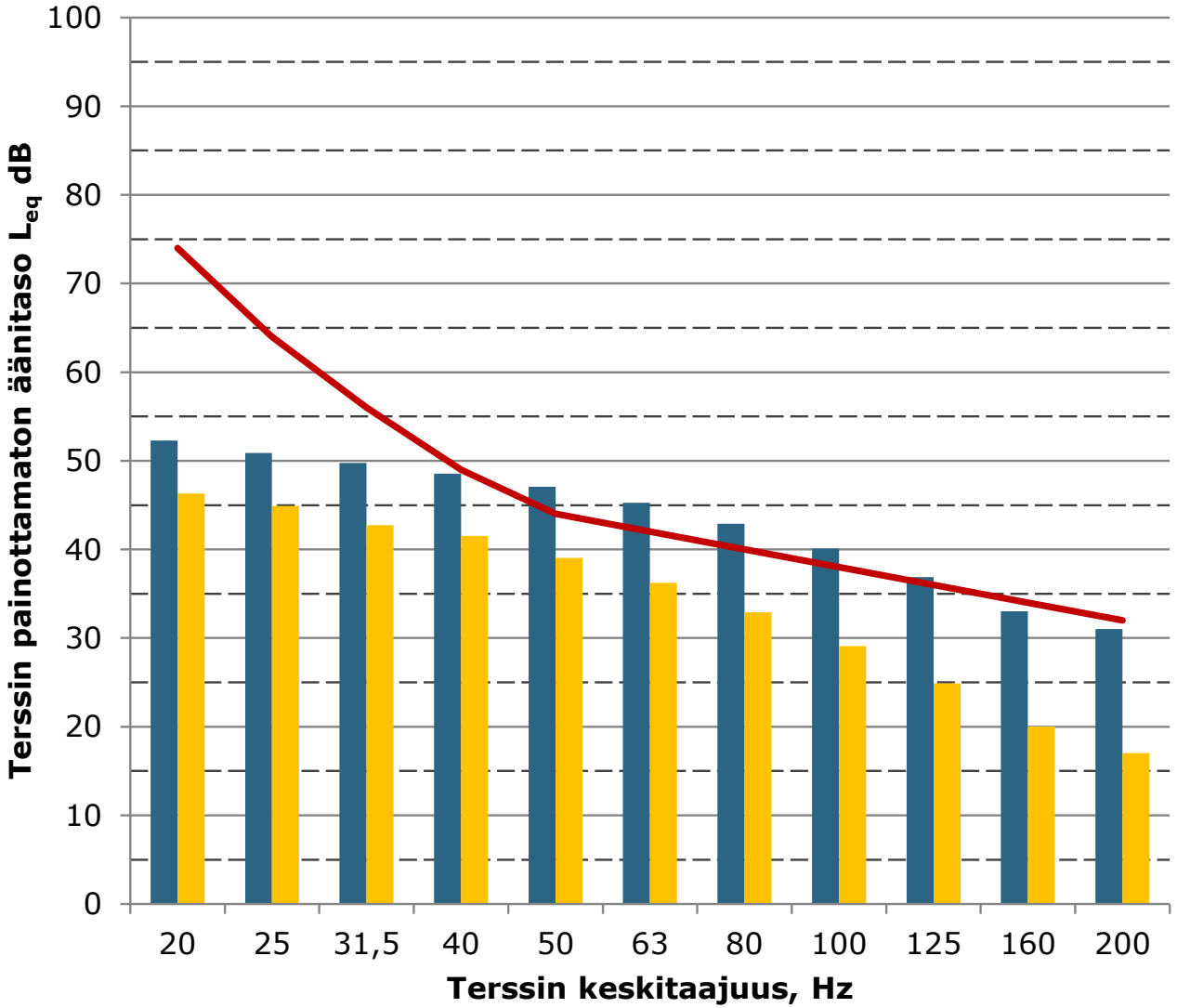
Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus H (Pinolantie 406), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

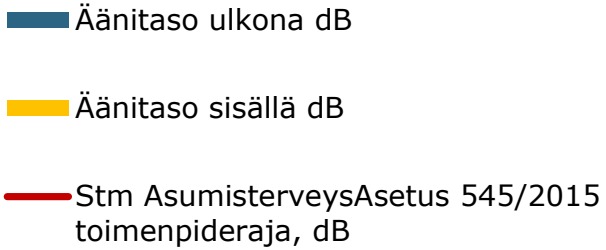




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus I (Kortenevantie 116), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



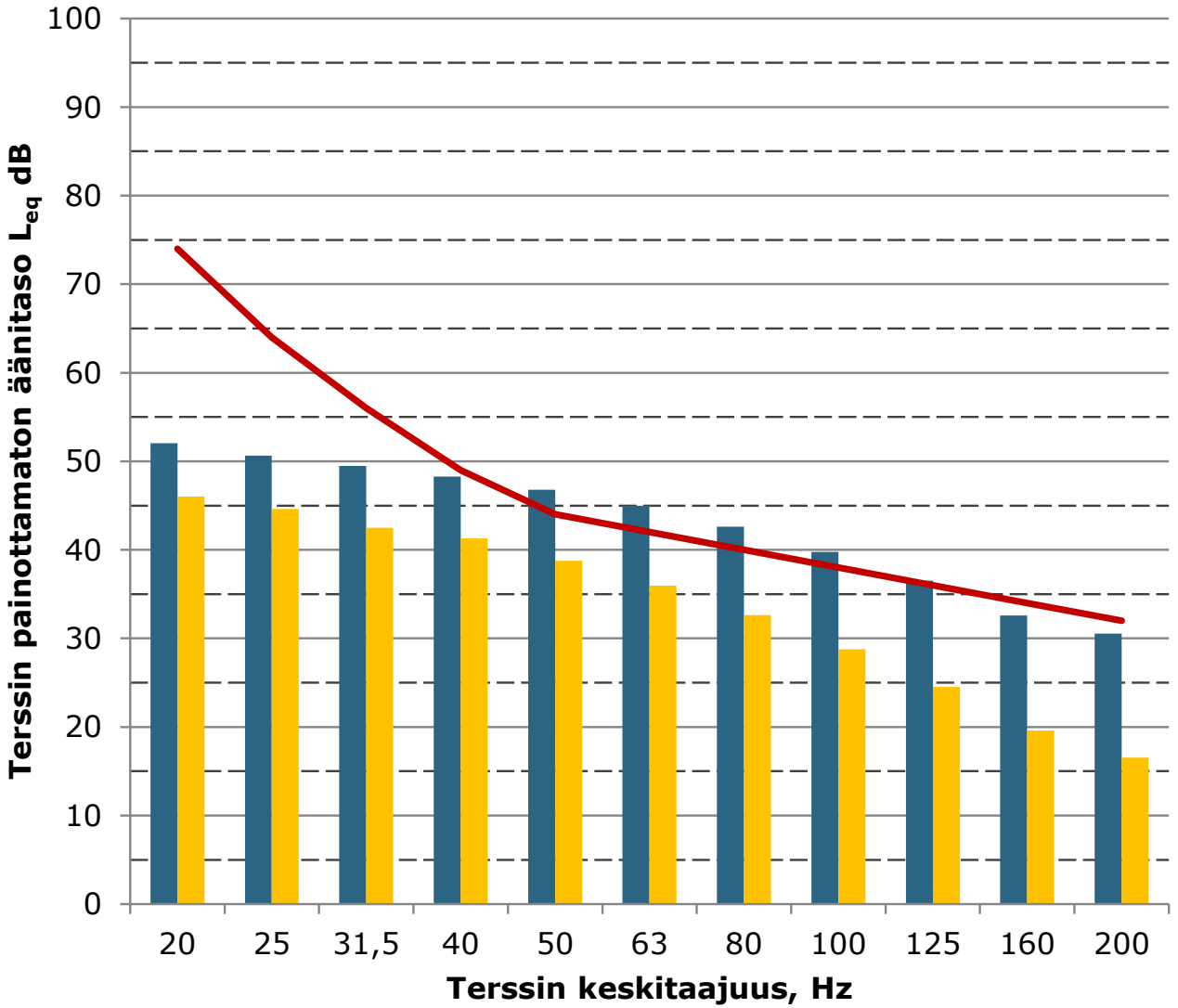


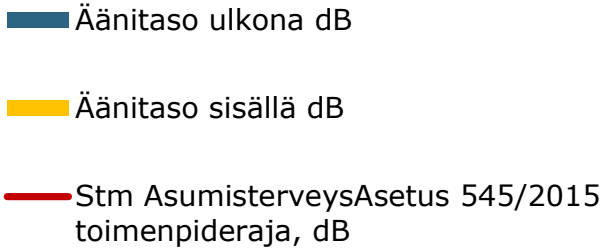
Tiedot rakennuksista ja voimaloista WindPro-raportista:

Voimalat	napakorkeus	kpl
GE158 -5.3MW + 2 dB	5,3 MW, 200 m,	49

Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

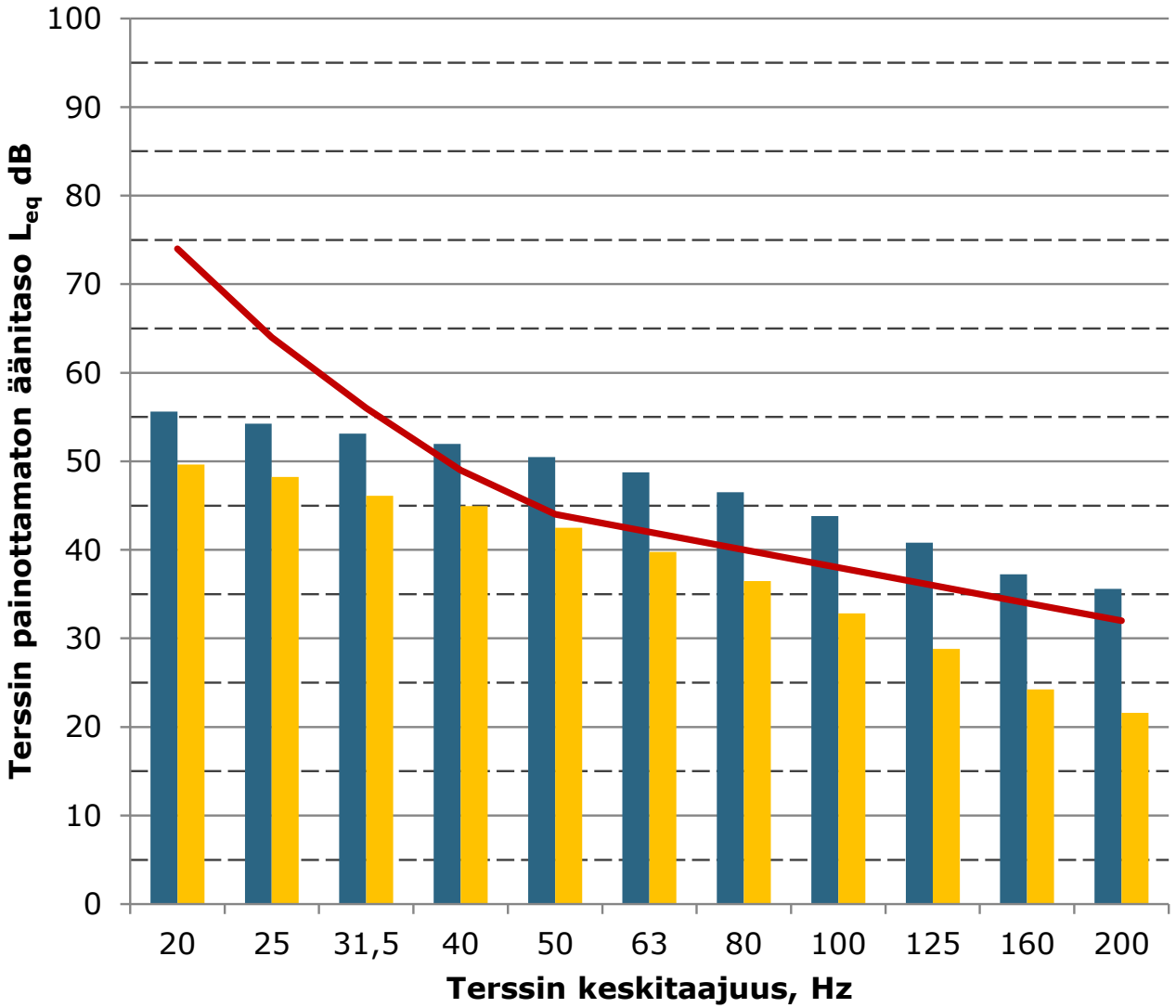
Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus J (Haapavesitie 1406), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

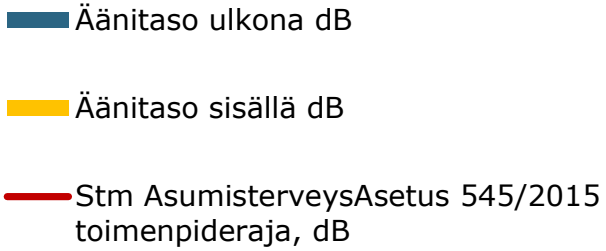




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

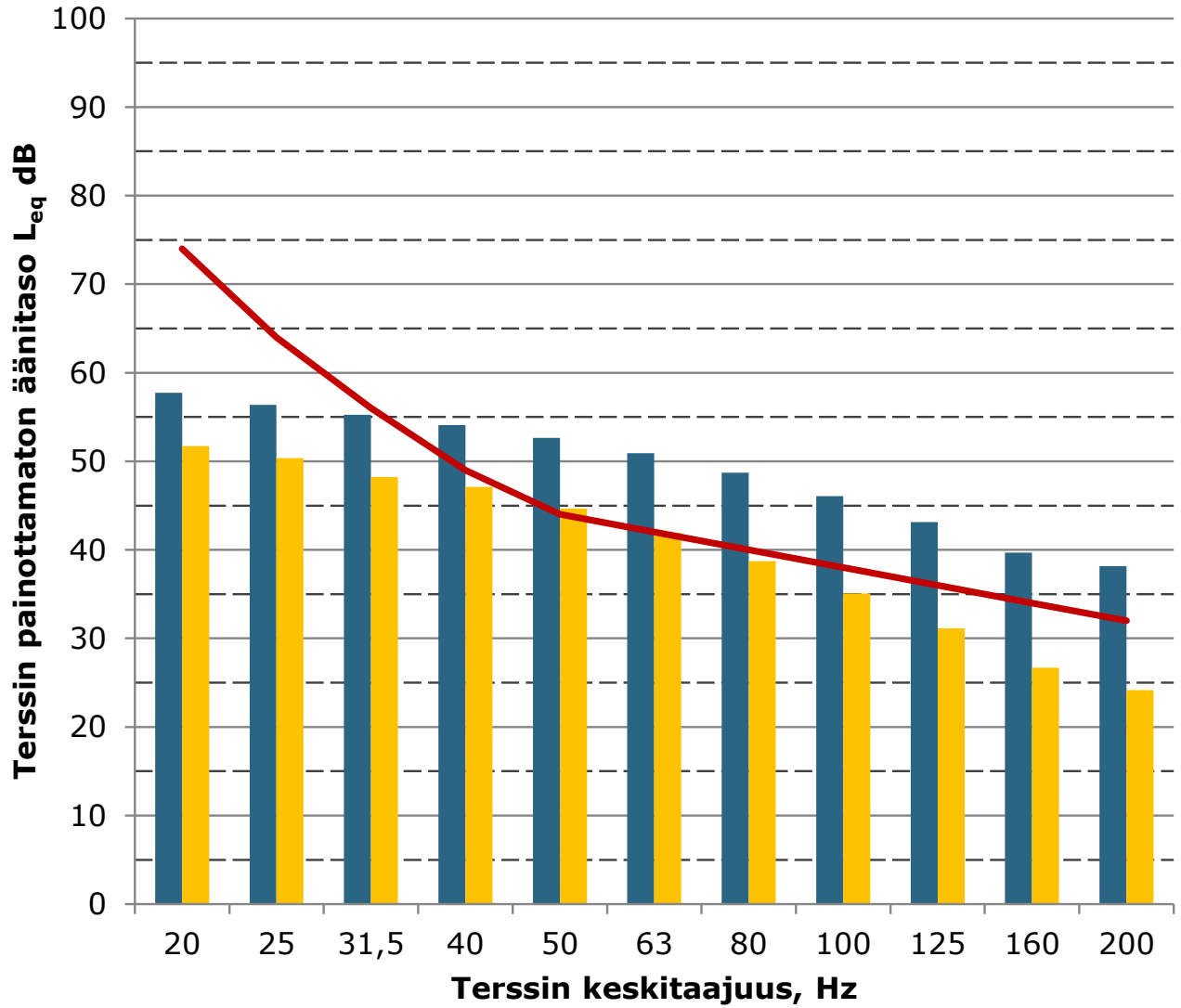
Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus K (Kurunoja), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

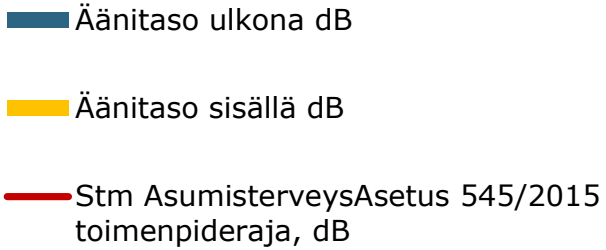




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

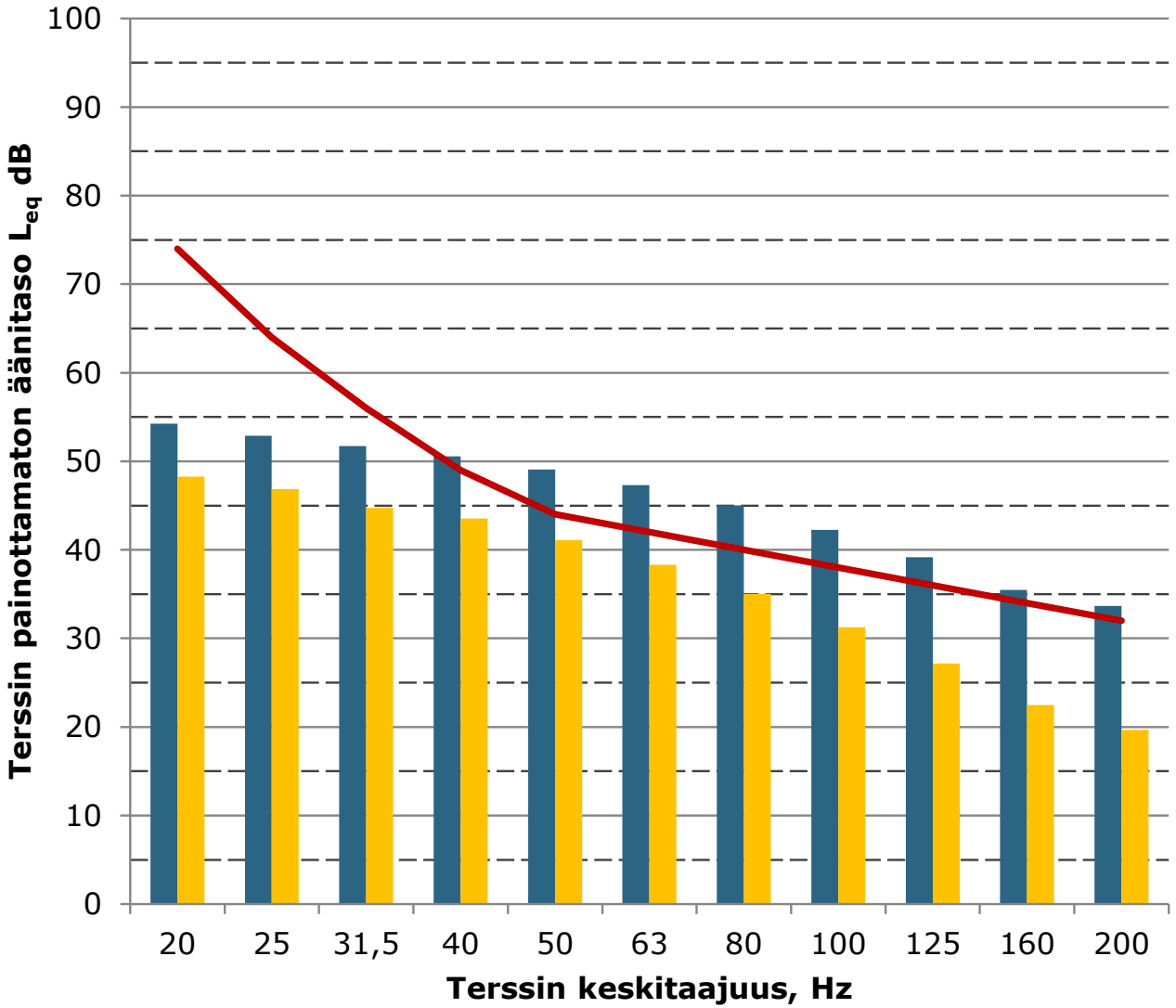
Matalien taajuuksien äänitasot ulkona ja sisällä, Muu käyttötarkoitus L (Perkkiontie, Ilmola), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

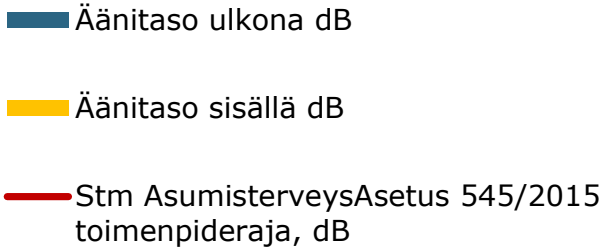




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

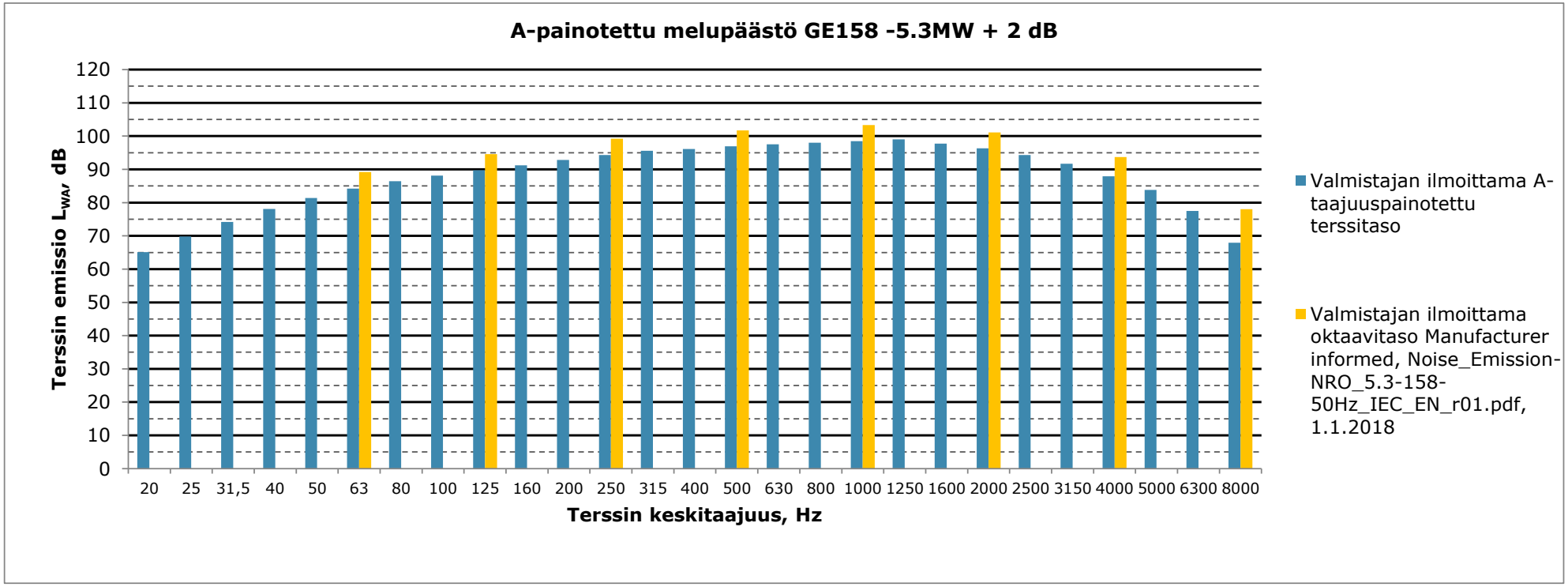
Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus M (Riskalan metsatie), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

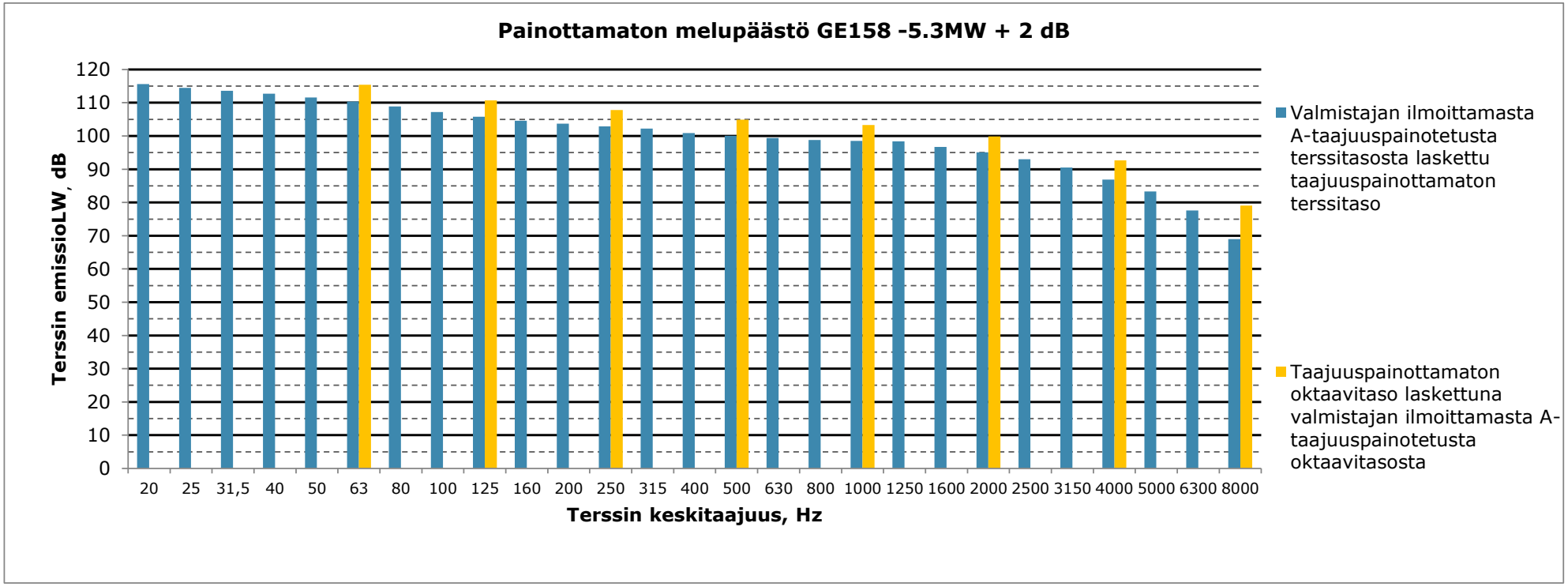


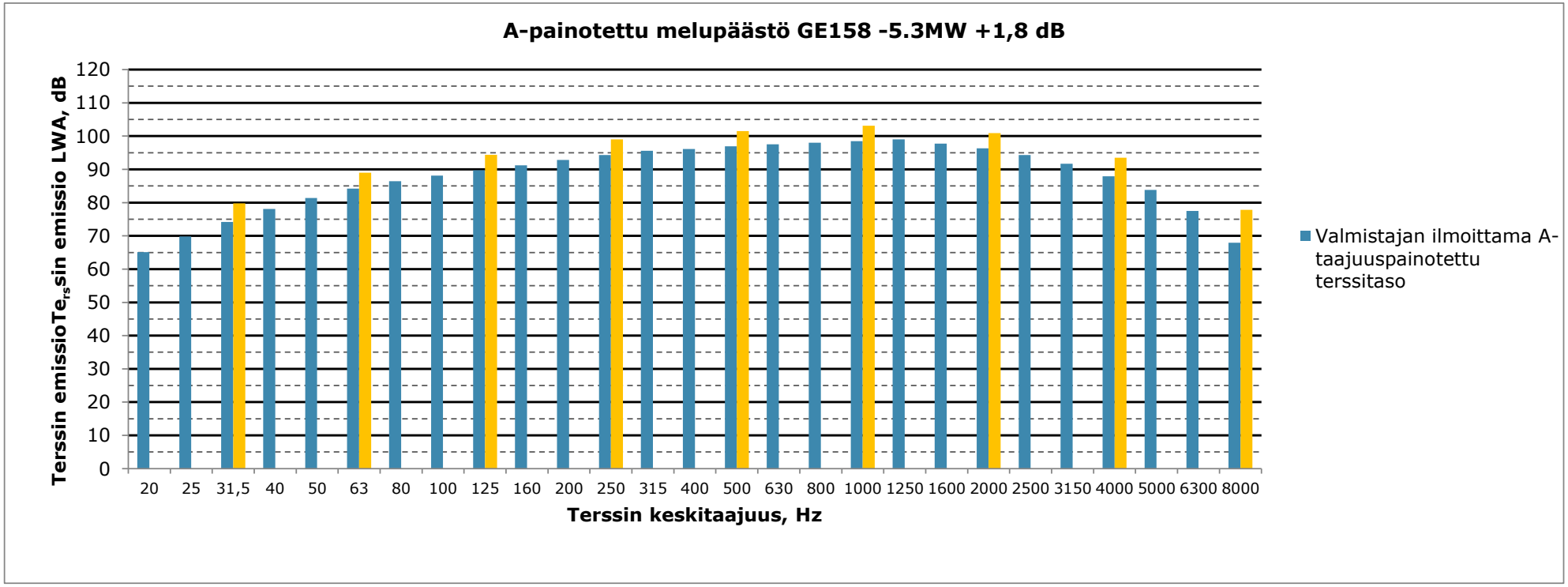


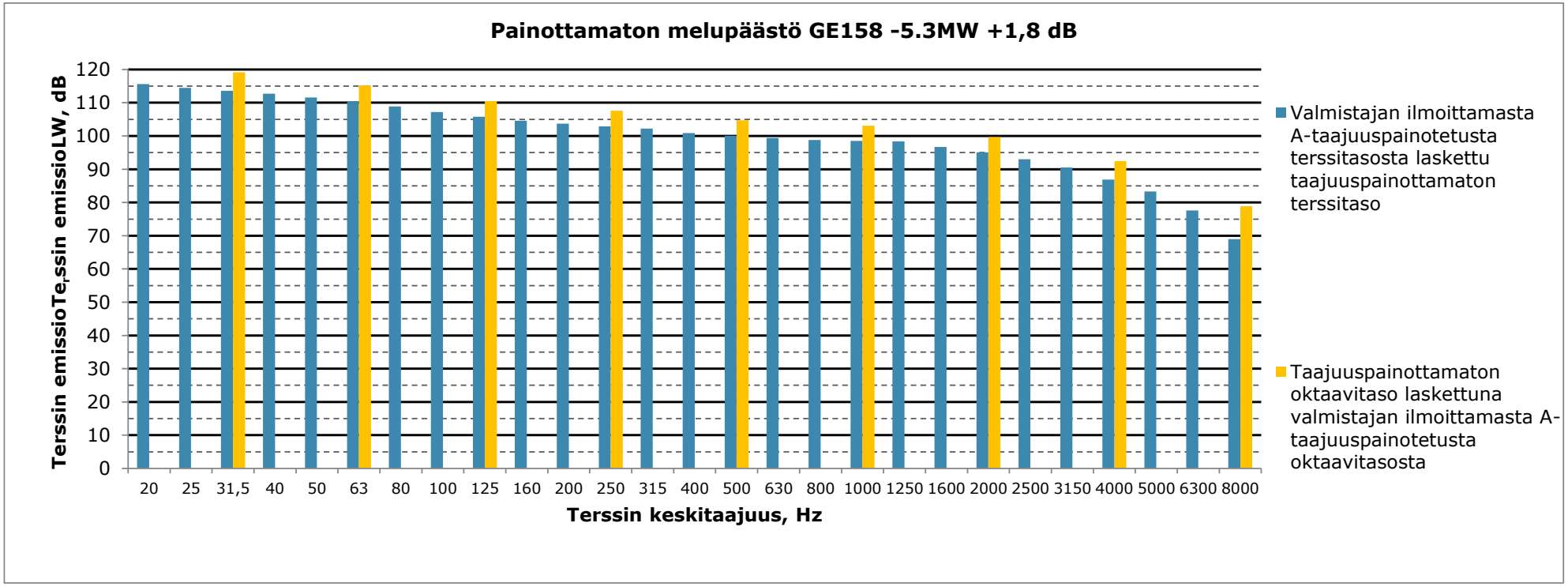
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

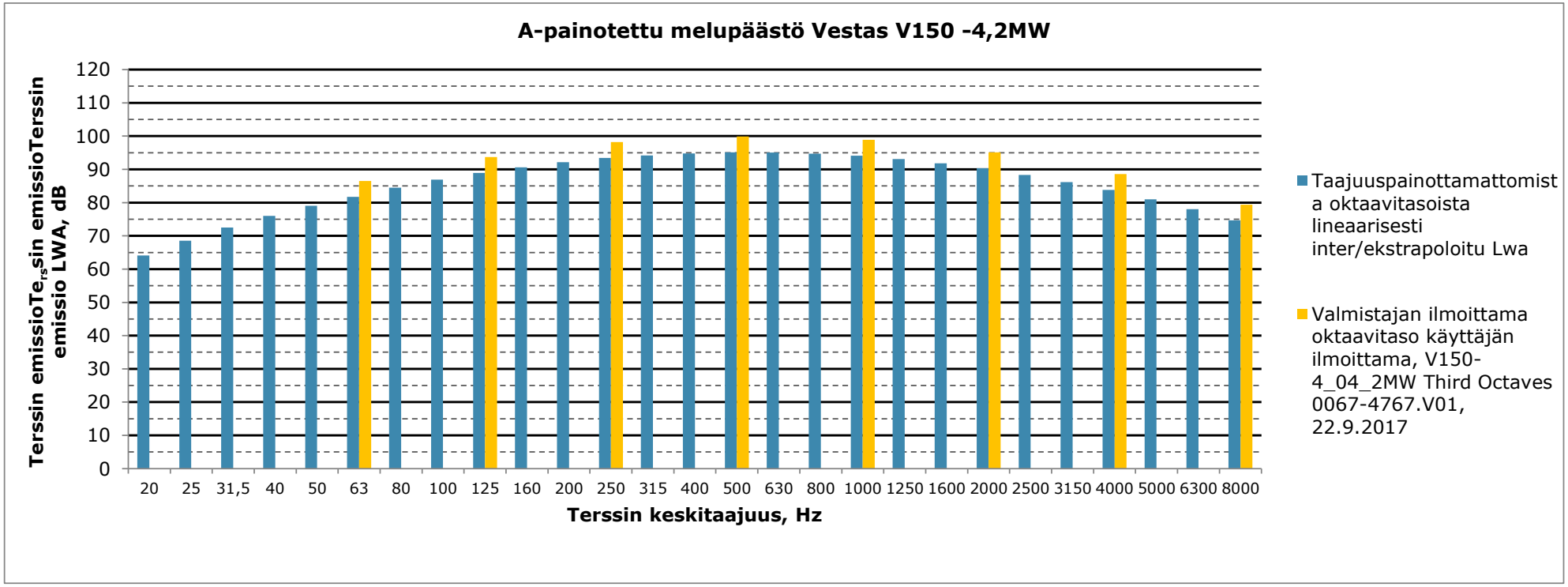
Liite 4: Puutionsaari - Matalataajuisen melun yhteismallinnuksen rakennuskohtaiset arvot

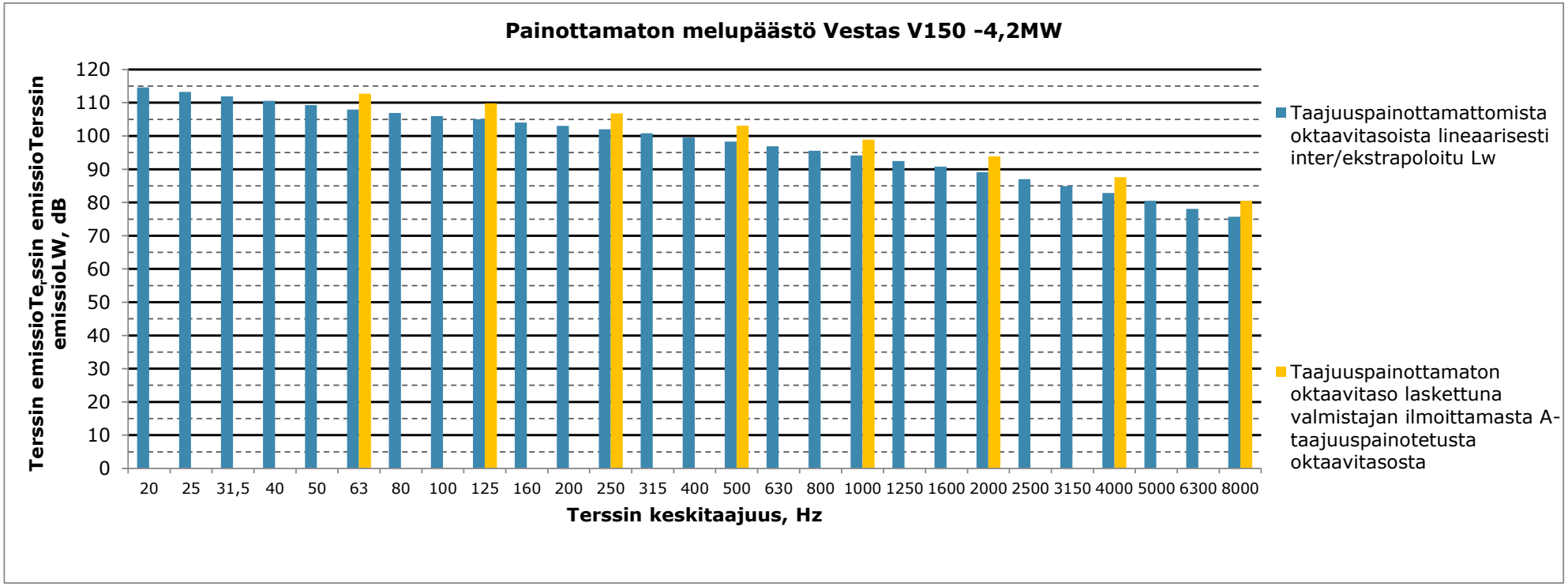

A-painotettu melupäästö GE158 -5.3MW + 2 dB
Terssin emissio L_{WA}, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittama A-taajuuspainotettu terssitaso
Valmistajan ilmoittama oktaavitaso Manufacturer informed, Noise_Emission-NRO_5.3-158-50Hz_IEC_EN_r01.pdf, 1.1.2018


Painottamaton melupäästö GE158 -5.3MW + 2 dB
Terssin emissioLW, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittamasta A-taajuuspainotetusta terssitasosta laskettu taajuuspainottamaton terssitaso
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta

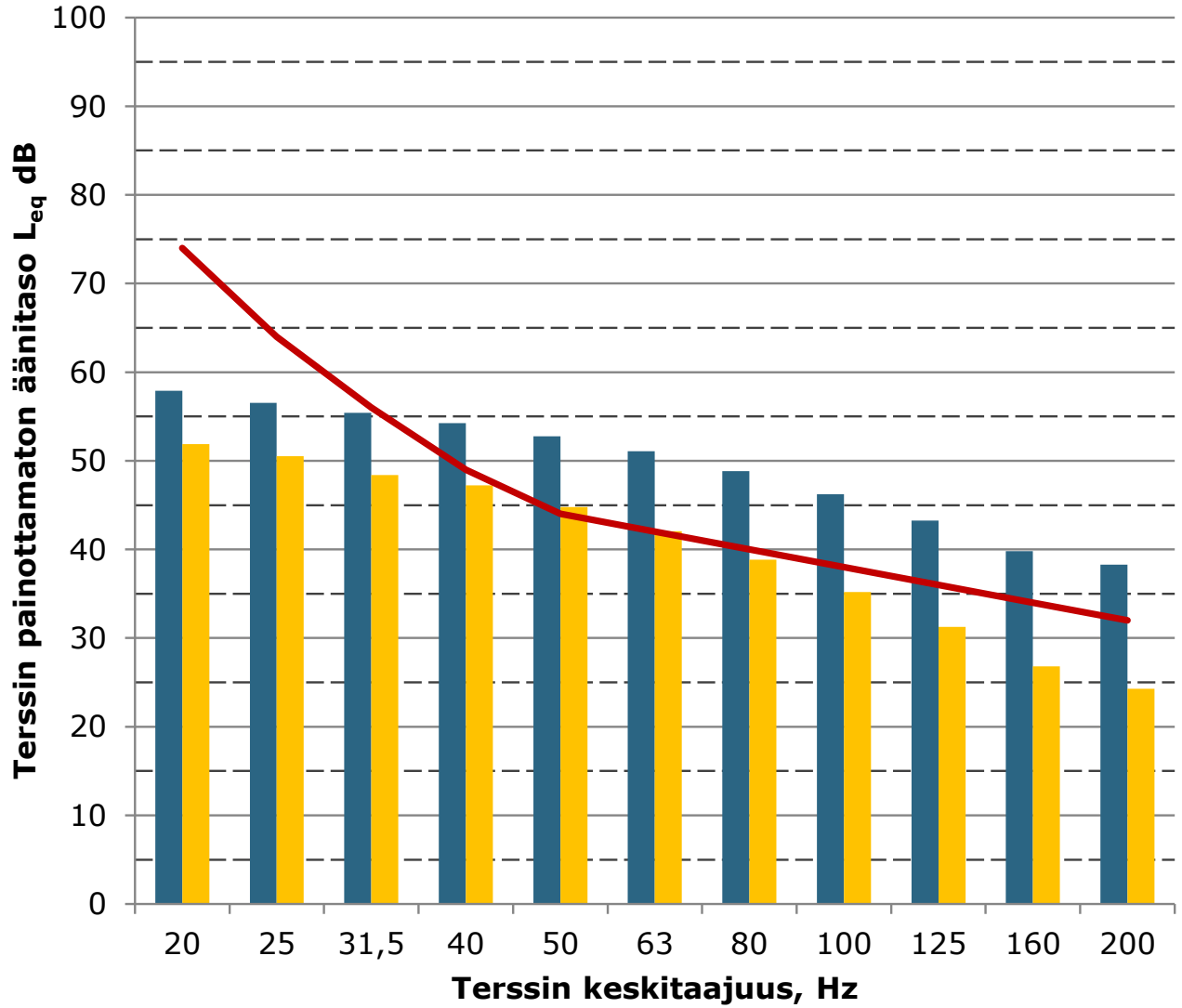

A-painotettu melupäästö GE158 -5.3MW +1,8 dB
Terssin emissioTe$_{rs}$sin emissio LWA, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittama A-taajuuspainotettu terssitaso

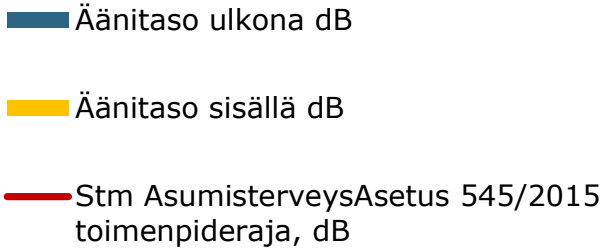

Painottamaton melupäästö GE158 -5.3MW +1,8 dB
Terssin emissioTe,ssin emissioLW, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittamasta A-taajuuspainotetusta terssitasosta laskettu taajuuspainottamaton terssitaso
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta


A-painotettu melupäästö Vestas V150 -4,2MW
Terssin emissioTe$_{rs}$sin emissioTerssin emissio LWA, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Taajuuspainottamattomista oktaavitasoista lineaarisesti inter/ekstrapoloitu Lwa
Valmistajan ilmoittama oktaavitaso käyttäjän ilmoittama, V150-4_04_2MW Third Octaves 0067-4767.V01, 22.9.2017


Painottamaton melupäästö Vestas V150 -4,2MW
Terssin emissioTe,ssin emissioTerssin emissioLW, dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Taajuuspainottamattomista oktaavitasoista lineaarisesti inter/ekstrapoloitu Lw
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta

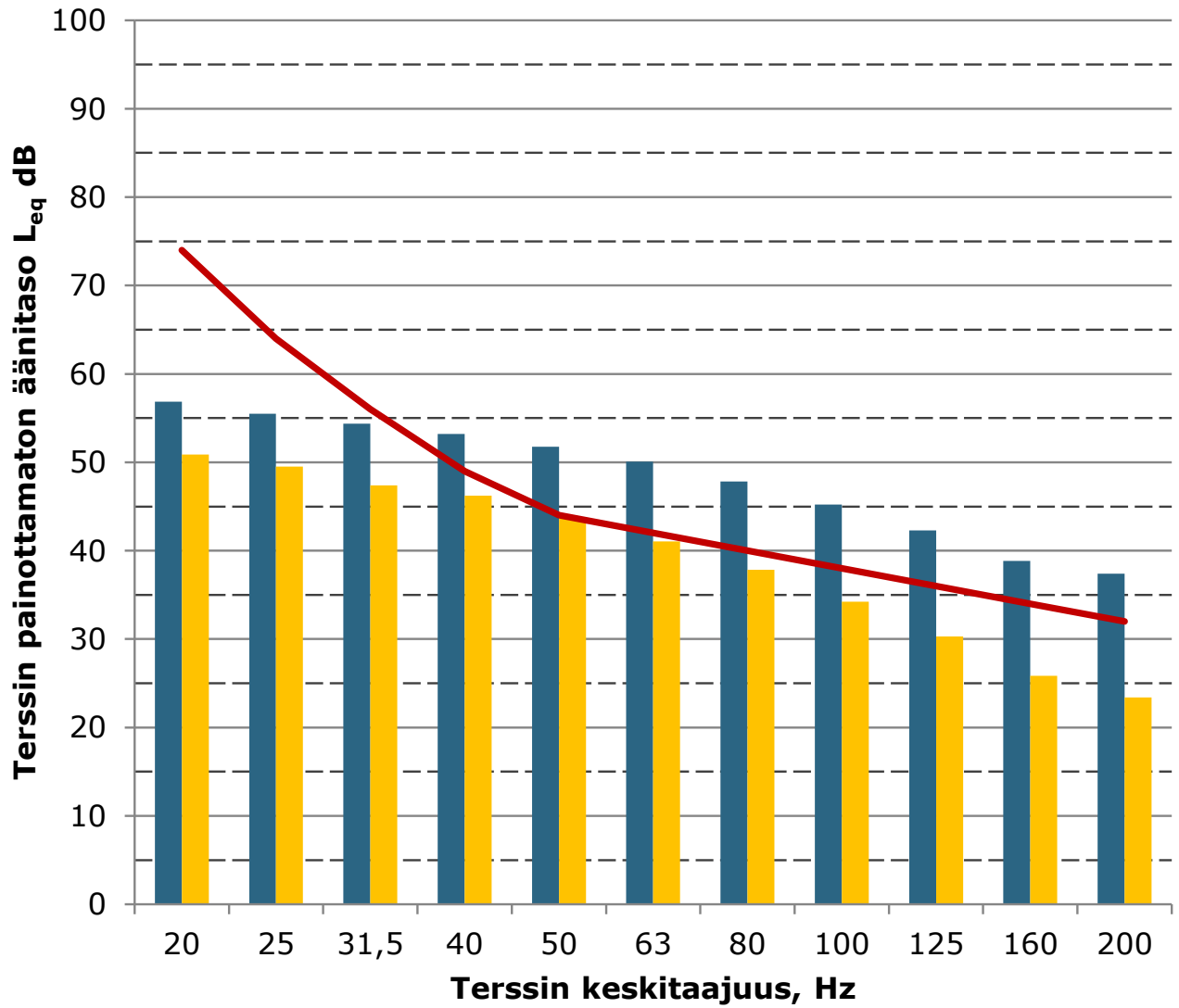
Matalien taajuuksien äänitasot ulkona ja sisällä, autiotalo C (Perkkiöntie 382), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

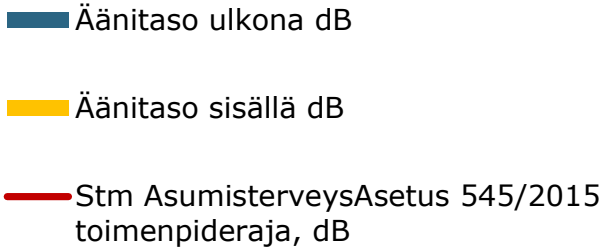




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

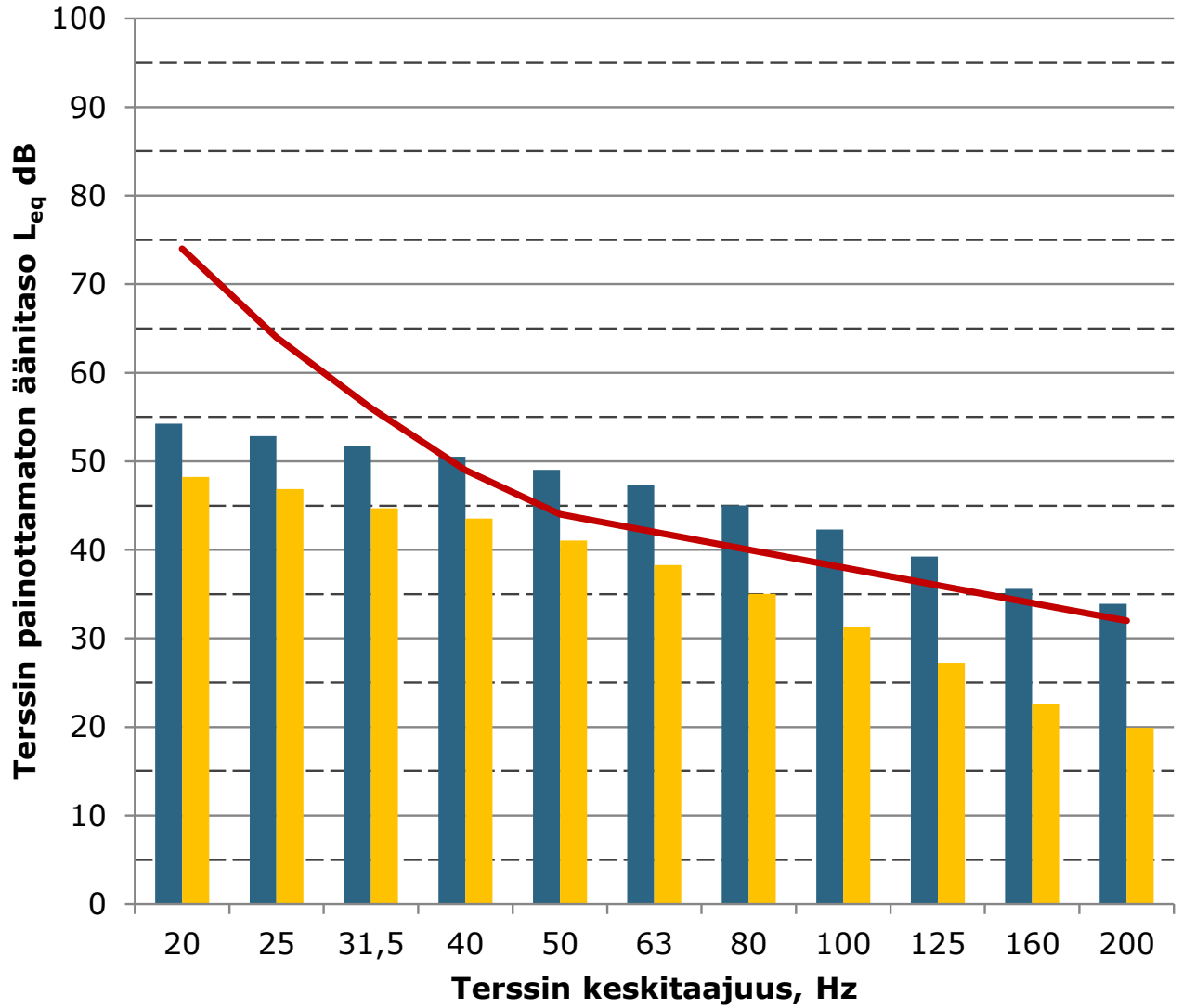
Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus D (Alakyläntie 243), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

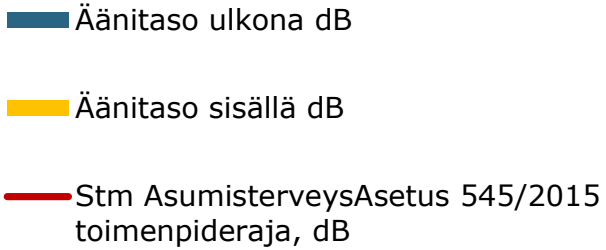




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

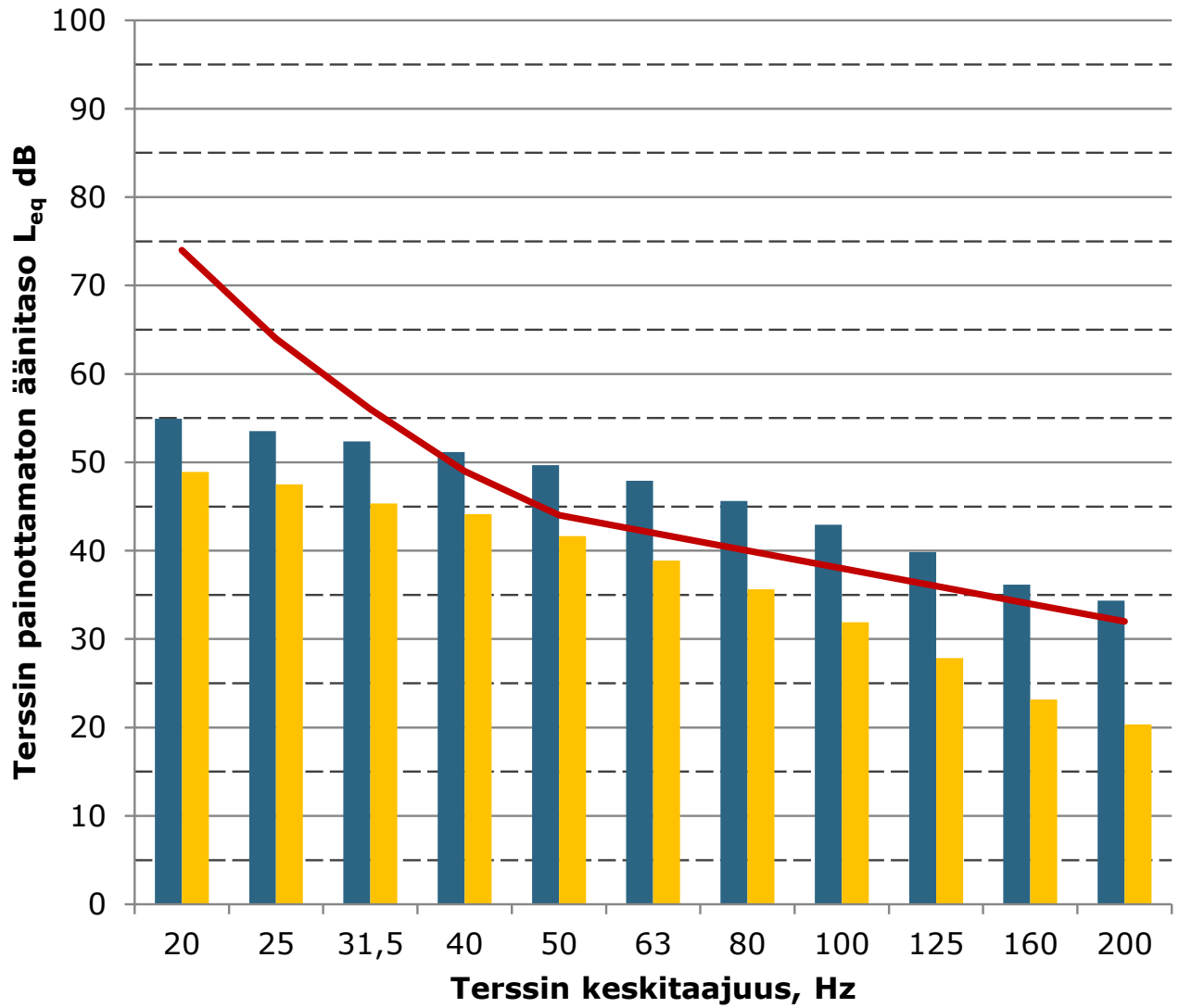
Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus E (Kellokankaan metsätie), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

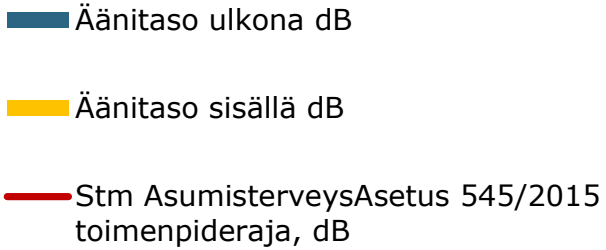




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus F (Ollilantie 112), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



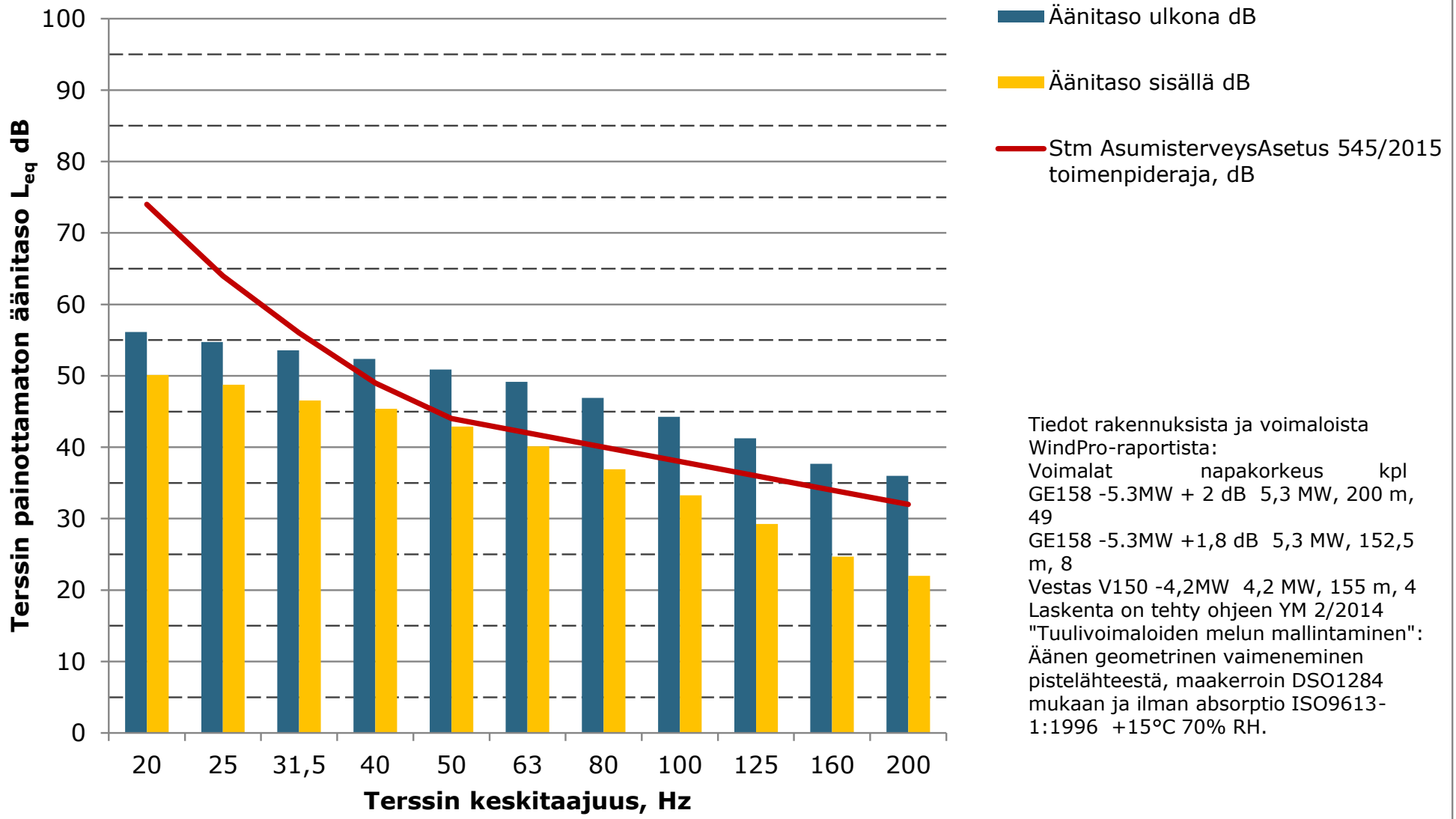


Tiedot rakennuksista ja voimaloista WindPro-raportista:

Voimalat	napakorkeus	kpl
GE158 -5.3MW + 2 dB	5,3 MW, 200 m,	49
GE158 -5.3MW +1,8 dB	5,3 MW, 152,5 m,	8
Vestas V150 -4,2MW	4,2 MW, 155 m,	4

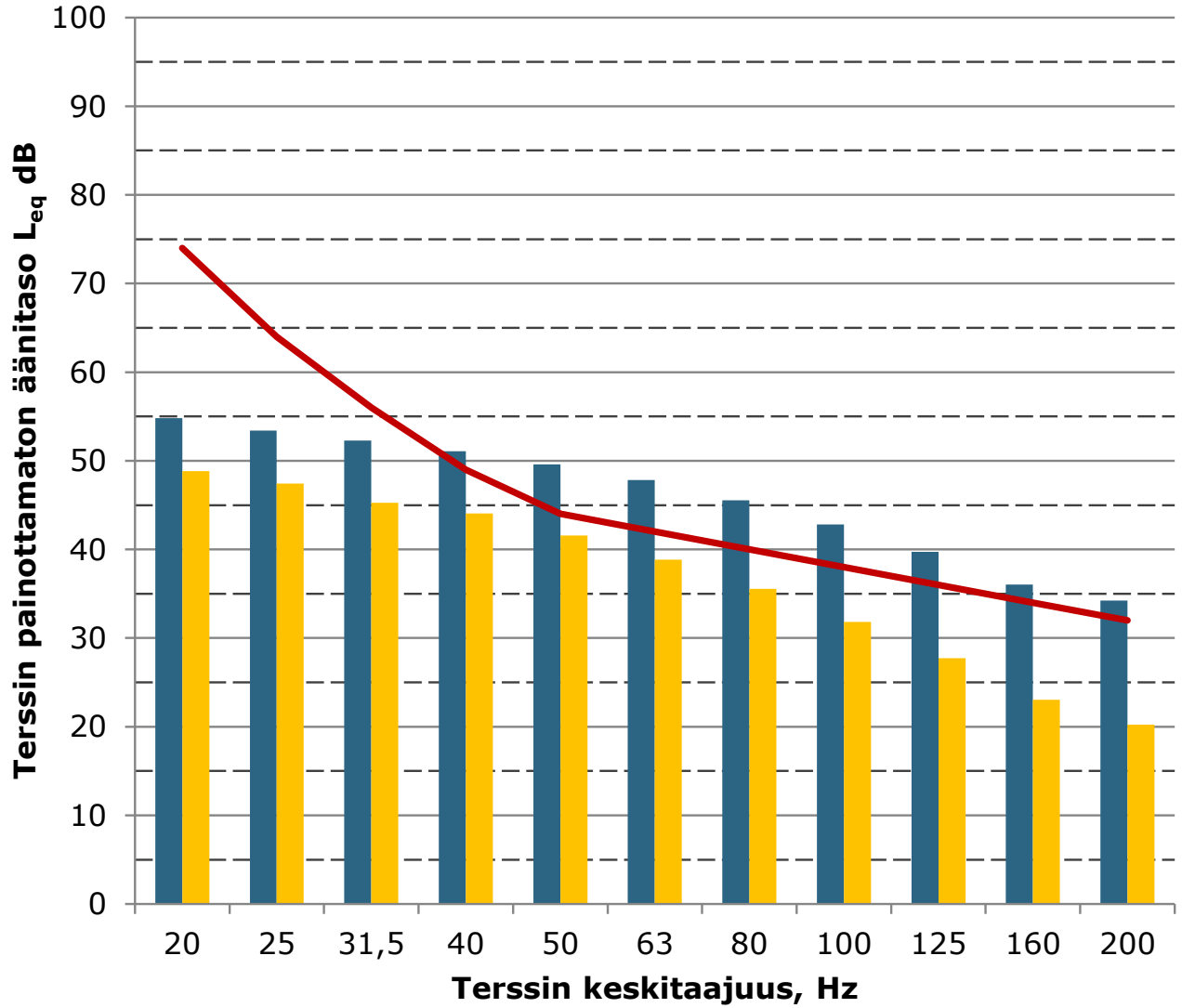
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

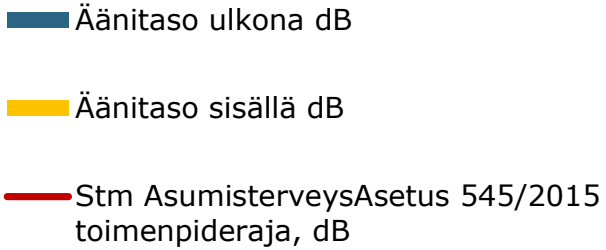
Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus G (Ollilantie, Siliäkuru), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

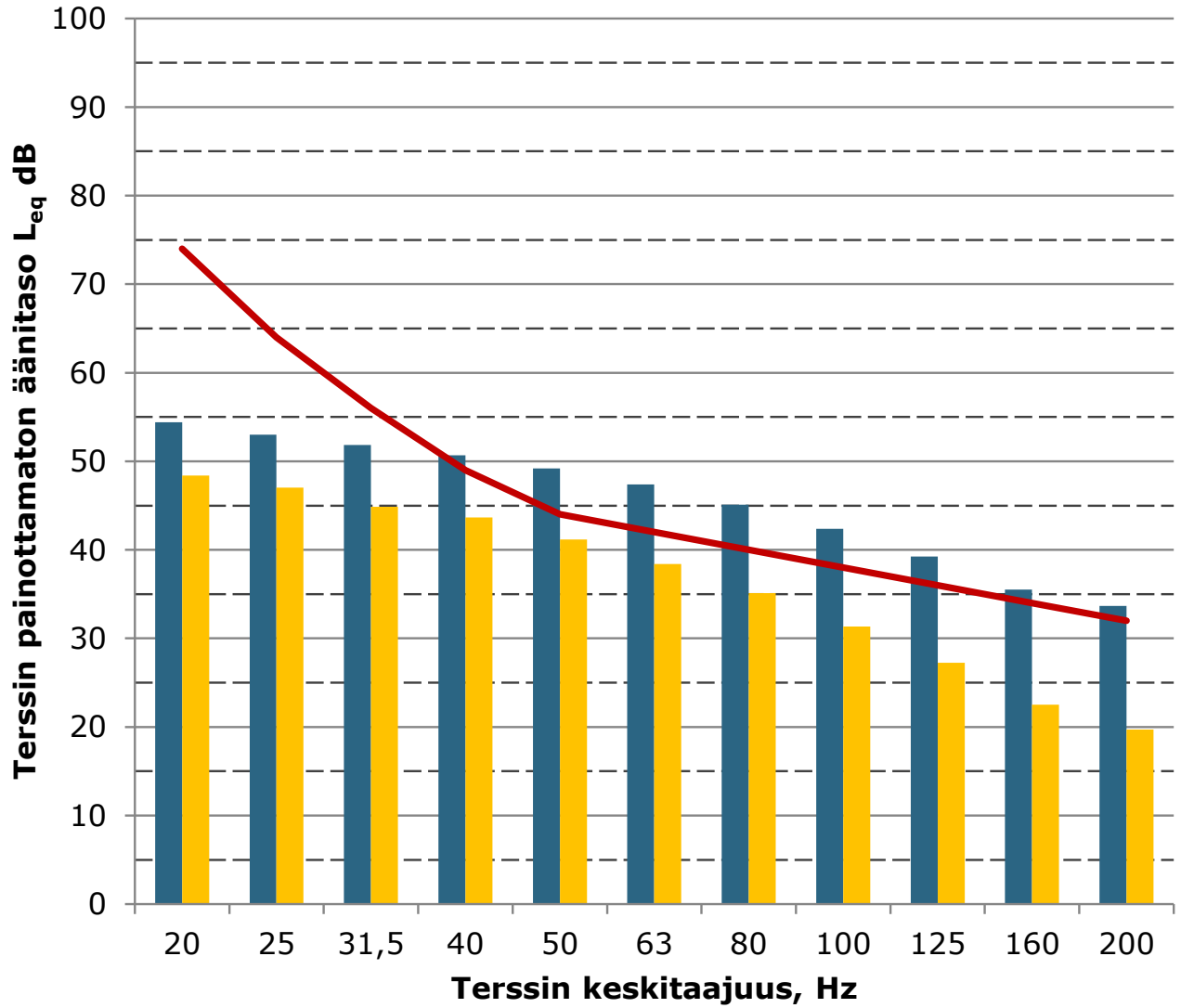
Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus H (Pinolantie 406), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan

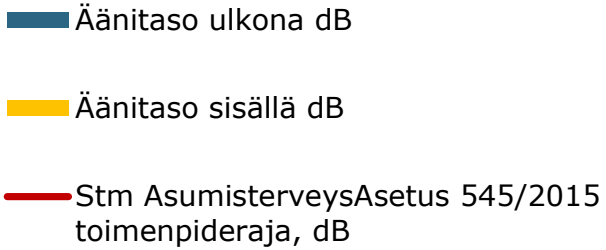




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
GE158 -5.3MW + 2 dB 5,3 MW, 200 m, 49
GE158 -5.3MW +1,8 dB 5,3 MW, 152,5 m, 8
Vestas V150 -4,2MW 4,2 MW, 155 m, 4
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus I (Kortenevantie 116), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



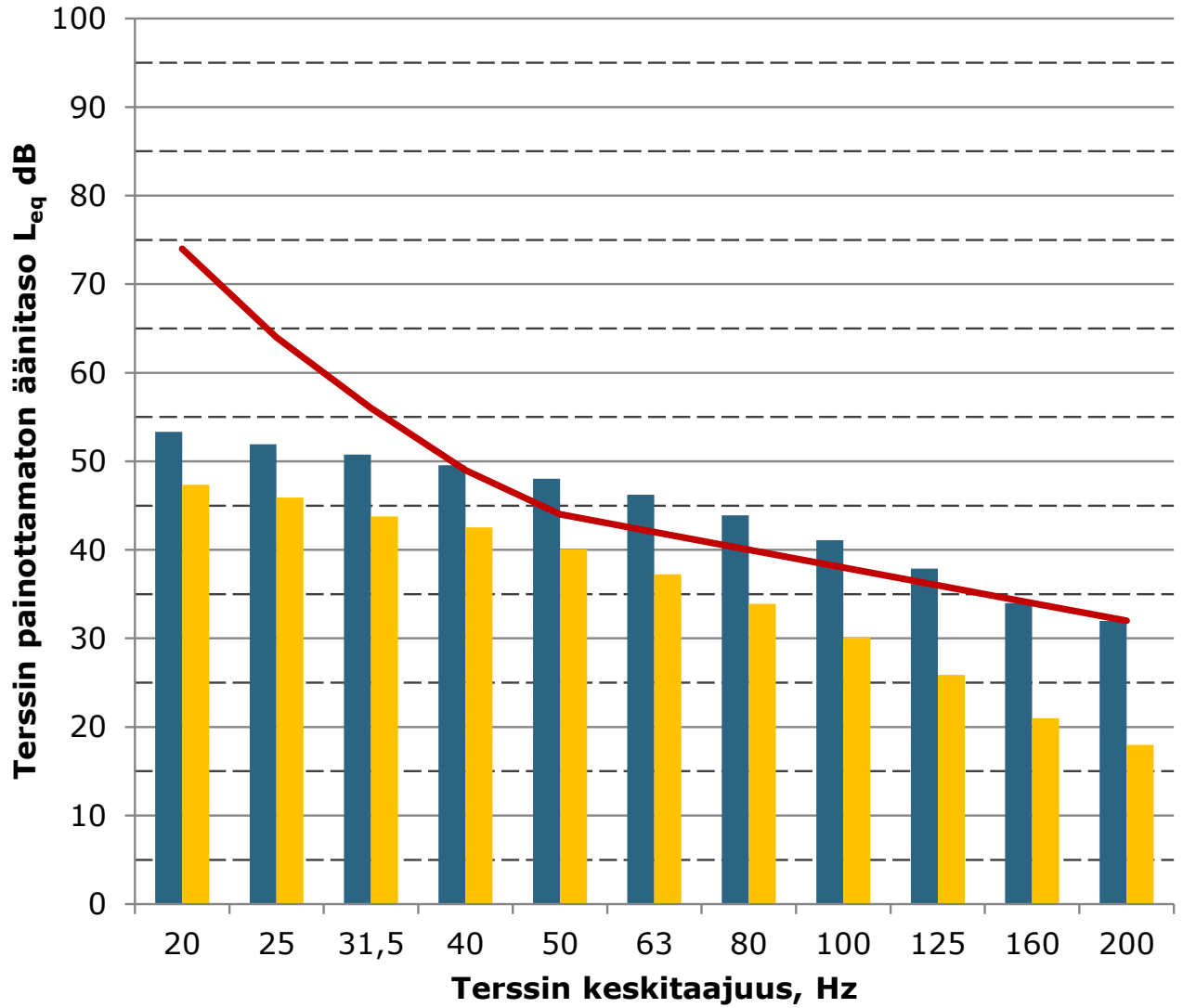


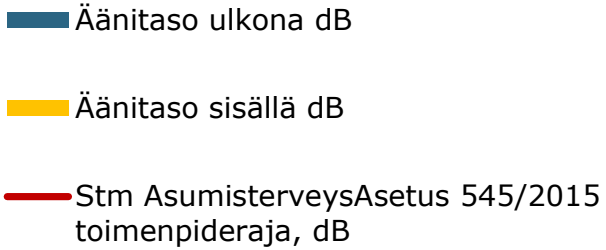
Tiedot rakennuksista ja voimaloista WindPro-raportista:

Voimalat	napakorkeus	kpl
GE158 -5.3MW + 2 dB	5,3 MW, 200 m,	49
GE158 -5.3MW +1,8 dB	5,3 MW, 152,5 m,	8
Vestas V150 -4,2MW	4,2 MW, 155 m,	4

Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Asuinrakennus J (Haapavesitie 1406), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



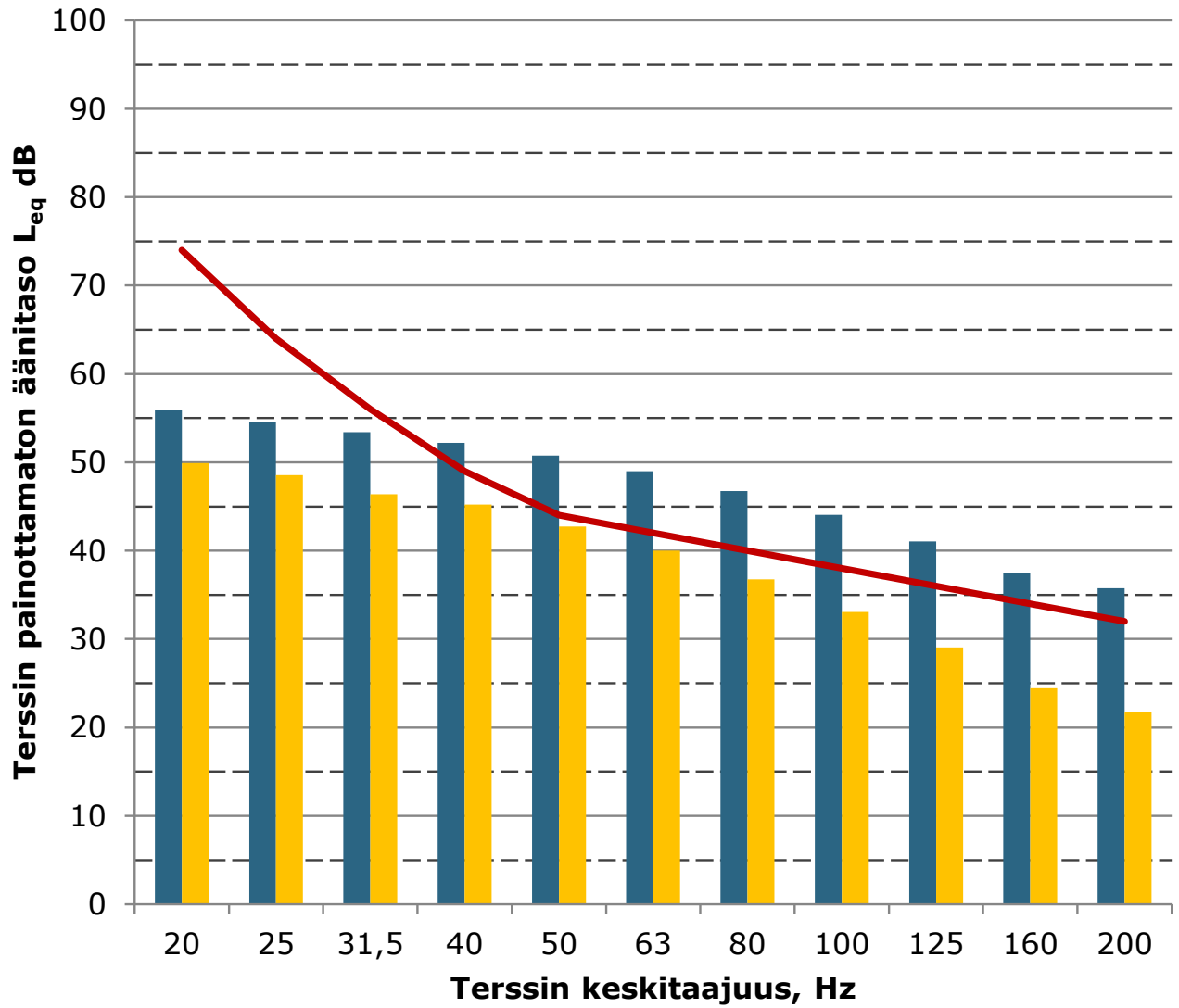


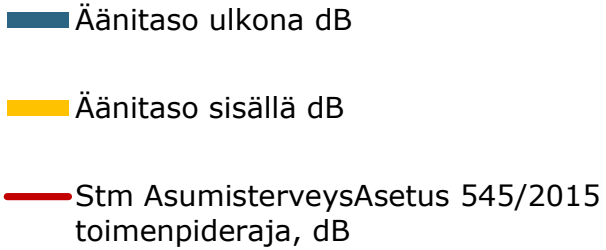
Tiedot rakennuksista ja voimaloista WindPro-raportista:

Voimalat	napakorkeus	kpl
GE158 -5.3MW + 2 dB	5,3 MW, 200 m,	49
GE158 -5.3MW +1,8 dB	5,3 MW, 152,5 m,	8
Vestas V150 -4,2MW	4,2 MW, 155 m,	4

Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus K (Kurunoja), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



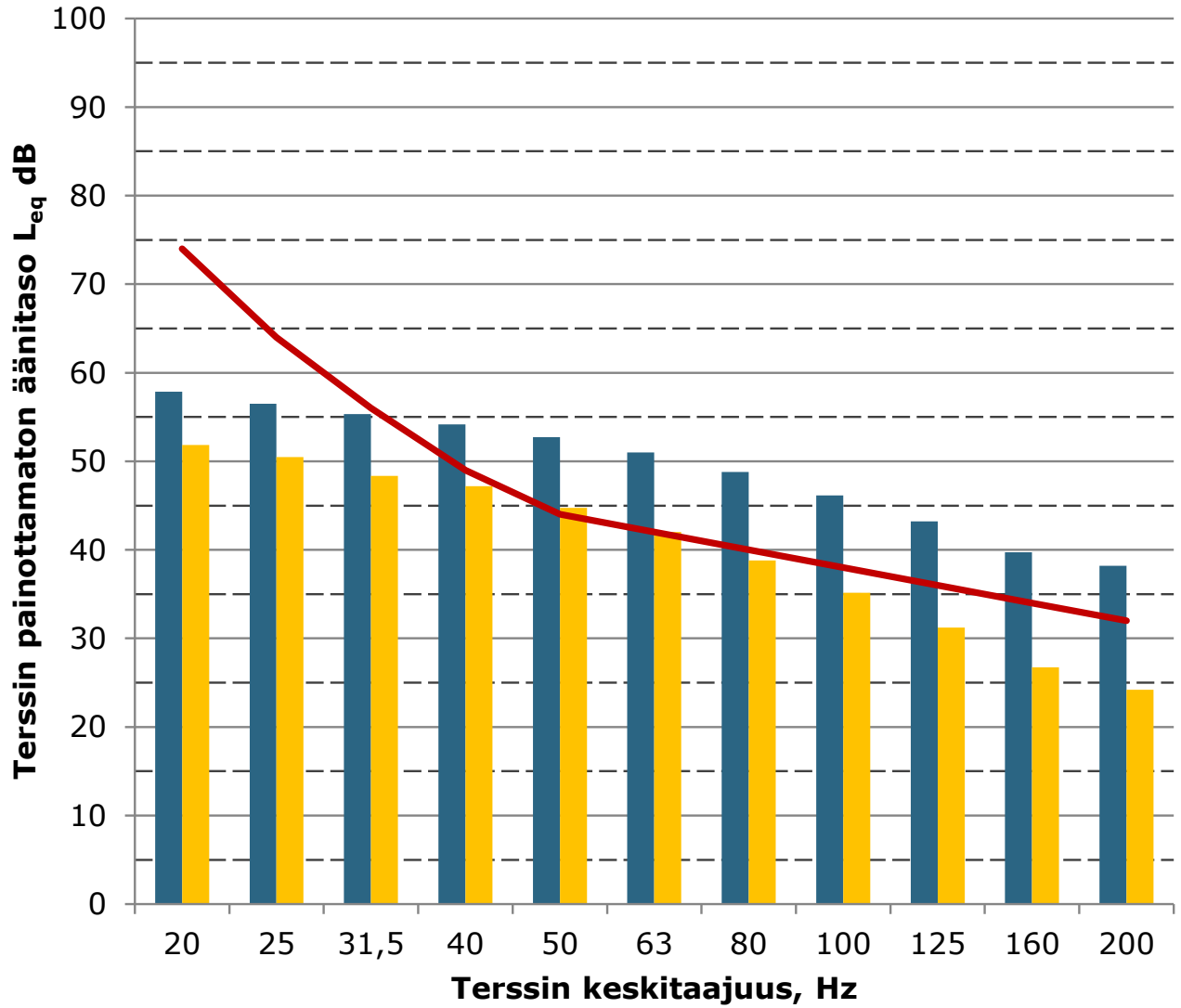


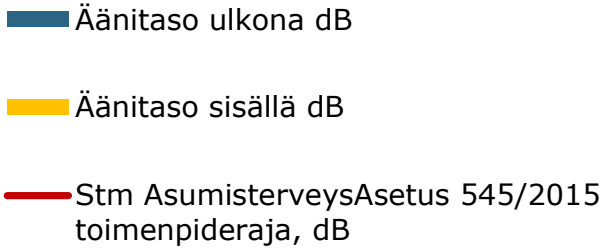
Tiedot rakennuksista ja voimaloista WindPro-raportista:

Voimalat	napakorkeus	kpl
GE158 -5.3MW + 2 dB	5,3 MW, 200 m,	49
GE158 -5.3MW +1,8 dB	5,3 MW, 152,5 m,	8
Vestas V150 -4,2MW	4,2 MW, 155 m,	4

Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Muu käyttötarkoitus L (Perkkiontie, Ilmola), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan



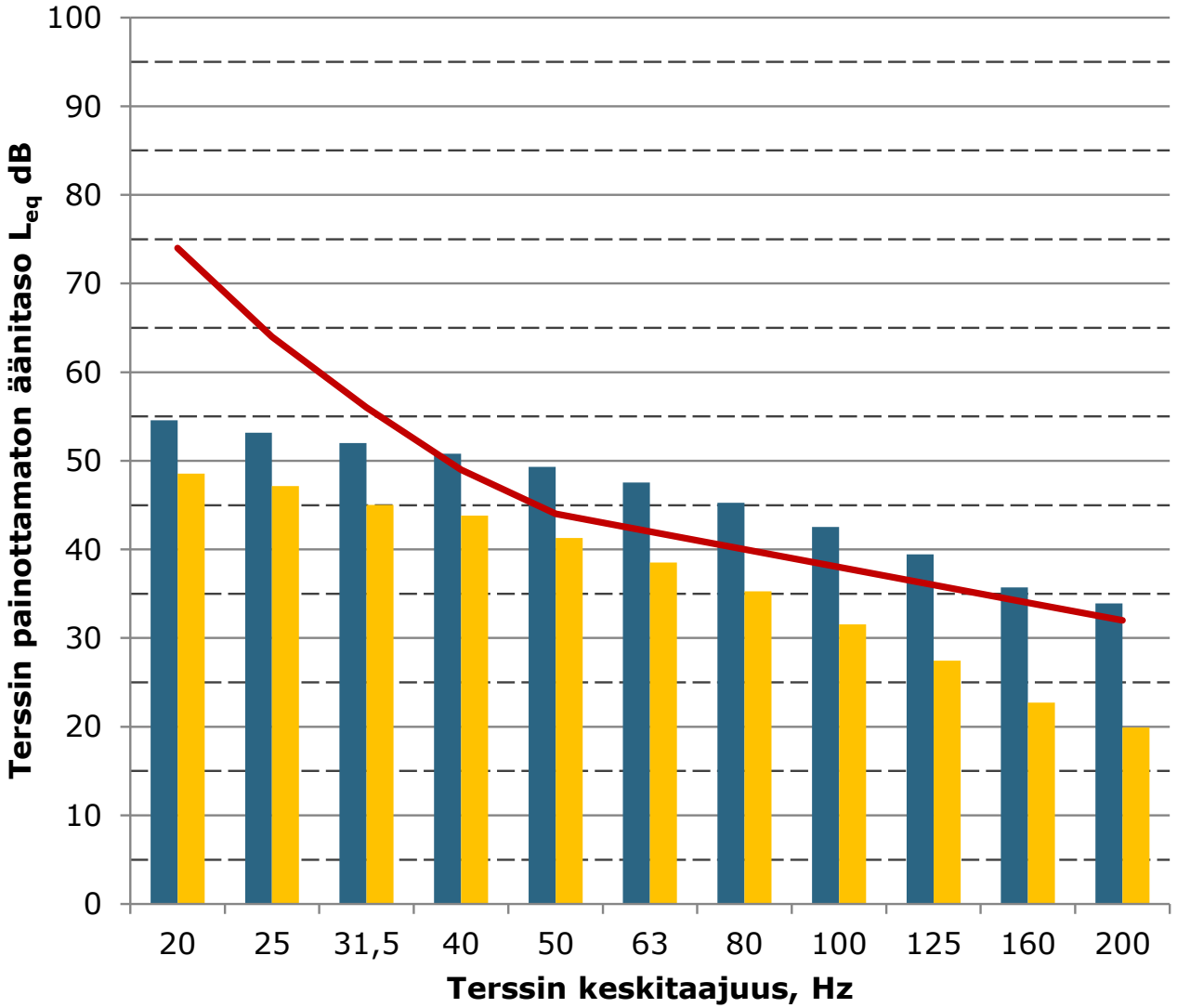


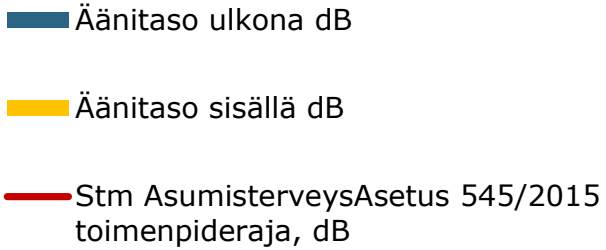
Tiedot rakennuksista ja voimaloista WindPro-raportista:

Voimalat	napakorkeus	kpl
GE158 -5.3MW + 2 dB	5,3 MW, 200 m,	49
GE158 -5.3MW +1,8 dB	5,3 MW, 152,5 m,	8
Vestas V150 -4,2MW	4,2 MW, 155 m,	4

Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Lomarakennus M (Riskalan metsatie), ääneneristävyys Keränen,Hakala,Hongisto 2017, vähimmäisarvon estimaatti DL90 mukaan





Tiedot rakennuksista ja voimaloista WindPro-raportista:

Voimalat	napakorkeus	kpl
GE158 -5.3MW + 2 dB	5,3 MW, 200 m,	49
GE158 -5.3MW +1,8 dB	5,3 MW, 152,5 m,	8
Vestas V150 -4,2MW	4,2 MW, 155 m,	4

Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen": Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Liite 5: Puutionsaari - Varjostusmallinnusten tulokset ”real case, no forest”

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational hours are calculated from WTGs in calculation and wind distribution:
MERRA_basic_E25.335_N64.000 (3)

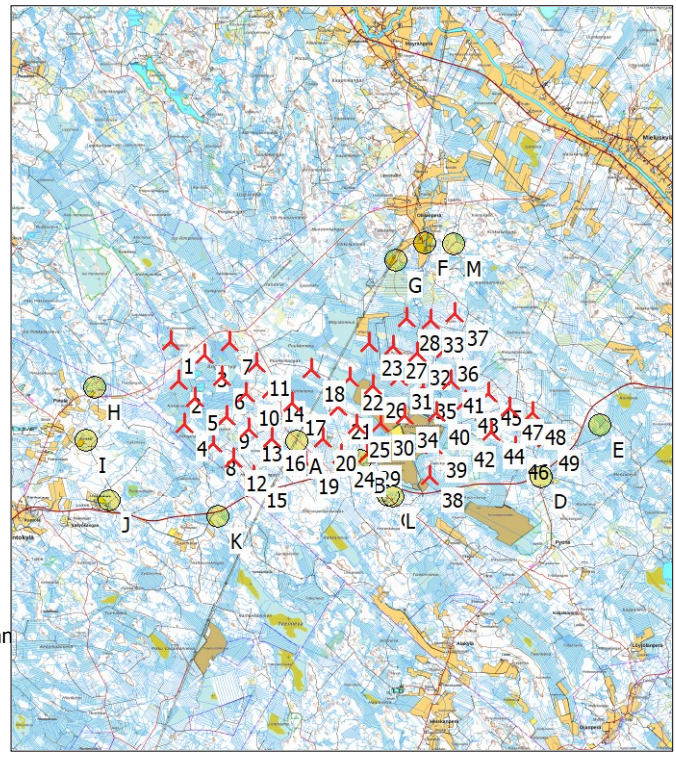
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:200 000

New WTG Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
2	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
3	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
4	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
5	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
6	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
7	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
8	400 019	7 109 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
9	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
10	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
11	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
12	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
13	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
26	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
27	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
28	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
29	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
30	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

To be continued on next page...

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
31	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
32	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
33	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
34	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
35	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
36	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
37	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
38	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
39	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
40	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
41	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
42	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
43	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
44	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
45	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
46	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
47	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
48	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
49	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Autiotalo B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Autiotalo C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus E (Kellokankaan metsatie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste A (Metsästysmaja)	133:58
B	Autiotalo B (Ylivieskantie, Pohlola)	73:24
C	Autiotalo C (Perkkiontie 382)	30:25
D	Asuinrakennus D (Alakylantie 243)	12:35
E	Lomarakennus E (Kellokankaan metsatie)	6:19
F	Asuinrakennus F (Ollilantie 112)	7:04
G	Lomarakennus G (Ollilantie, Siliakuru)	12:50
H	Asuinrakennus H (Pinolantie 406)	4:31
I	Asuinrakennus I (Kortenevantie 116)	0:00
J	Asuinrakennus J (Haapavesitie 1406)	0:00
K	Lomarakennus K (Kurunoja)	0:00
L	Muu käyttöt. L (Perkkiontie, Ilmola)	26:00
M	Lomarakennus M (Riskalan metsatie)	6:35

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	PUU01	10:56	2:46
2	PUU02	7:53	1:45
3	PUU03	0:00	0:00
4	PUU04	0:00	0:00
5	PUU05	0:00	0:00
6	PUU06	0:00	0:00
7	PUU07	0:00	0:00
8	PUU08	6:53	1:25
9	PUU09	11:16	2:30
10	PUU10	28:43	7:58
11	PUU11	0:00	0:00
12	PUU12	12:12	2:21
13	PUU13	26:46	5:55
14	PUU14	0:00	0:00
15	PUU15	18:40	3:52
16	PUU16	142:02	35:00
17	PUU17	12:46	3:26
18	PUU18	0:00	0:00
19	PUU19	120:47	26:39
20	PUU20	211:50	54:50
21	PUU21	33:58	9:10
22	PUU22	8:46	2:29
23	PUU23	12:30	1:42
24	PUU24	207:49	53:17
25	PUU25	17:24	3:46
26	PUU26	0:00	0:00
27	PUU27	16:09	2:14
28	PUU28	51:28	7:44
29	PUU29	10:25	2:04
30	PUU30	7:27	1:35
31	PUU31	0:00	0:00
32	PUU32	0:00	0:00
33	PUU33	48:23	7:26
34	PUU34	17:45	4:50
35	PUU35	0:00	0:00
36	PUU36	0:00	0:00
37	PUU37	44:36	7:21
38	PUU38	90:20	23:11
39	PUU39	25:07	6:22
40	PUU40	10:01	2:32
41	PUU41	0:00	0:00
42	PUU42	7:32	1:49
43	PUU43	0:00	0:00
44	PUU44	31:06	8:38
45	PUU45	0:00	0:00
46	PUU46	14:10	3:36
47	PUU47	5:45	1:16
48	PUU48	12:19	2:43
49	PUU49	17:11	3:18

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June		
1	10.13	09.04		07.31		10.17 (19)	06.42	08.01 (29)	04.57	06.13 (25)	03.19	04.41 (21)
	14.35	16.06		17.36	103	16.09 (15)	20.09	55 19.14 (8)	21.41	203 20.20 (9)	23.20	171 21.58 (10)
2	10.12	09.00		07.28		10.17 (19)	06.39	08.22 (24)	04.53	06.13 (25)	03.16	04.40 (21)
	14.37	16.09		17.39	102	16.08 (15)	20.12	42 19.13 (8)	21.45	198 20.18 (9)	23.23	171 21.58 (10)
3	10.10	08.57		07.25		10.16 (19)	06.35	08.22 (24)	04.50	06.14 (25)	03.14	04.40 (21)
	14.39	16.12		17.42	99	16.06 (15)	20.15	36 19.10 (8)	21.48	186 20.04 (13)	23.25	170 21.59 (10)
4	10.09	08.54		07.21		10.16 (19)	06.32	08.25 (24)	04.46	06.15 (25)	03.12	04.13 (22)
	14.42	16.16		17.45	97	16.05 (15)	20.18	23 19.07 (8)	21.51	184 20.03 (13)	23.28	169 21.58 (10)
5	10.08	08.51		07.18		10.15 (19)	06.28	08.27 (24)	04.43	06.16 (25)	03.09	04.12 (22)
	14.44	16.19		17.48	95	16.03 (15)	20.21	13 08.40 (24)	21.54	181 20.01 (13)	23.31	172 21.59 (10)
6	10.07	08.48		07.14		10.15 (19)	06.24		04.39	06.17 (25)	03.07	04.10 (22)
	14.46	16.22		17.51	87	15.59 (15)	20.24		21.57	178 20.00 (13)	23.33	171 21.58 (10)
7	10.05	08.45		07.11		10.15 (19)	06.21		04.36	06.19 (25)	03.05	04.09 (22)
	14.49	16.26		17.55	76	11.31 (19)	20.27		22.01	171 19.58 (13)	23.35	171 21.59 (10)
8	10.03	08.42		07.07		10.14 (19)	06.17		04.33	06.23 (25)	03.03	04.08 (22)
	14.51	16.29		17.58	85	17.21 (12)	20.30		22.04	157 19.55 (13)	23.38	173 21.59 (10)
9	10.02	08.39		07.04		10.14 (19)	06.14	19.02 (16)	04.29	06.37 (20)	03.01	04.07 (22)
	14.54	16.32		18.01	91	17.24 (12)	20.33	9 19.11 (16)	22.07	144 19.50 (13)	23.40	172 21.59 (10)
10	10.00	08.35	10.48 (19)	07.00		10.15 (19)	06.10	18.56 (16)	04.26	06.36 (20)	02.57	04.06 (22)
	14.56	16.35	15 11.03 (19)	18.04	95	17.28 (12)	20.36	22 19.18 (16)	22.10	142 19.38 (16)	23.42	171 21.59 (10)
11	09.58	08.32	10.43 (19)	06.57		10.14 (19)	06.07	06.40 (30)	04.23	06.36 (20)	02.56	04.05 (22)
	14.59	16.39	25 11.08 (19)	18.07	98	17.29 (12)	20.39	34 19.22 (16)	22.14	141 19.37 (16)	23.44	171 21.59 (10)
12	09.56	08.29	10.40 (19)	06.53		10.15 (19)	06.03	06.36 (30)	04.19	06.36 (20)	02.54	04.04 (22)
	15.02	16.42	32 11.12 (19)	18.10	98	17.30 (12)	20.42	56 19.58 (13)	22.17	141 19.38 (16)	23.46	172 21.59 (10)
13	09.54	08.26	10.37 (19)	06.50		07.37 (24)	06.00	06.33 (30)	04.16	06.36 (20)	02.53	04.04 (22)
	15.05	16.45	37 11.14 (19)	18.13	108	17.30 (12)	20.45	73 20.02 (13)	22.20	140 19.37 (16)	23.48	170 22.00 (10)
14	09.52	08.22	10.34 (19)	06.46		07.32 (24)	05.56	06.29 (30)	04.13	06.36 (20)	02.52	04.03 (22)
	15.08	16.49	54 16.01 (15)	18.16	118	17.30 (12)	20.48	85 20.03 (13)	22.23	139 19.36 (16)	23.49	169 21.59 (10)
15	09.49	08.19	10.32 (19)	06.43		07.30 (24)	05.53	06.27 (30)	04.10	06.36 (20)	02.51	04.03 (22)
	15.11	16.52	64 16.04 (15)	18.19	121	17.30 (12)	20.51	96 20.13 (9)	22.27	139 19.37 (16)	23.51	170 22.00 (10)
16	09.47	08.16	10.31 (19)	06.39		07.27 (24)	05.49	06.25 (25)	04.06	06.36 (20)	02.50	04.02 (22)
	15.14	16.55	71 16.07 (15)	18.22	124	17.30 (12)	20.54	123 20.16 (9)	22.30	138 19.36 (16)	23.52	168 21.59 (10)
17	09.45	08.12	10.29 (19)	06.35		07.07 (29)	05.45	06.20 (25)	04.03	06.37 (20)	02.50	04.02 (22)
	15.17	16.58	78 16.08 (15)	18.25	132	17.29 (12)	20.57	147 20.18 (9)	22.33	140 21.42 (10)	23.53	170 22.00 (10)
18	09.42	08.09	10.27 (19)	06.32		07.04 (29)	05.42	06.18 (25)	04.00	06.36 (20)	02.49	04.02 (22)
	15.20	17.01	82 16.08 (15)	18.28	138	17.29 (12)	21.00	161 20.21 (9)	22.36	143 21.44 (10)	23.54	169 22.00 (10)
19	09.40	08.06	10.27 (19)	06.28		07.00 (29)	05.38	06.17 (25)	03.57	04.53 (21)	02.49	04.03 (22)
	15.23	17.05	87 16.10 (15)	18.30	142	17.28 (12)	21.03	175 20.25 (9)	22.40	152 21.47 (10)	23.55	169 22.00 (10)
20	09.37	08.02	10.25 (19)	06.25		06.59 (29)	05.35	06.15 (25)	03.54	04.49 (21)	02.49	04.03 (22)
	15.26	17.08	90 16.10 (15)	18.33	141	17.27 (12)	21.07	181 20.25 (9)	22.43	161 21.49 (10)	23.55	169 22.01 (10)
21	09.35	07.59	10.24 (19)	06.21		06.57 (29)	05.31	06.14 (25)	03.50	04.47 (21)	02.49	04.03 (22)
	15.29	17.11	94 16.11 (15)	18.36	140	17.25 (12)	21.10	187 20.26 (9)	22.46	167 21.51 (10)	23.55	168 22.01 (10)
22	09.32	07.55	10.22 (19)	06.18		06.57 (29)	05.28	06.13 (25)	03.47	04.46 (21)	02.49	04.03 (22)
	15.33	17.14	97 16.11 (15)	18.39	136	18.05 (8)	21.13	192 20.26 (9)	22.49	170 21.54 (10)	23.56	169 22.01 (10)
23	09.29	07.52	10.22 (19)	06.14		06.56 (29)	05.24	06.13 (25)	03.44	04.44 (21)	02.50	04.04 (22)
	15.36	17.17	98 16.11 (15)	18.42	136	18.07 (8)	21.16	193 20.26 (9)	22.53	173 21.54 (10)	23.56	169 22.02 (10)
24	09.27	07.49	10.21 (19)	06.11		06.55 (29)	05.21	06.12 (25)	03.41	04.44 (21)	02.50	04.03 (22)
	15.39	17.21	101 16.11 (15)	18.45	131	18.10 (8)	21.19	196 20.25 (9)	22.56	173 21.55 (10)	23.55	169 22.01 (10)
25	09.24	07.45	10.19 (19)	06.07		06.55 (29)	05.17	06.11 (25)	03.38	04.43 (21)	02.51	04.04 (22)
	15.42	17.24	103 16.11 (15)	18.48	121	18.13 (8)	21.22	201 20.25 (9)	22.59	175 21.56 (10)	23.55	169 22.02 (10)
26	09.21	07.42	10.19 (19)	06.04		06.55 (29)	05.14	06.11 (25)	03.35	04.42 (21)	02.52	04.04 (22)
	15.46	17.27	103 16.11 (15)	18.51	119	18.16 (8)	21.25	203 20.25 (9)	23.02	175 21.56 (10)	23.55	170 22.02 (10)
27	09.18	07.38	10.18 (19)	06.00		06.55 (29)	05.10	06.11 (25)	03.33	04.42 (21)	02.53	04.05 (22)
	15.49	17.30	104 16.10 (15)	18.54	115	18.18 (8)	21.29	204 20.24 (9)	23.05	175 21.57 (10)	23.54	170 22.02 (10)
28	09.15	07.35	10.17 (19)	05.56		06.55 (29)	05.07	06.11 (25)	03.30	04.41 (21)	02.55	04.06 (22)
	15.52	17.33	104 16.09 (15)	18.57	102	18.17 (8)	21.32	206 20.24 (9)	23.08	174 21.57 (10)	23.53	171 22.03 (10)
29	09.12			06.53		07.56 (29)	05.03	06.12 (25)	03.27	04.41 (21)	02.56	04.07 (22)
	15.56			20.00	78	19.17 (8)	21.35	205 20.23 (9)	23.11	175 21.57 (10)	23.52	171 22.03 (10)
30	09.10			06.49		07.57 (29)	05.00	06.12 (25)	03.24	04.40 (21)	02.58	04.08 (22)
	15.59			20.03	72	19.16 (8)	21.38	206 20.22 (9)	23.14	173 21.57 (10)	23.51	171 22.03 (10)
31	09.07			06.46		07.59 (29)			03.22	04.40 (21)		
	16.02			20.06	66	19.16 (8)			23.17	172 21.57 (10)		
Potential sun hours	171	238		363			451		570		624	
Total, worst case			1439		3366			3324		5080		5105
Sun reduction			0,33		0,32			0,41		0,47		0,48
Oper. time red.			0,99		0,99			0,99		0,99		0,99
Wind dir. red.			0,65		0,64			0,61		0,62		0,62
Total reduction			0,22		0,20			0,25		0,29		0,29
Total, real			311		690			824		1457		1498

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October			November			December
1	02.59		04.09 (22)	04.24		06.46 (20)	06.00		06.39 (30)	07.26		10.53 (19)	08.00		10.19 (19)	09.35
	23.49	170	22.03 (10)	22.27	141	19.48 (16)	20.40	34	19.21 (16)	18.53	99	18.09 (12)	16.07	12	10.31 (19)	14.43
2	03.01		04.10 (22)	04.28		06.47 (20)	06.03		18.54 (16)	07.29		10.53 (19)	08.04			09.38
	23.48	171	22.03 (10)	22.24	141	19.48 (16)	20.36	22	19.16 (16)	18.49	98	18.08 (12)	16.04			14.41
3	03.01		04.12 (22)	04.31		06.46 (20)	06.06		19.00 (16)	07.32		10.52 (19)	08.07			09.41
	23.46	171	22.04 (10)	22.20	142	19.48 (16)	20.32	9	19.09 (16)	18.46	96	18.06 (12)	16.00			14.39
4	03.03		04.13 (22)	04.34		06.47 (20)	06.09			07.35		10.52 (19)	08.10			09.44
	23.45	171	22.04 (10)	22.17	150	20.03 (13)	20.29			18.42	92	18.03 (12)	15.57			14.37
5	03.05		04.14 (22)	04.37		06.31 (25)	06.12			07.38		10.51 (19)	08.13			09.46
	23.43	172	22.04 (10)	22.14	163	20.06 (13)	20.25			18.39	88	18.00 (12)	15.54			14.35
6	03.08		04.16 (22)	04.40		06.28 (25)	06.15			07.41		10.51 (19)	08.17			09.49
	23.41	171	22.05 (10)	22.10	174	20.08 (13)	20.22			18.35	80	17.56 (12)	15.51			14.33
7	03.10		04.18 (22)	04.44		06.26 (25)	06.18		08.22 (24)	07.44		10.50 (19)	08.20			09.51
	23.39	171	22.05 (10)	22.07	179	20.09 (13)	20.18	13	08.35 (24)	18.32	84	16.33 (15)	15.48			14.32
8	03.12		04.19 (22)	04.47		06.24 (25)	06.20		08.19 (24)	07.47		10.51 (19)	08.23			09.54
	23.37	170	22.05 (10)	22.03	183	20.11 (13)	20.15	21	19.00 (8)	18.28	92	16.37 (15)	15.45			14.30
9	03.15		04.21 (22)	04.50		06.23 (25)	06.23		08.17 (24)	07.50		10.51 (19)	08.26			09.56
	23.34	169	22.05 (10)	22.00	186	20.12 (13)	20.11	35	19.04 (8)	18.25	96	16.39 (15)	15.41			14.29
10	03.18		04.48 (21)	04.53		06.22 (25)	06.26		08.14 (24)	07.53		10.50 (19)	08.30			09.58
	23.32	169	22.06 (10)	21.57	192	20.23 (9)	20.08	42	19.05 (8)	18.21	99	16.40 (15)	15.38			14.28
11	03.20		04.48 (21)	04.56		06.21 (25)	06.29		07.54 (29)	07.56		10.50 (19)	08.33			10.00
	23.29	171	22.06 (10)	21.53	201	20.27 (9)	20.04	53	19.06 (8)	18.18	101	16.41 (15)	15.35			14.27
12	03.23		04.49 (21)	04.59		06.21 (25)	06.32		07.50 (29)	07.59		10.50 (19)	08.36			10.02
	23.27	172	22.06 (10)	21.50	205	20.29 (9)	20.00	65	19.07 (8)	18.14	103	16.42 (15)	15.32			14.26
13	03.26		04.49 (21)	05.02		06.20 (25)	06.35		07.48 (29)	08.02		10.50 (19)	08.39			10.04
	23.24	173	22.06 (10)	21.46	205	20.30 (9)	19.57	71	19.07 (8)	18.11	103	16.42 (15)	15.29			14.25
14	03.29		04.50 (21)	05.06		06.19 (25)	06.38		07.47 (29)	08.05		10.51 (19)	08.43			10.06
	23.22	174	22.06 (10)	21.43	206	20.30 (9)	19.53	77	19.08 (8)	18.08	103	16.43 (15)	15.26			14.24
15	03.31		04.50 (21)	05.09		06.19 (25)	06.41		07.45 (29)	08.08		10.51 (19)	08.46			10.07
	23.19	175	22.06 (10)	21.39	205	20.31 (9)	19.50	99	19.07 (8)	18.04	103	16.43 (15)	15.23			14.23
16	03.34		04.51 (21)	05.12		06.19 (25)	06.43		07.44 (29)	08.11		10.51 (19)	08.49			10.09
	23.16	174	22.06 (10)	21.36	203	20.32 (9)	19.46	113	19.06 (8)	18.01	103	16.43 (15)	15.20			14.23
17	03.37		04.51 (21)	05.15		06.18 (25)	06.46		07.43 (29)	08.14		10.51 (19)	08.52			10.10
	23.13	176	22.06 (10)	21.32	201	20.31 (9)	19.43	119	19.05 (8)	17.57	101	16.42 (15)	15.18			14.22
18	03.40		04.52 (21)	05.18		06.18 (25)	06.49		07.43 (29)	08.17		10.53 (19)	08.56			10.11
	23.11	174	22.05 (10)	21.29	200	20.32 (9)	19.39	121	19.02 (8)	17.54	100	16.43 (15)	15.15			14.22
19	03.43		04.53 (21)	05.21		06.18 (25)	06.52		07.43 (29)	08.20		10.53 (19)	08.59			10.12
	23.08	175	22.06 (10)	21.25	196	20.32 (9)	19.36	127	18.58 (8)	17.50	98	16.42 (15)	15.12			14.22
20	03.46		04.54 (21)	05.24		06.18 (25)	06.55		07.41 (29)	08.23		10.53 (19)	09.02			10.13
	23.05	173	22.05 (10)	21.22	194	20.32 (9)	19.32	135	18.54 (8)	17.47	95	16.41 (15)	15.09			14.22
21	03.50		04.55 (21)	05.27		06.18 (25)	06.58		07.42 (29)	08.26		10.55 (19)	09.05			10.14
	23.02	172	22.04 (10)	21.18	191	20.31 (9)	19.28	137	18.50 (8)	17.43	93	16.41 (15)	15.07			14.23
22	03.53		04.57 (21)	05.30		06.19 (25)	07.01		07.42 (29)	08.29		10.55 (19)	09.08			10.14
	22.59	168	22.03 (10)	21.15	185	20.30 (9)	19.25	139	18.10 (12)	17.40	90	16.40 (15)	15.04			14.23
23	03.56		04.58 (21)	05.33		06.20 (25)	07.03		07.42 (29)	08.32		10.57 (19)	09.11			10.15
	22.56	164	22.00 (10)	21.11	180	20.30 (9)	19.21	141	18.11 (12)	17.37	85	16.40 (15)	15.01			14.24
24	03.59		05.01 (21)	05.36		06.21 (25)	07.06		07.43 (29)	08.35		10.58 (19)	09.15			10.15
	22.53	157	21.58 (10)	21.08	172	20.28 (9)	19.18	141	18.11 (12)	17.33	80	16.38 (15)	14.59			14.24
25	04.02		06.47 (20)	05.39		06.21 (25)	07.09		07.46 (29)	07.38		09.59 (19)	09.18			10.15
	22.49	145	21.55 (10)	21.04	160	20.24 (9)	19.14	139	18.12 (12)	16.30	76	15.37 (15)	14.56			14.25
26	04.05		06.47 (20)	05.42		06.23 (25)	07.12		07.49 (29)	07.41		10.00 (19)	09.21			10.15
	22.46	142	21.53 (10)	21.01	144	20.21 (9)	19.11	134	18.12 (12)	16.27	70	15.35 (15)	14.54			14.26
27	04.08		06.47 (20)	05.45		06.27 (25)	07.15		08.08 (24)	07.45		10.02 (19)	09.24			10.15
	22.43	137	21.50 (10)	20.57	121	20.18 (9)	19.07	124	18.11 (12)	16.23	63	15.33 (15)	14.51			14.27
28	04.12		06.47 (20)	05.48		06.29 (30)	07.18		08.09 (24)	07.48		10.04 (19)	09.27			10.15
	22.40	138	19.47 (16)	20.54	94	20.15 (9)	19.04	123	18.11 (12)	16.20	52	15.30 (15)	14.49			14.28
29	04.15		06.46 (20)	05.51		06.30 (30)	07.21		08.11 (24)	07.51		10.06 (19)	09.30			10.15
	22.37	139	19.47 (16)	20.50	84	20.04 (13)	19.00	119	18.10 (12)	16.17	37	10.43 (19)	14.47			14.30
30	04.18		06.47 (20)	05.54		06.33 (30)	07.24		08.14 (24)	07.54		10.10 (19)	09.33			10.14
	22.33	140	19.48 (16)	20.47	70	20.01 (13)	18.57	114	18.10 (12)	16.13	31	10.41 (19)	14.45			14.31
31	04.21		06.47 (20)	05.57		06.36 (30)				07.57		10.14 (19)				10.14
	22.30	140	19.48 (16)	20.43	56	19.58 (13)				16.10	23	10.37 (19)				14.33
Potential sun hours	609			508			393			305			198			137
Total, worst case		5084			5124			2467			2634			12		
Sun reduction		0,38			0,31			0,33			0,35			0,24		
Oper. time red.		0,99			0,99			0,99			0,99			0,99		
Wind dir. red.		0,62			0,61			0,63			0,65			0,67		
Total reduction		0,23			0,19			0,21			0,23			0,16		
Total, real		1178			974			509			595			2		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March			April			May			June		
1	10.12	09.03	07.31			06.42		18.43 (19)	04.56		19.08 (24)	03.19		04.18 (34)
	14.35	16.06	17.36			20.09	32	19.15 (19)	21.41	40	19.48 (24)	23.20	157	21.38 (17)
2	10.11	09.00	07.28			06.39		18.42 (19)	04.53		19.06 (24)	03.16		04.17 (34)
	14.37	16.09	17.39			20.12	32	19.14 (19)	21.44	45	19.51 (24)	23.22	157	21.37 (17)
3	10.10	08.57	07.24			06.35		18.42 (19)	04.50		19.04 (24)	03.14		04.16 (34)
	14.39	16.12	17.42			20.15	33	19.15 (19)	21.48	49	19.53 (24)	23.25	155	21.36 (17)
4	10.09	08.54	07.21			06.31		18.41 (19)	04.46		19.02 (24)	03.11		04.16 (34)
	14.41	16.15	17.45			20.18	33	19.14 (19)	21.51	64	20.51 (20)	23.28	156	21.35 (17)
5	10.08	08.51	07.17			06.28		18.42 (19)	04.43		19.00 (24)	03.09		04.16 (34)
	14.44	16.19	17.48			20.21	32	19.14 (19)	21.54	74	20.54 (20)	23.30	151	21.08 (20)
6	10.06	08.48	07.14			06.24		18.42 (19)	04.39		05.20 (40)	03.07		04.15 (34)
	14.46	16.22	17.51			20.24	32	19.14 (19)	21.57	85	20.57 (20)	23.33	151	21.07 (20)
7	10.05	08.45	07.10			06.21		18.42 (19)	04.36		05.17 (40)	03.05		04.15 (34)
	14.48	16.25	17.54			20.27	31	19.13 (19)	22.00	96	20.59 (20)	23.35	152	21.07 (20)
8	10.03	08.42	07.07			06.17		18.42 (19)	04.33		05.14 (40)	03.03		04.15 (34)
	14.51	16.29	17.57			20.30	30	19.12 (19)	22.04	104	21.00 (20)	23.38	151	21.07 (20)
9	10.01	08.38	07.03			06.14		18.42 (19)	04.29		05.11 (40)	03.01		04.15 (34)
	14.54	16.32	18.00			20.33	35	19.56 (16)	22.07	112	21.01 (20)	23.40	153	21.08 (20)
10	10.00	08.35	07.00			06.10		18.43 (19)	04.26		05.08 (40)	02.57		04.15 (34)
	14.56	16.35	18.03			20.36	37	19.59 (16)	22.10	120	21.02 (20)	23.42	152	21.08 (20)
11	09.58	08.32	06.56			06.07		06.39 (39)	04.23		05.06 (40)	02.56		04.15 (34)
	14.59	16.39	18.06			20.39	46	20.01 (16)	22.14	126	21.25 (17)	23.44	152	21.07 (20)
12	09.56	08.29	06.53			06.03		06.36 (39)	04.19		05.07 (40)	02.54		04.14 (34)
	15.02	16.42	18.09			20.42	50	20.04 (16)	22.17	132	21.28 (17)	23.46	153	21.07 (20)
13	09.54	08.25	06.49			05.59		06.33 (39)	04.16		05.06 (40)	02.53		04.15 (34)
	15.05	16.45	18.12			20.45	53	20.07 (16)	22.20	140	21.31 (17)	23.47	152	21.08 (20)
14	09.51	08.22	06.46			05.56		06.30 (39)	04.13		05.06 (40)	02.52		04.15 (34)
	15.08	16.48	18.15			20.48	49	20.06 (16)	22.23	147	21.33 (17)	23.49	153	21.08 (20)
15	09.49	08.19	06.42		07.15 (38)	05.52		06.29 (39)	04.09		05.07 (40)	02.51		04.15 (34)
	15.11	16.52	18.18	7	07.22 (38)	20.51	42	20.06 (16)	22.27	151	21.36 (17)	23.50	153	21.08 (20)
16	09.47	08.15	06.39		07.11 (38)	05.49		06.28 (39)	04.06		05.07 (40)	02.50		04.15 (34)
	15.14	16.55	18.21	13	07.24 (38)	20.54	42	20.05 (16)	22.30	155	21.38 (17)	23.52	154	21.08 (20)
17	09.45	08.12	06.35		07.07 (38)	05.45		06.27 (39)	04.03		05.06 (40)	02.50		04.15 (34)
	15.17	16.58	18.24	18	07.25 (38)	20.57	42	20.04 (16)	22.33	159	21.40 (17)	23.53	153	21.08 (20)
18	09.42	08.09	06.32		07.06 (38)	05.42		06.27 (39)	04.00		05.07 (40)	02.49		04.15 (34)
	15.20	17.01	18.27	21	07.27 (38)	21.00	41	20.03 (16)	22.36	160	21.41 (17)	23.54	154	21.08 (20)
19	09.40	08.05	06.28		07.04 (38)	05.38		06.27 (39)	03.57		05.07 (40)	02.49		04.16 (34)
	15.23	17.05	18.30	23	07.27 (38)	21.03	37	20.01 (16)	22.40	161	21.40 (17)	23.54	153	21.09 (20)
20	09.37	08.02	06.25		07.04 (38)	05.35		06.27 (39)	03.53		05.08 (40)	02.49		04.16 (34)
	15.26	17.08	18.33	24	07.28 (38)	21.06	30	19.58 (16)	22.43	161	21.41 (17)	23.55	153	21.09 (20)
21	09.35	07.59	06.21		07.03 (38)	05.31		06.27 (39)	03.50		05.10 (40)	02.49		04.16 (34)
	15.29	17.11	18.36	24	07.27 (38)	21.10	23	06.50 (39)	22.46	159	21.41 (17)	23.55	153	21.09 (20)
22	09.32	07.55	06.18		07.02 (38)	05.28		06.28 (39)	03.47		05.10 (40)	02.49		04.16 (34)
	15.33	17.14	18.39	25	07.27 (38)	21.13	22	06.50 (39)	22.49	161	21.41 (17)	23.55	153	21.09 (20)
23	09.29	07.52	06.14		07.02 (38)	05.24		06.28 (39)	03.44		05.11 (40)	02.50		04.17 (34)
	15.36	17.17	18.42	25	07.27 (38)	21.16	21	06.49 (39)	22.52	159	21.41 (17)	23.55	153	21.10 (20)
24	09.27	07.49	06.11		07.01 (38)	05.21		06.28 (39)	03.41		05.13 (40)	02.50		04.16 (34)
	15.39	17.20	18.45	25	07.26 (38)	21.19	19	06.47 (39)	22.55	154	21.41 (17)	23.55	154	21.09 (20)
25	09.24	07.45	06.07		07.02 (38)	05.17		06.30 (39)	03.38		18.47 (24)	02.51		04.17 (34)
	15.42	17.24	18.48	37	18.08 (19)	21.22	15	06.45 (39)	22.59	148	21.41 (17)	23.55	153	21.10 (20)
26	09.21	07.42	06.03		07.02 (38)	05.14		06.31 (39)	03.35		18.47 (24)	02.52		04.17 (34)
	15.46	17.27	18.51	41	18.10 (19)	21.25	12	06.43 (39)	23.02	148	21.41 (17)	23.54	153	21.10 (20)
27	09.18	07.38	06.00		07.03 (38)	05.10		06.35 (39)	03.32		18.46 (24)	02.53		04.17 (34)
	15.49	17.30	18.54	43	18.12 (19)	21.28	5	06.40 (39)	23.05	148	21.40 (17)	23.54	153	21.10 (20)
28	09.15	07.35	05.56		07.03 (38)	05.07		19.21 (24)	03.30		18.46 (24)	02.55		04.18 (34)
	15.52	17.33	18.57	44	18.13 (19)	21.32	18	19.39 (24)	23.08	147	21.40 (17)	23.53	154	21.11 (20)
29	09.12		06.53		08.05 (38)	05.03		19.16 (24)	03.27		04.23 (34)	02.56		04.18 (34)
	15.56		20.00	42	19.14 (19)	21.35	28	19.44 (24)	23.11	151	21.39 (17)	23.52	154	21.11 (20)
30	09.09		06.49		08.07 (38)	05.00		19.12 (24)	03.24		04.21 (34)	02.58		04.19 (34)
	15.59		20.03	39	19.14 (19)	21.38	35	19.47 (24)	23.14	154	21.39 (17)	23.51	154	21.12 (20)
31	09.06		06.46		18.44 (19)				03.21		04.19 (34)			
	16.02		20.06	30	19.14 (19)				23.17	155	21.38 (17)			
Potential sun hours	171	238	363			451			570			624		
Total, worst case				481			957			3965			4599	
Sun reduction				0,32			0,41			0,47			0,48	
Oper. time red.				0,99			0,99			0,99			0,99	
Wind dir. red.				0,62			0,61			0,62			0,62	
Total reduction				0,20			0,25			0,29			0,29	
Total, real				95			236			1145			1345	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59		04.19 (34)	04.24		05.17 (40)	06.00		06.39 (39)	07.26	08.00	09.35
	23.49	154	21.12 (20)	22.27	130	21.37 (17)	20.39	46	20.01 (16)	18.53	16.07	14.42
2	03.01		04.19 (34)	04.28		05.17 (40)	06.03		18.41 (19)	07.29	08.04	09.38
	23.48	153	21.12 (20)	22.23	124	21.13 (20)	20.36	37	19.57 (16)	18.49	16.03	14.40
3	03.01		04.19 (34)	04.31		05.19 (40)	06.06		18.40 (19)	07.32	08.07	09.41
	23.46	153	21.12 (20)	22.20	117	21.12 (20)	20.32	35	19.54 (16)	18.46	16.00	14.39
4	03.03		04.20 (34)	04.34		05.22 (40)	06.09		18.39 (19)	07.35	08.10	09.43
	23.44	154	21.13 (20)	22.17	109	21.11 (20)	20.29	31	19.51 (16)	18.42	15.57	14.37
5	03.05		04.20 (34)	04.37		05.25 (40)	06.12		18.39 (19)	07.38	08.13	09.46
	23.43	152	21.13 (20)	22.13	102	21.10 (20)	20.25	31	19.10 (19)	18.39	15.54	14.35
6	03.08		04.21 (34)	04.40		05.27 (40)	06.15		18.37 (19)	07.41	08.16	09.49
	23.41	152	21.14 (20)	22.10	92	21.08 (20)	20.22	32	19.09 (19)	18.35	15.51	14.33
7	03.10		04.21 (34)	04.43		05.30 (40)	06.17		18.37 (19)	07.44	08.20	09.51
	23.38	151	21.13 (20)	22.07	82	21.06 (20)	20.18	32	19.09 (19)	18.32	15.48	14.32
8	03.12		04.22 (34)	04.47		19.11 (24)	06.20		18.37 (19)	07.47	08.23	09.53
	23.36	153	21.40 (17)	22.03	71	21.03 (20)	20.15	32	19.09 (19)	18.28	15.44	14.30
9	03.15		04.23 (34)	04.50		19.13 (24)	06.23		18.36 (19)	07.50	08.26	09.56
	23.34	157	21.43 (17)	22.00	60	21.00 (20)	20.11	33	19.09 (19)	18.25	15.41	14.29
10	03.17		04.24 (34)	04.53		19.14 (24)	06.26		18.35 (19)	07.53	08.29	09.58
	23.32	156	21.44 (17)	21.56	47	20.01 (24)	20.07	33	19.08 (19)	18.21	15.38	14.28
11	03.20		04.26 (34)	04.56		19.16 (24)	06.29		18.36 (19)	07.56	08.33	10.00
	23.29	158	21.46 (17)	21.53	43	19.59 (24)	20.04	31	19.07 (19)	18.18	15.35	14.26
12	03.23		04.26 (34)	04.59		19.18 (24)	06.32		18.36 (19)	07.59	08.36	10.02
	23.27	157	21.46 (17)	21.50	39	19.57 (24)	20.00	31	19.07 (19)	18.14	15.32	14.25
13	03.26		04.28 (34)	05.02		19.20 (24)	06.35		07.59 (38)	08.02	08.39	10.04
	23.24	154	21.46 (17)	21.46	33	19.53 (24)	19.57	37	19.06 (19)	18.11	15.29	14.25
14	03.29		04.31 (34)	05.05		19.24 (24)	06.38		07.55 (38)	08.05	08.42	10.05
	23.22	153	21.48 (17)	21.43	26	19.50 (24)	19.53	42	19.04 (19)	18.07	15.26	14.24
15	03.31		18.55 (24)	05.09		19.29 (24)	06.40		07.53 (38)	08.08	08.46	10.07
	23.19	147	21.49 (17)	21.39	16	19.45 (24)	19.50	44	19.03 (19)	18.04	15.23	14.23
16	03.34		18.55 (24)	05.12		06.41 (39)	06.43		07.52 (38)	08.11	08.49	10.08
	23.16	148	21.49 (17)	21.36	7	06.48 (39)	19.46	43	19.01 (19)	18.00	15.20	14.23
17	03.37		18.56 (24)	05.15		06.37 (39)	06.46		07.51 (38)	08.14	08.52	10.10
	23.13	146	21.49 (17)	21.32	13	06.50 (39)	19.43	41	18.59 (19)	17.57	15.18	14.22
18	03.40		18.56 (24)	05.18		06.36 (39)	06.49		07.50 (38)	08.17	08.55	10.11
	23.10	148	21.50 (17)	21.29	16	06.52 (39)	19.39	38	18.56 (19)	17.54	15.15	14.22
19	03.43		05.25 (40)	05.21		06.35 (39)	06.52		07.48 (38)	08.20	08.59	10.12
	23.07	151	21.51 (17)	21.25	18	06.53 (39)	19.35	27	18.49 (19)	17.50	15.12	14.22
20	03.46		05.22 (40)	05.24		06.34 (39)	06.55		07.48 (38)	08.23	09.02	10.13
	23.05	156	21.51 (17)	21.22	20	06.54 (39)	19.32	25	08.13 (38)	17.47	15.09	14.22
21	03.49		05.21 (40)	05.27		06.32 (39)	06.58		07.47 (38)	08.26	09.05	10.14
	23.02	158	21.51 (17)	21.18	22	06.54 (39)	19.28	26	08.13 (38)	17.43	15.06	14.23
22	03.53		05.20 (40)	05.30		06.31 (39)	07.00		07.47 (38)	08.29	09.08	10.14
	22.59	161	21.51 (17)	21.15	24	06.55 (39)	19.25	25	08.12 (38)	17.40	15.04	14.23
23	03.56		05.19 (40)	05.33		06.31 (39)	07.03		07.48 (38)	08.32	09.11	10.15
	22.55	161	21.51 (17)	21.11	32	20.03 (16)	19.21	24	08.12 (38)	17.37	15.01	14.23
24	03.59		05.18 (40)	05.36		06.31 (39)	07.06		07.48 (38)	08.35	09.14	10.15
	22.52	160	21.51 (17)	21.08	37	20.05 (16)	19.18	23	08.11 (38)	17.33	14.59	14.24
25	04.02		05.18 (40)	05.39		06.30 (39)	07.09		07.48 (38)	07.38	09.18	10.15
	22.49	161	21.51 (17)	21.04	39	20.05 (16)	19.14	22	08.10 (38)	16.30	14.56	14.25
26	04.05		05.17 (40)	05.42		06.30 (39)	07.12		07.48 (38)	07.41	09.21	10.15
	22.46	160	21.51 (17)	21.01	41	20.06 (16)	19.11	20	08.08 (38)	16.27	14.54	14.26
27	04.08		05.17 (40)	05.45		06.30 (39)	07.15		07.51 (38)	07.44	09.24	10.15
	22.43	157	21.50 (17)	20.57	43	20.07 (16)	19.07	15	08.06 (38)	16.23	14.51	14.27
28	04.12		05.17 (40)	05.48		06.31 (39)	07.18		07.54 (38)	07.48	09.27	10.15
	22.40	154	21.48 (17)	20.54	41	20.07 (16)	19.03	9	08.03 (38)	16.20	14.49	14.28
29	04.15		05.17 (40)	05.51		06.30 (39)	07.21			07.51	09.30	10.15
	22.37	148	21.45 (17)	20.50	50	20.06 (16)	19.00			16.17	14.47	14.30
30	04.18		05.17 (40)	05.54		06.33 (39)	07.23			07.54	09.32	10.14
	22.33	144	21.43 (17)	20.47	52	20.06 (16)	18.56			16.13	14.45	14.31
31	04.21		05.16 (40)	05.57		06.36 (39)				07.57		10.13
	22.30	138	21.40 (17)	20.43	50	20.04 (16)				16.10		14.33
Potential sun hours	608			508			393			305	198	137
Total, worst case		4755			1596			865				
Sun reduction		0,38			0,31			0,33				
Oper. time red.		0,99			0,99			0,99				
Wind dir. red.		0,62			0,61			0,62				
Total reduction		0,23			0,19			0,20				
Total, real		1106			303			174				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	10.12	09.03	07.31	06.42			04.56		20.16 (19)	03.19		04.18 (39)
	14.35	16.06	17.36	20.09			21.41	15	20.31 (19)	23.19	69	21.47 (24)
2	10.11	09.00	07.28	06.38			04.53		20.18 (19)	03.16		04.16 (39)
	14.37	16.09	17.39	20.12			21.44	11	20.29 (19)	23.22	74	21.47 (24)
3	10.10	08.57	07.24	06.35			04.50		05.42 (38)	03.14		04.14 (39)
	14.39	16.12	17.42	20.15			21.47	17	20.26 (19)	23.25	77	21.47 (24)
4	10.09	08.54	07.21	06.31			04.46		05.39 (38)	03.12		04.13 (39)
	14.42	16.15	17.45	20.18			21.51	17	05.56 (38)	23.28	79	21.48 (24)
5	10.08	08.51	07.17	06.28			04.43		05.36 (38)	03.09		04.12 (39)
	14.44	16.19	17.48	20.21			21.54	22	05.58 (38)	23.30	81	21.48 (24)
6	10.06	08.48	07.14	06.24			04.39		05.34 (38)	03.07		04.10 (39)
	14.46	16.22	17.51	20.24			21.57	26	06.00 (38)	23.33	82	21.48 (24)
7	10.05	08.45	07.10	06.21			04.36		05.34 (38)	03.05		04.09 (39)
	14.49	16.25	17.54	20.27			22.00	28	06.02 (38)	23.35	84	21.48 (24)
8	10.03	08.41	07.07	06.17			04.33		05.32 (38)	03.03		04.09 (39)
	14.51	16.29	17.57	20.30			22.04	31	06.03 (38)	23.37	84	21.48 (24)
9	10.01	08.38	07.03	06.14			04.29		05.31 (38)	03.01		04.09 (39)
	14.54	16.32	18.00	20.33			22.07	32	06.03 (38)	23.40	84	21.48 (24)
10	09.59	08.35	07.00	06.10			04.26		05.30 (38)	02.58		04.09 (39)
	14.56	16.35	18.03	20.36			22.10	34	06.04 (38)	23.42	84	21.49 (24)
11	09.58	08.32	06.56	06.07			04.23		05.29 (38)	02.56		04.08 (39)
	14.59	16.39	18.06	20.39			22.13	35	06.04 (38)	23.44	85	21.48 (24)
12	09.56	08.29	06.53	06.03			04.19		05.29 (38)	02.55		04.08 (39)
	15.02	16.42	18.09	20.42			22.17	37	06.06 (38)	23.45	85	21.48 (24)
13	09.53	08.25	06.49	05.59			04.16		05.28 (38)	02.53		04.09 (39)
	15.05	16.45	18.12	20.45			22.20	38	06.06 (38)	23.47	85	21.49 (24)
14	09.51	08.22	06.46	05.56			04.13		05.28 (38)	02.52		04.08 (39)
	15.08	16.48	18.15	20.48			22.23	42	21.33 (20)	23.49	85	21.49 (24)
15	09.49	08.19	06.42	05.52			04.09		05.28 (38)	02.51		04.09 (39)
	15.11	16.52	18.18	20.51			22.26	47	21.36 (20)	23.50	85	21.50 (24)
16	09.47	08.15	06.39	05.49			04.06		05.27 (38)	02.50		04.08 (39)
	15.14	16.55	18.21	20.54			22.30	53	21.38 (20)	23.51	84	21.49 (24)
17	09.44	08.12	06.35	05.45			04.03		05.26 (38)	02.50		04.09 (39)
	15.17	16.58	18.24	20.57			22.33	58	21.40 (20)	23.52	82	21.49 (24)
18	09.42	08.09	06.32	05.42			04.00		05.27 (38)	02.49		04.09 (39)
	15.20	17.01	18.27	21.00			22.36	62	21.44 (20)	23.53	84	21.50 (24)
19	09.40	08.05	06.28	05.38		20.21 (19)	03.57		05.26 (38)	02.49		04.09 (39)
	15.23	17.05	18.30	21.03	4	20.25 (19)	22.39	66	21.45 (20)	23.54	85	21.50 (24)
20	09.37	08.02	06.25	05.35		20.18 (19)	03.54		05.27 (38)	02.49		04.09 (39)
	15.26	17.08	18.33	21.06	9	20.27 (19)	22.43	67	21.46 (20)	23.55	83	21.50 (24)
21	09.34	07.59	06.21	05.31		20.17 (19)	03.50		05.27 (38)	02.49		04.09 (39)
	15.29	17.11	18.36	21.09	13	20.30 (19)	22.46	69	21.47 (20)	23.55	83	21.50 (24)
22	09.32	07.55	06.18	05.28		20.16 (19)	03.47		05.26 (38)	02.49		04.09 (39)
	15.33	17.14	18.39	21.13	17	20.33 (19)	22.49	69	21.46 (20)	23.55	83	21.50 (24)
23	09.29	07.52	06.14	05.24		20.16 (19)	03.44		05.27 (38)	02.50		04.10 (39)
	15.36	17.17	18.42	21.16	20	20.36 (19)	22.52	69	21.46 (20)	23.55	85	21.51 (24)
24	09.26	07.48	06.10	05.21		20.15 (19)	03.41		05.27 (38)	02.50		04.10 (39)
	15.39	17.20	18.45	21.19	20	20.35 (19)	22.55	71	21.47 (20)	23.55	84	21.51 (24)
25	09.24	07.45	06.07	05.17		20.14 (19)	03.38		05.27 (38)	02.51		04.11 (39)
	15.42	17.24	18.48	21.22	21	20.35 (19)	22.58	71	21.47 (20)	23.55	84	21.52 (24)
26	09.21	07.42	06.03	05.14		20.14 (19)	03.35		05.28 (38)	02.52		04.10 (39)
	15.46	17.27	18.51	21.25	21	20.35 (19)	23.02	70	21.47 (20)	23.54	85	21.51 (24)
27	09.18	07.38	06.00	05.10		20.15 (19)	03.33		05.28 (38)	02.53		04.11 (39)
	15.49	17.30	18.54	21.28	20	20.35 (19)	23.05	70	21.47 (20)	23.53	84	21.52 (24)
28	09.15	07.35	05.56	05.07		20.15 (19)	03.30		05.28 (38)	02.55		04.12 (39)
	15.52	17.33	18.57	21.31	19	20.34 (19)	23.08	70	21.47 (20)	23.52	83	21.52 (24)
29	09.12		06.53	05.03		20.15 (19)	03.27		05.28 (38)	02.56		04.12 (39)
	15.56		20.00	21.35	19	20.34 (19)	23.11	70	21.47 (20)	23.51	85	21.53 (24)
30	09.09		06.49	05.00		20.15 (19)	03.24		05.29 (38)	02.58		04.12 (39)
	15.59		20.03	21.38	17	20.32 (19)	23.14	69	21.47 (24)	23.50	85	21.53 (24)
31	09.06		06.46				03.22		05.29 (38)			
	16.02		20.06				23.16	69	21.47 (24)			
Potential sun hours	171	238	363	451			569			624		
Total, worst case					200			1505			2482	
Sun reduction					0,41			0,47			0,48	
Oper. time red.					0,99			0,99			0,99	
Wind dir. red.					0,63			0,63			0,63	
Total reduction					0,25			0,29			0,30	
Total, real					51			438			736	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59		04.13 (39)	04.24		05.39 (38)	06.00	07.26	08.00	09.35
	23.49	85	21.53 (24)	22.27	36	06.15 (38)	20.39	18.53	16.07	14.43
2	03.01		04.13 (39)	04.28		05.40 (38)	06.03	07.29	08.03	09.38
	23.47	85	21.53 (24)	22.23	35	06.15 (38)	20.36	18.49	16.03	14.41
3	03.01		04.13 (39)	04.31		05.40 (38)	06.06	07.32	08.07	09.41
	23.46	85	21.53 (24)	22.20	34	06.14 (38)	20.32	18.46	16.00	14.39
4	03.03		04.14 (39)	04.34		05.41 (38)	06.09	07.35	08.10	09.43
	23.44	85	21.54 (24)	22.17	32	06.13 (38)	20.29	18.42	15.57	14.37
5	03.06		04.15 (39)	04.37		05.43 (38)	06.12	07.38	08.13	09.46
	23.42	84	21.54 (24)	22.13	29	06.12 (38)	20.25	18.39	15.54	14.35
6	03.08		04.16 (39)	04.40		05.43 (38)	06.14	07.41	08.16	09.48
	23.40	83	21.54 (24)	22.10	27	06.10 (38)	20.22	18.35	15.51	14.33
7	03.10		04.17 (39)	04.43		05.45 (38)	06.17	07.44	08.20	09.51
	23.38	82	21.54 (24)	22.07	24	06.09 (38)	20.18	18.32	15.48	14.32
8	03.12		04.19 (39)	04.47		05.47 (38)	06.20	07.47	08.23	09.53
	23.36	81	21.54 (24)	22.03	21	06.08 (38)	20.14	18.28	15.44	14.30
9	03.15		04.21 (39)	04.50		05.49 (38)	06.23	07.50	08.26	09.55
	23.34	77	21.55 (24)	22.00	16	06.05 (38)	20.11	18.25	15.41	14.29
10	03.18		04.23 (39)	04.53		05.52 (38)	06.26	07.53	08.29	09.58
	23.31	75	21.55 (24)	21.56	17	20.37 (19)	20.07	18.21	15.38	14.28
11	03.20		04.25 (39)	04.56		20.26 (19)	06.29	07.56	08.33	10.00
	23.29	71	21.55 (24)	21.53	13	20.39 (19)	20.04	18.18	15.35	14.27
12	03.23		05.38 (38)	04.59		20.25 (19)	06.32	07.58	08.36	10.02
	23.27	68	21.55 (20)	21.49	15	20.40 (19)	20.00	18.14	15.32	14.26
13	03.26		05.38 (38)	05.02		20.23 (19)	06.35	08.01	08.39	10.03
	23.24	68	21.55 (20)	21.46	17	20.40 (19)	19.57	18.11	15.29	14.25
14	03.29		05.37 (38)	05.05		20.23 (19)	06.38	08.04	08.42	10.05
	23.21	70	21.55 (20)	21.43	18	20.41 (19)	19.53	18.07	15.26	14.24
15	03.31		05.37 (38)	05.09		20.22 (19)	06.40	08.07	08.46	10.07
	23.19	70	21.56 (20)	21.39	20	20.42 (19)	19.50	18.04	15.23	14.23
16	03.34		05.37 (38)	05.12		20.22 (19)	06.43	08.10	08.49	10.08
	23.16	70	21.56 (20)	21.36	20	20.42 (19)	19.46	18.00	15.20	14.23
17	03.37		05.37 (38)	05.15		20.21 (19)	06.46	08.13	08.52	10.09
	23.13	70	21.56 (20)	21.32	20	20.41 (19)	19.42	17.57	15.18	14.22
18	03.40		05.37 (38)	05.18		20.21 (19)	06.49	08.17	08.55	10.11
	23.10	70	21.56 (20)	21.29	20	20.41 (19)	19.39	17.54	15.15	14.22
19	03.43		05.37 (38)	05.21		20.21 (19)	06.52	08.20	08.58	10.12
	23.07	71	21.57 (20)	21.25	20	20.41 (19)	19.35	17.50	15.12	14.22
20	03.46		05.37 (38)	05.24		20.21 (19)	06.55	08.23	09.02	10.13
	23.04	71	21.57 (20)	21.22	20	20.41 (19)	19.32	17.47	15.09	14.22
21	03.50		05.37 (38)	05.27		20.21 (19)	06.58	08.26	09.05	10.13
	23.01	68	21.56 (20)	21.18	16	20.37 (19)	19.28	17.43	15.06	14.23
22	03.53		05.37 (38)	05.30		20.22 (19)	07.00	08.29	09.08	10.14
	22.58	69	21.57 (20)	21.15	12	20.34 (19)	19.25	17.40	15.04	14.23
23	03.56		05.37 (38)	05.33		20.23 (19)	07.03	08.32	09.11	10.15
	22.55	68	21.56 (20)	21.11	8	20.31 (19)	19.21	17.37	15.01	14.24
24	03.59		05.37 (38)	05.36		20.25 (19)	07.06	08.35	09.14	10.15
	22.52	67	21.57 (20)	21.08	3	20.28 (19)	19.18	17.33	14.59	14.24
25	04.02		05.37 (38)	05.39			07.09	07.38	09.17	10.15
	22.49	65	21.55 (20)	21.04			19.14	16.30	14.56	14.25
26	04.05		05.38 (38)	05.42			07.12	07.41	09.20	10.15
	22.46	60	21.53 (20)	21.01			19.10	16.26	14.54	14.26
27	04.08		05.37 (38)	05.45			07.15	07.44	09.23	10.15
	22.43	56	21.50 (20)	20.57			19.07	16.23	14.51	14.27
28	04.12		05.38 (38)	05.48			07.18	07.47	09.26	10.15
	22.40	51	21.48 (20)	20.54			19.03	16.20	14.49	14.28
29	04.15		05.38 (38)	05.51			07.20	07.51	09.29	10.14
	22.36	45	21.45 (20)	20.50			19.00	16.17	14.47	14.30
30	04.18		05.39 (38)	05.54			07.23	07.54	09.32	10.14
	22.33	41	21.43 (20)	20.46			18.56	16.13	14.45	14.31
31	04.21		05.38 (38)	05.57				07.57		10.13
	22.30	37	06.15 (38)	20.43				16.10		14.33
Potential sun hours	608			508			393	305	198	137
Total, worst case		2148			493					
Sun reduction		0,38			0,31					
Oper. time red.		0,99			0,99					
Wind dir. red.		0,63			0,62					
Total reduction		0,24			0,19					
Total, real		505			95					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	10.12	09.03	07.31	06.42			04.56		20.35 (42)	03.19		21.23 (44)
	14.35	16.05	17.36	20.08			21.41	20	20.55 (42)	23.19	28	21.51 (44)
2	10.11	09.00	07.27	06.38			04.53		20.34 (42)	03.16		21.23 (44)
	14.37	16.08	17.39	20.11			21.44	21	20.55 (42)	23.22	29	21.52 (44)
3	10.10	08.57	07.24	06.35			04.49		20.34 (42)	03.14		21.23 (44)
	14.39	16.12	17.42	20.14			21.47	21	20.55 (42)	23.25	28	21.51 (44)
4	10.09	08.54	07.21	06.31			04.46		20.35 (42)	03.11		21.24 (44)
	14.41	16.15	17.45	20.17			21.50	19	20.54 (42)	23.27	28	21.52 (44)
5	10.07	08.51	07.17	06.27			04.42		20.35 (42)	03.09		21.24 (44)
	14.43	16.18	17.48	20.20			21.54	19	20.54 (42)	23.30	27	21.51 (44)
6	10.06	08.47	07.14	06.24			04.39		20.35 (42)	03.07		21.24 (44)
	14.46	16.22	17.51	20.23			21.57	18	20.53 (42)	23.32	28	21.52 (44)
7	10.04	08.44	07.10	06.20			04.36		20.36 (42)	03.04		21.25 (44)
	14.48	16.25	17.54	20.26			22.00	16	20.52 (42)	23.35	27	21.52 (44)
8	10.03	08.41	07.07	06.17			04.32		20.37 (42)	03.02		21.25 (44)
	14.51	16.28	17.57	20.29			22.03	14	20.51 (42)	23.37	32	22.01 (46)
9	10.01	08.38	07.03	06.13			04.29		20.39 (42)	03.01		21.25 (44)
	14.53	16.32	18.00	20.32			22.07	11	20.50 (42)	23.39	37	22.04 (46)
10	09.59	08.35	07.00	06.10			04.26		20.42 (42)	02.57		21.26 (44)
	14.56	16.35	18.03	20.35			22.10	5	20.47 (42)	23.41	39	22.05 (46)
11	09.57	08.31	06.56	06.06			04.22			02.56		21.26 (44)
	14.59	16.38	18.06	20.38			22.13			23.43	41	22.07 (46)
12	09.55	08.28	06.53	06.03			04.19			02.54		21.26 (44)
	15.02	16.42	18.09	20.42			22.16			23.45	41	22.07 (46)
13	09.53	08.25	06.49	05.59			04.16			02.53		21.26 (44)
	15.04	16.45	18.12	20.45			22.20			23.47	42	22.08 (46)
14	09.51	08.22	06.46	05.56			04.12			02.52		21.27 (44)
	15.07	16.48	18.15	20.48			22.23			23.48	42	22.09 (46)
15	09.49	08.18	06.42	05.52			04.09		21.31 (44)	02.51		21.26 (44)
	15.10	16.51	18.18	20.51			22.26	4	21.35 (44)	23.50	44	22.10 (46)
16	09.47	08.15	06.38	05.48			04.06		21.29 (44)	02.50		21.27 (44)
	15.13	16.55	18.21	20.54			22.29	9	21.38 (44)	23.51	44	22.11 (46)
17	09.44	08.12	06.35	05.45			04.03		21.27 (44)	02.49		21.28 (44)
	15.16	16.58	18.24	20.57			22.33	14	21.41 (44)	23.52	43	22.11 (46)
18	09.42	08.08	06.31	05.41			03.59		21.27 (44)	02.49		21.28 (44)
	15.19	17.01	18.27	21.00			22.36	17	21.44 (44)	23.53	44	22.12 (46)
19	09.39	08.05	06.28	05.38			03.56		21.25 (44)	02.49		21.27 (44)
	15.23	17.04	18.30	21.03			22.39	21	21.46 (44)	23.54	44	22.11 (46)
20	09.37	08.02	06.24	05.34			03.53		21.25 (44)	02.49		21.29 (44)
	15.26	17.07	18.33	21.06			22.42	22	21.47 (44)	23.54	44	22.13 (46)
21	09.34	07.58	06.21	05.31			03.50		21.24 (44)	02.49		21.29 (44)
	15.29	17.11	18.36	21.09			22.46	23	21.47 (44)	23.55	44	22.13 (46)
22	09.32	07.55	06.17	05.27			03.47		21.24 (44)	02.49		21.29 (44)
	15.32	17.14	18.39	21.12			22.49	24	21.48 (44)	23.55	44	22.13 (46)
23	09.29	07.52	06.14	05.24			03.44		21.23 (44)	02.49		21.28 (44)
	15.35	17.17	18.42	21.15			22.52	26	21.49 (44)	23.55	45	22.13 (46)
24	09.26	07.48	06.10	05.20			03.41		21.23 (44)	02.50		21.29 (44)
	15.39	17.20	18.45	21.19			22.55	27	21.50 (44)	23.55	44	22.13 (46)
25	09.23	07.45	06.07	05.17		20.40 (42)	03.38		21.22 (44)	02.51		21.29 (44)
	15.42	17.23	18.48	21.22	1	20.41 (42)	22.58	27	21.49 (44)	23.54	44	22.13 (46)
26	09.21	07.41	06.03	05.13		20.39 (42)	03.35		21.22 (44)	02.52		21.29 (44)
	15.45	17.26	18.51	21.25	5	20.44 (42)	23.01	28	21.50 (44)	23.54	44	22.13 (46)
27	09.18	07.38	05.59	05.10		20.37 (42)	03.32		21.22 (44)	02.53		21.30 (44)
	15.49	17.29	18.54	21.28	9	20.46 (42)	23.04	28	21.50 (44)	23.53	43	22.13 (46)
28	09.15	07.34	05.56	05.06		20.36 (42)	03.29		21.22 (44)	02.54		21.30 (44)
	15.52	17.33	18.57	21.31	13	20.49 (42)	23.07	28	21.50 (44)	23.52	43	22.13 (46)
29	09.12		06.52	05.03		20.35 (42)	03.27		21.22 (44)	02.56		21.29 (44)
	15.55		20.00	21.34	17	20.52 (42)	23.10	28	21.50 (44)	23.51	43	22.12 (46)
30	09.09		06.49	05.00		20.35 (42)	03.24		21.23 (44)	02.57		21.29 (44)
	15.58		20.03	21.38	19	20.54 (42)	23.13	28	21.51 (44)	23.50	42	22.11 (46)
31	09.06		06.45				03.21		21.23 (44)			
	16.02		20.06				23.16	28	21.51 (44)			
Potential sun hours	171	238	363	451			570			624		
Total, worst case					64			546			1168	
Sun reduction					0,41			0,47			0,48	
Oper. time red.					0,99			0,99			0,99	
Wind dir. red.					0,64			0,64			0,64	
Total reduction					0,26			0,30			0,30	
Total, real					17			162			355	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August			September	October	November	December
1	02.59		21.30 (44)	04.24		06.00	07.26	08.00	09.35
	23.49	41	22.11 (46)	22.26		20.39	18.52	16.06	14.42
2	03.01		21.30 (44)	04.27		06.02	07.29	08.03	09.38
	23.47	40	22.10 (46)	22.23		20.35	18.49	16.03	14.40
3	03.01		21.30 (44)	04.30		20.51 (42)	06.05	07.32	08.06	09.40
	23.46	38	22.09 (46)	22.20	7	20.58 (42)	20.32	18.45	16.00	14.38
4	03.03		21.30 (44)	04.34		20.49 (42)	06.08	07.35	08.10	09.43
	23.44	35	22.07 (46)	22.16	12	21.01 (42)	20.28	18.42	15.57	14.36
5	03.05		21.30 (44)	04.37		20.47 (42)	06.11	07.38	08.13	09.46
	23.42	27	21.57 (44)	22.13	14	21.01 (42)	20.25	18.38	15.53	14.35
6	03.07		21.30 (44)	04.40		20.46 (42)	06.14	07.40	08.16	09.48
	23.40	27	21.57 (44)	22.10	16	21.02 (42)	20.21	18.35	15.50	14.33
7	03.10		21.30 (44)	04.43		20.45 (42)	06.17	07.43	08.19	09.51
	23.38	28	21.58 (44)	22.06	18	21.03 (42)	20.18	18.31	15.47	14.31
8	03.12		21.31 (44)	04.46		20.44 (42)	06.20	07.46	08.22	09.53
	23.36	28	21.59 (44)	22.03	19	21.03 (42)	20.14	18.28	15.44	14.30
9	03.15		21.30 (44)	04.49		20.44 (42)	06.23	07.49	08.26	09.55
	23.34	28	21.58 (44)	21.59	19	21.03 (42)	20.11	18.24	15.41	14.28
10	03.17		21.30 (44)	04.53		20.44 (42)	06.26	07.52	08.29	09.57
	23.31	28	21.58 (44)	21.56	20	21.04 (42)	20.07	18.21	15.38	14.27
11	03.20		21.31 (44)	04.56		20.44 (42)	06.29	07.55	08.32	09.59
	23.29	28	21.59 (44)	21.53	20	21.04 (42)	20.03	18.17	15.35	14.26
12	03.23		21.31 (44)	04.59		20.43 (42)	06.31	07.58	08.35	10.01
	23.26	28	21.59 (44)	21.49	20	21.03 (42)	20.00	18.14	15.32	14.25
13	03.25		21.31 (44)	05.02		20.43 (42)	06.34	08.01	08.39	10.03
	23.24	28	21.59 (44)	21.46	19	21.02 (42)	19.56	18.10	15.29	14.24
14	03.28		21.31 (44)	05.05		20.44 (42)	06.37	08.04	08.42	10.05
	23.21	28	21.59 (44)	21.42	15	20.59 (42)	19.53	18.07	15.26	14.23
15	03.31		21.31 (44)	05.08		20.44 (42)	06.40	08.07	08.45	10.06
	23.18	28	21.59 (44)	21.39	12	20.56 (42)	19.49	18.04	15.23	14.23
16	03.34		21.31 (44)	05.11		20.44 (42)	06.43	08.10	08.48	10.08
	23.16	28	21.59 (44)	21.35	8	20.52 (42)	19.46	18.00	15.20	14.22
17	03.37		21.32 (44)	05.14		20.45 (42)	06.46	08.13	08.52	10.09
	23.13	28	22.00 (44)	21.32	5	20.50 (42)	19.42	17.57	15.17	14.22
18	03.40		21.32 (44)	05.17			06.49	08.16	08.55	10.10
	23.10	27	21.59 (44)	21.28			19.39	17.53	15.14	14.22
19	03.43		21.32 (44)	05.21			06.51	08.19	08.58	10.12
	23.07	27	21.59 (44)	21.25			19.35	17.50	15.12	14.22
20	03.46		21.32 (44)	05.24			06.54	08.22	09.01	10.12
	23.04	26	21.58 (44)	21.21			19.31	17.46	15.09	14.22
21	03.49		21.34 (44)	05.27			06.57	08.25	09.05	10.13
	23.01	25	21.59 (44)	21.18			19.28	17.43	15.06	14.22
22	03.52		21.34 (44)	05.30			07.00	08.28	09.08	10.14
	22.58	24	21.58 (44)	21.14			19.24	17.40	15.03	14.23
23	03.55		21.35 (44)	05.33			07.03	08.32	09.11	10.14
	22.55	23	21.58 (44)	21.11			19.21	17.36	15.01	14.23
24	03.59		21.35 (44)	05.36			07.06	08.35	09.14	10.15
	22.52	22	21.57 (44)	21.07			19.17	17.33	14.58	14.24
25	04.02		21.36 (44)	05.39			07.09	07.38	09.17	10.15
	22.49	19	21.55 (44)	21.04			19.14	16.29	14.56	14.25
26	04.05		21.37 (44)	05.42			07.12	07.41	09.20	10.15
	22.46	15	21.52 (44)	21.00			19.10	16.26	14.53	14.26
27	04.08		21.39 (44)	05.45			07.14	07.44	09.23	10.15
	22.43	11	21.50 (44)	20.57			19.07	16.23	14.51	14.27
28	04.11		21.40 (44)	05.48			07.17	07.47	09.26	10.14
	22.39	7	21.47 (44)	20.53			19.03	16.19	14.49	14.28
29	04.14		21.43 (44)	05.51			07.20	07.50	09.29	10.14
	22.36	2	21.45 (44)	20.50			19.00	16.16	14.46	14.29
30	04.18			05.54			07.23	07.54	09.32	10.14
	22.33			20.46			18.56	16.13	14.44	14.31
31	04.21			05.57				07.57		10.13
	22.30			20.43				16.10		14.33
Potential sun hours	608			508			393	305	198	137
Total, worst case		744			224					
Sun reduction		0,38			0,31					
Oper. time red.		0,99			0,99					
Wind dir. red.		0,64			0,64					
Total reduction		0,24			0,20					
Total, real		178			44					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** E - Lomarakennus E (Kellokankaan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June
1	10.12	09.03	07.31		06.42		04.56	03.18
	14.35	16.05	17.35		20.08		21.41	23.19
2	10.11	09.00	07.27		06.38		04.52	03.16
	14.37	16.08	17.39		20.11		21.44	23.22
3	10.10	08.57	07.24		06.34		04.49	03.13
	14.39	16.12	17.42		20.14		21.47	23.25
4	10.09	08.54	07.20		06.31		04.46	03.11
	14.41	16.15	17.45		20.17		21.50	23.27
5	10.07	08.51	07.17		06.27		19.42 (47)	04.42	03.08
	14.43	16.18	17.48		20.20	2	19.44 (47)	21.54	23.30
6	10.06	08.47	07.13		06.24		19.40 (48)	04.39	03.06
	14.45	16.22	17.51		20.23	7	19.47 (47)	21.57	23.33
7	10.04	08.44	07.10		06.20		19.37 (48)	04.35	03.04
	14.48	16.25	17.54		20.26	13	19.50 (47)	22.00	23.35
8	10.03	08.41	07.06		17.19 (46)	06.17		19.34 (48)	04.32	03.02
	14.50	16.28	17.57	1	17.20 (46)	20.29	18	19.52 (47)	22.03	23.37
9	10.01	08.38	07.03		17.17 (46)	06.13		19.33 (48)	04.29	03.00
	14.53	16.31	18.00	7	17.24 (46)	20.32	23	19.56 (47)	22.07	23.39
10	09.59	08.35	06.59		17.15 (46)	06.10		19.31 (48)	04.25	02.57
	14.56	16.35	18.03	12	17.27 (46)	20.35	25	19.56 (47)	22.10	23.42
11	09.57	08.31	06.56		17.15 (46)	06.06		19.31 (48)	04.22	02.55
	14.58	16.38	18.06	16	17.31 (46)	20.38	25	19.56 (47)	22.13	23.44
12	09.55	08.28	06.52		17.13 (49)	06.02		19.29 (48)	04.19	02.54
	15.01	16.41	18.09	20	17.33 (46)	20.41	26	19.55 (47)	22.16	23.45
13	09.53	08.25	06.49		17.11 (49)	05.59		19.29 (48)	04.15	02.52
	15.04	16.45	18.12	22	17.33 (46)	20.44	26	19.55 (47)	22.20	23.47
14	09.51	08.22	06.45		17.09 (49)	05.55		19.29 (48)	04.12	02.51
	15.07	16.48	18.15	25	17.34 (46)	20.48	26	19.55 (48)	22.23	23.49
15	09.49	08.18	06.42		17.07 (49)	05.52		19.28 (48)	04.09	02.50
	15.10	16.51	18.18	27	17.34 (49)	20.51	26	19.54 (48)	22.26	23.50
16	09.47	08.15	06.38		17.06 (49)	05.48		19.28 (48)	04.06	02.50
	15.13	16.54	18.21	28	17.34 (49)	20.54	26	19.54 (48)	22.29	23.51
17	09.44	08.12	06.35		17.05 (49)	05.45		19.29 (48)	04.02	02.49
	15.16	16.58	18.24	30	17.35 (49)	20.57	25	19.54 (48)	22.33	23.52
18	09.42	08.08	06.31		17.04 (49)	05.41		19.29 (48)	03.59	02.48
	15.19	17.01	18.27	31	17.35 (49)	21.00	23	19.52 (48)	22.36	23.53
19	09.39	08.05	06.28		17.04 (49)	05.38		19.29 (48)	03.56	02.48
	15.22	17.04	18.30	32	17.36 (49)	21.03	23	19.52 (48)	22.39	23.54
20	09.37	08.02	06.24		17.03 (49)	05.34		19.30 (48)	03.53	02.48
	15.26	17.07	18.33	32	17.35 (49)	21.06	21	19.51 (48)	22.42	23.55
21	09.34	07.58	06.21		17.02 (49)	05.31		19.32 (48)	03.50	02.48
	15.29	17.10	18.36	32	17.34 (49)	21.09	18	19.50 (48)	22.46	23.55
22	09.32	07.55	06.17		17.03 (49)	05.27		19.33 (48)	03.47	02.48
	15.32	17.14	18.39	32	17.35 (49)	21.12	14	19.47 (48)	22.49	23.55
23	09.29	07.51	06.14		17.02 (49)	05.24		19.36 (48)	03.44	02.49
	15.35	17.17	18.42	32	17.34 (49)	21.15	8	19.44 (48)	22.52	23.55
24	09.26	07.48	06.10		17.03 (49)	05.20			03.41	02.50
	15.38	17.20	18.45	30	17.33 (49)	21.18			22.55	23.55
25	09.23	07.45	06.06		17.03 (49)	05.17			03.38	02.50
	15.42	17.23	18.48	29	17.32 (49)	21.22			22.58	23.55
26	09.21	07.41	06.03		17.04 (49)	05.13			03.35	02.51
	15.45	17.26	18.51	27	17.31 (49)	21.25			23.01	23.54
27	09.18	07.38	05.59		17.04 (49)	05.10			03.32	02.52
	15.48	17.29	18.54	26	17.30 (49)	21.28			23.04	23.53
28	09.15	07.34	05.56		17.06 (49)	05.06			03.29	02.54
	15.52	17.32	18.57	23	17.29 (49)	21.31			23.07	23.52
29	09.12		06.52		18.07 (49)	05.03			03.26	02.55
	15.55		19.59	19	18.26 (49)	21.34			23.10	23.51
30	09.09		06.49		18.09 (49)	04.59			03.23	02.57
	15.58		20.02	14	18.23 (49)	21.37			23.13	23.50
31	09.06		06.45		18.15 (49)				03.21	
	16.02		20.05	3	18.18 (49)				23.16	
Potential sun hours	171	238	363		451		570	624
Total, worst case				550		375			
Sun reduction				0,32		0,41			
Oper. time red.				0,99		0,99			
Wind dir. red.				0,60		0,61			
Total reduction				0,19		0,25			
Total, real				105		93			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** E - Lomarakennus E (Kellokankaan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August			September			October			November	December
1	02.59		04.24			05.59		19.30 (48)	07.26		17.52 (49)	08.00	09.35
	23.49		22.26			20.39	25	19.55 (47)	18.52	21	18.13 (46)	16.06	14.42
2	03.01		04.27			06.02		19.30 (48)	07.29		17.53 (46)	08.03	09.38
	23.47		22.23			20.35	25	19.55 (47)	18.49	18	18.11 (46)	16.03	14.40
3	03.01		04.30			06.05		19.30 (48)	07.32		17.53 (46)	08.06	09.40
	23.46		22.20			20.32	23	19.53 (47)	18.45	14	18.07 (46)	16.00	14.38
4	03.03		04.33			06.08		19.31 (48)	07.35		17.54 (46)	08.09	09.43
	23.44		22.16			20.28	19	19.50 (47)	18.42	9	18.03 (46)	15.56	14.36
5	03.05		04.37			06.11		19.33 (48)	07.37		17.55 (46)	08.13	09.46
	23.42		22.13			20.25	13	19.46 (47)	18.38	5	18.00 (46)	15.53	14.34
6	03.07		04.40			06.14		19.36 (48)	07.40			08.16	09.48
	23.40		22.10			20.21	7	19.43 (47)	18.35			15.50	14.33
7	03.09		04.43			06.17		19.38 (47)	07.43			08.19	09.51
	23.38		22.06			20.18	2	19.40 (47)	18.31			15.47	14.31
8	03.12		04.46			06.20			07.46			08.22	09.53
	23.36		22.03			20.14			18.28			15.44	14.30
9	03.14		04.49			06.23			07.49			08.26	09.55
	23.34		21.59			20.11			18.24			15.41	14.28
10	03.17		04.52			06.26			07.52			08.29	09.57
	23.31		21.56			20.07			18.21			15.38	14.27
11	03.19		04.56			06.28			07.55			08.32	09.59
	23.29		21.53			20.03			18.17			15.35	14.26
12	03.22		04.59			06.31			07.58			08.35	10.01
	23.26		21.49			20.00			18.14			15.32	14.25
13	03.25		05.02			06.34		18.01 (49)	08.01			08.39	10.03
	23.24		21.46			19.56	13	18.14 (49)	18.10			15.29	14.24
14	03.28		05.05			06.37		17.58 (49)	08.04			08.42	10.05
	23.21		21.42			19.53	18	18.16 (49)	18.07			15.26	14.23
15	03.31		05.08			06.40		17.56 (49)	08.07			08.45	10.07
	23.18		21.39			19.49	22	18.18 (49)	18.03			15.23	14.23
16	03.34		05.11			06.43		17.53 (49)	08.10			08.48	10.08
	23.16		21.35			19.46	25	18.18 (49)	18.00			15.20	14.22
17	03.37		05.14			06.46		17.52 (49)	08.13			08.52	10.09
	23.13		21.32			19.42	27	18.19 (49)	17.56			15.17	14.22
18	03.40		05.17			06.48		17.51 (49)	08.16			08.55	10.11
	23.10		21.28			19.38	29	18.20 (49)	17.53			15.14	14.22
19	03.43		05.20			06.51		17.50 (49)	08.19			08.58	10.12
	23.07		21.25			19.35	30	18.20 (49)	17.50			15.11	14.21
20	03.46		05.23		19.41 (48)	06.54		17.49 (49)	08.22			09.01	10.13
	23.04		21.21	9	19.50 (48)	19.31	31	18.20 (49)	17.46			15.09	14.22
21	03.49		05.26		19.38 (48)	06.57		17.48 (49)	08.25			09.05	10.13
	23.01		21.18	15	19.53 (48)	19.28	32	18.20 (49)	17.43			15.06	14.22
22	03.52		05.29		19.36 (48)	07.00		17.47 (49)	08.28			09.08	10.14
	22.58		21.14	18	19.54 (48)	19.24	32	18.19 (49)	17.39			15.03	14.22
23	03.55		05.33		19.34 (48)	07.03		17.47 (49)	08.31			09.11	10.14
	22.55		21.11	21	19.55 (48)	19.21	32	18.19 (49)	17.36			15.01	14.23
24	03.58		05.36		19.33 (48)	07.06		17.47 (49)	08.35			09.14	10.15
	22.52		21.07	22	19.55 (48)	19.17	32	18.19 (49)	17.33			14.58	14.23
25	04.01		05.39		19.32 (48)	07.09		17.47 (49)	07.38			09.17	10.15
	22.49		21.04	24	19.56 (48)	19.14	31	18.18 (49)	16.29			14.56	14.24
26	04.05		05.42		19.32 (48)	07.11		17.47 (49)	07.41			09.20	10.15
	22.46		21.00	25	19.57 (48)	19.10	30	18.17 (49)	16.26			14.53	14.25
27	04.08		05.45		19.30 (48)	07.14		17.48 (49)	07.44			09.23	10.15
	22.43		20.57	26	19.56 (48)	19.06	28	18.16 (49)	16.23			14.51	14.26
28	04.11		05.48		19.30 (48)	07.17		17.48 (49)	07.47			09.26	10.15
	22.39		20.53	26	19.56 (48)	19.03	27	18.15 (49)	16.19			14.48	14.28
29	04.14		05.50		19.30 (48)	07.20		17.49 (49)	07.50			09.29	10.14
	22.36		20.50	26	19.56 (48)	18.59	25	18.14 (49)	16.16			14.46	14.29
30	04.17		05.53		19.30 (48)	07.23		17.50 (49)	07.53			09.32	10.14
	22.33		20.46	26	19.56 (47)	18.56	24	18.14 (46)	16.13			14.44	14.31
31	04.21		05.56		19.29 (48)				07.57				10.13
	22.30		20.43	26	19.55 (47)				16.09				14.32
Potential sun hours	609		509			393			305			198	137
Total, worst case				264			602			67			
Sun reduction				0,31			0,33			0,35			
Oper. time red.				0,99			0,99			0,99			
Wind dir. red.				0,61			0,60			0,59			
Total reduction				0,19			0,20			0,21			
Total, real				50			118			14			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** F - Asuinrakennus F (Ollilantie 112)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	10.34 (37)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00		10.12 (37)	09.36		11.32 (33)
	14.34		16.05 50	13.31 (28)	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06 8		10.20 (37)	14.42	32	13.05 (28)
2	10.12		09.01	10.34 (37)	07.28	06.38	04.52	03.15	03.00	04.27	06.03	07.29	08.04		10.09 (37)	09.39		11.33 (33)
	14.36		16.08 37	13.29 (28)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03 14		10.23 (37)	14.40	29	13.05 (28)
3	10.11		08.58	10.35 (37)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07		10.08 (37)	09.41		11.34 (33)
	14.38		16.12 27	13.25 (28)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00 17		10.25 (37)	14.38	24	13.03 (28)
4	10.10		08.54	10.35 (37)	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10		10.07 (37)	09.44		11.35 (33)
	14.41		16.15 23	10.58 (37)	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57 19		10.26 (37)	14.36	17	13.01 (28)
5	10.08	11.54 (33)	08.51	10.35 (37)	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13		10.06 (37)	09.47		11.37 (33)
	14.43 5	11.59 (33)	16.18 23	10.58 (37)	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53 21		10.27 (37)	14.34	11	11.48 (33)
6	10.07	11.52 (33)	08.48	10.36 (37)	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17		10.06 (37)	09.49		11.39 (33)
	14.45 9	12.01 (33)	16.22 21	10.57 (37)	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50 22		10.28 (37)	14.32	9	11.48 (33)
7	10.05	11.52 (33)	08.45	10.38 (37)	07.10	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20		10.05 (37)	09.52		11.41 (33)
	14.48 11	12.03 (33)	16.25 19	10.57 (37)	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47 24		10.29 (37)	14.31	5	11.46 (33)
8	10.04	11.52 (33)	08.42	10.39 (37)	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23		10.05 (37)	09.54		
	14.50 16	13.17 (28)	16.28 16	10.55 (37)	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44 29		12.56 (28)	14.29		
9	10.02	11.50 (33)	08.39	10.40 (37)	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26		10.05 (37)	09.56		
	14.53 23	13.19 (28)	16.32 13	10.53 (37)	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41 37		13.00 (28)	14.28		
10	10.00	11.50 (33)	08.35	10.43 (37)	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30		10.05 (37)	09.58		
	14.55 28	13.21 (28)	16.35 7	10.50 (37)	18.03	20.36	22.11	23.43	23.33	21.57	20.07	18.21	15.38 49		13.01 (28)	14.27		
11	09.58	11.50 (33)	08.32		06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33		10.05 (37)	10.01		
	14.58 31	13.23 (28)	16.38		18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35 57		13.03 (28)	14.26		
12	09.56	11.50 (33)	08.29		06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36		10.05 (37)	10.02		
	15.01 35	13.25 (28)	16.42		18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32 63		13.04 (28)	14.25		
13	09.54	11.49 (33)	08.26		06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.02	08.39		10.05 (37)	10.04		
	15.04 39	13.26 (28)	16.45		18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29 65		13.04 (28)	14.24		
14	09.52	11.50 (33)	08.22		06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.05	08.43		10.06 (37)	10.06		
	15.07 39	13.27 (28)	16.48		18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26 67		13.06 (28)	14.23		
15	09.50	11.49 (33)	08.19		06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.08	08.46		10.07 (37)	10.08		
	15.10 42	13.28 (28)	16.51		18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23 68		13.06 (28)	14.22		
16	09.47	11.49 (33)	08.16		06.39	05.49	04.05	02.49	03.33	05.11	06.43	08.11	08.49		10.07 (37)	10.09		
	15.13 44	13.29 (28)	16.55		18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20 68		13.06 (28)	14.22		
17	09.45	11.50 (33)	08.12		06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52		10.09 (37)	10.10		
	15.16 45	13.30 (28)	16.58		18.24	20.57	22.34	23.54	23.14	21.32	19.42	17.57	15.17 66		13.07 (28)	14.21		
18	09.43	11.49 (33)	08.09		06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56		10.09 (37)	10.12		
	15.19 47	13.30 (28)	17.01		18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14 67		13.07 (28)	14.21		
19	09.40	11.49 (33)	08.06		06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59		10.10 (37)	10.13		
	15.22 49	13.31 (28)	17.04		18.30	21.03	22.40	23.56	23.08	21.25	19.35	17.50	15.11 65		13.07 (28)	14.21		
20	09.38	11.50 (33)	08.02		06.25	05.34	03.53	02.47	03.46	05.24	06.55	08.23	09.02		10.13 (37)	10.14		
	15.25 48	13.31 (28)	17.07		18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.09 61		13.07 (28)	14.21		
21	09.35	10.39 (37)	07.59		06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05		10.15 (37)	10.14		
	15.29 58	13.32 (28)	17.11		18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06 58		13.08 (28)	14.22		
22	09.32	10.38 (37)	07.55		06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09		11.26 (33)	10.15		
	15.32 61	13.32 (28)	17.14		18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03 47		13.07 (28)	14.22		
23	09.30	10.36 (37)	07.52		06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12		11.26 (33)	10.15		
	15.35 65	13.33 (28)	17.17		18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01 49		13.08 (28)	14.22		
24	09.27	10.36 (37)	07.49		06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15		11.27 (33)	10.16		
	15.38 66	13.33 (28)	17.20		18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58 47		13.08 (28)	14.23		
25	09.24	10.35 (37)	07.45		06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18		11.27 (33)	10.16		
	15.42 66	13.33 (28)	17.23		18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.55 45		13.07 (28)	14.24		
26	09.21	10.34 (37)	07.42		06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21		11.28 (33)	10.16		
	15.45 68	13.33 (28)	17.26		18.51	21.25	23.02	23.56	22.47	21.01	19.10	16.26	14.53 43		13.07 (28)	14.25		
27	09.18	10.34 (37)	07.38		06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24		11.28 (33)	10.16		
	15.48 67	13.33 (28)	17.30		18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51 42		13.07 (28)	14.26		
28	09.16	10.34 (37)	07.35		05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27		11.29 (33)	10.16		
	15.52 67	13.33 (28)	17.33		18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.19	14.48 39		13.06 (28)	14.27		
29	09.13	10.33 (37)			06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30		11.30 (33)	10.15		
	15.55 64	13.32 (28)			20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46 37		13.06 (28)	14.29		
30	09.10	10.33 (37)			06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33		11.31 (33)	10.15		
	15.58 61	13.32 (28)			20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44 35		13.06 (28)	14.30		
31	09.07	10.33 (37)			06.45		03.20		04.20	05.57		07.57				10.14		
	16.02 57	13.31 (28)			20.06		23.17		22.30	20.43		16.10				14.32		
Potential sun hours	170		238		363	451	570	625	609	509	393	305	198			136		
Total, worst case		1211		236										1329			127	
Sun reduction		0,19		0,33										0,24			0,22	
Oper. time red.		0,99		0,99										0,99			0,99	
Wind dir. red.		0,66		0,66										0,66			0,66	
Total reduction		0,12		0,22										0,16			0,14	
Total, real		147		52										208			18	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** G - Lomarakennus G (Ollilantie, Siliakuru)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June
1	10.13			09.04		10.08 (33)	07.31	06.42	04.56	03.18
	14.34			16.05	57	12.00 (28)	17.36	20.09	21.41	23.20
2	10.12			09.01		10.08 (33)	07.28	06.38	04.53	03.15
	14.36			16.08	56	12.00 (28)	17.39	20.12	21.45	23.23
3	10.11		12.19 (27)	08.58		10.07 (33)	07.24	06.35	04.49	03.13
	14.38	14	12.33 (27)	16.12	56	11.59 (28)	17.42	20.15	21.48	23.26
4	10.10		12.19 (27)	08.54		10.07 (33)	07.21	06.31	04.46	03.11
	14.41	15	12.34 (27)	16.15	55	11.58 (28)	17.45	20.18	21.51	23.29
5	10.08		12.19 (27)	08.51		10.07 (33)	07.17	06.28	04.42	03.08
	14.43	16	12.35 (27)	16.18	55	11.58 (28)	17.48	20.21	21.54	23.31
6	10.07		12.19 (27)	08.48		10.07 (33)	07.14	06.24	04.39	03.06
	14.45	17	12.36 (27)	16.22	53	11.57 (28)	17.51	20.24	21.58	23.34
7	10.05		12.19 (27)	08.45		10.08 (33)	07.11	06.21	04.35	03.04
	14.48	18	12.37 (27)	16.25	50	11.56 (28)	17.54	20.27	22.01	23.36
8	10.04		12.19 (27)	08.42		10.08 (33)	07.07	06.17	04.32	03.02
	14.50	18	12.37 (27)	16.28	47	11.55 (28)	17.57	20.30	22.04	23.39
9	10.02		12.19 (27)	08.39		10.08 (33)	07.03	06.13	04.29	03.00
	14.53	19	12.38 (27)	16.32	43	11.53 (28)	18.00	20.33	22.07	23.41
10	10.00		12.19 (27)	08.35		10.08 (33)	07.00	06.10	04.25	02.56
	14.56	20	12.39 (27)	16.35	35	11.49 (28)	18.03	20.36	22.11	23.43
11	09.58		12.19 (27)	08.32		10.09 (33)	06.56	06.06	04.22	02.55
	14.58	26	13.35 (23)	16.38	23	10.32 (33)	18.06	20.39	22.14	23.45
12	09.56		11.34 (28)	08.29		09.09 (37)	06.53	06.03	04.19	02.53
	15.01	41	13.41 (23)	16.42	26	10.32 (33)	18.09	20.42	22.17	23.47
13	09.54		11.32 (28)	08.26		09.05 (37)	06.49	05.59	04.15	02.52
	15.04	50	13.46 (23)	16.45	31	10.31 (33)	18.12	20.45	22.20	23.48
14	09.52		11.31 (28)	08.22		09.01 (37)	06.46	05.56	04.12	02.51
	15.07	55	13.47 (23)	16.48	32	10.29 (33)	18.15	20.48	22.24	23.50
15	09.50		11.30 (28)	08.19		09.00 (37)	06.42	05.52	04.09	02.50
	15.10	59	13.48 (23)	16.51	29	10.26 (33)	18.18	20.51	22.27	23.51
16	09.47		11.29 (28)	08.16		09.00 (37)	06.39	05.49	04.06	02.49
	15.13	64	13.49 (23)	16.55	20	09.20 (37)	18.21	20.54	22.30	23.53
17	09.45		11.29 (28)	08.12		08.59 (37)	06.35	05.45	04.02	02.48
	15.16	65	13.50 (23)	16.58	21	09.20 (37)	18.24	20.57	22.34	23.54
18	09.43		11.28 (28)	08.09		08.58 (37)	06.32	05.42	03.59	02.48
	15.19	67	13.50 (23)	17.01	22	09.20 (37)	18.27	21.00	22.37	23.55
19	09.40		11.27 (28)	08.06		08.58 (37)	06.28	05.38	03.56	02.48
	15.22	69	13.50 (23)	17.04	23	09.21 (37)	18.30	21.04	22.40	23.55
20	09.38		11.27 (28)	08.02		08.58 (37)	06.25	05.34	03.53	02.48
	15.26	71	13.51 (23)	17.08	23	09.21 (37)	18.33	21.07	22.43	23.56
21	09.35		11.27 (28)	07.59		08.58 (37)	06.21	05.31	03.50	02.48
	15.29	71	13.51 (23)	17.11	23	09.21 (37)	18.36	21.10	22.47	23.56
22	09.32		11.27 (28)	07.55		08.58 (37)	06.18	05.27	03.47	02.48
	15.32	72	13.52 (23)	17.14	22	09.20 (37)	18.39	21.13	22.50	23.57
23	09.30		11.27 (28)	07.52		08.59 (37)	06.14	05.24	03.44	02.48
	15.35	72	13.52 (23)	17.17	21	09.20 (37)	18.42	21.16	22.53	23.57
24	09.27		11.27 (28)	07.49		08.59 (37)	06.10	05.20	03.41	02.49
	15.39	69	13.52 (23)	17.20	20	09.19 (37)	18.45	21.19	22.56	23.56
25	09.24		11.27 (28)	07.45		09.00 (37)	06.07	05.17	03.38	02.50
	15.42	69	13.52 (23)	17.23	17	09.17 (37)	18.48	21.22	22.59	23.56
26	09.21		10.14 (33)	07.42		09.02 (37)	06.03	05.13	03.35	02.51
	15.45	76	13.52 (23)	17.26	14	09.16 (37)	18.51	21.25	23.02	23.55
27	09.18		10.12 (33)	07.38		09.04 (37)	06.00	05.10	03.32	02.52
	15.48	76	13.52 (23)	17.30	9	09.13 (37)	18.54	21.29	23.05	23.55
28	09.16		10.11 (33)	07.35			05.56	05.06	03.29	02.53
	15.52	72	13.51 (23)	17.33			18.57	21.32	23.09	23.54
29	09.13		10.09 (33)				06.53	05.03	03.26	02.55
	15.55	68	13.50 (23)				20.00	21.35	23.12	23.53
30	09.10		10.08 (33)				06.49	04.59	03.23	02.56
	15.58	67	13.49 (23)				20.03	21.38	23.15	23.52
31	09.07		10.08 (33)				06.46		03.21	
	16.02	64	13.47 (23)				20.06		23.17	
Potential sun hours	171			238			363	451	570	625
Total, worst case		1480			883					
Sun reduction		0,19			0,33					
Oper. time red.		0,99			0,99					
Wind dir. red.		0,66			0,66					
Total reduction		0,12			0,22					
Total, real		180			192					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** G - Lomarakennus G (Ollilantie, Siliakuru)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October			November			December		
1	02.58		04.24		06.00		07.26			08.01		09.37 (33)	09.36		12.01 (27)
	23.50		22.27		20.40		18.53			16.06	37	11.19 (28)	14.42	26	13.17 (23)
2	03.00		04.27		06.03		07.29			08.04		09.37 (33)	09.39		12.02 (27)
	23.49		22.24		20.36		18.49			16.03	43	11.22 (28)	14.40	20	12.22 (27)
3	03.00		04.30		06.06		07.32			08.07		09.37 (33)	09.41		12.02 (27)
	23.47		22.20		20.32		18.46			16.00	49	11.25 (28)	14.38	20	12.22 (27)
4	03.02		04.33		06.08		07.35			08.10		09.37 (33)	09.44		12.03 (27)
	23.45		22.17		20.29		18.42			15.57	51	11.26 (28)	14.36	19	12.22 (27)
5	03.04		04.37		06.11		07.38			08.13		09.37 (33)	09.47		12.05 (27)
	23.43		22.14		20.25		18.39			15.53	53	11.27 (28)	14.34	17	12.22 (27)
6	03.07		04.40		06.14		07.41			08.17		09.37 (33)	09.49		12.05 (27)
	23.41		22.10		20.22		18.35			15.50	54	11.28 (28)	14.32	17	12.22 (27)
7	03.09		04.43		06.17		07.44			08.20		09.37 (33)	09.52		12.06 (27)
	23.39		22.07		20.18		18.32			15.47	56	11.29 (28)	14.31	16	12.22 (27)
8	03.11		04.46		06.20		07.47			08.23		09.38 (33)	09.54		12.07 (27)
	23.37		22.04		20.15		18.28			15.44	56	11.30 (28)	14.29	15	12.22 (27)
9	03.14		04.49		06.23		07.50			08.26		09.38 (33)	09.56		12.08 (27)
	23.35		22.00		20.11		18.25			15.41	57	11.30 (28)	14.28	14	12.22 (27)
10	03.17		04.53		06.26		07.53			08.30		09.39 (33)	09.58		
	23.32		21.57		20.07		18.21			15.38	56	11.31 (28)	14.27		
11	03.19		04.56		06.29		07.56			08.33		09.39 (33)	10.01		
	23.30		21.53		20.04		18.18			15.35	65	13.19 (23)	14.26		
12	03.22		04.59		06.32		07.59			08.36		09.40 (33)	10.02		
	23.28		21.50		20.00		18.14			15.32	67	13.21 (23)	14.25		
13	03.25		05.02		06.35		08.02			08.39		09.41 (33)	10.04		
	23.25		21.46		19.57		18.11			15.29	68	13.22 (23)	14.24		
14	03.28		05.05		06.37		08.05			08.43		09.43 (33)	10.06		
	23.22		21.43		19.53		18.07			15.26	74	13.24 (23)	14.23		
15	03.31		05.08		06.40		08.08		09.35 (37)	08.46		09.45 (33)	10.08		
	23.20		21.39		19.50		18.04	12	09.47 (37)	15.23	76	13.24 (23)	14.22		
16	03.33		05.11		06.43		08.11		09.33 (37)	08.49		09.47 (33)	10.09		
	23.17		21.36		19.46		18.00	15	09.48 (37)	15.20	76	13.25 (23)	14.22		
17	03.36		05.14		06.46		08.14		09.31 (37)	08.53		11.00 (28)	10.10		
	23.14		21.33		19.42		17.57	18	09.49 (37)	15.17	70	13.26 (23)	14.22		
18	03.40		05.17		06.49		08.17		09.31 (37)	08.56		11.01 (28)	10.12		
	23.11		21.29		19.39		17.53	20	09.51 (37)	15.14	69	13.26 (23)	14.21		
19	03.43		05.21		06.52		08.20		09.29 (37)	08.59		11.01 (28)	10.13		
	23.08		21.26		19.35		17.50	22	09.51 (37)	15.11	72	13.26 (23)	14.21		
20	03.46		05.24		06.55		08.23		09.28 (37)	09.02		11.02 (28)	10.14		
	23.05		21.22		19.32		17.47	23	09.51 (37)	15.09	72	13.27 (23)	14.21		
21	03.49		05.27		06.58		08.26		09.28 (37)	09.05		11.02 (28)	10.14		
	23.02		21.18		19.28		17.43	23	09.51 (37)	15.06	70	13.26 (23)	14.22		
22	03.52		05.30		07.00		08.29		09.28 (37)	09.09		11.03 (28)	10.15		
	22.59		21.15		19.25		17.40	23	09.51 (37)	15.03	71	13.27 (23)	14.22		
23	03.55		05.33		07.03		08.32		09.28 (37)	09.12		11.04 (28)	10.15		
	22.56		21.11		19.21		17.36	23	09.51 (37)	15.01	69	13.27 (23)	14.23		
24	03.58		05.36		07.06		08.35		09.28 (37)	09.15		11.06 (28)	10.16		
	22.53		21.08		19.18		17.33	22	09.50 (37)	14.58	67	13.28 (23)	14.23		
25	04.01		05.39		07.09		07.38		08.29 (37)	09.18		11.06 (28)	10.16		
	22.50		21.04		19.14		16.30	21	08.50 (37)	14.56	66	13.27 (23)	14.24		
26	04.05		05.42		07.12		07.41		08.29 (37)	09.21		11.07 (28)	10.16		
	22.47		21.01		19.10		16.26	22	09.51 (33)	14.53	63	13.27 (23)	14.25		
27	04.08		05.45		07.15		07.45		08.30 (37)	09.24		11.09 (28)	10.16		
	22.43		20.57		19.07		16.23	31	09.57 (33)	14.51	59	13.27 (23)	14.26		
28	04.11		05.48		07.18		07.48		08.32 (37)	09.27		11.10 (28)	10.16		
	22.40		20.54		19.03		16.20	32	09.59 (33)	14.48	56	13.27 (23)	14.28		
29	04.14		05.51		07.21		07.51		08.35 (37)	09.30		11.12 (28)	10.15		
	22.37		20.50		19.00		16.16	30	10.00 (33)	14.46	50	13.26 (23)	14.29		
30	04.17		05.54		07.23		07.54		08.39 (37)	09.33		11.15 (28)	10.15		
	22.34		20.47		18.56		16.13	25	10.02 (33)	14.44	41	13.23 (23)	14.30		
31	04.21		05.57				07.57		09.39 (33)				10.14		
	22.30		20.43				16.10	24	10.03 (33)				14.32		
Potential sun hours	609		509		393		305			198			136		
Total, worst case								386			1833			164	
Sun reduction								0,35			0,24			0,22	
Oper. time red.								0,99			0,99			0,99	
Wind dir. red.								0,65			0,66			0,67	
Total reduction								0,22			0,16			0,14	
Total, real								86			288			24	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** H - Asuinrakennus H (Pinolantie 406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	July		August		September		October	November	December
1	10.13	09.04	07.32	06.43		04.57		03.19	03.00		04.25		05.21 (1)	06.00	06.55 (2)	07.27	08.01	09.36
	14.36	16.06	17.37	20.09		21.42		23.20	23.50		22.27	21	05.42 (1)	20.40	21 07.16 (2)	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39		04.53		03.17	03.00		04.28		05.21 (1)	06.03	06.54 (2)	07.30	08.04	09.39
	14.38	16.09	17.40	20.12		21.45		23.23	23.49		22.24	20	05.41 (1)	20.37	22 07.16 (2)	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	07.08 (2)	04.50		03.14	03.01		04.31		05.21 (1)	06.06	06.54 (2)	07.33	08.07	09.42
	14.40	16.13	17.43	20.15	6 07.14 (2)	21.48		23.26	23.47		22.21	20	05.41 (1)	20.33	22 07.16 (2)	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	07.04 (2)	04.47		03.12	03.04		04.34		05.22 (1)	06.09	06.53 (2)	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	11 07.15 (2)	21.51		23.29	23.45		22.17	17	05.39 (1)	20.29	21 07.14 (2)	18.43	15.58	14.37
5	10.09	08.52	07.18	06.28	07.01 (2)	04.43	05.23 (1)	03.09	03.06		04.38		05.25 (1)	06.12	06.54 (2)	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	16 07.17 (2)	21.55	3 05.26 (1)	23.31	23.43		22.14	14	05.39 (1)	20.26	20 07.14 (2)	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	06.58 (2)	04.40	05.20 (1)	03.07	03.08		04.41		05.28 (1)	06.15	06.54 (2)	07.41	08.17	09.49
	14.46	16.23	17.52	20.24	19 07.17 (2)	21.58	7 05.27 (1)	23.34	23.41		22.11	10	05.38 (1)	20.22	19 07.13 (2)	18.36	15.51	14.34
7	10.06	08.45	07.11	06.21	06.57 (2)	04.36	05.17 (1)	03.05	03.10		04.44		05.31 (1)	06.18	06.56 (2)	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	21 07.18 (2)	22.01	12 05.29 (1)	23.36	23.39		22.07	6	05.37 (1)	20.19	16 07.12 (2)	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	06.56 (2)	04.33	05.14 (1)	03.03	03.13		04.47		05.33 (1)	06.21	06.58 (2)	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	21 07.17 (2)	22.04	15 05.29 (1)	23.38	23.37		22.04	1	05.34 (1)	20.15	12 07.10 (2)	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	06.56 (2)	04.30	05.11 (1)	03.01	03.15		04.50			06.24	07.01 (2)	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22 07.18 (2)	22.08	19 05.30 (1)	23.41	23.35		22.01			20.12	6 07.07 (2)	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	06.55 (2)	04.26	05.11 (1)	02.58	03.18		04.53			06.27		07.53	08.30	09.59
	14.57	16.36	18.04	20.36	22 07.17 (2)	22.11	20 05.31 (1)	23.43	23.33		21.57			20.08		18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	06.56 (2)	04.23	05.11 (1)	02.56	03.20		04.57			06.30		07.56	08.33	10.01
	14.59	16.39	18.07	20.40	21 07.17 (2)	22.14	20 05.31 (1)	23.45	23.30		21.54			20.04		18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	06.56 (2)	04.20	05.10 (1)	02.55	03.23		05.00			06.32		07.59	08.37	10.03
	15.02	16.42	18.10	20.43	20 07.16 (2)	22.18	21 05.31 (1)	23.47	23.28		21.50			20.01		18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	06.56 (2)	04.16	05.10 (1)	02.53	03.26		05.03			06.35		08.02	08.40	10.04
	15.05	16.46	18.13	20.46	19 07.15 (2)	22.21	21 05.31 (1)	23.48	23.25		21.47			19.57		18.11	15.30	14.25
14	09.52	08.23	06.47	05.56	06.57 (2)	04.13	05.10 (1)	02.52	03.29		05.06			06.38		08.05	08.43	10.06
	15.08	16.49	18.16	20.49	17 07.14 (2)	22.24	21 05.31 (1)	23.50	23.22		21.43			19.54		18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	06.58 (2)	04.10	05.10 (1)	02.51	03.32		05.09			06.41		08.08	08.46	10.08
	15.11	16.52	18.19	20.52	13 07.11 (2)	22.27	21 05.31 (1)	23.51	23.20		21.40			19.50		18.04	15.24	14.24
16	09.48	08.16	06.39	05.49	07.00 (2)	04.07	05.10 (1)	02.51	03.35		05.12			06.44		08.11	08.50	10.09
	15.14	16.55	18.22	20.55	9 07.09 (2)	22.31	20 05.30 (1)	23.53	23.17		21.36			19.47		18.01	15.21	14.23
17	09.45	08.13	06.36	05.46		04.03	05.11 (1)	02.50	03.38		05.15			06.47		08.14	08.53	10.11
	15.17	16.59	18.25	20.58		22.34	20 05.31 (1)	23.54	23.14		21.33			19.43		17.58	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00	05.11 (1)	02.49	03.41		05.18			06.50		08.17	08.56	10.12
	15.20	17.02	18.28	21.01		22.37	19 05.30 (1)	23.55	23.11		21.29			19.40		17.54	15.15	14.23
19	09.40	08.06	06.29	05.39		03.57	05.12 (1)	02.49	03.44	05.27 (1)	05.21			06.52		08.20	08.59	10.13
	15.23	17.05	18.31	21.04		22.40	18 05.30 (1)	23.55	23.08	7 05.34 (1)	21.26			19.36		17.51	15.12	14.23
20	09.38	08.03	06.25	05.35		03.54	05.13 (1)	02.49	03.47	05.25 (1)	05.24			06.55		08.23	09.03	10.14
	15.27	17.08	18.34	21.07		22.44	17 05.30 (1)	23.56	23.05	10 05.35 (1)	21.22			19.32		17.47	15.10	14.23
21	09.35	07.59	06.22	05.32		03.51	05.13 (1)	02.49	03.50	05.25 (1)	05.28			06.58		08.26	09.06	10.14
	15.30	17.11	18.37	21.10		22.47	15 05.28 (1)	23.56	23.02	12 05.37 (1)	21.19			19.29		17.44	15.07	14.23
22	09.33	07.56	06.18	05.28		03.48	05.14 (1)	02.49	03.53	05.23 (1)	05.31			07.01		08.29	09.09	10.15
	15.33	17.15	18.40	21.13		22.50	14 05.28 (1)	23.56	22.59	15 05.38 (1)	21.15			19.25		17.40	15.04	14.23
23	09.30	07.53	06.15	05.25		03.45	05.15 (1)	02.50	03.56	05.22 (1)	05.34			07.04		08.33	09.12	10.16
	15.36	17.18	18.43	21.16		22.53	12 05.27 (1)	23.56	22.56	16 05.38 (1)	21.12			19.22		17.37	15.02	14.24
24	09.27	07.49	06.11	05.21		03.42	05.16 (1)	02.50	03.59	05.22 (1)	05.37			07.07		08.36	09.15	10.16
	15.39	17.21	18.46	21.20		22.56	8 05.24 (1)	23.56	22.53	18 05.40 (1)	21.08			19.18		17.34	14.59	14.24
25	09.24	07.46	06.08	05.18		03.39	05.19 (1)	02.51	04.02	05.21 (1)	05.40			07.10		07.39	09.18	10.16
	15.43	17.24	18.49	21.23		22.59	3 05.22 (1)	23.56	22.50	19 05.40 (1)	21.05			19.15		16.30	14.57	14.25
26	09.22	07.42	06.04	05.14		03.36		02.52	04.06	05.21 (1)	05.43			07.13		07.42	09.21	10.16
	15.46	17.27	18.52	21.26		23.03		23.55	22.47	20 05.41 (1)	21.01			19.11		16.27	14.54	14.26
27	09.19	07.39	06.00	05.11		03.33		02.53	04.09	05.20 (1)	05.46		07.02 (2)	07.15		07.45	09.24	10.16
	15.49	17.30	18.55	21.29		23.06		23.55	22.44	21 05.41 (1)	20.58	9	07.11 (2)	19.08		16.24	14.52	14.27
28	09.16	07.35	05.57	05.07		03.30		02.55	04.12	05.21 (1)	05.49		06.59 (2)	07.18		07.48	09.27	10.16
	15.53	17.33	18.58	21.32		23.09		23.54	22.41	20 05.41 (1)	20.54	14	07.13 (2)	19.04		16.20	14.49	14.29
29	09.13		06.53	05.04		03.27		02.56	04.15	05.21 (1)	05.52		06.58 (2)	07.21		07.51	09.30	10.15
	15.56		20.01	21.35		23.12		23.53	22.37	21 05.42 (1)	20.51	16	07.14 (2)	19.00		16.17	14.47	14.30
30	09.10		06.50	05.00		03.24		02.58	04.18	05.20 (1)	05.55		06.57 (2)	07.24		07.55	09.33	10.15
	15.59		20.04	21.39		23.15		23.51	22.34	21 05.41 (1)	20.47	18	07.15 (2)	18.57		16.14	14.45	14.32
31	09.07		06.46			03.22			04.22	05.21 (1)	05.57		06.55 (2)			07.58		10.14
	16.03		20.07			23.18			22.31	21 05.42 (1)	20.44	20	07.15 (2)			16.10		14.33
Potential sun hours	171	238	363	451		570		624	609		509			393		305	198	137
Total, worst case					237		326			221		186			159			
Sun reduction					0,41		0,47			0,38		0,31			0,33			
Oper. time red.					0,99		0,99			0,99		0,99			0,99			
Wind dir. red.					0,62		0,62			0,62		0,62			0,62			
Total reduction					0,25		0,29			0,23		0,19			0,20			
Total, real					59		94			51		36			32			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** I - Asuinrakennus I (Kortenevantie 116)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.52	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.05	03.11	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.40	23.35	22.00	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.02
	15.02	16.43	18.10	20.43	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.30	14.57	14.26
26	09.22	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.05	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.27	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.11	23.52	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.17		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** J - Asuinrakennus J (Haapavesitie 1406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**Shadow receptor:** K - Lomarakennus K (Kurunoja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** L - Laskentapiste L (Perkkiontie, Ilmola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August		September	October	November	December
1	10.12	09.03	07.31	06.42	04.56		03.19		05.13 (38)	02.59	05.18 (38)	04.24	05.33 (38)	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41		23.19	73	21.39 (24)	23.49	70	21.43 (24)	22.27	26	21.37 (20)	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.38	04.53		03.16		05.13 (38)	03.01	05.18 (38)	04.28	05.35 (38)	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44		23.22	72	21.39 (24)	23.47	70	21.43 (24)	22.23	18	05.53 (38)	20.36	18.49	16.03	14.41
3	10.10	08.57	07.24	06.35	04.50		03.14		05.12 (38)	03.01	05.18 (38)	04.31	05.38 (38)	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47		23.25	72	21.38 (24)	23.46	70	21.43 (24)	22.20	12	05.50 (38)	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46		03.12		05.13 (38)	03.03	05.19 (38)	04.34				06.09	07.35	08.10	09.43
	14.42	16.15	17.45	20.18	21.51		23.28	73	21.39 (24)	23.44	71	21.44 (24)	22.17			20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43		03.09		05.13 (38)	03.05	05.19 (38)	04.37				06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.30	72	21.39 (24)	23.42	71	21.44 (24)	22.13			20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39		03.07		05.13 (38)	03.08	05.19 (38)	04.40				06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33	71	21.38 (24)	23.40	72	21.45 (24)	22.10			20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36		03.05		05.13 (38)	03.10	05.19 (38)	04.43				06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.00		23.35	72	21.39 (24)	23.38	72	21.45 (24)	22.07			20.18	18.32	15.48	14.32
8	10.03	08.41	07.07	06.17	04.33		03.03		05.14 (38)	03.12	05.20 (38)	04.47				06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.37	70	21.39 (24)	23.36	71	21.45 (24)	22.03			20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29		05.31 (38)		03.01		05.14 (38)	03.15	05.20 (38)	04.50		06.23	07.50	08.26	09.55
	14.54	16.32	18.00	20.33	22.07	6	05.37 (38)		23.40	71	21.39 (24)	23.34	73	21.46 (24)	22.00		20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26		05.26 (38)		02.58		05.14 (38)	03.18	05.20 (38)	04.53			06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	15	05.41 (38)		23.42	70	21.39 (24)	23.31	72	21.46 (24)	21.56		20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23		05.24 (38)		02.56		05.14 (38)	03.20	05.21 (38)	04.56			06.29	07.55	08.33	10.00
	14.59	16.39	18.06	20.39	22.13	19	05.43 (38)		23.44	70	21.39 (24)	23.29	72	21.47 (24)	21.53		20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19		05.22 (38)		02.55		05.14 (38)	03.23	05.21 (38)	04.59			06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	32	21.28 (20)		23.45	69	21.38 (24)	23.27	73	21.47 (24)	21.49		20.00	18.14	15.32	14.26
13	09.53	08.25	06.49	05.59	04.16		05.20 (38)		02.53		04.04 (39)	03.26	05.20 (38)	05.02			06.35	08.01	08.39	10.03
	15.05	16.45	18.12	20.45	22.20	41	21.31 (20)		23.47	72	21.39 (24)	23.24	73	21.46 (20)	21.46		19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13		05.19 (38)		02.52		04.03 (39)	03.29	05.21 (38)	05.05			06.38	08.04	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	47	21.33 (20)		23.49	74	21.39 (24)	23.21	74	21.48 (20)	21.43		19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09		05.18 (38)		02.51		04.03 (39)	03.31	05.21 (38)	05.09			06.40	08.07	08.46	10.07
	15.11	16.52	18.18	20.51	22.26	54	21.36 (20)		23.50	75	21.39 (24)	23.19	73	21.48 (20)	21.39		19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06		05.17 (38)		02.50		04.02 (39)	03.34	05.22 (38)	05.12			06.43	08.10	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	58	21.38 (20)		23.51	76	21.39 (24)	23.16	73	21.49 (20)	21.36		19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45	04.03		05.15 (38)		02.50		04.02 (39)	03.37	05.22 (38)	05.15			06.46	08.13	08.52	10.09
	15.17	16.58	18.24	20.57	22.33	64	21.40 (20)		23.52	76	21.39 (24)	23.13	73	21.49 (20)	21.32		19.42	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00		05.15 (38)		02.49		04.02 (39)	03.40	05.22 (38)	05.18			06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	66	21.40 (20)		23.53	77	21.39 (24)	23.10	73	21.49 (20)	21.29		19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57		05.14 (38)		02.49		04.02 (39)	03.43	05.23 (38)	05.21			06.52	08.20	08.58	10.12
	15.23	17.05	18.30	21.03	22.39	68	21.40 (20)		23.54	77	21.40 (24)	23.07	72	21.50 (20)	21.25		19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54		05.14 (38)		02.49		04.02 (39)	03.46	05.23 (38)	05.24			06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	69	21.40 (20)		23.55	79	21.40 (24)	23.04	72	21.50 (20)	21.22		19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50		05.14 (38)		02.49		04.02 (39)	03.50	05.23 (38)	05.27			06.58	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	71	21.41 (20)		23.55	79	21.40 (24)	23.01	72	21.50 (20)	21.18		19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47		05.13 (38)		02.49		04.02 (39)	03.53	05.24 (38)	05.30			07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	72	21.40 (20)		23.55	79	21.40 (24)	22.58	71	21.51 (20)	21.15		19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44		05.13 (38)		02.50		04.03 (39)	03.56	05.24 (38)	05.33			07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	72	21.40 (20)		23.55	79	21.41 (24)	22.55	70	21.51 (20)	21.11		19.21	17.37	15.01	14.24
24	09.26	07.48	06.10	05.21	03.41		05.13 (38)		02.50		04.03 (39)	03.59	05.24 (38)	05.36			07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	72	21.40 (20)		23.55	76	21.40 (24)	22.52	69	21.50 (20)	21.08		19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38		05.13 (38)		02.51		04.04 (39)	04.02	05.25 (38)	05.39			07.09	07.38	09.17	10.15
	15.42	17.24	18.48	21.22	22.58	72	21.40 (20)		23.55	77	21.41 (24)	22.49	68	21.51 (20)	21.04		19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35		05.13 (38)		02.52		04.04 (39)	04.05	05.25 (38)	05.42			07.12	07.41	09.20	10.15
	15.46	17.27	18.51	21.25	23.02	73	21.40 (20)		23.54	77	21.41 (24)	22.46	64	21.50 (20)	21.01		19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33		05.13 (38)		02.53		04.05 (39)	04.08	05.27 (38)	05.45			07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05	73	21.40 (20)		23.53	75	21.41 (24)	22.43	61	21.50 (20)	20.57		19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30		05.13 (38)		02.55		04.06 (39)	04.12	05.28 (38)	05.48			07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	72	21.39 (20)		23.52	74	21.42 (24)	22.40	57	21.48 (20)	20.54		19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27		05.12 (38)		02.56		04.07 (39)	04.15	05.28 (38)	05.51			07.20	07.51	09.29	10.14
	15.56		20.00	21.35	23.11	74	21.39 (20)		23.51	74	21.42 (24)	22.36	51	21.45 (20)	20.50		19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24		05.12 (38)		02.58		05.18 (38)	04.18	05.30 (38)	05.54			07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	74	21.39 (24)		23.50	70	21.43 (24)	22.33	45	21.43 (20)	20.46		18.56	16.13	14.45	14.31
31	09.06		06.46		03.22		05.12 (38)					04.21	05.31 (38)	05.57				07.57		10.13
	16.02		20.06		23.16	73	21.38 (24)					22.30	37	21.39 (20)	20.43			16.10		14.33
Potential sun hours	171	238	363	451	569			624		608		508		393	305	198	137
Total, worst case						1337			2221		2105		56				
Sun reduction						0,47			0,48		0,38		0,31				
Oper. time red.						0,99			0,99		0,99		0,99				
Wind dir. red.						0,63			0,63		0,63		0,62				
Total reduction						0,29			0,30		0,24		0,19				
Total, real						392			661		497		11				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102 **Shadow receptor:** M - Lomarakennus M (Riskalan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June	July	August	September	October	November			December		
1	10.13			09.04		12.12 (37)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00			09.36		11.47 (37)
	14.34			16.05	50	14.53 (28)	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06			14.42	32	13.17 (33)
2	10.12			09.01		12.14 (37)	07.28	06.38	04.52	03.15	03.00	04.27	06.02	07.29	08.04			09.39		11.48 (37)
	14.36			16.08	36	14.53 (28)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03			14.40	25	13.13 (33)
3	10.11			08.57		12.17 (37)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07		14.08 (28)	09.41		11.49 (37)
	14.38			16.12	29	14.53 (28)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	10	14.18 (28)	14.38	17	12.06 (37)
4	10.10		12.11 (37)	08.54		14.33 (28)	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10		14.06 (28)	09.44		11.50 (37)
	14.40	2	12.13 (37)	16.15	19	14.52 (28)	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14	14.20 (28)	14.36	15	12.05 (37)
5	10.08		12.08 (37)	08.51		14.34 (28)	07.17	06.28	04.42	03.08	03.04	04.36	06.11	07.38	08.13		14.05 (28)	09.47		11.52 (37)
	14.43	8	12.16 (37)	16.18	18	14.52 (28)	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	16	14.21 (28)	14.34	13	12.05 (37)
6	10.07		12.07 (37)	08.48		14.35 (28)	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17		14.04 (28)	09.49		11.54 (37)
	14.45	11	12.18 (37)	16.22	16	14.51 (28)	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	18	14.22 (28)	14.32	11	12.05 (37)
7	10.05		12.07 (37)	08.45		14.37 (28)	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20		14.04 (28)	09.52		11.55 (37)
	14.48	13	12.20 (37)	16.25	13	14.50 (28)	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.31	15.47	19	14.23 (28)	14.31	8	12.03 (37)
8	10.04		12.07 (37)	08.42		14.39 (28)	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23		14.24 (28)	14.29	3	12.01 (37)
	14.50	14	12.21 (37)	16.28	9	14.48 (28)	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	31	14.24 (28)	14.29	3	12.01 (37)
9	10.02		12.05 (37)	08.38			07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26		11.44 (37)	09.56		
	14.53	17	12.22 (37)	16.32			18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.24	15.41	38	14.24 (28)	14.28		
10	10.00		12.05 (37)	08.35			07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30		11.43 (37)	09.58		
	14.55	24	13.29 (33)	16.35			18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	50	14.24 (28)	14.27		
11	09.58		12.05 (37)	08.32			06.56	06.06	04.22	02.54	03.19	04.56	06.29	07.56	08.33		11.42 (37)	10.00		
	14.58	30	13.34 (33)	16.38			18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.17	15.35	55	14.24 (28)	14.25		
12	09.56		12.05 (37)	08.29			06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36		11.41 (37)	10.02		
	15.01	38	13.40 (33)	16.41			18.09	20.42	22.17	23.47	23.27	21.50	20.00	18.14	15.32	61	14.24 (28)	14.24		
13	09.54		12.04 (37)	08.25			06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39		11.40 (37)	10.04		
	15.04	40	13.40 (33)	16.45			18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	64	14.24 (28)	14.24		
14	09.52		12.05 (37)	08.22			06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.04	08.43		11.39 (37)	10.06		
	15.07	42	13.42 (33)	16.48			18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	66	14.23 (28)	14.23		
15	09.50		12.04 (37)	08.19			06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.07	08.46		11.40 (37)	10.08		
	15.10	44	13.42 (33)	16.51			18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	67	14.24 (28)	14.22		
16	09.47		12.04 (37)	08.16			06.39	05.48	04.05	02.49	03.33	05.11	06.43	08.11	08.49		11.39 (37)	10.09		
	15.13	46	13.43 (33)	16.54			18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	66	14.21 (28)	14.22		
17	09.45		12.05 (37)	08.12			06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52		11.39 (37)	10.10		
	15.16	47	13.44 (33)	16.58			18.24	20.57	22.33	23.54	23.14	21.32	19.42	17.57	15.17	60	14.16 (28)	14.21		
18	09.43		12.04 (37)	08.09			06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56		11.40 (37)	10.12		
	15.19	49	13.44 (33)	17.01			18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	57	14.13 (28)	14.21		
19	09.40		12.04 (37)	08.05			06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59		11.39 (37)	10.13		
	15.22	50	13.45 (33)	17.04			18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	51	13.21 (33)	14.21		
20	09.38		12.04 (37)	08.02			06.25	05.34	03.53	02.47	03.45	05.23	06.55	08.23	09.02		11.40 (37)	10.14		
	15.25	51	13.46 (33)	17.07			18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.08	50	13.21 (33)	14.21		
21	09.35		12.05 (37)	07.59			06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05		11.40 (37)	10.14		
	15.29	51	13.46 (33)	17.11			18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	51	13.21 (33)	14.21		
22	09.32		12.05 (37)	07.55			06.17	05.27	03.46	02.48	03.52	05.30	07.00	08.29	09.09		11.40 (37)	10.15		
	15.32	50	13.46 (33)	17.14			18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	51	13.22 (33)	14.22		
23	09.30		12.05 (37)	07.52			06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12		11.41 (37)	10.15		
	15.35	51	13.47 (33)	17.17			18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.00	50	13.22 (33)	14.22		
24	09.27		12.06 (37)	07.48			06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15		11.42 (37)	10.16		
	15.38	56	14.39 (28)	17.20			18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	48	13.22 (33)	14.23		
25	09.24		12.06 (37)	07.45			06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18		11.42 (37)	10.16		
	15.42	61	14.44 (28)	17.23			18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.29	14.55	48	13.22 (33)	14.24		
26	09.21		12.06 (37)	07.42			06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21		11.43 (37)	10.16		
	15.45	66	14.48 (28)	17.26			18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	46	13.22 (33)	14.25		
27	09.18		12.07 (37)	07.38			06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24		11.43 (37)	10.16		
	15.48	67	14.51 (28)	17.29			18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	44	13.21 (33)	14.26		
28	09.15		12.08 (37)	07.35			05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27		11.44 (37)	10.16		
	15.52	64	14.51 (28)	17.33			18.57	21.32	23.08	23.54	22.40	20.54	19.03	16.19	14.48	42	13.21 (33)	14.27		
29	09.13		12.08 (37)				06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30		11.45 (37)	10.15		
	15.55	65	14.52 (28)				20.00	21.35	23.11	23.53	22.37	20.50	19.00	16.16	14.46	40	13.21 (33)	14.29		
30	09.10		12.09 (37)				06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33		11.46 (37)	10.15		
	15.58	60	14.52 (28)				20.03	21.38	23.14	23.52	22.34	20.47	18.56	16.13	14.44	38	13.21 (33)	14.30		
31	09.07		12.10 (37)				06.45		03.20		04.20	05.57		07.57				10.14		
	16.02	55	14.52 (28)				20.06		23.17		22.30	20.43		16.10				14.32		
Potential sun hours	170			238			363	451	570	625	609	509	393	305	198			136		
Total, worst case		1172			190											1251			124	
Sun reduction		0,19			0,33											0,24			0,22	
Oper. time red.		0,99			0,99											0,99			0,99	
Wind dir. red.		0,66			0,65											0,65			0,67	
Total reduction		0,12			0,21											0,16			0,14	
Total, real		142			41											195			18	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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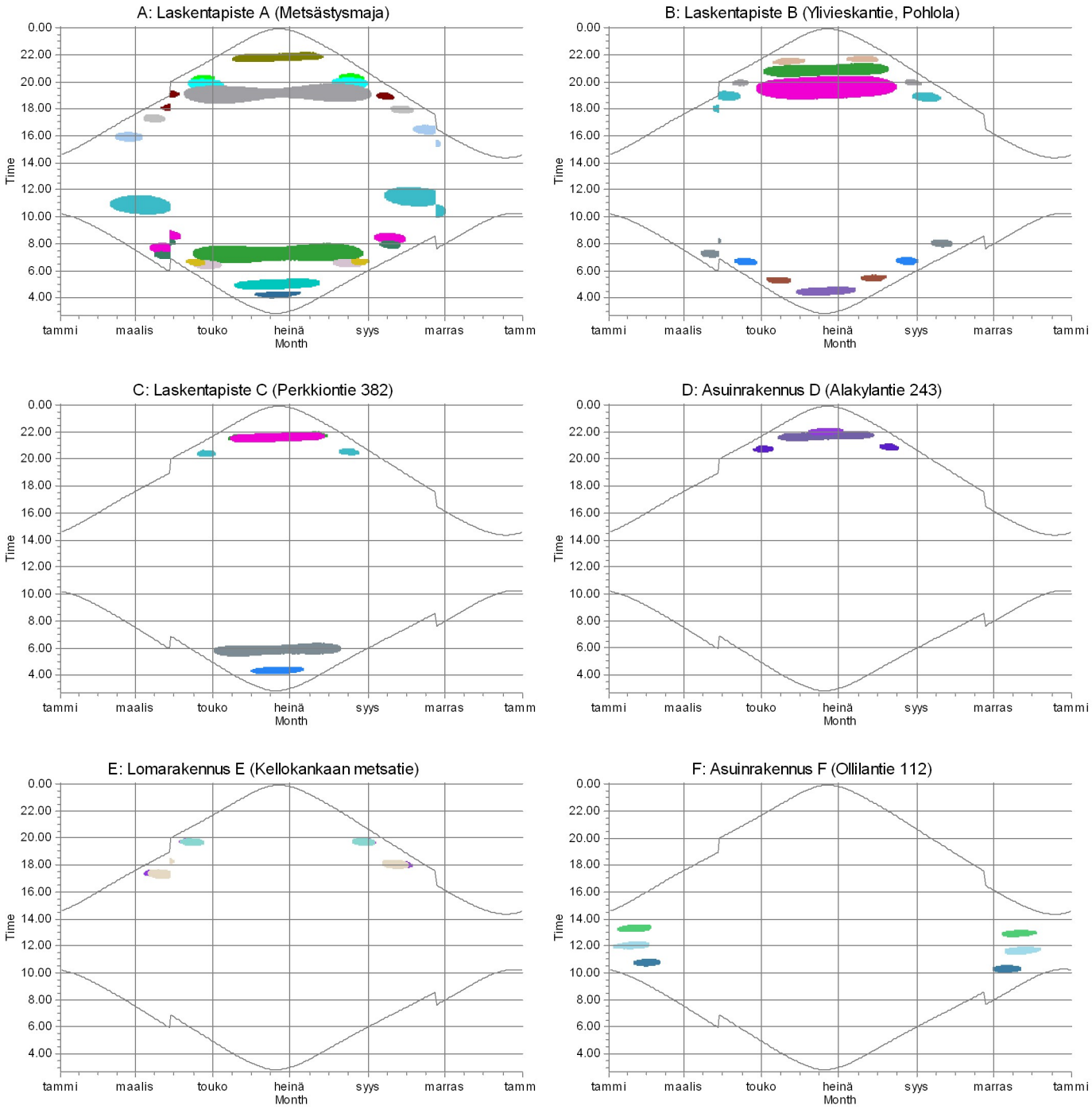
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



WTGs

8: PUU08	15: PUU15	21: PUU21	29: PUU29	38: PUU38	46: PUU46
9: PUU09	16: PUU16	22: PUU22	30: PUU30	39: PUU39	47: PUU47
10: PUU10	17: PUU17	24: PUU24	33: PUU33	40: PUU40	48: PUU48
12: PUU12	19: PUU19	25: PUU25	34: PUU34	42: PUU42	49: PUU49
13: PUU13	20: PUU20	28: PUU28	37: PUU37	44: PUU44	

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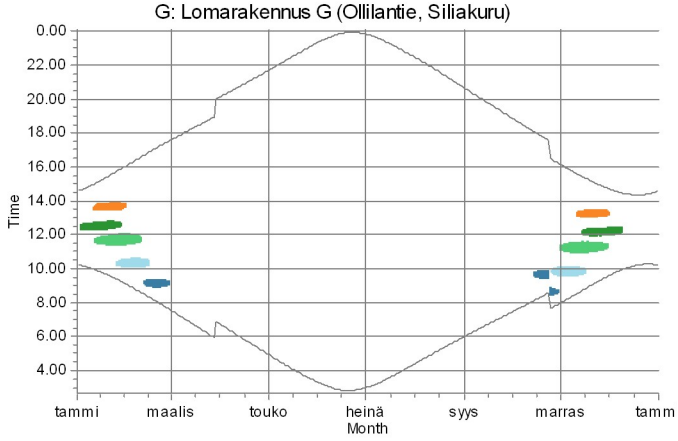
Calculated:
18.11.2020 15.30/3.4.388

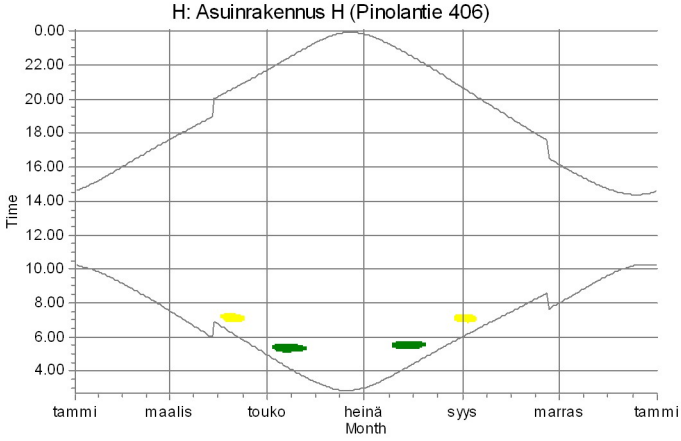
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102

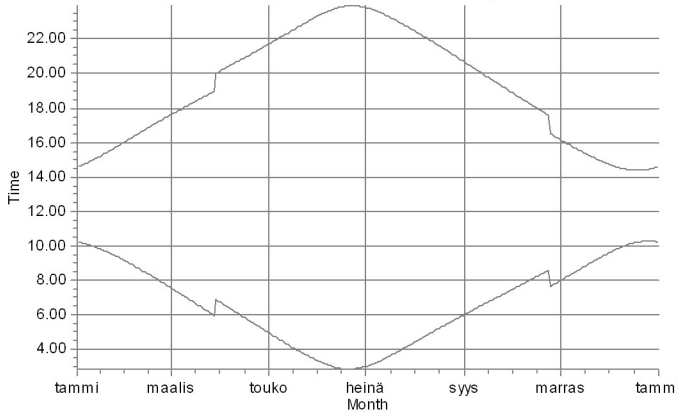
G: Lomarakennus G (Ollilantie, Siliakuru)



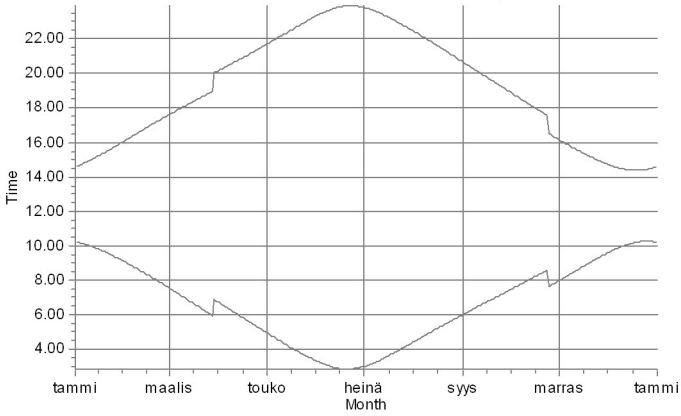
H: Asuinrakennus H (Pinolantie 406)



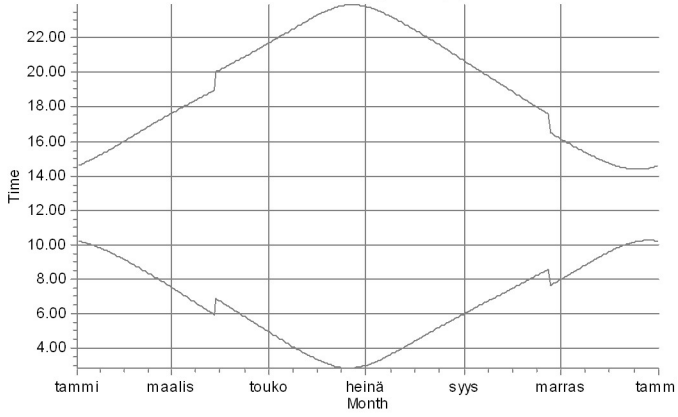
I: Asuinrakennus I (Kortenevantie 116)



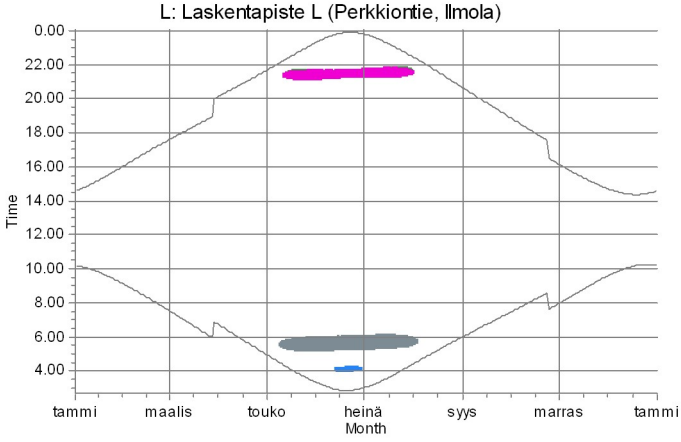
J: Asuinrakennus J (Haapavesitie 1406)



K: Lomarakennus K (Kurunoja)



L: Laskentapiste L (Perkkiontie, Ilmola)



WTGs

1: PUU01	20: PUU20	24: PUU24	28: PUU28	37: PUU37	39: PUU39	
2: PUU02	23: PUU23	27: PUU27	33: PUU33	38: PUU38		

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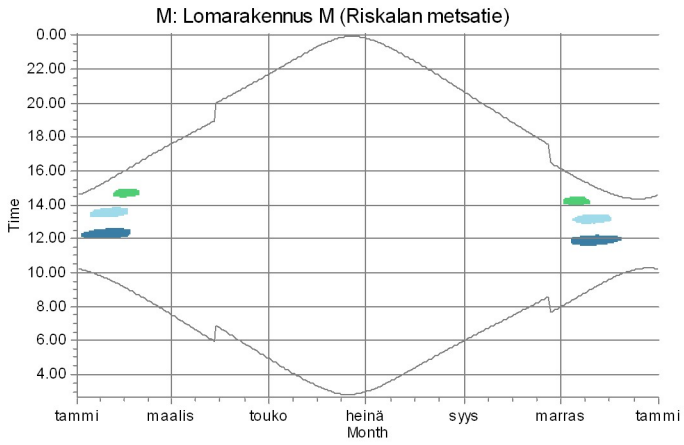
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



WTGs

28: PUU28 33: PUU33 37: PUU37

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 1 - PUU01

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24 05.21-05.42/21	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28 05.21-05.41/20	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31 05.21-05.41/20	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34 05.22-05.39/17	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43 05.23-05.26/3	03.09	03.05	04.37 05.25-05.39/14	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40 05.20-05.27/7	03.07	03.07	04.40 05.28-05.38/10	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36 05.17-05.29/12	03.05	03.10	04.44 05.31-05.37/6	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33 05.14-05.29/15	03.03	03.12	04.47 05.33-05.34/1	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 05.11-05.30/19	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26 05.11-05.31/20	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 05.11-05.31/20	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.10-05.31/21	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 05.10-05.31/21	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13 05.10-05.31/21	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10 05.10-05.31/21	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06 05.10-05.30/20	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03 05.11-05.31/20	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00 05.11-05.30/19	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57 05.12-05.30/18	02.49	03.43 05.27-05.34/7	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54 05.13-05.30/17	02.49	03.46 05.25-05.35/10	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50 05.13-05.28/15	02.49	03.50 05.25-05.37/12	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47 05.14-05.28/14	02.49	03.53 05.23-05.38/15	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44 05.15-05.27/12	02.49	03.56 05.22-05.38/16	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 05.16-05.24/8	02.50	03.59 05.22-05.40/18	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38 05.19-05.22/3	02.51	04.02 05.21-05.40/19	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05 05.21-05.41/20	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08 05.20-05.41/21	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12 05.21-05.41/20	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15 05.21-05.42/21	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18 05.20-05.41/21	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21 05.21-05.42/21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	326	0	221	109	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 2 - PUU02

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May	June	July	August		September		October	November	December
1	10.13	09.04	07.32	06.42		04.57	03.19	02.59	04.25		06.00	06.55-07.16/21	07.27	08.01	09.36
	14.35	16.06	17.36	20.09		21.42	23.20	23.50	22.27		20.40		18.53	16.07	14.43
2	10.12	09.01	07.28	06.39		04.53	03.16	03.01	04.28		06.03	06.54-07.16/22	07.30	08.04	09.39
	14.37	16.09	17.39	20.12		21.45	23.23	23.49	22.24		20.36		18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	07.08-07.14/6	04.50	03.14	03.01	04.31		06.06	06.54-07.16/22	07.33	08.07	09.41
	14.39	16.12	17.43	20.15		21.48	23.26	23.47	22.21		20.33		18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	07.04-07.15/11	04.46	03.12	03.03	04.34		06.09	06.53-07.14/21	07.35	08.10	09.44
	14.42	16.16	17.46	20.18		21.51	23.28	23.45	22.17		20.29		18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	07.01-07.17/16	04.43	03.09	03.05	04.37		06.12	06.54-07.14/20	07.38	08.14	09.47
	14.44	16.19	17.49	20.21		21.55	23.31	23.43	22.14		20.26		18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	06.58-07.17/19	04.40	03.07	03.08	04.41		06.15	06.54-07.13/19	07.41	08.17	09.49
	14.46	16.22	17.52	20.24		21.58	23.34	23.41	22.11		20.22		18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	06.57-07.18/21	04.36	03.05	03.10	04.44		06.18	06.56-07.12/16	07.44	08.20	09.52
	14.49	16.26	17.55	20.27		22.01	23.36	23.39	22.07		20.19		18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	06.56-07.17/21	04.33	03.03	03.12	04.47		06.21	06.58-07.10/12	07.47	08.23	09.54
	14.51	16.29	17.58	20.30		22.04	23.38	23.37	22.04		20.15		18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	06.56-07.18/22	04.29	03.01	03.15	04.50		06.24	07.01-07.07/6	07.50	08.27	09.56
	14.54	16.32	18.01	20.33		22.08	23.41	23.35	22.00		20.11		18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	06.55-07.17/22	04.26	02.57	03.18	04.53		06.26		07.53	08.30	09.58
	14.56	16.36	18.04	20.36		22.11	23.43	23.32	21.57		20.08		18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	06.56-07.17/21	04.23	02.56	03.20	04.56		06.29		07.56	08.33	10.01
	14.59	16.39	18.07	20.39		22.14	23.45	23.30	21.54		20.04		18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	06.56-07.16/20	04.19	02.54	03.23	05.00		06.32		07.59	08.36	10.02
	15.02	16.42	18.10	20.42		22.17	23.46	23.27	21.50		20.01		18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	06.56-07.15/19	04.16	02.53	03.26	05.03		06.35		08.02	08.40	10.04
	15.05	16.46	18.13	20.45		22.21	23.48	23.25	21.47		19.57		18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	06.57-07.14/17	04.13	02.52	03.29	05.06		06.38		08.05	08.43	10.06
	15.08	16.49	18.16	20.48		22.24	23.50	23.22	21.43		19.54		18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	06.58-07.11/13	04.10	02.51	03.32	05.09		06.41		08.08	08.46	10.08
	15.11	16.52	18.19	20.52		22.27	23.51	23.20	21.40		19.50		18.04	15.24	14.23
16	09.48	08.16	06.39	05.49	07.00-07.09/9	04.06	02.50	03.34	05.12		06.44		08.11	08.49	10.09
	15.14	16.55	18.22	20.55		22.30	23.52	23.17	21.36		19.46		18.01	15.21	14.23
17	09.45	08.13	06.36	05.46		04.03	02.50	03.37	05.15		06.47		08.14	08.53	10.10
	15.17	16.58	18.25	20.58		22.34	23.54	23.14	21.33		19.43		17.57	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00	02.49	03.40	05.18		06.49		08.17	08.56	10.12
	15.20	17.02	18.28	21.01		22.37	23.54	23.11	21.29		19.39		17.54	15.15	14.22
19	09.40	08.06	06.29	05.39		03.57	02.49	03.43	05.21		06.52		08.20	08.59	10.13
	15.23	17.05	18.31	21.04		22.40	23.55	23.08	21.26		19.36		17.51	15.12	14.22
20	09.38	08.03	06.25	05.35		03.54	02.49	03.47	05.24		06.55		08.23	09.02	10.14
	15.26	17.08	18.34	21.07		22.43	23.56	23.05	21.22		19.32		17.47	15.09	14.22
21	09.35	07.59	06.22	05.32		03.51	02.49	03.50	05.27		06.58		08.26	09.06	10.14
	15.30	17.11	18.37	21.10		22.47	23.56	23.02	21.19		19.29		17.44	15.07	14.23
22	09.33	07.56	06.18	05.28		03.47	02.49	03.53	05.30		07.01		08.29	09.09	10.15
	15.33	17.14	18.40	21.13		22.50	23.56	22.59	21.15		19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	05.25		03.44	02.50	03.56	05.33		07.04		08.32	09.12	10.15
	15.36	17.18	18.43	21.16		22.53	23.56	22.56	21.12		19.22		17.37	15.01	14.24
24	09.27	07.49	06.11	05.21		03.41	02.50	03.59	05.36		07.07		08.36	09.15	10.16
	15.39	17.21	18.46	21.19		22.56	23.56	22.53	21.08		19.18		17.34	14.59	14.24
25	09.24	07.46	06.07	05.18		03.38	02.51	04.02	05.39		07.09		07.39	09.18	10.16
	15.43	17.24	18.49	21.23		22.59	23.56	22.50	21.05		19.14		16.30	14.56	14.25
26	09.22	07.42	06.04	05.14		03.36	02.52	04.05	05.42		07.12		07.42	09.21	10.16
	15.46	17.27	18.52	21.26		23.02	23.55	22.47	21.01		19.11		16.27	14.54	14.26
27	09.19	07.39	06.00	05.11		03.33	02.53	04.09	05.45	07.02-07.11/9	07.15		07.45	09.24	10.16
	15.49	17.30	18.54	21.29		23.05	23.54	22.44	20.58		19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	05.07		03.30	02.55	04.12	05.48	06.59-07.13/14	07.18		07.48	09.27	10.16
	15.52	17.33	18.57	21.32		23.08	23.54	22.40	20.54		19.04		16.20	14.49	14.29
29	09.13		06.53	05.04		03.27	02.56	04.15	05.51	06.58-07.14/16	07.21		07.51	09.30	10.15
	15.56		20.00	21.35		23.12	23.53	22.37	20.51		19.00		16.17	14.47	14.30
30	09.10		06.50	05.00		03.24	02.58	04.18	05.54	06.57-07.15/18	07.24		07.54	09.33	10.15
	15.59		20.03	21.38		23.14	23.51	22.34	20.47		18.57		16.14	14.45	14.31
31	09.07		06.46			03.22		04.21	05.57	06.55-07.15/20			07.58		10.14
	16.02		20.06			23.17		22.31	20.43				16.10		14.33
Potential sun hours	171	238	363	451		570	624	609	509		393		305	198	137
Sum of minutes with flicker	0	0	0	237		0	0	0	77		159		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 3 - PUU03

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 4 - PUU04

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 5 - PUU05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 6 - PUU06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 7 - PUU07

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 8 - PUU08

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August	September		October	November	December
1	10.13	09.04	07.32		06.42	18.56-19.14/18	04.57	03.19	03.00	04.25	06.00		07.27	08.01	09.36
	14.36	16.06	17.36		20.09		21.41	23.20	23.50	22.27	20.40		18.53	16.07	14.43
2	10.12	09.01	07.28		06.39	18.58-19.13/15	04.53	03.17	03.00	04.28	06.03		07.30	08.04	09.38
	14.38	16.09	17.39		20.12		21.45	23.23	23.48	22.24	20.36		18.50	16.04	14.41
3	10.11	08.58	07.25		06.35	18.59-19.10/11	04.50	03.14	03.02	04.31	06.06		07.32	08.07	09.41
	14.40	16.12	17.42		20.15		21.48	23.25	23.46	22.20	20.33		18.46	16.01	14.39
4	10.09	08.54	07.21		06.32	19.03-19.07/4	04.46	03.12	03.04	04.34	06.09		07.35	08.10	09.44
	14.42	16.16	17.46		20.18		21.51	23.28	23.45	22.17	20.29		18.43	15.57	14.37
5	10.08	08.51	07.18		06.28		04.43	03.09	03.06	04.37	06.12		07.38	08.14	09.46
	14.44	16.19	17.49		20.21		21.54	23.31	23.43	22.14	20.26		18.39	15.54	14.35
6	10.07	08.48	07.14		06.25		04.40	03.07	03.08	04.41	06.15		07.41	08.17	09.49
	14.46	16.22	17.52		20.24		21.58	23.33	23.41	22.10	20.22		18.36	15.51	14.34
7	10.05	08.45	07.11		06.21		04.36	03.05	03.10	04.44	06.18		07.44	08.20	09.51
	14.49	16.26	17.55		20.27		22.01	23.36	23.39	22.07	20.18		18.32	15.48	14.32
8	10.04	08.42	07.07		06.18		04.33	03.03	03.13	04.47	06.21	18.58-19.00/2	07.47	08.23	09.54
	14.51	16.29	17.58		20.30		22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04		06.14		04.30	03.01	03.15	04.50	06.24	18.53-19.04/11	07.50	08.26	09.56
	14.54	16.32	18.01		20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00		06.10		04.26	02.58	03.18	04.53	06.26	18.50-19.05/15	07.53	08.30	09.58
	14.57	16.36	18.04		20.36		22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57		06.07		04.23	02.56	03.20	04.56	06.29	18.49-19.06/17	07.56	08.33	10.00
	14.59	16.39	18.07		20.39		22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53		06.03		04.20	02.55	03.23	05.00	06.32	18.48-19.07/19	07.59	08.36	10.02
	15.02	16.42	18.10		20.42		22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50		06.00		04.16	02.53	03.26	05.03	06.35	18.47-19.07/20	08.02	08.40	10.04
	15.05	16.45	18.13		20.45		22.20	23.48	23.25	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46		05.56		04.13	02.52	03.29	05.06	06.38	18.46-19.08/22	08.05	08.43	10.06
	15.08	16.49	18.16		20.48		22.24	23.49	23.22	21.43	19.54		18.08	15.26	14.24
15	09.50	08.19	06.43		05.53		04.10	02.51	03.32	05.09	06.41	18.45-19.07/22	08.08	08.46	10.07
	15.11	16.52	18.19		20.51		22.27	23.51	23.19	21.40	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39		05.49		04.06	02.51	03.35	05.12	06.44	18.45-19.06/21	08.11	08.49	10.09
	15.14	16.55	18.22		20.54		22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36		05.46		04.03	02.50	03.38	05.15	06.46	18.45-19.05/20	08.14	08.52	10.10
	15.17	16.58	18.25		20.58		22.33	23.53	23.14	21.33	19.43		17.57	15.18	14.23
18	09.43	08.09	06.32		05.42		04.00	02.49	03.41	05.18	06.49	18.46-19.02/16	08.17	08.56	10.11
	15.20	17.02	18.28		21.01		22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22
19	09.40	08.06	06.29		05.39		03.57	02.49	03.44	05.21	06.52	18.46-18.58/12	08.20	08.59	10.12
	15.23	17.05	18.31		21.04		22.40	23.55	23.08	21.26	19.36		17.50	15.12	14.22
20	09.38	08.02	06.25		05.35		03.54	02.49	03.47	05.24	06.55	18.46-18.54/8	08.23	09.02	10.13
	15.26	17.08	18.34		21.07		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.23
21	09.35	07.59	06.21		05.32		03.51	02.49	03.50	05.27	06.58	18.48-18.50/2	08.26	09.05	10.14
	15.30	17.11	18.37		21.10		22.46	23.56	23.02	21.19	19.29		17.44	15.07	14.23
22	09.32	07.56	06.18	18.04-18.05/1	05.28		03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
	15.33	17.14	18.40		21.13		22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	18.01-18.07/6	05.25		03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
	15.36	17.18	18.43		21.16		22.53	23.56	22.56	21.12	19.21		17.37	15.01	14.24
24	09.27	07.49	06.11	17.59-18.10/11	05.21		03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
	15.39	17.21	18.45		21.19		22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24
25	09.24	07.45	06.07	17.58-18.13/15	05.18		03.39	02.51	04.02	05.39	07.09		07.38	09.18	10.16
	15.43	17.24	18.48		21.22		22.59	23.55	22.50	21.05	19.14		16.30	14.56	14.25
26	09.21	07.42	06.04	17.57-18.16/19	05.14		03.36	02.52	04.05	05.42	07.12		07.42	09.21	10.16
	15.46	17.27	18.51		21.26		23.02	23.55	22.46	21.01	19.11		16.27	14.54	14.26
27	09.18	07.39	06.00	17.56-18.18/22	05.11		03.33	02.53	04.09	05.45	07.15		07.45	09.24	10.16
	15.49	17.30	18.54		21.29		23.05	23.54	22.43	20.57	19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	17.55-18.17/22	05.07		03.30	02.55	04.12	05.48	07.18		07.48	09.27	10.15
	15.53	17.33	18.57		21.32		23.08	23.53	22.40	20.54	19.04		16.20	14.49	14.29
29	09.13		06.53	18.56-19.17/21	05.04		03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35		23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.10		06.50	18.55-19.16/21	05.00		03.24	02.58	04.18	05.54	07.24		07.54	09.33	10.14
	15.59		20.03		21.38		23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.32
31	09.07		06.46	18.56-19.16/20			03.22		04.21	05.57			07.57		10.14
	16.02		20.06				23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363		451		570	624	609	508	393		305	198	137
Sum of minutes with flicker	0	0	158		48		0	0	0	0	207		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 9 - PUU09

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 20.06-20.20/14	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 20.08-20.18/10	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.18	04.53 20.18-20.23/5	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 20.15-20.27/12	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.55	03.23	04.59 20.13-20.29/16	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03 20.12-20.30/18	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06 20.10-20.30/20	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 20.11-20.13/2	04.10	02.51	03.32	05.09 20.09-20.31/22	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 20.09-20.16/7	04.06	02.50	03.34	05.12 20.09-20.32/23	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 20.06-20.18/12	04.03	02.50	03.37	05.15 20.07-20.31/24	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42 20.05-20.21/16	04.00	02.49	03.40	05.18 20.07-20.32/25	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39 20.04-20.25/21	03.57	02.49	03.43	05.21 20.07-20.32/25	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35 20.02-20.25/23	03.54	02.49	03.47	05.24 20.07-20.32/25	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 20.02-20.26/24	03.51	02.49	03.50	05.27 20.06-20.31/25	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 20.02-20.26/24	03.47	02.49	03.53	05.30 20.06-20.30/24	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 20.01-20.26/25	03.44	02.50	03.56	05.33 20.07-20.30/23	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 20.01-20.25/24	03.41	02.50	03.59	05.36 20.08-20.28/20	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 20.01-20.25/24	03.38	02.51	04.02	05.39 20.08-20.24/16	07.09	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 20.01-20.25/24	03.36	02.52	04.05	05.42 20.09-20.21/12	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.11 20.01-20.24/23	03.33	02.53	04.09	05.45 20.11-20.18/7	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 20.02-20.24/22	03.30	02.55	04.12	05.48 20.14-20.15/1	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 20.03-20.23/20	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 20.04-20.22/18	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 10 - PUU10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57		03.19	21.31-21.58/27	02.59	21.37-22.03/26	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41		23.20		23.50		22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53		03.16	21.30-21.58/28	03.01	21.37-22.03/26	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45		23.23		23.48		22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50		03.14	21.31-21.59/28	03.01	21.38-22.04/26	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48		23.26		23.47		22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46		03.11	21.31-21.58/27	03.03	21.37-22.04/27	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51		23.28		23.45		22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43		03.09	21.31-21.59/28	03.05	21.37-22.04/27	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54		23.31		23.43		22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39		03.07	21.31-21.58/27	03.08	21.38-22.05/27	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58		23.33		23.41		22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36		03.05	21.31-21.59/28	03.10	21.38-22.05/27	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01		23.36		23.39		22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33		03.03	21.32-21.59/27	03.12	21.38-22.05/27	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04		23.38		23.37		22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29		03.01	21.32-21.59/27	03.15	21.38-22.05/27	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07		23.40		23.35		22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26		02.57	21.32-21.59/27	03.17	21.38-22.06/28	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11		23.42		23.32		21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23		02.56	21.32-21.59/27	03.20	21.39-22.06/27	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44		23.30		21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19		02.54	21.32-21.59/27	03.23	21.39-22.06/27	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46		23.27		21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16		02.53	21.33-22.00/27	03.26	21.39-22.06/27	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20		23.48		23.25		21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13		02.52	21.33-21.59/26	03.28	21.39-22.06/27	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24		23.50		23.22		21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10		02.51	21.34-22.00/26	03.31	21.39-22.06/27	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51		23.19		21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06		02.50	21.34-21.59/25	03.34	21.40-22.06/26	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30		23.52		23.17		21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.46	04.03	21.38-21.42/4	02.50	21.34-22.00/26	03.37	21.40-22.06/26	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.33		23.53		23.14		21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	21.36-21.44/8	02.49	21.34-22.00/26	03.40	21.40-22.05/25	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37		23.54		23.11		21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	21.35-21.47/12	02.49	21.35-22.00/25	03.43	21.41-22.06/25	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40		23.55		23.08		21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	21.33-21.49/16	02.49	21.35-22.01/26	03.46	21.41-22.05/24	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43		23.55		23.05		21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	21.33-21.51/18	02.49	21.35-22.01/26	03.50	21.41-22.04/23	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46		23.56		23.02		21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	21.33-21.54/21	02.49	21.35-22.01/26	03.53	21.43-22.03/20	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50		23.56		22.59		21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	21.31-21.54/23	02.50	21.36-22.02/26	03.56	21.43-22.00/17	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53		23.56		22.56		21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	21.31-21.55/24	02.50	21.36-22.01/25	03.59	21.45-21.58/13	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56		23.56		22.53		21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	21.31-21.56/25	02.51	21.36-22.02/26	04.02	21.45-21.55/10	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59		23.56		22.50		21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	21.31-21.56/25	02.52	21.36-22.02/26	04.05	21.47-21.53/6	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02		23.55		22.47		21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.10	03.33	21.31-21.57/26	02.53	21.36-22.02/26	04.08	21.49-21.50/1	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	21.31-21.57/26	02.54	21.36-22.03/27	04.12		05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53		22.40		20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	21.30-21.57/27	02.56	21.37-22.03/26	04.15		05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11		23.52		22.37		20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	21.30-21.57/27	02.58	21.37-22.03/26	04.18		05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51		22.34		20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21	21.30-21.57/27			04.21		05.57		07.57		10.14
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	309		795		619		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 11 - PUU11

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 12 - PUU12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27 17.44-18.09/25	08.01	09.36
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29 17.44-18.08/24	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32 17.45-18.06/21	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35 17.46-18.03/17	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38 17.48-18.00/12	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41 17.51-17.56/5	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07 17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04 17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00 17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57 17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53 17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50 17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46 17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43 17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39 17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36 17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32 17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29 17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52 17.59-18.04/5	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25 17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55 17.54-18.07/13	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21 17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58 17.51-18.09/18	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18 17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01 17.49-18.10/21	08.29	09.08	10.15
	15.33	17.14	18.40	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14 17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04 17.48-18.11/23	08.32	09.12	10.15
	15.36	17.18	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11 17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06 17.47-18.11/24	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09 17.46-18.12/26	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12 17.45-18.12/27	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15 17.44-18.11/27	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18 17.43-18.11/28	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21 17.43-18.10/27	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24 17.43-18.10/27	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 13 - PUU13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 19.33-20.05/32	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 19.34-20.05/31	03.16	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50 19.35-20.04/29	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46 19.35-20.03/28	03.12	03.03	04.34 19.54-20.03/9	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43 19.37-20.01/24	03.09	03.05	04.37 19.51-20.06/15	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40 19.38-20.00/22	03.07	03.08	04.40 19.49-20.08/19	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 19.40-19.58/18	03.05	03.10	04.44 19.47-20.09/22	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33 19.42-19.55/13	03.03	03.12	04.47 19.45-20.11/26	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 19.47-19.50/3	03.01	03.15	04.50 19.44-20.12/28	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53 19.42-20.12/30	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 19.42-20.13/31	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03 19.47-19.58/11	04.19	02.55	03.23	04.59 19.41-20.14/33	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00 19.44-20.02/18	04.16	02.53	03.26	05.03 19.40-20.14/34	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56 19.40-20.03/23	04.13	02.52	03.29	05.06 19.39-20.14/35	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 19.39-20.05/26	04.10	02.51	03.32	05.09 19.39-20.14/35	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 19.38-20.06/28	04.06	02.50	03.34	05.12 19.39-20.15/36	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 19.36-20.06/30	04.03	02.50	03.37	05.15 19.37-20.14/37	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42 19.35-20.07/32	04.00	02.49	03.40	05.18 19.37-20.14/37	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38 19.34-20.08/34	03.57	02.49	03.43	05.21 19.37-20.14/37	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 19.33-20.08/35	03.54	02.49	03.47	05.24 19.37-20.14/37	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 19.32-20.08/36	03.51	02.49	03.50	05.27 19.37-20.13/36	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 19.32-20.09/37	03.47	02.49	03.53	05.30 19.37-20.13/36	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 19.32-20.09/37	03.44	02.50	03.56	05.33 19.38-20.12/34	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 19.31-20.08/37	03.41	02.50	03.59	05.36 19.38-20.12/34	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 19.31-20.08/37	03.38	02.51	04.02	05.39 19.38-20.10/32	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 19.31-20.08/37	03.36	02.52	04.05	05.42 19.39-20.09/30	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10 19.31-20.07/36	03.33	02.53	04.09	05.45 19.40-20.08/28	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 19.32-20.07/35	03.30	02.55	04.12	05.48 19.41-20.07/26	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 19.32-20.07/35	03.27	02.56	04.15	05.51 19.41-20.04/23	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 19.32-20.06/34	03.24	02.58	04.18	05.54 19.44-20.01/17	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57 19.47-19.58/11		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 14 - PUU14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 15 - PUU15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April	May	June	July	August	September	October		November	December
1	10.12	09.04		07.32	15.40-16.09/29	06.42	04.57	03.19	03.00	04.25	06.00	07.27		08.01	09.35
	14.36	16.06		17.36		20.09	21.41	23.20	23.49	22.27	20.40	18.53		16.07	14.43
2	10.12	09.01		07.28	15.40-16.08/28	06.39	04.53	03.17	03.00	04.28	06.03	07.29		08.04	09.38
	14.38	16.09		17.39		20.12	21.45	23.22	23.48	22.24	20.36	18.50		16.04	14.41
3	10.10	08.57		07.25	15.41-16.06/25	06.35	04.50	03.14	03.02	04.31	06.06	07.32		08.07	09.41
	14.40	16.12		17.42		20.15	21.48	23.25	23.46	22.20	20.33	18.46		16.00	14.39
4	10.09	08.54		07.21	15.43-16.05/22	06.32	04.46	03.12	03.04	04.34	06.09	07.35		08.10	09.44
	14.42	16.16		17.45		20.18	21.51	23.28	23.44	22.17	20.29	18.43		15.57	14.37
5	10.08	08.51		07.18	15.44-16.03/19	06.28	04.43	03.09	03.06	04.37	06.12	07.38		08.13	09.46
	14.44	16.19		17.49		20.21	21.54	23.30	23.43	22.14	20.25	18.39		15.54	14.35
6	10.06	08.48		07.14	15.47-15.59/12	06.25	04.40	03.07	03.08	04.41	06.15	07.41		08.17	09.49
	14.46	16.22		17.52		20.24	21.57	23.33	23.41	22.10	20.22	18.35		15.51	14.34
7	10.05	08.45		07.11		06.21	04.36	03.05	03.10	04.44	06.18	07.44	16.25-16.33/8	08.20	09.51
	14.49	16.26		17.55		20.27	22.01	23.35	23.39	22.07	20.18	18.32		15.48	14.32
8	10.03	08.42		07.07		06.17	04.33	03.03	03.13	04.47	06.21	07.47	16.21-16.37/16	08.23	09.54
	14.51	16.29		17.58		20.30	22.04	23.38	23.36	22.03	20.15	18.28		15.45	14.31
9	10.02	08.39		07.04		06.14	04.29	03.01	03.15	04.50	06.23	07.50	16.18-16.39/21	08.26	09.56
	14.54	16.32		18.01		20.33	22.07	23.40	23.34	22.00	20.11	18.25		15.42	14.29
10	10.00	08.35		07.00		06.10	04.26	02.58	03.18	04.53	06.26	07.53	16.16-16.40/24	08.30	09.58
	14.57	16.36		18.04		20.36	22.10	23.42	23.32	21.57	20.08	18.22		15.38	14.28
11	09.58	08.32		06.57		06.07	04.23	02.56	03.20	04.56	06.29	07.56	16.15-16.41/26	08.33	10.00
	14.59	16.39		18.07		20.39	22.14	23.44	23.29	21.53	20.04	18.18		15.35	14.27
12	09.56	08.29		06.53		06.03	04.20	02.55	03.23	05.00	06.32	07.59	16.13-16.42/29	08.36	10.02
	15.02	16.42		18.10		20.42	22.17	23.46	23.27	21.50	20.01	18.15		15.32	14.26
13	09.54	08.26		06.50		06.00	04.16	02.54	03.26	05.03	06.35	08.02	16.12-16.42/30	08.39	10.04
	15.05	16.45		18.13		20.45	22.20	23.48	23.24	21.46	19.57	18.11		15.29	14.25
14	09.52	08.22	15.49-16.01/12	06.46		05.56	04.13	02.52	03.29	05.06	06.38	08.05	16.12-16.43/31	08.43	10.05
	15.08	16.49		18.16		20.48	22.23	23.49	23.22	21.43	19.53	18.08		15.26	14.24
15	09.49	08.19	15.46-16.04/18	06.43		05.53	04.10	02.51	03.32	05.09	06.41	08.08	16.11-16.43/32	08.46	10.07
	15.11	16.52		18.19		20.51	22.27	23.50	23.19	21.39	19.50	18.04		15.24	14.24
16	09.47	08.16	15.45-16.07/22	06.39		05.49	04.06	02.51	03.35	05.12	06.44	08.11	16.10-16.43/33	08.49	10.09
	15.14	16.55		18.22		20.54	22.30	23.52	23.16	21.36	19.46	18.01		15.21	14.23
17	09.45	08.12	15.43-16.08/25	06.36		05.46	04.03	02.50	03.38	05.15	06.46	08.14	16.10-16.42/32	08.52	10.10
	15.17	16.58		18.25		20.57	22.33	23.53	23.13	21.32	19.43	17.57		15.18	14.23
18	09.42	08.09	15.42-16.08/26	06.32		05.42	04.00	02.50	03.41	05.18	06.49	08.17	16.10-16.43/33	08.56	10.11
	15.20	17.02		18.28		21.00	22.36	23.54	23.11	21.29	19.39	17.54		15.15	14.23
19	09.40	08.06	15.41-16.10/29	06.28		05.39	03.57	02.49	03.44	05.21	06.52	08.20	16.10-16.42/32	08.59	10.12
	15.23	17.05		18.31		21.04	22.40	23.54	23.08	21.25	19.36	17.50		15.12	14.22
20	09.37	08.02	15.40-16.10/30	06.25		05.35	03.54	02.49	03.47	05.24	06.55	08.23	16.10-16.41/31	09.02	10.13
	15.26	17.08		18.34		21.07	22.43	23.55	23.05	21.22	19.32	17.47		15.09	14.23
21	09.35	07.59	15.39-16.11/32	06.21		05.32	03.51	02.49	03.50	05.27	06.58	08.26	16.10-16.41/31	09.05	10.14
	15.30	17.11		18.37		21.10	22.46	23.55	23.02	21.18	19.29	17.44		15.07	14.23
22	09.32	07.56	15.39-16.11/32	06.18		05.28	03.48	02.50	03.53	05.30	07.01	08.29	16.10-16.40/30	09.08	10.14
	15.33	17.14		18.39		21.13	22.49	23.56	22.59	21.15	19.25	17.40		15.04	14.23
23	09.29	07.52	15.39-16.11/32	06.14		05.24	03.45	02.50	03.56	05.33	07.04	08.32	16.12-16.40/28	09.11	10.15
	15.36	17.18		18.42		21.16	22.52	23.56	22.56	21.11	19.21	17.37		15.01	14.24
24	09.27	07.49	15.38-16.11/33	06.11		05.21	03.42	02.51	03.59	05.36	07.06	08.35	16.12-16.38/26	09.15	10.15
	15.39	17.21		18.45		21.19	22.56	23.55	22.53	21.08	19.18	17.33		14.59	14.24
25	09.24	07.45	15.38-16.11/33	06.07		05.17	03.39	02.51	04.02	05.39	07.09	07.38	15.13-15.37/24	09.18	10.15
	15.43	17.24		18.48		21.22	22.59	23.55	22.49	21.04	19.14	16.30		14.56	14.25
26	09.21	07.42	15.39-16.11/32	06.04		05.14	03.36	02.52	04.05	05.42	07.12	07.41	15.14-15.35/21	09.21	10.15
	15.46	17.27		18.51		21.25	23.02	23.54	22.46	21.01	19.11	16.27		14.54	14.26
27	09.18	07.38	15.38-16.10/32	06.00		05.11	03.33	02.54	04.09	05.45	07.15	07.45	15.16-15.33/17	09.24	10.15
	15.49	17.30		18.54		21.29	23.05	23.54	22.43	20.57	19.07	16.23		14.52	14.27
28	09.15	07.35	15.38-16.09/31	05.57		05.07	03.30	02.55	04.12	05.48	07.18	07.48	15.19-15.30/11	09.27	10.15
	15.52	17.33		18.57		21.32	23.08	23.53	22.40	20.54	19.04	16.20		14.49	14.29
29	09.12			06.53		05.04	03.27	02.56	04.15	05.51	07.21	07.51		09.30	10.15
	15.56			20.00		21.35	23.11	23.52	22.37	20.50	19.00	16.17		14.47	14.30
30	09.10			06.49		05.00	03.24	02.58	04.18	05.54	07.24	07.54		09.33	10.14
	15.59			20.03		21.38	23.14	23.51	22.33	20.47	18.57	16.14		14.45	14.32
31	09.07			06.46			03.22		04.21	05.57		07.57			10.13
	16.02			20.06			23.17		22.30	20.43		16.10			14.33
Potential sun hours	171	238		363		451	570	624	608	508	393	305		198	137
Sum of minutes with flicker	0	419		135		0	0	0	0	0	0	566		0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	
1	10.13	09.04	07.32	06.42		04.57	18.27-19.39/72	03.19	18.40-19.31/51
	14.35	16.06	17.36	20.09		21.41		23.20	
2	10.12	09.01	07.28	06.39		04.53	18.27-19.39/72	03.16	18.40-19.30/50
	14.37	16.09	17.39	20.12		21.45		23.23	
3	10.11	08.57	07.25	06.35		04.50	18.27-19.39/72	03.14	18.42-19.30/48
	14.39	16.12	17.42	20.15		21.48		23.25	
4	10.09	08.54	07.21	06.32		04.46	18.27-19.39/72	03.12	18.42-19.29/47
	14.42	16.16	17.45	20.18		21.51		23.28	
5	10.08	08.51	07.18	06.28		04.43	18.27-19.39/72	03.09	18.43-19.29/46
	14.44	16.19	17.48	20.21		21.54		23.31	
6	10.07	08.48	07.14	06.25		04.39	18.26-19.39/73	03.07	18.43-19.28/45
	14.46	16.22	17.52	20.24		21.57		23.33	
7	10.05	08.45	07.11	06.21		04.36	18.26-19.39/73	03.05	18.45-19.28/43
	14.49	16.26	17.55	20.27		22.01		23.36	
8	10.03	08.42	07.07	06.17		04.33	18.26-19.38/72	03.03	18.45-19.28/43
	14.51	16.29	17.58	20.30		22.04		23.38	
9	10.02	08.39	07.04	06.14	19.50-19.56/6	04.29	18.26-19.38/72	03.01	18.46-19.28/42
	14.54	16.32	18.01	20.33	19.02-19.11/9	22.07		23.40	
10	10.00	08.35	07.00	06.10	19.49-19.59/10	04.26	18.26-19.38/72	02.58	18.47-19.27/40
	14.56	16.36	18.04	20.36	18.56-19.18/22	22.10		23.42	
11	09.58	08.32	06.57	06.07	19.47-20.01/14	04.23	18.26-19.37/71	02.56	18.48-19.27/39
	14.59	16.39	18.07	20.39	18.52-19.22/30	22.14		23.44	
12	09.56	08.29	06.53	06.03	19.47-20.04/17	04.19	18.27-19.38/71	02.55	18.48-19.27/39
	15.02	16.42	18.10	20.42	18.48-19.24/36	22.17		23.46	
13	09.54	08.26	06.50	06.00	19.47-20.07/20	04.16	18.27-19.37/70	02.53	18.50-19.27/37
	15.05	16.45	18.13	20.45	18.46-19.27/41	22.20		23.48	
14	09.52	08.22	06.46	05.56	19.46-20.06/20	04.13	18.27-19.36/69	02.52	18.50-19.26/36
	15.08	16.49	18.16	20.48	18.43-19.28/45	22.24		23.49	
15	09.49	08.19	06.43	05.53	19.46-20.06/20	04.10	18.28-19.37/69	02.51	18.51-19.27/36
	15.11	16.52	18.19	20.51	18.42-19.30/48	22.27		23.51	
16	09.47	08.16	06.39	05.49	19.47-20.05/18	04.06	18.28-19.36/68	02.50	18.51-19.26/35
	15.14	16.55	18.22	20.54	18.40-19.31/51	22.30		23.52	
17	09.45	08.12	06.36	05.46	19.46-20.04/18	04.03	18.29-19.36/67	02.50	18.51-19.26/35
	15.17	16.58	18.25	20.57	18.38-19.32/54	22.33		23.53	
18	09.42	08.09	06.32	05.42	19.47-20.03/16	04.00	18.29-19.35/66	02.49	18.52-19.27/35
	15.20	17.02	18.28	21.00	18.37-19.33/56	22.37		23.54	
19	09.40	08.06	06.28	05.38	19.49-20.01/12	03.57	18.30-19.36/66	02.49	18.52-19.27/35
	15.23	17.05	18.31	21.04	18.36-19.34/58	22.40		23.55	
20	09.37	08.02	06.25	05.35	19.51-19.58/7	03.54	18.30-19.35/65	02.49	18.53-19.27/34
	15.26	17.08	18.34	21.07	18.34-19.34/60	22.43		23.55	
21	09.35	07.59	06.21	05.31	18.33-19.35/62	03.51	18.31-19.35/64	02.49	18.53-19.27/34
	15.29	17.11	18.36	21.10		22.46		23.56	
22	09.32	07.56	06.18	05.28	18.32-19.36/64	03.47	18.32-19.35/63	02.49	18.53-19.27/34
	15.33	17.14	18.39	21.13		22.49		23.56	
23	09.29	07.52	06.14	05.24	18.32-19.37/65	03.44	18.32-19.33/61	02.50	18.54-19.28/34
	15.36	17.17	18.42	21.16		22.53		23.56	
24	09.27	07.49	06.11	05.21	18.30-19.37/67	03.41	18.33-19.33/60	02.50	18.53-19.28/35
	15.39	17.21	18.45	21.19		22.56		23.56	
25	09.24	07.45	06.07	05.17	18.29-19.37/68	03.38	18.34-19.33/59	02.51	18.54-19.28/34
	15.42	17.24	18.48	21.22		22.59		23.55	
26	09.21	07.42	06.04	05.14	18.29-19.38/69	03.36	18.35-19.33/58	02.52	18.53-19.28/35
	15.46	17.27	18.51	21.25		23.02		23.55	
27	09.18	07.38	06.00	05.10	18.29-19.38/69	03.33	18.36-19.32/56	02.53	18.53-19.29/36
	15.49	17.30	18.54	21.29		23.05		23.54	
28	09.15	07.35	05.57	05.07	18.28-19.38/70	03.30	18.36-19.32/56	02.55	18.53-19.30/37
	15.52	17.33	18.57	21.32		23.08		23.53	
29	09.13		06.53	05.04	18.28-19.39/71	03.27	18.37-19.32/55	02.56	18.53-19.30/37
	15.56		20.00	21.35		23.11		23.52	
30	09.10		06.49	05.00	18.27-19.39/72	03.24	18.38-19.31/53	02.58	18.53-19.31/38
	15.59		20.03	21.38		23.14		23.51	
31	09.07		06.46			03.22	18.38-19.30/52		
	16.02		20.06			23.17			
Potential sun hours	171	238	363	451		570		624	
Sum of minutes with flicker	0	0	0	1365		2041		1170	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	18.52-19.31/39	04.25	18.37-19.48/71	06.00	19.47-20.01/14	07.27	08.01	09.36
	23.49		22.27		20.40	18.51-19.21/30	18.53	16.07	14.43
2	03.01	18.52-19.32/40	04.28	18.37-19.48/71	06.03	19.47-19.57/10	07.29	08.04	09.38
	23.48		22.24		20.36	18.54-19.16/22	18.50	16.04	14.41
3	03.01	18.52-19.33/41	04.31	18.36-19.48/72	06.06	19.48-19.54/6	07.32	08.07	09.41
	23.46		22.20		20.33	19.00-19.09/9	18.46	16.00	14.39
4	03.03	18.51-19.33/42	04.34	18.36-19.48/72	06.09	19.50-19.51/1	07.35	08.10	09.44
	23.45		22.17		20.29		18.42	15.57	14.37
5	03.05	18.50-19.33/43	04.37	18.36-19.48/72	06.12		07.38	08.13	09.46
	23.43		22.14		20.25		18.39	15.54	14.35
6	03.08	18.50-19.35/45	04.40	18.36-19.49/73	06.15		07.41	08.17	09.49
	23.41		22.10		20.22		18.35	15.51	14.33
7	03.10	18.50-19.36/46	04.44	18.35-19.48/73	06.18		07.44	08.20	09.51
	23.39		22.07		20.18		18.32	15.48	14.32
8	03.12	18.49-19.36/47	04.47	18.36-19.48/72	06.20		07.47	08.23	09.54
	23.37		22.04		20.15		18.28	15.45	14.30
9	03.15	18.49-19.37/48	04.50	18.36-19.48/72	06.23		07.50	08.26	09.56
	23.34		22.00		20.11		18.25	15.41	14.29
10	03.18	18.49-19.37/48	04.53	18.35-19.47/72	06.26		07.53	08.30	09.58
	23.32		21.57		20.08		18.21	15.38	14.28
11	03.20	18.48-19.38/50	04.56	18.35-19.47/72	06.29		07.56	08.33	10.00
	23.30		21.53		20.04		18.18	15.35	14.27
12	03.23	18.48-19.39/51	04.59	18.35-19.47/72	06.32		07.59	08.36	10.02
	23.27		21.50		20.01		18.14	15.32	14.26
13	03.26	18.47-19.40/53	05.03	18.36-19.47/71	06.35		08.02	08.39	10.04
	23.24		21.46		19.57		18.11	15.29	14.25
14	03.29	18.46-19.40/54	05.06	18.35-19.46/71	06.38		08.05	08.43	10.06
	23.22		21.43		19.53		18.08	15.26	14.24
15	03.32	18.46-19.41/55	05.09	18.35-19.46/71	06.41		08.08	08.46	10.07
	23.19		21.39		19.50		18.04	15.23	14.23
16	03.34	18.45-19.41/56	05.12	18.36-19.45/69	06.43		08.11	08.49	10.09
	23.16		21.36		19.46		18.01	15.21	14.23
17	03.37	18.44-19.42/58	05.15	18.35-19.44/69	06.46		08.14	08.52	10.10
	23.14		21.32		19.43		17.57	15.18	14.23
18	03.40	18.44-19.42/58	05.18	18.36-19.43/67	06.49		08.17	08.56	10.11
	23.11		21.29		19.39		17.54	15.15	14.22
19	03.43	18.44-19.43/59	05.21	18.37-19.43/66	06.52		08.20	08.59	10.12
	23.08		21.26		19.36		17.50	15.12	14.22
20	03.47	18.43-19.43/60	05.24	18.37-19.42/65	06.55		08.23	09.02	10.13
	23.05		21.22		19.32		17.47	15.09	14.22
21	03.50	18.42-19.44/62	05.27	18.37-19.41/64	06.58		08.26	09.05	10.14
	23.02		21.19		19.28		17.44	15.07	14.23
22	03.53	18.42-19.45/63	05.30	18.38-19.40/62	07.01		08.29	09.08	10.15
	22.59		21.15		19.25		17.40	15.04	14.23
23	03.56	18.41-19.45/64	05.33	19.55-20.03/8	07.04		08.32	09.12	10.15
	22.56		21.11	18.39-19.39/60	19.21		17.37	15.01	14.24
24	03.59	18.41-19.46/65	05.36	19.52-20.05/13	07.06		08.35	09.15	10.15
	22.53		21.08	18.40-19.38/58	19.18		17.33	14.59	14.24
25	04.02	18.40-19.46/66	05.39	19.50-20.05/15	07.09		07.38	09.18	10.16
	22.50		21.04	18.40-19.36/56	19.14		16.30	14.56	14.25
26	04.05	18.40-19.47/67	05.42	19.49-20.06/17	07.12		07.41	09.21	10.16
	22.46		21.01	18.41-19.34/53	19.11		16.27	14.54	14.26
27	04.09	18.39-19.46/67	05.45	19.48-20.07/19	07.15		07.45	09.24	10.15
	22.43		20.57	18.42-19.33/51	19.07		16.23	14.51	14.27
28	04.12	18.39-19.47/68	05.48	19.48-20.07/19	07.18		07.48	09.27	10.15
	22.40		20.54	18.44-19.31/47	19.04		16.20	14.49	14.29
29	04.15	18.38-19.47/69	05.51	19.47-20.06/19	07.21		07.51	09.30	10.15
	22.37		20.50	18.44-19.28/44	19.00		16.17	14.47	14.30
30	04.18	18.38-19.48/70	05.54	19.47-20.06/19	07.24		07.54	09.33	10.14
	22.34		20.47	18.46-19.26/40	18.57		16.13	14.45	14.31
31	04.21	18.38-19.48/70	05.57	19.47-20.04/17			07.57		10.14
	22.30		20.43	18.48-19.24/36			16.10		14.33
Potential sun hours	609		509		393		305	198	137
Sum of minutes with flicker	1724		2130		92		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 17 - PUU17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.19 21.26-21.38/12	02.59	04.24 21.34-21.37/3	06.00	07.26	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16 21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40
3	10.11	08.57	07.25	06.35	04.50	03.14 21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11 21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12 21.38-21.40/2	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15 21.36-21.43/7	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17 21.35-21.44/9	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 21.24-21.25/1	02.56	03.20 21.34-21.46/12	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 21.24-21.28/4	02.54	03.23 21.33-21.46/13	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 21.22-21.31/9	02.53	03.26 21.32-21.46/14	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.21-21.33/12	02.52	03.28 21.32-21.48/16	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09 21.21-21.36/15	02.51	03.31 21.32-21.49/17	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.20-21.38/18	02.50	03.34 21.31-21.49/18	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.20-21.40/20	02.49	03.37 21.31-21.49/18	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.20-21.41/21	02.49	03.40 21.30-21.50/20	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57 21.19-21.40/21	02.49	03.43 21.31-21.51/20	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 21.20-21.41/21	02.49	03.46 21.30-21.51/21	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.20-21.41/21	02.49	03.49 21.30-21.51/21	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47 21.19-21.41/22	02.49	03.53 21.30-21.51/21	05.30	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44 21.20-21.41/21	02.49	03.56 21.30-21.51/21	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 21.20-21.41/21	02.50	03.59 21.30-21.51/21	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.21-21.41/20	02.51	04.02 21.30-21.51/21	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35 21.21-21.41/20	02.52	04.05 21.30-21.51/21	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32 21.22-21.40/18	02.53	04.08 21.31-21.50/19	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30 21.23-21.40/17	02.54	04.12 21.31-21.48/17	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27 21.23-21.39/16	02.56	04.15 21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24 21.24-21.39/15	02.57	04.18 21.32-21.43/11	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21 21.24-21.38/14		04.21 21.33-21.40/7	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 18 - PUU18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June
1	10.12	09.03		07.31	10.17-11.31/74	06.42	18.43-19.15/32	04.57	20.16-20.31/15	03.19
	14.35	16.06		17.36		20.09		21.41		23.20
2	10.11	09.00		07.28	10.17-11.31/74	06.39	18.42-19.14/32	04.53	20.18-20.29/11	03.16
	14.37	16.09		17.39		20.12		21.44		23.22
3	10.10	08.57		07.25	10.16-11.30/74	06.35	18.42-19.15/33	04.50	20.20-20.26/6	03.14
	14.39	16.12		17.42		20.15		21.48		23.25
4	10.09	08.54		07.21	10.16-11.31/75	06.32	18.41-19.14/33	04.46		03.12
	14.42	16.16		17.45		20.18		21.51		23.28
5	10.08	08.51		07.18	10.15-11.31/76	06.28	18.42-19.14/32	04.43		03.09
	14.44	16.19		17.48		20.21		21.54		23.30
6	10.06	08.48		07.14	10.15-11.30/75	06.24	18.42-19.14/32	04.39		03.07
	14.46	16.22		17.51		20.24		21.57		23.33
7	10.05	08.45		07.11	10.15-11.31/76	06.21	18.42-19.13/31	04.36		03.05
	14.49	16.26		17.55		20.27		22.01		23.35
8	10.03	08.42		07.07	10.14-11.30/76	06.17	18.42-19.12/30	04.33		03.03
	14.51	16.29		17.58		20.30		22.04		23.38
9	10.02	08.38		07.04	10.14-11.30/76	06.14	18.42-19.11/29	04.29		03.01
	14.54	16.32		18.01		20.33		22.07		23.40
10	10.00	08.35	10.48-11.03/15	07.00	10.15-11.30/75	06.10	18.43-19.10/27	04.26		02.58
	14.56	16.35		18.04		20.36		22.10		23.42
11	09.58	08.32	10.43-11.08/25	06.57	10.14-11.29/75	06.07	18.44-19.08/24	04.23		02.56
	14.59	16.39		18.07		20.39		22.14		23.44
12	09.56	08.29	10.40-11.12/32	06.53	10.15-11.29/74	06.03	18.46-19.06/20	04.19		02.55
	15.02	16.42		18.10		20.42		22.17		23.46
13	09.54	08.25	10.37-11.14/37	06.50	10.15-11.28/73	06.00	18.48-19.04/16	04.16		02.53
	15.05	16.45		18.13		20.45		22.20		23.47
14	09.52	08.22	10.34-11.16/42	06.46	10.14-11.27/73	05.56	18.51-19.00/9	04.13		02.52
	15.08	16.49		18.16		20.48		22.23		23.49
15	09.49	08.19	10.32-11.18/46	06.43	10.15-11.26/71	05.53		04.10		02.51
	15.11	16.52		18.19		20.51		22.27		23.50
16	09.47	08.16	10.31-11.20/49	06.39	10.15-11.25/70	05.49		04.06		02.50
	15.14	16.55		18.22		20.54		22.30		23.52
17	09.45	08.12	10.29-11.22/53	06.35	10.15-11.23/68	05.45		04.03		02.50
	15.17	16.58		18.25		20.57		22.33		23.53
18	09.42	08.09	10.27-11.23/56	06.32	10.16-11.23/67	05.42		04.00		02.49
	15.20	17.01		18.28		21.00		22.36		23.54
19	09.40	08.06	10.27-11.25/58	06.28	10.16-11.21/65	05.38	20.21-20.25/4	03.57		02.49
	15.23	17.05		18.30		21.03		22.40		23.54
20	09.37	08.02	10.25-11.25/60	06.25	10.18-11.20/62	05.35	20.18-20.27/9	03.54		02.49
	15.26	17.08		18.33		21.07		22.43		23.55
21	09.35	07.59	10.24-11.26/62	06.21	10.18-11.18/60	05.31	20.17-20.30/13	03.51		02.49
	15.29	17.11		18.36		21.10		22.46		23.55
22	09.32	07.55	10.22-11.27/65	06.18	10.20-11.16/56	05.28	20.16-20.33/17	03.47		02.49
	15.33	17.14		18.39		21.13		22.49		23.56
23	09.29	07.52	10.22-11.28/66	06.14	10.20-11.14/54	05.24	20.16-20.36/20	03.44		02.50
	15.36	17.17		18.42		21.16		22.52		23.56
24	09.27	07.49	10.21-11.29/68	06.11	10.21-11.11/50	05.21	20.15-20.35/20	03.41		02.50
	15.39	17.21		18.45		21.19		22.56		23.55
25	09.24	07.45	10.19-11.29/70	06.07	17.55-18.08/13	05.17	20.14-20.35/21	03.38		02.51
	15.42	17.24		18.48	10.24-11.08/44	21.22		22.59		23.55
26	09.21	07.42	10.19-11.30/71	06.04	17.52-18.10/18	05.14	20.14-20.35/21	03.36		02.52
	15.46	17.27		18.51	10.26-11.05/39	21.25		23.02		23.54
27	09.18	07.38	10.18-11.30/72	06.00	17.50-18.12/22	05.10	20.15-20.35/20	03.33		02.53
	15.49	17.30		18.54	10.29-11.01/32	21.28		23.05		23.54
28	09.15	07.35	10.17-11.30/73	05.56	17.48-18.13/25	05.07	20.15-20.34/19	03.30		02.55
	15.52	17.33		18.57	10.33-10.54/21	21.32		23.08		23.53
29	09.12			06.53	18.47-19.14/27	05.03	20.15-20.34/19	03.27		02.56
	15.56			20.00		21.35		23.11		23.52
30	09.09			06.49	18.45-19.14/29	05.00	20.15-20.32/17	03.24		02.58
	15.59			20.03		21.38		23.14		23.51
31	09.06			06.46	18.44-19.14/30			03.22		
	16.02			20.06				23.17		
Potential sun hours	171	238		363		451		570		624
Sum of minutes with flicker	0	1020		1969		580		32		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November		December
1	03.00	04.24		06.00	18.44-19.08/24	07.26	10.53-12.07/74	08.00	10.19-10.31/12	09.35
	23.49	22.27		20.40		18.53		16.07		14.43
2	03.00	04.28		06.03	18.41-19.08/27	07.29	10.53-12.07/74	08.04		09.38
	23.48	22.24		20.36		18.49		16.04		14.41
3	03.01	04.31		06.06	18.40-19.09/29	07.32	10.52-12.07/75	08.07		09.41
	23.46	22.20		20.32		18.46		16.00		14.39
4	03.03	04.34		06.09	18.39-19.09/30	07.35	10.52-12.07/75	08.10		09.44
	23.44	22.17		20.29		18.42		15.57		14.37
5	03.06	04.37		06.12	18.39-19.10/31	07.38	10.51-12.07/76	08.13		09.46
	23.43	22.14		20.25		18.39		15.54		14.35
6	03.08	04.40		06.15	18.37-19.09/32	07.41	10.51-12.06/75	08.17		09.49
	23.41	22.10		20.22		18.35		15.51		14.33
7	03.10	04.44		06.18	18.37-19.09/32	07.44	10.50-12.06/76	08.20		09.51
	23.39	22.07		20.18		18.32		15.48		14.32
8	03.13	04.47		06.20	18.37-19.09/32	07.47	10.51-12.07/76	08.23		09.53
	23.36	22.03		20.15		18.28		15.45		14.30
9	03.15	04.50		06.23	18.36-19.09/33	07.50	10.51-12.06/75	08.26		09.56
	23.34	22.00		20.11		18.25		15.41		14.29
10	03.18	04.53	20.29-20.37/8	06.26	18.35-19.08/33	07.53	10.50-12.05/75	08.30		09.58
	23.32	21.57		20.08		18.21		15.38		14.28
11	03.20	04.56	20.26-20.39/13	06.29	18.36-19.07/31	07.56	10.50-12.05/75	08.33		10.00
	23.29	21.53		20.04		18.18		15.35		14.27
12	03.23	04.59	20.25-20.40/15	06.32	18.36-19.07/31	07.59	10.50-12.04/74	08.36		10.02
	23.27	21.50		20.00		18.14		15.32		14.26
13	03.26	05.02	20.23-20.40/17	06.35	18.37-19.06/29	08.02	10.50-12.03/73	08.39		10.04
	23.24	21.46		19.57		18.11		15.29		14.25
14	03.29	05.06	20.23-20.41/18	06.38	18.36-19.04/28	08.05	10.51-12.03/72	08.43		10.05
	23.22	21.43		19.53		18.08		15.26		14.24
15	03.32	05.09	20.22-20.42/20	06.41	18.37-19.03/26	08.08	10.51-12.02/71	08.46		10.07
	23.19	21.39		19.50	11.24-11.43/19	18.04		15.23		14.23
16	03.34	05.12	20.22-20.42/20	06.43	18.38-19.01/23	08.11	10.51-12.01/70	08.49		10.08
	23.16	21.36		19.46	11.18-11.49/31	18.01		15.20		14.23
17	03.37	05.15	20.21-20.41/20	06.46	18.40-18.59/19	08.14	10.51-12.00/69	08.52		10.10
	23.13	21.32		19.43	11.15-11.52/37	17.57		15.18		14.23
18	03.40	05.18	20.21-20.41/20	06.49	18.42-18.56/14	08.17	10.53-12.00/67	08.55		10.11
	23.11	21.29		19.39	11.12-11.55/43	17.54		15.15		14.22
19	03.43	05.21	20.21-20.41/20	06.52	18.47-18.49/2	08.20	10.53-11.59/66	08.59		10.12
	23.08	21.25		19.36	11.10-11.58/48	17.50		15.12		14.22
20	03.47	05.24	20.21-20.41/20	06.55	11.07-11.59/52	08.23	10.53-11.57/64	09.02		10.13
	23.05	21.22		19.32		17.47		15.09		14.22
21	03.50	05.27	20.21-20.37/16	06.58	11.05-12.01/56	08.26	10.55-11.57/62	09.05		10.14
	23.02	21.18		19.28		17.43		15.07		14.23
22	03.53	05.30	20.22-20.34/12	07.01	11.03-12.02/59	08.29	10.55-11.55/60	09.08		10.14
	22.59	21.15		19.25		17.40		15.04		14.23
23	03.56	05.33	20.23-20.31/8	07.03	11.02-12.03/61	08.32	10.57-11.54/57	09.11		10.15
	22.56	21.11		19.21		17.37		15.01		14.24
24	03.59	05.36	20.25-20.28/3	07.06	11.01-12.04/63	08.35	10.58-11.52/54	09.15		10.15
	22.53	21.08		19.18		17.33		14.59		14.24
25	04.02	05.39		07.09	10.59-12.05/66	07.38	09.59-10.51/52	09.18		10.15
	22.49	21.04		19.14		16.30		14.56		14.25
26	04.05	05.42		07.12	10.58-12.06/68	07.41	10.00-10.49/49	09.21		10.15
	22.46	21.01		19.11		16.27		14.54		14.26
27	04.09	05.45		07.15	10.56-12.06/70	07.45	10.02-10.48/46	09.24		10.15
	22.43	20.57		19.07		16.23		14.51		14.27
28	04.12	05.48		07.18	10.56-12.06/70	07.48	10.04-10.45/41	09.27		10.15
	22.40	20.54		19.04		16.20		14.49		14.29
29	04.15	05.51	18.51-19.01/10	07.21	10.55-12.07/72	07.51	10.06-10.43/37	09.30		10.15
	22.37	20.50		19.00		16.17		14.47		14.30
30	04.18	05.54	18.48-19.04/16	07.24	10.54-12.07/73	07.54	10.10-10.41/31	09.33		10.14
	22.33	20.47		18.56		16.13		14.45		14.31
31	04.21	05.57	18.46-19.06/20			07.57	10.14-10.37/23			10.13
	22.30	20.43				16.10				14.33
Potential sun hours	608	508		393		305		198		137
Sum of minutes with flicker	0	276		1394		1964		12		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 20 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	
1	10.12	09.03	07.31	06.42		04.56	06.40-07.45/65	03.19	21.26-21.46/20 06.41-07.42/61
	14.35	16.06	17.36	20.09		21.41		23.20	20.27-21.08/41
2	10.12	09.00	07.28	06.39		04.53	06.40-07.45/65	03.16	21.27-21.46/19 06.42-07.42/60
	14.37	16.09	17.39	20.12		21.44		23.23	20.27-21.08/41
3	10.10	08.57	07.25	06.35		04.50	06.39-07.45/66	03.14	21.28-21.45/17 06.42-07.42/60
	14.39	16.12	17.42	20.15		21.48		23.25	20.27-21.07/40
4	10.09	08.54	07.21	06.32		04.46	20.40-20.51/11	03.11	21.29-21.45/16 06.42-07.41/59
	14.41	16.16	17.45	20.18		21.51	06.39-07.46/67	23.28	20.27-21.08/41
5	10.08	08.51	07.18	06.28		04.43	20.36-20.54/18	03.09	21.30-21.45/15 06.43-07.42/59
	14.44	16.19	17.48	20.21		21.54	06.38-07.46/68	23.31	20.28-21.08/40
6	10.06	08.48	07.14	06.24		04.39	20.35-20.57/22	03.07	21.30-21.44/14 06.43-07.41/58
	14.46	16.22	17.51	20.24		21.57	06.38-07.46/68	23.33	20.28-21.07/39
7	10.05	08.45	07.11	06.21		04.36	20.33-20.59/26	03.05	21.31-21.44/13 06.44-07.41/57
	14.49	16.26	17.54	20.27		22.01	06.37-07.46/69	23.35	20.28-21.07/39
8	10.03	08.42	07.07	06.17		04.33	20.32-21.00/28	03.03	21.32-21.44/12 06.44-07.41/57
	14.51	16.29	17.57	20.30		22.04	06.37-07.46/69	23.38	20.29-21.07/38
9	10.02	08.38	07.04	06.14		04.29	20.30-21.01/31	03.01	21.33-21.43/10 06.45-07.41/56
	14.54	16.32	18.01	20.33		22.07	06.37-07.46/69	23.40	20.29-21.08/39
10	10.00	08.35	07.00	06.10		04.26	20.29-21.02/33	02.57	21.34-21.43/9 06.45-07.40/55
	14.56	16.35	18.04	20.36		22.10	06.36-07.46/70	23.42	20.30-21.08/38
11	09.58	08.32	06.57	06.07		04.23	20.28-21.03/35	02.56	21.35-21.42/7 06.45-07.40/55
	14.59	16.39	18.07	20.39		22.14	06.36-07.46/70	23.44	20.30-21.07/37
12	09.56	08.29	06.53	06.03		04.19	21.24-21.28/4 06.36-07.46/70	02.54	21.36-21.41/5 06.45-07.40/55
	15.02	16.42	18.10	20.42		22.17	20.28-21.04/36	23.46	20.30-21.07/37
13	09.54	08.25	06.50	06.00		04.16	21.22-21.31/9 06.36-07.46/70	02.53	21.39-21.40/1 06.46-07.40/54
	15.05	16.45	18.13	20.45		22.20	20.27-21.04/37	23.48	20.31-21.08/37
14	09.52	08.22	06.46	05.56		04.13	21.21-21.33/12 06.36-07.46/70	02.52	20.31-21.08/37
	15.08	16.49	18.16	20.48		22.23	20.26-21.05/39	23.49	06.46-07.40/54
15	09.49	08.19	06.42	05.52		04.09	21.21-21.36/15 06.36-07.46/70	02.51	20.32-21.08/36
	15.11	16.52	18.19	20.51		22.27	20.26-21.06/40	23.51	06.47-07.40/53
16	09.47	08.16	06.39	05.49	07.09-07.23/14	04.06	21.21-21.38/17 06.36-07.46/70	02.50	20.31-21.08/37
	15.14	16.55	18.22	20.54		22.30	20.26-21.06/40	23.52	06.47-07.40/53
17	09.45	08.12	06.35	05.45	07.03-07.27/24	04.03	21.20-21.40/20 06.37-07.46/69	02.50	20.32-21.08/36
	15.17	16.58	18.24	20.57		22.33	20.25-21.06/41	23.53	06.47-07.40/53
18	09.42	08.09	06.32	05.42	07.00-07.30/30	04.00	21.20-21.44/24 06.36-07.45/69	02.49	20.32-21.08/36
	15.20	17.01	18.27	21.00		22.36	20.25-21.06/41	23.54	06.48-07.40/52
19	09.40	08.06	06.28	05.38	06.57-07.33/36	03.57	21.19-21.45/26 06.37-07.46/69	02.49	20.33-21.09/36
	15.23	17.05	18.30	21.03		22.40	20.24-21.06/42	23.55	06.48-07.41/53
20	09.37	08.02	06.25	05.35	06.54-07.34/40	03.54	21.20-21.46/26 06.37-07.45/68	02.49	20.33-21.09/36
	15.26	17.08	18.33	21.07		22.43	20.25-21.07/42	23.55	06.48-07.41/53
21	09.35	07.59	06.21	05.31	06.52-07.36/44	03.50	21.20-21.47/27 06.37-07.45/68	02.49	20.33-21.09/36
	15.29	17.11	18.36	21.10		22.46	20.25-21.07/42	23.55	06.49-07.41/52
22	09.32	07.55	06.18	05.28	06.50-07.38/48	03.47	21.20-21.46/26 06.38-07.45/67	02.49	20.33-21.09/36
	15.33	17.14	18.39	21.13		22.49	20.24-21.07/43	23.56	06.48-07.41/53
23	09.29	07.52	06.14	05.24	06.49-07.39/50	03.44	21.20-21.46/26 06.37-07.44/67	02.50	20.34-21.10/36
	15.36	17.17	18.42	21.16		22.52	20.24-21.07/43	23.56	06.49-07.42/53
24	09.27	07.49	06.11	05.21	06.47-07.39/52	03.41	21.21-21.47/26 06.38-07.44/66	02.50	20.33-21.09/36
	15.39	17.20	18.45	21.19		22.56	20.25-21.07/42	23.55	06.49-07.42/53
25	09.24	07.45	06.07	05.17	06.45-07.40/55	03.38	21.21-21.47/26 06.38-07.44/66	02.51	20.34-21.10/36
	15.42	17.24	18.48	21.22		22.59	20.25-21.08/43	23.55	06.50-07.42/52
26	09.21	07.42	06.04	05.14	06.44-07.41/57	03.35	21.22-21.47/25 06.39-07.44/65	02.52	20.34-21.10/36
	15.46	17.27	18.51	21.25		23.02	20.25-21.08/43	23.55	06.49-07.42/53
27	09.18	07.38	06.00	05.10	06.43-07.42/59	03.33	21.22-21.47/25 06.39-07.44/65	02.53	20.34-21.10/36
	15.49	17.30	18.54	21.28		23.05	20.25-21.08/43	23.54	06.49-07.43/54
28	09.15	07.35	05.56	05.07	06.43-07.43/60	03.30	21.23-21.47/24 06.40-07.43/63	02.54	20.34-21.11/37
	15.52	17.33	18.57	21.32		23.08	20.25-21.08/43	23.53	06.50-07.43/53
29	09.12		06.53	05.03	06.42-07.44/62	03.27	21.23-21.47/24 06.40-07.43/63	02.56	20.34-21.11/37
	15.56		20.00	21.35		23.11	20.26-21.08/42	23.52	06.50-07.44/54
30	09.09		06.49	05.00	06.41-07.44/63	03.24	21.24-21.46/22 06.40-07.42/62	02.58	21.41-21.45/4 06.50-07.44/54
	15.59		20.03	21.38		23.14	20.26-21.08/42	23.51	20.34-21.12/38
31	09.06		06.46			03.21	21.25-21.46/21 06.40-07.42/62		
	16.02		20.06			23.17	20.26-21.07/41		
Potential sun hours	171	238	363	451		570		624	
Sum of minutes with flicker	0	0	0	694		3539		2935	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 20 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 21.40-21.46/6 06.50-07.44/54	04.24 21.34-21.37/3 06.46-07.56/70	06.00	07.26	08.00	09.35
	23.49 20.34-21.12/38	22.27 20.38-21.14/36	20.40	18.53	16.07	14.43
2	03.01 21.39-21.47/8 06.49-07.45/56	04.28 20.39-21.13/34	06.03	07.29	08.04	09.38
	23.48 20.34-21.12/38	22.24 06.47-07.57/70	20.36	18.49	16.04	14.40
3	03.01 21.38-21.48/10 06.50-07.46/56	04.31 20.39-21.12/33	06.06	07.32	08.07	09.41
	23.46 20.34-21.12/38	22.20 06.46-07.56/70	20.32	18.46	16.00	14.39
4	03.03 21.38-21.49/11 06.50-07.46/56	04.34 20.41-21.11/30	06.09	07.35	08.10	09.44
	23.45 20.34-21.13/39	22.17 06.47-07.56/69	20.29	18.42	15.57	14.37
5	03.05 21.37-21.49/12 06.49-07.46/57	04.37 20.42-21.10/28	06.12	07.38	08.13	09.46
	23.43 20.34-21.13/39	22.14 06.47-07.56/69	20.25	18.39	15.54	14.35
6	03.08 21.37-21.51/14 06.50-07.47/57	04.40 20.43-21.08/25	06.15	07.41	08.17	09.49
	23.41 20.34-21.14/40	22.10 06.47-07.56/69	20.22	18.35	15.51	14.33
7	03.10 21.36-21.51/15 06.50-07.48/58	04.44 20.45-21.06/21	06.17	07.44	08.20	09.51
	23.39 20.34-21.13/39	22.07 06.47-07.55/68	20.18	18.32	15.48	14.32
8	03.12 21.36-21.52/16 06.49-07.48/59	04.47 20.47-21.03/16	06.20	07.47	08.23	09.54
	23.36 20.34-21.14/40	22.03 06.47-07.55/68	20.15	18.28	15.44	14.30
9	03.15 21.36-21.53/17 06.49-07.49/60	04.50 20.51-21.00/9	06.23	07.50	08.26	09.56
	23.34 20.34-21.15/41	22.00 06.48-07.55/67	20.11	18.25	15.41	14.29
10	03.17 21.36-21.53/17 06.49-07.49/60	04.53 06.47-07.53/66	06.26	07.53	08.30	09.58
	23.32 20.35-21.15/40	21.57	20.08	18.21	15.38	14.28
11	03.20 21.35-21.54/19 06.49-07.50/61	04.56 06.48-07.53/65	06.29	07.56	08.33	10.00
	23.29 20.35-21.16/41	21.53	20.04	18.18	15.35	14.26
12	03.23 21.34-21.55/21 06.49-07.51/62	04.59 06.49-07.53/64	06.32	07.59	08.36	10.02
	23.27 20.34-21.15/41	21.50	20.00	18.14	15.32	14.25
13	03.26 21.32-21.55/23 06.49-07.51/62	05.02 06.49-07.52/63	06.35	08.02	08.39	10.04
	23.24 20.34-21.15/41	21.46	19.57	18.11	15.29	14.25
14	03.29 21.33-21.55/22 06.49-07.52/63	05.06 06.49-07.51/62	06.38	08.05	08.43	10.05
	23.22 20.35-21.17/42	21.43	19.53	18.07	15.26	14.24
15	03.31 21.32-21.56/24 06.49-07.52/63	05.09 06.50-07.50/60	06.41	08.08	08.46	10.07
	23.19 20.34-21.17/43	21.39	19.50	18.04	15.23	14.23
16	03.34 21.32-21.56/24 06.48-07.52/64	05.12 06.51-07.49/58	06.43	08.11	08.49	10.09
	23.16 20.34-21.17/43	21.36	19.46	18.01	15.20	14.23
17	03.37 21.31-21.56/25 06.48-07.53/65	05.15 06.51-07.47/56	06.46	08.14	08.52	10.10
	23.13 20.34-21.17/43	21.32	19.43	17.57	15.18	14.22
18	03.40 21.30-21.56/26 06.48-07.53/65	05.18 06.52-07.47/55	06.49	08.17	08.56	10.11
	23.11 20.34-21.17/43	21.29	19.39	17.54	15.15	14.22
19	03.43 21.31-21.57/26 06.48-07.54/66	05.21 06.53-07.45/52	06.52	08.20	08.59	10.12
	23.08 20.35-21.17/42	21.25	19.35	17.50	15.12	14.22
20	03.46 21.30-21.57/27 06.48-07.54/66	05.24 06.55-07.44/49	06.55	08.23	09.02	10.13
	23.05 20.35-21.17/42	21.22	19.32	17.47	15.09	14.22
21	03.50 21.30-21.56/26 06.47-07.54/67	05.27 06.55-07.42/47	06.58	08.26	09.05	10.14
	23.02 20.34-21.17/43	21.18	19.28	17.43	15.06	14.23
22	03.53 21.30-21.57/27 06.48-07.55/67	05.30 06.57-07.40/43	07.01	08.29	09.08	10.14
	22.59 20.35-21.18/43	21.15	19.25	17.40	15.04	14.23
23	03.56 21.30-21.56/26 06.47-07.55/68	05.33 06.59-07.38/39	07.03	08.32	09.11	10.15
	22.56 20.35-21.17/42	21.11	19.21	17.37	15.01	14.23
24	03.59 21.30-21.57/27 06.47-07.56/69	05.36 07.01-07.36/35	07.06	08.35	09.15	10.15
	22.53 20.35-21.16/41	21.08	19.18	17.33	14.59	14.24
25	04.02 21.30-21.55/25 06.47-07.56/69	05.39 07.03-07.33/30	07.09	07.38	09.18	10.15
	22.49 20.35-21.17/42	21.04	19.14	16.30	14.56	14.25
26	04.05 21.30-21.53/23 06.47-07.56/69	05.42 07.06-07.29/23	07.12	07.41	09.21	10.15
	22.46 20.35-21.16/41	21.01	19.11	16.27	14.54	14.26
27	04.08 21.31-21.50/19 06.47-07.56/69	05.45 07.11-07.24/13	07.15	07.45	09.24	10.15
	22.43 20.36-21.16/40	20.57	19.07	16.23	14.51	14.27
28	04.12 21.32-21.48/16 06.47-07.57/70	05.48	07.18	07.48	09.27	10.15
	22.40 20.37-21.16/39	20.54	19.04	16.20	14.49	14.28
29	04.15 21.31-21.45/14 06.46-07.56/70	05.51	07.21	07.51	09.30	10.15
	22.37 20.37-21.15/38	20.50	19.00	16.17	14.47	14.30
30	04.18 21.33-21.43/10 06.47-07.57/70	05.54	07.24	07.54	09.33	10.14
	22.33 20.37-21.15/38	20.47	18.56	16.13	14.45	14.31
31	04.21 21.33-21.39/6 06.47-07.57/70	05.57		07.57		10.13
	22.30 20.37-21.14/37	20.43		16.10		14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	3807	1735	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 21 - PUU21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56		03.19	04.41-05.13/32	02.59	04.45-05.20/35	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41		23.20		23.50		22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53		03.16	04.40-05.13/33	03.01	04.45-05.20/35	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44		23.23		23.48		22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.50		03.14	04.40-05.14/34	03.01	04.46-05.21/35	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48		23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46		03.11	04.40-05.13/33	03.03	04.46-05.20/34	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51		23.28		23.45		22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43		03.09	04.40-05.14/34	03.05	04.45-05.20/35	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.31		23.43		22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39		03.07	04.40-05.14/34	03.07	04.46-05.20/34	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57		23.33		23.41		22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36		03.05	04.40-05.14/34	03.10	04.47-05.21/34	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01		23.36		23.39		22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33		03.03	04.40-05.15/35	03.12	04.47-05.20/33	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04		23.38		23.37		22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29		03.01	04.40-05.15/35	03.15	04.47-05.20/33	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07		23.40		23.34		22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26		02.57	04.40-05.15/35	03.17	04.48-05.21/33	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10		23.42		23.32		21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22		02.56	04.40-05.15/35	03.20	04.48-05.21/33	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44		23.30		21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19		02.54	04.40-05.15/35	03.23	04.49-05.21/32	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46		23.27		21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	05.59	04.16		02.53	04.41-05.16/35	03.25	04.49-05.20/31	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20		23.48		23.24		21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13		02.52	04.41-05.16/35	03.28	04.50-05.20/30	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.23		23.49		23.22		21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09		02.51	04.41-05.17/36	03.31	04.50-05.20/30	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51		23.19		21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06		02.50	04.41-05.16/35	03.34	04.51-05.19/28	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30		23.52		23.16		21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03		02.49	04.41-05.17/36	03.37	04.51-05.18/27	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33		23.53		23.14		21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00		02.49	04.42-05.17/35	03.40	04.52-05.18/26	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37		23.54		23.11		21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	04.53-04.58/5	02.49	04.42-05.18/36	03.43	04.53-05.18/25	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40		23.55		23.08		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	04.49-05.01/12	02.49	04.42-05.18/36	03.46	04.54-05.17/23	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43		23.55		23.05		21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	04.47-05.04/17	02.49	04.42-05.18/36	03.49	04.55-05.15/20	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46		23.56		23.02		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	04.46-05.05/19	02.49	04.42-05.18/36	03.52	04.57-05.15/18	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49		23.56		22.59		21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	04.44-05.06/22	02.49	04.43-05.19/36	03.56	04.58-05.13/15	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53		23.56		22.56		21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	04.44-05.07/23	02.50	04.43-05.18/35	03.59	05.01-05.11/10	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56		23.56		22.53		21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	04.43-05.08/25	02.51	04.43-05.19/36	04.02		05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59		23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	04.42-05.09/27	02.52	04.43-05.19/36	04.05		05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02		23.55		22.46		21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	04.42-05.10/28	02.53	04.44-05.19/35	04.08		05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	04.41-05.10/29	02.54	04.44-05.19/35	04.11		05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53		22.40		20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	04.41-05.11/30	02.56	04.44-05.20/36	04.15		05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11		23.52		22.37		20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	04.40-05.11/31	02.57	04.44-05.20/36	04.18		05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51		22.33		20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21	04.40-05.11/31			04.21		05.57		07.57		10.14
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	299		1050		689		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 22 - PUU22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19		02.59	04.09-04.25/16	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20		23.50		22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16		03.01	04.10-04.24/14	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23		23.48		22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14		03.01	04.12-04.25/13	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25		23.47		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	04.13-04.16/3	03.03	04.13-04.25/12	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28		23.45		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	04.12-04.17/5	03.05	04.14-04.24/10	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31		23.43		22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	04.10-04.17/7	03.07	04.16-04.24/8	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33		23.41		22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	04.09-04.18/9	03.10	04.18-04.24/6	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36		23.39		22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	04.08-04.19/11	03.12	04.19-04.23/4	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38		23.37		22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	04.07-04.19/12	03.15	04.21-04.22/1	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	04.06-04.20/14	03.17		04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	04.05-04.20/15	03.20		04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44		23.30		21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	04.04-04.20/16	03.23		04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46		23.27		21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	04.04-04.21/17	03.25		05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48		23.25		21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	04.03-04.21/18	03.28		05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49		23.22		21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51	04.03-04.22/19	03.31		05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51		23.19		21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	04.02-04.22/20	03.34		05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	04.02-04.22/20	03.37		05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53		23.14		21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	04.02-04.23/21	03.40		05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54		23.11		21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	04.03-04.23/20	03.43		05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55		23.08		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	04.03-04.23/20	03.46		05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55		23.05		21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	04.03-04.23/20	03.49		05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56		23.02		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	04.03-04.23/20	03.52		05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56		22.59		21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	04.04-04.24/20	03.56		05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56		22.56		21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	04.03-04.24/21	03.59		05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56		22.53		21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.04-04.25/21	04.02		05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55		22.50		21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.04-04.24/20	04.05		05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55		22.46		21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.05-04.24/19	04.08		05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.06-04.25/19	04.11		05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53		22.40		20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.07-04.25/18	04.15		05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52		22.37		20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.08-04.25/17	04.18		05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51		22.34		20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21			04.21		05.57		07.57		10.14
	16.02		20.06		23.17			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	442		84		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 23 - PUU23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February	March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00		09.36	13.12-13.17/5
	14.35		16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07		14.42	
2	10.12		09.01	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04		09.38	
	14.37		16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03		14.40	
3	10.11		08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07		09.41	
	14.39		16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00		14.38	
4	10.09		08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10		09.44	
	14.41		16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57		14.36	
5	10.08		08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13		09.46	
	14.43		16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54		14.35	
6	10.07		08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17		09.49	
	14.46		16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50		14.33	
7	10.05		08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20		09.51	
	14.48		16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47		14.31	
8	10.04		08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23		09.54	
	14.51		16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44		14.30	
9	10.02		08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26		09.56	
	14.53		16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41		14.28	
10	10.00		08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30		09.58	
	14.56		16.35	18.03	20.36	22.11	23.42	23.32	21.57	20.07	18.21	15.38		14.27	
11	09.58	13.30-13.35/5	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	13.10-13.19/9	10.00	
	14.59		16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35		14.26	
12	09.56	13.30-13.41/11	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	13.08-13.21/13	10.02	
	15.01		16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32		14.25	
13	09.54	13.30-13.46/16	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	13.06-13.22/16	10.04	
	15.04		16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29		14.24	
14	09.52	13.30-13.47/17	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	13.06-13.24/18	10.06	
	15.07		16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26		14.23	
15	09.50	13.29-13.48/19	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	13.05-13.24/19	10.07	
	15.10		16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23		14.23	
16	09.47	13.29-13.49/20	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	13.05-13.25/20	10.09	
	15.13		16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20		14.22	
17	09.45	13.29-13.50/21	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	13.05-13.26/21	10.10	
	15.16		16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17		14.22	
18	09.42	13.29-13.50/21	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.56	13.05-13.26/21	10.11	
	15.20		17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.14		14.22	
19	09.40	13.29-13.50/21	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	13.04-13.26/22	10.12	
	15.23		17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12		14.22	
20	09.37	13.29-13.51/22	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	13.05-13.27/22	10.13	
	15.26		17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09		14.22	
21	09.35	13.30-13.51/21	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	13.05-13.26/21	10.14	
	15.29		17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06		14.22	
22	09.32	13.30-13.52/22	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	13.05-13.27/22	10.15	
	15.32		17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04		14.22	
23	09.30	13.30-13.52/22	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	13.06-13.27/21	10.15	
	15.35		17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01		14.23	
24	09.27	13.31-13.52/21	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	13.07-13.28/21	10.16	
	15.39		17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58		14.24	
25	09.24	13.31-13.52/21	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	13.07-13.27/20	10.16	
	15.42		17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56		14.25	
26	09.21	13.32-13.52/20	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	13.07-13.27/20	10.16	
	15.45		17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53		14.26	
27	09.18	13.33-13.52/19	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	13.08-13.27/19	10.16	
	15.49		17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51		14.27	
28	09.15	13.33-13.51/18	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	13.09-13.27/18	10.15	
	15.52		17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49		14.28	
29	09.13	13.34-13.50/16		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	13.10-13.26/16	10.15	
	15.55			20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46		14.29	
30	09.10	13.36-13.49/13		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	13.12-13.23/11	10.14	
	15.59			20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44		14.31	
31	09.07	13.38-13.47/9		06.46		03.21		04.21	05.57		07.57			10.14	
	16.02			20.06		23.17		22.30	20.43		16.10			14.33	
Potential sun hours	171		238	363	451	570	625	609	509	393	305	198		136	
Sum of minutes with flicker	375		0	0	0	0	0	0	0	0	0	370		5	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 24 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May		June	
1	10.12	09.03	07.31		06.42	08.20-08.50/30	04.56	19.08-19.48/40	03.19	21.11-21.47/36
	14.35	16.06	17.36		20.09		21.41		23.20	18.46-20.14/88
2	10.11	09.00	07.28		06.39	08.22-08.49/27	04.53	19.06-19.51/45	03.16	21.11-21.47/36
	14.37	16.09	17.39		20.12		21.44		23.22	18.46-20.14/88
3	10.10	08.57	07.24		06.35	08.22-08.47/25	04.50	19.04-19.53/49	03.14	21.11-21.47/36
	14.39	16.12	17.42		20.15		21.48		23.25	18.46-20.14/88
4	10.09	08.54	07.21		06.31	08.25-08.44/19	04.46	19.02-19.55/53	03.12	21.11-21.48/37
	14.41	16.16	17.45		20.18		21.51		23.28	18.46-20.15/89
5	10.08	08.51	07.18		06.28	08.27-08.40/13	04.43	19.00-19.56/56	03.09	21.12-21.48/36
	14.44	16.19	17.48		20.21		21.54		23.30	18.47-20.16/89
6	10.06	08.48	07.14		06.24		04.39	19.00-19.59/59	03.07	21.12-21.48/36
	14.46	16.22	17.51		20.24		21.57		23.33	18.46-20.15/89
7	10.05	08.45	07.11		06.21		04.36	18.58-20.00/62	03.05	21.12-21.48/36
	14.49	16.25	17.54		20.27		22.01		23.35	18.46-20.16/90
8	10.03	08.42	07.07		06.17		04.33	18.57-20.01/64	03.03	21.13-21.48/35
	14.51	16.29	17.57		20.30		22.04		23.38	18.47-20.16/89
9	10.01	08.38	07.04		06.14		04.29	18.56-20.02/66	03.01	21.13-21.48/35
	14.54	16.32	18.00		20.33		22.07		23.40	18.47-20.16/89
10	10.00	08.35	07.00		06.10		04.26	18.54-20.03/69	02.57	21.14-21.49/35
	14.56	16.35	18.04		20.36		22.10		23.42	18.47-20.16/89
11	09.58	08.32	06.57		06.07		04.23	18.53-20.03/70	02.56	21.14-21.48/34
	14.59	16.39	18.07		20.39		22.14		23.44	18.47-20.17/90
12	09.56	08.29	06.53		06.03		04.19	21.20-21.27/7	02.54	21.14-21.48/34
	15.02	16.42	18.10		20.42		22.17	18.53-20.05/72	23.46	18.47-20.17/90
13	09.54	08.25	06.49	07.37-07.46/9	06.00		04.16	21.17-21.30/13	02.53	21.15-21.49/34
	15.05	16.45	18.13		20.45		22.20	18.52-20.05/73	23.47	18.48-20.17/89
14	09.52	08.22	06.46	07.32-07.50/18	05.56		04.13	21.15-21.31/16	02.52	21.15-21.49/34
	15.08	16.48	18.16		20.48		22.23	18.51-20.06/75	23.49	18.47-20.17/90
15	09.49	08.19	06.42	07.30-07.53/23	05.52		04.09	21.14-21.33/19	02.51	21.16-21.50/34
	15.11	16.52	18.18		20.51		22.27	18.51-20.07/76	23.50	18.48-20.18/90
16	09.47	08.16	06.39	07.27-07.54/27	05.49		04.06	21.13-21.35/22	02.50	21.15-21.49/34
	15.14	16.55	18.21		20.54		22.30	18.50-20.07/77	23.52	18.48-20.18/90
17	09.45	08.12	06.35	07.25-07.55/30	05.45		04.03	21.12-21.37/25	02.50	21.16-21.49/33
	15.17	16.58	18.24		20.57		22.33	18.49-20.07/78	23.53	18.48-20.18/90
18	09.42	08.09	06.32	07.24-07.56/32	05.42		04.00	21.11-21.39/28	02.49	21.16-21.50/34
	15.20	17.01	18.27		21.00		22.36	18.49-20.08/79	23.54	18.48-20.18/90
19	09.40	08.05	06.28	07.23-07.56/33	05.38		03.57	21.10-21.40/30	02.49	21.17-21.50/33
	15.23	17.05	18.30		21.03		22.40	18.48-20.08/80	23.54	18.49-20.19/90
20	09.37	08.02	06.25	07.22-07.57/35	05.35		03.54	21.10-21.41/31	02.49	21.17-21.50/33
	15.26	17.08	18.33		21.06		22.43	18.48-20.09/81	23.55	18.49-20.19/90
21	09.35	07.59	06.21	07.21-07.57/36	05.31		03.50	21.10-21.43/33	02.49	21.17-21.50/33
	15.29	17.11	18.36		21.10		22.46	18.48-20.10/82	23.55	18.49-20.19/90
22	09.32	07.55	06.18	07.21-07.58/37	05.28		03.47	21.09-21.43/34	02.49	21.17-21.50/33
	15.33	17.14	18.39		21.13		22.49	18.47-20.10/83	23.55	18.49-20.19/90
23	09.29	07.52	06.14	07.20-07.57/37	05.24		03.44	21.09-21.44/35	02.50	21.18-21.51/33
	15.36	17.17	18.42		21.16		22.52	18.47-20.11/84	23.55	18.50-20.20/90
24	09.27	07.49	06.11	07.19-07.57/38	05.21		03.41	21.10-21.44/34	02.50	21.18-21.51/33
	15.39	17.20	18.45		21.19		22.56	18.47-20.11/84	23.55	18.50-20.20/90
25	09.24	07.45	06.07	07.19-07.57/38	05.17		03.38	21.10-21.45/35	02.51	21.18-21.52/34
	15.42	17.24	18.48		21.22		22.59	18.47-20.12/85	23.55	18.50-20.20/90
26	09.21	07.42	06.03	07.18-07.56/38	05.14		03.35	21.10-21.45/35	02.52	21.18-21.51/33
	15.46	17.27	18.51		21.25		23.02	18.47-20.12/85	23.54	18.50-20.20/90
27	09.18	07.38	06.00	07.19-07.56/37	05.10		03.33	21.10-21.46/36	02.53	21.18-21.52/34
	15.49	17.30	18.54		21.28		23.05	18.46-20.13/87	23.54	18.50-20.20/90
28	09.15	07.35	05.56	07.18-07.55/37	05.07	19.21-19.39/18	03.30	21.10-21.46/36	02.55	21.18-21.52/34
	15.52	17.33	18.57		21.32		23.08	18.46-20.13/87	23.53	18.51-20.21/90
29	09.12		06.53	08.19-08.55/36	05.03	19.16-19.44/28	03.27	21.10-21.46/36	02.56	21.18-21.53/35
	15.56		20.00		21.35		23.11	18.46-20.13/87	23.52	18.51-20.21/90
30	09.09		06.49	08.19-08.53/34	05.00	19.12-19.47/35	03.24	21.10-21.47/37	02.58	21.18-21.53/35
	15.59		20.03		21.38		23.14	18.46-20.13/87	23.51	18.51-20.21/90
31	09.06		06.46	08.20-08.52/32			03.22	21.10-21.47/37		
	16.02		20.06				23.17	18.46-20.13/87		
Potential sun hours	171	238	363		451		570		624	
Sum of minutes with flicker	0	0	607		195		2841		3719	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 24 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	21.18-21.53/35	04.24	21.33-21.34/1	06.00		07.26	08.00	09.35
	23.49	18.51-20.21/90	22.27	19.03-20.14/71	20.39		18.53	16.07	14.43
2	03.01	21.18-21.53/35	04.28	19.04-20.14/70	06.03		07.29	08.04	09.38
	23.48	18.51-20.21/90	22.23		20.36		18.49	16.04	14.41
3	03.01	21.18-21.53/35	04.31	19.05-20.12/67	06.06		07.32	08.07	09.41
	23.46	18.51-20.21/90	22.20		20.32		18.46	16.00	14.39
4	03.03	21.18-21.54/36	04.34	19.06-20.11/65	06.09		07.35	08.10	09.44
	23.44	18.52-20.22/90	22.17		20.29		18.42	15.57	14.37
5	03.05	21.18-21.54/36	04.37	19.07-20.10/63	06.12		07.38	08.13	09.46
	23.43	18.52-20.21/89	22.13		20.25		18.39	15.54	14.35
6	03.08	21.18-21.54/36	04.40	19.08-20.08/60	06.15		07.41	08.16	09.49
	23.41	18.53-20.22/89	22.10		20.22		18.35	15.51	14.33
7	03.10	21.18-21.54/36	04.44	19.09-20.07/58	06.17	08.22-08.35/13	07.44	08.20	09.51
	23.39	18.52-20.21/89	22.07		20.18		18.32	15.48	14.32
8	03.12	21.18-21.54/36	04.47	19.11-20.06/55	06.20	08.19-08.38/19	07.47	08.23	09.53
	23.36	18.53-20.22/89	22.03		20.15		18.28	15.44	14.30
9	03.15	21.18-21.55/37	04.50	19.13-20.04/51	06.23	08.17-08.41/24	07.50	08.26	09.56
	23.34	18.53-20.22/89	22.00		20.11		18.25	15.41	14.29
10	03.18	21.19-21.55/36	04.53	19.14-20.01/47	06.26	08.14-08.41/27	07.53	08.29	09.58
	23.32	18.54-20.22/88	21.57		20.07		18.21	15.38	14.28
11	03.20	21.19-21.55/36	04.56	19.16-19.59/43	06.29	08.13-08.43/30	07.56	08.33	10.00
	23.29	18.54-20.22/88	21.53		20.04		18.18	15.35	14.27
12	03.23	21.19-21.55/36	04.59	19.18-19.57/39	06.32	08.12-08.44/32	07.59	08.36	10.02
	23.27	18.53-20.21/88	21.50		20.00		18.14	15.32	14.25
13	03.26	21.18-21.55/37	05.02	19.20-19.53/33	06.35	08.11-08.44/33	08.02	08.39	10.04
	23.24	18.54-20.21/87	21.46		19.57		18.11	15.29	14.25
14	03.29	21.19-21.55/36	05.06	19.24-19.50/26	06.38	08.10-08.45/35	08.05	08.42	10.05
	23.22	18.55-20.22/87	21.43		19.53		18.07	15.26	14.24
15	03.31	21.19-21.55/36	05.09	19.29-19.45/16	06.40	08.08-08.44/36	08.08	08.46	10.07
	23.19	18.55-20.22/87	21.39		19.50		18.04	15.23	14.23
16	03.34	21.19-21.55/36	05.12		06.43	08.07-08.45/38	08.11	08.49	10.08
	23.16	18.55-20.22/87	21.36		19.46		18.01	15.20	14.23
17	03.37	21.19-21.55/36	05.15		06.46	08.07-08.45/38	08.14	08.52	10.10
	23.13	18.56-20.21/85	21.32		19.43		17.57	15.18	14.22
18	03.40	21.19-21.54/35	05.18		06.49	08.07-08.45/38	08.17	08.55	10.11
	23.10	18.56-20.21/85	21.29		19.39		17.54	15.15	14.22
19	03.43	21.20-21.55/35	05.21		06.52	08.06-08.45/39	08.20	08.59	10.12
	23.08	18.57-20.22/85	21.25		19.35		17.50	15.12	14.22
20	03.46	21.20-21.54/34	05.24		06.55	08.05-08.43/38	08.23	09.02	10.13
	23.05	18.57-20.21/84	21.22		19.32		17.47	15.09	14.22
21	03.50	21.19-21.53/34	05.27		06.58	08.05-08.43/38	08.26	09.05	10.14
	23.02	18.57-20.20/83	21.18		19.28		17.43	15.06	14.23
22	03.53	21.20-21.53/33	05.30		07.00	08.06-08.42/36	08.29	09.08	10.14
	22.59	18.58-20.21/83	21.15		19.25		17.40	15.04	14.23
23	03.56	21.20-21.52/32	05.33		07.03	08.06-08.41/35	08.32	09.11	10.15
	22.56	18.58-20.20/82	21.11		19.21		17.37	15.01	14.24
24	03.59	21.20-21.52/32	05.36		07.06	08.06-08.40/34	08.35	09.14	10.15
	22.52	18.58-20.19/81	21.08		19.18		17.33	14.59	14.24
25	04.02	21.21-21.50/29	05.39		07.09	08.07-08.39/32	07.38	09.18	10.15
	22.49	18.59-20.19/80	21.04		19.14		16.30	14.56	14.25
26	04.05	21.22-21.49/27	05.42		07.12	08.08-08.38/30	07.41	09.21	10.15
	22.46	18.59-20.18/79	21.01		19.11		16.27	14.54	14.26
27	04.08	21.23-21.47/24	05.45		07.15	08.08-08.35/27	07.44	09.24	10.15
	22.43	19.00-20.18/78	20.57		19.07		16.23	14.51	14.27
28	04.12	21.24-21.45/21	05.48		07.18	08.09-08.34/25	07.48	09.27	10.15
	22.40	19.01-20.18/77	20.54		19.03		16.20	14.49	14.28
29	04.15	21.25-21.42/17	05.51		07.21	08.11-08.31/20	07.51	09.30	10.15
	22.37	19.01-20.17/76	20.50		19.00		16.17	14.47	14.30
30	04.18	21.26-21.41/15	05.54		07.23	08.14-08.28/14	07.54	09.33	10.14
	22.33	19.02-20.16/74	20.47		18.56		16.13	14.45	14.31
31	04.21	21.28-21.38/10	05.57				07.57		10.13
	22.30	19.02-20.15/73	20.43				16.10		14.33
Potential sun hours	608		508		393		305	198	137
Sum of minutes with flicker	3611		765		731		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 25 - PUU25

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 06.13-06.39/26	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53 06.13-06.38/25	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50 06.14-06.37/23	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46 06.15-06.36/21	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43 06.16-06.35/19	03.09	03.05	04.37 06.31-06.38/7	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 06.17-06.33/16	03.07	03.07	04.40 06.28-06.41/13	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 06.19-06.30/11	03.05	03.10	04.43 06.26-06.43/17	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33 06.23-06.26/3	03.03	03.12	04.47 06.24-06.44/20	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50 06.23-06.46/23	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53 06.22-06.46/24	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.07	04.22	02.56	03.20	04.56 06.21-06.47/26	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59 06.21-06.48/27	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02 06.20-06.48/28	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05 06.19-06.48/29	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09 06.19-06.48/29	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 06.25-06.33/8	04.06	02.50	03.34	05.12 06.19-06.48/29	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45 06.20-06.35/15	04.03	02.49	03.37	05.15 06.18-06.47/29	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.18-06.37/19	04.00	02.49	03.40	05.18 06.18-06.47/29	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38 06.17-06.39/22	03.57	02.49	03.43	05.21 06.18-06.47/29	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.15-06.39/24	03.53	02.49	03.46	05.24 06.18-06.47/29	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 06.14-06.40/26	03.50	02.49	03.49	05.27 06.18-06.45/27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28 06.13-06.41/28	03.47	02.49	03.52	05.30 06.19-06.44/25	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.13-06.41/28	03.44	02.49	03.56	05.33 06.20-06.43/23	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21 06.12-06.41/29	03.41	02.50	03.59	05.36 06.21-06.42/21	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 06.11-06.41/30	03.38	02.51	04.02	05.39 06.21-06.40/19	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14 06.11-06.41/30	03.35	02.52	04.05	05.42 06.23-06.38/15	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10 06.11-06.41/30	03.32	02.53	04.08	05.45 06.27-06.34/7	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 06.11-06.41/30	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 06.12-06.40/28	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00 06.12-06.40/28	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	375	144	0	0	525	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 26 - PUU26

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 27 - PUU27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February	March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00		09.36	12.01-12.22/21
	14.35		16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06		14.42	
2	10.12		09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04		09.38	12.02-12.22/20
	14.37		16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03		14.40	
3	10.11	12.19-12.33/14	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07		09.41	12.02-12.22/20
	14.39		16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00		14.38	
4	10.09	12.19-12.34/15	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10		09.44	12.03-12.22/19
	14.41		16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57		14.36	
5	10.08	12.19-12.35/16	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13		09.46	12.05-12.22/17
	14.43		16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54		14.34	
6	10.07	12.19-12.36/17	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17		09.49	12.05-12.22/17
	14.46		16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50		14.33	
7	10.05	12.19-12.37/18	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20		09.51	12.06-12.22/16
	14.48		16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47		14.31	
8	10.03	12.19-12.37/18	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23		09.54	12.07-12.22/15
	14.51		16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44		14.30	
9	10.02	12.19-12.38/19	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26		09.56	12.08-12.22/14
	14.53		16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41		14.28	
10	10.00	12.19-12.39/20	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30		09.58	
	14.56		16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38		14.27	
11	09.58	12.19-12.40/21	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33		10.00	
	14.59		16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35		14.26	
12	09.56	12.20-12.41/21	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36		10.02	
	15.01		16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32		14.25	
13	09.54	12.20-12.41/21	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39		10.04	
	15.04		16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29		14.24	
14	09.52	12.20-12.42/22	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	12.05-12.11/6	10.06	
	15.07		16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26		14.23	
15	09.50	12.20-12.42/22	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	12.02-12.13/11	10.07	
	15.10		16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23		14.23	
16	09.47	12.20-12.43/23	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	12.00-12.15/15	10.09	
	15.13		16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20		14.22	
17	09.45	12.21-12.43/22	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	12.00-12.17/17	10.10	
	15.16		16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17		14.22	
18	09.42	12.21-12.43/22	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	11.59-12.17/18	10.11	
	15.19		17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14		14.22	
19	09.40	12.21-12.43/22	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	11.58-12.18/20	10.12	
	15.23		17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12		14.22	
20	09.37	12.22-12.44/22	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	11.58-12.19/21	10.13	
	15.26		17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09		14.22	
21	09.35	12.22-12.44/22	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	11.58-12.19/21	10.14	
	15.29		17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06		14.22	
22	09.32	12.23-12.44/21	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	11.58-12.20/22	10.15	
	15.32		17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03		14.22	
23	09.29	12.24-12.44/20	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	11.58-12.20/22	10.15	
	15.35		17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01		14.23	
24	09.27	12.25-12.43/18	07.49	06.10	05.21	03.41	02.50	03.58	05.36	07.06	08.35	09.15	11.59-12.21/22	10.15	
	15.39		17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58		14.24	
25	09.24	12.26-12.43/17	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	11.58-12.21/23	10.16	
	15.42		17.23	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56		14.24	
26	09.21	12.27-12.42/15	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	11.59-12.21/22	10.16	
	15.45		17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53		14.25	
27	09.18	12.29-12.40/11	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	11.59-12.21/22	10.16	
	15.49		17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51		14.27	
28	09.15	12.32-12.37/5	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	11.59-12.21/22	10.15	
	15.52		17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49		14.28	
29	09.12			06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	12.00-12.21/21	10.15	
	15.55			20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46		14.29	
30	09.10			06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	12.01-12.22/21	10.14	
	15.59			20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44		14.31	
31	09.07			06.46		03.21		04.21	05.57		07.57			10.14	
	16.02			20.06		23.17		22.30	20.43		16.10			14.32	
Potential sun hours	171		238	363	451	570	625	609	509	393	305	198		136	
Sum of minutes with flicker	484		0	0	0	0	0	0	0	0	0	326		159	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 28 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13	09.04 14.32-14.53/21 13.15-13.31/16	07.31	06.42	04.56	03.18
	14.35	16.05 11.28-12.00/32	17.36	20.09	21.41	23.20
2	10.12	09.00 14.32-14.53/21 13.17-13.29/12	07.28	06.38	04.53	03.16
	14.37	16.08 11.29-12.00/31	17.39	20.12	21.44	23.23
3	10.11	08.57 14.33-14.53/20 13.21-13.25/4	07.24	06.35	04.49	03.13
	14.39	16.12 11.29-11.59/30	17.42	20.15	21.48	23.26
4	10.10	08.54 14.33-14.52/19	07.21	06.31	04.46	03.11
	14.41	16.15 11.30-11.58/28	17.45	20.18	21.51	23.28
5	10.08	08.51 14.34-14.52/18	07.17	06.28	04.42	03.08
	14.43	16.18 11.30-11.58/28	17.48	20.21	21.54	23.31
6	10.07	08.48 14.35-14.51/16	07.14	06.24	04.39	03.06
	14.45	16.22 11.31-11.57/26	17.51	20.24	21.57	23.33
7	10.05	08.45 14.37-14.50/13	07.10	06.21	04.36	03.04
	14.48	16.25 11.33-11.56/23	17.54	20.27	22.01	23.36
8	10.04 13.14-13.17/3	08.42 14.39-14.48/9	07.07	06.17	04.32	03.02
	14.50	16.28 11.34-11.55/21	17.57	20.30	22.04	23.38
9	10.02 13.11-13.19/8	08.38 11.36-11.53/17	07.03	06.13	04.29	03.00
	14.53	16.32	18.00	20.33	22.07	23.40
10	10.00 13.10-13.21/11	08.35 11.39-11.49/10	07.00	06.10	04.25	02.57
	14.56	16.35	18.03	20.36	22.10	23.43
11	09.58 13.09-13.23/14	08.32	06.56	06.06	04.22	02.55
	14.59	16.38	18.06	20.39	22.14	23.45
12	09.56 11.34-11.43/9	08.29	06.53	06.03	04.19	02.54
	15.01 13.09-13.25/16	16.42	18.09	20.42	22.17	23.46
13	09.54 11.32-11.45/13	08.25	06.49	05.59	04.16	02.52
	15.04 13.08-13.26/18	16.45	18.12	20.45	22.20	23.48
14	09.52 11.31-11.47/16	08.22	06.46	05.56	04.12	02.51
	15.07 13.09-13.27/18	16.48	18.15	20.48	22.24	23.50
15	09.50 11.30-11.48/18	08.19	06.42	05.52	04.09	02.50
	15.10 13.08-13.28/20	16.51	18.18	20.51	22.27	23.51
16	09.47 11.29-11.50/21	08.16	06.39	05.49	04.06	02.49
	15.13 13.08-13.29/21	16.55	18.21	20.54	22.30	23.52
17	09.45 11.29-11.51/22	08.12	06.35	05.45	04.02	02.49
	15.16 13.08-13.30/22	16.58	18.24	20.57	22.33	23.53
18	09.42 11.28-11.52/24	08.09	06.32	05.42	03.59	02.48
	15.19 13.07-13.30/23	17.01	18.27	21.00	22.37	23.54
19	09.40 11.27-11.53/26	08.06	06.28	05.38	03.56	02.48
	15.22 13.07-13.31/24	17.04	18.30	21.03	22.40	23.55
20	09.37 11.27-11.54/27	08.02	06.25	05.35	03.53	02.48
	15.26 13.07-13.31/24	17.08	18.33	21.07	22.43	23.56
21	09.35 11.27-11.55/28	07.59	06.21	05.31	03.50	02.48
	15.29 13.08-13.32/24	17.11	18.36	21.10	22.46	23.56
22	09.32 11.27-11.56/29	07.55	06.18	05.27	03.47	02.48
	15.32 13.08-13.32/24	17.14	18.39	21.13	22.50	23.56
23	09.30 11.27-11.57/30	07.52	06.14	05.24	03.44	02.49
	15.35 13.08-13.33/25	17.17	18.42	21.16	22.53	23.56
24	09.27 14.34-14.39/5 13.08-13.33/25	07.49	06.10	05.20	03.41	02.49
	15.39 11.27-11.57/30	17.20	18.45	21.19	22.56	23.56
25	09.24 14.33-14.44/11 13.09-13.33/24	07.45	06.07	05.17	03.38	02.50
	15.42 11.27-11.58/31	17.23	18.48	21.22	22.59	23.56
26	09.21 14.32-14.48/16 13.09-13.33/24	07.42	06.03	05.13	03.35	02.51
	15.45 11.27-11.58/31	17.26	18.51	21.25	23.02	23.55
27	09.18 14.32-14.51/19 13.10-13.33/23	07.38	06.00	05.10	03.32	02.52
	15.49 11.27-11.59/32	17.30	18.54	21.28	23.05	23.54
28	09.15 14.31-14.51/20 13.10-13.33/23	07.35	05.56	05.06	03.29	02.54
	15.52 11.27-11.59/32	17.33	18.57	21.32	23.08	23.53
29	09.12 14.31-14.52/21 13.11-13.32/21		06.53	05.03	03.26	02.55
	15.55 11.27-11.59/32		20.00	21.35	23.11	23.52
30	09.10 14.31-14.52/21 13.12-13.32/20		06.49	05.00	03.24	02.57
	15.58 11.27-11.59/32		20.03	21.38	23.14	23.51
31	09.07 14.31-14.52/21 13.13-13.31/18		06.46		03.21	
	16.02 11.27-11.59/32		20.06		23.17	
Potential sun hours	171	238	363	451	570	625
Sum of minutes with flicker	1122	415	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 28 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58	04.24	06.00	07.26	08.00 11.08-11.19/11	09.36 12.51-13.05/14
	23.50	22.27	20.39	18.53	16.06	14.42
2	03.00	04.27	06.03	07.29	08.04 11.05-11.22/17	09.38 12.53-13.05/12
	23.48	22.24	20.36	18.49	16.03	14.40
3	03.00	04.30	06.06	07.32	08.07 14.08-14.18/10	09.41 12.54-13.03/9
	23.47	22.20	20.32	18.46	16.00 11.03-11.25/22	14.38
4	03.02	04.34	06.08	07.35	08.10 14.06-14.20/14	09.44 12.57-13.01/4
	23.45	22.17	20.29	18.42	15.57 11.02-11.26/24	14.36
5	03.05	04.37	06.11	07.38	08.13 14.05-14.21/16	09.46
	23.43	22.14	20.25	18.39	15.54 11.01-11.27/26	14.34
6	03.07	04.40	06.14	07.41	08.17 14.04-14.22/18	09.49
	23.41	22.10	20.22	18.35	15.50 11.01-11.28/27	14.33
7	03.09	04.43	06.17	07.44	08.20 14.04-14.23/19	09.51
	23.39	22.07	20.18	18.32	15.47 11.00-11.29/29	14.31
8	03.12	04.46	06.20	07.47	08.23 14.03-14.24/21 12.51-12.56/5	09.54
	23.37	22.03	20.15	18.28	15.44 11.00-11.30/30	14.30
9	03.14	04.49	06.23	07.50	08.26 14.03-14.24/21 12.47-13.00/13	09.56
	23.35	22.00	20.11	18.25	15.41 10.59-11.30/31	14.28
10	03.17	04.53	06.26	07.53	08.30 14.03-14.24/21 12.46-13.01/15	09.58
	23.32	21.57	20.07	18.21	15.38 10.59-11.31/32	14.27
11	03.19	04.56	06.29	07.56	08.33 14.03-14.24/21 12.44-13.03/19	10.00
	23.30	21.53	20.04	18.18	15.35 10.59-11.31/32	14.26
12	03.22	04.59	06.32	07.59	08.36 14.03-14.24/21 12.43-13.04/21	10.02
	23.27	21.50	20.00	18.14	15.32 10.59-11.31/32	14.25
13	03.25	05.02	06.35	08.02	08.39 14.03-14.24/21 12.43-13.04/21	10.04
	23.25	21.46	19.57	18.11	15.29 10.59-11.31/32	14.24
14	03.28	05.05	06.37	08.05	08.43 14.03-14.23/20 12.43-13.06/23	10.06
	23.22	21.43	19.53	18.07	15.26 10.59-11.32/33	14.23
15	03.31	05.08	06.40	08.08	08.46 14.05-14.24/19 12.42-13.06/24	10.07
	23.19	21.39	19.50	18.04	15.23 10.59-11.31/32	14.23
16	03.34	05.11	06.43	08.11	08.49 14.05-14.21/16 12.42-13.06/24	10.09
	23.17	21.36	19.46	18.00	15.20 10.59-11.31/32	14.22
17	03.37	05.14	06.46	08.14	08.52 14.06-14.16/10 12.43-13.07/24	10.10
	23.14	21.32	19.42	17.57	15.17 11.00-11.32/32	14.22
18	03.40	05.18	06.49	08.17	08.56 14.07-14.13/6 12.42-13.07/25	10.11
	23.11	21.29	19.39	17.53	15.14 11.01-11.31/30	14.22
19	03.43	05.21	06.52	08.20	08.59 11.01-11.31/30	10.12
	23.08	21.25	19.35	17.50	15.11 12.42-13.07/25	14.22
20	03.46	05.24	06.55	08.23	09.02 11.02-11.31/29	10.13
	23.05	21.22	19.32	17.47	15.09 12.43-13.07/24	14.22
21	03.49	05.27	06.57	08.26	09.05 11.02-11.30/28	10.14
	23.02	21.18	19.28	17.43	15.06 12.44-13.08/24	14.22
22	03.52	05.30	07.00	08.29	09.08 11.03-11.30/27	10.15
	22.59	21.15	19.25	17.40	15.03 12.44-13.07/23	14.22
23	03.55	05.33	07.03	08.32	09.12 11.04-11.30/26	10.15
	22.56	21.11	19.21	17.36	15.01 12.44-13.08/24	14.23
24	03.58	05.36	07.06	08.35	09.15 11.06-11.30/24	10.16
	22.53	21.08	19.18	17.33	14.58 12.45-13.08/23	14.24
25	04.02	05.39	07.09	07.38	09.18 11.06-11.29/23	10.16
	22.50	21.04	19.14	16.30	14.56 12.45-13.07/22	14.24
26	04.05	05.42	07.12	07.41	09.21 11.07-11.28/21	10.16
	22.46	21.01	19.10	16.26	14.53 12.46-13.07/21	14.25
27	04.08	05.45	07.15	07.45	09.24 11.09-11.27/18	10.16
	22.43	20.57	19.07	16.23	14.51 12.47-13.07/20	14.26
28	04.11	05.48	07.18	07.48	09.27 11.10-11.26/16	10.15
	22.40	20.54	19.03	16.20	14.49 12.48-13.06/18	14.28
29	04.14	05.51	07.20	07.51	09.30 11.12-11.25/13	10.15
	22.37	20.50	19.00	16.16	14.46 12.49-13.06/17	14.29
30	04.17	05.54	07.23	07.54	09.33 11.15-11.24/9	10.14
	22.34	20.47	18.56	16.13	14.44 12.51-13.06/15	14.31
31	04.21	05.57		07.57		10.14
	22.30	20.43		16.10		14.32
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	1512	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 29 - PUU29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August	September		October	November	December
1	10.12	09.03	07.31		06.42	08.01-08.08/7	04.56	03.19	02.59	04.24	06.00		07.26	08.00	09.35
	14.35	16.05	17.36		20.09		21.41	23.20	23.49	22.27	20.39		18.53	16.07	14.42
2	10.11	09.00	07.28		06.39		04.53	03.16	03.01	04.28	06.03		07.29	08.03	09.38
	14.37	16.09	17.39		20.12		21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40
3	10.10	08.57	07.24		06.35		04.50	03.14	03.01	04.31	06.06		07.32	08.07	09.41
	14.39	16.12	17.42		20.15		21.48	23.25	23.46	22.20	20.32		18.46	16.00	14.38
4	10.09	08.54	07.21		06.31		04.46	03.11	03.03	04.34	06.09		07.35	08.10	09.43
	14.41	16.15	17.45		20.18		21.51	23.28	23.44	22.17	20.29		18.42	15.57	14.37
5	10.08	08.51	07.17		06.28		04.43	03.09	03.05	04.37	06.12		07.38	08.13	09.46
	14.44	16.19	17.48		20.21		21.54	23.30	23.43	22.13	20.25		18.39	15.54	14.35
6	10.06	08.48	07.14		06.24		04.39	03.07	03.08	04.40	06.15		07.41	08.16	09.49
	14.46	16.22	17.51		20.24		21.57	23.33	23.41	22.10	20.22		18.35	15.51	14.33
7	10.05	08.45	07.10		06.21		04.36	03.05	03.10	04.43	06.17		07.44	08.20	09.51
	14.48	16.25	17.54		20.27		22.00	23.35	23.38	22.07	20.18		18.32	15.48	14.32
8	10.03	08.42	07.07		06.17		04.33	03.03	03.12	04.47	06.20		07.47	08.23	09.53
	14.51	16.29	17.57		20.30		22.04	23.38	23.36	22.03	20.15		18.28	15.44	14.30
9	10.01	08.38	07.03		06.14		04.29	03.01	03.15	04.50	06.23		07.50	08.26	09.56
	14.54	16.32	18.00		20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.41	14.29
10	10.00	08.35	07.00		06.10		04.26	02.57	03.17	04.53	06.26		07.53	08.29	09.58
	14.56	16.35	18.03		20.36		22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.28
11	09.58	08.32	06.56		06.07		04.23	02.56	03.20	04.56	06.29	07.54-08.00/6	07.56	08.33	10.00
	14.59	16.39	18.06		20.39		22.14	23.44	23.29	21.53	20.04		18.18	15.35	14.26
12	09.56	08.29	06.53		06.03		04.19	02.54	03.23	04.59	06.32	07.50-08.04/14	07.59	08.36	10.02
	15.02	16.42	18.09		20.42		22.17	23.46	23.27	21.50	20.00		18.14	15.32	14.25
13	09.54	08.25	06.49		05.59		04.16	02.53	03.26	05.02	06.35	07.48-08.06/18	08.02	08.39	10.04
	15.05	16.45	18.12		20.45		22.20	23.47	23.24	21.46	19.57		18.11	15.29	14.25
14	09.51	08.22	06.46		05.56		04.13	02.52	03.28	05.05	06.38	07.47-08.07/20	08.05	08.42	10.05
	15.08	16.48	18.15		20.48		22.23	23.49	23.22	21.43	19.53		18.07	15.26	14.24
15	09.49	08.19	06.42		05.52		04.09	02.51	03.31	05.09	06.40	07.45-08.07/22	08.08	08.46	10.07
	15.11	16.52	18.18		20.51		22.27	23.50	23.19	21.39	19.50		18.04	15.23	14.23
16	09.47	08.15	06.39		05.49		04.06	02.50	03.34	05.12	06.43	07.44-08.07/23	08.11	08.49	10.08
	15.14	16.55	18.21		20.54		22.30	23.52	23.16	21.36	19.46		18.00	15.20	14.23
17	09.45	08.12	06.35	07.07-07.14/7	05.45		04.03	02.50	03.37	05.15	06.46	07.43-08.08/25	08.14	08.52	10.10
	15.17	16.58	18.24		20.57		22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22
18	09.42	08.09	06.32	07.04-07.17/13	05.42		04.00	02.49	03.40	05.18	06.49	07.43-08.08/25	08.17	08.55	10.11
	15.20	17.01	18.27		21.00		22.36	23.54	23.10	21.29	19.39		17.54	15.15	14.22
19	09.40	08.05	06.28	07.00-07.18/18	05.38		03.57	02.49	03.43	05.21	06.52	07.43-08.08/25	08.20	08.59	10.12
	15.23	17.05	18.30		21.03		22.40	23.54	23.08	21.25	19.35		17.50	15.12	14.22
20	09.37	08.02	06.25	06.59-07.20/21	05.35		03.53	02.49	03.46	05.24	06.55	07.41-08.06/25	08.23	09.02	10.13
	15.26	17.08	18.33		21.06		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.22
21	09.35	07.59	06.21	06.57-07.20/23	05.31		03.50	02.49	03.49	05.27	06.58	07.42-08.06/24	08.26	09.05	10.14
	15.29	17.11	18.36		21.10		22.46	23.55	23.02	21.18	19.28		17.43	15.06	14.22
22	09.32	07.55	06.18	06.57-07.21/24	05.28		03.47	02.49	03.53	05.30	07.00	07.42-08.05/23	08.29	09.08	10.14
	15.33	17.14	18.39		21.13		22.49	23.55	22.59	21.15	19.25		17.40	15.04	14.23
23	09.29	07.52	06.14	06.56-07.20/24	05.24		03.44	02.50	03.56	05.33	07.03	07.42-08.04/22	08.32	09.11	10.15
	15.36	17.17	18.42		21.16		22.52	23.55	22.55	21.11	19.21		17.37	15.01	14.23
24	09.27	07.48	06.11	06.55-07.20/25	05.21		03.41	02.50	03.59	05.36	07.06	07.43-08.03/20	08.35	09.14	10.15
	15.39	17.20	18.45		21.19		22.55	23.55	22.52	21.08	19.18		17.33	14.59	14.24
25	09.24	07.45	06.07	06.55-07.20/25	05.17		03.38	02.51	04.02	05.39	07.09	07.46-08.01/15	07.38	09.18	10.15
	15.42	17.24	18.48		21.22		22.59	23.55	22.49	21.04	19.14		16.30	14.56	14.25
26	09.21	07.42	06.03	06.55-07.19/24	05.14		03.35	02.52	04.05	05.42	07.12	07.49-07.58/9	07.41	09.21	10.15
	15.46	17.27	18.51		21.25		23.02	23.54	22.46	21.01	19.11		16.26	14.54	14.26
27	09.18	07.38	06.00	06.55-07.19/24	05.10		03.32	02.53	04.08	05.45	07.15		07.44	09.24	10.15
	15.49	17.30	18.54		21.28		23.05	23.54	22.43	20.57	19.07		16.23	14.51	14.27
28	09.15	07.35	05.56	06.55-07.17/22	05.07		03.30	02.54	04.12	05.48	07.18		07.48	09.27	10.15
	15.52	17.33	18.57		21.32		23.08	23.53	22.40	20.54	19.03		16.20	14.49	14.28
29	09.12		06.53	07.56-08.17/21	05.03		03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35		23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.09		06.49	07.57-08.14/17	05.00		03.24	02.58	04.18	05.54	07.23		07.54	09.32	10.14
	15.59		20.03		21.38		23.14	23.51	22.33	20.47	18.56		16.13	14.45	14.31
31	09.06		06.46	07.59-08.13/14			03.21		04.21	05.57			07.57		10.13
	16.02		20.06				23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363		451		570	624	608	508	393		305	198	137
Sum of minutes with flicker	0	0	302		7		0	0	0	0	316		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 30 - PUU30

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00 06.39-06.43/4	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 06.40-06.44/4	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03 06.36-06.45/9	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59 06.33-06.47/14	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56 06.29-06.46/17	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52 06.27-06.47/20	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49 06.27-06.48/21	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45 06.26-06.47/21	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.26-06.47/21	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38 06.26-06.47/21	03.56	02.49	03.43	05.21 06.36-06.46/10	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.26-06.45/19	03.53	02.49	03.46	05.24 06.34-06.48/14	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 06.26-06.44/18	03.50	02.49	03.49	05.27 06.32-06.48/16	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28 06.27-06.43/16	03.47	02.49	03.52	05.30 06.31-06.49/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.29-06.42/13	03.44	02.49	03.56	05.33 06.30-06.50/20	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.10	05.21 06.30-06.39/9	03.41	02.50	03.59	05.36 06.30-06.50/20	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39 06.28-06.49/21	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42 06.28-06.49/21	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45 06.28-06.49/21	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48 06.29-06.49/20	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51 06.30-06.47/17	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54 06.33-06.46/13	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57 06.36-06.45/9		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	223	0	0	0	220	4	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 31 - PUU31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 32 - PUU32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 33 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13	09.03 13.32-13.43/11 12.01-12.10/9	07.31	06.42	04.56	03.18
	14.35	16.05 10.08-10.33/25	17.36	20.09	21.41	23.20
2	10.12	09.00 10.08-10.33/25	07.28	06.38	04.53	03.16
	14.37	16.08	17.39	20.12	21.44	23.23
3	10.11	08.57 10.07-10.33/26	07.24	06.35	04.49	03.13
	14.39	16.12	17.42	20.15	21.48	23.26
4	10.09	08.54 10.07-10.34/27	07.21	06.31	04.46	03.11
	14.41	16.15	17.45	20.18	21.51	23.28
5	10.08 11.54-11.59/5	08.51 10.07-10.34/27	07.17	06.28	04.42	03.08
	14.43	16.18	17.48	20.21	21.54	23.31
6	10.07 11.52-12.01/9	08.48 10.07-10.34/27	07.14	06.24	04.39	03.06
	14.45	16.22	17.51	20.24	21.57	23.33
7	10.05 11.52-12.03/11	08.45 10.08-10.35/27	07.10	06.21	04.36	03.04
	14.48	16.25	17.54	20.27	22.01	23.36
8	10.03 11.52-12.05/13	08.42 10.08-10.34/26	07.07	06.17	04.32	03.02
	14.50	16.28	17.57	20.30	22.04	23.38
9	10.02 11.50-12.05/15	08.38 10.08-10.34/26	07.03	06.13	04.29	03.00
	14.53	16.32	18.00	20.33	22.07	23.40
10	10.00 13.23-13.29/6	08.35 10.08-10.33/25	07.00	06.10	04.25	02.57
	14.56 11.50-12.07/17	16.35	18.03	20.36	22.10	23.42
11	09.58 13.23-13.34/11	08.32 10.09-10.32/23	06.56	06.06	04.22	02.55
	14.58 11.50-12.07/17	16.38	18.06	20.39	22.14	23.44
12	09.56 13.23-13.40/17	08.29 10.10-10.32/22	06.53	06.03	04.19	02.54
	15.01 11.50-12.09/19	16.42	18.09	20.42	22.17	23.46
13	09.54 13.22-13.40/18	08.25 10.11-10.31/20	06.49	05.59	04.15	02.52
	15.04 11.49-12.10/21	16.45	18.12	20.45	22.20	23.48
14	09.52 13.23-13.42/19	08.22 10.13-10.29/16	06.46	05.56	04.12	02.51
	15.07 11.50-12.11/21	16.48	18.15	20.48	22.24	23.50
15	09.50 13.22-13.42/20	08.19 10.15-10.26/11	06.42	05.52	04.09	02.50
	15.10 11.49-12.11/22	16.51	18.18	20.51	22.27	23.51
16	09.47 13.22-13.43/21	08.15	06.39	05.49	04.06	02.49
	15.13 11.49-12.12/23	16.55	18.21	20.54	22.30	23.52
17	09.45 13.22-13.44/22	08.12	06.35	05.45	04.02	02.49
	15.16 11.50-12.13/23	16.58	18.24	20.57	22.33	23.53
18	09.42 13.21-13.44/23	08.09	06.32	05.42	03.59	02.48
	15.19 11.49-12.13/24	17.01	18.27	21.00	22.37	23.54
19	09.40 13.22-13.45/23	08.05	06.28	05.38	03.56	02.48
	15.22 11.49-12.14/25	17.04	18.30	21.03	22.40	23.55
20	09.37 13.22-13.46/24	08.02	06.25	05.34	03.53	02.48
	15.26 11.50-12.14/24	17.07	18.33	21.06	22.43	23.56
21	09.35 13.22-13.46/24	07.59	06.21	05.31	03.50	02.48
	15.29 11.50-12.15/25	17.11	18.36	21.10	22.46	23.56
22	09.32 13.23-13.46/23	07.55	06.17	05.27	03.47	02.48
	15.32 11.50-12.15/25	17.14	18.39	21.13	22.49	23.56
23	09.29 13.23-13.47/24	07.52	06.14	05.24	03.44	02.49
	15.35 11.51-12.15/24	17.17	18.42	21.16	22.53	23.56
24	09.27 13.23-13.47/24	07.48	06.10	05.20	03.41	02.49
	15.39 11.51-12.15/24	17.20	18.45	21.19	22.56	23.56
25	09.24 13.24-13.47/23	07.45	06.07	05.17	03.38	02.50
	15.42 11.52-12.15/23	17.23	18.48	21.22	22.59	23.56
26	09.21 13.24-13.47/23 11.52-12.15/23	07.42	06.03	05.13	03.35	02.51
	15.45 10.14-10.24/10	17.26	18.51	21.25	23.02	23.55
27	09.18 13.25-13.47/22 11.53-12.15/22	07.38	06.00	05.10	03.32	02.52
	15.48 10.12-10.26/14	17.30	18.54	21.28	23.05	23.54
28	09.15 13.26-13.46/20 11.54-12.15/21	07.35	05.56	05.06	03.29	02.54
	15.52 10.11-10.28/17	17.33	18.57	21.32	23.08	23.53
29	09.12 13.26-13.46/20 11.55-12.14/19		06.53	05.03	03.26	02.55
	15.55 10.09-10.29/20		20.00	21.35	23.11	23.52
30	09.09 13.28-13.45/17 11.56-12.13/17		06.49	05.00	03.23	02.57
	15.58 10.08-10.30/22		20.03	21.38	23.14	23.51
31	09.06 13.29-13.43/14 11.57-12.11/14		06.45		03.21	
	16.02 10.08-10.31/23		20.06		23.17	
Potential sun hours	171	238	363	451	570	625
Sum of minutes with flicker	1070	373	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 33 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58	04.24	06.00	07.26	08.00 09.37-10.03/26	09.36 13.05-13.17/12
	23.50	22.27	20.39	18.53	16.06	14.42 11.32-11.50/18
2	03.00	04.27	06.03	07.29	08.04 09.37-10.03/26	09.38 13.07-13.13/6
	23.48	22.24	20.36	18.49	16.03	14.40 11.33-11.50/17
3	03.00	04.30	06.06	07.32	08.07 09.37-10.04/27	09.41 11.34-11.49/15
	23.47	22.20	20.32	18.46	16.00	14.38
4	03.02	04.33	06.08	07.35	08.10 09.37-10.04/27	09.44 11.35-11.48/13
	23.45	22.17	20.29	18.42	15.57	14.36
5	03.05	04.37	06.11	07.38	08.13 09.37-10.04/27	09.46 11.37-11.48/11
	23.43	22.14	20.25	18.39	15.53	14.34
6	03.07	04.40	06.14	07.41	08.16 09.37-10.04/27	09.49 11.39-11.48/9
	23.41	22.10	20.22	18.35	15.50	14.33
7	03.09	04.43	06.17	07.44	08.20 09.37-10.04/27	09.51 11.41-11.46/5
	23.39	22.07	20.18	18.32	15.47	14.31
8	03.12	04.46	06.20	07.47	08.23 09.38-10.04/26	09.54
	23.37	22.03	20.15	18.28	15.44	14.30
9	03.14	04.49	06.23	07.50	08.26 13.07-13.09/2	09.56
	23.35	22.00	20.11	18.25	15.41 09.38-10.04/26	14.28
10	03.17	04.53	06.26	07.53	08.30 13.02-13.13/11 11.31-11.41/10	09.58
	23.32	21.57	20.07	18.21	15.38 09.39-10.03/24	14.27
11	03.19	04.56	06.29	07.56	08.33 13.01-13.15/14 11.29-11.43/14	10.00
	23.30	21.53	20.04	18.18	15.35 09.39-10.03/24	14.26
12	03.22	04.59	06.32	07.58	08.36 12.59-13.17/18 11.27-11.45/18	10.02
	23.27	21.50	20.00	18.14	15.32 09.40-10.02/22	14.25
13	03.25	05.02	06.35	08.01	08.39 12.58-13.17/19 11.26-11.46/20	10.04
	23.25	21.46	19.57	18.11	15.29 09.41-10.01/20	14.24
14	03.28	05.05	06.37	08.04	08.43 12.57-13.18/21 11.26-11.47/21	10.06
	23.22	21.43	19.53	18.07	15.26 09.43-10.00/17	14.23
15	03.31	05.08	06.40	08.07	08.46 12.58-13.20/22 11.26-11.48/22	10.07
	23.19	21.39	19.50	18.04	15.23 09.45-09.59/14	14.23
16	03.34	05.11	06.43	08.10	08.49 12.57-13.20/23 11.25-11.48/23	10.09
	23.16	21.36	19.46	18.00	15.20 09.47-09.56/9	14.22
17	03.37	05.14	06.46	08.14	08.52 12.57-13.20/23	10.10
	23.14	21.32	19.42	17.57	15.17 11.26-11.49/23	14.22
18	03.40	05.17	06.49	08.17	08.56 12.57-13.21/24	10.11
	23.11	21.29	19.39	17.53	15.14 11.25-11.49/24	14.22
19	03.43	05.21	06.52	08.20	08.59 12.57-13.21/24	10.12
	23.08	21.25	19.35	17.50	15.11 11.25-11.49/24	14.21
20	03.46	05.24	06.55	08.23	09.02 12.58-13.21/23	10.13
	23.05	21.22	19.32	17.47	15.09 11.25-11.50/25	14.22
21	03.49	05.27	06.57	08.26	09.05 12.57-13.21/24	10.14
	23.02	21.18	19.28	17.43	15.06 11.26-11.51/25	14.22
22	03.52	05.30	07.00	08.29	09.08 12.58-13.22/24	10.15
	22.59	21.15	19.25	17.40	15.03 11.26-11.50/24	14.22
23	03.55	05.33	07.03	08.32	09.12 12.59-13.22/23	10.15
	22.56	21.11	19.21	17.36	15.01 11.26-11.51/25	14.23
24	03.58	05.36	07.06	08.35	09.15 13.00-13.22/22	10.15
	22.53	21.08	19.17	17.33	14.58 11.27-11.51/24	14.23
25	04.01	05.39	07.09	07.38	09.18 12.59-13.22/23	10.16
	22.50	21.04	19.14	16.30	14.56 11.27-11.50/23	14.24
26	04.05	05.42	07.12	07.41 09.49-09.51/2	09.21 13.00-13.22/22	10.16
	22.46	21.01	19.10	16.26	14.53 11.28-11.50/22	14.25
27	04.08	05.45	07.15	07.44 09.44-09.57/13	09.24 13.01-13.21/20	10.16
	22.43	20.57	19.07	16.23	14.51 11.28-11.50/22	14.26
28	04.11	05.48	07.18	07.48 09.42-09.59/17	09.27 13.02-13.21/19	10.15
	22.40	20.54	19.03	16.20	14.48 11.29-11.50/21	14.28
29	04.14	05.51	07.20	07.51 09.40-10.00/20	09.30 13.03-13.21/18	10.15
	22.37	20.50	19.00	16.16	14.46 11.30-11.50/20	14.29
30	04.17	05.54	07.23	07.54 09.39-10.02/23	09.33 13.04-13.21/17	10.14
	22.34	20.47	18.56	16.13	14.44 11.31-11.51/20	14.31
31	04.21	05.57		07.57 09.39-10.03/24		10.14
	22.30	20.43		16.10		14.32
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	99	1255	106

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 34 - PUU34

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.34/16	02.59 04.19-04.45/26	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.17-04.35/18	03.01 04.19-04.44/25	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.16-04.35/19	03.01 04.19-04.44/25	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.16-04.37/21	03.03 04.20-04.45/25	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.16-04.38/22	03.05 04.20-04.44/24	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.15-04.38/23	03.07 04.21-04.44/23	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.15-04.38/23	03.10 04.21-04.44/23	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02 04.15-04.39/24	03.12 04.22-04.44/22	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01 04.15-04.40/25	03.15 04.23-04.43/20	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.15-04.40/25	03.17 04.24-04.43/19	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56 04.15-04.40/25	03.20 04.26-04.43/17	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54 04.14-04.40/26	03.23 04.26-04.41/15	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53 04.15-04.41/26	03.25 04.28-04.40/12	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52 04.15-04.41/26	03.28 04.31-04.39/8	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51 04.15-04.42/27	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50 04.15-04.42/27	03.34	05.12	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49 04.15-04.42/27	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49 04.15-04.43/28	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49 04.16-04.43/27	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48 04.16-04.43/27	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49 04.16-04.43/27	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49 04.16-04.43/27	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49 04.17-04.44/27	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50 04.16-04.44/28	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51 04.17-04.44/27	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52 04.17-04.44/27	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53 04.17-04.44/27	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.18-04.45/27	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27 04.23-04.29/6	02.56 04.18-04.45/27	04.15	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24 04.21-04.31/10	02.57 04.19-04.45/26	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21 04.19-04.32/13		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	29	752	284	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 35 - PUU35

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 36 - PUU36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 37 - PUU37

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03 12.12-12.30/18	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00 10.12-10.20/8	09.36 11.47-12.07/20
	14.35	16.05 10.34-10.59/25	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00 12.14-12.29/15	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04 10.09-10.23/14	09.38 11.48-12.07/19
	14.36	16.08 10.34-10.59/25	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57 12.17-12.26/9	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07 10.08-10.25/17	09.41 11.49-12.06/17
	14.39	16.12 10.35-10.58/23	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09 12.11-12.13/2	08.54 10.35-10.58/23	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10 10.07-10.26/19	09.44 11.50-12.05/15
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08 12.08-12.16/8	08.51 10.35-10.58/23	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13 10.06-10.27/21	09.46 11.52-12.05/13
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07 12.07-12.18/11	08.48 10.36-10.57/21	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16 10.06-10.28/22	09.49 11.54-12.05/11
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05 12.07-12.20/13	08.45 10.38-10.57/19	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20 10.05-10.29/24	09.51 11.55-12.03/8
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03 12.07-12.21/14	08.42 10.39-10.55/16	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23 11.47-11.57/10	09.54 11.58-12.01/3
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44 10.05-10.29/24	14.29
9	10.02 12.05-12.22/17	08.38 10.40-10.53/13	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26 11.44-11.59/15	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24	15.41 10.05-10.29/24	14.28
10	10.00 12.05-12.23/18	08.35 10.43-10.50/7	07.00	06.10	04.25	02.56	03.17	04.52	06.26	07.53	08.29 11.43-12.01/18	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38 10.05-10.29/24	14.27
11	09.58 12.05-12.24/19	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33 11.42-12.02/20	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35 10.05-10.29/24	14.26
12	09.56 12.05-12.26/21	08.29 09.09-09.13/4	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36 11.41-12.03/22	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32 10.05-10.29/24	14.25
13	09.54 12.04-12.26/22	08.25 09.05-09.16/11	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39 11.40-12.04/24	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29 10.05-10.29/24	14.24
14	09.52 12.05-12.28/23	08.22 09.01-09.17/16	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43 11.39-12.04/25	10.06
	15.07	16.48	18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07	15.26 10.06-10.29/23	14.23
15	09.49 12.04-12.28/24	08.19 09.00-09.18/18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07 09.35-09.47/12	08.46 11.40-12.06/26	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23 10.07-10.29/22	14.22
16	09.47 12.04-12.29/25	08.15 09.00-09.20/20	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10 09.33-09.48/15	08.49 11.39-12.06/27	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20 10.07-10.28/21	14.22
17	09.45 12.05-12.30/25	08.12 08.59-09.20/21	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13 09.31-09.49/18	08.52 11.39-12.06/27	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17 10.09-10.28/19	14.22
18	09.42 12.04-12.30/26	08.09 08.58-09.20/22	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17 09.31-09.51/20	08.56 11.40-12.07/27	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14 10.09-10.27/18	14.21
19	09.40 12.04-12.31/27	08.05 08.58-09.21/23	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20 09.29-09.51/22	08.59 11.39-12.06/27	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11 10.10-10.26/16	14.21
20	09.37 12.04-12.31/27	08.02 08.58-09.21/23	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23 09.28-09.51/23	09.02 11.40-12.07/27	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46	15.09 10.13-10.25/12	14.21
21	09.35 12.05-12.32/27	07.59 08.58-09.21/23	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26 09.28-09.51/23	09.05 11.40-12.07/27	10.14
	15.29 10.39-10.48/9	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06 10.15-10.24/9	14.22
22	09.32 12.05-12.32/27	07.55 08.58-09.20/22	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29 09.28-09.51/23	09.08 11.40-12.07/27	10.15
	15.32 10.38-10.50/12	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29 12.05-12.32/27	07.52 08.59-09.20/21	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32 09.28-09.51/23	09.11 11.41-12.08/27	10.15
	15.35 10.36-10.52/16	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27 12.06-12.33/27	07.48 08.59-09.19/20	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35 09.28-09.50/22	09.15 11.42-12.08/26	10.15
	15.38 10.36-10.53/17	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24 12.06-12.33/27	07.45 09.00-09.17/17	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38 08.29-08.50/21	09.18 11.42-12.07/25	10.16
	15.42 10.35-10.54/19	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21 12.06-12.33/27	07.42 09.02-09.16/14	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41 08.29-08.49/20	09.21 11.43-12.07/24	10.16
	15.45 10.34-10.55/21	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18 12.07-12.33/26	07.38 09.04-09.13/9	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44 08.30-08.48/18	09.24 11.43-12.07/24	10.16
	15.48 10.34-10.56/22	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15 12.08-12.32/24	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48 08.32-08.47/15	09.27 11.44-12.07/23	10.15
	15.52 10.34-10.57/23	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19	14.48	14.28
29	09.12 12.08-12.32/24		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51 08.35-08.45/10	09.30 11.45-12.07/22	10.15
	15.55 10.33-10.57/24		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09 12.09-12.31/22		06.49	04.59	03.23	02.57	04.17	05.54	07.23	07.54 08.39-08.41/2	09.33 11.46-12.07/21	10.14
	15.58 10.33-10.57/24		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06 12.10-12.30/20		06.45		03.21		04.21	05.57		07.57		10.14
	16.02 10.33-10.58/25		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	812	521	0	0	0	0	0	0	0	287	950	106

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May		June	
1	10.12	09.03	07.31		06.42	04.56		03.19	05.13-06.08/55
	14.35	16.05	17.36		20.09	21.41		23.19	
2	10.11	09.00	07.28		06.38	04.53		03.16	05.13-06.07/54
	14.37	16.09	17.39		20.12	21.44		23.22	
3	10.10	08.57	07.24		06.35	04.49	05.42-05.53/11	03.14	05.12-06.07/55
	14.39	16.12	17.42		20.15	21.47		23.25	
4	10.09	08.54	07.21		06.31	04.46	05.39-05.56/17	03.11	05.13-06.07/54
	14.41	16.15	17.45		20.18	21.51		23.28	
5	10.08	08.51	07.17		06.28	04.43	05.36-05.58/22	03.09	05.13-06.07/54
	14.44	16.19	17.48		20.21	21.54		23.30	
6	10.06	08.48	07.14		06.24	04.39	05.34-06.00/26	03.07	05.13-06.06/53
	14.46	16.22	17.51		20.24	21.57		23.33	
7	10.05	08.45	07.10		06.21	04.36	05.34-06.02/28	03.05	05.13-06.07/54
	14.48	16.25	17.54		20.27	22.00		23.35	
8	10.03	08.41	07.07		06.17	04.32	05.32-06.03/31	03.03	05.14-06.07/53
	14.51	16.29	17.57		20.30	22.04		23.37	
9	10.01	08.38	07.03		06.14	04.29	05.31-06.03/32	03.01	05.14-06.07/53
	14.54	16.32	18.00		20.33	22.07		23.40	
10	09.59	08.35	07.00		06.10	04.26	05.26-06.04/38	02.57	05.14-06.06/52
	14.56	16.35	18.03		20.36	22.10		23.42	
11	09.57	08.32	06.56		06.06	04.22	05.24-06.04/40	02.56	05.14-06.06/52
	14.59	16.39	18.06		20.39	22.13		23.44	
12	09.56	08.28	06.53		06.03	04.19	05.22-06.06/44	02.54	05.14-06.06/52
	15.02	16.42	18.09		20.42	22.17		23.45	
13	09.53	08.25	06.49		05.59	04.16	05.20-06.06/46	02.53	05.15-06.07/52
	15.05	16.45	18.12		20.45	22.20		23.47	
14	09.51	08.22	06.46		05.56	04.13	05.19-06.06/47	02.52	05.15-06.06/51
	15.08	16.48	18.15		20.48	22.23		23.49	
15	09.49	08.19	06.42	07.15-07.22/7	05.52	04.09	05.18-06.07/49	02.51	05.15-06.07/52
	15.11	16.52	18.18		20.51	22.26		23.50	
16	09.47	08.15	06.39	07.11-07.24/13	05.49	04.06	05.17-06.07/50	02.50	05.15-06.06/51
	15.14	16.55	18.21		20.54	22.30		23.51	
17	09.44	08.12	06.35	07.07-07.25/18	05.45	04.03	05.15-06.07/52	02.50	05.16-06.06/50
	15.17	16.58	18.24		20.57	22.33		23.52	
18	09.42	08.09	06.32	07.06-07.27/21	05.42	04.00	05.15-06.07/52	02.49	05.16-06.07/51
	15.20	17.01	18.27		21.00	22.36		23.53	
19	09.40	08.05	06.28	07.04-07.27/23	05.38	03.57	05.14-06.07/53	02.49	05.16-06.07/51
	15.23	17.04	18.30		21.03	22.39		23.54	
20	09.37	08.02	06.25	07.04-07.28/24	05.35	03.53	05.14-06.07/53	02.49	05.16-06.07/51
	15.26	17.08	18.33		21.06	22.43		23.55	
21	09.34	07.59	06.21	07.03-07.27/24	05.31	03.50	05.14-06.08/54	02.49	05.16-06.07/51
	15.29	17.11	18.36		21.09	22.46		23.55	
22	09.32	07.55	06.17	07.02-07.27/25	05.28	03.47	05.13-06.07/54	02.49	05.16-06.07/51
	15.32	17.14	18.39		21.12	22.49		23.55	
23	09.29	07.52	06.14	07.02-07.27/25	05.24	03.44	05.13-06.08/55	02.50	05.17-06.08/51
	15.36	17.17	18.42		21.16	22.52		23.55	
24	09.26	07.48	06.10	07.01-07.26/25	05.21	03.41	05.13-06.08/55	02.50	05.17-06.08/51
	15.39	17.20	18.45		21.19	22.55		23.55	
25	09.24	07.45	06.07	07.02-07.26/24	05.17	03.38	05.13-06.08/55	02.51	05.18-06.09/51
	15.42	17.23	18.48		21.22	22.58		23.55	
26	09.21	07.41	06.03	07.02-07.25/23	05.14	03.35	05.13-06.08/55	02.52	05.17-06.08/51
	15.45	17.27	18.51		21.25	23.02		23.54	
27	09.18	07.38	06.00	07.03-07.24/21	05.10	03.32	05.13-06.08/55	02.53	05.18-06.09/51
	15.49	17.30	18.54		21.28	23.05		23.53	
28	09.15	07.35	05.56	07.03-07.22/19	05.07	03.30	05.13-06.08/55	02.54	05.18-06.09/51
	15.52	17.33	18.57		21.31	23.08		23.53	
29	09.12		06.53	08.05-08.20/15	05.03	03.27	05.12-06.08/56	02.56	05.18-06.10/52
	15.55		20.00		21.35	23.11		23.51	
30	09.09		06.49	08.07-08.17/10	05.00	03.24	05.12-06.07/55	02.58	05.18-06.10/52
	15.59		20.03		21.38	23.14		23.50	
31	09.06		06.46			03.21	05.12-06.07/55		
	16.02		20.06			23.16			
Potential sun hours	171	238	363		451	570		624	
Sum of minutes with flicker	0	0	317		0	1295		1562	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	05.18-06.11/53	04.24	05.33-06.15/42	06.00		07.26	08.00	09.35
	23.49		22.27		20.39		18.53	16.07	14.42
2	03.01	05.18-06.11/53	04.27	05.35-06.15/40	06.03		07.29	08.03	09.38
	23.47		22.23		20.36		18.49	16.03	14.40
3	03.01	05.18-06.11/53	04.31	05.38-06.14/36	06.06		07.32	08.07	09.41
	23.46		22.20		20.32		18.46	16.00	14.38
4	03.03	05.19-06.12/53	04.34	05.41-06.13/32	06.09		07.35	08.10	09.43
	23.44		22.17		20.29		18.42	15.57	14.37
5	03.05	05.19-06.12/53	04.37	05.43-06.12/29	06.11		07.38	08.13	09.46
	23.42		22.13		20.25		18.39	15.54	14.35
6	03.08	05.19-06.13/54	04.40	05.43-06.10/27	06.14		07.41	08.16	09.48
	23.40		22.10		20.22		18.35	15.51	14.33
7	03.10	05.19-06.13/54	04.43	05.45-06.09/24	06.17		07.44	08.19	09.51
	23.38		22.06		20.18		18.32	15.47	14.32
8	03.12	05.20-06.14/54	04.47	05.47-06.08/21	06.20		07.47	08.23	09.53
	23.36		22.03		20.14		18.28	15.44	14.30
9	03.15	05.20-06.14/54	04.50	05.49-06.05/16	06.23		07.50	08.26	09.55
	23.34		22.00		20.11		18.25	15.41	14.29
10	03.17	05.20-06.15/55	04.53	05.52-06.01/9	06.26		07.52	08.29	09.58
	23.31		21.56		20.07		18.21	15.38	14.28
11	03.20	05.21-06.15/54	04.56		06.29		07.55	08.32	10.00
	23.29		21.53		20.04		18.18	15.35	14.26
12	03.23	05.21-06.16/55	04.59		06.32		07.58	08.36	10.02
	23.27		21.49		20.00		18.14	15.32	14.25
13	03.26	05.20-06.16/56	05.02		06.35	07.59-08.07/8	08.01	08.39	10.03
	23.24		21.46		19.57		18.11	15.29	14.24
14	03.28	05.21-06.17/56	05.05		06.37	07.55-08.09/14	08.04	08.42	10.05
	23.21		21.43		19.53		18.07	15.26	14.24
15	03.31	05.21-06.17/56	05.08		06.40	07.53-08.11/18	08.07	08.45	10.07
	23.19		21.39		19.49		18.04	15.23	14.23
16	03.34	05.22-06.17/55	05.12		06.43	07.52-08.12/20	08.10	08.49	10.08
	23.16		21.36		19.46		18.00	15.20	14.23
17	03.37	05.22-06.17/55	05.15		06.46	07.51-08.13/22	08.13	08.52	10.09
	23.13		21.32		19.42		17.57	15.17	14.22
18	03.40	05.22-06.17/55	05.18		06.49	07.50-08.14/24	08.16	08.55	10.11
	23.10		21.29		19.39		17.53	15.15	14.22
19	03.43	05.23-06.18/55	05.21		06.52	07.48-08.13/25	08.19	08.58	10.12
	23.07		21.25		19.35		17.50	15.12	14.22
20	03.46	05.23-06.18/55	05.24		06.55	07.48-08.13/25	08.23	09.02	10.13
	23.04		21.22		19.32		17.47	15.09	14.22
21	03.49	05.23-06.17/54	05.27		06.57	07.47-08.13/26	08.26	09.05	10.13
	23.01		21.18		19.28		17.43	15.06	14.22
22	03.52	05.24-06.18/54	05.30		07.00	07.47-08.12/25	08.29	09.08	10.14
	22.58		21.15		19.25		17.40	15.04	14.23
23	03.56	05.24-06.18/54	05.33		07.03	07.48-08.12/24	08.32	09.11	10.15
	22.55		21.11		19.21		17.36	15.01	14.23
24	03.59	05.24-06.18/54	05.36		07.06	07.48-08.11/23	08.35	09.14	10.15
	22.52		21.08		19.17		17.33	14.59	14.24
25	04.02	05.25-06.18/53	05.39		07.09	07.48-08.10/22	07.38	09.17	10.15
	22.49		21.04		19.14		16.30	14.56	14.25
26	04.05	05.25-06.18/53	05.42		07.12	07.48-08.08/20	07.41	09.20	10.15
	22.46		21.01		19.10		16.26	14.54	14.26
27	04.08	05.27-06.17/50	05.45		07.15	07.51-08.06/15	07.44	09.23	10.15
	22.43		20.57		19.07		16.23	14.51	14.27
28	04.11	05.28-06.18/50	05.48		07.18	07.54-08.03/9	07.47	09.26	10.15
	22.40		20.53		19.03		16.20	14.49	14.28
29	04.15	05.28-06.17/49	05.51		07.20		07.51	09.29	10.14
	22.36		20.50		19.00		16.16	14.47	14.30
30	04.18	05.30-06.17/47	05.54		07.23		07.54	09.32	10.14
	22.33		20.46		18.56		16.13	14.44	14.31
31	04.21	05.31-06.15/44	05.57				07.57		10.13
	22.30		20.43				16.10		14.33
Potential sun hours	608		508		393		305	198	137
Sum of minutes with flicker	1650		276		320		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 39 - PUU39

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.19/1	02.59 04.13-04.34/21	04.24	06.00 06.39-06.47/8	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.16-04.22/6	03.01 04.13-04.34/21	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.14-04.23/9	03.01 04.13-04.33/20	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.13-04.25/12	03.03 04.14-04.34/20	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.12-04.26/14	03.05 04.15-04.33/18	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.10-04.26/16	03.07 04.16-04.33/17	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.09-04.27/18	03.10 04.17-04.32/15	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.03 04.09-04.28/19	03.12 04.19-04.32/13	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.01 04.09-04.29/20	03.15 04.21-04.31/10	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.09-04.29/20	03.17 04.23-04.30/7	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 06.39-06.47/8	04.22	02.56 04.08-04.30/22	03.20 04.25-04.29/4	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03 06.36-06.49/13	04.19	02.54 04.08-04.30/22	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59 06.33-06.50/17	04.16	02.53 04.04-04.08/4	03.25	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47 04.09-04.31/22	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56 06.30-06.50/20	04.12	02.52 04.03-04.31/28	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52 06.29-06.51/22	04.09	02.51 04.03-04.32/29	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49 06.28-06.52/24	04.06	02.50 04.02-04.31/29	03.34	05.11 06.41-06.48/7	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45 06.27-06.51/24	04.03	02.49 04.02-04.32/30	03.37	05.15 06.37-06.50/13	06.46	08.13	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.27-06.52/25	04.00	02.49 04.02-04.32/30	03.40	05.18 06.36-06.52/16	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38 06.27-06.52/25	03.56	02.49 04.02-04.33/31	03.43	05.21 06.35-06.53/18	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.27-06.50/23	03.53	02.49 04.02-04.33/31	03.46	05.24 06.34-06.54/20	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31 06.27-06.50/23	03.50	02.49 04.02-04.33/31	03.49	05.27 06.32-06.54/22	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28 06.28-06.50/22	03.47	02.49 04.02-04.33/31	03.52	05.30 06.31-06.55/24	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.28-06.49/21	03.44	02.49 04.03-04.34/31	03.56	05.33 06.31-06.55/24	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21 06.28-06.47/19	03.41	02.50 04.03-04.33/30	03.59	05.36 06.31-06.55/24	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 06.30-06.45/15	03.38	02.51 04.04-04.34/30	04.02	05.39 06.30-06.54/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14 06.31-06.43/12	03.35	02.52 04.04-04.34/30	04.05	05.42 06.30-06.54/24	07.12	07.41	09.20	10.15
	15.45	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10 06.35-06.40/5	03.32	02.53 04.05-04.34/29	04.08	05.45 06.30-06.54/24	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.06-04.34/28	04.11	05.48 06.31-06.53/22	07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56 04.07-04.34/27	04.15	05.51 06.30-06.51/21	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57 04.12-04.34/22	04.18	05.54 06.33-06.50/17	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 06.36-06.49/13		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	318	0	702	166	313	8	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 40 - PUU40

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21 05.16-05.37/21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 41 - PUU41

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 42 - PUU42

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 20.35-20.55/20	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53 20.34-20.55/21	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49 20.34-20.55/21	03.14	03.01	04.30 20.51-20.58/7	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46 20.35-20.54/19	03.11	03.03	04.34 20.49-21.01/12	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42 20.35-20.54/19	03.09	03.05	04.37 20.47-21.01/14	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 20.35-20.53/18	03.07	03.07	04.40 20.46-21.02/16	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 20.36-20.52/16	03.04	03.10	04.43 20.45-21.03/18	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 20.37-20.51/14	03.02	03.12	04.46 20.44-21.03/19	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 20.39-20.50/11	03.01	03.15	04.50 20.44-21.03/19	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26 20.42-20.47/5	02.57	03.17	04.53 20.44-21.04/20	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56 20.44-21.04/20	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.23	04.59 20.43-21.03/20	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	03.25	05.02 20.43-21.02/19	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	03.28	05.05 20.44-20.59/15	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08 20.44-20.56/12	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11 20.44-20.52/8	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	03.37	05.15 20.45-20.50/5	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.35	03.53	02.48	03.46	05.24	06.55	08.22	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 20.40-20.41/1	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13 20.39-20.44/5	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10 20.37-20.46/9	03.32	02.53	04.08	05.45	07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 20.36-20.49/13	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 20.35-20.52/17	03.27	02.56	04.14	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00 20.35-20.54/19	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 43 - PUU43

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 44 - PUU44

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56		03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41		23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53		03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44		23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49		03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47		23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46		03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51		23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42		03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54		23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39		03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36		03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00		23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32		03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04		23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29		03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07		23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26		02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22		02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13		23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19		02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17		23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16		02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20		23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12		02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23		23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	21.31-21.35/4	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26		23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	21.29-21.38/9	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30		23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	21.27-21.41/14	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33		23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	21.27-21.44/17	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36		23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	21.25-21.46/21	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39		23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	21.25-21.47/22	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43		23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	21.24-21.47/23	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46		23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	21.24-21.48/24	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49		23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	21.23-21.49/26	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52		23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	21.23-21.50/27	02.50	21.29-21.54/25	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55		23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	21.22-21.49/27	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58		23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	21.22-21.50/28	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02		23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	21.22-21.50/28	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	21.22-21.50/28	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08		23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	21.22-21.50/28	02.56	21.29-21.55/26	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11		23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	21.23-21.51/28	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14		23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	21.23-21.51/28			04.21		05.57		07.57		10.13
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382		786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 45 - PUU45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 46 - PUU46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May	June		July		August	September		October		November	December
1	10.12	09.03	07.31		06.42	04.56	03.18		02.59	21.56-22.11/15	04.24	06.00		07.26	17.53-18.13/20	08.00	09.35
	14.35	16.05	17.36		20.09	21.41	23.19		23.49		22.26	20.39		18.53		16.06	14.42
2	10.11	09.00	07.28		06.38	04.53	03.16		03.01	21.56-22.10/14	04.27	06.02		07.29	17.53-18.11/18	08.03	09.38
	14.37	16.08	17.39		20.12	21.44	23.22		23.47		22.23	20.36		18.49		16.03	14.40
3	10.10	08.57	07.24		06.35	04.49	03.13		03.01	21.58-22.09/11	04.30	06.05		07.32	17.53-18.07/14	08.06	09.41
	14.39	16.12	17.42		20.15	21.47	23.25		23.46		22.20	20.32		18.45		16.00	14.38
4	10.09	08.54	07.21		06.31	04.46	03.11		03.03	21.59-22.07/8	04.34	06.08		07.35	17.54-18.03/9	08.10	09.43
	14.41	16.15	17.45		20.18	21.50	23.27		23.44		22.16	20.28		18.42		15.57	14.36
5	10.07	08.51	07.17		06.28	04.42	03.09		03.05		04.37	06.11		07.38	17.55-18.00/5	08.13	09.46
	14.43	16.18	17.48		20.20	21.54	23.30		23.42		22.13	20.25		18.38		15.53	14.35
6	10.06	08.48	07.14		06.24	04.39	03.07		03.07		04.40	06.14		07.41		08.16	09.48
	14.46	16.22	17.51		20.23	21.57	23.33		23.40		22.10	20.21		18.35		15.50	14.33
7	10.05	08.44	07.10		06.20	04.36	03.04		03.10		04.43	06.17		07.43		08.19	09.51
	14.48	16.25	17.54		20.26	22.00	23.35		23.38		22.06	20.18		18.31		15.47	14.31
8	10.03	08.41	07.07	17.19-17.20/1	06.17	04.32	03.02	21.56-22.01/5	03.12		04.46	06.20		07.46		08.23	09.53
	14.51	16.28	17.57		20.29	22.03	23.37		23.36		22.03	20.14		18.28		15.44	14.30
9	10.01	08.38	07.03	17.17-17.24/7	06.13	04.29	03.00	21.54-22.04/10	03.14		04.49	06.23		07.49		08.26	09.55
	14.53	16.32	18.00		20.33	22.07	23.40		23.34		22.00	20.11		18.24		15.41	14.28
10	09.59	08.35	07.00	17.15-17.27/12	06.10	04.26	02.57	21.52-22.05/13	03.17		04.53	06.26		07.52		08.29	09.58
	14.56	16.35	18.03		20.36	22.10	23.42		23.31		21.56	20.07		18.21		15.38	14.27
11	09.57	08.32	06.56	17.15-17.31/16	06.06	04.22	02.55	21.51-22.07/16	03.20		04.56	06.29		07.55		08.32	10.00
	14.59	16.38	18.06		20.39	22.13	23.44		23.29		21.53	20.04		18.17		15.35	14.26
12	09.55	08.28	06.53	17.14-17.33/19	06.03	04.19	02.54	21.51-22.07/16	03.22		04.59	06.31		07.58		08.36	10.02
	15.01	16.42	18.09		20.42	22.16	23.45		23.26		21.49	20.00		18.14		15.32	14.25
13	09.53	08.25	06.49	17.13-17.33/20	05.59	04.16	02.53	21.50-22.08/18	03.25		05.02	06.34		08.01		08.39	10.03
	15.04	16.45	18.12		20.45	22.20	23.47		23.24		21.46	19.56		18.11		15.29	14.24
14	09.51	08.22	06.46	17.13-17.34/21	05.56	04.12	02.52	21.50-22.09/19	03.28		05.05	06.37		08.04		08.42	10.05
	15.07	16.48	18.15		20.48	22.23	23.49		23.21		21.42	19.53		18.07		15.26	14.23
15	09.49	08.18	06.42	17.13-17.33/20	05.52	04.09	02.51	21.49-22.10/21	03.31		05.08	06.40		08.07		08.45	10.07
	15.10	16.51	18.18		20.51	22.26	23.50		23.19		21.39	19.49		18.04		15.23	14.23
16	09.47	08.15	06.39	17.13-17.31/18	05.49	04.06	02.50	21.49-22.11/22	03.34		05.11	06.43		08.10		08.49	10.08
	15.13	16.55	18.21		20.54	22.30	23.51		23.16		21.35	19.46		18.00		15.20	14.22
17	09.44	08.12	06.35	17.14-17.31/17	05.45	04.03	02.49	21.50-22.11/21	03.37		05.14	06.46		08.13		08.52	10.09
	15.16	16.58	18.24		20.57	22.33	23.52		23.13		21.32	19.42		17.57		15.17	14.22
18	09.42	08.08	06.31	17.14-17.29/15	05.41	03.59	02.49	21.50-22.12/22	03.40		05.17	06.49		08.16		08.55	10.11
	15.19	17.01	18.27		21.00	22.36	23.53		23.10		21.28	19.39		17.53		15.14	14.22
19	09.39	08.05	06.28	17.17-17.27/10	05.38	03.56	02.48	21.49-22.11/22	03.43		05.21	06.52		08.19		08.58	10.12
	15.23	17.04	18.30		21.03	22.39	23.54		23.07		21.25	19.35		17.50		15.12	14.22
20	09.37	08.02	06.24		05.34	03.53	02.48	21.50-22.13/23	03.46		05.24	06.54		08.22		09.02	10.13
	15.26	17.07	18.33		21.06	22.42	23.55		23.04		21.21	19.32		17.46		15.09	14.22
21	09.34	07.58	06.21		05.31	03.50	02.48	21.50-22.13/23	03.49		05.27	06.57		08.25		09.05	10.13
	15.29	17.11	18.36		21.09	22.46	23.55		23.01		21.18	19.28		17.43		15.06	14.22
22	09.32	07.55	06.17		05.27	03.47	02.49	21.50-22.13/23	03.52		05.30	07.00		08.29		09.08	10.14
	15.32	17.14	18.39		21.12	22.49	23.55		22.58		21.14	19.24		17.40		15.03	14.23
23	09.29	07.52	06.14		05.24	03.44	02.49	21.50-22.13/23	03.55		05.33	07.03		08.32		09.11	10.14
	15.35	17.17	18.42		21.15	22.52	23.55		22.55		21.11	19.21		17.36		15.01	14.23
24	09.26	07.48	06.10		05.20	03.41	02.50	21.51-22.13/22	03.58		05.36	07.06	18.01-18.10/9	08.35		09.14	10.15
	15.39	17.20	18.45		21.19	22.55	23.55		22.52		21.07	19.17		17.33		14.58	14.24
25	09.23	07.45	06.07		05.17	03.38	02.51	21.51-22.13/22	04.02		05.39	07.09	17.58-18.12/14	07.38		09.17	10.15
	15.42	17.23	18.48		21.22	22.58	23.55		22.49		21.04	19.14		16.30		14.56	14.25
26	09.21	07.41	06.03		05.13	03.35	02.52	21.51-22.13/22	04.05		05.42	07.12	17.56-18.13/17	07.41		09.20	10.15
	15.45	17.26	18.51		21.25	23.01	23.54		22.46		21.00	19.10		16.26		14.53	14.26
27	09.18	07.38	06.00		05.10	03.32	02.53	21.52-22.13/21	04.08		05.45	07.14	17.55-18.13/18	07.44		09.23	10.15
	15.49	17.29	18.54		21.28	23.05	23.53		22.43		20.57	19.07		16.23		14.51	14.27
28	09.15	07.34	05.56		05.06	03.29	02.54	21.53-22.13/20	04.11		05.48	07.17	17.54-18.14/20	07.47		09.26	10.15
	15.52	17.33	18.57		21.31	23.08	23.53		22.39		20.53	19.03		16.20		14.49	14.28
29	09.12		06.52		05.03	03.26	02.56	21.53-22.12/19	04.14		05.51	07.20	17.53-18.14/21	07.50		09.29	10.14
	15.55		20.00		21.34	23.11	23.51		22.36		20.50	19.00		16.16		14.46	14.29
30	09.09		06.49		05.00	03.24	02.57	21.54-22.11/17	04.18		05.54	07.23	17.53-18.14/21	07.54		09.32	10.14
	15.58		20.03		21.38	23.14	23.50		22.33		20.46	18.56		16.13		14.44	14.31
31	09.06		06.45			03.21			04.21		05.57			07.57			10.13
	16.02		20.06			23.16			22.30		20.43			16.10			14.33
Potential sun hours	171	238	363		451	570	624		609		509	393		305		198	137
Sum of minutes with flicker	0	0	176		0	0	440		48		0	120		66		0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 47 - PUU47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00 19.36-19.55/19	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02 19.36-19.55/19	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05 19.35-19.53/18	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08 19.35-19.50/15	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28 19.42-19.44/2	04.42	03.09	03.05	04.37	06.11 19.36-19.46/10	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24 19.41-19.47/6	04.39	03.06	03.07	04.40	06.14 19.37-19.43/6	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20 19.40-19.50/10	04.36	03.04	03.09	04.43	06.17 19.38-19.40/2	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17 19.38-19.52/14	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13 19.38-19.56/18	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10 19.37-19.56/19	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 19.37-19.56/19	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03 19.36-19.55/19	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59 19.37-19.55/18	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56 19.38-19.54/16	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52 19.38-19.52/14	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48 19.40-19.50/10	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45 19.43-19.47/4	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42 19.45-19.51/6	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45 19.41-19.52/11	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48 19.39-19.54/15	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51 19.38-19.55/17	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54 19.37-19.56/19	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 19.36-19.55/19		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	169	0	0	0	87	89	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 48 - PUU48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59 19.30-19.54/24	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02 19.30-19.53/23	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05 19.30-19.51/21	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08 19.31-19.50/19	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28	18.42	15.57	14.36
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11 19.33-19.46/13	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24 19.40-19.47/7	04.39	03.06	03.07	04.40	06.14 19.36-19.43/7	07.41	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20 19.37-19.50/13	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17 19.34-19.52/18	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13 19.33-19.54/21	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10 19.31-19.54/23	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06 19.31-19.55/24	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03 19.29-19.55/26	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59 19.29-19.55/26	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56 19.29-19.55/26	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52 19.28-19.54/26	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48 19.28-19.54/26	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45 19.29-19.54/25	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41 19.29-19.52/23	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38 19.29-19.52/23	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34 19.30-19.51/21	03.53	02.48	03.46	05.24 19.41-19.50/9	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31 19.32-19.50/18	03.50	02.48	03.49	05.27 19.38-19.53/15	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27 19.33-19.47/14	03.47	02.49	03.52	05.30 19.36-19.54/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24 19.36-19.44/8	03.44	02.49	03.55	05.33 19.34-19.55/21	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36 19.33-19.55/22	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39 19.32-19.56/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42 19.32-19.57/25	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45 19.30-19.56/26	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48 19.30-19.56/26	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51 19.30-19.56/26	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54 19.30-19.56/26	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 19.29-19.55/26		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	368	0	0	0	264	107	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102**WTG:** 49 - PUU49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.12	09.03	07.31		06.42	04.56	03.18	02.59	04.24	05.59		07.26	17.52-18.10/18	08.00	09.35
	14.35	16.05	17.36		20.08	21.41	23.19	23.49	22.26	20.39		18.52		16.06	14.42
2	10.11	09.00	07.27		06.38	04.53	03.16	03.01	04.27	06.02		07.29	17.54-18.06/12	08.03	09.38
	14.37	16.08	17.39		20.11	21.44	23.22	23.47	22.23	20.36		18.49		16.03	14.40
3	10.10	08.57	07.24		06.35	04.49	03.13	03.01	04.30	06.05		07.32		08.06	09.41
	14.39	16.12	17.42		20.14	21.47	23.25	23.46	22.20	20.32		18.45		16.00	14.38
4	10.09	08.54	07.21		06.31	04.46	03.11	03.03	04.33	06.08		07.35		08.10	09.43
	14.41	16.15	17.45		20.17	21.50	23.27	23.44	22.16	20.28		18.42		15.57	14.36
5	10.07	08.51	07.17		06.27	04.42	03.09	03.05	04.37	06.11		07.38		08.13	09.46
	14.43	16.18	17.48		20.20	21.54	23.30	23.42	22.13	20.25		18.38		15.53	14.34
6	10.06	08.48	07.14		06.24	04.39	03.06	03.07	04.40	06.14		07.40		08.16	09.48
	14.46	16.22	17.51		20.23	21.57	23.33	23.40	22.10	20.21		18.35		15.50	14.33
7	10.04	08.44	07.10		06.20	04.35	03.04	03.09	04.43	06.17		07.43		08.19	09.51
	14.48	16.25	17.54		20.26	22.00	23.35	23.38	22.06	20.18		18.31		15.47	14.31
8	10.03	08.41	07.07		06.17	04.32	03.02	03.12	04.46	06.20		07.46		08.23	09.53
	14.51	16.28	17.57		20.29	22.03	23.37	23.36	22.03	20.14		18.28		15.44	14.30
9	10.01	08.38	07.03		06.13	04.29	03.00	03.14	04.49	06.23		07.49		08.26	09.55
	14.53	16.32	18.00		20.32	22.07	23.40	23.34	22.00	20.11		18.24		15.41	14.28
10	09.59	08.35	07.00		06.10	04.25	02.57	03.17	04.53	06.26		07.52		08.29	09.57
	14.56	16.35	18.03		20.35	22.10	23.42	23.31	21.56	20.07		18.21		15.38	14.27
11	09.57	08.32	06.56	17.18-17.26/8	06.06	04.22	02.55	03.20	04.56	06.29		07.55		08.32	10.00
	14.59	16.38	18.06		20.38	22.13	23.44	23.29	21.53	20.03		18.17		15.35	14.26
12	09.55	08.28	06.53	17.13-17.29/16	06.03	04.19	02.54	03.22	04.59	06.31		07.58		08.36	10.01
	15.01	16.41	18.09		20.42	22.16	23.45	23.26	21.49	20.00		18.14		15.32	14.25
13	09.53	08.25	06.49	17.11-17.31/20	05.59	04.15	02.53	03.25	05.02	06.34	18.01-18.14/13	08.01		08.39	10.03
	15.04	16.45	18.12		20.45	22.20	23.47	23.24	21.46	19.56		18.10		15.29	14.24
14	09.51	08.22	06.46	17.09-17.33/24	05.56	04.12	02.51	03.28	05.05	06.37	17.58-18.16/18	08.04		08.42	10.05
	15.07	16.48	18.15		20.48	22.23	23.49	23.21	21.42	19.53		18.07		15.26	14.23
15	09.49	08.18	06.42	17.07-17.34/27	05.52	04.09	02.51	03.31	05.08	06.40	17.56-18.18/22	08.07		08.45	10.07
	15.10	16.51	18.18		20.51	22.26	23.50	23.19	21.39	19.49		18.04		15.23	14.23
16	09.47	08.15	06.38	17.06-17.34/28	05.48	04.06	02.50	03.34	05.11	06.43	17.53-18.18/25	08.10		08.49	10.08
	15.13	16.54	18.21		20.54	22.29	23.51	23.16	21.35	19.46		18.00		15.20	14.22
17	09.44	08.12	06.35	17.05-17.35/30	05.45	04.02	02.49	03.37	05.14	06.46	17.52-18.19/27	08.13		08.52	10.09
	15.16	16.58	18.24		20.57	22.33	23.52	23.13	21.32	19.42		17.57		15.17	14.22
18	09.42	08.08	06.31	17.04-17.35/31	05.41	03.59	02.49	03.40	05.17	06.49	17.51-18.20/29	08.16		08.55	10.11
	15.19	17.01	18.27		21.00	22.36	23.53	23.10	21.28	19.39		17.53		15.14	14.22
19	09.39	08.05	06.28	17.04-17.36/32	05.38	03.56	02.48	03.43	05.20	06.51	17.50-18.20/30	08.19		08.58	10.12
	15.22	17.04	18.30		21.03	22.39	23.54	23.07	21.25	19.35		17.50		15.11	14.22
20	09.37	08.02	06.24	17.03-17.35/32	05.34	03.53	02.48	03.46	05.24	06.54	17.49-18.20/31	08.22		09.01	10.13
	15.26	17.07	18.33		21.06	22.42	23.55	23.04	21.21	19.31		17.46		15.09	14.22
21	09.34	07.58	06.21	17.02-17.34/32	05.31	03.50	02.48	03.49	05.27	06.57	17.48-18.20/32	08.25		09.05	10.13
	15.29	17.11	18.36		21.09	22.46	23.55	23.01	21.18	19.28		17.43		15.06	14.22
22	09.32	07.55	06.17	17.03-17.35/32	05.27	03.47	02.49	03.52	05.30	07.00	17.47-18.19/32	08.28		09.08	10.14
	15.32	17.14	18.39		21.12	22.49	23.55	22.58	21.14	19.24		17.40		15.03	14.22
23	09.29	07.52	06.14	17.02-17.34/32	05.24	03.44	02.49	03.55	05.33	07.03	17.47-18.19/32	08.32		09.11	10.14
	15.35	17.17	18.42		21.15	22.52	23.55	22.55	21.11	19.21		17.36		15.01	14.23
24	09.26	07.48	06.10	17.03-17.33/30	05.20	03.41	02.50	03.58	05.36	07.06	17.47-18.19/32	08.35		09.14	10.15
	15.39	17.20	18.45		21.19	22.55	23.55	22.52	21.07	19.17		17.33		14.58	14.24
25	09.23	07.45	06.07	17.03-17.32/29	05.17	03.38	02.51	04.02	05.39	07.09	17.47-18.18/31	07.38		09.17	10.15
	15.42	17.23	18.48		21.22	22.58	23.55	22.49	21.04	19.14		16.29		14.56	14.25
26	09.21	07.41	06.03	17.04-17.31/27	05.13	03.35	02.52	04.05	05.42	07.12	17.47-18.17/30	07.41		09.20	10.15
	15.45	17.26	18.51		21.25	23.01	23.54	22.46	21.00	19.10		16.26		14.53	14.25
27	09.18	07.38	05.59	17.04-17.30/26	05.10	03.32	02.53	04.08	05.45	07.14	17.48-18.16/28	07.44		09.23	10.15
	15.48	17.29	18.54		21.28	23.04	23.53	22.43	20.57	19.07		16.23		14.51	14.27
28	09.15	07.34	05.56	17.06-17.29/23	05.06	03.29	02.54	04.11	05.48	07.17	17.48-18.15/27	07.47		09.26	10.15
	15.52	17.32	18.57		21.31	23.08	23.53	22.39	20.53	19.03		16.19		14.49	14.28
29	09.12		06.52	18.07-18.26/19	05.03	03.26	02.55	04.14	05.51	07.20	17.49-18.14/25	07.50		09.29	10.14
	15.55		20.00		21.34	23.11	23.51	22.36	20.50	19.00		16.16		14.46	14.29
30	09.09		06.49	18.09-18.23/14	04.59	03.24	02.57	04.17	05.54	07.23	17.50-18.12/22	07.54		09.32	10.14
	15.58		20.03		21.38	23.13	23.50	22.33	20.46	18.56		16.13		14.44	14.31
31	09.06		06.45	18.15-18.18/3		03.21		04.21	05.57			07.57			10.13
	16.02		20.06			23.16		22.30	20.43			16.10			14.32
Potential sun hours	171	238	363		451	570	624	609	509	393		305		198	137
Sum of minutes with flicker	0	0	515		0	0	0	0	0	486		30		0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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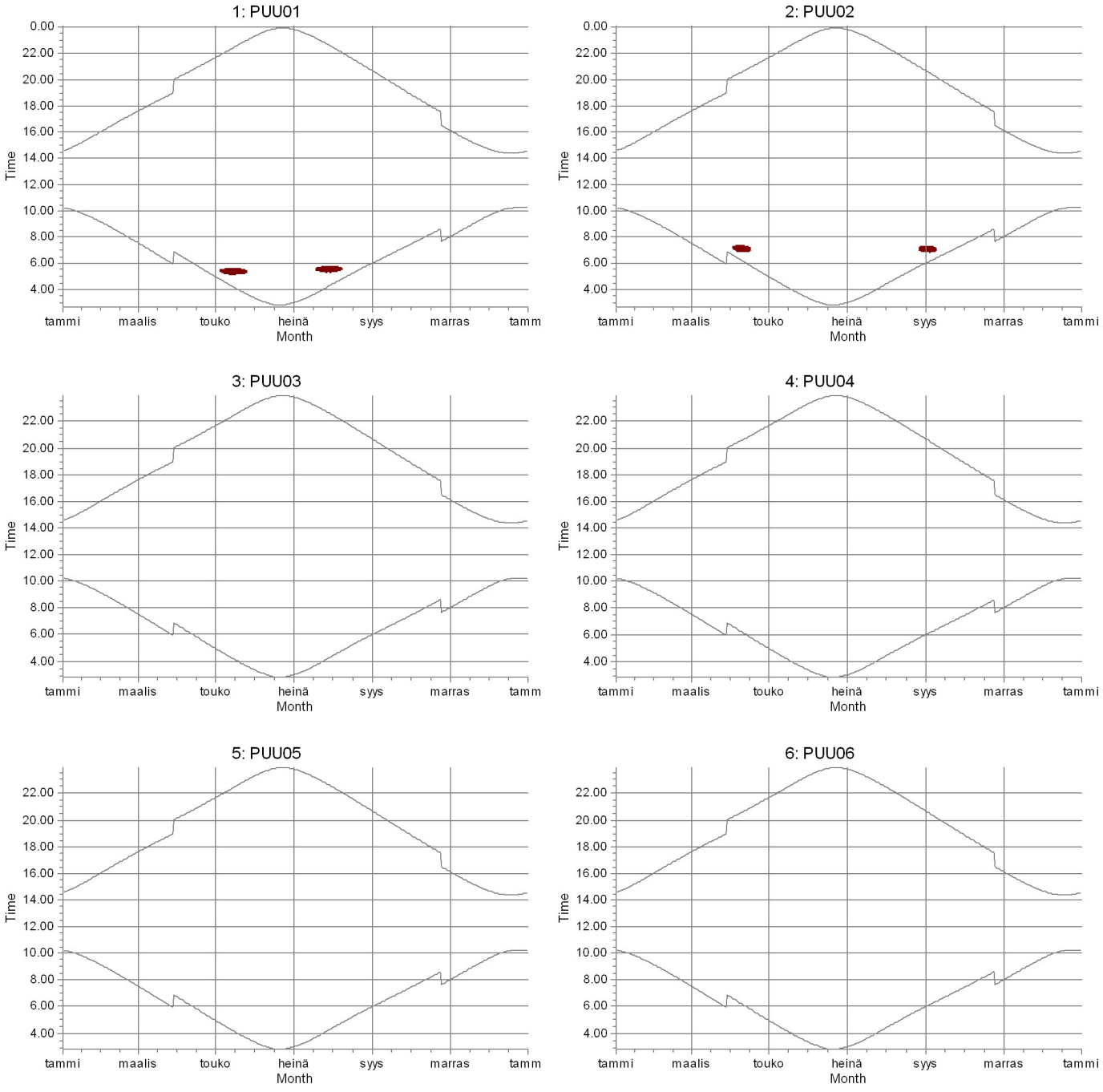
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

H: Asuinrakennus H (Pinolantie 406)

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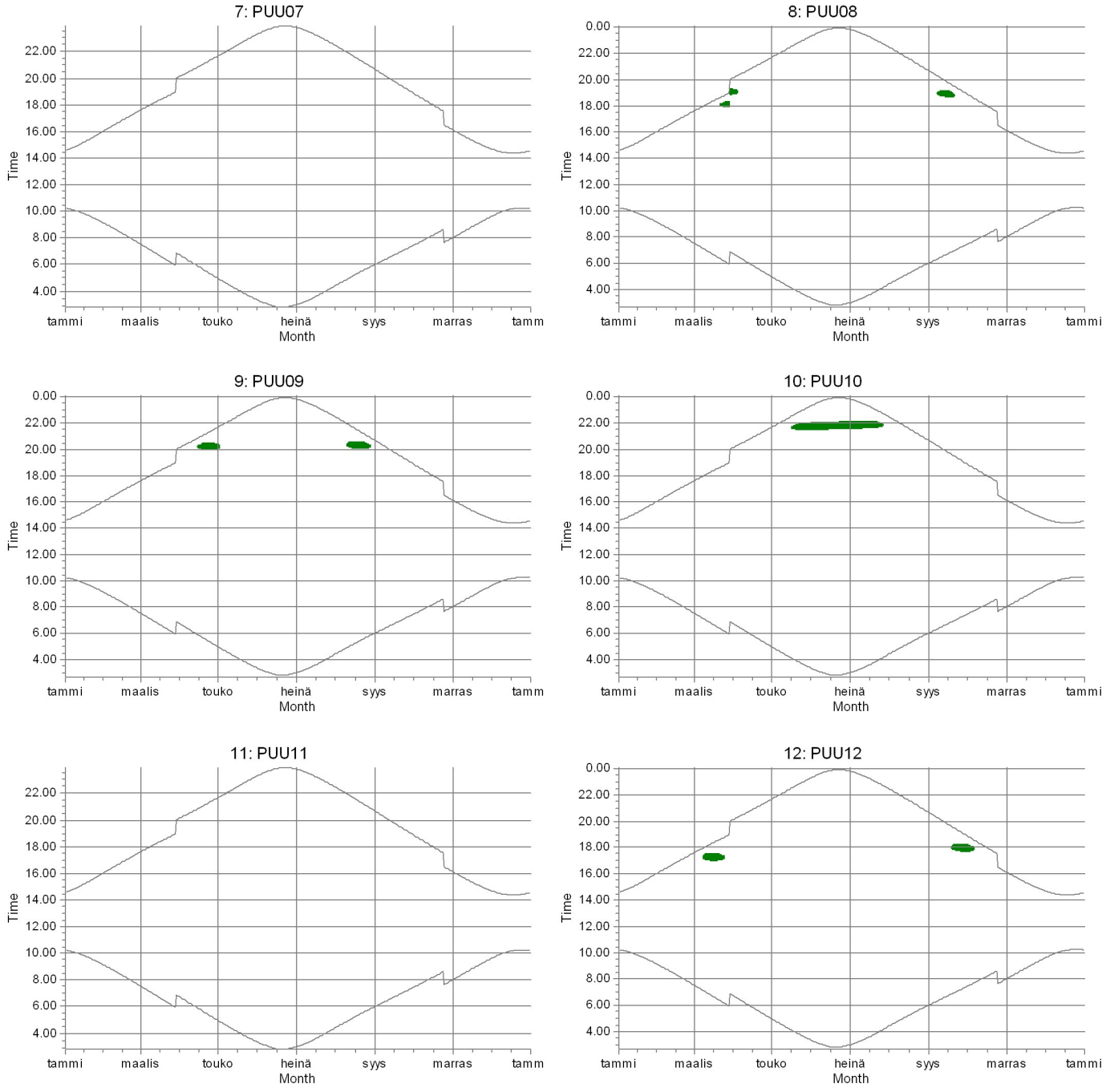
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

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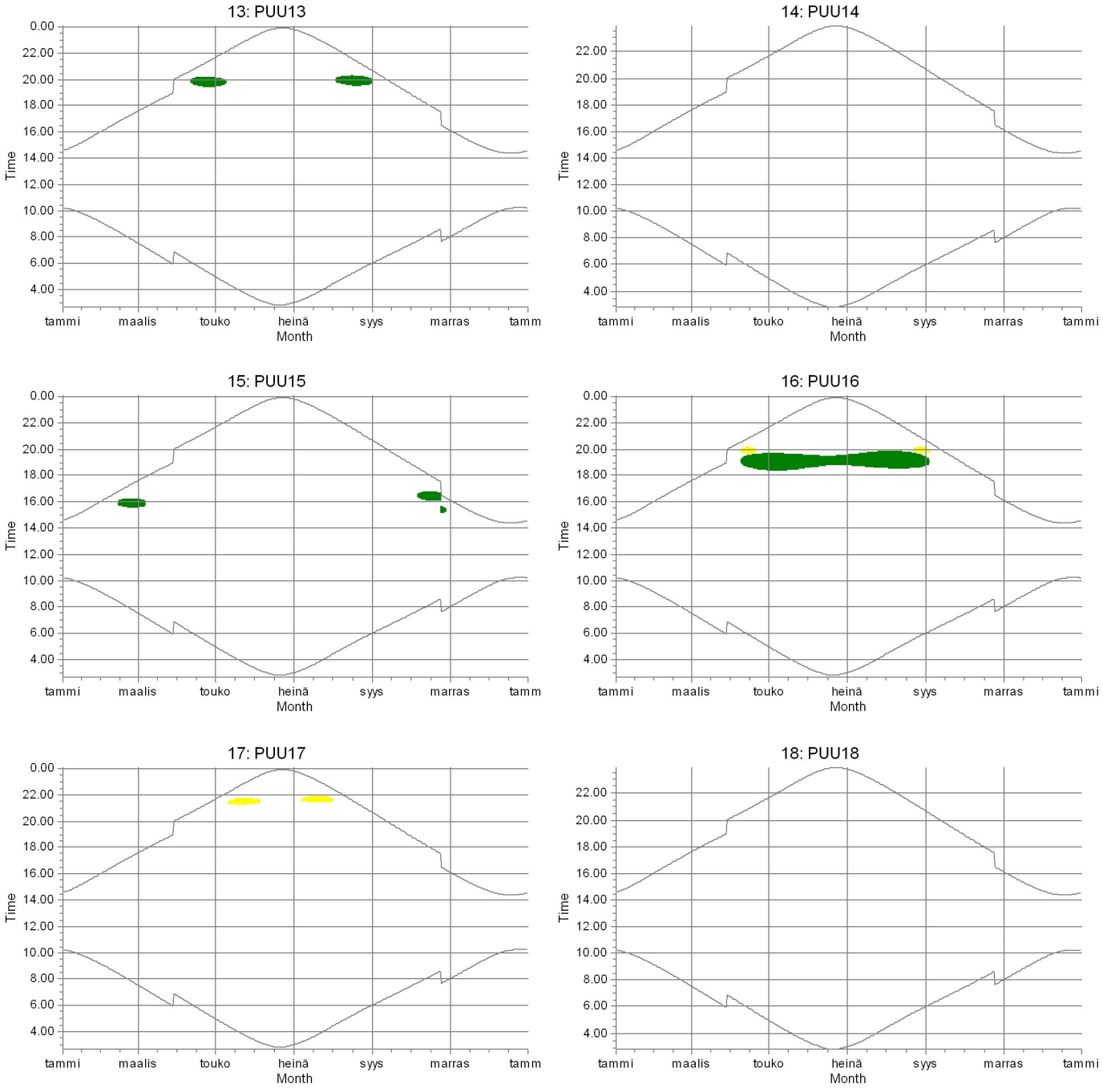
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

B: Laskentapiste B (Ylivieskantie, Pohlola)

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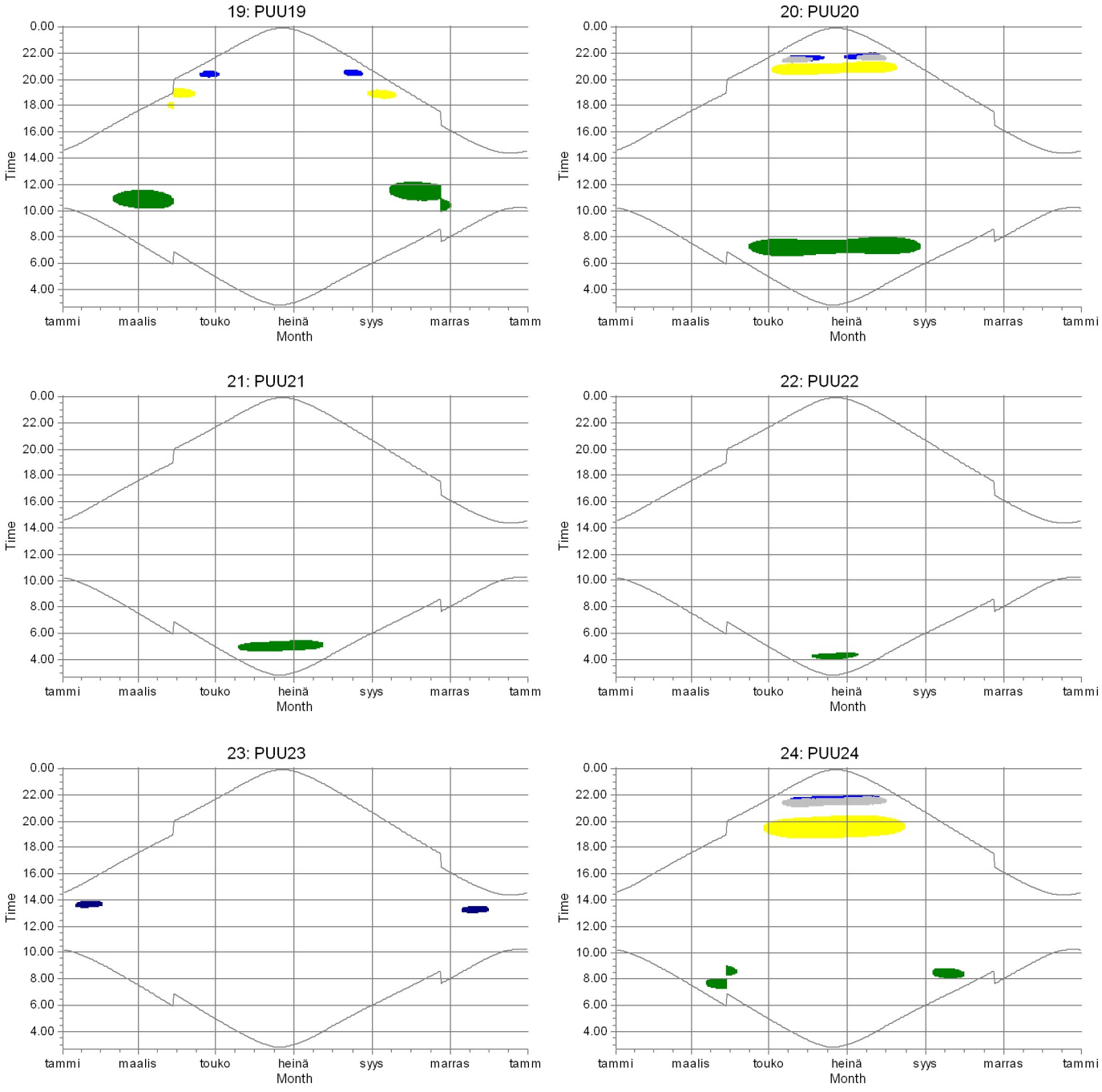
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

- A: Laskentapiste A (Metsästysmaja)
- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- L: Laskentapiste L (Perkkiontie, Ilmola)

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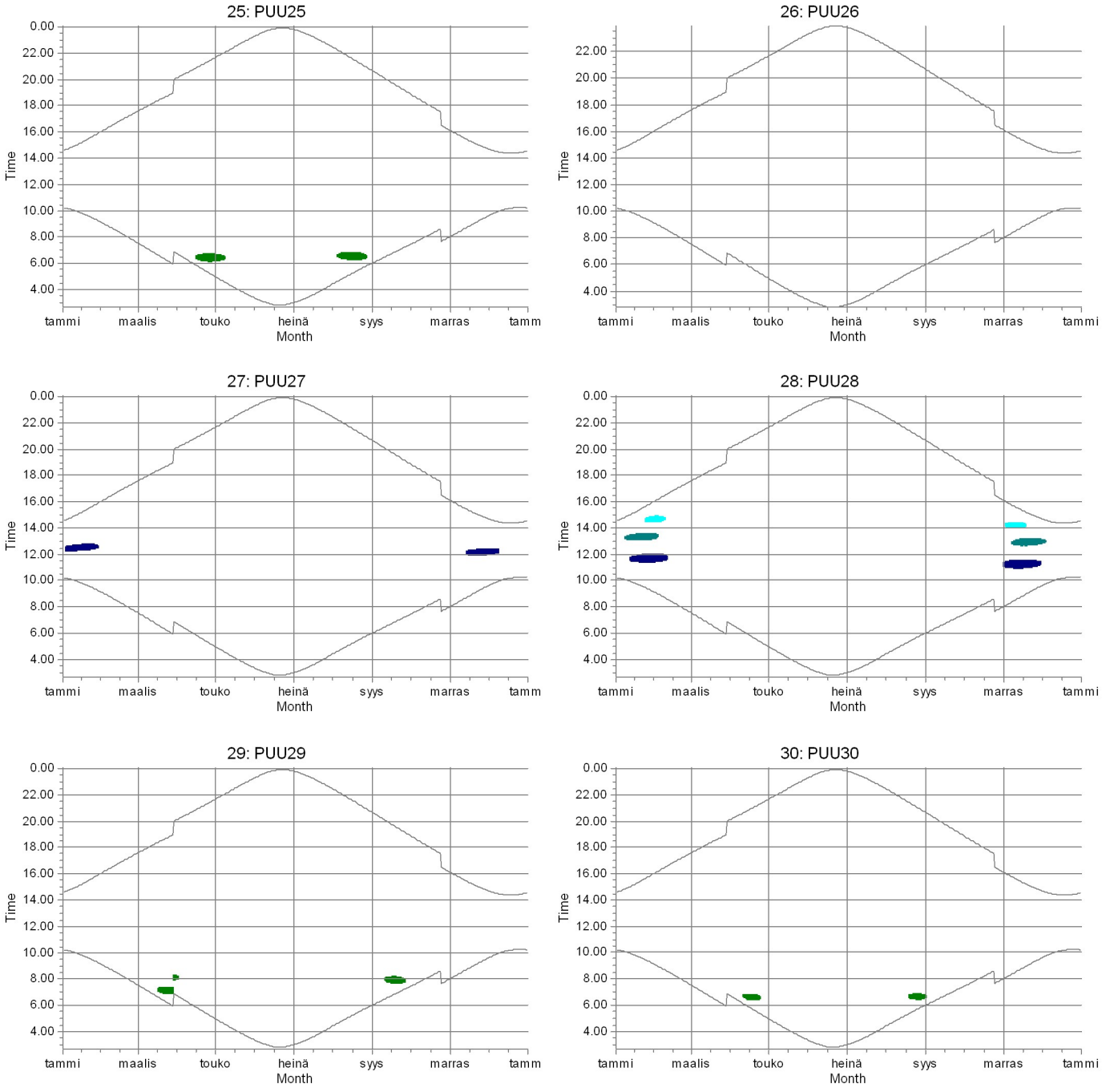
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

- A: Laskentapiste A (Metsästysmaja)
- F: Asuinrakennus F (Ollilantie 112)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- M: Lomarakennus M (Riskalan metsatie)

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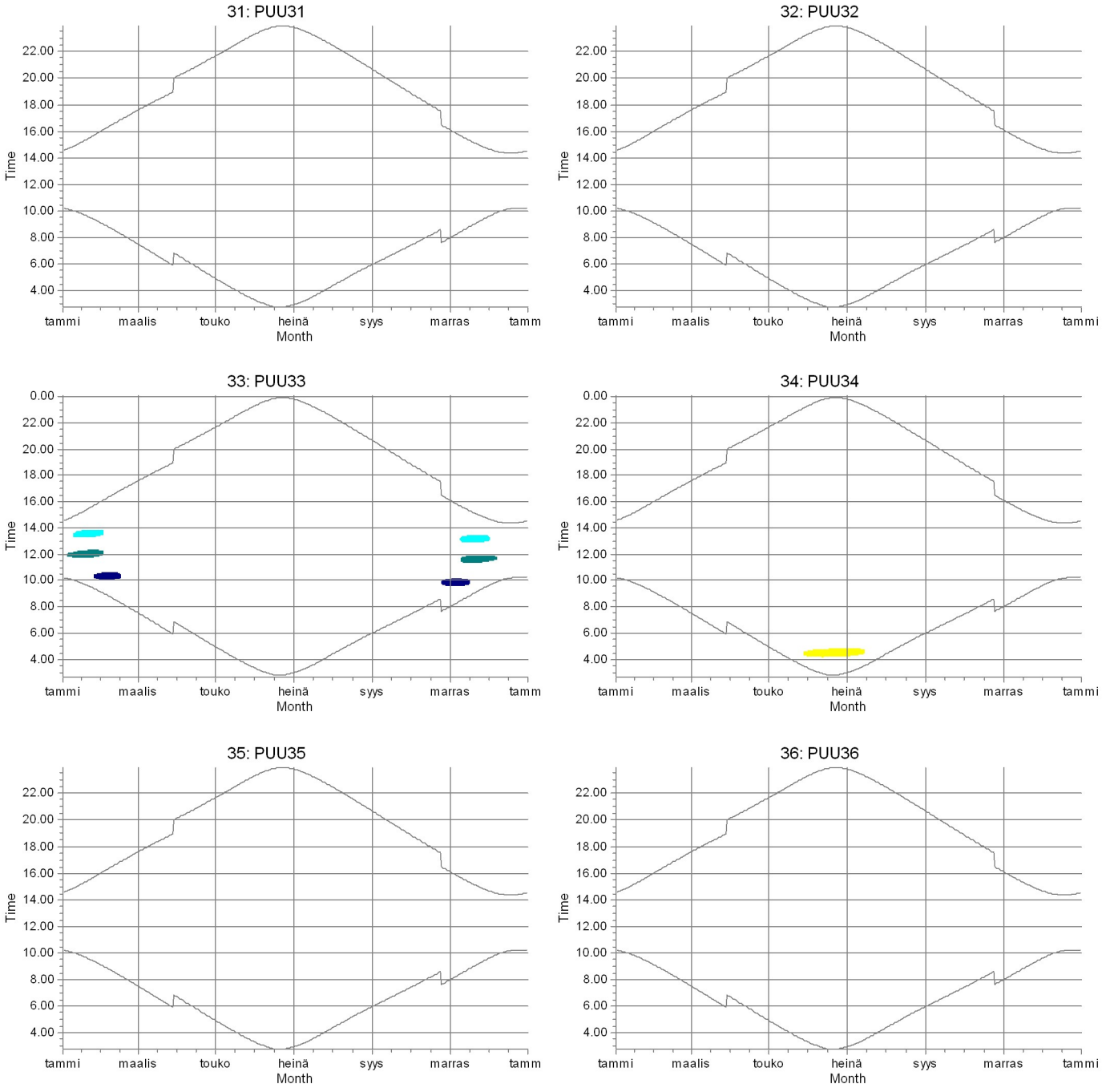
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- F: Asuinrakennus F (Ollilantie 112)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- M: Lomarakennus M (Riskalan metsatie)

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Calculated:
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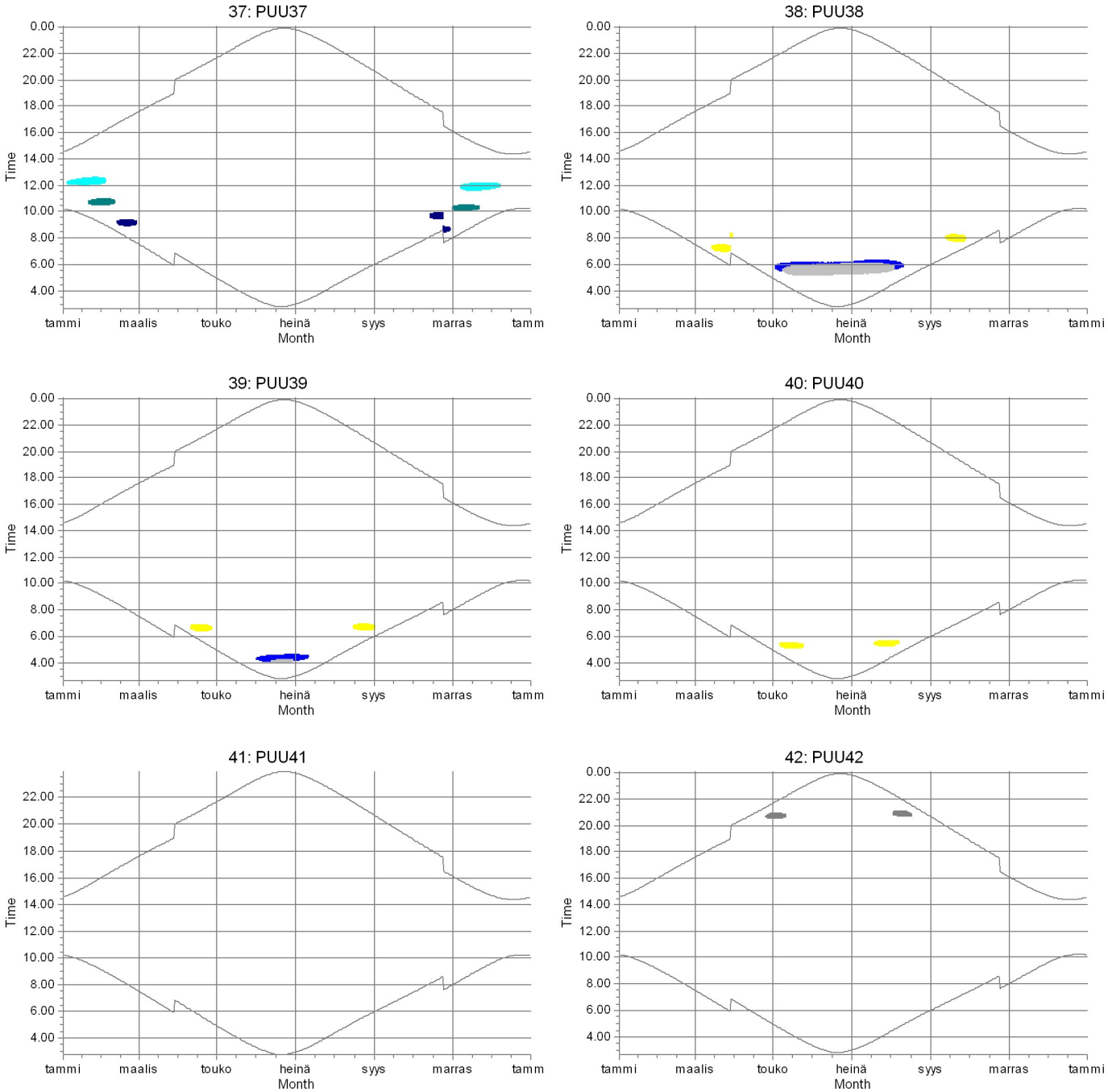
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- D: Asuinrakennus D (Alakylantie 243)
- F: Asuinrakennus F (Ollilantie 112)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- L: Laskentapiste L (Perkkiontie, Ilmola)
- M: Lomarakennus M (Riskalan metsatie)

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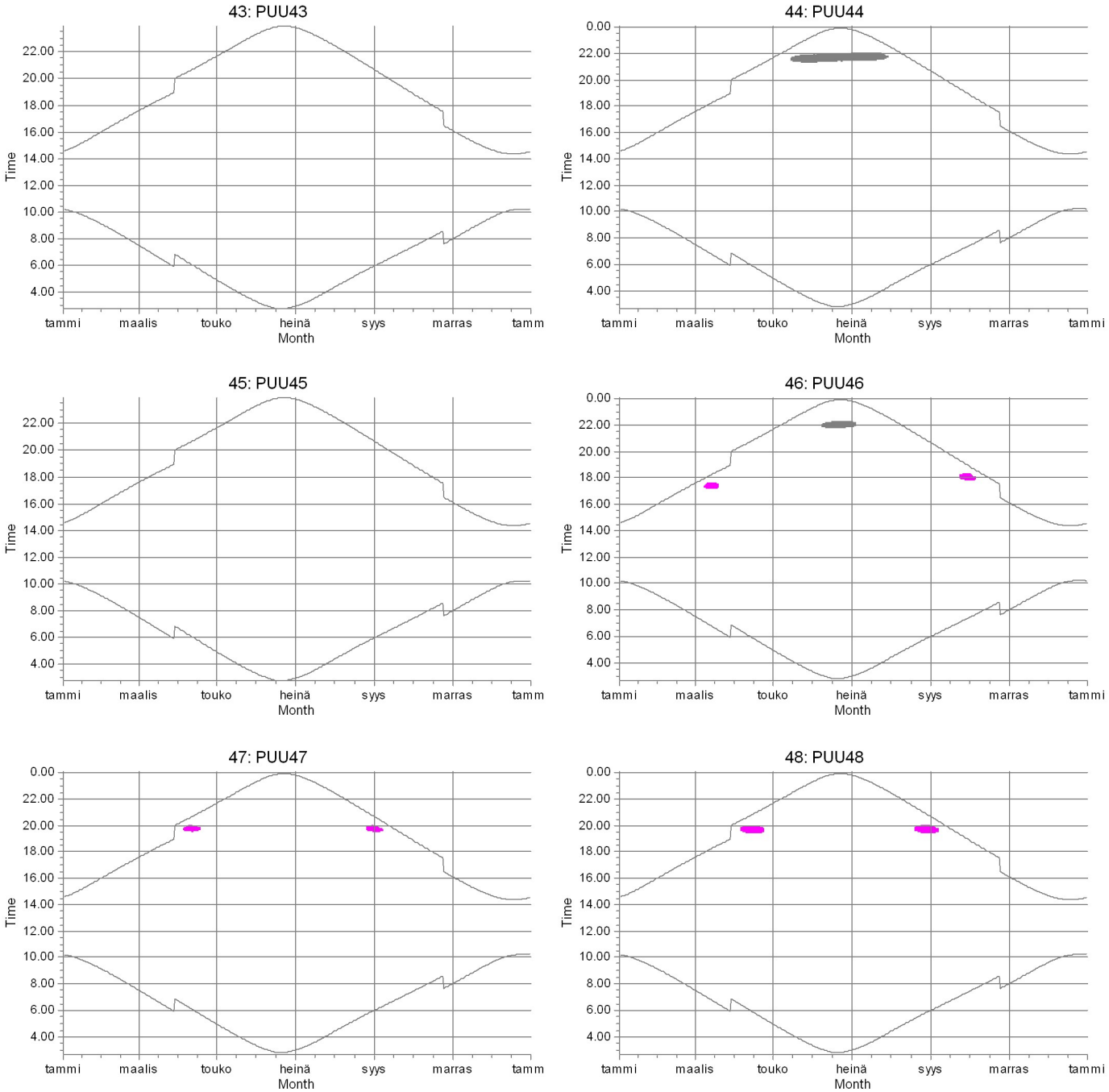
Calculated:
18.11.2020 15.30/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

D: Asuinrakennus D (Alakylantie 243)

E: Lomarakennus E (Kellokankaan metsatie)

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Calculated:
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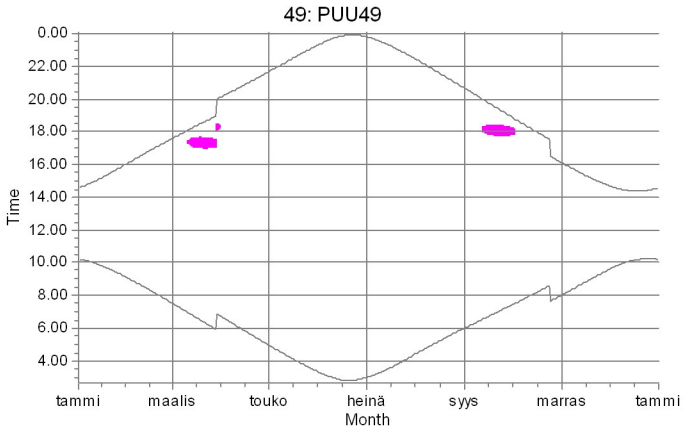
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Shadow receptors

E: Lomarakennus E (Kellokankaan metsatie)

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Calculated:
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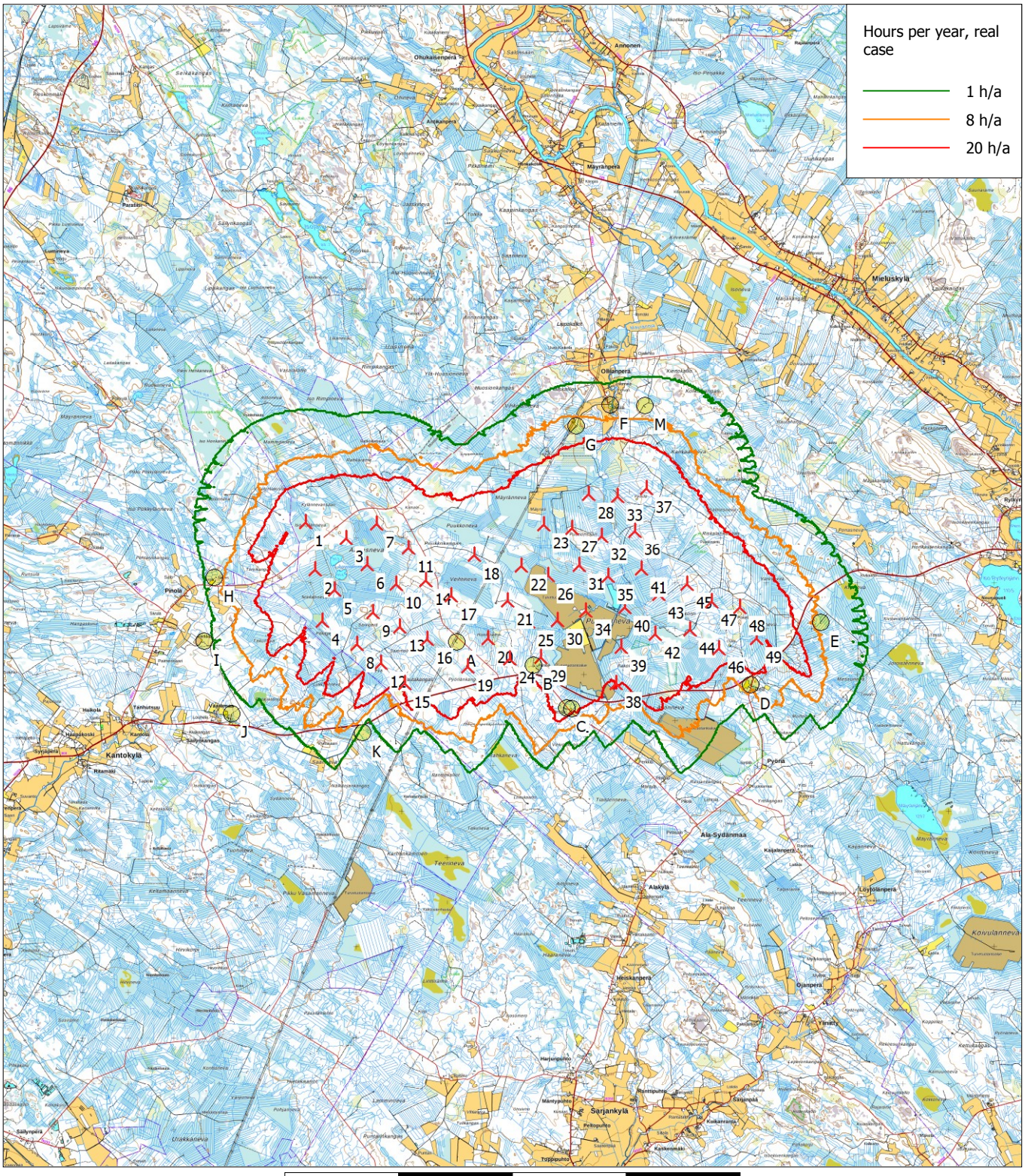
SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_no forest_20201102



Map: Maastokarttarasteri50K , Print scale 1:125 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 403 440 North: 7 110 930

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)

Liite 6: Puutionsaari - Varjostusmallinnusten tulokset ”real case, Luke forest”

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational hours are calculated from WTGs in calculation and wind distribution:
MERRA_basic_E25.335_N64.000 (3)

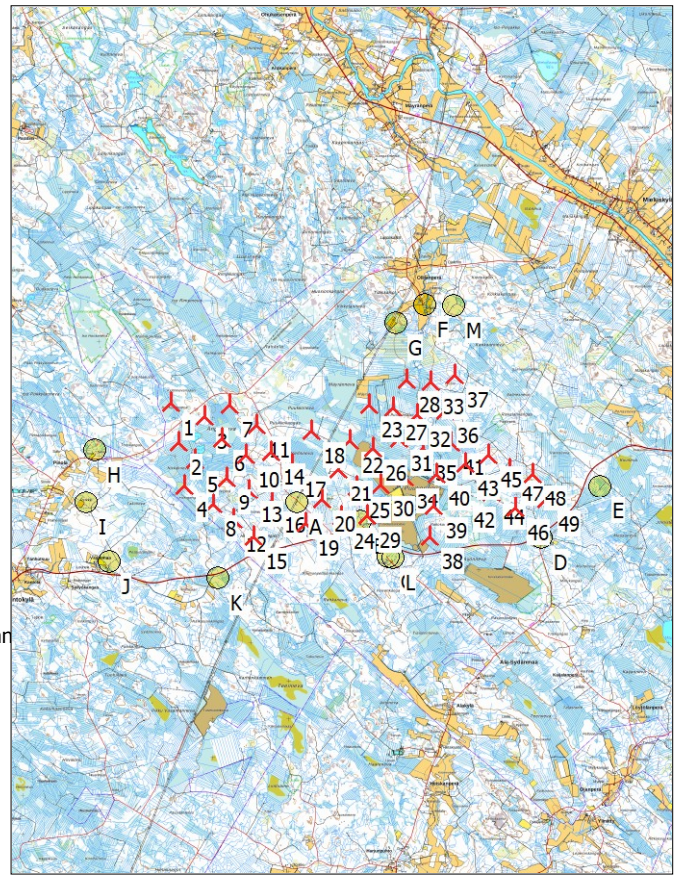
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan
Area object(s) used in calculation:
Area object (Luke2017_SE): (1)
Area object (Luke2017_SW): (2)
Area object (Luke2017_NE): (3)
Area object (Luke2017_NW): (4)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:200 000

New WTG Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
2	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
3	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
4	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
5	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
6	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
7	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
8	400 019	7 109 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
9	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
10	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
11	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
12	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
13	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

To be continued on next page...

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
26	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
27	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
28	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
29	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
30	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
31	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
32	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
33	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
34	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
35	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
36	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
37	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
38	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
39	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
40	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
41	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
42	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
43	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
44	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
45	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
46	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
47	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
48	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
49	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

Shadow receptor-Input

No.	Name		East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
					[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste	A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Autiotalo	B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Autiotalo	C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus	D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus	E (Kellokankaan metsatie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus	F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus	G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus	H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus	I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus	J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus	K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt.	L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus	M (Riskalan metsatie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name		Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste	A (Metsästysmaja)	65:52
B	Autiotalo	B (Ylivieskantie, Pohlola)	51:30
C	Autiotalo	C (Perkkiontie 382)	30:25
D	Asuinrakennus	D (Alakylantie 243)	12:35
E	Lomarakennus	E (Kellokankaan metsatie)	0:00
F	Asuinrakennus	F (Ollilantie 112)	4:51
G	Lomarakennus	G (Ollilantie, Siliakuru)	0:00
H	Asuinrakennus	H (Pinolantie 406)	0:00
I	Asuinrakennus	I (Kortenevantie 116)	0:00
J	Asuinrakennus	J (Haapavesitie 1406)	0:00
K	Lomarakennus	K (Kurunoja)	0:00
L	Muu käyttöt.	L (Perkkiontie, Ilmola)	25:16
M	Lomarakennus	M (Riskalan metsatie)	0:00

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	PUU01	0:00	0:00
2	PUU02	0:00	0:00
3	PUU03	0:00	0:00
4	PUU04	0:00	0:00
5	PUU05	0:00	0:00
6	PUU06	0:00	0:00
7	PUU07	0:00	0:00
8	PUU08	6:53	1:25
9	PUU09	11:16	2:30
10	PUU10	0:00	0:00
11	PUU11	0:00	0:00
12	PUU12	12:12	2:21
13	PUU13	26:46	5:55
14	PUU14	0:00	0:00
15	PUU15	0:00	0:00
16	PUU16	136:07	33:43
17	PUU17	12:46	3:26
18	PUU18	0:00	0:00
19	PUU19	102:31	22:40
20	PUU20	19:32	5:15
21	PUU21	0:00	0:00
22	PUU22	0:00	0:00
23	PUU23	0:00	0:00
24	PUU24	183:37	48:22
25	PUU25	0:00	0:00
26	PUU26	0:00	0:00
27	PUU27	0:00	0:00
28	PUU28	16:54	2:20
29	PUU29	0:00	0:00
30	PUU30	0:00	0:00
31	PUU31	0:00	0:00
32	PUU32	0:00	0:00
33	PUU33	17:53	2:30
34	PUU34	17:45	4:50
35	PUU35	0:00	0:00
36	PUU36	0:00	0:00
37	PUU37	0:00	0:00
38	PUU38	90:20	23:11
39	PUU39	23:20	5:49
40	PUU40	10:01	2:32
41	PUU41	0:00	0:00
42	PUU42	7:32	1:49
43	PUU43	0:00	0:00
44	PUU44	31:06	8:38
45	PUU45	0:00	0:00
46	PUU46	8:08	2:26
47	PUU47	0:00	0:00
48	PUU48	0:00	0:00
49	PUU49	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February			March			April			May			June		
1	10.13		09.04			07.31			10.17 (19)		06.42		18.56 (8)	04.57		18.27 (16)	03.19		18.40 (16)
	14.35		16.06			17.36	74		11.31 (19)		20.09	18	19.14 (8)	21.41	112	20.20 (9)	23.20	51	19.31 (16)
2	10.12		09.00			07.28			10.17 (19)		06.39		18.58 (8)	04.53		18.27 (16)	03.16		18.40 (16)
	14.37		16.09			17.39	74		11.31 (19)		20.12	15	19.13 (8)	21.45	108	20.18 (9)	23.23	50	19.30 (16)
3	10.10		08.57			07.25			10.16 (19)		06.35		18.59 (8)	04.50		18.27 (16)	03.14		18.42 (16)
	14.39		16.12			17.42	74		11.30 (19)		20.15	11	19.10 (8)	21.48	97	20.04 (13)	23.25	48	19.30 (16)
4	10.09		08.54			07.21			10.16 (19)		06.32		19.03 (8)	04.46		18.27 (16)	03.12		18.42 (16)
	14.42		16.16			17.45	75		11.31 (19)		20.18	4	19.07 (8)	21.51	96	20.03 (13)	23.28	47	19.29 (16)
5	10.08		08.51			07.18			10.15 (19)		06.28			04.43		18.27 (16)	03.09		18.43 (16)
	14.44		16.19			17.48	76		11.31 (19)		20.21			21.54	94	20.01 (13)	23.31	46	19.29 (16)
6	10.07		08.48			07.14			10.15 (19)		06.24			04.39		18.26 (16)	03.07		18.43 (16)
	14.46		16.22			17.51	75		11.30 (19)		20.24			21.57	94	20.00 (13)	23.33	45	19.28 (16)
7	10.05		08.45			07.11			10.15 (19)		06.21			04.36		18.26 (16)	03.05		18.45 (16)
	14.49		16.26			17.55	76		11.31 (19)		20.27			22.01	91	19.58 (13)	23.35	43	19.28 (16)
8	10.03		08.42			07.07			10.14 (19)		06.17			04.33		18.26 (16)	03.03		18.45 (16)
	14.51		16.29			17.58	85		17.21 (12)		20.30			22.04	85	19.55 (13)	23.38	43	19.28 (16)
9	10.02		08.39			07.04			10.14 (19)		06.14		19.02 (16)	04.29		18.26 (16)	03.01		18.46 (16)
	14.54		16.32			18.01	91		17.24 (12)		20.33	9	19.11 (16)	22.07	75	19.50 (13)	23.40	42	19.28 (16)
10	10.00		08.35		10.48 (19)	07.00			10.15 (19)		06.10		18.56 (16)	04.26		18.26 (16)	02.57		18.47 (16)
	14.56		16.35	15	11.03 (19)	18.04	95		17.28 (12)		20.36	22	19.18 (16)	22.10	72	19.38 (16)	23.42	40	19.27 (16)
11	09.58		08.32		10.43 (19)	06.57			10.14 (19)		06.07		18.52 (16)	04.23		18.26 (16)	02.56		18.48 (16)
	14.59		16.39	25	11.08 (19)	18.07	98		17.29 (12)		20.39	30	19.22 (16)	22.14	71	19.37 (16)	23.44	39	19.27 (16)
12	09.56		08.29		10.40 (19)	06.53			10.15 (19)		06.03		18.48 (16)	04.19		18.27 (16)	02.54		18.48 (16)
	15.02		16.42	32	11.12 (19)	18.10	98		17.30 (12)		20.42	47	19.58 (13)	22.17	71	19.38 (16)	23.46	39	19.27 (16)
13	09.54		08.26		10.37 (19)	06.50			10.15 (19)		06.00		18.46 (16)	04.16		18.27 (16)	02.53		18.50 (16)
	15.05		16.45	37	11.14 (19)	18.13	99		17.30 (12)		20.45	59	20.02 (13)	22.20	70	19.37 (16)	23.48	37	19.27 (16)
14	09.52		08.22		10.34 (19)	06.46			10.14 (19)		05.56		18.43 (16)	04.13		18.27 (16)	02.52		18.50 (16)
	15.08		16.49	42	11.16 (19)	18.16	100		17.30 (12)		20.48	68	20.03 (13)	22.23	69	19.36 (16)	23.49	36	19.26 (16)
15	09.49		08.19		10.32 (19)	06.43			10.15 (19)		05.53		18.42 (16)	04.10		18.28 (16)	02.51		18.51 (16)
	15.11		16.52	46	11.18 (19)	18.19	98		17.30 (12)		20.51	76	20.13 (9)	22.27	69	19.37 (16)	23.51	36	19.27 (16)
16	09.47		08.16		10.31 (19)	06.39			10.15 (19)		05.49		18.40 (16)	04.06		18.28 (16)	02.50		18.51 (16)
	15.14		16.55	49	11.20 (19)	18.22	97		17.30 (12)		20.54	86	20.16 (9)	22.30	68	19.36 (16)	23.52	35	19.26 (16)
17	09.45		08.12		10.29 (19)	06.35			10.15 (19)		05.45		18.38 (16)	04.03		18.29 (16)	02.50		18.51 (16)
	15.17		16.58	53	11.22 (19)	18.25	95		17.29 (12)		20.57	96	20.18 (9)	22.33	67	19.36 (16)	23.53	35	19.26 (16)
18	09.42		08.09		10.27 (19)	06.32			10.16 (19)		05.42		18.37 (16)	04.00		18.29 (16)	02.49		18.52 (16)
	15.20		17.01	56	11.23 (19)	18.28	93		17.29 (12)		21.00	102	20.21 (9)	22.36	66	19.35 (16)	23.54	35	19.27 (16)
19	09.40		08.06		10.27 (19)	06.28			10.16 (19)		05.38		18.36 (16)	03.57		18.30 (16)	02.49		18.52 (16)
	15.23		17.05	58	11.25 (19)	18.30	91		17.28 (12)		21.03	109	20.25 (9)	22.40	66	19.36 (16)	23.55	35	19.27 (16)
20	09.37		08.02		10.25 (19)	06.25			10.18 (19)		05.35		18.34 (16)	03.54		18.30 (16)	02.49		18.53 (16)
	15.26		17.08	60	11.25 (19)	18.33	85		17.27 (12)		21.07	111	20.25 (9)	22.43	65	19.35 (16)	23.55	34	19.27 (16)
21	09.35		07.59		10.24 (19)	06.21			10.18 (19)		05.31		18.33 (16)	03.50		18.31 (16)	02.49		18.53 (16)
	15.29		17.11	62	11.26 (19)	18.36	81		17.25 (12)		21.10	113	20.26 (9)	22.46	64	19.35 (16)	23.55	34	19.27 (16)
22	09.32		07.55		10.22 (19)	06.18			10.20 (19)		05.28		18.32 (16)	03.47		18.32 (16)	02.49		18.53 (16)
	15.33		17.14	65	11.27 (19)	18.39	75		18.05 (8)		21.13	114	20.26 (9)	22.49	63	19.35 (16)	23.56	34	19.27 (16)
23	09.29		07.52		10.22 (19)	06.14			10.20 (19)		05.24		18.32 (16)	03.44		18.32 (16)	02.50		18.54 (16)
	15.36		17.17	66	11.28 (19)	18.42	75		18.07 (8)		21.16	114	20.26 (9)	22.53	61	19.33 (16)	23.56	34	19.28 (16)
24	09.27		07.49		10.21 (19)	06.11			10.21 (19)		05.21		18.30 (16)	03.41		18.33 (16)	02.50		18.53 (16)
	15.39		17.21	68	11.29 (19)	18.45	69		18.10 (8)		21.19	115	20.25 (9)	22.56	60	19.33 (16)	23.55	35	19.28 (16)
25	09.24		07.45		10.19 (19)	06.07			10.24 (19)		05.17		18.29 (16)	03.38		18.34 (16)	02.51		18.54 (16)
	15.42		17.24	70	11.29 (19)	18.48	59		18.13 (8)		21.22	116	20.25 (9)	22.59	59	19.33 (16)	23.55	34	19.28 (16)
26	09.21		07.42		10.19 (19)	06.04			10.26 (19)		05.14		18.29 (16)	03.35		18.35 (16)	02.52		18.53 (16)
	15.46		17.27	71	11.30 (19)	18.51	58		18.16 (8)		21.25	116	20.25 (9)	23.02	58	19.33 (16)	23.55	35	19.28 (16)
27	09.18		07.38		10.18 (19)	06.00			10.29 (19)		05.10		18.29 (16)	03.33		18.36 (16)	02.53		18.53 (16)
	15.49		17.30	72	11.30 (19)	18.54	54		18.18 (8)		21.29	115	20.24 (9)	23.05	56	19.32 (16)	23.54	36	19.29 (16)
28	09.15		07.35		10.17 (19)	05.56			10.33 (19)		05.07		18.28 (16)	03.30		18.36 (16)	02.55		18.53 (16)
	15.52		17.33	73	11.30 (19)	18.57	43		18.17 (8)		21.32	116	20.24 (9)	23.08	56	19.32 (16)	23.53	37	19.30 (16)
29	09.12					06.53			18.56 (8)		05.03		18.28 (16)	03.27		18.37 (16)	02.56		18.53 (16)
	15.56					20.00	21		19.17 (8)		21.35	115	20.23 (9)	23.11	55	19.32 (16)	23.52	37	19.30 (16)
30	09.10					06.49			18.55 (8)		05.00		18.27 (16)	03.24		18.38 (16)	02.58		18.53 (16)
	15.59					20.03	21		19.16 (8)		21.38	115	20.22 (9)	23.14	53	19.31 (16)	23.51	38	19.31 (16)
31	09.07					06.46			18.56 (8)					03.22		18.38 (16)			
	16.02					20.06	20		19.16 (8)					23.17	52	19.30 (16)			
Potential sun hours	171		238			363			451				570				624		
Total, worst case				1020			2325			2012				2243				1170	
Sun reduction				0,33			0,32			0,41				0,47				0,48	
Oper. time red.				0,99			0,99			0,99				0,99				0,99	
Wind dir. red.				0,67			0,65			0,62				0,62				0,62	
Total reduction				0,22			0,21			0,25				0,29				0,29	
Total, real				225			485			503				647				344	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

Licensed user:
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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

July		August		September		October		November		December
1	02.59	18.52 (16)	04.24	18.37 (16)	06.00	18.51 (16)	07.26	10.53 (19)	08.00	10.19 (19)	09.35
	23.49 39	19.31 (16)	22.27 71	19.48 (16)	20.40 30	19.21 (16)	18.53 99	18.09 (12)	16.07 12	10.31 (19)	14.43
2	03.01	18.52 (16)	04.28	18.37 (16)	06.03	18.54 (16)	07.29	10.53 (19)	08.04		09.38
	23.48 40	19.32 (16)	22.24 71	19.48 (16)	20.36 22	19.16 (16)	18.49 98	18.08 (12)	16.04		14.41
3	03.01	18.52 (16)	04.31	18.36 (16)	06.06	19.00 (16)	07.32	10.52 (19)	08.07		09.41
	23.46 41	19.33 (16)	22.20 72	19.48 (16)	20.32 9	19.09 (16)	18.46 96	18.06 (12)	16.00		14.39
4	03.03	18.51 (16)	04.34	18.36 (16)	06.09		07.35	10.52 (19)	08.10		09.44
	23.45 42	19.33 (16)	22.17 81	20.03 (13)	20.29		18.42 92	18.03 (12)	15.57		14.37
5	03.05	18.50 (16)	04.37	18.36 (16)	06.12		07.38	10.51 (19)	08.13		09.46
	23.43 43	19.33 (16)	22.14 87	20.06 (13)	20.25		18.39 88	18.00 (12)	15.54		14.35
6	03.08	18.50 (16)	04.40	18.36 (16)	06.15		07.41	10.51 (19)	08.17		09.49
	23.41 45	19.35 (16)	22.10 92	20.08 (13)	20.22		18.35 80	17.56 (12)	15.51		14.33
7	03.10	18.50 (16)	04.44	18.35 (16)	06.18		07.44	10.50 (19)	08.20		09.51
	23.39 46	19.36 (16)	22.07 94	20.09 (13)	20.18		18.32 76	12.06 (19)	15.48		14.32
8	03.12	18.49 (16)	04.47	18.36 (16)	06.20	18.58 (8)	07.47	10.51 (19)	08.23		09.54
	23.37 47	19.36 (16)	22.03 95	20.11 (13)	20.15 2	19.00 (8)	18.28 76	12.07 (19)	15.45		14.30
9	03.15	18.49 (16)	04.50	18.36 (16)	06.23	18.53 (8)	07.50	10.51 (19)	08.26		09.56
	23.34 48	19.37 (16)	22.00 96	20.12 (13)	20.11 11	19.04 (8)	18.25 75	12.06 (19)	15.41		14.29
10	03.18	18.49 (16)	04.53	18.35 (16)	06.26	18.50 (8)	07.53	10.50 (19)	08.30		09.58
	23.32 48	19.37 (16)	21.57 102	20.23 (9)	20.08 15	19.05 (8)	18.21 75	12.05 (19)	15.38		14.28
11	03.20	18.48 (16)	04.56	18.35 (16)	06.29	18.49 (8)	07.56	10.50 (19)	08.33		10.00
	23.29 50	19.38 (16)	21.53 110	20.27 (9)	20.04 17	19.06 (8)	18.18 75	12.05 (19)	15.35		14.27
12	03.23	18.48 (16)	04.59	18.35 (16)	06.32	18.48 (8)	07.59	10.50 (19)	08.36		10.02
	23.27 51	19.39 (16)	21.50 114	20.29 (9)	20.00 19	19.07 (8)	18.14 74	12.04 (19)	15.32		14.26
13	03.26	18.47 (16)	05.02	18.36 (16)	06.35	18.47 (8)	08.02	10.50 (19)	08.39		10.04
	23.24 53	19.40 (16)	21.46 114	20.30 (9)	19.57 20	19.07 (8)	18.11 73	12.03 (19)	15.29		14.25
14	03.29	18.46 (16)	05.06	18.35 (16)	06.38	18.46 (8)	08.05	10.51 (19)	08.43		10.06
	23.22 54	19.40 (16)	21.43 115	20.30 (9)	19.53 22	19.08 (8)	18.08 72	12.03 (19)	15.26		14.24
15	03.31	18.46 (16)	05.09	18.35 (16)	06.41	11.24 (19)	08.08	10.51 (19)	08.46		10.07
	23.19 55	19.41 (16)	21.39 116	20.31 (9)	19.50 41	19.07 (8)	18.04 71	12.02 (19)	15.23		14.23
16	03.34	18.45 (16)	05.12	18.36 (16)	06.43	11.18 (19)	08.11	10.51 (19)	08.49		10.09
	23.16 56	19.41 (16)	21.36 116	20.32 (9)	19.46 52	19.06 (8)	18.01 70	12.01 (19)	15.20		14.23
17	03.37	18.44 (16)	05.15	18.35 (16)	06.46	11.15 (19)	08.14	10.51 (19)	08.52		10.10
	23.13 58	19.42 (16)	21.32 116	20.31 (9)	19.43 57	19.05 (8)	17.57 69	12.00 (19)	15.18		14.22
18	03.40	18.44 (16)	05.18	18.36 (16)	06.49	11.12 (19)	08.17	10.53 (19)	08.56		10.11
	23.11 58	19.42 (16)	21.29 116	20.32 (9)	19.39 59	19.02 (8)	17.54 67	12.00 (19)	15.15		14.22
19	03.43	18.44 (16)	05.21	18.37 (16)	06.52	11.10 (19)	08.20	10.53 (19)	08.59		10.12
	23.08 59	19.43 (16)	21.25 115	20.32 (9)	19.36 65	18.58 (8)	17.50 66	11.59 (19)	15.12		14.22
20	03.46	18.43 (16)	05.24	18.37 (16)	06.55	11.07 (19)	08.23	10.53 (19)	09.02		10.13
	23.05 60	19.43 (16)	21.22 115	20.32 (9)	19.32 73	18.54 (8)	17.47 64	11.57 (19)	15.09		14.22
21	03.50	18.42 (16)	05.27	18.37 (16)	06.58	11.05 (19)	08.26	10.55 (19)	09.05		10.14
	23.02 62	19.44 (16)	21.18 114	20.31 (9)	19.28 76	18.50 (8)	17.43 62	11.57 (19)	15.07		14.23
22	03.53	18.42 (16)	05.30	18.38 (16)	07.01	11.03 (19)	08.29	10.55 (19)	09.08		10.14
	22.59 63	19.45 (16)	21.15 112	20.30 (9)	19.25 80	18.10 (12)	17.40 60	11.55 (19)	15.04		14.23
23	03.56	18.41 (16)	05.33	18.39 (16)	07.03	11.02 (19)	08.32	10.57 (19)	09.11		10.15
	22.56 64	19.45 (16)	21.11 111	20.30 (9)	19.21 84	18.11 (12)	17.37 57	11.54 (19)	15.01		14.24
24	03.59	18.41 (16)	05.36	18.40 (16)	07.06	11.01 (19)	08.35	10.58 (19)	09.15		10.15
	22.53 65	19.46 (16)	21.08 108	20.28 (9)	19.18 87	18.11 (12)	17.33 54	11.52 (19)	14.59		14.24
25	04.02	18.40 (16)	05.39	18.40 (16)	07.09	10.59 (19)	07.38	09.59 (19)	09.18		10.15
	22.49 66	19.46 (16)	21.04 102	20.24 (9)	19.14 92	18.12 (12)	16.30 52	10.51 (19)	14.56		14.25
26	04.05	18.40 (16)	05.42	18.41 (16)	07.12	10.58 (19)	07.41	10.00 (19)	09.21		10.15
	22.46 67	19.47 (16)	21.01 95	20.21 (9)	19.11 95	18.12 (12)	16.27 49	10.49 (19)	14.54		14.26
27	04.08	18.39 (16)	05.45	18.42 (16)	07.15	10.56 (19)	07.45	10.02 (19)	09.24		10.15
	22.43 67	19.46 (16)	20.57 86	20.18 (9)	19.07 97	18.11 (12)	16.23 46	10.48 (19)	14.51		14.27
28	04.12	18.39 (16)	05.48	18.44 (16)	07.18	10.56 (19)	07.48	10.04 (19)	09.27		10.15
	22.40 68	19.47 (16)	20.54 74	20.15 (9)	19.04 98	18.11 (12)	16.20 41	10.45 (19)	14.49		14.28
29	04.15	18.38 (16)	05.51	18.44 (16)	07.21	10.55 (19)	07.51	10.06 (19)	09.30		10.15
	22.37 69	19.47 (16)	20.50 67	20.04 (13)	19.00 99	18.10 (12)	16.17 37	10.43 (19)	14.47		14.30
30	04.18	18.38 (16)	05.54	18.46 (16)	07.24	10.54 (19)	07.54	10.10 (19)	09.33		10.14
	22.33 70	19.48 (16)	20.47 57	20.01 (13)	18.57 100	18.10 (12)	16.13 31	10.41 (19)	14.45		14.31
31	04.21	18.38 (16)	05.57	18.48 (16)			07.57	10.14 (19)			10.14
	22.30 70	19.48 (16)	20.43 47	19.58 (13)			16.10 23	10.37 (19)			14.33
Potential sun hours	609		508		393		305		198		137
Total, worst case	1724		2981		1422		2068		12		
Sun reduction	0,38		0,31		0,33		0,35		0,24		
Oper. time red.	0,99		0,99		0,99		0,99		0,99		
Wind dir. red.	0,62		0,62		0,64		0,66		0,67		
Total reduction	0,23		0,19		0,21		0,23		0,16		
Total, real	401		571		299		474		2		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April			May		June		
1	10.12	09.03	07.31		06.42			04.56		19.08 (24)	03.19	04.18 (34)
	14.35	16.06	17.36		20.09			21.41	40	19.48 (24)	23.20	116 21.38 (17)
2	10.11	09.00	07.28		06.39			04.53		19.06 (24)	03.16	04.17 (34)
	14.37	16.09	17.39		20.12			21.44	45	19.51 (24)	23.22	116 21.37 (17)
3	10.10	08.57	07.24		06.35			04.50		19.04 (24)	03.14	04.16 (34)
	14.39	16.12	17.42		20.15			21.48	49	19.53 (24)	23.25	115 21.36 (17)
4	10.09	08.54	07.21		06.31			04.46		19.02 (24)	03.11	04.16 (34)
	14.41	16.15	17.45		20.18			21.51	53	19.55 (24)	23.28	115 21.35 (17)
5	10.08	08.51	07.17		06.28			04.43		19.00 (24)	03.09	04.16 (34)
	14.44	16.19	17.48		20.21			21.54	56	19.56 (24)	23.30	111 20.16 (24)
6	10.06	08.48	07.14		06.24			04.39		05.20 (40)	03.07	04.15 (34)
	14.46	16.22	17.51		20.24			21.57	63	19.59 (24)	23.33	112 20.15 (24)
7	10.05	08.45	07.10		06.21			04.36		05.17 (40)	03.05	04.15 (34)
	14.48	16.25	17.54		20.27			22.00	70	20.00 (24)	23.35	113 20.16 (24)
8	10.03	08.42	07.07		06.17			04.33		05.14 (40)	03.03	04.15 (34)
	14.51	16.29	17.57		20.30			22.04	76	20.01 (24)	23.38	113 20.16 (24)
9	10.01	08.38	07.03		06.14			04.29		05.11 (40)	03.01	04.15 (34)
	14.54	16.32	18.00		20.33			22.07	81	20.02 (24)	23.40	114 20.16 (24)
10	10.00	08.35	07.00		06.10			04.26		05.08 (40)	02.57	04.15 (34)
	14.56	16.35	18.03		20.36			22.10	87	20.03 (24)	23.42	114 20.16 (24)
11	09.58	08.32	06.56		06.07		06.39 (39)	04.23		05.06 (40)	02.56	04.15 (34)
	14.59	16.39	18.06		20.39	8	06.47 (39)	22.14	91	21.25 (17)	23.44	115 20.17 (24)
12	09.56	08.29	06.53		06.03		06.36 (39)	04.19		05.07 (40)	02.54	04.14 (34)
	15.02	16.42	18.09		20.42	13	06.49 (39)	22.17	96	21.28 (17)	23.46	116 20.17 (24)
13	09.54	08.25	06.49		05.59		06.33 (39)	04.16		05.06 (40)	02.53	04.15 (34)
	15.05	16.45	18.12		20.45	17	06.50 (39)	22.20	103	21.31 (17)	23.47	115 20.17 (24)
14	09.51	08.22	06.46		05.56		06.30 (39)	04.13		05.06 (40)	02.52	04.15 (34)
	15.08	16.48	18.15		20.48	20	06.50 (39)	22.23	108	21.33 (17)	23.49	116 20.17 (24)
15	09.49	08.19	06.42	07.15 (38)	05.52		06.29 (39)	04.09		05.07 (40)	02.51	04.15 (34)
	15.11	16.52	18.18	7 07.22 (38)	20.51	22	06.51 (39)	22.27	111	21.36 (17)	23.50	117 20.18 (24)
16	09.47	08.15	06.39	07.11 (38)	05.49		06.28 (39)	04.06		05.07 (40)	02.50	04.15 (34)
	15.14	16.55	18.21	13 07.24 (38)	20.54	24	06.52 (39)	22.30	115	21.38 (17)	23.52	117 20.18 (24)
17	09.45	08.12	06.35	07.07 (38)	05.45		06.27 (39)	04.03		05.06 (40)	02.50	04.15 (34)
	15.17	16.58	18.24	18 07.25 (38)	20.57	24	06.51 (39)	22.33	118	21.40 (17)	23.53	117 20.18 (24)
18	09.42	08.09	06.32	07.06 (38)	05.42		06.27 (39)	04.00		05.07 (40)	02.49	04.15 (34)
	15.20	17.01	18.27	21 07.27 (38)	21.00	25	06.52 (39)	22.36	119	21.41 (17)	23.54	118 20.18 (24)
19	09.40	08.05	06.28	07.04 (38)	05.38		06.27 (39)	03.57		05.07 (40)	02.49	04.16 (34)
	15.23	17.05	18.30	23 07.27 (38)	21.03	25	06.52 (39)	22.40	119	21.40 (17)	23.54	117 20.19 (24)
20	09.37	08.02	06.25	07.04 (38)	05.35		06.27 (39)	03.53		05.08 (40)	02.49	04.16 (34)
	15.26	17.08	18.33	24 07.28 (38)	21.06	23	06.50 (39)	22.43	119	21.41 (17)	23.55	117 20.19 (24)
21	09.35	07.59	06.21	07.03 (38)	05.31		06.27 (39)	03.50		05.10 (40)	02.49	04.16 (34)
	15.29	17.11	18.36	24 07.27 (38)	21.10	23	06.50 (39)	22.46	117	21.41 (17)	23.55	117 20.19 (24)
22	09.32	07.55	06.18	07.02 (38)	05.28		06.28 (39)	03.47		05.10 (40)	02.49	04.16 (34)
	15.33	17.14	18.39	25 07.27 (38)	21.13	22	06.50 (39)	22.49	118	21.41 (17)	23.55	117 20.19 (24)
23	09.29	07.52	06.14	07.02 (38)	05.24		06.28 (39)	03.44		05.11 (40)	02.50	04.17 (34)
	15.36	17.17	18.42	25 07.27 (38)	21.16	21	06.49 (39)	22.52	116	21.41 (17)	23.55	117 20.20 (24)
24	09.27	07.49	06.11	07.01 (38)	05.21		06.28 (39)	03.41		05.13 (40)	02.50	04.16 (34)
	15.39	17.20	18.45	25 07.26 (38)	21.19	19	06.47 (39)	22.55	112	21.41 (17)	23.55	118 20.20 (24)
25	09.24	07.45	06.07	07.02 (38)	05.17		06.30 (39)	03.38		18.47 (24)	02.51	04.17 (34)
	15.42	17.24	18.48	24 07.26 (38)	21.22	15	06.45 (39)	22.59	105	21.41 (17)	23.55	117 20.20 (24)
26	09.21	07.42	06.03	07.02 (38)	05.14		06.31 (39)	03.35		18.47 (24)	02.52	04.17 (34)
	15.46	17.27	18.51	23 07.25 (38)	21.25	12	06.43 (39)	23.02	105	21.41 (17)	23.54	117 20.20 (24)
27	09.18	07.38	06.00	07.03 (38)	05.10		06.35 (39)	03.32		18.46 (24)	02.53	04.17 (34)
	15.49	17.30	18.54	21 07.24 (38)	21.28	5	06.40 (39)	23.05	105	21.40 (17)	23.54	117 20.20 (24)
28	09.15	07.35	05.56	07.03 (38)	05.07		19.21 (24)	03.30		18.46 (24)	02.55	04.18 (34)
	15.52	17.33	18.57	19 07.22 (38)	21.32	18	19.39 (24)	23.08	104	21.40 (17)	23.53	117 20.21 (24)
29	09.12		06.53	08.05 (38)	05.03		19.16 (24)	03.27		04.23 (34)	02.56	04.18 (34)
	15.56		20.00	15 08.20 (38)	21.35	28	19.44 (24)	23.11	109	21.39 (17)	23.52	117 20.21 (24)
30	09.09		06.49	08.07 (38)	05.00		19.12 (24)	03.24		04.21 (34)	02.58	04.19 (34)
	15.59		20.03	10 08.17 (38)	21.38	35	19.47 (24)	23.14	112	21.39 (17)	23.51	116 20.21 (24)
31	09.06		06.46					03.21		04.19 (34)		
	16.02		20.06					23.17	114	21.38 (17)		
Potential sun hours	171	238	363		451			570			624	
Total, worst case				317		399			2936			3474
Sun reduction				0,32		0,41			0,47			0,48
Oper. time red.				0,99		0,99			0,99			0,99
Wind dir. red.				0,61		0,60			0,61			0,61
Total reduction				0,20		0,24			0,29			0,29
Total, real				62		97			838			1003

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59		04.19 (34)	04.24		05.17 (40)	06.00	06.39 (39)	07.26	08.00	09.35
	23.49	116	20.21 (24)	22.27	94	21.37 (17)	20.39	8	06.47 (39)	18.53	16.07	14.42
2	03.01		04.19 (34)	04.28		05.17 (40)	06.03			07.29	08.04	09.38
	23.48	115	20.21 (24)	22.23	90	20.14 (24)	20.36			18.49	16.03	14.40
3	03.01		04.19 (34)	04.31		05.19 (40)	06.06			07.32	08.07	09.41
	23.46	115	20.21 (24)	22.20	84	20.12 (24)	20.32			18.46	16.00	14.39
4	03.03		04.20 (34)	04.34		05.22 (40)	06.09			07.35	08.10	09.43
	23.44	115	20.22 (24)	22.17	79	20.11 (24)	20.29			18.42	15.57	14.37
5	03.05		04.20 (34)	04.37		05.25 (40)	06.12			07.38	08.13	09.46
	23.43	113	20.21 (24)	22.13	74	20.10 (24)	20.25			18.39	15.54	14.35
6	03.08		04.21 (34)	04.40		05.27 (40)	06.15			07.41	08.16	09.49
	23.41	112	20.22 (24)	22.10	67	20.08 (24)	20.22			18.35	15.51	14.33
7	03.10		04.21 (34)	04.43		05.30 (40)	06.17			07.44	08.20	09.51
	23.38	112	20.21 (24)	22.07	61	20.07 (24)	20.18			18.32	15.48	14.32
8	03.12		04.22 (34)	04.47		19.11 (24)	06.20			07.47	08.23	09.53
	23.36	113	21.40 (17)	22.03	55	20.06 (24)	20.15			18.28	15.44	14.30
9	03.15		04.23 (34)	04.50		19.13 (24)	06.23			07.50	08.26	09.56
	23.34	116	21.43 (17)	22.00	51	20.04 (24)	20.11			18.25	15.41	14.29
10	03.17		04.24 (34)	04.53		19.14 (24)	06.26			07.53	08.29	09.58
	23.32	116	21.44 (17)	21.56	47	20.01 (24)	20.07			18.21	15.38	14.28
11	03.20		04.26 (34)	04.56		19.16 (24)	06.29			07.56	08.33	10.00
	23.29	117	21.46 (17)	21.53	43	19.59 (24)	20.04			18.18	15.35	14.26
12	03.23		04.26 (34)	04.59		19.18 (24)	06.32			07.59	08.36	10.02
	23.27	116	21.46 (17)	21.50	39	19.57 (24)	20.00			18.14	15.32	14.25
13	03.26		04.28 (34)	05.02		19.20 (24)	06.35		07.59 (38)	08.02	08.39	10.04
	23.24	113	21.46 (17)	21.46	33	19.53 (24)	19.57	8	08.07 (38)	18.11	15.29	14.25
14	03.29		04.31 (34)	05.05		19.24 (24)	06.38		07.55 (38)	08.05	08.42	10.05
	23.22	111	21.48 (17)	21.43	26	19.50 (24)	19.53	14	08.09 (38)	18.07	15.26	14.24
15	03.31		18.55 (24)	05.09		19.29 (24)	06.40		07.53 (38)	08.08	08.46	10.07
	23.19	104	21.49 (17)	21.39	16	19.45 (24)	19.50	18	08.11 (38)	18.04	15.23	14.23
16	03.34		18.55 (24)	05.12		06.41 (39)	06.43		07.52 (38)	08.11	08.49	10.08
	23.16	105	21.49 (17)	21.36	7	06.48 (39)	19.46	20	08.12 (38)	18.00	15.20	14.23
17	03.37		18.56 (24)	05.15		06.37 (39)	06.46		07.51 (38)	08.14	08.52	10.10
	23.13	103	21.49 (17)	21.32	13	06.50 (39)	19.43	22	08.13 (38)	17.57	15.18	14.22
18	03.40		18.56 (24)	05.18		06.36 (39)	06.49		07.50 (38)	08.17	08.55	10.11
	23.10	105	21.50 (17)	21.29	16	06.52 (39)	19.39	24	08.14 (38)	17.54	15.15	14.22
19	03.43		05.25 (40)	05.21		06.35 (39)	06.52		07.48 (38)	08.20	08.59	10.12
	23.07	109	21.51 (17)	21.25	18	06.53 (39)	19.35	25	08.13 (38)	17.50	15.12	14.22
20	03.46		05.22 (40)	05.24		06.34 (39)	06.55		07.48 (38)	08.23	09.02	10.13
	23.05	114	21.51 (17)	21.22	20	06.54 (39)	19.32	25	08.13 (38)	17.47	15.09	14.22
21	03.49		05.21 (40)	05.27		06.32 (39)	06.58		07.47 (38)	08.26	09.05	10.14
	23.02	115	21.51 (17)	21.18	22	06.54 (39)	19.28	26	08.13 (38)	17.43	15.06	14.23
22	03.53		05.20 (40)	05.30		06.31 (39)	07.00		07.47 (38)	08.29	09.08	10.14
	22.59	118	21.51 (17)	21.15	24	06.55 (39)	19.25	25	08.12 (38)	17.40	15.04	14.23
23	03.56		05.19 (40)	05.33		06.31 (39)	07.03		07.48 (38)	08.32	09.11	10.15
	22.55	119	21.51 (17)	21.11	24	06.55 (39)	19.21	24	08.12 (38)	17.37	15.01	14.23
24	03.59		05.18 (40)	05.36		06.31 (39)	07.06		07.48 (38)	08.35	09.14	10.15
	22.52	119	21.51 (17)	21.08	24	06.55 (39)	19.18	23	08.11 (38)	17.33	14.59	14.24
25	04.02		05.18 (40)	05.39		06.30 (39)	07.09		07.48 (38)	07.38	09.18	10.15
	22.49	119	21.51 (17)	21.04	24	06.54 (39)	19.14	22	08.10 (38)	16.30	14.56	14.25
26	04.05		05.17 (40)	05.42		06.30 (39)	07.12		07.48 (38)	07.41	09.21	10.15
	22.46	119	21.51 (17)	21.01	24	06.54 (39)	19.11	20	08.08 (38)	16.27	14.54	14.26
27	04.08		05.17 (40)	05.45		06.30 (39)	07.15		07.51 (38)	07.44	09.24	10.15
	22.43	117	21.50 (17)	20.57	24	06.54 (39)	19.07	15	08.06 (38)	16.23	14.51	14.27
28	04.12		05.17 (40)	05.48		06.31 (39)	07.18		07.54 (38)	07.48	09.27	10.15
	22.40	115	21.48 (17)	20.54	22	06.53 (39)	19.03	9	08.03 (38)	16.20	14.49	14.28
29	04.15		05.17 (40)	05.51		06.30 (39)	07.21			07.51	09.30	10.15
	22.37	110	21.45 (17)	20.50	21	06.51 (39)	19.00			16.17	14.47	14.30
30	04.18		05.17 (40)	05.54		06.33 (39)	07.23			07.54	09.32	10.14
	22.33	106	21.43 (17)	20.47	17	06.50 (39)	18.56			16.13	14.45	14.31
31	04.21		05.16 (40)	05.57		06.36 (39)				07.57		10.13
	22.30	101	21.40 (17)	20.43	13	06.49 (39)				16.10		14.33
Potential sun hours	608			508			393			305	198	137
Total, worst case		3498			1172			328				
Sun reduction		0,38			0,31			0,33				
Oper. time red.		0,99			0,99			0,99				
Wind dir. red.		0,61			0,61			0,61				
Total reduction		0,23			0,19			0,20				
Total, real		804			221			66				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	10.12	09.03	07.31	06.42			04.56		20.16 (19)	03.19		04.18 (39)
	14.35	16.06	17.36	20.09			21.41	15	20.31 (19)	23.19	69	21.47 (24)
2	10.11	09.00	07.28	06.38			04.53		20.18 (19)	03.16		04.16 (39)
	14.37	16.09	17.39	20.12			21.44	11	20.29 (19)	23.22	74	21.47 (24)
3	10.10	08.57	07.24	06.35			04.50		05.42 (38)	03.14		04.14 (39)
	14.39	16.12	17.42	20.15			21.47	17	20.26 (19)	23.25	77	21.47 (24)
4	10.09	08.54	07.21	06.31			04.46		05.39 (38)	03.12		04.13 (39)
	14.42	16.15	17.45	20.18			21.51	17	05.56 (38)	23.28	79	21.48 (24)
5	10.08	08.51	07.17	06.28			04.43		05.36 (38)	03.09		04.12 (39)
	14.44	16.19	17.48	20.21			21.54	22	05.58 (38)	23.30	81	21.48 (24)
6	10.06	08.48	07.14	06.24			04.39		05.34 (38)	03.07		04.10 (39)
	14.46	16.22	17.51	20.24			21.57	26	06.00 (38)	23.33	82	21.48 (24)
7	10.05	08.45	07.10	06.21			04.36		05.34 (38)	03.05		04.09 (39)
	14.49	16.25	17.54	20.27			22.00	28	06.02 (38)	23.35	84	21.48 (24)
8	10.03	08.41	07.07	06.17			04.33		05.32 (38)	03.03		04.09 (39)
	14.51	16.29	17.57	20.30			22.04	31	06.03 (38)	23.37	84	21.48 (24)
9	10.01	08.38	07.03	06.14			04.29		05.31 (38)	03.01		04.09 (39)
	14.54	16.32	18.00	20.33			22.07	32	06.03 (38)	23.40	84	21.48 (24)
10	09.59	08.35	07.00	06.10			04.26		05.30 (38)	02.58		04.09 (39)
	14.56	16.35	18.03	20.36			22.10	34	06.04 (38)	23.42	84	21.49 (24)
11	09.58	08.32	06.56	06.07			04.23		05.29 (38)	02.56		04.08 (39)
	14.59	16.39	18.06	20.39			22.13	35	06.04 (38)	23.44	85	21.48 (24)
12	09.56	08.29	06.53	06.03			04.19		05.29 (38)	02.55		04.08 (39)
	15.02	16.42	18.09	20.42			22.17	37	06.06 (38)	23.45	85	21.48 (24)
13	09.53	08.25	06.49	05.59			04.16		05.28 (38)	02.53		04.09 (39)
	15.05	16.45	18.12	20.45			22.20	38	06.06 (38)	23.47	85	21.49 (24)
14	09.51	08.22	06.46	05.56			04.13		05.28 (38)	02.52		04.08 (39)
	15.08	16.48	18.15	20.48			22.23	42	21.33 (20)	23.49	85	21.49 (24)
15	09.49	08.19	06.42	05.52			04.09		05.28 (38)	02.51		04.09 (39)
	15.11	16.52	18.18	20.51			22.26	47	21.36 (20)	23.50	85	21.50 (24)
16	09.47	08.15	06.39	05.49			04.06		05.27 (38)	02.50		04.08 (39)
	15.14	16.55	18.21	20.54			22.30	53	21.38 (20)	23.51	84	21.49 (24)
17	09.44	08.12	06.35	05.45			04.03		05.26 (38)	02.50		04.09 (39)
	15.17	16.58	18.24	20.57			22.33	58	21.40 (20)	23.52	82	21.49 (24)
18	09.42	08.09	06.32	05.42			04.00		05.27 (38)	02.49		04.09 (39)
	15.20	17.01	18.27	21.00			22.36	62	21.44 (20)	23.53	84	21.50 (24)
19	09.40	08.05	06.28	05.38		20.21 (19)	03.57		05.26 (38)	02.49		04.09 (39)
	15.23	17.05	18.30	21.03	4	20.25 (19)	22.39	66	21.45 (20)	23.54	85	21.50 (24)
20	09.37	08.02	06.25	05.35		20.18 (19)	03.54		05.27 (38)	02.49		04.09 (39)
	15.26	17.08	18.33	21.06	9	20.27 (19)	22.43	67	21.46 (20)	23.55	83	21.50 (24)
21	09.34	07.59	06.21	05.31		20.17 (19)	03.50		05.27 (38)	02.49		04.09 (39)
	15.29	17.11	18.36	21.09	13	20.30 (19)	22.46	69	21.47 (20)	23.55	83	21.50 (24)
22	09.32	07.55	06.18	05.28		20.16 (19)	03.47		05.26 (38)	02.49		04.09 (39)
	15.33	17.14	18.39	21.13	17	20.33 (19)	22.49	69	21.46 (20)	23.55	83	21.50 (24)
23	09.29	07.52	06.14	05.24		20.16 (19)	03.44		05.27 (38)	02.50		04.10 (39)
	15.36	17.17	18.42	21.16	20	20.36 (19)	22.52	69	21.46 (20)	23.55	85	21.51 (24)
24	09.26	07.48	06.10	05.21		20.15 (19)	03.41		05.27 (38)	02.50		04.10 (39)
	15.39	17.20	18.45	21.19	20	20.35 (19)	22.55	71	21.47 (20)	23.55	84	21.51 (24)
25	09.24	07.45	06.07	05.17		20.14 (19)	03.38		05.27 (38)	02.51		04.11 (39)
	15.42	17.24	18.48	21.22	21	20.35 (19)	22.58	71	21.47 (20)	23.55	84	21.52 (24)
26	09.21	07.42	06.03	05.14		20.14 (19)	03.35		05.28 (38)	02.52		04.10 (39)
	15.46	17.27	18.51	21.25	21	20.35 (19)	23.02	70	21.47 (20)	23.54	85	21.51 (24)
27	09.18	07.38	06.00	05.10		20.15 (19)	03.33		05.28 (38)	02.53		04.11 (39)
	15.49	17.30	18.54	21.28	20	20.35 (19)	23.05	70	21.47 (20)	23.53	84	21.52 (24)
28	09.15	07.35	05.56	05.07		20.15 (19)	03.30		05.28 (38)	02.55		04.12 (39)
	15.52	17.33	18.57	21.31	19	20.34 (19)	23.08	70	21.47 (20)	23.52	83	21.52 (24)
29	09.12		06.53	05.03		20.15 (19)	03.27		05.28 (38)	02.56		04.12 (39)
	15.56		20.00	21.35	19	20.34 (19)	23.11	70	21.47 (20)	23.51	85	21.53 (24)
30	09.09		06.49	05.00		20.15 (19)	03.24		05.29 (38)	02.58		04.12 (39)
	15.59		20.03	21.38	17	20.32 (19)	23.14	69	21.47 (24)	23.50	85	21.53 (24)
31	09.06		06.46				03.22		05.29 (38)			
	16.02		20.06				23.16	69	21.47 (24)			
Potential sun hours	171	238	363	451			569			624		
Total, worst case					200			1505			2482	
Sun reduction					0,41			0,47			0,48	
Oper. time red.					0,99			0,99			0,99	
Wind dir. red.					0,63			0,63			0,63	
Total reduction					0,25			0,29			0,30	
Total, real					51			438			736	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59		04.13 (39)	04.24	05.39 (38)	06.00	07.26	08.00	09.35
	23.49	85	21.53 (24)	22.27 36	06.15 (38)	20.39	18.53	16.07	14.43
2	03.01		04.13 (39)	04.28	05.40 (38)	06.03	07.29	08.03	09.38
	23.47	85	21.53 (24)	22.23 35	06.15 (38)	20.36	18.49	16.03	14.41
3	03.01		04.13 (39)	04.31	05.40 (38)	06.06	07.32	08.07	09.41
	23.46	85	21.53 (24)	22.20 34	06.14 (38)	20.32	18.46	16.00	14.39
4	03.03		04.14 (39)	04.34	05.41 (38)	06.09	07.35	08.10	09.43
	23.44	85	21.54 (24)	22.17 32	06.13 (38)	20.29	18.42	15.57	14.37
5	03.06		04.15 (39)	04.37	05.43 (38)	06.12	07.38	08.13	09.46
	23.42	84	21.54 (24)	22.13 29	06.12 (38)	20.25	18.39	15.54	14.35
6	03.08		04.16 (39)	04.40	05.43 (38)	06.14	07.41	08.16	09.48
	23.40	83	21.54 (24)	22.10 27	06.10 (38)	20.22	18.35	15.51	14.33
7	03.10		04.17 (39)	04.43	05.45 (38)	06.17	07.44	08.20	09.51
	23.38	82	21.54 (24)	22.07 24	06.09 (38)	20.18	18.32	15.48	14.32
8	03.12		04.19 (39)	04.47	05.47 (38)	06.20	07.47	08.23	09.53
	23.36	81	21.54 (24)	22.03 21	06.08 (38)	20.14	18.28	15.44	14.30
9	03.15		04.21 (39)	04.50	05.49 (38)	06.23	07.50	08.26	09.55
	23.34	77	21.55 (24)	22.00 16	06.05 (38)	20.11	18.25	15.41	14.29
10	03.18		04.23 (39)	04.53	05.52 (38)	06.26	07.53	08.29	09.58
	23.31	75	21.55 (24)	21.56 17	20.37 (19)	20.07	18.21	15.38	14.28
11	03.20		04.25 (39)	04.56	20.26 (19)	06.29	07.56	08.33	10.00
	23.29	71	21.55 (24)	21.53 13	20.39 (19)	20.04	18.18	15.35	14.27
12	03.23		05.38 (38)	04.59	20.25 (19)	06.32	07.58	08.36	10.02
	23.27	68	21.55 (20)	21.49 15	20.40 (19)	20.00	18.14	15.32	14.26
13	03.26		05.38 (38)	05.02	20.23 (19)	06.35	08.01	08.39	10.03
	23.24	68	21.55 (20)	21.46 17	20.40 (19)	19.57	18.11	15.29	14.25
14	03.29		05.37 (38)	05.05	20.23 (19)	06.38	08.04	08.42	10.05
	23.21	70	21.55 (20)	21.43 18	20.41 (19)	19.53	18.07	15.26	14.24
15	03.31		05.37 (38)	05.09	20.22 (19)	06.40	08.07	08.46	10.07
	23.19	70	21.56 (20)	21.39 20	20.42 (19)	19.50	18.04	15.23	14.23
16	03.34		05.37 (38)	05.12	20.22 (19)	06.43	08.10	08.49	10.08
	23.16	70	21.56 (20)	21.36 20	20.42 (19)	19.46	18.00	15.20	14.23
17	03.37		05.37 (38)	05.15	20.21 (19)	06.46	08.13	08.52	10.09
	23.13	70	21.56 (20)	21.32 20	20.41 (19)	19.42	17.57	15.18	14.22
18	03.40		05.37 (38)	05.18	20.21 (19)	06.49	08.17	08.55	10.11
	23.10	70	21.56 (20)	21.29 20	20.41 (19)	19.39	17.54	15.15	14.22
19	03.43		05.37 (38)	05.21	20.21 (19)	06.52	08.20	08.58	10.12
	23.07	71	21.57 (20)	21.25 20	20.41 (19)	19.35	17.50	15.12	14.22
20	03.46		05.37 (38)	05.24	20.21 (19)	06.55	08.23	09.02	10.13
	23.04	71	21.57 (20)	21.22 20	20.41 (19)	19.32	17.47	15.09	14.22
21	03.50		05.37 (38)	05.27	20.21 (19)	06.58	08.26	09.05	10.13
	23.01	68	21.56 (20)	21.18 16	20.37 (19)	19.28	17.43	15.06	14.23
22	03.53		05.37 (38)	05.30	20.22 (19)	07.00	08.29	09.08	10.14
	22.58	69	21.57 (20)	21.15 12	20.34 (19)	19.25	17.40	15.04	14.23
23	03.56		05.37 (38)	05.33	20.23 (19)	07.03	08.32	09.11	10.15
	22.55	68	21.56 (20)	21.11 8	20.31 (19)	19.21	17.37	15.01	14.24
24	03.59		05.37 (38)	05.36	20.25 (19)	07.06	08.35	09.14	10.15
	22.52	67	21.57 (20)	21.08 3	20.28 (19)	19.18	17.33	14.59	14.24
25	04.02		05.37 (38)	05.39		07.09	07.38	09.17	10.15
	22.49	65	21.55 (20)	21.04		19.14	16.30	14.56	14.25
26	04.05		05.38 (38)	05.42		07.12	07.41	09.20	10.15
	22.46	60	21.53 (20)	21.01		19.10	16.26	14.54	14.26
27	04.08		05.37 (38)	05.45		07.15	07.44	09.23	10.15
	22.43	56	21.50 (20)	20.57		19.07	16.23	14.51	14.27
28	04.12		05.38 (38)	05.48		07.18	07.47	09.26	10.15
	22.40	51	21.48 (20)	20.54		19.03	16.20	14.49	14.28
29	04.15		05.38 (38)	05.51		07.20	07.51	09.29	10.14
	22.36	45	21.45 (20)	20.50		19.00	16.17	14.47	14.30
30	04.18		05.39 (38)	05.54		07.23	07.54	09.32	10.14
	22.33	41	21.43 (20)	20.46		18.56	16.13	14.45	14.31
31	04.21		05.38 (38)	05.57			07.57		10.13
	22.30	37	06.15 (38)	20.43			16.10		14.33
Potential sun hours	608			508		393	305	198	137
Total, worst case		2148		493					
Sun reduction		0,38		0,31					
Oper. time red.		0,99		0,99					
Wind dir. red.		0,63		0,62					
Total reduction		0,24		0,19					
Total, real		505		95					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	10.12	09.03	07.31	06.42			04.56		20.35 (42)	03.19		21.23 (44)
	14.35	16.05	17.36	20.08			21.41	20	20.55 (42)	23.19	28	21.51 (44)
2	10.11	09.00	07.27	06.38			04.53		20.34 (42)	03.16		21.23 (44)
	14.37	16.08	17.39	20.11			21.44	21	20.55 (42)	23.22	29	21.52 (44)
3	10.10	08.57	07.24	06.35			04.49		20.34 (42)	03.14		21.23 (44)
	14.39	16.12	17.42	20.14			21.47	21	20.55 (42)	23.25	28	21.51 (44)
4	10.09	08.54	07.21	06.31			04.46		20.35 (42)	03.11		21.24 (44)
	14.41	16.15	17.45	20.17			21.50	19	20.54 (42)	23.27	28	21.52 (44)
5	10.07	08.51	07.17	06.27			04.42		20.35 (42)	03.09		21.24 (44)
	14.43	16.18	17.48	20.20			21.54	19	20.54 (42)	23.30	27	21.51 (44)
6	10.06	08.47	07.14	06.24			04.39		20.35 (42)	03.07		21.24 (44)
	14.46	16.22	17.51	20.23			21.57	18	20.53 (42)	23.32	28	21.52 (44)
7	10.04	08.44	07.10	06.20			04.36		20.36 (42)	03.04		21.25 (44)
	14.48	16.25	17.54	20.26			22.00	16	20.52 (42)	23.35	27	21.52 (44)
8	10.03	08.41	07.07	06.17			04.32		20.37 (42)	03.02		21.25 (44)
	14.51	16.28	17.57	20.29			22.03	14	20.51 (42)	23.37	32	22.01 (46)
9	10.01	08.38	07.03	06.13			04.29		20.39 (42)	03.01		21.25 (44)
	14.53	16.32	18.00	20.32			22.07	11	20.50 (42)	23.39	37	22.04 (46)
10	09.59	08.35	07.00	06.10			04.26		20.42 (42)	02.57		21.26 (44)
	14.56	16.35	18.03	20.35			22.10	5	20.47 (42)	23.41	39	22.05 (46)
11	09.57	08.31	06.56	06.06			04.22			02.56		21.26 (44)
	14.59	16.38	18.06	20.38			22.13			23.43	41	22.07 (46)
12	09.55	08.28	06.53	06.03			04.19			02.54		21.26 (44)
	15.02	16.42	18.09	20.42			22.16			23.45	41	22.07 (46)
13	09.53	08.25	06.49	05.59			04.16			02.53		21.26 (44)
	15.04	16.45	18.12	20.45			22.20			23.47	42	22.08 (46)
14	09.51	08.22	06.46	05.56			04.12			02.52		21.27 (44)
	15.07	16.48	18.15	20.48			22.23			23.48	42	22.09 (46)
15	09.49	08.18	06.42	05.52			04.09		21.31 (44)	02.51		21.26 (44)
	15.10	16.51	18.18	20.51			22.26	4	21.35 (44)	23.50	44	22.10 (46)
16	09.47	08.15	06.38	05.48			04.06		21.29 (44)	02.50		21.27 (44)
	15.13	16.55	18.21	20.54			22.29	9	21.38 (44)	23.51	44	22.11 (46)
17	09.44	08.12	06.35	05.45			04.03		21.27 (44)	02.49		21.28 (44)
	15.16	16.58	18.24	20.57			22.33	14	21.41 (44)	23.52	43	22.11 (46)
18	09.42	08.08	06.31	05.41			03.59		21.27 (44)	02.49		21.28 (44)
	15.19	17.01	18.27	21.00			22.36	17	21.44 (44)	23.53	44	22.12 (46)
19	09.39	08.05	06.28	05.38			03.56		21.25 (44)	02.49		21.27 (44)
	15.23	17.04	18.30	21.03			22.39	21	21.46 (44)	23.54	44	22.11 (46)
20	09.37	08.02	06.24	05.34			03.53		21.25 (44)	02.49		21.29 (44)
	15.26	17.07	18.33	21.06			22.42	22	21.47 (44)	23.54	44	22.13 (46)
21	09.34	07.58	06.21	05.31			03.50		21.24 (44)	02.49		21.29 (44)
	15.29	17.11	18.36	21.09			22.46	23	21.47 (44)	23.55	44	22.13 (46)
22	09.32	07.55	06.17	05.27			03.47		21.24 (44)	02.49		21.29 (44)
	15.32	17.14	18.39	21.12			22.49	24	21.48 (44)	23.55	44	22.13 (46)
23	09.29	07.52	06.14	05.24			03.44		21.23 (44)	02.49		21.28 (44)
	15.35	17.17	18.42	21.15			22.52	26	21.49 (44)	23.55	45	22.13 (46)
24	09.26	07.48	06.10	05.20			03.41		21.23 (44)	02.50		21.29 (44)
	15.39	17.20	18.45	21.19			22.55	27	21.50 (44)	23.55	44	22.13 (46)
25	09.23	07.45	06.07	05.17		20.40 (42)	03.38		21.22 (44)	02.51		21.29 (44)
	15.42	17.23	18.48	21.22	1	20.41 (42)	22.58	27	21.49 (44)	23.54	44	22.13 (46)
26	09.21	07.41	06.03	05.13		20.39 (42)	03.35		21.22 (44)	02.52		21.29 (44)
	15.45	17.26	18.51	21.25	5	20.44 (42)	23.01	28	21.50 (44)	23.54	44	22.13 (46)
27	09.18	07.38	05.59	05.10		20.37 (42)	03.32		21.22 (44)	02.53		21.30 (44)
	15.49	17.29	18.54	21.28	9	20.46 (42)	23.04	28	21.50 (44)	23.53	43	22.13 (46)
28	09.15	07.34	05.56	05.06		20.36 (42)	03.29		21.22 (44)	02.54		21.30 (44)
	15.52	17.33	18.57	21.31	13	20.49 (42)	23.07	28	21.50 (44)	23.52	43	22.13 (46)
29	09.12		06.52	05.03		20.35 (42)	03.27		21.22 (44)	02.56		21.29 (44)
	15.55		20.00	21.34	17	20.52 (42)	23.10	28	21.50 (44)	23.51	43	22.12 (46)
30	09.09		06.49	05.00		20.35 (42)	03.24		21.23 (44)	02.57		21.29 (44)
	15.58		20.03	21.38	19	20.54 (42)	23.13	28	21.51 (44)	23.50	42	22.11 (46)
31	09.06		06.45				03.21		21.23 (44)			
	16.02		20.06				23.16	28	21.51 (44)			
Potential sun hours	171	238	363	451			570			624		
Total, worst case					64			546			1168	
Sun reduction					0,41			0,47			0,48	
Oper. time red.					0,99			0,99			0,99	
Wind dir. red.					0,64			0,64			0,64	
Total reduction					0,26			0,30			0,30	
Total, real					17			162			355	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August			September	October	November	December
1	02.59		21.30 (44)	04.24		06.00	07.26	08.00	09.35
	23.49	41	22.11 (46)	22.26		20.39	18.52	16.06	14.42
2	03.01		21.30 (44)	04.27		06.02	07.29	08.03	09.38
	23.47	40	22.10 (46)	22.23		20.35	18.49	16.03	14.40
3	03.01		21.30 (44)	04.30		20.51 (42)	06.05	07.32	08.06	09.40
	23.46	38	22.09 (46)	22.20	7	20.58 (42)	20.32	18.45	16.00	14.38
4	03.03		21.30 (44)	04.34		20.49 (42)	06.08	07.35	08.10	09.43
	23.44	35	22.07 (46)	22.16	12	21.01 (42)	20.28	18.42	15.57	14.36
5	03.05		21.30 (44)	04.37		20.47 (42)	06.11	07.38	08.13	09.46
	23.42	27	21.57 (44)	22.13	14	21.01 (42)	20.25	18.38	15.53	14.35
6	03.07		21.30 (44)	04.40		20.46 (42)	06.14	07.40	08.16	09.48
	23.40	27	21.57 (44)	22.10	16	21.02 (42)	20.21	18.35	15.50	14.33
7	03.10		21.30 (44)	04.43		20.45 (42)	06.17	07.43	08.19	09.51
	23.38	28	21.58 (44)	22.06	18	21.03 (42)	20.18	18.31	15.47	14.31
8	03.12		21.31 (44)	04.46		20.44 (42)	06.20	07.46	08.22	09.53
	23.36	28	21.59 (44)	22.03	19	21.03 (42)	20.14	18.28	15.44	14.30
9	03.15		21.30 (44)	04.49		20.44 (42)	06.23	07.49	08.26	09.55
	23.34	28	21.58 (44)	21.59	19	21.03 (42)	20.11	18.24	15.41	14.28
10	03.17		21.30 (44)	04.53		20.44 (42)	06.26	07.52	08.29	09.57
	23.31	28	21.58 (44)	21.56	20	21.04 (42)	20.07	18.21	15.38	14.27
11	03.20		21.31 (44)	04.56		20.44 (42)	06.29	07.55	08.32	09.59
	23.29	28	21.59 (44)	21.53	20	21.04 (42)	20.03	18.17	15.35	14.26
12	03.23		21.31 (44)	04.59		20.43 (42)	06.31	07.58	08.35	10.01
	23.26	28	21.59 (44)	21.49	20	21.03 (42)	20.00	18.14	15.32	14.25
13	03.25		21.31 (44)	05.02		20.43 (42)	06.34	08.01	08.39	10.03
	23.24	28	21.59 (44)	21.46	19	21.02 (42)	19.56	18.10	15.29	14.24
14	03.28		21.31 (44)	05.05		20.44 (42)	06.37	08.04	08.42	10.05
	23.21	28	21.59 (44)	21.42	15	20.59 (42)	19.53	18.07	15.26	14.23
15	03.31		21.31 (44)	05.08		20.44 (42)	06.40	08.07	08.45	10.06
	23.18	28	21.59 (44)	21.39	12	20.56 (42)	19.49	18.04	15.23	14.23
16	03.34		21.31 (44)	05.11		20.44 (42)	06.43	08.10	08.48	10.08
	23.16	28	21.59 (44)	21.35	8	20.52 (42)	19.46	18.00	15.20	14.22
17	03.37		21.32 (44)	05.14		20.45 (42)	06.46	08.13	08.52	10.09
	23.13	28	22.00 (44)	21.32	5	20.50 (42)	19.42	17.57	15.17	14.22
18	03.40		21.32 (44)	05.17			06.49	08.16	08.55	10.10
	23.10	27	21.59 (44)	21.28			19.39	17.53	15.14	14.22
19	03.43		21.32 (44)	05.21			06.51	08.19	08.58	10.12
	23.07	27	21.59 (44)	21.25			19.35	17.50	15.12	14.22
20	03.46		21.32 (44)	05.24			06.54	08.22	09.01	10.12
	23.04	26	21.58 (44)	21.21			19.31	17.46	15.09	14.22
21	03.49		21.34 (44)	05.27			06.57	08.25	09.05	10.13
	23.01	25	21.59 (44)	21.18			19.28	17.43	15.06	14.22
22	03.52		21.34 (44)	05.30			07.00	08.28	09.08	10.14
	22.58	24	21.58 (44)	21.14			19.24	17.40	15.03	14.23
23	03.55		21.35 (44)	05.33			07.03	08.32	09.11	10.14
	22.55	23	21.58 (44)	21.11			19.21	17.36	15.01	14.23
24	03.59		21.35 (44)	05.36			07.06	08.35	09.14	10.15
	22.52	22	21.57 (44)	21.07			19.17	17.33	14.58	14.24
25	04.02		21.36 (44)	05.39			07.09	07.38	09.17	10.15
	22.49	19	21.55 (44)	21.04			19.14	16.29	14.56	14.25
26	04.05		21.37 (44)	05.42			07.12	07.41	09.20	10.15
	22.46	15	21.52 (44)	21.00			19.10	16.26	14.53	14.26
27	04.08		21.39 (44)	05.45			07.14	07.44	09.23	10.15
	22.43	11	21.50 (44)	20.57			19.07	16.23	14.51	14.27
28	04.11		21.40 (44)	05.48			07.17	07.47	09.26	10.14
	22.39	7	21.47 (44)	20.53			19.03	16.19	14.49	14.28
29	04.14		21.43 (44)	05.51			07.20	07.50	09.29	10.14
	22.36	2	21.45 (44)	20.50			19.00	16.16	14.46	14.29
30	04.18			05.54			07.23	07.54	09.32	10.14
	22.33			20.46			18.56	16.13	14.44	14.31
31	04.21			05.57				07.57		10.13
	22.30			20.43				16.10		14.33
Potential sun hours	608			508			393	305	198	137
Total, worst case		744			224					
Sun reduction		0,38			0,31					
Oper. time red.		0,99			0,99					
Wind dir. red.		0,64			0,64					
Total reduction		0,24			0,20					
Total, real		178			44					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** E - Lomarakennus E (Kellokankaan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.35	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.52	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.35	18.49	16.03	14.40
3	10.10	08.57	07.24	06.34	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.40
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.20	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.09	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.56	14.36
5	10.07	08.51	07.17	06.27	04.42	03.08	03.05	04.37	06.11	07.37	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.47	07.13	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.06	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.22	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.31	18.00	20.32	22.07	23.39	23.34	21.59	20.11	18.24	15.41	14.28
10	09.59	08.35	06.59	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.31	06.56	06.06	04.22	02.55	03.19	04.56	06.28	07.55	08.32	09.59
	14.58	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.52	06.02	04.19	02.54	03.22	04.59	06.31	07.58	08.35	10.01
	15.01	16.41	18.09	20.41	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.44	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.45	05.55	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.18	21.39	19.49	18.03	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.48	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.56	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.48	03.40	05.17	06.48	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.38	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.23	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.26	06.57	08.25	09.05	10.13
	15.29	17.10	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.29	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.39	15.03	14.22
23	09.29	07.51	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.31	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.38	17.20	18.45	21.18	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.23
25	09.23	07.45	06.06	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.11	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.52	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.06	16.23	14.51	14.26
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.07	23.52	22.39	20.53	19.03	16.19	14.48	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.50	07.20	07.50	09.29	10.14
	15.55		19.59	21.34	23.10	23.51	22.36	20.50	18.59	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.53	07.23	07.53	09.32	10.14
	15.58		20.02	21.37	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.56		07.57		10.13
	16.02		20.05		23.16		22.30	20.43		16.09		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**Shadow receptor:** F - Asuinrakennus F (Ollilantie 112)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	12.01 (33)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00		09.36	11.32 (33)
	14.34		16.05 25	13.31 (28)	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06		14.42 32	13.05 (28)
2	10.12		09.01	13.17 (28)	07.28	06.38	04.52	03.15	03.00	04.27	06.03	07.29	08.04		09.39	11.33 (33)
	14.36		16.08 12	13.29 (28)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03		14.40 29	13.05 (28)
3	10.11		08.58	13.21 (28)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07		09.41	11.34 (33)
	14.38		16.12 4	13.25 (28)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00		14.38 24	13.03 (28)
4	10.10		08.54		07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10		09.44	11.35 (33)
	14.41		16.15		17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57		14.36 17	13.01 (28)
5	10.08	11.54 (33)	08.51		07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13		09.47	11.37 (33)
	14.43 5	11.59 (33)	16.18		17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53		14.34 11	11.48 (33)
6	10.07	11.52 (33)	08.48		07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17		09.49	11.39 (33)
	14.45 9	12.01 (33)	16.22		17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50		14.32 9	11.48 (33)
7	10.05	11.52 (33)	08.45		07.10	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20		09.52	11.41 (33)
	14.48 11	12.03 (33)	16.25		17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47		14.31 5	11.46 (33)
8	10.04	11.52 (33)	08.42		07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	12.51 (28)	09.54	
	14.50 16	13.17 (28)	16.28		17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44 5	12.56 (28)	14.29	
9	10.02	11.50 (33)	08.39		07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	12.47 (28)	09.56	
	14.53 23	13.19 (28)	16.32		18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41 13	13.00 (28)	14.28	
10	10.00	11.50 (33)	08.35		07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	11.31 (33)	09.58	
	14.55 28	13.21 (28)	16.35		18.03	20.36	22.11	23.43	23.33	21.57	20.07	18.21	15.38 25	13.01 (28)	14.27	
11	09.58	11.50 (33)	08.32		06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	11.29 (33)	10.01	
	14.58 31	13.23 (28)	16.38		18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35 33	13.03 (28)	14.26	
12	09.56	11.50 (33)	08.29		06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	11.27 (33)	10.02	
	15.01 35	13.25 (28)	16.42		18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32 39	13.04 (28)	14.25	
13	09.54	11.49 (33)	08.26		06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.02	08.39	11.26 (33)	10.04	
	15.04 39	13.26 (28)	16.45		18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29 41	13.04 (28)	14.24	
14	09.52	11.50 (33)	08.22		06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.05	08.43	11.26 (33)	10.06	
	15.07 39	13.27 (28)	16.48		18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26 44	13.06 (28)	14.23	
15	09.50	11.49 (33)	08.19		06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.08	08.46	11.26 (33)	10.08	
	15.10 42	13.28 (28)	16.51		18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23 46	13.06 (28)	14.22	
16	09.47	11.49 (33)	08.16		06.39	05.49	04.05	02.49	03.33	05.11	06.43	08.11	08.49	11.25 (33)	10.09	
	15.13 44	13.29 (28)	16.55		18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20 47	13.06 (28)	14.22	
17	09.45	11.50 (33)	08.12		06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	11.26 (33)	10.10	
	15.16 45	13.30 (28)	16.58		18.24	20.57	22.34	23.54	23.14	21.32	19.42	17.57	15.17 47	13.07 (28)	14.21	
18	09.43	11.49 (33)	08.09		06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	11.25 (33)	10.12	
	15.19 47	13.30 (28)	17.01		18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14 49	13.07 (28)	14.21	
19	09.40	11.49 (33)	08.06		06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	11.25 (33)	10.13	
	15.22 49	13.31 (28)	17.04		18.30	21.03	22.40	23.56	23.08	21.25	19.35	17.50	15.11 49	13.07 (28)	14.21	
20	09.38	11.50 (33)	08.02		06.25	05.34	03.53	02.47	03.46	05.24	06.55	08.23	09.02	11.25 (33)	10.14	
	15.25 48	13.31 (28)	17.07		18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.09 49	13.07 (28)	14.21	
21	09.35	11.50 (33)	07.59		06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	11.26 (33)	10.14	
	15.29 49	13.32 (28)	17.11		18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06 49	13.08 (28)	14.22	
22	09.32	11.50 (33)	07.55		06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	11.26 (33)	10.15	
	15.32 49	13.32 (28)	17.14		18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03 47	13.07 (28)	14.22	
23	09.30	11.51 (33)	07.52		06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	11.26 (33)	10.15	
	15.35 49	13.33 (28)	17.17		18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01 49	13.08 (28)	14.22	
24	09.27	11.51 (33)	07.49		06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	11.27 (33)	10.16	
	15.38 49	13.33 (28)	17.20		18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58 47	13.08 (28)	14.23	
25	09.24	11.52 (33)	07.45		06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	11.27 (33)	10.16	
	15.42 47	13.33 (28)	17.23		18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.55 45	13.07 (28)	14.24	
26	09.21	11.52 (33)	07.42		06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	11.28 (33)	10.16	
	15.45 47	13.33 (28)	17.26		18.51	21.25	23.02	23.56	22.47	21.01	19.10	16.26	14.53 43	13.07 (28)	14.25	
27	09.18	11.53 (33)	07.38		06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	11.28 (33)	10.16	
	15.48 45	13.33 (28)	17.30		18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51 42	13.07 (28)	14.26	
28	09.16	11.54 (33)	07.35		05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	11.29 (33)	10.16	
	15.52 44	13.33 (28)	17.33		18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.19	14.48 39	13.06 (28)	14.27	
29	09.13	11.55 (33)			06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	11.30 (33)	10.15	
	15.55 40	13.32 (28)			20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46 37	13.06 (28)	14.29	
30	09.10	11.56 (33)			06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	11.31 (33)	10.15	
	15.58 37	13.32 (28)			20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44 35	13.06 (28)	14.30	
31	09.07	11.57 (33)			06.45		03.20		04.20	05.57		07.57			10.14	
	16.02 32	13.31 (28)			20.06		23.17		22.30	20.43		16.10			14.32	
Potential sun hours	170		238		363	451	570	625	609	509	393	305	198		136	
Total, worst case		999		41										920		127
Sun reduction		0,19		0,33										0,24		0,22
Oper. time red.		0,99		0,99										0,99		0,99
Wind dir. red.		0,66		0,65										0,66		0,66
Total reduction		0,12		0,22										0,16		0,14
Total, real		121		9										144		18

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** G - Lomarakennus G (Ollilantie, Siliakuru)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.01	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.53	03.15	03.00	04.27	06.03	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.11	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.39	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.49	04.06	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.53	10.10
	15.16	16.58	18.24	20.57	22.34	23.54	23.14	21.33	19.42	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.04	22.40	23.55	23.08	21.26	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.44	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.48	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.26
28	09.16	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.20	14.48	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	14.30
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102 **Shadow receptor:** H - Asuinrakennus H (Pinolantie 406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.34	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.58	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.23	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.41	23.35	22.01	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	02.58	03.18	04.53	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.20	04.57	06.30	07.56	08.33	10.01
	14.59	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.03	10.14
	15.27	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.49	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.37	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.08	05.18	03.39	02.51	04.02	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.30	14.57	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**Shadow receptor:** I - Asuinrakennus I (Kortenevantie 116)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.52	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.05	03.11	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.40	23.35	22.00	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.02
	15.02	16.43	18.10	20.43	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.30	14.57	14.26
26	09.22	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.05	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.27	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.11	23.52	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.17		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**Shadow receptor:** J - Asuinrakennus J (Haapavesitie 1406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**Shadow receptor:** K - Lomarakennus K (Kurunoja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**Shadow receptor:** L - Laskentapiste L (Perkkiontie, Ilmola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	05.13 (38)	02.59	05.18 (38)	04.24	05.33 (38)	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41	23.19 73	21.39 (24)	23.49 70	21.43 (24)	22.27 26	21.37 (20)	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.38	04.53	03.16	05.13 (38)	03.01	05.18 (38)	04.28	05.35 (38)	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22 72	21.39 (24)	23.47 70	21.43 (24)	22.23 18	05.53 (38)	20.36	18.49	16.03	14.41
3	10.10	08.57	07.24	06.35	04.50	03.14	05.12 (38)	03.01	05.18 (38)	04.31	05.38 (38)	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25 72	21.38 (24)	23.46 70	21.43 (24)	22.20 12	05.50 (38)	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46	03.12	05.13 (38)	03.03	05.19 (38)	04.34		06.09	07.35	08.10	09.43
	14.42	16.15	17.45	20.18	21.51	23.28 73	21.39 (24)	23.44 71	21.44 (24)	22.17		20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	05.13 (38)	03.05	05.19 (38)	04.37		06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30 72	21.39 (24)	23.42 71	21.44 (24)	22.13		20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	05.13 (38)	03.08	05.19 (38)	04.40		06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33 71	21.38 (24)	23.40 72	21.45 (24)	22.10		20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	05.13 (38)	03.10	05.19 (38)	04.43		06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.00	23.35 72	21.39 (24)	23.38 72	21.45 (24)	22.07		20.18	18.32	15.48	14.32
8	10.03	08.41	07.07	06.17	04.33	03.03	05.14 (38)	03.12	05.20 (38)	04.47		06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37 70	21.39 (24)	23.36 71	21.45 (24)	22.03		20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	05.31 (38) 03.01	05.14 (38)	03.15	05.20 (38)	04.50		06.23	07.50	08.26	09.55
	14.54	16.32	18.00	20.33	22.07 6	05.37 (38) 23.40 71	21.39 (24)	23.34 73	21.46 (24)	22.00		20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26	05.26 (38) 02.58	05.14 (38)	03.18	05.20 (38)	04.53		06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10 15	05.41 (38) 23.42 70	21.39 (24)	23.31 72	21.46 (24)	21.56		20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23	05.24 (38) 02.56	05.14 (38)	03.20	05.21 (38)	04.56		06.29	07.55	08.33	10.00
	14.59	16.39	18.06	20.39	22.13 19	05.43 (38) 23.44 70	21.39 (24)	23.29 72	21.47 (24)	21.53		20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	05.22 (38) 02.55	05.14 (38)	03.23	05.21 (38)	04.59		06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17 32	21.28 (20) 23.45 69	21.38 (24)	23.27 73	21.47 (24)	21.49		20.00	18.14	15.32	14.26
13	09.53	08.25	06.49	05.59	04.16	05.20 (38) 02.53	05.15 (38)	03.26	05.20 (38)	05.02		06.35	08.01	08.39	10.03
	15.05	16.45	18.12	20.45	22.20 41	21.31 (20) 23.47 68	21.39 (24)	23.24 73	21.46 (20)	21.46		19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13	05.19 (38) 02.52	05.15 (38)	03.29	05.21 (38)	05.05		06.38	08.04	08.42	10.05
	15.08	16.48	18.15	20.48	22.23 47	21.33 (20) 23.49 68	21.39 (24)	23.21 74	21.48 (20)	21.43		19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	05.18 (38) 02.51	05.15 (38)	03.31	05.21 (38)	05.09		06.40	08.07	08.46	10.07
	15.11	16.52	18.18	20.51	22.26 54	21.36 (20) 23.50 68	21.39 (24)	23.19 73	21.48 (20)	21.39		19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	05.17 (38) 02.50	05.15 (38)	03.34	05.22 (38)	05.12		06.43	08.10	08.49	10.08
	15.14	16.55	18.21	20.54	22.30 58	21.38 (20) 23.51 68	21.39 (24)	23.16 73	21.49 (20)	21.36		19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45	04.03	05.15 (38) 02.50	05.16 (38)	03.37	05.22 (38)	05.15		06.46	08.13	08.52	10.09
	15.17	16.58	18.24	20.57	22.33 64	21.40 (20) 23.52 67	21.39 (24)	23.13 73	21.49 (20)	21.32		19.42	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00	05.15 (38) 02.49	05.16 (38)	03.40	05.22 (38)	05.18		06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36 66	21.40 (20) 23.53 67	21.39 (24)	23.10 73	21.49 (20)	21.29		19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	05.14 (38) 02.49	05.16 (38)	03.43	05.23 (38)	05.21		06.52	08.20	08.58	10.12
	15.23	17.05	18.30	21.03	22.39 68	21.40 (20) 23.54 67	21.40 (24)	23.07 72	21.50 (20)	21.25		19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54	05.14 (38) 02.49	05.16 (38)	03.46	05.23 (38)	05.24		06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43 69	21.40 (20) 23.55 68	21.40 (24)	23.04 72	21.50 (20)	21.22		19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50	05.14 (38) 02.49	05.16 (38)	03.50	05.23 (38)	05.27		06.58	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46 71	21.41 (20) 23.55 68	21.40 (24)	23.01 72	21.50 (20)	21.18		19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47	05.13 (38) 02.49	05.16 (38)	03.53	05.24 (38)	05.30		07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49 72	21.40 (20) 23.55 68	21.40 (24)	22.58 71	21.51 (20)	21.15		19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	05.13 (38) 02.50	05.17 (38)	03.56	05.24 (38)	05.33		07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52 72	21.40 (20) 23.55 68	21.41 (24)	22.55 70	21.51 (20)	21.11		19.21	17.37	15.01	14.24
24	09.26	07.48	06.10	05.21	03.41	05.13 (38) 02.50	05.17 (38)	03.59	05.24 (38)	05.36		07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55 72	21.40 (20) 23.55 66	21.40 (24)	22.52 69	21.50 (20)	21.08		19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	05.13 (38) 02.51	05.18 (38)	04.02	05.25 (38)	05.39		07.09	07.38	09.17	10.15
	15.42	17.24	18.48	21.22	22.58 72	21.40 (20) 23.55 67	21.41 (24)	22.49 68	21.51 (20)	21.04		19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	05.13 (38) 02.52	05.17 (38)	04.05	05.25 (38)	05.42		07.12	07.41	09.20	10.15
	15.46	17.27	18.51	21.25	23.02 73	21.40 (20) 23.54 68	21.41 (24)	22.46 64	21.50 (20)	21.01		19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33	05.13 (38) 02.53	05.18 (38)	04.08	05.27 (38)	05.45		07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05 73	21.40 (20) 23.53 67	21.41 (24)	22.43 61	21.50 (20)	20.57		19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	05.13 (38) 02.55	05.18 (38)	04.12	05.28 (38)	05.48		07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08 72	21.39 (20) 23.52 68	21.42 (24)	22.40 57	21.48 (20)	20.54		19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	05.12 (38) 02.56	05.18 (38)	04.15	05.28 (38)	05.51		07.20	07.51	09.29	10.14
	15.56		20.00	21.35	23.11 74	21.39 (20) 23.51 69	21.42 (24)	22.36 51	21.45 (20)	20.50		19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	05.12 (38) 02.58	05.18 (38)	04.18	05.30 (38)	05.54		07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14 74	21.39 (24) 23.50 70	21.43 (24)	22.33 45	21.43 (20)	20.46		18.56	16.13	14.45	14.31
31	09.06		06.46		03.22	05.12 (38)		04.21	05.31 (38)	05.57			07.57		10.13
	16.02		20.06		23.16 73	21.38 (24)		22.30 37	21.39 (20)	20.43			16.10		14.33
Potential sun hours	171	238	363	451	569	624	608	508		393	305	198	137
Total, worst case					1337	2075	2105	56					
Sun reduction					0,47	0,48	0,38	0,31					
Oper. time red.					0,99	0,99	0,99	0,99					
Wind dir. red.					0,63	0,63	0,63	0,62					
Total reduction					0,29	0,30	0,24	0,19					
Total, real					392	617	497	11					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**Shadow receptor:** M - Lomarakennus M (Riskalan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.52	03.15	03.00	04.27	06.02	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	09.44
	14.40	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.36	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.31	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	09.58
	14.55	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.54	03.19	04.56	06.29	07.56	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.17	15.35	14.25
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.47	23.27	21.50	20.00	18.14	15.32	14.24
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.07	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.48	04.05	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.54	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.54	23.14	21.32	19.42	17.57	15.17	14.21
18	09.43	08.09	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.47	03.45	05.23	06.55	08.23	09.02	10.14
	15.25	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.08	14.21
21	09.35	07.59	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.21
22	09.32	07.55	06.17	05.27	03.46	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.00	14.22
24	09.27	07.48	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.29	14.55	14.24
26	09.21	07.42	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.03	16.19	14.48	14.27
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.14	23.52	22.34	20.47	18.56	16.13	14.44	14.30
31	09.07		06.45		03.20		04.20	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	170	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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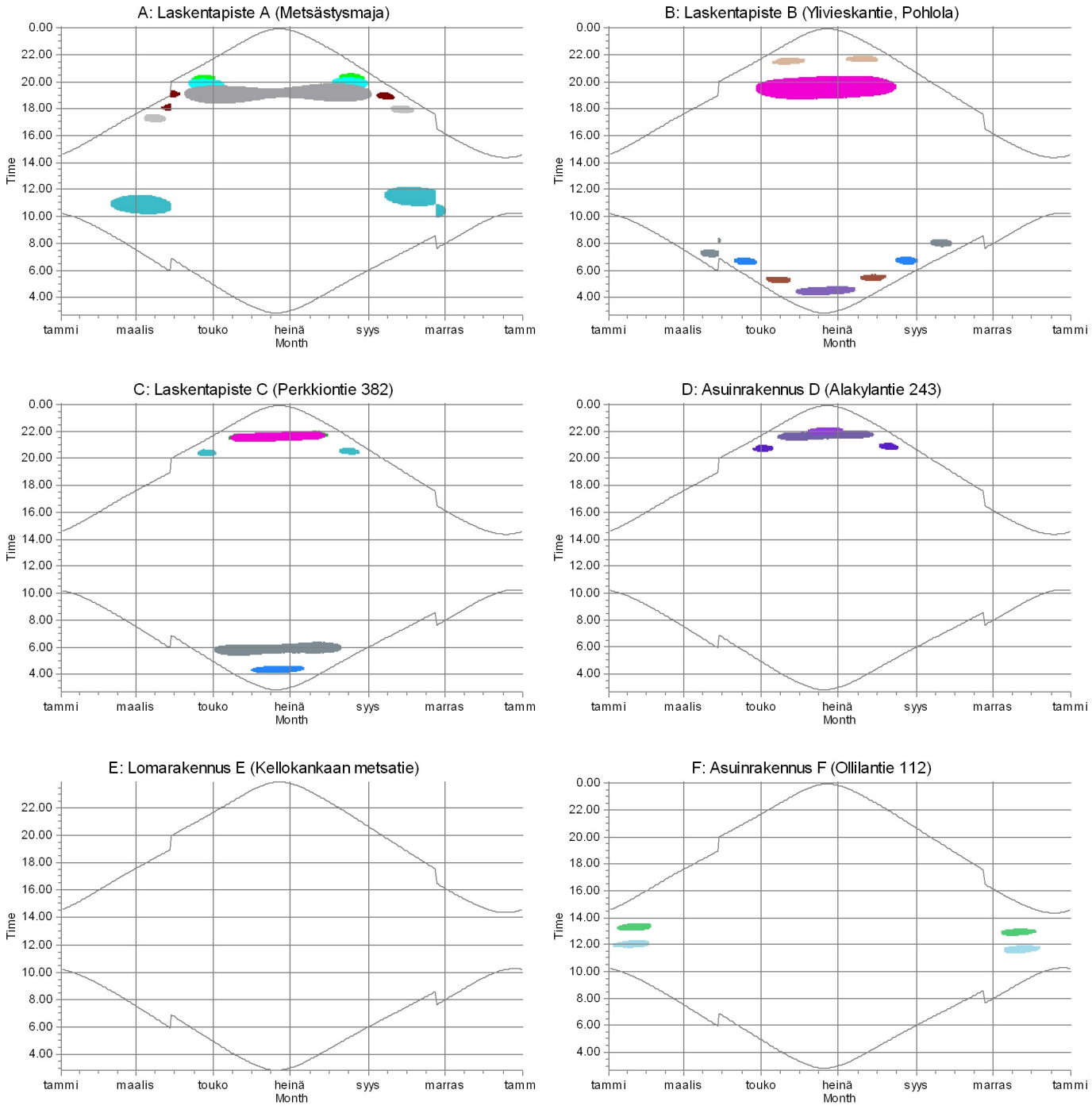
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



WTGs

8: PUU08	13: PUU13	19: PUU19	28: PUU28	38: PUU38	42: PUU42
9: PUU09	16: PUU16	20: PUU20	33: PUU33	39: PUU39	44: PUU44
12: PUU12	17: PUU17	24: PUU24	34: PUU34	40: PUU40	46: PUU46

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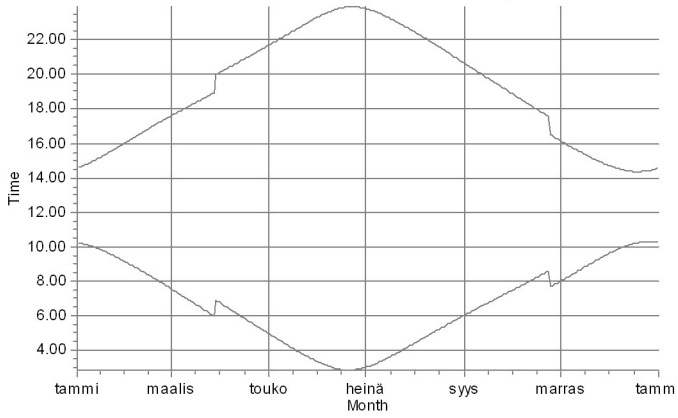
Calculated:
18.11.2020 15.23/3.4.388

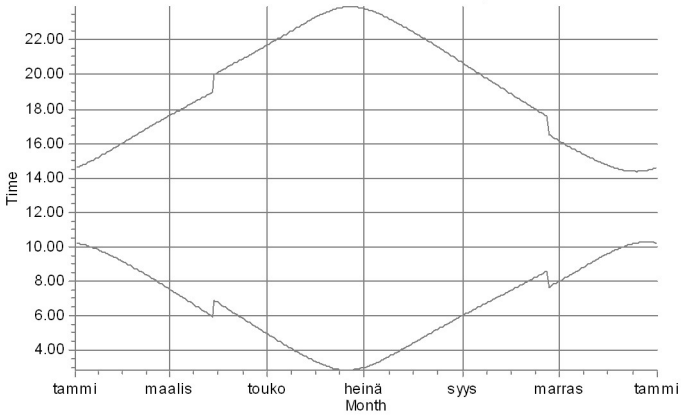
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102

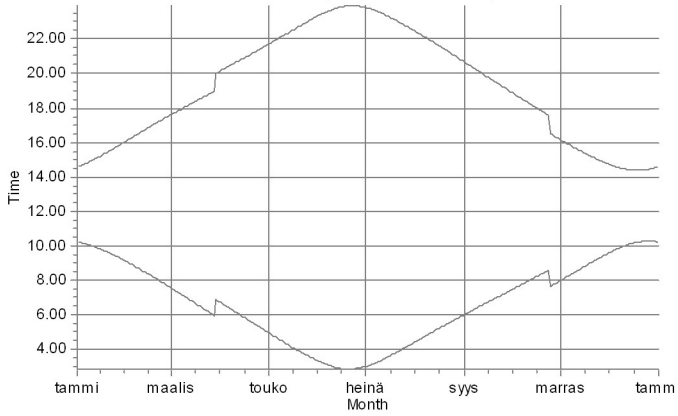
G: Lomarakennus G (Ollilantie, Siliakuru)



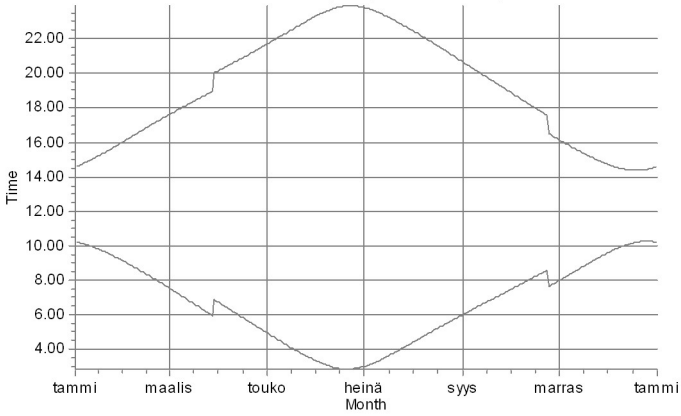
H: Asuinrakennus H (Pinolantie 406)



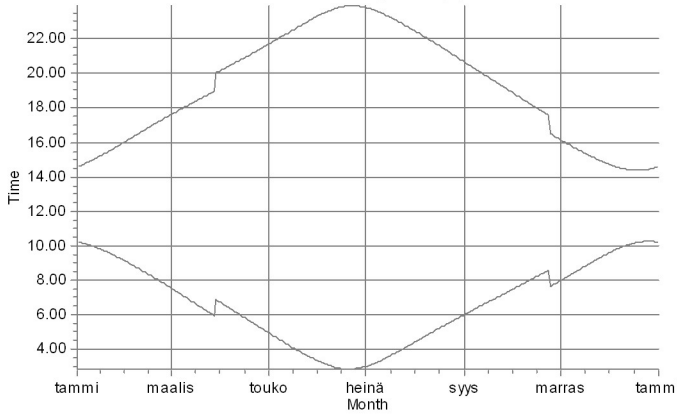
I: Asuinrakennus I (Kortenevantie 116)



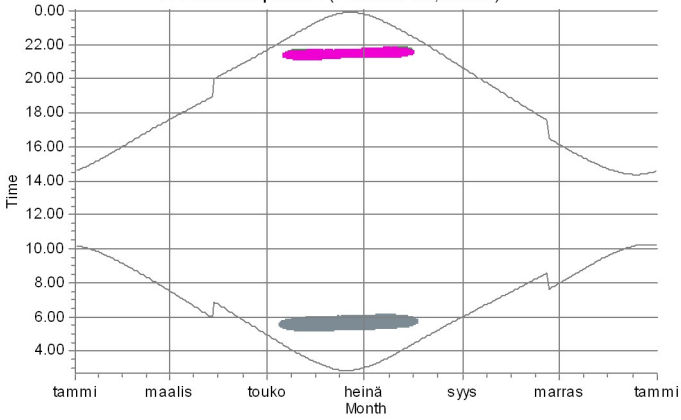
J: Asuinrakennus J (Haapavesitie 1406)



K: Lomarakennus K (Kurunoja)



L: Laskentapiste L (Perkkiontie, Ilmola)



WTGs

20: PUU20 24: PUU24 38: PUU38

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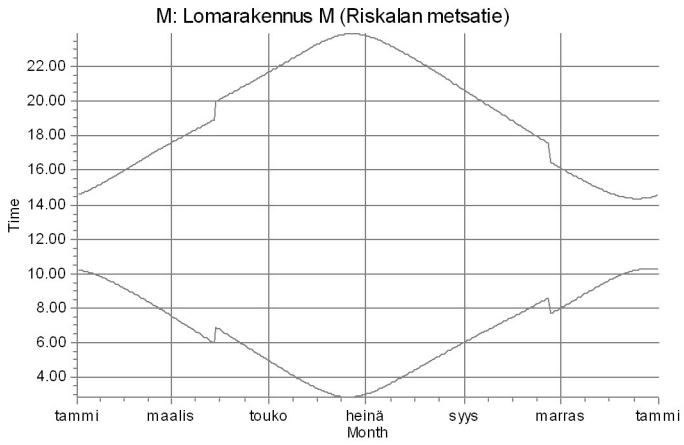
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



WTGs

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 1 - PUU01

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 2 - PUU02

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.44	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 3 - PUU03

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 4 - PUU04

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 5 - PUU05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 6 - PUU06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 7 - PUU07

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 8 - PUU08

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August	September		October	November	December
1	10.13	09.04	07.32		06.42	18.56-19.14/18	04.57	03.19	03.00	04.25	06.00		07.27	08.01	09.36
	14.36	16.06	17.36		20.09		21.41	23.20	23.50	22.27	20.40		18.53	16.07	14.43
2	10.12	09.01	07.28		06.39	18.58-19.13/15	04.53	03.17	03.00	04.28	06.03		07.30	08.04	09.38
	14.38	16.09	17.39		20.12		21.45	23.23	23.48	22.24	20.36		18.50	16.04	14.41
3	10.11	08.58	07.25		06.35	18.59-19.10/11	04.50	03.14	03.02	04.31	06.06		07.32	08.07	09.41
	14.40	16.12	17.42		20.15		21.48	23.25	23.46	22.20	20.33		18.46	16.01	14.39
4	10.09	08.54	07.21		06.32	19.03-19.07/4	04.46	03.12	03.04	04.34	06.09		07.35	08.10	09.44
	14.42	16.16	17.46		20.18		21.51	23.28	23.45	22.17	20.29		18.43	15.57	14.37
5	10.08	08.51	07.18		06.28		04.43	03.09	03.06	04.37	06.12		07.38	08.14	09.46
	14.44	16.19	17.49		20.21		21.54	23.31	23.43	22.14	20.26		18.39	15.54	14.35
6	10.07	08.48	07.14		06.25		04.40	03.07	03.08	04.41	06.15		07.41	08.17	09.49
	14.46	16.22	17.52		20.24		21.58	23.33	23.41	22.10	20.22		18.36	15.51	14.34
7	10.05	08.45	07.11		06.21		04.36	03.05	03.10	04.44	06.18		07.44	08.20	09.51
	14.49	16.26	17.55		20.27		22.01	23.36	23.39	22.07	20.18		18.32	15.48	14.32
8	10.04	08.42	07.07		06.18		04.33	03.03	03.13	04.47	06.21	18.58-19.00/2	07.47	08.23	09.54
	14.51	16.29	17.58		20.30		22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04		06.14		04.30	03.01	03.15	04.50	06.24	18.53-19.04/11	07.50	08.26	09.56
	14.54	16.32	18.01		20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00		06.10		04.26	02.58	03.18	04.53	06.26	18.50-19.05/15	07.53	08.30	09.58
	14.57	16.36	18.04		20.36		22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57		06.07		04.23	02.56	03.20	04.56	06.29	18.49-19.06/17	07.56	08.33	10.00
	14.59	16.39	18.07		20.39		22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53		06.03		04.20	02.55	03.23	05.00	06.32	18.48-19.07/19	07.59	08.36	10.02
	15.02	16.42	18.10		20.42		22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50		06.00		04.16	02.53	03.26	05.03	06.35	18.47-19.07/20	08.02	08.40	10.04
	15.05	16.45	18.13		20.45		22.20	23.48	23.25	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46		05.56		04.13	02.52	03.29	05.06	06.38	18.46-19.08/22	08.05	08.43	10.06
	15.08	16.49	18.16		20.48		22.24	23.49	23.22	21.43	19.54		18.08	15.26	14.24
15	09.50	08.19	06.43		05.53		04.10	02.51	03.32	05.09	06.41	18.45-19.07/22	08.08	08.46	10.07
	15.11	16.52	18.19		20.51		22.27	23.51	23.19	21.40	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39		05.49		04.06	02.51	03.35	05.12	06.44	18.45-19.06/21	08.11	08.49	10.09
	15.14	16.55	18.22		20.54		22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36		05.46		04.03	02.50	03.38	05.15	06.46	18.45-19.05/20	08.14	08.52	10.10
	15.17	16.58	18.25		20.58		22.33	23.53	23.14	21.33	19.43		17.57	15.18	14.23
18	09.43	08.09	06.32		05.42		04.00	02.49	03.41	05.18	06.49	18.46-19.02/16	08.17	08.56	10.11
	15.20	17.02	18.28		21.01		22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22
19	09.40	08.06	06.29		05.39		03.57	02.49	03.44	05.21	06.52	18.46-18.58/12	08.20	08.59	10.12
	15.23	17.05	18.31		21.04		22.40	23.55	23.08	21.26	19.36		17.50	15.12	14.22
20	09.38	08.02	06.25		05.35		03.54	02.49	03.47	05.24	06.55	18.46-18.54/8	08.23	09.02	10.13
	15.26	17.08	18.34		21.07		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.23
21	09.35	07.59	06.21		05.32		03.51	02.49	03.50	05.27	06.58	18.48-18.50/2	08.26	09.05	10.14
	15.30	17.11	18.37		21.10		22.46	23.56	23.02	21.19	19.29		17.44	15.07	14.23
22	09.32	07.56	06.18	18.04-18.05/1	05.28		03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
	15.33	17.14	18.40		21.13		22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	18.01-18.07/6	05.25		03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
	15.36	17.18	18.43		21.16		22.53	23.56	22.56	21.12	19.21		17.37	15.01	14.24
24	09.27	07.49	06.11	17.59-18.10/11	05.21		03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
	15.39	17.21	18.45		21.19		22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24
25	09.24	07.45	06.07	17.58-18.13/15	05.18		03.39	02.51	04.02	05.39	07.09		07.38	09.18	10.16
	15.43	17.24	18.48		21.22		22.59	23.55	22.50	21.05	19.14		16.30	14.56	14.25
26	09.21	07.42	06.04	17.57-18.16/19	05.14		03.36	02.52	04.05	05.42	07.12		07.42	09.21	10.16
	15.46	17.27	18.51		21.26		23.02	23.55	22.46	21.01	19.11		16.27	14.54	14.26
27	09.18	07.39	06.00	17.56-18.18/22	05.11		03.33	02.53	04.09	05.45	07.15		07.45	09.24	10.16
	15.49	17.30	18.54		21.29		23.05	23.54	22.43	20.57	19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	17.55-18.17/22	05.07		03.30	02.55	04.12	05.48	07.18		07.48	09.27	10.15
	15.53	17.33	18.57		21.32		23.08	23.53	22.40	20.54	19.04		16.20	14.49	14.29
29	09.13		06.53	18.56-19.17/21	05.04		03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35		23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.10		06.50	18.55-19.16/21	05.00		03.24	02.58	04.18	05.54	07.24		07.54	09.33	10.14
	15.59		20.03		21.38		23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.32
31	09.07		06.46	18.56-19.16/20			03.22		04.21	05.57			07.57		10.14
	16.02		20.06				23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363		451		570	624	609	508	393		305	198	137
Sum of minutes with flicker	0	0	158		48		0	0	0	0	207		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 9 - PUU09

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 20.06-20.20/14	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 20.08-20.18/10	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.18	04.53 20.18-20.23/5	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 20.15-20.27/12	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.55	03.23	04.59 20.13-20.29/16	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03 20.12-20.30/18	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06 20.10-20.30/20	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 20.11-20.13/2	04.10	02.51	03.32	05.09 20.09-20.31/22	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 20.09-20.16/7	04.06	02.50	03.34	05.12 20.09-20.32/23	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 20.06-20.18/12	04.03	02.50	03.37	05.15 20.07-20.31/24	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42 20.05-20.21/16	04.00	02.49	03.40	05.18 20.07-20.32/25	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39 20.04-20.25/21	03.57	02.49	03.43	05.21 20.07-20.32/25	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35 20.02-20.25/23	03.54	02.49	03.47	05.24 20.07-20.32/25	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 20.02-20.26/24	03.51	02.49	03.50	05.27 20.06-20.31/25	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 20.02-20.26/24	03.47	02.49	03.53	05.30 20.06-20.30/24	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 20.01-20.26/25	03.44	02.50	03.56	05.33 20.07-20.30/23	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 20.01-20.25/24	03.41	02.50	03.59	05.36 20.08-20.28/20	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 20.01-20.25/24	03.38	02.51	04.02	05.39 20.08-20.24/16	07.09	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 20.01-20.25/24	03.36	02.52	04.05	05.42 20.09-20.21/12	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.11 20.01-20.24/23	03.33	02.53	04.09	05.45 20.11-20.18/7	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 20.02-20.24/22	03.30	02.55	04.12	05.48 20.14-20.15/1	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 20.03-20.23/20	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 20.04-20.22/18	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 10 - PUU10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 11 - PUU11

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 12 - PUU12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27 17.44-18.09/25	08.01	09.36
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29 17.44-18.08/24	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32 17.45-18.06/21	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35 17.46-18.03/17	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38 17.48-18.00/12	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41 17.51-17.56/5	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07 17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04 17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00 17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57 17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53 17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50 17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46 17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43 17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39 17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36 17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32 17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29 17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52 17.59-18.04/5	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25 17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55 17.54-18.07/13	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21 17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58 17.51-18.09/18	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18 17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01 17.49-18.10/21	08.29	09.08	10.15
	15.33	17.14	18.40	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14 17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04 17.48-18.11/23	08.32	09.12	10.15
	15.36	17.18	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11 17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06 17.47-18.11/24	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09 17.46-18.12/26	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12 17.45-18.12/27	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15 17.44-18.11/27	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18 17.43-18.11/28	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21 17.43-18.10/27	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24 17.43-18.10/27	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 13 - PUU13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 19.33-20.05/32	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 19.34-20.05/31	03.16	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50 19.35-20.04/29	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46 19.35-20.03/28	03.12	03.03	04.34 19.54-20.03/9	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43 19.37-20.01/24	03.09	03.05	04.37 19.51-20.06/15	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40 19.38-20.00/22	03.07	03.08	04.40 19.49-20.08/19	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 19.40-19.58/18	03.05	03.10	04.44 19.47-20.09/22	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33 19.42-19.55/13	03.03	03.12	04.47 19.45-20.11/26	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 19.47-19.50/3	03.01	03.15	04.50 19.44-20.12/28	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53 19.42-20.12/30	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 19.42-20.13/31	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03 19.47-19.58/11	04.19	02.55	03.23	04.59 19.41-20.14/33	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00 19.44-20.02/18	04.16	02.53	03.26	05.03 19.40-20.14/34	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56 19.40-20.03/23	04.13	02.52	03.29	05.06 19.39-20.14/35	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 19.39-20.05/26	04.10	02.51	03.32	05.09 19.39-20.14/35	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 19.38-20.06/28	04.06	02.50	03.34	05.12 19.39-20.15/36	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 19.36-20.06/30	04.03	02.50	03.37	05.15 19.37-20.14/37	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42 19.35-20.07/32	04.00	02.49	03.40	05.18 19.37-20.14/37	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38 19.34-20.08/34	03.57	02.49	03.43	05.21 19.37-20.14/37	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 19.33-20.08/35	03.54	02.49	03.47	05.24 19.37-20.14/37	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 19.32-20.08/36	03.51	02.49	03.50	05.27 19.37-20.13/36	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 19.32-20.09/37	03.47	02.49	03.53	05.30 19.37-20.13/36	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 19.32-20.09/37	03.44	02.50	03.56	05.33 19.38-20.12/34	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 19.31-20.08/37	03.41	02.50	03.59	05.36 19.38-20.12/34	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 19.31-20.08/37	03.38	02.51	04.02	05.39 19.38-20.10/32	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 19.31-20.08/37	03.36	02.52	04.05	05.42 19.39-20.09/30	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10 19.31-20.07/36	03.33	02.53	04.09	05.45 19.40-20.08/28	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 19.32-20.07/35	03.30	02.55	04.12	05.48 19.41-20.07/26	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 19.32-20.07/35	03.27	02.56	04.15	05.51 19.41-20.04/23	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 19.32-20.06/34	03.24	02.58	04.18	05.54 19.44-20.01/17	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57 19.47-19.58/11		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 14 - PUU14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 15 - PUU15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.45	14.31
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.49	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.28	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.25	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.18	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.39	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.12		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	
1	10.13	09.04	07.32	06.42		04.57	18.27-19.39/72	03.19	18.40-19.31/51
	14.35	16.06	17.36	20.09		21.41		23.20	
2	10.12	09.01	07.28	06.39		04.53	18.27-19.39/72	03.16	18.40-19.30/50
	14.37	16.09	17.39	20.12		21.45		23.23	
3	10.11	08.57	07.25	06.35		04.50	18.27-19.39/72	03.14	18.42-19.30/48
	14.39	16.12	17.42	20.15		21.48		23.25	
4	10.09	08.54	07.21	06.32		04.46	18.27-19.39/72	03.12	18.42-19.29/47
	14.42	16.16	17.45	20.18		21.51		23.28	
5	10.08	08.51	07.18	06.28		04.43	18.27-19.39/72	03.09	18.43-19.29/46
	14.44	16.19	17.48	20.21		21.54		23.31	
6	10.07	08.48	07.14	06.25		04.39	18.26-19.39/73	03.07	18.43-19.28/45
	14.46	16.22	17.52	20.24		21.57		23.33	
7	10.05	08.45	07.11	06.21		04.36	18.26-19.39/73	03.05	18.45-19.28/43
	14.49	16.26	17.55	20.27		22.01		23.36	
8	10.03	08.42	07.07	06.17		04.33	18.26-19.38/72	03.03	18.45-19.28/43
	14.51	16.29	17.58	20.30		22.04		23.38	
9	10.02	08.39	07.04	06.14	19.02-19.11/9	04.29	18.26-19.38/72	03.01	18.46-19.28/42
	14.54	16.32	18.01	20.33		22.07		23.40	
10	10.00	08.35	07.00	06.10	18.56-19.18/22	04.26	18.26-19.38/72	02.58	18.47-19.27/40
	14.56	16.36	18.04	20.36		22.10		23.42	
11	09.58	08.32	06.57	06.07	18.52-19.22/30	04.23	18.26-19.37/71	02.56	18.48-19.27/39
	14.59	16.39	18.07	20.39		22.14		23.44	
12	09.56	08.29	06.53	06.03	18.48-19.24/36	04.19	18.27-19.38/71	02.55	18.48-19.27/39
	15.02	16.42	18.10	20.42		22.17		23.46	
13	09.54	08.26	06.50	06.00	18.46-19.27/41	04.16	18.27-19.37/70	02.53	18.50-19.27/37
	15.05	16.45	18.13	20.45		22.20		23.48	
14	09.52	08.22	06.46	05.56	18.43-19.28/45	04.13	18.27-19.36/69	02.52	18.50-19.26/36
	15.08	16.49	18.16	20.48		22.24		23.49	
15	09.49	08.19	06.43	05.53	18.42-19.30/48	04.10	18.28-19.37/69	02.51	18.51-19.27/36
	15.11	16.52	18.19	20.51		22.27		23.51	
16	09.47	08.16	06.39	05.49	18.40-19.31/51	04.06	18.28-19.36/68	02.50	18.51-19.26/35
	15.14	16.55	18.22	20.54		22.30		23.52	
17	09.45	08.12	06.36	05.46	18.38-19.32/54	04.03	18.29-19.36/67	02.50	18.51-19.26/35
	15.17	16.58	18.25	20.57		22.33		23.53	
18	09.42	08.09	06.32	05.42	18.37-19.33/56	04.00	18.29-19.35/66	02.49	18.52-19.27/35
	15.20	17.02	18.28	21.00		22.37		23.54	
19	09.40	08.06	06.28	05.38	18.36-19.34/58	03.57	18.30-19.36/66	02.49	18.52-19.27/35
	15.23	17.05	18.31	21.04		22.40		23.55	
20	09.37	08.02	06.25	05.35	18.34-19.34/60	03.54	18.30-19.35/65	02.49	18.53-19.27/34
	15.26	17.08	18.34	21.07		22.43		23.55	
21	09.35	07.59	06.21	05.31	18.33-19.35/62	03.51	18.31-19.35/64	02.49	18.53-19.27/34
	15.29	17.11	18.36	21.10		22.46		23.56	
22	09.32	07.56	06.18	05.28	18.32-19.36/64	03.47	18.32-19.35/63	02.49	18.53-19.27/34
	15.33	17.14	18.39	21.13		22.49		23.56	
23	09.29	07.52	06.14	05.24	18.32-19.37/65	03.44	18.32-19.33/61	02.50	18.54-19.28/34
	15.36	17.17	18.42	21.16		22.53		23.56	
24	09.27	07.49	06.11	05.21	18.30-19.37/67	03.41	18.33-19.33/60	02.50	18.53-19.28/35
	15.39	17.21	18.45	21.19		22.56		23.56	
25	09.24	07.45	06.07	05.17	18.29-19.37/68	03.38	18.34-19.33/59	02.51	18.54-19.28/34
	15.42	17.24	18.48	21.22		22.59		23.55	
26	09.21	07.42	06.04	05.14	18.29-19.38/69	03.36	18.35-19.33/58	02.52	18.53-19.28/35
	15.46	17.27	18.51	21.25		23.02		23.55	
27	09.18	07.38	06.00	05.10	18.29-19.38/69	03.33	18.36-19.32/56	02.53	18.53-19.29/36
	15.49	17.30	18.54	21.29		23.05		23.54	
28	09.15	07.35	05.57	05.07	18.28-19.38/70	03.30	18.36-19.32/56	02.55	18.53-19.30/37
	15.52	17.33	18.57	21.32		23.08		23.53	
29	09.13		06.53	05.04	18.28-19.39/71	03.27	18.37-19.32/55	02.56	18.53-19.30/37
	15.56		20.00	21.35		23.11		23.52	
30	09.10		06.49	05.00	18.27-19.39/72	03.24	18.38-19.31/53	02.58	18.53-19.31/38
	15.59		20.03	21.38		23.14		23.51	
31	09.07		06.46			03.22	18.38-19.30/52		
	16.02		20.06			23.17			
Potential sun hours	171	238	363	451		570		624	
Sum of minutes with flicker	0	0	0	1187		2041		1170	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 16 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	18.52-19.31/39	04.25	18.37-19.48/71	06.00	18.51-19.21/30	07.27	08.01	09.36
	23.49		22.27		20.40		18.53	16.07	14.43
2	03.01	18.52-19.32/40	04.28	18.37-19.48/71	06.03	18.54-19.16/22	07.29	08.04	09.38
	23.48		22.24		20.36		18.50	16.04	14.41
3	03.01	18.52-19.33/41	04.31	18.36-19.48/72	06.06	19.00-19.09/9	07.32	08.07	09.41
	23.46		22.20		20.33		18.46	16.00	14.39
4	03.03	18.51-19.33/42	04.34	18.36-19.48/72	06.09		07.35	08.10	09.44
	23.45		22.17		20.29		18.42	15.57	14.37
5	03.05	18.50-19.33/43	04.37	18.36-19.48/72	06.12		07.38	08.13	09.46
	23.43		22.14		20.25		18.39	15.54	14.35
6	03.08	18.50-19.35/45	04.40	18.36-19.49/73	06.15		07.41	08.17	09.49
	23.41		22.10		20.22		18.35	15.51	14.33
7	03.10	18.50-19.36/46	04.44	18.35-19.48/73	06.18		07.44	08.20	09.51
	23.39		22.07		20.18		18.32	15.48	14.32
8	03.12	18.49-19.36/47	04.47	18.36-19.48/72	06.20		07.47	08.23	09.54
	23.37		22.04		20.15		18.28	15.45	14.30
9	03.15	18.49-19.37/48	04.50	18.36-19.48/72	06.23		07.50	08.26	09.56
	23.34		22.00		20.11		18.25	15.41	14.29
10	03.18	18.49-19.37/48	04.53	18.35-19.47/72	06.26		07.53	08.30	09.58
	23.32		21.57		20.08		18.21	15.38	14.28
11	03.20	18.48-19.38/50	04.56	18.35-19.47/72	06.29		07.56	08.33	10.00
	23.30		21.53		20.04		18.18	15.35	14.27
12	03.23	18.48-19.39/51	04.59	18.35-19.47/72	06.32		07.59	08.36	10.02
	23.27		21.50		20.01		18.14	15.32	14.26
13	03.26	18.47-19.40/53	05.03	18.36-19.47/71	06.35		08.02	08.39	10.04
	23.24		21.46		19.57		18.11	15.29	14.25
14	03.29	18.46-19.40/54	05.06	18.35-19.46/71	06.38		08.05	08.43	10.06
	23.22		21.43		19.53		18.08	15.26	14.24
15	03.32	18.46-19.41/55	05.09	18.35-19.46/71	06.41		08.08	08.46	10.07
	23.19		21.39		19.50		18.04	15.23	14.23
16	03.34	18.45-19.41/56	05.12	18.36-19.45/69	06.43		08.11	08.49	10.09
	23.16		21.36		19.46		18.01	15.21	14.23
17	03.37	18.44-19.42/58	05.15	18.35-19.44/69	06.46		08.14	08.52	10.10
	23.14		21.32		19.43		17.57	15.18	14.23
18	03.40	18.44-19.42/58	05.18	18.36-19.43/67	06.49		08.17	08.56	10.11
	23.11		21.29		19.39		17.54	15.15	14.22
19	03.43	18.44-19.43/59	05.21	18.37-19.43/66	06.52		08.20	08.59	10.12
	23.08		21.26		19.36		17.50	15.12	14.22
20	03.47	18.43-19.43/60	05.24	18.37-19.42/65	06.55		08.23	09.02	10.13
	23.05		21.22		19.32		17.47	15.09	14.22
21	03.50	18.42-19.44/62	05.27	18.37-19.41/64	06.58		08.26	09.05	10.14
	23.02		21.19		19.28		17.44	15.07	14.23
22	03.53	18.42-19.45/63	05.30	18.38-19.40/62	07.01		08.29	09.08	10.15
	22.59		21.15		19.25		17.40	15.04	14.23
23	03.56	18.41-19.45/64	05.33	18.39-19.39/60	07.04		08.32	09.12	10.15
	22.56		21.11		19.21		17.37	15.01	14.24
24	03.59	18.41-19.46/65	05.36	18.40-19.38/58	07.06		08.35	09.15	10.15
	22.53		21.08		19.18		17.33	14.59	14.24
25	04.02	18.40-19.46/66	05.39	18.40-19.36/56	07.09		07.38	09.18	10.16
	22.50		21.04		19.14		16.30	14.56	14.25
26	04.05	18.40-19.47/67	05.42	18.41-19.34/53	07.12		07.41	09.21	10.16
	22.46		21.01		19.11		16.27	14.54	14.26
27	04.09	18.39-19.46/67	05.45	18.42-19.33/51	07.15		07.45	09.24	10.15
	22.43		20.57		19.07		16.23	14.51	14.27
28	04.12	18.39-19.47/68	05.48	18.44-19.31/47	07.18		07.48	09.27	10.15
	22.40		20.54		19.04		16.20	14.49	14.29
29	04.15	18.38-19.47/69	05.51	18.44-19.28/44	07.21		07.51	09.30	10.15
	22.37		20.50		19.00		16.17	14.47	14.30
30	04.18	18.38-19.48/70	05.54	18.46-19.26/40	07.24		07.54	09.33	10.14
	22.34		20.47		18.57		16.13	14.45	14.31
31	04.21	18.38-19.48/70	05.57	18.48-19.24/36			07.57		10.14
	22.30		20.43				16.10		14.33
Potential sun hours	609		509		393		305	198	137
Sum of minutes with flicker	1724		1984		61		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 17 - PUU17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.19 21.26-21.38/12	02.59	04.24 21.34-21.37/3	06.00	07.26	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16 21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40
3	10.11	08.57	07.25	06.35	04.50	03.14 21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11 21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12 21.38-21.40/2	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15 21.36-21.43/7	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17 21.35-21.44/9	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 21.24-21.25/1	02.56	03.20 21.34-21.46/12	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 21.24-21.28/4	02.54	03.23 21.33-21.46/13	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 21.22-21.31/9	02.53	03.26 21.32-21.46/14	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.21-21.33/12	02.52	03.28 21.32-21.48/16	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09 21.21-21.36/15	02.51	03.31 21.32-21.49/17	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.20-21.38/18	02.50	03.34 21.31-21.49/18	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.20-21.40/20	02.49	03.37 21.31-21.49/18	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.20-21.41/21	02.49	03.40 21.30-21.50/20	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57 21.19-21.40/21	02.49	03.43 21.31-21.51/20	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 21.20-21.41/21	02.49	03.46 21.30-21.51/21	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.20-21.41/21	02.49	03.49 21.30-21.51/21	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47 21.19-21.41/22	02.49	03.53 21.30-21.51/21	05.30	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44 21.20-21.41/21	02.49	03.56 21.30-21.51/21	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 21.20-21.41/21	02.50	03.59 21.30-21.51/21	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.21-21.41/20	02.51	04.02 21.30-21.51/21	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35 21.21-21.41/20	02.52	04.05 21.30-21.51/21	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32 21.22-21.40/18	02.53	04.08 21.31-21.50/19	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30 21.23-21.40/17	02.54	04.12 21.31-21.48/17	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27 21.23-21.39/16	02.56	04.15 21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24 21.24-21.39/15	02.57	04.18 21.32-21.43/11	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21 21.24-21.38/14		04.21 21.33-21.40/7	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 18 - PUU18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June
1	10.12	09.03		07.31	10.17-11.31/74	06.42		04.57	20.16-20.31/15	03.19
	14.35	16.06		17.36		20.09		21.41		23.20
2	10.11	09.00		07.28	10.17-11.31/74	06.39		04.53	20.18-20.29/11	03.16
	14.37	16.09		17.39		20.12		21.44		23.22
3	10.10	08.57		07.25	10.16-11.30/74	06.35		04.50	20.20-20.26/6	03.14
	14.39	16.12		17.42		20.15		21.48		23.25
4	10.09	08.54		07.21	10.16-11.31/75	06.32		04.46		03.12
	14.42	16.16		17.45		20.18		21.51		23.28
5	10.08	08.51		07.18	10.15-11.31/76	06.28		04.43		03.09
	14.44	16.19		17.48		20.21		21.54		23.30
6	10.06	08.48		07.14	10.15-11.30/75	06.24		04.39		03.07
	14.46	16.22		17.51		20.24		21.57		23.33
7	10.05	08.45		07.11	10.15-11.31/76	06.21		04.36		03.05
	14.49	16.26		17.55		20.27		22.01		23.35
8	10.03	08.42		07.07	10.14-11.30/76	06.17		04.33		03.03
	14.51	16.29		17.58		20.30		22.04		23.38
9	10.02	08.38		07.04	10.14-11.30/76	06.14		04.29		03.01
	14.54	16.32		18.01		20.33		22.07		23.40
10	10.00	08.35	10.48-11.03/15	07.00	10.15-11.30/75	06.10		04.26		02.58
	14.56	16.35		18.04		20.36		22.10		23.42
11	09.58	08.32	10.43-11.08/25	06.57	10.14-11.29/75	06.07		04.23		02.56
	14.59	16.39		18.07		20.39		22.14		23.44
12	09.56	08.29	10.40-11.12/32	06.53	10.15-11.29/74	06.03		04.19		02.55
	15.02	16.42		18.10		20.42		22.17		23.46
13	09.54	08.25	10.37-11.14/37	06.50	10.15-11.28/73	06.00		04.16		02.53
	15.05	16.45		18.13		20.45		22.20		23.47
14	09.52	08.22	10.34-11.16/42	06.46	10.14-11.27/73	05.56		04.13		02.52
	15.08	16.49		18.16		20.48		22.23		23.49
15	09.49	08.19	10.32-11.18/46	06.43	10.15-11.26/71	05.53		04.10		02.51
	15.11	16.52		18.19		20.51		22.27		23.50
16	09.47	08.16	10.31-11.20/49	06.39	10.15-11.25/70	05.49		04.06		02.50
	15.14	16.55		18.22		20.54		22.30		23.52
17	09.45	08.12	10.29-11.22/53	06.35	10.15-11.23/68	05.45		04.03		02.50
	15.17	16.58		18.25		20.57		22.33		23.53
18	09.42	08.09	10.27-11.23/56	06.32	10.16-11.23/67	05.42		04.00		02.49
	15.20	17.01		18.28		21.00		22.36		23.54
19	09.40	08.06	10.27-11.25/58	06.28	10.16-11.21/65	05.38	20.21-20.25/4	03.57		02.49
	15.23	17.05		18.30		21.03		22.40		23.54
20	09.37	08.02	10.25-11.25/60	06.25	10.18-11.20/62	05.35	20.18-20.27/9	03.54		02.49
	15.26	17.08		18.33		21.07		22.43		23.55
21	09.35	07.59	10.24-11.26/62	06.21	10.18-11.18/60	05.31	20.17-20.30/13	03.51		02.49
	15.29	17.11		18.36		21.10		22.46		23.55
22	09.32	07.55	10.22-11.27/65	06.18	10.20-11.16/56	05.28	20.16-20.33/17	03.47		02.49
	15.33	17.14		18.39		21.13		22.49		23.56
23	09.29	07.52	10.22-11.28/66	06.14	10.20-11.14/54	05.24	20.16-20.36/20	03.44		02.50
	15.36	17.17		18.42		21.16		22.52		23.56
24	09.27	07.49	10.21-11.29/68	06.11	10.21-11.11/50	05.21	20.15-20.35/20	03.41		02.50
	15.39	17.21		18.45		21.19		22.56		23.55
25	09.24	07.45	10.19-11.29/70	06.07	10.24-11.08/44	05.17	20.14-20.35/21	03.38		02.51
	15.42	17.24		18.48		21.22		22.59		23.55
26	09.21	07.42	10.19-11.30/71	06.04	10.26-11.05/39	05.14	20.14-20.35/21	03.36		02.52
	15.46	17.27		18.51		21.25		23.02		23.54
27	09.18	07.38	10.18-11.30/72	06.00	10.29-11.01/32	05.10	20.15-20.35/20	03.33		02.53
	15.49	17.30		18.54		21.28		23.05		23.54
28	09.15	07.35	10.17-11.30/73	05.56	10.33-10.54/21	05.07	20.15-20.34/19	03.30		02.55
	15.52	17.33		18.57		21.32		23.08		23.53
29	09.12			06.53		05.03	20.15-20.34/19	03.27		02.56
	15.56			20.00		21.35		23.11		23.52
30	09.09			06.49		05.00	20.15-20.32/17	03.24		02.58
	15.59			20.03		21.38		23.14		23.51
31	09.06			06.46				03.22		
	16.02			20.06				23.17		
Potential sun hours	171	238		363		451		570		624
Sum of minutes with flicker	0	1020		1805		200		32		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 19 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November		December
1	03.00	04.24		06.00		07.26	10.53-12.07/74	08.00	10.19-10.31/12	09.35
	23.49	22.27		20.40		18.53		16.07		14.43
2	03.00	04.28		06.03		07.29	10.53-12.07/74	08.04		09.38
	23.48	22.24		20.36		18.49		16.04		14.41
3	03.01	04.31		06.06		07.32	10.52-12.07/75	08.07		09.41
	23.46	22.20		20.32		18.46		16.00		14.39
4	03.03	04.34		06.09		07.35	10.52-12.07/75	08.10		09.44
	23.44	22.17		20.29		18.42		15.57		14.37
5	03.06	04.37		06.12		07.38	10.51-12.07/76	08.13		09.46
	23.43	22.14		20.25		18.39		15.54		14.35
6	03.08	04.40		06.15		07.41	10.51-12.06/75	08.17		09.49
	23.41	22.10		20.22		18.35		15.51		14.33
7	03.10	04.44		06.18		07.44	10.50-12.06/76	08.20		09.51
	23.39	22.07		20.18		18.32		15.48		14.32
8	03.13	04.47		06.20		07.47	10.51-12.07/76	08.23		09.53
	23.36	22.03		20.15		18.28		15.45		14.30
9	03.15	04.50		06.23		07.50	10.51-12.06/75	08.26		09.56
	23.34	22.00		20.11		18.25		15.41		14.29
10	03.18	04.53	20.29-20.37/8	06.26		07.53	10.50-12.05/75	08.30		09.58
	23.32	21.57		20.08		18.21		15.38		14.28
11	03.20	04.56	20.26-20.39/13	06.29		07.56	10.50-12.05/75	08.33		10.00
	23.29	21.53		20.04		18.18		15.35		14.27
12	03.23	04.59	20.25-20.40/15	06.32		07.59	10.50-12.04/74	08.36		10.02
	23.27	21.50		20.00		18.14		15.32		14.26
13	03.26	05.02	20.23-20.40/17	06.35		08.02	10.50-12.03/73	08.39		10.04
	23.24	21.46		19.57		18.11		15.29		14.25
14	03.29	05.06	20.23-20.41/18	06.38		08.05	10.51-12.03/72	08.43		10.05
	23.22	21.43		19.53		18.08		15.26		14.24
15	03.32	05.09	20.22-20.42/20	06.41	11.24-11.43/19	08.08	10.51-12.02/71	08.46		10.07
	23.19	21.39		19.50		18.04		15.23		14.23
16	03.34	05.12	20.22-20.42/20	06.43	11.18-11.49/31	08.11	10.51-12.01/70	08.49		10.08
	23.16	21.36		19.46		18.01		15.20		14.23
17	03.37	05.15	20.21-20.41/20	06.46	11.15-11.52/37	08.14	10.51-12.00/69	08.52		10.10
	23.13	21.32		19.43		17.57		15.18		14.23
18	03.40	05.18	20.21-20.41/20	06.49	11.12-11.55/43	08.17	10.53-12.00/67	08.55		10.11
	23.11	21.29		19.39		17.54		15.15		14.22
19	03.43	05.21	20.21-20.41/20	06.52	11.10-11.58/48	08.20	10.53-11.59/66	08.59		10.12
	23.08	21.25		19.36		17.50		15.12		14.22
20	03.47	05.24	20.21-20.41/20	06.55	11.07-11.59/52	08.23	10.53-11.57/64	09.02		10.13
	23.05	21.22		19.32		17.47		15.09		14.22
21	03.50	05.27	20.21-20.37/16	06.58	11.05-12.01/56	08.26	10.55-11.57/62	09.05		10.14
	23.02	21.18		19.28		17.43		15.07		14.23
22	03.53	05.30	20.22-20.34/12	07.01	11.03-12.02/59	08.29	10.55-11.55/60	09.08		10.14
	22.59	21.15		19.25		17.40		15.04		14.23
23	03.56	05.33	20.23-20.31/8	07.03	11.02-12.03/61	08.32	10.57-11.54/57	09.11		10.15
	22.56	21.11		19.21		17.37		15.01		14.24
24	03.59	05.36	20.25-20.28/3	07.06	11.01-12.04/63	08.35	10.58-11.52/54	09.15		10.15
	22.53	21.08		19.18		17.33		14.59		14.24
25	04.02	05.39		07.09	10.59-12.05/66	07.38	09.59-10.51/52	09.18		10.15
	22.49	21.04		19.14		16.30		14.56		14.25
26	04.05	05.42		07.12	10.58-12.06/68	07.41	10.00-10.49/49	09.21		10.15
	22.46	21.01		19.11		16.27		14.54		14.26
27	04.09	05.45		07.15	10.56-12.06/70	07.45	10.02-10.48/46	09.24		10.15
	22.43	20.57		19.07		16.23		14.51		14.27
28	04.12	05.48		07.18	10.56-12.06/70	07.48	10.04-10.45/41	09.27		10.15
	22.40	20.54		19.04		16.20		14.49		14.29
29	04.15	05.51		07.21	10.55-12.07/72	07.51	10.06-10.43/37	09.30		10.15
	22.37	20.50		19.00		16.17		14.47		14.30
30	04.18	05.54		07.24	10.54-12.07/73	07.54	10.10-10.41/31	09.33		10.14
	22.33	20.47		18.56		16.13		14.45		14.31
31	04.21	05.57				07.57	10.14-10.37/23			10.13
	22.30	20.43				16.10				14.33
Potential sun hours	608	508		393		305		198		137
Sum of minutes with flicker	0	230		888		1964		12		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 20 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 21.26-21.46/20	02.59 21.40-21.46/6	04.24 21.34-21.37/3	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.00	07.28	06.39	04.53	03.16 21.27-21.46/19	03.01 21.39-21.47/8	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.04	14.40
3	10.10	08.57	07.25	06.35	04.50	03.14 21.28-21.45/17	03.01 21.38-21.48/10	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11 21.29-21.45/16	03.03 21.38-21.49/11	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09 21.30-21.45/15	03.05 21.37-21.49/12	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 21.30-21.44/14	03.08 21.37-21.51/14	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05 21.31-21.44/13	03.10 21.36-21.51/15	04.44	06.17	07.44	08.20	09.51
	14.49	16.26	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03 21.32-21.44/12	03.12 21.36-21.52/16	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01 21.33-21.43/10	03.15 21.36-21.53/17	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 21.34-21.43/9	03.17 21.36-21.53/17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56 21.35-21.42/7	03.20 21.35-21.54/19	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 21.24-21.28/4	02.54 21.36-21.41/5	03.23 21.34-21.55/21	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	06.00	04.16 21.22-21.31/9	02.53 21.39-21.40/1	03.26 21.32-21.55/23	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.21-21.33/12	02.52	03.29 21.33-21.55/22	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09 21.21-21.36/15	02.51	03.31 21.32-21.56/24	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.21-21.38/17	02.50	03.34 21.32-21.56/24	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.20-21.40/20	02.50	03.37 21.31-21.56/25	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.20-21.44/24	02.49	03.40 21.30-21.56/26	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57 21.19-21.45/26	02.49	03.43 21.31-21.57/26	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54 21.20-21.46/26	02.49	03.46 21.30-21.57/27	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.20-21.47/27	02.49	03.50 21.30-21.56/26	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47 21.20-21.46/26	02.49	03.53 21.30-21.57/27	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 21.20-21.46/26	02.50	03.56 21.30-21.56/26	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 21.21-21.47/26	02.50	03.59 21.30-21.57/27	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.21-21.47/26	02.51	04.02 21.30-21.55/25	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35 21.22-21.47/25	02.52	04.05 21.30-21.53/23	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33 21.22-21.47/25	02.53	04.08 21.31-21.50/19	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30 21.23-21.47/24	02.54	04.12 21.32-21.48/16	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27 21.23-21.47/24	02.56	04.15 21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24 21.24-21.46/22	02.58 21.41-21.45/4	04.18 21.33-21.43/10	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21 21.25-21.46/21		04.21 21.33-21.39/6	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	425	162	582	3	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 21 - PUU21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 22 - PUU22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 23 - PUU23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 24 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 19.08-19.48/40	03.19 21.11-21.47/36	02.59 21.18-21.53/35	04.24 21.33-21.34/1	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41	23.20 18.46-20.14/88	23.49 18.51-20.21/90	22.27 19.03-20.14/71	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.39	04.53 19.06-19.51/45	03.16 21.11-21.47/36	03.01 21.18-21.53/35	04.28 19.04-20.14/70	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22 18.46-20.14/88	23.48 18.51-20.21/90	22.23	20.36	18.49	16.04	14.41
3	10.10	08.57	07.24	06.35	04.50 19.04-19.53/49	03.14 21.11-21.47/36	03.01 21.18-21.53/35	04.31 19.05-20.12/67	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25 18.46-20.14/88	23.46 18.51-20.21/90	22.20	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46 19.02-19.55/53	03.12 21.11-21.48/37	03.03 21.18-21.54/36	04.34 19.06-20.11/65	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28 18.46-20.15/89	23.44 18.52-20.22/90	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43 19.00-19.56/56	03.09 21.12-21.48/36	03.05 21.18-21.54/36	04.37 19.07-20.10/63	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30 18.47-20.16/89	23.43 18.52-20.21/89	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 19.00-19.59/59	03.07 21.12-21.48/36	03.08 21.18-21.54/36	04.40 19.08-20.08/60	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33 18.46-20.15/89	23.41 18.53-20.22/89	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 18.58-20.00/62	03.05 21.12-21.48/36	03.10 21.18-21.54/36	04.44 19.09-20.07/58	06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.01	23.35 18.46-20.16/90	23.39 18.52-20.21/89	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33 18.57-20.01/64	03.03 21.13-21.48/35	03.12 21.18-21.54/36	04.47 19.11-20.06/55	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38 18.47-20.16/89	23.36 18.53-20.22/89	22.03	20.15	18.28	15.44	14.30
9	10.01	08.38	07.04	06.14	04.29 18.56-20.02/66	03.01 21.13-21.48/35	03.15 21.18-21.55/37	04.50 19.13-20.04/51	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40 18.47-20.16/89	23.34 18.53-20.22/89	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 18.54-20.03/69	02.57 21.14-21.49/35	03.18 21.19-21.55/36	04.53 19.14-20.01/47	06.26	07.53	08.29	09.58
	14.56	16.35	18.04	20.36	22.10	23.42 18.47-20.16/89	23.32 18.54-20.22/88	21.57	20.07	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 18.53-20.03/70	02.56 21.14-21.48/34	03.20 21.19-21.55/36	04.56 19.16-19.59/43	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44 18.47-20.17/90	23.29 18.54-20.22/88	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19 21.20-21.27/7	02.54 21.14-21.48/34	03.23 21.19-21.55/36	04.59 19.18-19.57/39	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17 18.53-20.05/72	23.46 18.47-20.17/90	23.27 18.53-20.21/88	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	06.00	04.16 21.17-21.30/13	02.53 21.15-21.49/34	03.26 21.18-21.55/37	05.02 19.20-19.53/33	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20 18.52-20.05/73	23.47 18.48-20.17/89	23.24 18.54-20.21/87	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.15-21.31/16	02.52 21.15-21.49/34	03.29 21.19-21.55/36	05.06 19.24-19.50/26	06.38	08.05	08.42	10.05
	15.08	16.48	18.16	20.48	22.23 18.51-20.06/75	23.49 18.47-20.17/90	23.22 18.55-20.22/87	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09 21.14-21.33/19	02.51 21.16-21.50/34	03.31 21.19-21.55/36	05.09 19.29-19.45/16	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27 18.51-20.07/76	23.50 18.48-20.18/90	23.19 18.55-20.22/87	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.13-21.35/22	02.50 21.15-21.49/34	03.34 21.19-21.55/36	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30 18.50-20.07/77	23.52 18.48-20.18/90	23.16 18.55-20.22/87	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.12-21.37/25	02.50 21.16-21.49/33	03.37 21.19-21.55/36	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33 18.49-20.07/78	23.53 18.48-20.18/90	23.13 18.56-20.21/85	21.32	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.11-21.39/28	02.49 21.16-21.50/34	03.40 21.19-21.54/35	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36 18.49-20.08/79	23.54 18.48-20.18/90	23.10 18.56-20.21/85	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57 21.10-21.40/30	02.49 21.17-21.50/33	03.43 21.20-21.55/35	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40 18.48-20.08/80	23.54 18.49-20.19/90	23.08 18.57-20.22/85	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54 21.10-21.41/31	02.49 21.17-21.50/33	03.46 21.20-21.54/34	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43 18.48-20.09/81	23.55 18.49-20.19/90	23.05 18.57-20.21/84	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.10-21.43/33	02.49 21.17-21.50/33	03.50 21.19-21.53/34	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46 18.48-20.10/82	23.55 18.49-20.19/90	23.02 18.57-20.20/83	21.18	19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47 21.09-21.43/34	02.49 21.17-21.50/33	03.53 21.20-21.53/33	05.30	07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49 18.47-20.10/83	23.55 18.49-20.19/90	22.59 18.58-20.21/83	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 21.09-21.44/35	02.50 21.18-21.51/33	03.56 21.20-21.52/32	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52 18.47-20.11/84	23.55 18.50-20.20/90	22.56 18.58-20.20/82	21.11	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41 21.10-21.44/34	02.50 21.18-21.51/33	03.59 21.20-21.52/32	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56 18.47-20.11/84	23.55 18.50-20.20/90	22.52 18.58-20.19/81	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.10-21.45/35	02.51 21.18-21.52/34	04.02 21.21-21.50/29	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59 18.47-20.12/85	23.55 18.50-20.20/90	22.49 18.59-20.19/80	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35 21.10-21.45/35	02.52 21.18-21.51/33	04.05 21.22-21.49/27	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02 18.47-20.12/85	23.54 18.50-20.20/90	22.46 18.59-20.18/79	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33 21.10-21.46/36	02.53 21.18-21.52/34	04.08 21.23-21.47/24	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05 18.46-20.13/87	23.54 18.50-20.20/90	22.43 19.00-20.18/78	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 19.21-19.39/18	03.30 21.10-21.46/36	02.55 21.18-21.52/34	04.12 21.24-21.45/21	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08 18.46-20.13/87	23.53 18.51-20.21/90	22.40 19.01-20.18/77	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 19.16-19.44/28	03.27 21.10-21.46/36	02.56 21.18-21.53/35	04.15 21.25-21.42/17	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11 18.46-20.13/87	23.52 18.51-20.21/90	22.37 19.01-20.17/76	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00 19.12-19.47/35	03.24 21.10-21.47/37	02.58 21.18-21.53/35	04.18 21.26-21.41/15	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14 18.46-20.13/87	23.51 18.51-20.21/90	22.33 19.02-20.16/74	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.22 21.10-21.47/37		04.21 21.28-21.38/10	05.57		07.57		10.13
	16.02		20.06		23.17 18.46-20.13/87		22.30 19.02-20.15/73	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	81	2841	3719	3611	765	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 25 - PUU25

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 26 - PUU26

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 27 - PUU27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 28 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04 13.15-13.31/16	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36 12.51-13.05/14
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00 13.17-13.29/12	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38 12.53-13.05/12
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57 13.21-13.25/4	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41 12.54-13.03/9
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44 12.57-13.01/4
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04 13.14-13.17/3	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23 12.51-12.56/5	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02 13.11-13.19/8	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26 12.47-13.00/13	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00 13.10-13.21/11	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30 12.46-13.01/15	09.58
	14.56	16.35	18.03	20.36	22.10	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58 13.09-13.23/14	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33 12.44-13.03/19	10.00
	14.59	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56 13.09-13.25/16	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36 12.43-13.04/21	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54 13.08-13.26/18	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39 12.43-13.04/21	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52 13.09-13.27/18	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43 12.43-13.06/23	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50 13.08-13.28/20	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46 12.42-13.06/24	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47 13.08-13.29/21	08.16	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.11	08.49 12.42-13.06/24	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45 13.08-13.30/22	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52 12.43-13.07/24	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42 13.07-13.30/23	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56 12.42-13.07/25	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40 13.07-13.31/24	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59 12.42-13.07/25	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37 13.07-13.31/24	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02 12.43-13.07/24	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35 13.08-13.32/24	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05 12.44-13.08/24	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32 13.08-13.32/24	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08 12.44-13.07/23	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30 13.08-13.33/25	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12 12.44-13.08/24	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27 13.08-13.33/25	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15 12.45-13.08/23	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24 13.09-13.33/24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18 12.45-13.07/22	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21 13.09-13.33/24	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21 12.46-13.07/21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18 13.10-13.33/23	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24 12.47-13.07/20	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15 13.10-13.33/23	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27 12.48-13.06/18	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12 13.11-13.32/21		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30 12.49-13.06/17	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10 13.12-13.32/20		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33 12.51-13.06/15	10.14
	15.58		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07 13.13-13.31/18		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	473	32	0	0	0	0	0	0	0	0	470	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 29 - PUU29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.50	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.53	05.30	07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.58	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 30 - PUU30

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 31 - PUU31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 32 - PUU32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 33 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03 12.01-12.10/9	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36 11.32-11.50/18
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38 11.33-11.50/17
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41 11.34-11.49/15
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44 11.35-11.48/13
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08 11.54-11.59/5	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46 11.37-11.48/11
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07 11.52-12.01/9	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49 11.39-11.48/9
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05 11.52-12.03/11	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51 11.41-11.46/5
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03 11.52-12.05/13	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02 11.50-12.05/15	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00 11.50-12.07/17	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30 11.31-11.41/10	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58 11.50-12.07/17	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33 11.29-11.43/14	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56 11.50-12.09/19	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36 11.27-11.45/18	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54 11.49-12.10/21	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.01	08.39 11.26-11.46/20	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52 11.50-12.11/21	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43 11.26-11.47/21	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50 11.49-12.11/22	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46 11.26-11.48/22	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47 11.49-12.12/23	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49 11.25-11.48/23	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45 11.50-12.13/23	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52 11.26-11.49/23	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42 11.49-12.13/24	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56 11.25-11.49/24	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40 11.49-12.14/25	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59 11.25-11.49/24	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37 11.50-12.14/24	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02 11.25-11.50/25	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35 11.50-12.15/25	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05 11.26-11.51/25	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32 11.50-12.15/25	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08 11.26-11.50/24	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29 11.51-12.15/24	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12 11.26-11.51/25	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27 11.51-12.15/24	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15 11.27-11.51/24	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24 11.52-12.15/23	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18 11.27-11.50/23	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21 11.52-12.15/23	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21 11.28-11.50/22	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18 11.53-12.15/22	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24 11.28-11.50/22	10.16
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15 11.54-12.15/21	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27 11.29-11.50/21	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.48	14.28
29	09.12 11.55-12.14/19		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30 11.30-11.50/20	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09 11.56-12.13/17		06.49	05.00	03.23	02.57	04.17	05.54	07.23	07.54	09.33 11.31-11.51/20	10.14
	15.58		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.06 11.57-12.11/14		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	526	9	0	0	0	0	0	0	0	0	450	88

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 34 - PUU34

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.34/16	02.59 04.19-04.45/26	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.17-04.35/18	03.01 04.19-04.44/25	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.16-04.35/19	03.01 04.19-04.44/25	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.16-04.37/21	03.03 04.20-04.45/25	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.16-04.38/22	03.05 04.20-04.44/24	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.15-04.38/23	03.07 04.21-04.44/23	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.15-04.38/23	03.10 04.21-04.44/23	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02 04.15-04.39/24	03.12 04.22-04.44/22	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01 04.15-04.40/25	03.15 04.23-04.43/20	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.15-04.40/25	03.17 04.24-04.43/19	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56 04.15-04.40/25	03.20 04.26-04.43/17	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54 04.14-04.40/26	03.23 04.26-04.41/15	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53 04.15-04.41/26	03.25 04.28-04.40/12	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52 04.15-04.41/26	03.28 04.31-04.39/8	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51 04.15-04.42/27	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50 04.15-04.42/27	03.34	05.12	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49 04.15-04.42/27	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49 04.15-04.43/28	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49 04.16-04.43/27	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48 04.16-04.43/27	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49 04.16-04.43/27	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49 04.16-04.43/27	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49 04.17-04.44/27	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50 04.16-04.44/28	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51 04.17-04.44/27	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52 04.17-04.44/27	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53 04.17-04.44/27	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.18-04.45/27	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27 04.23-04.29/6	02.56 04.18-04.45/27	04.15	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24 04.21-04.31/10	02.57 04.19-04.45/26	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21 04.19-04.32/13		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	29	752	284	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 35 - PUU35

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 36 - PUU36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 37 - PUU37

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38
	14.36	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.52	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.22
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19	14.48	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May		June	
1	10.12	09.03	07.31		06.42	04.56		03.19	05.13-06.08/55
	14.35	16.05	17.36		20.09	21.41		23.19	
2	10.11	09.00	07.28		06.38	04.53		03.16	05.13-06.07/54
	14.37	16.09	17.39		20.12	21.44		23.22	
3	10.10	08.57	07.24		06.35	04.49	05.42-05.53/11	03.14	05.12-06.07/55
	14.39	16.12	17.42		20.15	21.47		23.25	
4	10.09	08.54	07.21		06.31	04.46	05.39-05.56/17	03.11	05.13-06.07/54
	14.41	16.15	17.45		20.18	21.51		23.28	
5	10.08	08.51	07.17		06.28	04.43	05.36-05.58/22	03.09	05.13-06.07/54
	14.44	16.19	17.48		20.21	21.54		23.30	
6	10.06	08.48	07.14		06.24	04.39	05.34-06.00/26	03.07	05.13-06.06/53
	14.46	16.22	17.51		20.24	21.57		23.33	
7	10.05	08.45	07.10		06.21	04.36	05.34-06.02/28	03.05	05.13-06.07/54
	14.48	16.25	17.54		20.27	22.00		23.35	
8	10.03	08.41	07.07		06.17	04.32	05.32-06.03/31	03.03	05.14-06.07/53
	14.51	16.29	17.57		20.30	22.04		23.37	
9	10.01	08.38	07.03		06.14	04.29	05.31-06.03/32	03.01	05.14-06.07/53
	14.54	16.32	18.00		20.33	22.07		23.40	
10	09.59	08.35	07.00		06.10	04.26	05.26-06.04/38	02.57	05.14-06.06/52
	14.56	16.35	18.03		20.36	22.10		23.42	
11	09.57	08.32	06.56		06.06	04.22	05.24-06.04/40	02.56	05.14-06.06/52
	14.59	16.39	18.06		20.39	22.13		23.44	
12	09.56	08.28	06.53		06.03	04.19	05.22-06.06/44	02.54	05.14-06.06/52
	15.02	16.42	18.09		20.42	22.17		23.45	
13	09.53	08.25	06.49		05.59	04.16	05.20-06.06/46	02.53	05.15-06.07/52
	15.05	16.45	18.12		20.45	22.20		23.47	
14	09.51	08.22	06.46		05.56	04.13	05.19-06.06/47	02.52	05.15-06.06/51
	15.08	16.48	18.15		20.48	22.23		23.49	
15	09.49	08.19	06.42	07.15-07.22/7	05.52	04.09	05.18-06.07/49	02.51	05.15-06.07/52
	15.11	16.52	18.18		20.51	22.26		23.50	
16	09.47	08.15	06.39	07.11-07.24/13	05.49	04.06	05.17-06.07/50	02.50	05.15-06.06/51
	15.14	16.55	18.21		20.54	22.30		23.51	
17	09.44	08.12	06.35	07.07-07.25/18	05.45	04.03	05.15-06.07/52	02.50	05.16-06.06/50
	15.17	16.58	18.24		20.57	22.33		23.52	
18	09.42	08.09	06.32	07.06-07.27/21	05.42	04.00	05.15-06.07/52	02.49	05.16-06.07/51
	15.20	17.01	18.27		21.00	22.36		23.53	
19	09.40	08.05	06.28	07.04-07.27/23	05.38	03.57	05.14-06.07/53	02.49	05.16-06.07/51
	15.23	17.04	18.30		21.03	22.39		23.54	
20	09.37	08.02	06.25	07.04-07.28/24	05.35	03.53	05.14-06.07/53	02.49	05.16-06.07/51
	15.26	17.08	18.33		21.06	22.43		23.55	
21	09.34	07.59	06.21	07.03-07.27/24	05.31	03.50	05.14-06.08/54	02.49	05.16-06.07/51
	15.29	17.11	18.36		21.09	22.46		23.55	
22	09.32	07.55	06.17	07.02-07.27/25	05.28	03.47	05.13-06.07/54	02.49	05.16-06.07/51
	15.32	17.14	18.39		21.12	22.49		23.55	
23	09.29	07.52	06.14	07.02-07.27/25	05.24	03.44	05.13-06.08/55	02.50	05.17-06.08/51
	15.36	17.17	18.42		21.16	22.52		23.55	
24	09.26	07.48	06.10	07.01-07.26/25	05.21	03.41	05.13-06.08/55	02.50	05.17-06.08/51
	15.39	17.20	18.45		21.19	22.55		23.55	
25	09.24	07.45	06.07	07.02-07.26/24	05.17	03.38	05.13-06.08/55	02.51	05.18-06.09/51
	15.42	17.23	18.48		21.22	22.58		23.55	
26	09.21	07.41	06.03	07.02-07.25/23	05.14	03.35	05.13-06.08/55	02.52	05.17-06.08/51
	15.45	17.27	18.51		21.25	23.02		23.54	
27	09.18	07.38	06.00	07.03-07.24/21	05.10	03.32	05.13-06.08/55	02.53	05.18-06.09/51
	15.49	17.30	18.54		21.28	23.05		23.53	
28	09.15	07.35	05.56	07.03-07.22/19	05.07	03.30	05.13-06.08/55	02.54	05.18-06.09/51
	15.52	17.33	18.57		21.31	23.08		23.53	
29	09.12		06.53	08.05-08.20/15	05.03	03.27	05.12-06.08/56	02.56	05.18-06.10/52
	15.55		20.00		21.35	23.11		23.51	
30	09.09		06.49	08.07-08.17/10	05.00	03.24	05.12-06.07/55	02.58	05.18-06.10/52
	15.59		20.03		21.38	23.14		23.50	
31	09.06		06.46			03.21	05.12-06.07/55		
	16.02		20.06			23.16			
Potential sun hours	171	238	363		451	570		624	
Sum of minutes with flicker	0	0	317		0	1295		1562	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 38 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	05.18-06.11/53	04.24	05.33-06.15/42	06.00		07.26	08.00	09.35
	23.49		22.27		20.39		18.53	16.07	14.42
2	03.01	05.18-06.11/53	04.27	05.35-06.15/40	06.03		07.29	08.03	09.38
	23.47		22.23		20.36		18.49	16.03	14.40
3	03.01	05.18-06.11/53	04.31	05.38-06.14/36	06.06		07.32	08.07	09.41
	23.46		22.20		20.32		18.46	16.00	14.38
4	03.03	05.19-06.12/53	04.34	05.41-06.13/32	06.09		07.35	08.10	09.43
	23.44		22.17		20.29		18.42	15.57	14.37
5	03.05	05.19-06.12/53	04.37	05.43-06.12/29	06.11		07.38	08.13	09.46
	23.42		22.13		20.25		18.39	15.54	14.35
6	03.08	05.19-06.13/54	04.40	05.43-06.10/27	06.14		07.41	08.16	09.48
	23.40		22.10		20.22		18.35	15.51	14.33
7	03.10	05.19-06.13/54	04.43	05.45-06.09/24	06.17		07.44	08.19	09.51
	23.38		22.06		20.18		18.32	15.47	14.32
8	03.12	05.20-06.14/54	04.47	05.47-06.08/21	06.20		07.47	08.23	09.53
	23.36		22.03		20.14		18.28	15.44	14.30
9	03.15	05.20-06.14/54	04.50	05.49-06.05/16	06.23		07.50	08.26	09.55
	23.34		22.00		20.11		18.25	15.41	14.29
10	03.17	05.20-06.15/55	04.53	05.52-06.01/9	06.26		07.52	08.29	09.58
	23.31		21.56		20.07		18.21	15.38	14.28
11	03.20	05.21-06.15/54	04.56		06.29		07.55	08.32	10.00
	23.29		21.53		20.04		18.18	15.35	14.26
12	03.23	05.21-06.16/55	04.59		06.32		07.58	08.36	10.02
	23.27		21.49		20.00		18.14	15.32	14.25
13	03.26	05.20-06.16/56	05.02		06.35	07.59-08.07/8	08.01	08.39	10.03
	23.24		21.46		19.57		18.11	15.29	14.24
14	03.28	05.21-06.17/56	05.05		06.37	07.55-08.09/14	08.04	08.42	10.05
	23.21		21.43		19.53		18.07	15.26	14.24
15	03.31	05.21-06.17/56	05.08		06.40	07.53-08.11/18	08.07	08.45	10.07
	23.19		21.39		19.49		18.04	15.23	14.23
16	03.34	05.22-06.17/55	05.12		06.43	07.52-08.12/20	08.10	08.49	10.08
	23.16		21.36		19.46		18.00	15.20	14.23
17	03.37	05.22-06.17/55	05.15		06.46	07.51-08.13/22	08.13	08.52	10.09
	23.13		21.32		19.42		17.57	15.17	14.22
18	03.40	05.22-06.17/55	05.18		06.49	07.50-08.14/24	08.16	08.55	10.11
	23.10		21.29		19.39		17.53	15.15	14.22
19	03.43	05.23-06.18/55	05.21		06.52	07.48-08.13/25	08.19	08.58	10.12
	23.07		21.25		19.35		17.50	15.12	14.22
20	03.46	05.23-06.18/55	05.24		06.55	07.48-08.13/25	08.23	09.02	10.13
	23.04		21.22		19.32		17.47	15.09	14.22
21	03.49	05.23-06.17/54	05.27		06.57	07.47-08.13/26	08.26	09.05	10.13
	23.01		21.18		19.28		17.43	15.06	14.22
22	03.52	05.24-06.18/54	05.30		07.00	07.47-08.12/25	08.29	09.08	10.14
	22.58		21.15		19.25		17.40	15.04	14.23
23	03.56	05.24-06.18/54	05.33		07.03	07.48-08.12/24	08.32	09.11	10.15
	22.55		21.11		19.21		17.36	15.01	14.23
24	03.59	05.24-06.18/54	05.36		07.06	07.48-08.11/23	08.35	09.14	10.15
	22.52		21.08		19.17		17.33	14.59	14.24
25	04.02	05.25-06.18/53	05.39		07.09	07.48-08.10/22	07.38	09.17	10.15
	22.49		21.04		19.14		16.30	14.56	14.25
26	04.05	05.25-06.18/53	05.42		07.12	07.48-08.08/20	07.41	09.20	10.15
	22.46		21.01		19.10		16.26	14.54	14.26
27	04.08	05.27-06.17/50	05.45		07.15	07.51-08.06/15	07.44	09.23	10.15
	22.43		20.57		19.07		16.23	14.51	14.27
28	04.11	05.28-06.18/50	05.48		07.18	07.54-08.03/9	07.47	09.26	10.15
	22.40		20.53		19.03		16.20	14.49	14.28
29	04.15	05.28-06.17/49	05.51		07.20		07.51	09.29	10.14
	22.36		20.50		19.00		16.16	14.47	14.30
30	04.18	05.30-06.17/47	05.54		07.23		07.54	09.32	10.14
	22.33		20.46		18.56		16.13	14.44	14.31
31	04.21	05.31-06.15/44	05.57				07.57		10.13
	22.30		20.43				16.10		14.33
Potential sun hours	608		508		393		305	198	137
Sum of minutes with flicker	1650		276		320		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 39 - PUU39

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.19/1	02.59 04.13-04.34/21	04.24	06.00 06.39-06.47/8	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.16-04.22/6	03.01 04.13-04.34/21	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.14-04.23/9	03.01 04.13-04.33/20	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.13-04.25/12	03.03 04.14-04.34/20	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.12-04.26/14	03.05 04.15-04.33/18	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.10-04.26/16	03.07 04.16-04.33/17	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.09-04.27/18	03.10 04.17-04.32/15	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.03 04.09-04.28/19	03.12 04.19-04.32/13	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.01 04.09-04.29/20	03.15 04.21-04.31/10	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.09-04.29/20	03.17 04.23-04.30/7	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 06.39-06.47/8	04.22	02.56 04.08-04.30/22	03.20 04.25-04.29/4	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03 06.36-06.49/13	04.19	02.54 04.08-04.30/22	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59 06.33-06.50/17	04.16	02.53 04.09-04.31/22	03.25	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56 06.30-06.50/20	04.12	02.52 04.08-04.31/23	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52 06.29-06.51/22	04.09	02.51 04.09-04.32/23	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49 06.28-06.52/24	04.06	02.50 04.08-04.31/23	03.34	05.11 06.41-06.48/7	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45 06.27-06.51/24	04.03	02.49 04.09-04.32/23	03.37	05.15 06.37-06.50/13	06.46	08.13	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.27-06.52/25	04.00	02.49 04.09-04.32/23	03.40	05.18 06.36-06.52/16	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38 06.27-06.52/25	03.56	02.49 04.09-04.33/24	03.43	05.21 06.35-06.53/18	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.27-06.50/23	03.53	02.49 04.09-04.33/24	03.46	05.24 06.34-06.54/20	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31 06.27-06.50/23	03.50	02.49 04.09-04.33/24	03.49	05.27 06.32-06.54/22	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28 06.28-06.50/22	03.47	02.49 04.09-04.33/24	03.52	05.30 06.31-06.55/24	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.28-06.49/21	03.44	02.49 04.10-04.34/24	03.56	05.33 06.31-06.55/24	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21 06.28-06.47/19	03.41	02.50 04.10-04.33/23	03.59	05.36 06.31-06.55/24	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 06.30-06.45/15	03.38	02.51 04.11-04.34/23	04.02	05.39 06.30-06.54/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14 06.31-06.43/12	03.35	02.52 04.10-04.34/24	04.05	05.42 06.30-06.54/24	07.12	07.41	09.20	10.15
	15.45	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10 06.35-06.40/5	03.32	02.53 04.11-04.34/23	04.08	05.45 06.30-06.54/24	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.12-04.34/22	04.11	05.48 06.31-06.53/22	07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56 04.12-04.34/22	04.15	05.51 06.30-06.51/21	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57 04.12-04.34/22	04.18	05.54 06.33-06.50/17	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 06.36-06.49/13		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	318	0	595	166	313	8	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 40 - PUU40

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21 05.16-05.37/21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 41 - PUU41

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 42 - PUU42

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 20.35-20.55/20	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53 20.34-20.55/21	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49 20.34-20.55/21	03.14	03.01	04.30 20.51-20.58/7	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46 20.35-20.54/19	03.11	03.03	04.34 20.49-21.01/12	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42 20.35-20.54/19	03.09	03.05	04.37 20.47-21.01/14	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 20.35-20.53/18	03.07	03.07	04.40 20.46-21.02/16	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 20.36-20.52/16	03.04	03.10	04.43 20.45-21.03/18	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 20.37-20.51/14	03.02	03.12	04.46 20.44-21.03/19	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 20.39-20.50/11	03.01	03.15	04.50 20.44-21.03/19	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26 20.42-20.47/5	02.57	03.17	04.53 20.44-21.04/20	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56 20.44-21.04/20	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.23	04.59 20.43-21.03/20	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	03.25	05.02 20.43-21.02/19	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	03.28	05.05 20.44-20.59/15	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08 20.44-20.56/12	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11 20.44-20.52/8	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	03.37	05.15 20.45-20.50/5	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.35	03.53	02.48	03.46	05.24	06.55	08.22	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 20.40-20.41/1	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13 20.39-20.44/5	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10 20.37-20.46/9	03.32	02.53	04.08	05.45	07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 20.36-20.49/13	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 20.35-20.52/17	03.27	02.56	04.14	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00 20.35-20.54/19	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 43 - PUU43

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 44 - PUU44

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56		03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41		23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53		03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44		23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49		03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47		23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46		03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51		23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42		03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54		23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39		03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36		03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00		23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32		03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04		23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29		03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07		23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26		02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22		02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13		23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19		02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17		23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16		02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20		23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12		02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23		23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	21.31-21.35/4	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26		23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	21.29-21.38/9	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30		23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	21.27-21.41/14	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33		23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	21.27-21.44/17	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36		23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	21.25-21.46/21	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39		23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	21.25-21.47/22	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43		23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	21.24-21.47/23	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46		23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	21.24-21.48/24	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49		23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	21.23-21.49/26	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52		23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	21.23-21.50/27	02.50	21.29-21.54/25	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55		23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	21.22-21.49/27	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58		23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	21.22-21.50/28	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02		23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	21.22-21.50/28	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	21.22-21.50/28	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08		23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	21.22-21.50/28	02.56	21.29-21.55/26	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11		23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	21.23-21.51/28	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14		23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	21.23-21.51/28			04.21		05.57		07.57		10.13
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382		786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 45 - PUU45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 46 - PUU46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18		02.59	21.56-22.11/15	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19		23.49		22.26	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16		03.01	21.56-22.10/14	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22		23.47		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13		03.01	21.58-22.09/11	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25		23.46		22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11		03.03	21.59-22.07/8	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.50	23.27		23.44		22.16	20.28	18.42	15.57	14.36
5	10.07	08.51	07.17	06.28	04.42	03.09		03.05		04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30		23.42		22.13	20.25	18.38	15.53	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07		03.07		04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20	04.36	03.04		03.10		04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	21.56-22.01/5	03.12		04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	21.54-22.04/10	03.14		04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26	02.57	21.52-22.05/13	03.17		04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.31		21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	21.51-22.07/16	03.20		04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	21.51-22.07/16	03.22		04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.16	23.45		23.26		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	21.50-22.08/18	03.25		05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	21.50-22.09/19	03.28		05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.51	21.49-22.10/21	03.31		05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	21.49-22.11/22	03.34		05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.51		23.16		21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	21.50-22.11/21	03.37		05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	21.50-22.12/22	03.40		05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53		23.10		21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	21.49-22.11/22	03.43		05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.50-22.13/23	03.46		05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.42	23.55		23.04		21.21	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.50-22.13/23	03.49		05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.50-22.13/23	03.52		05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55		22.58		21.14	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.50-22.13/23	03.55		05.33	07.03	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.51-22.13/22	03.58		05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55		22.52		21.07	19.17	17.33	14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	21.51-22.13/22	04.02		05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.51-22.13/22	04.05		05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.52-22.13/21	04.08		05.45	07.14	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.53		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	21.53-22.13/20	04.11		05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53		22.39		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.56	21.53-22.12/19	04.14		05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	21.54-22.11/17	04.18		05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21			04.21		05.57		07.57		10.13
	16.02		20.06		23.16			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	440		48		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 47 - PUU47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 48 - PUU48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28	18.42	15.57	14.36
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102**WTG:** 49 - PUU49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.57	14.36
5	10.07	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.32	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.01
	15.01	16.41	18.09	20.42	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.39	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.16		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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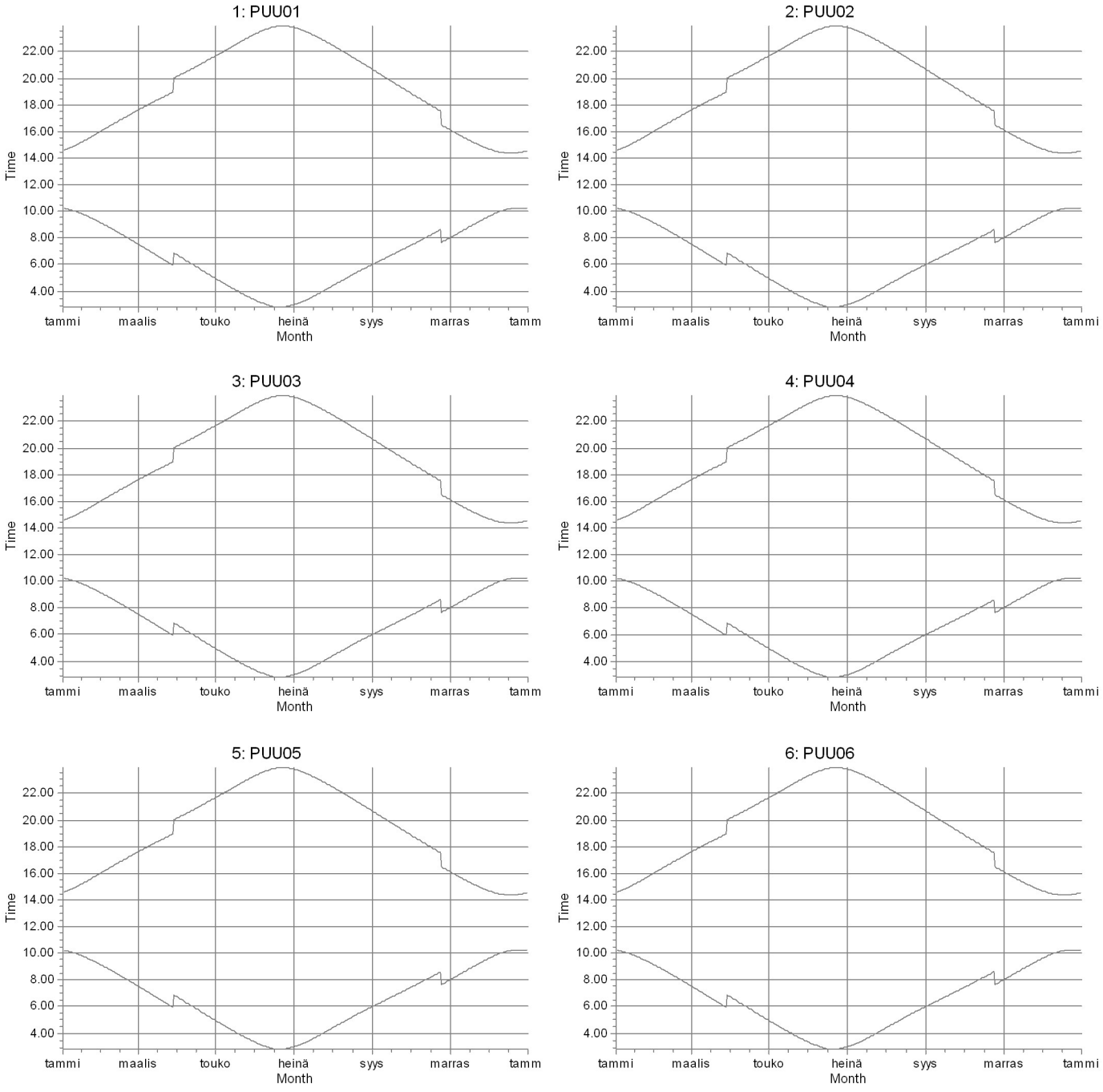
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi

Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



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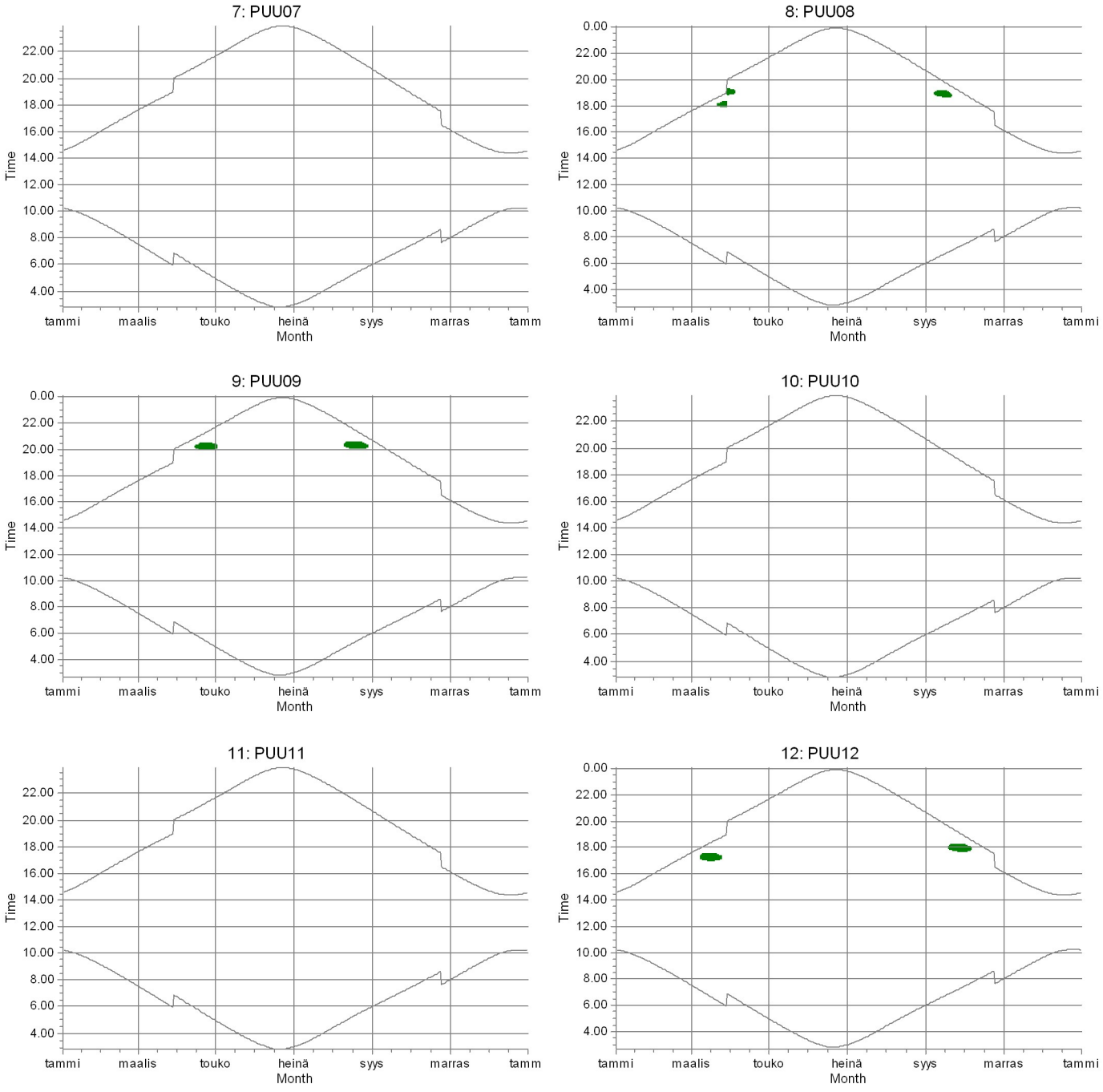
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

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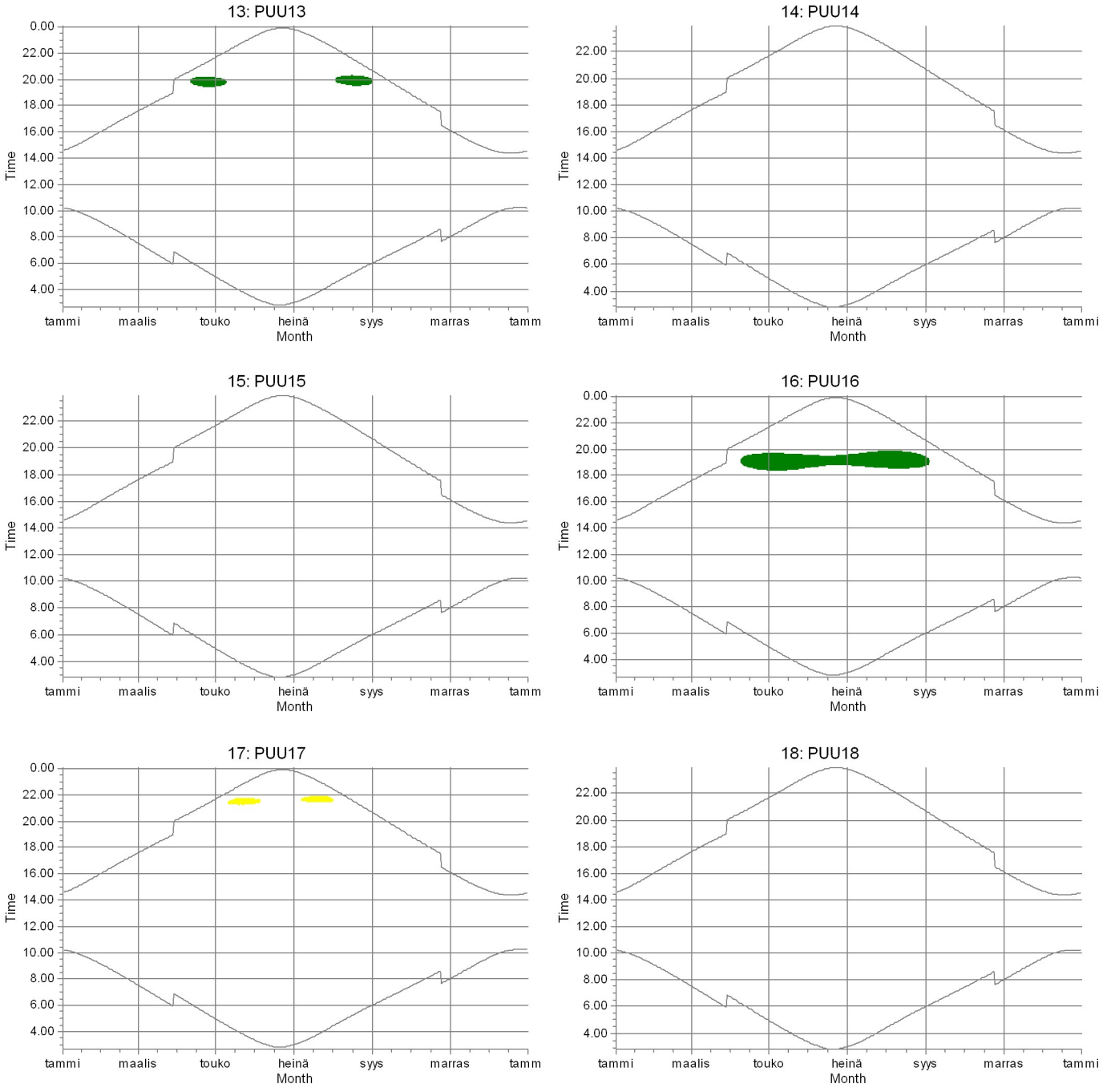
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi

Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

B: Laskentapiste B (Ylivieskantie, Pohlola)

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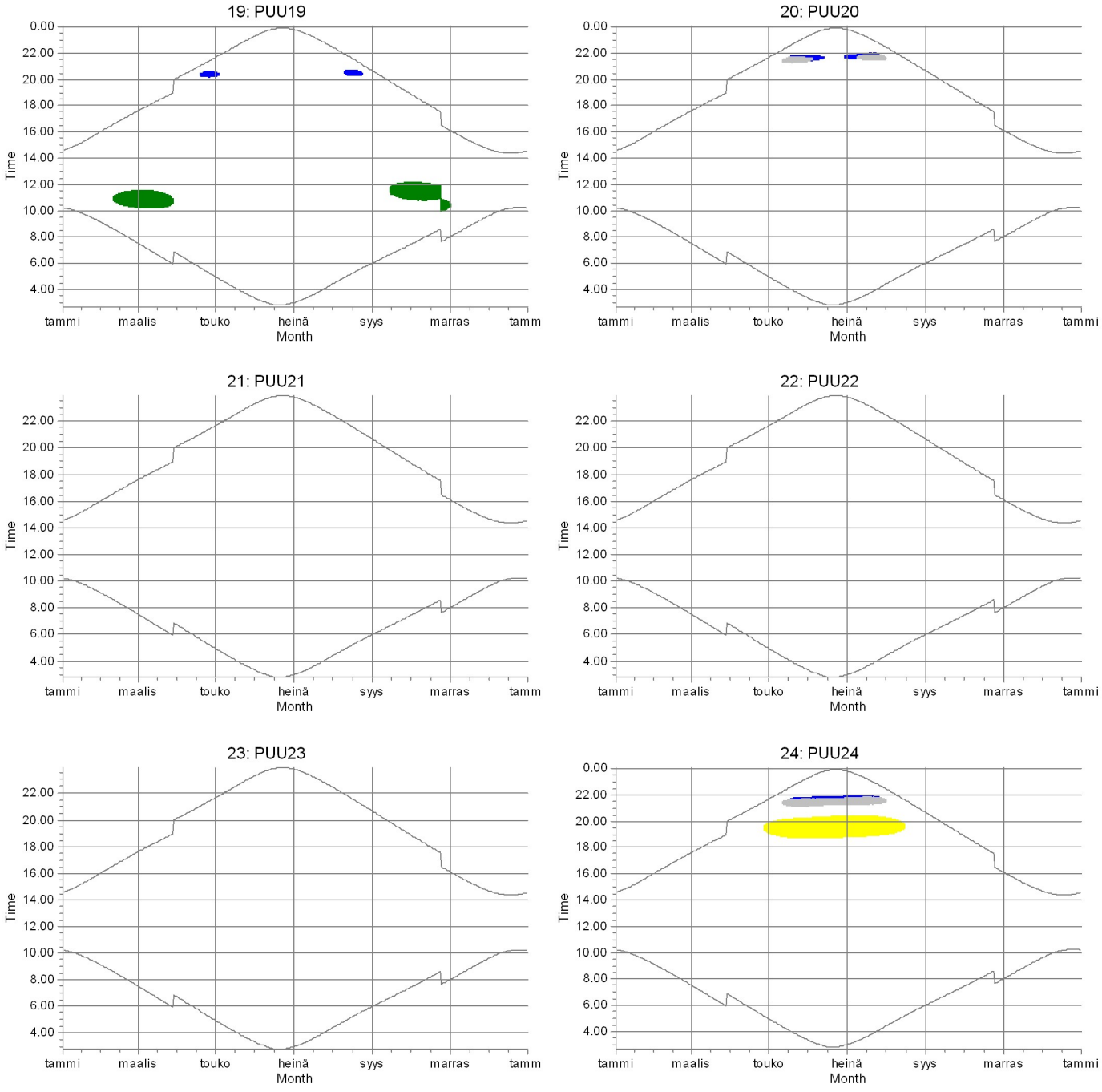
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

- A: Laskentapiste A (Metsästysmaja)
- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- L: Laskentapiste L (Perkkiontie, Ilmola)

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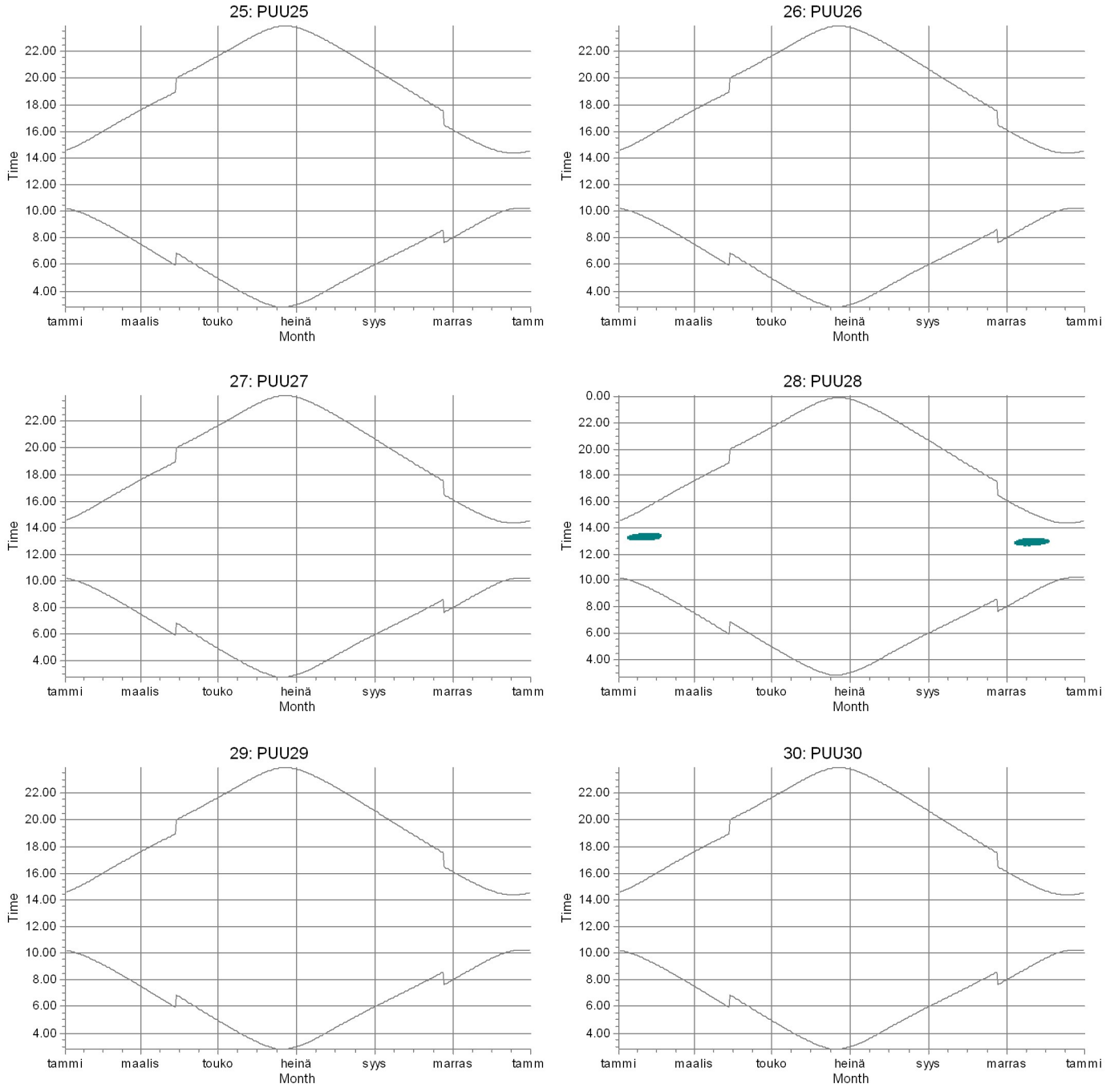
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

F: Asuinrakennus F (Ollilantie 112)

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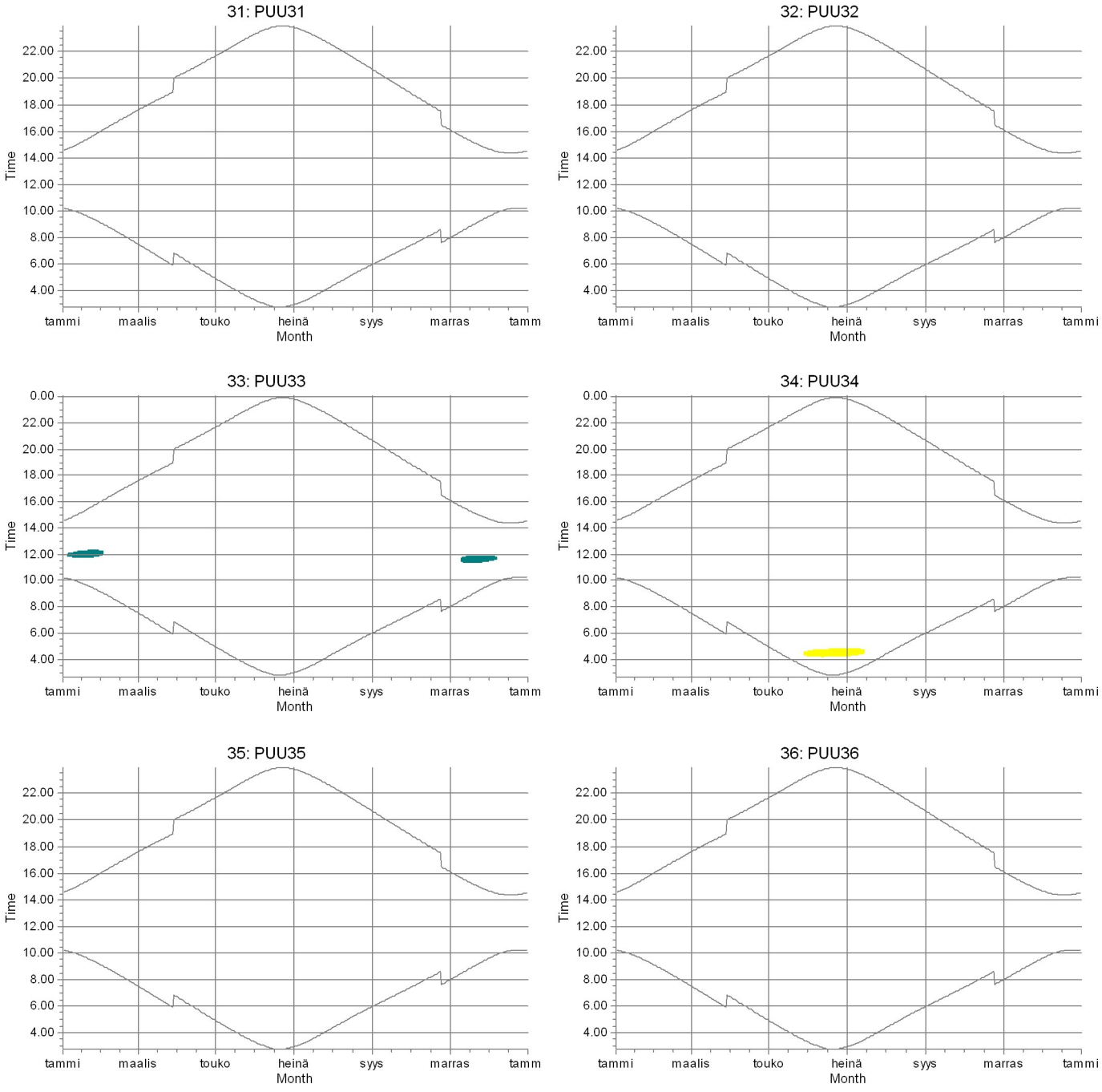
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

B: Laskentapiste B (Ylivieskantie, Pohlola)

F: Asuinrakennus F (Ollilantie 112)

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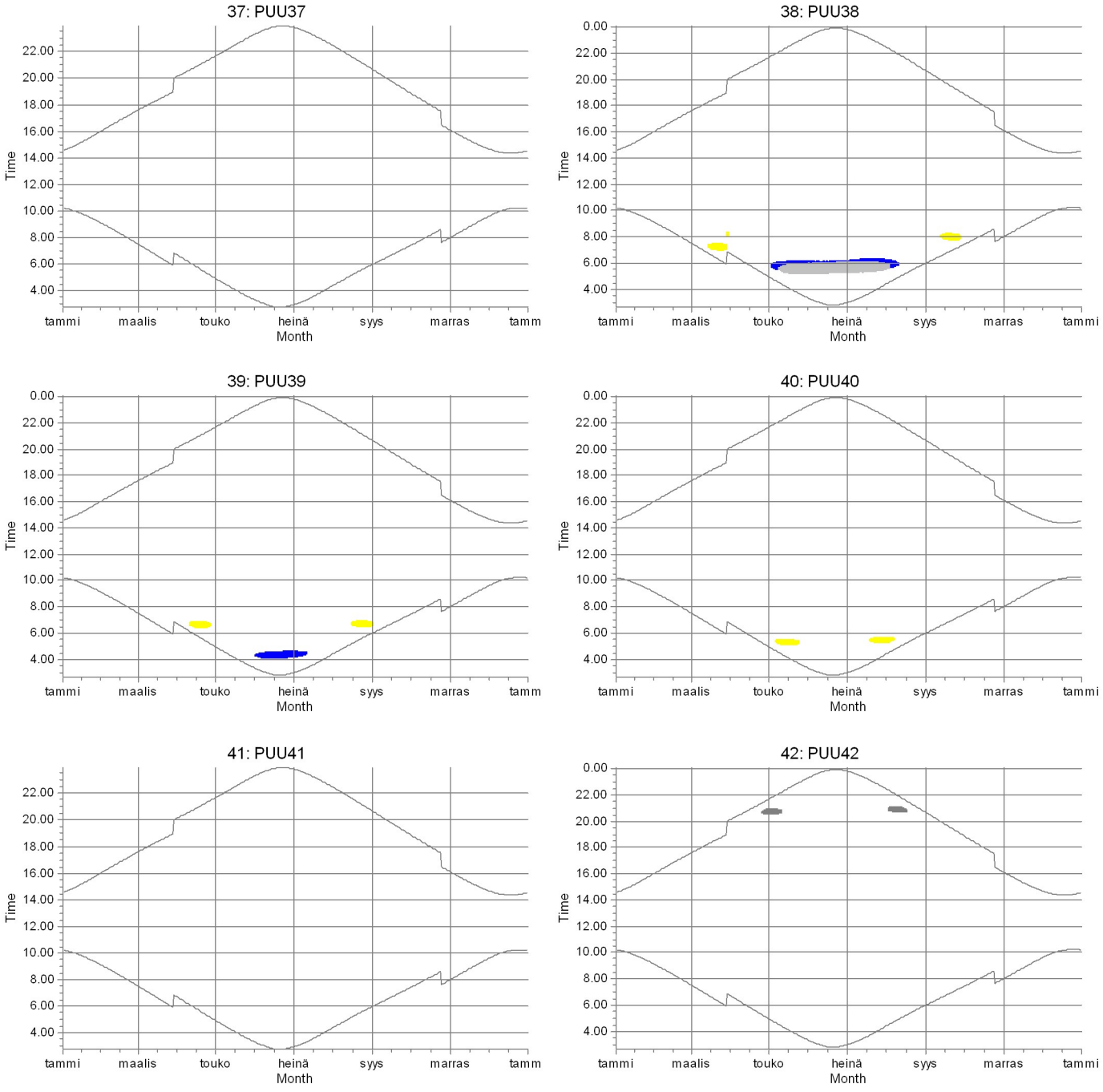
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- D: Asuinrakennus D (Alakylantie 243)
- L: Laskentapiste L (Perkkiontie, Ilmola)

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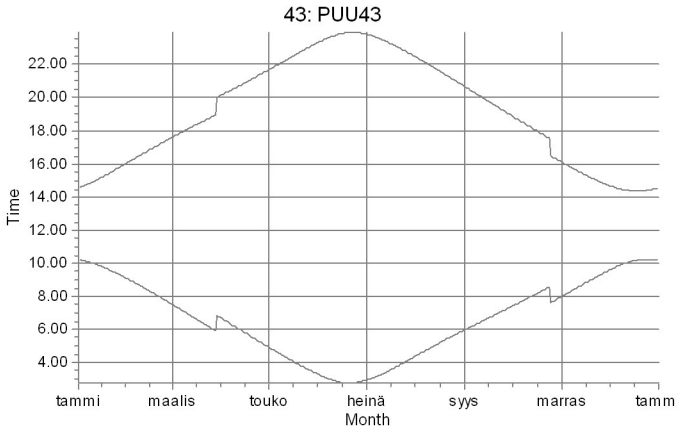
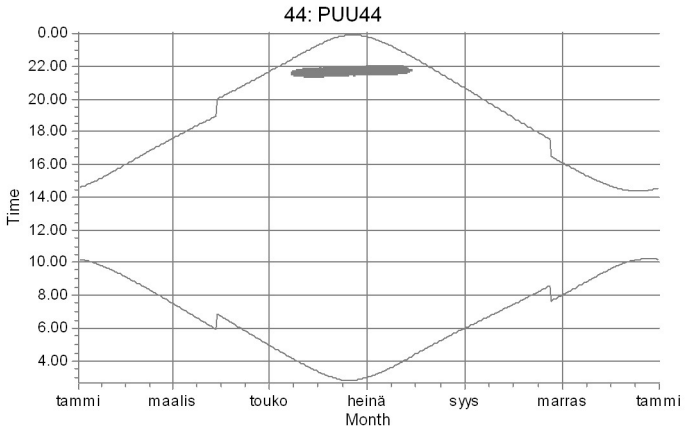
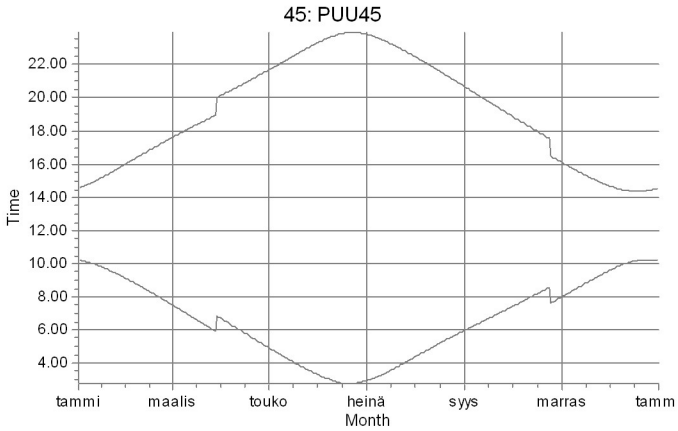
Calculated:
18.11.2020 15.23/3.4.388

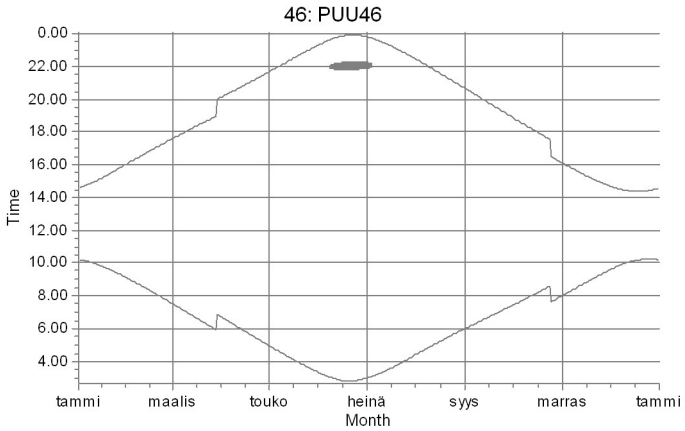
SHADOW - Calendar per WTG, graphical

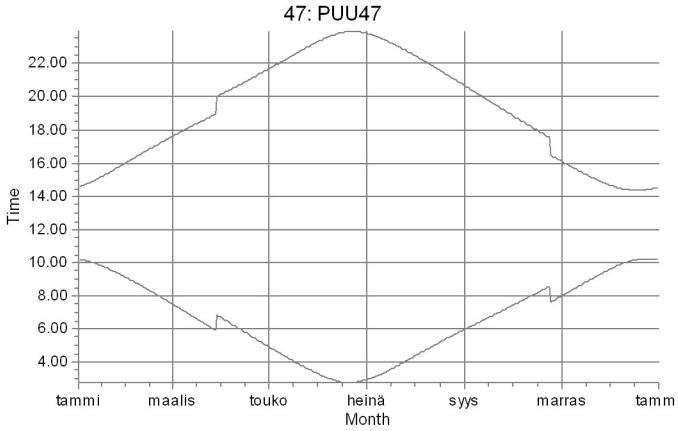
Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102

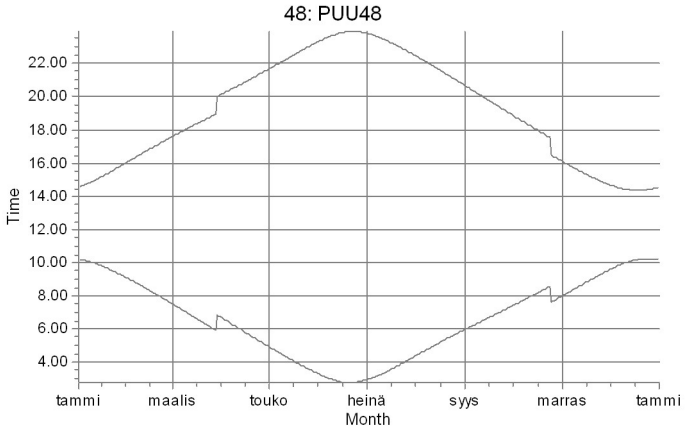












Shadow receptors

D: Asuinrakennus D (Alakylantie 243)

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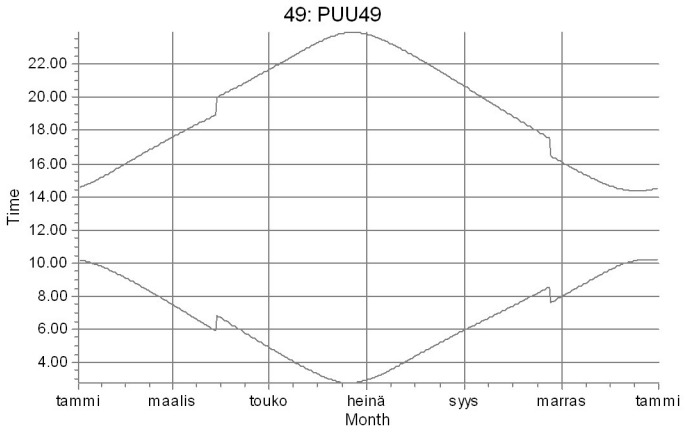
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Shadow receptors

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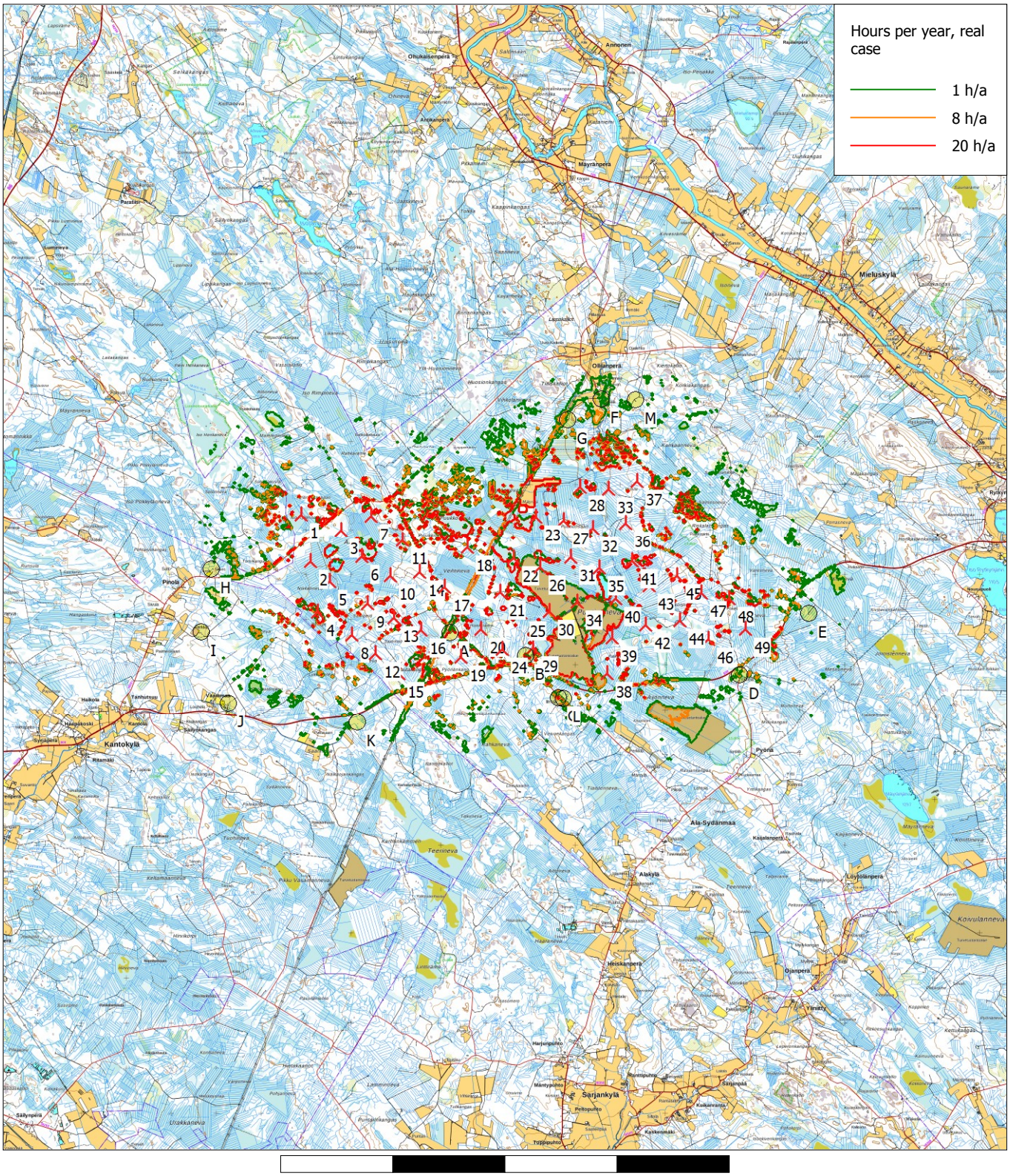
Calculated:
18.11.2020 15.23/3.4.388

SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_Luke forest_20201102



Map: Maastokarttarasteri50K , Print scale 1:125 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 403 440 North: 7 110 930

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)

Liite 7: Puutionsaari – Varjostuksen yhteismallinnusten tulokset ”real case, no forest”

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational hours are calculated from WTGs in calculation and wind distribution:
MERRA_basic_E25.335_N64.000 (3)

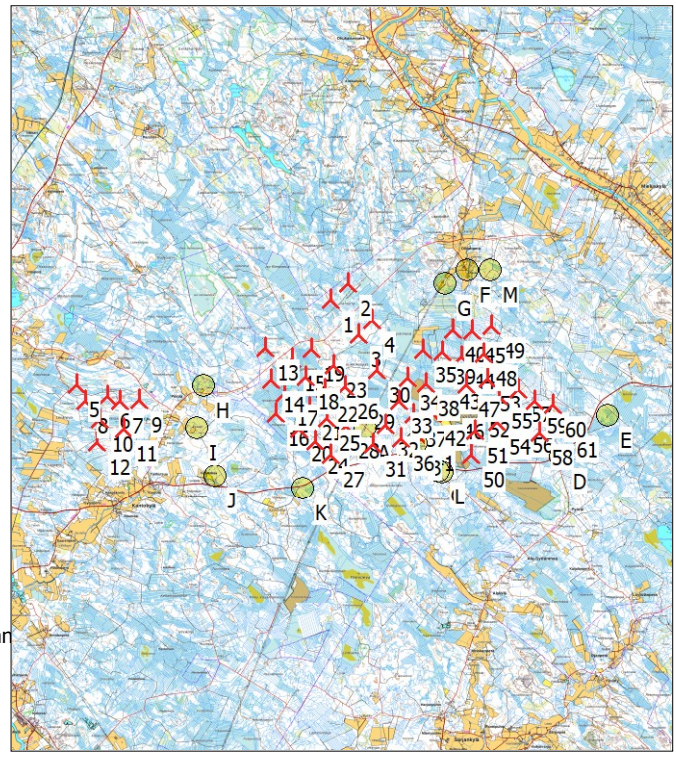
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:250 000

New WTG Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	401 061	7 113 928	105,0	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
2	401 644	7 114 439	105,4	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
3	401 997	7 112 772	109,3	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
4	402 450	7 113 258	106,6	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
5	392 697	7 111 104	81,0	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
6	393 696	7 110 723	85,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
7	394 124	7 110 573	88,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
8	392 964	7 110 572	83,6	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
9	394 736	7 110 600	89,9	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
10	393 462	7 109 982	84,9	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
11	394 233	7 109 674	87,5	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
12	393 349	7 109 200	83,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
13	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	400 019	7 109 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
26	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
27	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
28	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
29	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
30	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

To be continued on next page...

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

...continued from previous page

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
31	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
32	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
33	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
34	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
35	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
36	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
37	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
38	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
39	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
40	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
41	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
42	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
43	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
44	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
45	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
46	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
47	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
48	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
49	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
50	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
51	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
52	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
53	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
54	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
55	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
56	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
57	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
58	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
59	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
60	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
61	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus E (Kellokankaan metsatie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste A (Metsästysmaja)	133:58
B	Autiotalo B (Ylivieskantie, Pohlola)	73:24
C	Autiotalo C (Perkkiontie 382)	30:25
D	Asuinrakennus D (Alakylantie 243)	12:35
E	Lomarakennus E (Kellokankaan metsatie)	6:19
F	Asuinrakennus F (Ollilantie 112)	7:04

To be continued on next page...

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

...continued from previous page

No.	Name	Shadow, expected values Shadow hours per year [h/year]
G	Lomarakennus G (Ollilantie, Siliakuru)	12:50
H	Asuinrakennus H (Pinolantie 406)	4:31
I	Asuinrakennus I (Kortenevantie 116)	1:25
J	Asuinrakennus J (Haapavesitie 1406)	0:00
K	Lomarakennus K (Kurunoja)	0:00
L	Muu käyttöt. L (Perkkiontie, Ilmola)	26:00
M	Lomarakennus M (Riskalan metsatie)	6:35

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (235)	0:00	0:00
2	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)	0:00	0:00
3	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (237)	0:00	0:00
4	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)	0:00	0:00
5	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (239)	0:00	0:00
6	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)	0:00	0:00
7	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (241)	0:00	0:00
8	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (242)	0:00	0:00
9	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (243)	6:12	1:25
10	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (244)	0:00	0:00
11	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (245)	0:00	0:00
12	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (246)	0:00	0:00
13	PUU01	10:56	2:46
14	PUU02	7:53	1:45
15	PUU03	0:00	0:00
16	PUU04	0:00	0:00
17	PUU05	0:00	0:00
18	PUU06	0:00	0:00
19	PUU07	0:00	0:00
20	PUU08	6:53	1:25
21	PUU09	11:16	2:30
22	PUU10	28:43	7:58
23	PUU11	0:00	0:00
24	PUU12	12:12	2:21
25	PUU13	26:46	5:55
26	PUU14	0:00	0:00
27	PUU15	18:40	3:52
28	PUU16	142:02	35:00
29	PUU17	12:46	3:26
30	PUU18	0:00	0:00
31	PUU19	120:47	26:39
32	PUU20	211:50	54:50
33	PUU21	33:58	9:10
34	PUU22	8:46	2:29
35	PUU23	12:30	1:42
36	PUU24	207:49	53:17
37	PUU25	17:24	3:46
38	PUU26	0:00	0:00
39	PUU27	16:09	2:14
40	PUU28	51:28	7:44
41	PUU29	10:25	2:04
42	PUU30	7:27	1:35
43	PUU31	0:00	0:00
44	PUU32	0:00	0:00
45	PUU33	48:23	7:26
46	PUU34	17:45	4:50
47	PUU35	0:00	0:00
48	PUU36	0:00	0:00
49	PUU37	44:36	7:21
50	PUU38	90:20	23:11
51	PUU39	25:07	6:22
52	PUU40	10:01	2:32

To be continued on next page...

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
53	PUU41	0:00	0:00
54	PUU42	7:32	1:49
55	PUU43	0:00	0:00
56	PUU44	31:06	8:38
57	PUU45	0:00	0:00
58	PUU46	14:10	3:36
59	PUU47	5:45	1:16
60	PUU48	12:19	2:43
61	PUU49	17:11	3:18

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201103 **Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May		June		
1	10.13	09.04			07.31		10.17 (31)	06.42		08.01 (41)	04.57		06.13 (37)	03.19		04.41 (33)
	14.35	16.06			17.36	103	16.09 (27)	20.09	55	19.14 (20)	21.41	203	20.20 (21)	23.20	171	21.58 (22)
2	10.12	09.00			07.28		10.17 (31)	06.39		08.22 (36)	04.53		06.13 (37)	03.16		04.40 (33)
	14.37	16.09			17.39	102	16.08 (27)	20.12	42	19.13 (20)	21.45	198	20.18 (21)	23.23	171	21.58 (22)
3	10.10	08.57			07.25		10.16 (31)	06.35		08.22 (36)	04.50		06.14 (37)	03.14		04.40 (33)
	14.39	16.12			17.42	99	16.06 (27)	20.15	36	19.10 (20)	21.48	186	20.04 (25)	23.25	170	21.59 (22)
4	10.09	08.54			07.21		10.16 (31)	06.32		08.25 (36)	04.46		06.15 (37)	03.12		04.13 (34)
	14.42	16.16			17.45	97	16.05 (27)	20.18	23	19.07 (20)	21.51	184	20.03 (25)	23.28	169	21.58 (22)
5	10.08	08.51			07.18		10.15 (31)	06.28		08.27 (36)	04.43		06.16 (37)	03.09		04.12 (34)
	14.44	16.19			17.48	95	16.03 (27)	20.21	13	08.40 (36)	21.54	181	20.01 (25)	23.31	172	21.59 (22)
6	10.07	08.48			07.14		10.15 (31)	06.24			04.39		06.17 (37)	03.07		04.10 (34)
	14.46	16.22			17.51	87	15.59 (27)	20.24			21.57	178	20.00 (25)	23.33	171	21.58 (22)
7	10.05	08.45			07.11		10.15 (31)	06.21			04.36		06.19 (37)	03.05		04.09 (34)
	14.49	16.26			17.55	76	11.31 (31)	20.27			22.01	171	19.58 (25)	23.35	171	21.59 (22)
8	10.03	08.42			07.07		10.14 (31)	06.17			04.33		06.23 (37)	03.03		04.08 (34)
	14.51	16.29			17.58	85	17.21 (24)	20.30			22.04	157	19.55 (25)	23.38	173	21.59 (22)
9	10.02	08.39			07.04		10.14 (31)	06.14		19.02 (28)	04.29		06.37 (32)	03.01		04.07 (34)
	14.54	16.32			18.01	91	17.24 (24)	20.33	9	19.11 (28)	22.07	144	19.50 (25)	23.40	172	21.59 (22)
10	10.00	08.35		10.48 (31)	07.00		10.15 (31)	06.10		18.56 (28)	04.26		06.36 (32)	02.57		04.06 (34)
	14.56	16.35	15	11.03 (31)	18.04	95	17.28 (24)	20.36	22	19.18 (28)	22.10	142	19.38 (28)	23.42	171	21.59 (22)
11	09.58	08.32		10.43 (31)	06.57		10.14 (31)	06.07		06.40 (42)	04.23		06.36 (32)	02.56		04.05 (34)
	14.59	16.39	25	11.08 (31)	18.07	98	17.29 (24)	20.39	34	19.22 (28)	22.14	141	19.37 (28)	23.44	171	21.59 (22)
12	09.56	08.29		10.40 (31)	06.53		10.15 (31)	06.03		06.36 (42)	04.19		06.36 (32)	02.54		04.04 (34)
	15.02	16.42	32	11.12 (31)	18.10	98	17.30 (24)	20.42	56	19.58 (25)	22.17	141	19.38 (28)	23.46	172	21.59 (22)
13	09.54	08.26		10.37 (31)	06.50		07.37 (36)	06.00		06.33 (42)	04.16		06.36 (32)	02.53		04.04 (34)
	15.05	16.45	37	11.14 (31)	18.13	108	17.30 (24)	20.45	73	20.02 (25)	22.20	140	19.37 (28)	23.48	170	22.00 (22)
14	09.52	08.22		10.34 (31)	06.46		07.32 (36)	05.56		06.29 (42)	04.13		06.36 (32)	02.52		04.03 (34)
	15.08	16.49	54	16.01 (27)	18.16	118	17.30 (24)	20.48	85	20.03 (25)	22.23	139	19.36 (28)	23.49	169	21.59 (22)
15	09.49	08.19		10.32 (31)	06.43		07.30 (36)	05.53		06.27 (42)	04.10		06.36 (32)	02.51		04.03 (34)
	15.11	16.52	64	16.04 (27)	18.19	121	17.30 (24)	20.51	96	20.13 (21)	22.27	139	19.37 (28)	23.51	170	22.00 (22)
16	09.47	08.16		10.31 (31)	06.39		07.27 (36)	05.49		06.25 (37)	04.06		06.36 (32)	02.50		04.02 (34)
	15.14	16.55	71	16.07 (27)	18.22	124	17.30 (24)	20.54	123	20.16 (21)	22.30	138	19.36 (28)	23.52	168	21.59 (22)
17	09.45	08.12		10.29 (31)	06.35		07.07 (41)	05.45		06.20 (37)	04.03		06.37 (32)	02.50		04.02 (34)
	15.17	16.58	78	16.08 (27)	18.25	132	17.29 (24)	20.57	147	20.18 (21)	22.33	140	21.42 (22)	23.53	170	22.00 (22)
18	09.42	08.09		10.27 (31)	06.32		07.04 (41)	05.42		06.18 (37)	04.00		06.36 (32)	02.49		04.02 (34)
	15.20	17.01	82	16.08 (27)	18.28	138	17.29 (24)	21.00	161	20.21 (21)	22.36	143	21.44 (22)	23.54	169	22.00 (22)
19	09.40	08.06		10.27 (31)	06.28		07.00 (41)	05.38		06.17 (37)	03.57		04.53 (33)	02.49		04.03 (34)
	15.23	17.05	87	16.10 (27)	18.30	142	17.28 (24)	21.03	175	20.25 (21)	22.40	152	21.47 (22)	23.55	169	22.00 (22)
20	09.37	08.02		10.25 (31)	06.25		06.59 (41)	05.35		06.15 (37)	03.54		04.49 (33)	02.49		04.03 (34)
	15.26	17.08	90	16.10 (27)	18.33	141	17.27 (24)	21.07	181	20.25 (21)	22.43	161	21.49 (22)	23.55	169	22.01 (22)
21	09.35	07.59		10.24 (31)	06.21		06.57 (41)	05.31		06.14 (37)	03.50		04.47 (33)	02.49		04.03 (34)
	15.29	17.11	94	16.11 (27)	18.36	140	17.25 (24)	21.10	187	20.26 (21)	22.46	167	21.51 (22)	23.55	168	22.01 (22)
22	09.32	07.55		10.22 (31)	06.18		06.57 (41)	05.28		06.13 (37)	03.47		04.46 (33)	02.49		04.03 (34)
	15.33	17.14	97	16.11 (27)	18.39	136	18.05 (20)	21.13	192	20.26 (21)	22.49	170	21.54 (22)	23.56	169	22.01 (22)
23	09.29	07.52		10.22 (31)	06.14		06.56 (41)	05.24		06.13 (37)	03.44		04.44 (33)	02.50		04.04 (34)
	15.36	17.17	98	16.11 (27)	18.42	136	18.07 (20)	21.16	193	20.26 (21)	22.53	173	21.54 (22)	23.56	169	22.02 (22)
24	09.27	07.49		10.21 (31)	06.11		06.55 (41)	05.21		06.12 (37)	03.41		04.44 (33)	02.50		04.03 (34)
	15.39	17.21	101	16.11 (27)	18.45	131	18.10 (20)	21.19	196	20.25 (21)	22.56	173	21.55 (22)	23.55	169	22.01 (22)
25	09.24	07.45		10.19 (31)	06.07		06.55 (41)	05.17		06.11 (37)	03.38		04.43 (33)	02.51		04.04 (34)
	15.42	17.24	103	16.11 (27)	18.48	121	18.13 (20)	21.22	201	20.25 (21)	22.59	175	21.56 (22)	23.55	169	22.02 (22)
26	09.21	07.42		10.19 (31)	06.04		06.55 (41)	05.14		06.11 (37)	03.35		04.42 (33)	02.52		04.04 (34)
	15.46	17.27	103	16.11 (27)	18.51	119	18.16 (20)	21.25	203	20.25 (21)	23.02	175	21.56 (22)	23.55	170	22.02 (22)
27	09.18	07.38		10.18 (31)	06.00		06.55 (41)	05.10		06.11 (37)	03.33		04.42 (33)	02.53		04.05 (34)
	15.49	17.30	104	16.10 (27)	18.54	115	18.18 (20)	21.29	204	20.24 (21)	23.05	175	21.57 (22)	23.54	170	22.02 (22)
28	09.15	07.35		10.17 (31)	05.56		06.55 (41)	05.07		06.11 (37)	03.30		04.41 (33)	02.55		04.06 (34)
	15.52	17.33	104	16.09 (27)	18.57	102	18.17 (20)	21.32	206	20.24 (21)	23.08	174	21.57 (22)	23.53	171	22.03 (22)
29	09.12				06.53		07.56 (41)	05.03		06.12 (37)	03.27		04.41 (33)	02.56		04.07 (34)
	15.56				20.00	78	19.17 (20)	21.35	205	20.23 (21)	23.11	175	21.57 (22)	23.52	171	22.03 (22)
30	09.10				06.49		07.57 (41)	05.00		06.12 (37)	03.24		04.40 (33)	02.58		04.08 (34)
	15.59				20.03	72	19.16 (20)	21.38	206	20.22 (21)	23.14	173	21.57 (22)	23.51	171	22.03 (22)
31	09.07				06.46		07.59 (41)				03.22		04.40 (33)			
	16.02				20.06	66	19.16 (20)				23.17	172	21.57 (22)			
Potential sun hours	171		238		363			451			570			624		
Total, worst case			1439			3366			3324			5080			5105	
Sun reduction			0,33			0,32			0,41			0,47			0,48	
Oper. time red.			0,99			0,99			0,99			0,99			0,99	
Wind dir. red.			0,65			0,64			0,61			0,62			0,62	
Total reduction			0,22			0,20			0,25			0,29			0,29	
Total, real			311			690			824			1457			1498	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201103 **Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December
1	02.59		04.09 (34)	04.24	06.46 (32)	06.00	06.39 (42)	07.26	10.53 (31)	08.00	10.19 (31)	09.35
	23.49	170	22.03 (22)	22.27 141	19.48 (28)	20.40 34	19.21 (28)	18.53 99	18.09 (24)	16.07 12	10.31 (31)	14.43
2	03.01		04.10 (34)	04.28	06.47 (32)	06.03	18.54 (28)	07.29	10.53 (31)	08.04		09.38
	23.48	171	22.03 (22)	22.24 141	19.48 (28)	20.36 22	19.16 (28)	18.49 98	18.08 (24)	16.04		14.41
3	03.01		04.12 (34)	04.31	06.46 (32)	06.06	19.00 (28)	07.32	10.52 (31)	08.07		09.41
	23.46	171	22.04 (22)	22.20 142	19.48 (28)	20.32 9	19.09 (28)	18.46 96	18.06 (24)	16.00		14.39
4	03.03		04.13 (34)	04.34	06.47 (32)	06.09		07.35	10.52 (31)	08.10		09.44
	23.45	171	22.04 (22)	22.17 150	20.03 (25)	20.29		18.42 92	18.03 (24)	15.57		14.37
5	03.05		04.14 (34)	04.37	06.31 (37)	06.12		07.38	10.51 (31)	08.13		09.46
	23.43	172	22.04 (22)	22.14 163	20.06 (25)	20.25		18.39 88	18.00 (24)	15.54		14.35
6	03.08		04.16 (34)	04.40	06.28 (37)	06.15		07.41	10.51 (31)	08.17		09.49
	23.41	171	22.05 (22)	22.10 174	20.08 (25)	20.22		18.35 80	17.56 (24)	15.51		14.33
7	03.10		04.18 (34)	04.44	06.26 (37)	06.18	08.22 (36)	07.44	10.50 (31)	08.20		09.51
	23.39	171	22.05 (22)	22.07 179	20.09 (25)	20.18 13	08.35 (36)	18.32 84	16.33 (27)	15.48		14.32
8	03.12		04.19 (34)	04.47	06.24 (37)	06.20	08.19 (36)	07.47	10.51 (31)	08.23		09.54
	23.37	170	22.05 (22)	22.03 183	20.11 (25)	20.15 21	19.00 (20)	18.28 92	16.37 (27)	15.45		14.30
9	03.15		04.21 (34)	04.50	06.23 (37)	06.23	08.17 (36)	07.50	10.51 (31)	08.26		09.56
	23.34	169	22.05 (22)	22.00 186	20.12 (25)	20.11 35	19.04 (20)	18.25 96	16.39 (27)	15.41		14.29
10	03.18		04.48 (33)	04.53	06.22 (37)	06.26	08.14 (36)	07.53	10.50 (31)	08.30		09.58
	23.32	169	22.06 (22)	21.57 192	20.23 (21)	20.08 42	19.05 (20)	18.21 99	16.40 (27)	15.38		14.28
11	03.20		04.48 (33)	04.56	06.21 (37)	06.29	07.54 (41)	07.56	10.50 (31)	08.33		10.00
	23.29	171	22.06 (22)	21.53 201	20.27 (21)	20.04 53	19.06 (20)	18.18 101	16.41 (27)	15.35		14.27
12	03.23		04.49 (33)	04.59	06.21 (37)	06.32	07.50 (41)	07.59	10.50 (31)	08.36		10.02
	23.27	172	22.06 (22)	21.50 205	20.29 (21)	20.00 65	19.07 (20)	18.14 103	16.42 (27)	15.32		14.26
13	03.26		04.49 (33)	05.02	06.20 (37)	06.35	07.48 (41)	08.02	10.50 (31)	08.39		10.04
	23.24	173	22.06 (22)	21.46 205	20.30 (21)	19.57 71	19.07 (20)	18.11 103	16.42 (27)	15.29		14.25
14	03.29		04.50 (33)	05.06	06.19 (37)	06.38	07.47 (41)	08.05	10.51 (31)	08.43		10.06
	23.22	174	22.06 (22)	21.43 206	20.30 (21)	19.53 77	19.08 (20)	18.08 103	16.43 (27)	15.26		14.24
15	03.31		04.50 (33)	05.09	06.19 (37)	06.41	07.45 (41)	08.08	10.51 (31)	08.46		10.07
	23.19	175	22.06 (22)	21.39 205	20.31 (21)	19.50 99	19.07 (20)	18.04 103	16.43 (27)	15.23		14.23
16	03.34		04.51 (33)	05.12	06.19 (37)	06.43	07.44 (41)	08.11	10.51 (31)	08.49		10.09
	23.16	174	22.06 (22)	21.36 203	20.32 (21)	19.46 113	19.06 (20)	18.01 103	16.43 (27)	15.20		14.23
17	03.37		04.51 (33)	05.15	06.18 (37)	06.46	07.43 (41)	08.14	10.51 (31)	08.52		10.10
	23.13	176	22.06 (22)	21.32 201	20.31 (21)	19.43 119	19.05 (20)	17.57 101	16.42 (27)	15.18		14.22
18	03.40		04.52 (33)	05.18	06.18 (37)	06.49	07.43 (41)	08.17	10.53 (31)	08.56		10.11
	23.11	174	22.05 (22)	21.29 200	20.32 (21)	19.39 121	19.02 (20)	17.54 100	16.43 (27)	15.15		14.22
19	03.43		04.53 (33)	05.21	06.18 (37)	06.52	07.43 (41)	08.20	10.53 (31)	08.59		10.12
	23.08	175	22.06 (22)	21.25 196	20.32 (21)	19.36 127	18.58 (20)	17.50 98	16.42 (27)	15.12		14.22
20	03.46		04.54 (33)	05.24	06.18 (37)	06.55	07.41 (41)	08.23	10.53 (31)	09.02		10.13
	23.05	173	22.05 (22)	21.22 194	20.32 (21)	19.32 135	18.54 (20)	17.47 95	16.41 (27)	15.09		14.22
21	03.50		04.55 (33)	05.27	06.18 (37)	06.58	07.42 (41)	08.26	10.55 (31)	09.05		10.14
	23.02	172	22.04 (22)	21.18 191	20.31 (21)	19.28 137	18.50 (20)	17.43 93	16.41 (27)	15.07		14.23
22	03.53		04.57 (33)	05.30	06.19 (37)	07.01	07.42 (41)	08.29	10.55 (31)	09.08		10.14
	22.59	168	22.03 (22)	21.15 185	20.30 (21)	19.25 139	18.10 (24)	17.40 90	16.40 (27)	15.04		14.23
23	03.56		04.58 (33)	05.33	06.20 (37)	07.03	07.42 (41)	08.32	10.57 (31)	09.11		10.15
	22.56	164	22.00 (22)	21.11 180	20.30 (21)	19.21 141	18.11 (24)	17.37 85	16.40 (27)	15.01		14.24
24	03.59		05.01 (33)	05.36	06.21 (37)	07.06	07.43 (41)	08.35	10.58 (31)	09.15		10.15
	22.53	157	21.58 (22)	21.08 172	20.28 (21)	19.18 141	18.11 (24)	17.33 80	16.38 (27)	14.59		14.24
25	04.02		06.47 (32)	05.39	06.21 (37)	07.09	07.46 (41)	07.38	09.59 (31)	09.18		10.15
	22.49	145	21.55 (22)	21.04 160	20.24 (21)	19.14 139	18.12 (24)	16.30 76	15.37 (27)	14.56		14.25
26	04.05		06.47 (32)	05.42	06.23 (37)	07.12	07.49 (41)	07.41	10.00 (31)	09.21		10.15
	22.46	142	21.53 (22)	21.01 144	20.21 (21)	19.11 134	18.12 (24)	16.27 70	15.35 (27)	14.54		14.26
27	04.08		06.47 (32)	05.45	06.27 (37)	07.15	08.08 (36)	07.45	10.02 (31)	09.24		10.15
	22.43	137	21.50 (22)	20.57 121	20.18 (21)	19.07 124	18.11 (24)	16.23 63	15.33 (27)	14.51		14.27
28	04.12		06.47 (32)	05.48	06.29 (42)	07.18	08.09 (36)	07.48	10.04 (31)	09.27		10.15
	22.40	138	19.47 (28)	20.54 94	20.15 (21)	19.04 123	18.11 (24)	16.20 52	15.30 (27)	14.49		14.28
29	04.15		06.46 (32)	05.51	06.30 (42)	07.21	08.11 (36)	07.51	10.06 (31)	09.30		10.15
	22.37	139	19.47 (28)	20.50 84	20.04 (25)	19.00 119	18.10 (24)	16.17 37	10.43 (31)	14.47		14.30
30	04.18		06.47 (32)	05.54	06.33 (42)	07.24	08.14 (36)	07.54	10.10 (31)	09.33		10.14
	22.33	140	19.48 (28)	20.47 70	20.01 (25)	18.57 114	18.10 (24)	16.13 31	10.41 (31)	14.45		14.31
31	04.21		06.47 (32)	05.57	06.36 (42)			07.57	10.14 (31)			10.14
	22.30	140	19.48 (28)	20.43 56	19.58 (25)			16.10 23	10.37 (31)			14.33
Potential sun hours	609			508		393		305		198		137
Total, worst case		5084			5124		2467		2634		12	
Sun reduction		0,38			0,31		0,33		0,35		0,24	
Oper. time red.		0,99			0,99		0,99		0,99		0,99	
Wind dir. red.		0,62			0,61		0,63		0,65		0,67	
Total reduction		0,23			0,19		0,21		0,23		0,16	
Total, real		1178			974		509		595		2	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March			April			May			June		
1	10.12		09.03		07.31			06.42		18.43 (31)	04.56		19.08 (36)	03.19		04.18 (46)
	14.35		16.06		17.36			20.09	32	19.15 (31)	21.41	40	19.48 (36)	23.20	157	21.38 (29)
2	10.11		09.00		07.28			06.39		18.42 (31)	04.53		19.06 (36)	03.16		04.17 (46)
	14.37		16.09		17.39			20.12	32	19.14 (31)	21.44	45	19.51 (36)	23.22	157	21.37 (29)
3	10.10		08.57		07.24			06.35		18.42 (31)	04.50		19.04 (36)	03.14		04.16 (46)
	14.39		16.12		17.42			20.15	33	19.15 (31)	21.48	49	19.53 (36)	23.25	155	21.36 (29)
4	10.09		08.54		07.21			06.31		18.41 (31)	04.46		19.02 (36)	03.11		04.16 (46)
	14.41		16.15		17.45			20.18	33	19.14 (31)	21.51	64	20.51 (32)	23.28	156	21.35 (29)
5	10.08		08.51		07.17			06.28		18.42 (31)	04.43		19.00 (36)	03.09		04.16 (46)
	14.44		16.19		17.48			20.21	32	19.14 (31)	21.54	74	20.54 (32)	23.30	151	21.08 (32)
6	10.06		08.48		07.14			06.24		18.42 (31)	04.39		05.20 (52)	03.07		04.15 (46)
	14.46		16.22		17.51			20.24	32	19.14 (31)	21.57	85	20.57 (32)	23.33	151	21.07 (32)
7	10.05		08.45		07.10			06.21		18.42 (31)	04.36		05.17 (52)	03.05		04.15 (46)
	14.48		16.25		17.54			20.27	31	19.13 (31)	22.00	96	20.59 (32)	23.35	152	21.07 (32)
8	10.03		08.42		07.07			06.17		18.42 (31)	04.33		05.14 (52)	03.03		04.15 (46)
	14.51		16.29		17.57			20.30	30	19.12 (31)	22.04	104	21.00 (32)	23.38	151	21.07 (32)
9	10.01		08.38		07.03			06.14		18.42 (31)	04.29		05.11 (52)	03.01		04.15 (46)
	14.54		16.32		18.00			20.33	35	19.56 (28)	22.07	112	21.01 (32)	23.40	153	21.08 (32)
10	10.00		08.35		07.00			06.10		18.43 (31)	04.26		05.08 (52)	02.57		04.15 (46)
	14.56		16.35		18.03			20.36	37	19.59 (28)	22.10	120	21.02 (32)	23.42	152	21.08 (32)
11	09.58		08.32		06.56			06.07		06.39 (51)	04.23		05.06 (52)	02.56		04.15 (46)
	14.59		16.39		18.06			20.39	46	20.01 (28)	22.14	126	21.25 (29)	23.44	152	21.07 (32)
12	09.56		08.29		06.53			06.03		06.36 (51)	04.19		05.07 (52)	02.54		04.14 (46)
	15.02		16.42		18.09			20.42	50	20.04 (28)	22.17	132	21.28 (29)	23.46	153	21.07 (32)
13	09.54		08.25		06.49			05.59		06.33 (51)	04.16		05.06 (52)	02.53		04.15 (46)
	15.05		16.45		18.12			20.45	53	20.07 (28)	22.20	140	21.31 (29)	23.47	152	21.08 (32)
14	09.51		08.22		06.46			05.56		06.30 (51)	04.13		05.06 (52)	02.52		04.15 (46)
	15.08		16.48		18.15			20.48	49	20.06 (28)	22.23	147	21.33 (29)	23.49	153	21.08 (32)
15	09.49		08.19		06.42		07.15 (50)	05.52		06.29 (51)	04.09		05.07 (52)	02.51		04.15 (46)
	15.11		16.52		18.18	7	07.22 (50)	20.51	42	20.06 (28)	22.27	151	21.36 (29)	23.50	153	21.08 (32)
16	09.47		08.15		06.39		07.11 (50)	05.49		06.28 (51)	04.06		05.07 (52)	02.50		04.15 (46)
	15.14		16.55		18.21	13	07.24 (50)	20.54	42	20.05 (28)	22.30	155	21.38 (29)	23.52	154	21.08 (32)
17	09.45		08.12		06.35		07.07 (50)	05.45		06.27 (51)	04.03		05.06 (52)	02.50		04.15 (46)
	15.17		16.58		18.24	18	07.25 (50)	20.57	42	20.04 (28)	22.33	159	21.40 (29)	23.53	153	21.08 (32)
18	09.42		08.09		06.32		07.06 (50)	05.42		06.27 (51)	04.00		05.07 (52)	02.49		04.15 (46)
	15.20		17.01		18.27	21	07.27 (50)	21.00	41	20.03 (28)	22.36	160	21.41 (29)	23.54	154	21.08 (32)
19	09.40		08.05		06.28		07.04 (50)	05.38		06.27 (51)	03.57		05.07 (52)	02.49		04.16 (46)
	15.23		17.05		18.30	23	07.27 (50)	21.03	37	20.01 (28)	22.40	161	21.40 (29)	23.54	153	21.09 (32)
20	09.37		08.02		06.25		07.04 (50)	05.35		06.27 (51)	03.53		05.08 (52)	02.49		04.16 (46)
	15.26		17.08		18.33	24	07.28 (50)	21.06	30	19.58 (28)	22.43	161	21.41 (29)	23.55	153	21.09 (32)
21	09.35		07.59		06.21		07.03 (50)	05.31		06.27 (51)	03.50		05.10 (52)	02.49		04.16 (46)
	15.29		17.11		18.36	24	07.27 (50)	21.10	23	06.50 (51)	22.46	159	21.41 (29)	23.55	153	21.09 (32)
22	09.32		07.55		06.18		07.02 (50)	05.28		06.28 (51)	03.47		05.10 (52)	02.49		04.16 (46)
	15.33		17.14		18.39	25	07.27 (50)	21.13	22	06.50 (51)	22.49	161	21.41 (29)	23.55	153	21.09 (32)
23	09.29		07.52		06.14		07.02 (50)	05.24		06.28 (51)	03.44		05.11 (52)	02.50		04.17 (46)
	15.36		17.17		18.42	25	07.27 (50)	21.16	21	06.49 (51)	22.52	159	21.41 (29)	23.55	153	21.10 (32)
24	09.27		07.49		06.11		07.01 (50)	05.21		06.28 (51)	03.41		05.13 (52)	02.50		04.16 (46)
	15.39		17.20		18.45	25	07.26 (50)	21.19	19	06.47 (51)	22.55	154	21.41 (29)	23.55	154	21.09 (32)
25	09.24		07.45		06.07		07.02 (50)	05.17		06.30 (51)	03.38		18.47 (36)	02.51		04.17 (46)
	15.42		17.24		18.48	37	18.08 (31)	21.22	15	06.45 (51)	22.59	148	21.41 (29)	23.55	153	21.10 (32)
26	09.21		07.42		06.03		07.02 (50)	05.14		06.31 (51)	03.35		18.47 (36)	02.52		04.17 (46)
	15.46		17.27		18.51	41	18.10 (31)	21.25	12	06.43 (51)	23.02	148	21.41 (29)	23.54	153	21.10 (32)
27	09.18		07.38		06.00		07.03 (50)	05.10		06.35 (51)	03.32		18.46 (36)	02.53		04.17 (46)
	15.49		17.30		18.54	43	18.12 (31)	21.28	5	06.40 (51)	23.05	148	21.40 (29)	23.54	153	21.10 (32)
28	09.15		07.35		05.56		07.03 (50)	05.07		19.21 (36)	03.30		18.46 (36)	02.55		04.18 (46)
	15.52		17.33		18.57	44	18.13 (31)	21.32	18	19.39 (36)	23.08	147	21.40 (29)	23.53	154	21.11 (32)
29	09.12				06.53		08.05 (50)	05.03		19.16 (36)	03.27		04.23 (46)	02.56		04.18 (46)
	15.56				20.00	42	19.14 (31)	21.35	28	19.44 (36)	23.11	151	21.39 (29)	23.52	154	21.11 (32)
30	09.09				06.49		08.07 (50)	05.00		19.12 (36)	03.24		04.21 (46)	02.58		04.19 (46)
	15.59				20.03	39	19.14 (31)	21.38	35	19.47 (36)	23.14	154	21.39 (29)	23.51	154	21.12 (32)
31	09.06				06.46		18.44 (31)				03.21		04.19 (46)			
	16.02				20.06	30	19.14 (31)				23.17	155	21.38 (29)			
Potential sun hours	171		238		363			451			570			624		
Total, worst case						481			957			3965			4599	
Sun reduction						0,32			0,41			0,47			0,48	
Oper. time red.						0,99			0,99			0,99			0,99	
Wind dir. red.						0,62			0,61			0,62			0,62	
Total reduction						0,20			0,25			0,29			0,29	
Total, real						95			236			1145			1345	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November	December
1	02.59		04.19 (46)	04.24		05.17 (52)	06.00		06.39 (51)	07.26	08.00	09.35
	23.49	154	21.12 (32)	22.27	130	21.37 (29)	20.39	46	20.01 (28)	18.53	16.07	14.42
2	03.01		04.19 (46)	04.28		05.17 (52)	06.03		18.41 (31)	07.29	08.04	09.38
	23.48	153	21.12 (32)	22.23	124	21.13 (32)	20.36	37	19.57 (28)	18.49	16.03	14.40
3	03.01		04.19 (46)	04.31		05.19 (52)	06.06		18.40 (31)	07.32	08.07	09.41
	23.46	153	21.12 (32)	22.20	117	21.12 (32)	20.32	35	19.54 (28)	18.46	16.00	14.39
4	03.03		04.20 (46)	04.34		05.22 (52)	06.09		18.39 (31)	07.35	08.10	09.43
	23.44	154	21.13 (32)	22.17	109	21.11 (32)	20.29	31	19.51 (28)	18.42	15.57	14.37
5	03.05		04.20 (46)	04.37		05.25 (52)	06.12		18.39 (31)	07.38	08.13	09.46
	23.43	152	21.13 (32)	22.13	102	21.10 (32)	20.25	31	19.10 (31)	18.39	15.54	14.35
6	03.08		04.21 (46)	04.40		05.27 (52)	06.15		18.37 (31)	07.41	08.16	09.49
	23.41	152	21.14 (32)	22.10	92	21.08 (32)	20.22	32	19.09 (31)	18.35	15.51	14.33
7	03.10		04.21 (46)	04.43		05.30 (52)	06.17		18.37 (31)	07.44	08.20	09.51
	23.38	151	21.13 (32)	22.07	82	21.06 (32)	20.18	32	19.09 (31)	18.32	15.48	14.32
8	03.12		04.22 (46)	04.47		19.11 (36)	06.20		18.37 (31)	07.47	08.23	09.53
	23.36	153	21.40 (29)	22.03	71	21.03 (32)	20.15	32	19.09 (31)	18.28	15.44	14.30
9	03.15		04.23 (46)	04.50		19.13 (36)	06.23		18.36 (31)	07.50	08.26	09.56
	23.34	157	21.43 (29)	22.00	60	21.00 (32)	20.11	33	19.09 (31)	18.25	15.41	14.29
10	03.17		04.24 (46)	04.53		19.14 (36)	06.26		18.35 (31)	07.53	08.29	09.58
	23.32	156	21.44 (29)	21.56	47	20.01 (36)	20.07	33	19.08 (31)	18.21	15.38	14.28
11	03.20		04.26 (46)	04.56		19.16 (36)	06.29		18.36 (31)	07.56	08.33	10.00
	23.29	158	21.46 (29)	21.53	43	19.59 (36)	20.04	31	19.07 (31)	18.18	15.35	14.26
12	03.23		04.26 (46)	04.59		19.18 (36)	06.32		18.36 (31)	07.59	08.36	10.02
	23.27	157	21.46 (29)	21.50	39	19.57 (36)	20.00	31	19.07 (31)	18.14	15.32	14.25
13	03.26		04.28 (46)	05.02		19.20 (36)	06.35		07.59 (50)	08.02	08.39	10.04
	23.24	154	21.46 (29)	21.46	33	19.53 (36)	19.57	37	19.06 (31)	18.11	15.29	14.25
14	03.29		04.31 (46)	05.05		19.24 (36)	06.38		07.55 (50)	08.05	08.42	10.05
	23.22	153	21.48 (29)	21.43	26	19.50 (36)	19.53	42	19.04 (31)	18.07	15.26	14.24
15	03.31		18.55 (36)	05.09		19.29 (36)	06.40		07.53 (50)	08.08	08.46	10.07
	23.19	147	21.49 (29)	21.39	16	19.45 (36)	19.50	44	19.03 (31)	18.04	15.23	14.23
16	03.34		18.55 (36)	05.12		06.41 (51)	06.43		07.52 (50)	08.11	08.49	10.08
	23.16	148	21.49 (29)	21.36	7	06.48 (51)	19.46	43	19.01 (31)	18.00	15.20	14.23
17	03.37		18.56 (36)	05.15		06.37 (51)	06.46		07.51 (50)	08.14	08.52	10.10
	23.13	146	21.49 (29)	21.32	13	06.50 (51)	19.43	41	18.59 (31)	17.57	15.18	14.22
18	03.40		18.56 (36)	05.18		06.36 (51)	06.49		07.50 (50)	08.17	08.55	10.11
	23.10	148	21.50 (29)	21.29	16	06.52 (51)	19.39	38	18.56 (31)	17.54	15.15	14.22
19	03.43		05.25 (52)	05.21		06.35 (51)	06.52		07.48 (50)	08.20	08.59	10.12
	23.07	151	21.51 (29)	21.25	18	06.53 (51)	19.35	27	18.49 (31)	17.50	15.12	14.22
20	03.46		05.22 (52)	05.24		06.34 (51)	06.55		07.48 (50)	08.23	09.02	10.13
	23.05	156	21.51 (29)	21.22	20	06.54 (51)	19.32	25	08.13 (50)	17.47	15.09	14.22
21	03.49		05.21 (52)	05.27		06.32 (51)	06.58		07.47 (50)	08.26	09.05	10.14
	23.02	158	21.51 (29)	21.18	22	06.54 (51)	19.28	26	08.13 (50)	17.43	15.06	14.23
22	03.53		05.20 (52)	05.30		06.31 (51)	07.00		07.47 (50)	08.29	09.08	10.14
	22.59	161	21.51 (29)	21.15	24	06.55 (51)	19.25	25	08.12 (50)	17.40	15.04	14.23
23	03.56		05.19 (52)	05.33		06.31 (51)	07.03		07.48 (50)	08.32	09.11	10.15
	22.55	161	21.51 (29)	21.11	32	20.03 (28)	19.21	24	08.12 (50)	17.37	15.01	14.23
24	03.59		05.18 (52)	05.36		06.31 (51)	07.06		07.48 (50)	08.35	09.14	10.15
	22.52	160	21.51 (29)	21.08	37	20.05 (28)	19.18	23	08.11 (50)	17.33	14.59	14.24
25	04.02		05.18 (52)	05.39		06.30 (51)	07.09		07.48 (50)	07.38	09.18	10.15
	22.49	161	21.51 (29)	21.04	39	20.05 (28)	19.14	22	08.10 (50)	16.30	14.56	14.25
26	04.05		05.17 (52)	05.42		06.30 (51)	07.12		07.48 (50)	07.41	09.21	10.15
	22.46	160	21.51 (29)	21.01	41	20.06 (28)	19.11	20	08.08 (50)	16.27	14.54	14.26
27	04.08		05.17 (52)	05.45		06.30 (51)	07.15		07.51 (50)	07.44	09.24	10.15
	22.43	157	21.50 (29)	20.57	43	20.07 (28)	19.07	15	08.06 (50)	16.23	14.51	14.27
28	04.12		05.17 (52)	05.48		06.31 (51)	07.18		07.54 (50)	07.48	09.27	10.15
	22.40	154	21.48 (29)	20.54	41	20.07 (28)	19.03	9	08.03 (50)	16.20	14.49	14.28
29	04.15		05.17 (52)	05.51		06.30 (51)	07.21			07.51	09.30	10.15
	22.37	148	21.45 (29)	20.50	50	20.06 (28)	19.00			16.17	14.47	14.30
30	04.18		05.17 (52)	05.54		06.33 (51)	07.23			07.54	09.32	10.14
	22.33	144	21.43 (29)	20.47	52	20.06 (28)	18.56			16.13	14.45	14.31
31	04.21		05.16 (52)	05.57		06.36 (51)				07.57		10.13
	22.30	138	21.40 (29)	20.43	50	20.04 (28)				16.10		14.33
Potential sun hours	608			508			393			305	198	137
Total, worst case		4755			1596			865				
Sun reduction		0,38			0,31			0,33				
Oper. time red.		0,99			0,99			0,99				
Wind dir. red.		0,62			0,61			0,62				
Total reduction		0,23			0,19			0,20				
Total, real		1106			303			174				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	10.12	09.03	07.31	06.42			04.56		20.16 (31)	03.19		04.18 (51)
	14.35	16.06	17.36	20.09			21.41	15	20.31 (31)	23.19	69	21.47 (36)
2	10.11	09.00	07.28	06.38			04.53		20.18 (31)	03.16		04.16 (51)
	14.37	16.09	17.39	20.12			21.44	11	20.29 (31)	23.22	74	21.47 (36)
3	10.10	08.57	07.24	06.35			04.50		05.42 (50)	03.14		04.14 (51)
	14.39	16.12	17.42	20.15			21.47	17	20.26 (31)	23.25	77	21.47 (36)
4	10.09	08.54	07.21	06.31			04.46		05.39 (50)	03.12		04.13 (51)
	14.42	16.15	17.45	20.18			21.51	17	05.56 (50)	23.28	79	21.48 (36)
5	10.08	08.51	07.17	06.28			04.43		05.36 (50)	03.09		04.12 (51)
	14.44	16.19	17.48	20.21			21.54	22	05.58 (50)	23.30	81	21.48 (36)
6	10.06	08.48	07.14	06.24			04.39		05.34 (50)	03.07		04.10 (51)
	14.46	16.22	17.51	20.24			21.57	26	06.00 (50)	23.33	82	21.48 (36)
7	10.05	08.45	07.10	06.21			04.36		05.34 (50)	03.05		04.09 (51)
	14.49	16.25	17.54	20.27			22.00	28	06.02 (50)	23.35	84	21.48 (36)
8	10.03	08.41	07.07	06.17			04.33		05.32 (50)	03.03		04.09 (51)
	14.51	16.29	17.57	20.30			22.04	31	06.03 (50)	23.37	84	21.48 (36)
9	10.01	08.38	07.03	06.14			04.29		05.31 (50)	03.01		04.09 (51)
	14.54	16.32	18.00	20.33			22.07	32	06.03 (50)	23.40	84	21.48 (36)
10	09.59	08.35	07.00	06.10			04.26		05.30 (50)	02.58		04.09 (51)
	14.56	16.35	18.03	20.36			22.10	34	06.04 (50)	23.42	84	21.49 (36)
11	09.58	08.32	06.56	06.07			04.23		05.29 (50)	02.56		04.08 (51)
	14.59	16.39	18.06	20.39			22.13	35	06.04 (50)	23.44	85	21.48 (36)
12	09.56	08.29	06.53	06.03			04.19		05.29 (50)	02.55		04.08 (51)
	15.02	16.42	18.09	20.42			22.17	37	06.06 (50)	23.45	85	21.48 (36)
13	09.53	08.25	06.49	05.59			04.16		05.28 (50)	02.53		04.09 (51)
	15.05	16.45	18.12	20.45			22.20	38	06.06 (50)	23.47	85	21.49 (36)
14	09.51	08.22	06.46	05.56			04.13		05.28 (50)	02.52		04.08 (51)
	15.08	16.48	18.15	20.48			22.23	42	21.33 (32)	23.49	85	21.49 (36)
15	09.49	08.19	06.42	05.52			04.09		05.28 (50)	02.51		04.09 (51)
	15.11	16.52	18.18	20.51			22.26	47	21.36 (32)	23.50	85	21.50 (36)
16	09.47	08.15	06.39	05.49			04.06		05.27 (50)	02.50		04.08 (51)
	15.14	16.55	18.21	20.54			22.30	53	21.38 (32)	23.51	84	21.49 (36)
17	09.44	08.12	06.35	05.45			04.03		05.26 (50)	02.50		04.09 (51)
	15.17	16.58	18.24	20.57			22.33	58	21.40 (32)	23.52	82	21.49 (36)
18	09.42	08.09	06.32	05.42			04.00		05.27 (50)	02.49		04.09 (51)
	15.20	17.01	18.27	21.00			22.36	62	21.44 (32)	23.53	84	21.50 (36)
19	09.40	08.05	06.28	05.38		20.21 (31)	03.57		05.26 (50)	02.49		04.09 (51)
	15.23	17.05	18.30	21.03	4	20.25 (31)	22.39	66	21.45 (32)	23.54	85	21.50 (36)
20	09.37	08.02	06.25	05.35		20.18 (31)	03.54		05.27 (50)	02.49		04.09 (51)
	15.26	17.08	18.33	21.06	9	20.27 (31)	22.43	67	21.46 (32)	23.55	83	21.50 (36)
21	09.34	07.59	06.21	05.31		20.17 (31)	03.50		05.27 (50)	02.49		04.09 (51)
	15.29	17.11	18.36	21.09	13	20.30 (31)	22.46	69	21.47 (32)	23.55	83	21.50 (36)
22	09.32	07.55	06.18	05.28		20.16 (31)	03.47		05.26 (50)	02.49		04.09 (51)
	15.33	17.14	18.39	21.13	17	20.33 (31)	22.49	69	21.46 (32)	23.55	83	21.50 (36)
23	09.29	07.52	06.14	05.24		20.16 (31)	03.44		05.27 (50)	02.50		04.10 (51)
	15.36	17.17	18.42	21.16	20	20.36 (31)	22.52	69	21.46 (32)	23.55	85	21.51 (36)
24	09.26	07.48	06.10	05.21		20.15 (31)	03.41		05.27 (50)	02.50		04.10 (51)
	15.39	17.20	18.45	21.19	20	20.35 (31)	22.55	71	21.47 (32)	23.55	84	21.51 (36)
25	09.24	07.45	06.07	05.17		20.14 (31)	03.38		05.27 (50)	02.51		04.11 (51)
	15.42	17.24	18.48	21.22	21	20.35 (31)	22.58	71	21.47 (32)	23.55	84	21.52 (36)
26	09.21	07.42	06.03	05.14		20.14 (31)	03.35		05.28 (50)	02.52		04.10 (51)
	15.46	17.27	18.51	21.25	21	20.35 (31)	23.02	70	21.47 (32)	23.54	85	21.51 (36)
27	09.18	07.38	06.00	05.10		20.15 (31)	03.33		05.28 (50)	02.53		04.11 (51)
	15.49	17.30	18.54	21.28	20	20.35 (31)	23.05	70	21.47 (32)	23.53	84	21.52 (36)
28	09.15	07.35	05.56	05.07		20.15 (31)	03.30		05.28 (50)	02.55		04.12 (51)
	15.52	17.33	18.57	21.31	19	20.34 (31)	23.08	70	21.47 (32)	23.52	83	21.52 (36)
29	09.12		06.53	05.03		20.15 (31)	03.27		05.28 (50)	02.56		04.12 (51)
	15.56		20.00	21.35	19	20.34 (31)	23.11	70	21.47 (32)	23.51	85	21.53 (36)
30	09.09		06.49	05.00		20.15 (31)	03.24		05.29 (50)	02.58		04.12 (51)
	15.59		20.03	21.38	17	20.32 (31)	23.14	69	21.47 (36)	23.50	85	21.53 (36)
31	09.06		06.46				03.22		05.29 (50)			
	16.02		20.06				23.16	69	21.47 (36)			
Potential sun hours	171	238	363	451			569			624		
Total, worst case					200			1505			2482	
Sun reduction					0,41			0,47			0,48	
Oper. time red.					0,99			0,99			0,99	
Wind dir. red.					0,63			0,63			0,63	
Total reduction					0,25			0,29			0,30	
Total, real					51			438			736	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59		04.13 (51)	04.24		05.39 (50)	06.00	07.26	08.00	09.35
	23.49	85	21.53 (36)	22.27	36	06.15 (50)	20.39	18.53	16.07	14.43
2	03.01		04.13 (51)	04.28		05.40 (50)	06.03	07.29	08.03	09.38
	23.47	85	21.53 (36)	22.23	35	06.15 (50)	20.36	18.49	16.03	14.41
3	03.01		04.13 (51)	04.31		05.40 (50)	06.06	07.32	08.07	09.41
	23.46	85	21.53 (36)	22.20	34	06.14 (50)	20.32	18.46	16.00	14.39
4	03.03		04.14 (51)	04.34		05.41 (50)	06.09	07.35	08.10	09.43
	23.44	85	21.54 (36)	22.17	32	06.13 (50)	20.29	18.42	15.57	14.37
5	03.06		04.15 (51)	04.37		05.43 (50)	06.12	07.38	08.13	09.46
	23.42	84	21.54 (36)	22.13	29	06.12 (50)	20.25	18.39	15.54	14.35
6	03.08		04.16 (51)	04.40		05.43 (50)	06.14	07.41	08.16	09.48
	23.40	83	21.54 (36)	22.10	27	06.10 (50)	20.22	18.35	15.51	14.33
7	03.10		04.17 (51)	04.43		05.45 (50)	06.17	07.44	08.20	09.51
	23.38	82	21.54 (36)	22.07	24	06.09 (50)	20.18	18.32	15.48	14.32
8	03.12		04.19 (51)	04.47		05.47 (50)	06.20	07.47	08.23	09.53
	23.36	81	21.54 (36)	22.03	21	06.08 (50)	20.14	18.28	15.44	14.30
9	03.15		04.21 (51)	04.50		05.49 (50)	06.23	07.50	08.26	09.55
	23.34	77	21.55 (36)	22.00	16	06.05 (50)	20.11	18.25	15.41	14.29
10	03.18		04.23 (51)	04.53		05.52 (50)	06.26	07.53	08.29	09.58
	23.31	75	21.55 (36)	21.56	17	20.37 (31)	20.07	18.21	15.38	14.28
11	03.20		04.25 (51)	04.56		20.26 (31)	06.29	07.56	08.33	10.00
	23.29	71	21.55 (36)	21.53	13	20.39 (31)	20.04	18.18	15.35	14.27
12	03.23		05.38 (50)	04.59		20.25 (31)	06.32	07.58	08.36	10.02
	23.27	68	21.55 (32)	21.49	15	20.40 (31)	20.00	18.14	15.32	14.26
13	03.26		05.38 (50)	05.02		20.23 (31)	06.35	08.01	08.39	10.03
	23.24	68	21.55 (32)	21.46	17	20.40 (31)	19.57	18.11	15.29	14.25
14	03.29		05.37 (50)	05.05		20.23 (31)	06.38	08.04	08.42	10.05
	23.21	70	21.55 (32)	21.43	18	20.41 (31)	19.53	18.07	15.26	14.24
15	03.31		05.37 (50)	05.09		20.22 (31)	06.40	08.07	08.46	10.07
	23.19	70	21.56 (32)	21.39	20	20.42 (31)	19.50	18.04	15.23	14.23
16	03.34		05.37 (50)	05.12		20.22 (31)	06.43	08.10	08.49	10.08
	23.16	70	21.56 (32)	21.36	20	20.42 (31)	19.46	18.00	15.20	14.23
17	03.37		05.37 (50)	05.15		20.21 (31)	06.46	08.13	08.52	10.09
	23.13	70	21.56 (32)	21.32	20	20.41 (31)	19.42	17.57	15.18	14.22
18	03.40		05.37 (50)	05.18		20.21 (31)	06.49	08.17	08.55	10.11
	23.10	70	21.56 (32)	21.29	20	20.41 (31)	19.39	17.54	15.15	14.22
19	03.43		05.37 (50)	05.21		20.21 (31)	06.52	08.20	08.58	10.12
	23.07	71	21.57 (32)	21.25	20	20.41 (31)	19.35	17.50	15.12	14.22
20	03.46		05.37 (50)	05.24		20.21 (31)	06.55	08.23	09.02	10.13
	23.04	71	21.57 (32)	21.22	20	20.41 (31)	19.32	17.47	15.09	14.22
21	03.50		05.37 (50)	05.27		20.21 (31)	06.58	08.26	09.05	10.13
	23.01	68	21.56 (32)	21.18	16	20.37 (31)	19.28	17.43	15.06	14.23
22	03.53		05.37 (50)	05.30		20.22 (31)	07.00	08.29	09.08	10.14
	22.58	69	21.57 (32)	21.15	12	20.34 (31)	19.25	17.40	15.04	14.23
23	03.56		05.37 (50)	05.33		20.23 (31)	07.03	08.32	09.11	10.15
	22.55	68	21.56 (32)	21.11	8	20.31 (31)	19.21	17.37	15.01	14.24
24	03.59		05.37 (50)	05.36		20.25 (31)	07.06	08.35	09.14	10.15
	22.52	67	21.57 (32)	21.08	3	20.28 (31)	19.18	17.33	14.59	14.24
25	04.02		05.37 (50)	05.39			07.09	07.38	09.17	10.15
	22.49	65	21.55 (32)	21.04			19.14	16.30	14.56	14.25
26	04.05		05.38 (50)	05.42			07.12	07.41	09.20	10.15
	22.46	60	21.53 (32)	21.01			19.10	16.26	14.54	14.26
27	04.08		05.37 (50)	05.45			07.15	07.44	09.23	10.15
	22.43	56	21.50 (32)	20.57			19.07	16.23	14.51	14.27
28	04.12		05.38 (50)	05.48			07.18	07.47	09.26	10.15
	22.40	51	21.48 (32)	20.54			19.03	16.20	14.49	14.28
29	04.15		05.38 (50)	05.51			07.20	07.51	09.29	10.14
	22.36	45	21.45 (32)	20.50			19.00	16.17	14.47	14.30
30	04.18		05.39 (50)	05.54			07.23	07.54	09.32	10.14
	22.33	41	21.43 (32)	20.46			18.56	16.13	14.45	14.31
31	04.21		05.38 (50)	05.57				07.57		10.13
	22.30	37	06.15 (50)	20.43				16.10		14.33
Potential sun hours	608			508			393	305	198	137
Total, worst case		2148			493					
Sun reduction		0,38			0,31					
Oper. time red.		0,99			0,99					
Wind dir. red.		0,63			0,62					
Total reduction		0,24			0,19					
Total, real		505			95					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April			May			June		
1	10.12		09.03		07.31		06.42			04.56		20.35 (54)	03.19		21.23 (56)
	14.35		16.05		17.36		20.08			21.41	20	20.55 (54)	23.19	28	21.51 (56)
2	10.11		09.00		07.27		06.38			04.53		20.34 (54)	03.16		21.23 (56)
	14.37		16.08		17.39		20.11			21.44	21	20.55 (54)	23.22	29	21.52 (56)
3	10.10		08.57		07.24		06.35			04.49		20.34 (54)	03.14		21.23 (56)
	14.39		16.12		17.42		20.14			21.47	21	20.55 (54)	23.25	28	21.51 (56)
4	10.09		08.54		07.21		06.31			04.46		20.35 (54)	03.11		21.24 (56)
	14.41		16.15		17.45		20.17			21.50	19	20.54 (54)	23.27	28	21.52 (56)
5	10.07		08.51		07.17		06.27			04.42		20.35 (54)	03.09		21.24 (56)
	14.43		16.18		17.48		20.20			21.54	19	20.54 (54)	23.30	27	21.51 (56)
6	10.06		08.47		07.14		06.24			04.39		20.35 (54)	03.07		21.24 (56)
	14.46		16.22		17.51		20.23			21.57	18	20.53 (54)	23.32	28	21.52 (56)
7	10.04		08.44		07.10		06.20			04.36		20.36 (54)	03.04		21.25 (56)
	14.48		16.25		17.54		20.26			22.00	16	20.52 (54)	23.35	27	21.52 (56)
8	10.03		08.41		07.07		06.17			04.32		20.37 (54)	03.02		21.25 (56)
	14.51		16.28		17.57		20.29			22.03	14	20.51 (54)	23.37	32	22.01 (58)
9	10.01		08.38		07.03		06.13			04.29		20.39 (54)	03.01		21.25 (56)
	14.53		16.32		18.00		20.32			22.07	11	20.50 (54)	23.39	37	22.04 (58)
10	09.59		08.35		07.00		06.10			04.26		20.42 (54)	02.57		21.26 (56)
	14.56		16.35		18.03		20.35			22.10	5	20.47 (54)	23.41	39	22.05 (58)
11	09.57		08.31		06.56		06.06			04.22			02.56		21.26 (56)
	14.59		16.38		18.06		20.38			22.13			23.43	41	22.07 (58)
12	09.55		08.28		06.53		06.03			04.19			02.54		21.26 (56)
	15.02		16.42		18.09		20.42			22.16			23.45	41	22.07 (58)
13	09.53		08.25		06.49		05.59			04.16			02.53		21.26 (56)
	15.04		16.45		18.12		20.45			22.20			23.47	42	22.08 (58)
14	09.51		08.22		06.46		05.56			04.12			02.52		21.27 (56)
	15.07		16.48		18.15		20.48			22.23			23.48	42	22.09 (58)
15	09.49		08.18		06.42		05.52			04.09		21.31 (56)	02.51		21.26 (56)
	15.10		16.51		18.18		20.51			22.26	4	21.35 (56)	23.50	44	22.10 (58)
16	09.47		08.15		06.38		05.48			04.06		21.29 (56)	02.50		21.27 (56)
	15.13		16.55		18.21		20.54			22.29	9	21.38 (56)	23.51	44	22.11 (58)
17	09.44		08.12		06.35		05.45			04.03		21.27 (56)	02.49		21.28 (56)
	15.16		16.58		18.24		20.57			22.33	14	21.41 (56)	23.52	43	22.11 (58)
18	09.42		08.08		06.31		05.41			03.59		21.27 (56)	02.49		21.28 (56)
	15.19		17.01		18.27		21.00			22.36	17	21.44 (56)	23.53	44	22.12 (58)
19	09.39		08.05		06.28		05.38			03.56		21.25 (56)	02.49		21.27 (56)
	15.23		17.04		18.30		21.03			22.39	21	21.46 (56)	23.54	44	22.11 (58)
20	09.37		08.02		06.24		05.34			03.53		21.25 (56)	02.49		21.29 (56)
	15.26		17.07		18.33		21.06			22.42	22	21.47 (56)	23.54	44	22.13 (58)
21	09.34		07.58		06.21		05.31			03.50		21.24 (56)	02.49		21.29 (56)
	15.29		17.11		18.36		21.09			22.46	23	21.47 (56)	23.55	44	22.13 (58)
22	09.32		07.55		06.17		05.27			03.47		21.24 (56)	02.49		21.29 (56)
	15.32		17.14		18.39		21.12			22.49	24	21.48 (56)	23.55	44	22.13 (58)
23	09.29		07.52		06.14		05.24			03.44		21.23 (56)	02.49		21.28 (56)
	15.35		17.17		18.42		21.15			22.52	26	21.49 (56)	23.55	45	22.13 (58)
24	09.26		07.48		06.10		05.20			03.41		21.23 (56)	02.50		21.29 (56)
	15.39		17.20		18.45		21.19			22.55	27	21.50 (56)	23.55	44	22.13 (58)
25	09.23		07.45		06.07		05.17		20.40 (54)	03.38		21.22 (56)	02.51		21.29 (56)
	15.42		17.23		18.48		21.22	1	20.41 (54)	22.58	27	21.49 (56)	23.54	44	22.13 (58)
26	09.21		07.41		06.03		05.13		20.39 (54)	03.35		21.22 (56)	02.52		21.29 (56)
	15.45		17.26		18.51		21.25	5	20.44 (54)	23.01	28	21.50 (56)	23.54	44	22.13 (58)
27	09.18		07.38		05.59		05.10		20.37 (54)	03.32		21.22 (56)	02.53		21.30 (56)
	15.49		17.29		18.54		21.28	9	20.46 (54)	23.04	28	21.50 (56)	23.53	43	22.13 (58)
28	09.15		07.34		05.56		05.06		20.36 (54)	03.29		21.22 (56)	02.54		21.30 (56)
	15.52		17.33		18.57		21.31	13	20.49 (54)	23.07	28	21.50 (56)	23.52	43	22.13 (58)
29	09.12				06.52		05.03		20.35 (54)	03.27		21.22 (56)	02.56		21.29 (56)
	15.55				20.00		21.34	17	20.52 (54)	23.10	28	21.50 (56)	23.51	43	22.12 (58)
30	09.09				06.49		05.00		20.35 (54)	03.24		21.23 (56)	02.57		21.29 (56)
	15.58				20.03		21.38	19	20.54 (54)	23.13	28	21.51 (56)	23.50	42	22.11 (58)
31	09.06				06.45					03.21		21.23 (56)			
	16.02				20.06					23.16	28	21.51 (56)			
Potential sun hours	171		238		363		451			570			624		
Total, worst case								64			546			1168	
Sun reduction								0,41			0,47			0,48	
Oper. time red.								0,99			0,99			0,99	
Wind dir. red.								0,64			0,64			0,64	
Total reduction								0,26			0,30			0,30	
Total, real								17			162			355	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59		21.30 (56)	04.24		06.00	07.26	08.00	09.35
	23.49	41	22.11 (58)	22.26		20.39	18.52	16.06	14.42
2	03.01		21.30 (56)	04.27		06.02	07.29	08.03	09.38
	23.47	40	22.10 (58)	22.23		20.35	18.49	16.03	14.40
3	03.01		21.30 (56)	04.30	20.51 (54)	06.05	07.32	08.06	09.40
	23.46	38	22.09 (58)	22.20	7	20.58 (54)	20.32	18.45	16.00	14.38
4	03.03		21.30 (56)	04.34	20.49 (54)	06.08	07.35	08.10	09.43
	23.44	35	22.07 (58)	22.16	12	21.01 (54)	20.28	18.42	15.57	14.36
5	03.05		21.30 (56)	04.37	20.47 (54)	06.11	07.38	08.13	09.46
	23.42	27	21.57 (56)	22.13	14	21.01 (54)	20.25	18.38	15.53	14.35
6	03.07		21.30 (56)	04.40	20.46 (54)	06.14	07.40	08.16	09.48
	23.40	27	21.57 (56)	22.10	16	21.02 (54)	20.21	18.35	15.50	14.33
7	03.10		21.30 (56)	04.43	20.45 (54)	06.17	07.43	08.19	09.51
	23.38	28	21.58 (56)	22.06	18	21.03 (54)	20.18	18.31	15.47	14.31
8	03.12		21.31 (56)	04.46	20.44 (54)	06.20	07.46	08.22	09.53
	23.36	28	21.59 (56)	22.03	19	21.03 (54)	20.14	18.28	15.44	14.30
9	03.15		21.30 (56)	04.49	20.44 (54)	06.23	07.49	08.26	09.55
	23.34	28	21.58 (56)	21.59	19	21.03 (54)	20.11	18.24	15.41	14.28
10	03.17		21.30 (56)	04.53	20.44 (54)	06.26	07.52	08.29	09.57
	23.31	28	21.58 (56)	21.56	20	21.04 (54)	20.07	18.21	15.38	14.27
11	03.20		21.31 (56)	04.56	20.44 (54)	06.29	07.55	08.32	09.59
	23.29	28	21.59 (56)	21.53	20	21.04 (54)	20.03	18.17	15.35	14.26
12	03.23		21.31 (56)	04.59	20.43 (54)	06.31	07.58	08.35	10.01
	23.26	28	21.59 (56)	21.49	20	21.03 (54)	20.00	18.14	15.32	14.25
13	03.25		21.31 (56)	05.02	20.43 (54)	06.34	08.01	08.39	10.03
	23.24	28	21.59 (56)	21.46	19	21.02 (54)	19.56	18.10	15.29	14.24
14	03.28		21.31 (56)	05.05	20.44 (54)	06.37	08.04	08.42	10.05
	23.21	28	21.59 (56)	21.42	15	20.59 (54)	19.53	18.07	15.26	14.23
15	03.31		21.31 (56)	05.08	20.44 (54)	06.40	08.07	08.45	10.06
	23.18	28	21.59 (56)	21.39	12	20.56 (54)	19.49	18.04	15.23	14.23
16	03.34		21.31 (56)	05.11	20.44 (54)	06.43	08.10	08.48	10.08
	23.16	28	21.59 (56)	21.35	8	20.52 (54)	19.46	18.00	15.20	14.22
17	03.37		21.32 (56)	05.14	20.45 (54)	06.46	08.13	08.52	10.09
	23.13	28	22.00 (56)	21.32	5	20.50 (54)	19.42	17.57	15.17	14.22
18	03.40		21.32 (56)	05.17		06.49	08.16	08.55	10.10
	23.10	27	21.59 (56)	21.28		19.39	17.53	15.14	14.22
19	03.43		21.32 (56)	05.21		06.51	08.19	08.58	10.12
	23.07	27	21.59 (56)	21.25		19.35	17.50	15.12	14.22
20	03.46		21.32 (56)	05.24		06.54	08.22	09.01	10.12
	23.04	26	21.58 (56)	21.21		19.31	17.46	15.09	14.22
21	03.49		21.34 (56)	05.27		06.57	08.25	09.05	10.13
	23.01	25	21.59 (56)	21.18		19.28	17.43	15.06	14.22
22	03.52		21.34 (56)	05.30		07.00	08.28	09.08	10.14
	22.58	24	21.58 (56)	21.14		19.24	17.40	15.03	14.23
23	03.55		21.35 (56)	05.33		07.03	08.32	09.11	10.14
	22.55	23	21.58 (56)	21.11		19.21	17.36	15.01	14.23
24	03.59		21.35 (56)	05.36		07.06	08.35	09.14	10.15
	22.52	22	21.57 (56)	21.07		19.17	17.33	14.58	14.24
25	04.02		21.36 (56)	05.39		07.09	07.38	09.17	10.15
	22.49	19	21.55 (56)	21.04		19.14	16.29	14.56	14.25
26	04.05		21.37 (56)	05.42		07.12	07.41	09.20	10.15
	22.46	15	21.52 (56)	21.00		19.10	16.26	14.53	14.26
27	04.08		21.39 (56)	05.45		07.14	07.44	09.23	10.15
	22.43	11	21.50 (56)	20.57		19.07	16.23	14.51	14.27
28	04.11		21.40 (56)	05.48		07.17	07.47	09.26	10.14
	22.39	7	21.47 (56)	20.53		19.03	16.19	14.49	14.28
29	04.14		21.43 (56)	05.51		07.20	07.50	09.29	10.14
	22.36	2	21.45 (56)	20.50		19.00	16.16	14.46	14.29
30	04.18			05.54		07.23	07.54	09.32	10.14
	22.33			20.46		18.56	16.13	14.44	14.31
31	04.21			05.57			07.57		10.13
	22.30			20.43			16.10		14.33
Potential sun hours	608			508		393	305	198	137
Total, worst case		744			224				
Sun reduction		0,38			0,31				
Oper. time red.		0,99			0,99				
Wind dir. red.		0,64			0,64				
Total reduction		0,24			0,20				
Total, real		178			44				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102**Shadow receptor:** E - Lomarakennus E (Kellokankaan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June
1	10.12	09.03	07.31		06.42		04.56	03.18
	14.35	16.05	17.35		20.08		21.41	23.19
2	10.11	09.00	07.27		06.38		04.52	03.16
	14.37	16.08	17.39		20.11		21.44	23.22
3	10.10	08.57	07.24		06.34		04.49	03.13
	14.39	16.12	17.42		20.14		21.47	23.25
4	10.09	08.54	07.20		06.31		04.46	03.11
	14.41	16.15	17.45		20.17		21.50	23.27
5	10.07	08.51	07.17		06.27		19.42 (59)	04.42	03.08
	14.43	16.18	17.48		20.20	2	19.44 (59)	21.54	23.30
6	10.06	08.47	07.13		06.24		19.40 (60)	04.39	03.06
	14.45	16.22	17.51		20.23	7	19.47 (59)	21.57	23.33
7	10.04	08.44	07.10		06.20		19.37 (60)	04.35	03.04
	14.48	16.25	17.54		20.26	13	19.50 (59)	22.00	23.35
8	10.03	08.41	07.06		17.19 (58)	06.17		19.34 (60)	04.32	03.02
	14.50	16.28	17.57	1	17.20 (58)	20.29	18	19.52 (59)	22.03	23.37
9	10.01	08.38	07.03		17.17 (58)	06.13		19.33 (60)	04.29	03.00
	14.53	16.31	18.00	7	17.24 (58)	20.32	23	19.56 (59)	22.07	23.39
10	09.59	08.35	06.59		17.15 (58)	06.10		19.31 (60)	04.25	02.57
	14.56	16.35	18.03	12	17.27 (58)	20.35	25	19.56 (59)	22.10	23.42
11	09.57	08.31	06.56		17.15 (58)	06.06		19.31 (60)	04.22	02.55
	14.58	16.38	18.06	16	17.31 (58)	20.38	25	19.56 (59)	22.13	23.44
12	09.55	08.28	06.52		17.13 (61)	06.02		19.29 (60)	04.19	02.54
	15.01	16.41	18.09	20	17.33 (58)	20.41	26	19.55 (59)	22.16	23.45
13	09.53	08.25	06.49		17.11 (61)	05.59		19.29 (60)	04.15	02.52
	15.04	16.45	18.12	22	17.33 (58)	20.44	26	19.55 (59)	22.20	23.47
14	09.51	08.22	06.45		17.09 (61)	05.55		19.29 (60)	04.12	02.51
	15.07	16.48	18.15	25	17.34 (58)	20.48	26	19.55 (60)	22.23	23.49
15	09.49	08.18	06.42		17.07 (61)	05.52		19.28 (60)	04.09	02.50
	15.10	16.51	18.18	27	17.34 (61)	20.51	26	19.54 (60)	22.26	23.50
16	09.47	08.15	06.38		17.06 (61)	05.48		19.28 (60)	04.06	02.50
	15.13	16.54	18.21	28	17.34 (61)	20.54	26	19.54 (60)	22.29	23.51
17	09.44	08.12	06.35		17.05 (61)	05.45		19.29 (60)	04.02	02.49
	15.16	16.58	18.24	30	17.35 (61)	20.57	25	19.54 (60)	22.33	23.52
18	09.42	08.08	06.31		17.04 (61)	05.41		19.29 (60)	03.59	02.48
	15.19	17.01	18.27	31	17.35 (61)	21.00	23	19.52 (60)	22.36	23.53
19	09.39	08.05	06.28		17.04 (61)	05.38		19.29 (60)	03.56	02.48
	15.22	17.04	18.30	32	17.36 (61)	21.03	23	19.52 (60)	22.39	23.54
20	09.37	08.02	06.24		17.03 (61)	05.34		19.30 (60)	03.53	02.48
	15.26	17.07	18.33	32	17.35 (61)	21.06	21	19.51 (60)	22.42	23.55
21	09.34	07.58	06.21		17.02 (61)	05.31		19.32 (60)	03.50	02.48
	15.29	17.10	18.36	32	17.34 (61)	21.09	18	19.50 (60)	22.46	23.55
22	09.32	07.55	06.17		17.03 (61)	05.27		19.33 (60)	03.47	02.48
	15.32	17.14	18.39	32	17.35 (61)	21.12	14	19.47 (60)	22.49	23.55
23	09.29	07.51	06.14		17.02 (61)	05.24		19.36 (60)	03.44	02.49
	15.35	17.17	18.42	32	17.34 (61)	21.15	8	19.44 (60)	22.52	23.55
24	09.26	07.48	06.10		17.03 (61)	05.20			03.41	02.50
	15.38	17.20	18.45	30	17.33 (61)	21.18			22.55	23.55
25	09.23	07.45	06.06		17.03 (61)	05.17			03.38	02.50
	15.42	17.23	18.48	29	17.32 (61)	21.22			22.58	23.55
26	09.21	07.41	06.03		17.04 (61)	05.13			03.35	02.51
	15.45	17.26	18.51	27	17.31 (61)	21.25			23.01	23.54
27	09.18	07.38	05.59		17.04 (61)	05.10			03.32	02.52
	15.48	17.29	18.54	26	17.30 (61)	21.28			23.04	23.53
28	09.15	07.34	05.56		17.06 (61)	05.06			03.29	02.54
	15.52	17.32	18.57	23	17.29 (61)	21.31			23.07	23.52
29	09.12		06.52		18.07 (61)	05.03			03.26	02.55
	15.55		19.59	19	18.26 (61)	21.34			23.10	23.51
30	09.09		06.49		18.09 (61)	04.59			03.23	02.57
	15.58		20.02	14	18.23 (61)	21.37			23.13	23.50
31	09.06		06.45		18.15 (61)				03.21	
	16.02		20.05	3	18.18 (61)				23.16	
Potential sun hours	171	238	363		451		570	624
Total, worst case				550		375			
Sun reduction				0,32		0,41			
Oper. time red.				0,99		0,99			
Wind dir. red.				0,60		0,61			
Total reduction				0,19		0,25			
Total, real				105		93			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** E - Lomarakennus E (Kellokankaan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November	December
1	02.59	04.24		05.59		19.30 (60)	07.26	17.52 (61)	08.00	09.35
	23.49	22.26		20.39	25	19.55 (59)	18.52	21 18.13 (58)	16.06	14.42
2	03.01	04.27		06.02		19.30 (60)	07.29	17.53 (58)	08.03	09.38
	23.47	22.23		20.35	25	19.55 (59)	18.49	18 18.11 (58)	16.03	14.40
3	03.01	04.30		06.05		19.30 (60)	07.32	17.53 (58)	08.06	09.40
	23.46	22.20		20.32	23	19.53 (59)	18.45	14 18.07 (58)	16.00	14.38
4	03.03	04.33		06.08		19.31 (60)	07.35	17.54 (58)	08.09	09.43
	23.44	22.16		20.28	19	19.50 (59)	18.42	9 18.03 (58)	15.56	14.36
5	03.05	04.37		06.11		19.33 (60)	07.37	17.55 (58)	08.13	09.46
	23.42	22.13		20.25	13	19.46 (59)	18.38	5 18.00 (58)	15.53	14.34
6	03.07	04.40		06.14		19.36 (60)	07.40		08.16	09.48
	23.40	22.10		20.21	7	19.43 (59)	18.35		15.50	14.33
7	03.09	04.43		06.17		19.38 (59)	07.43		08.19	09.51
	23.38	22.06		20.18	2	19.40 (59)	18.31		15.47	14.31
8	03.12	04.46		06.20			07.46		08.22	09.53
	23.36	22.03		20.14			18.28		15.44	14.30
9	03.14	04.49		06.23			07.49		08.26	09.55
	23.34	21.59		20.11			18.24		15.41	14.28
10	03.17	04.52		06.26			07.52		08.29	09.57
	23.31	21.56		20.07			18.21		15.38	14.27
11	03.19	04.56		06.28			07.55		08.32	09.59
	23.29	21.53		20.03			18.17		15.35	14.26
12	03.22	04.59		06.31			07.58		08.35	10.01
	23.26	21.49		20.00			18.14		15.32	14.25
13	03.25	05.02		06.34		18.01 (61)	08.01		08.39	10.03
	23.24	21.46		19.56	13	18.14 (61)	18.10		15.29	14.24
14	03.28	05.05		06.37		17.58 (61)	08.04		08.42	10.05
	23.21	21.42		19.53	18	18.16 (61)	18.07		15.26	14.23
15	03.31	05.08		06.40		17.56 (61)	08.07		08.45	10.07
	23.18	21.39		19.49	22	18.18 (61)	18.03		15.23	14.23
16	03.34	05.11		06.43		17.53 (61)	08.10		08.48	10.08
	23.16	21.35		19.46	25	18.18 (61)	18.00		15.20	14.22
17	03.37	05.14		06.46		17.52 (61)	08.13		08.52	10.09
	23.13	21.32		19.42	27	18.19 (61)	17.56		15.17	14.22
18	03.40	05.17		06.48		17.51 (61)	08.16		08.55	10.11
	23.10	21.28		19.38	29	18.20 (61)	17.53		15.14	14.22
19	03.43	05.20		06.51		17.50 (61)	08.19		08.58	10.12
	23.07	21.25		19.35	30	18.20 (61)	17.50		15.11	14.21
20	03.46	05.23	19.41 (60)	06.54		17.49 (61)	08.22		09.01	10.13
	23.04	21.21	9 19.50 (60)	19.31	31	18.20 (61)	17.46		15.09	14.22
21	03.49	05.26	19.38 (60)	06.57		17.48 (61)	08.25		09.05	10.13
	23.01	21.18	15 19.53 (60)	19.28	32	18.20 (61)	17.43		15.06	14.22
22	03.52	05.29	19.36 (60)	07.00		17.47 (61)	08.28		09.08	10.14
	22.58	21.14	18 19.54 (60)	19.24	32	18.19 (61)	17.39		15.03	14.22
23	03.55	05.33	19.34 (60)	07.03		17.47 (61)	08.31		09.11	10.14
	22.55	21.11	21 19.55 (60)	19.21	32	18.19 (61)	17.36		15.01	14.23
24	03.58	05.36	19.33 (60)	07.06		17.47 (61)	08.35		09.14	10.15
	22.52	21.07	22 19.55 (60)	19.17	32	18.19 (61)	17.33		14.58	14.23
25	04.01	05.39	19.32 (60)	07.09		17.47 (61)	07.38		09.17	10.15
	22.49	21.04	24 19.56 (60)	19.14	31	18.18 (61)	16.29		14.56	14.24
26	04.05	05.42	19.32 (60)	07.11		17.47 (61)	07.41		09.20	10.15
	22.46	21.00	25 19.57 (60)	19.10	30	18.17 (61)	16.26		14.53	14.25
27	04.08	05.45	19.30 (60)	07.14		17.48 (61)	07.44		09.23	10.15
	22.43	20.57	26 19.56 (60)	19.06	28	18.16 (61)	16.23		14.51	14.26
28	04.11	05.48	19.30 (60)	07.17		17.48 (61)	07.47		09.26	10.15
	22.39	20.53	26 19.56 (60)	19.03	27	18.15 (61)	16.19		14.48	14.28
29	04.14	05.50	19.30 (60)	07.20		17.49 (61)	07.50		09.29	10.14
	22.36	20.50	26 19.56 (60)	18.59	25	18.14 (61)	16.16		14.46	14.29
30	04.17	05.53	19.30 (60)	07.23		17.50 (61)	07.53		09.32	10.14
	22.33	20.46	26 19.56 (59)	18.56	24	18.14 (58)	16.13		14.44	14.31
31	04.21	05.56	19.29 (60)				07.57			10.13
	22.30	20.43	26 19.55 (59)				16.09			14.32
Potential sun hours	609	509		393			305		198	137
Total, worst case			264		602			67		
Sun reduction			0,31		0,33			0,35		
Oper. time red.			0,99		0,99			0,99		
Wind dir. red.			0,61		0,60			0,59		
Total reduction			0,19		0,20			0,21		
Total, real			50		118			14		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201103 **Shadow receptor:** F - Asuinrakennus F (Ollilantie 112)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	10.34 (49)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	10.12 (49)	09.36	11.32 (45)
	14.34		16.05 50	13.31 (40)	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06 8	10.20 (49)	14.42 32	13.05 (40)
2	10.12		09.01	10.34 (49)	07.28	06.38	04.52	03.15	03.00	04.27	06.03	07.29	08.04	10.09 (49)	09.39	11.33 (45)
	14.36		16.08 37	13.29 (40)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03 14	10.23 (49)	14.40 29	13.05 (40)
3	10.11		08.58	10.35 (49)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	10.08 (49)	09.41	11.34 (45)
	14.38		16.12 27	13.25 (40)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00 17	10.25 (49)	14.38 24	13.03 (40)
4	10.10		08.54	10.35 (49)	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	10.07 (49)	09.44	11.35 (45)
	14.41		16.15 23	10.58 (49)	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57 19	10.26 (49)	14.36 17	13.01 (40)
5	10.08	11.54 (45)	08.51	10.35 (49)	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	10.06 (49)	09.47	11.37 (45)
	14.43 5	11.59 (45)	16.18 23	10.58 (49)	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53 21	10.27 (49)	14.34 11	11.48 (45)
6	10.07	11.52 (45)	08.48	10.36 (49)	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	10.06 (49)	09.49	11.39 (45)
	14.45 9	12.01 (45)	16.22 21	10.57 (49)	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50 22	10.28 (49)	14.32 9	11.48 (45)
7	10.05	11.52 (45)	08.45	10.38 (49)	07.10	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	10.05 (49)	09.52	11.41 (45)
	14.48 11	12.03 (45)	16.25 19	10.57 (49)	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47 24	10.29 (49)	14.31 5	11.46 (45)
8	10.04	11.52 (45)	08.42	10.39 (49)	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	10.05 (49)	09.54	
	14.50 16	13.17 (40)	16.28 16	10.55 (49)	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44 29	12.56 (40)	14.29	
9	10.02	11.50 (45)	08.39	10.40 (49)	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	10.05 (49)	09.56	
	14.53 23	13.19 (40)	16.32 13	10.53 (49)	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41 37	13.00 (40)	14.28	
10	10.00	11.50 (45)	08.35	10.43 (49)	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	10.05 (49)	09.58	
	14.55 28	13.21 (40)	16.35 7	10.50 (49)	18.03	20.36	22.11	23.43	23.33	21.57	20.07	18.21	15.38 49	13.01 (40)	14.27	
11	09.58	11.50 (45)	08.32		06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.05 (49)	10.01	
	14.58 31	13.23 (40)	16.38		18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35 57	13.03 (40)	14.26	
12	09.56	11.50 (45)	08.29		06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	10.05 (49)	10.02	
	15.01 35	13.25 (40)	16.42		18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32 63	13.04 (40)	14.25	
13	09.54	11.49 (45)	08.26		06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.02	08.39	10.05 (49)	10.04	
	15.04 39	13.26 (40)	16.45		18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29 65	13.04 (40)	14.24	
14	09.52	11.50 (45)	08.22		06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.05	08.43	10.06 (49)	10.06	
	15.07 39	13.27 (40)	16.48		18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26 67	13.06 (40)	14.23	
15	09.50	11.49 (45)	08.19		06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.08	08.46	10.07 (49)	10.08	
	15.10 42	13.28 (40)	16.51		18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23 68	13.06 (40)	14.22	
16	09.47	11.49 (45)	08.16		06.39	05.49	04.05	02.49	03.33	05.11	06.43	08.11	08.49	10.07 (49)	10.09	
	15.13 44	13.29 (40)	16.55		18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20 68	13.06 (40)	14.22	
17	09.45	11.50 (45)	08.12		06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	10.09 (49)	10.10	
	15.16 45	13.30 (40)	16.58		18.24	20.57	22.34	23.54	23.14	21.32	19.42	17.57	15.17 66	13.07 (40)	14.21	
18	09.43	11.49 (45)	08.09		06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	10.09 (49)	10.12	
	15.19 47	13.30 (40)	17.01		18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14 67	13.07 (40)	14.21	
19	09.40	11.49 (45)	08.06		06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	10.10 (49)	10.13	
	15.22 49	13.31 (40)	17.04		18.30	21.03	22.40	23.56	23.08	21.25	19.35	17.50	15.11 65	13.07 (40)	14.21	
20	09.38	11.50 (45)	08.02		06.25	05.34	03.53	02.47	03.46	05.24	06.55	08.23	09.02	10.13 (49)	10.14	
	15.25 48	13.31 (40)	17.07		18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.09 61	13.07 (40)	14.21	
21	09.35	10.39 (49)	07.59		06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	10.15 (49)	10.14	
	15.29 58	13.32 (40)	17.11		18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06 58	13.08 (40)	14.22	
22	09.32	10.38 (49)	07.55		06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	11.26 (45)	10.15	
	15.32 61	13.32 (40)	17.14		18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03 47	13.07 (40)	14.22	
23	09.30	10.36 (49)	07.52		06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	11.26 (45)	10.15	
	15.35 65	13.33 (40)	17.17		18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01 49	13.08 (40)	14.22	
24	09.27	10.36 (49)	07.49		06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	11.27 (45)	10.16	
	15.38 66	13.33 (40)	17.20		18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58 47	13.08 (40)	14.23	
25	09.24	10.35 (49)	07.45		06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	11.27 (45)	10.16	
	15.42 66	13.33 (40)	17.23		18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.55 45	13.07 (40)	14.24	
26	09.21	10.34 (49)	07.42		06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	11.28 (45)	10.16	
	15.45 68	13.33 (40)	17.26		18.51	21.25	23.02	23.56	22.47	21.01	19.10	16.26	14.53 43	13.07 (40)	14.25	
27	09.18	10.34 (49)	07.38		06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	11.28 (45)	10.16	
	15.48 67	13.33 (40)	17.30		18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51 42	13.07 (40)	14.26	
28	09.16	10.34 (49)	07.35		05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	11.29 (45)	10.16	
	15.52 67	13.33 (40)	17.33		18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.19	14.48 39	13.06 (40)	14.27	
29	09.13	10.33 (49)			06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	11.30 (45)	10.15	
	15.55 64	13.32 (40)			20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46 37	13.06 (40)	14.29	
30	09.10	10.33 (49)			06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	11.31 (45)	10.15	
	15.58 61	13.32 (40)			20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44 35	13.06 (40)	14.30	
31	09.07	10.33 (49)			06.45		03.20		04.20	05.57		07.57			10.14	
	16.02 57	13.31 (40)			20.06		23.17		22.30	20.43		16.10			14.32	
Potential sun hours	170		238		363	451	570	625	609	509	393	305	198		136	
Total, worst case		1211		236										1329		127
Sun reduction		0,19		0,33										0,24		0,22
Oper. time red.		0,99		0,99										0,99		0,99
Wind dir. red.		0,66		0,66										0,66		0,66
Total reduction		0,12		0,22										0,16		0,14
Total, real		147		52										208		18

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** G - Lomarakennus G (Ollilantie, Siliakuru)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January			February			March	April	May	June
1	10.13			09.04		10.08 (45)	07.31	06.42	04.56	03.18
	14.34			16.05	57	12.00 (40)	17.36	20.09	21.41	23.20
2	10.12			09.01		10.08 (45)	07.28	06.38	04.53	03.15
	14.36			16.08	56	12.00 (40)	17.39	20.12	21.45	23.23
3	10.11		12.19 (39)	08.58		10.07 (45)	07.24	06.35	04.49	03.13
	14.38	14	12.33 (39)	16.12	56	11.59 (40)	17.42	20.15	21.48	23.26
4	10.10		12.19 (39)	08.54		10.07 (45)	07.21	06.31	04.46	03.11
	14.41	15	12.34 (39)	16.15	55	11.58 (40)	17.45	20.18	21.51	23.29
5	10.08		12.19 (39)	08.51		10.07 (45)	07.17	06.28	04.42	03.08
	14.43	16	12.35 (39)	16.18	55	11.58 (40)	17.48	20.21	21.54	23.31
6	10.07		12.19 (39)	08.48		10.07 (45)	07.14	06.24	04.39	03.06
	14.45	17	12.36 (39)	16.22	53	11.57 (40)	17.51	20.24	21.58	23.34
7	10.05		12.19 (39)	08.45		10.08 (45)	07.11	06.21	04.35	03.04
	14.48	18	12.37 (39)	16.25	50	11.56 (40)	17.54	20.27	22.01	23.36
8	10.04		12.19 (39)	08.42		10.08 (45)	07.07	06.17	04.32	03.02
	14.50	18	12.37 (39)	16.28	47	11.55 (40)	17.57	20.30	22.04	23.39
9	10.02		12.19 (39)	08.39		10.08 (45)	07.03	06.13	04.29	03.00
	14.53	19	12.38 (39)	16.32	43	11.53 (40)	18.00	20.33	22.07	23.41
10	10.00		12.19 (39)	08.35		10.08 (45)	07.00	06.10	04.25	02.56
	14.56	20	12.39 (39)	16.35	35	11.49 (40)	18.03	20.36	22.11	23.43
11	09.58		12.19 (39)	08.32		10.09 (45)	06.56	06.06	04.22	02.55
	14.58	26	13.35 (35)	16.38	23	10.32 (45)	18.06	20.39	22.14	23.45
12	09.56		11.34 (40)	08.29		09.09 (49)	06.53	06.03	04.19	02.53
	15.01	41	13.41 (35)	16.42	26	10.32 (45)	18.09	20.42	22.17	23.47
13	09.54		11.32 (40)	08.26		09.05 (49)	06.49	05.59	04.15	02.52
	15.04	50	13.46 (35)	16.45	31	10.31 (45)	18.12	20.45	22.20	23.48
14	09.52		11.31 (40)	08.22		09.01 (49)	06.46	05.56	04.12	02.51
	15.07	55	13.47 (35)	16.48	32	10.29 (45)	18.15	20.48	22.24	23.50
15	09.50		11.30 (40)	08.19		09.00 (49)	06.42	05.52	04.09	02.50
	15.10	59	13.48 (35)	16.51	29	10.26 (45)	18.18	20.51	22.27	23.51
16	09.47		11.29 (40)	08.16		09.00 (49)	06.39	05.49	04.06	02.49
	15.13	64	13.49 (35)	16.55	20	09.20 (49)	18.21	20.54	22.30	23.53
17	09.45		11.29 (40)	08.12		08.59 (49)	06.35	05.45	04.02	02.48
	15.16	65	13.50 (35)	16.58	21	09.20 (49)	18.24	20.57	22.34	23.54
18	09.43		11.28 (40)	08.09		08.58 (49)	06.32	05.42	03.59	02.48
	15.19	67	13.50 (35)	17.01	22	09.20 (49)	18.27	21.00	22.37	23.55
19	09.40		11.27 (40)	08.06		08.58 (49)	06.28	05.38	03.56	02.48
	15.22	69	13.50 (35)	17.04	23	09.21 (49)	18.30	21.04	22.40	23.55
20	09.38		11.27 (40)	08.02		08.58 (49)	06.25	05.34	03.53	02.48
	15.26	71	13.51 (35)	17.08	23	09.21 (49)	18.33	21.07	22.43	23.56
21	09.35		11.27 (40)	07.59		08.58 (49)	06.21	05.31	03.50	02.48
	15.29	71	13.51 (35)	17.11	23	09.21 (49)	18.36	21.10	22.47	23.56
22	09.32		11.27 (40)	07.55		08.58 (49)	06.18	05.27	03.47	02.48
	15.32	72	13.52 (35)	17.14	22	09.20 (49)	18.39	21.13	22.50	23.57
23	09.30		11.27 (40)	07.52		08.59 (49)	06.14	05.24	03.44	02.48
	15.35	72	13.52 (35)	17.17	21	09.20 (49)	18.42	21.16	22.53	23.57
24	09.27		11.27 (40)	07.49		08.59 (49)	06.10	05.20	03.41	02.49
	15.39	69	13.52 (35)	17.20	20	09.19 (49)	18.45	21.19	22.56	23.56
25	09.24		11.27 (40)	07.45		09.00 (49)	06.07	05.17	03.38	02.50
	15.42	69	13.52 (35)	17.23	17	09.17 (49)	18.48	21.22	22.59	23.56
26	09.21		10.14 (45)	07.42		09.02 (49)	06.03	05.13	03.35	02.51
	15.45	76	13.52 (35)	17.26	14	09.16 (49)	18.51	21.25	23.02	23.55
27	09.18		10.12 (45)	07.38		09.04 (49)	06.00	05.10	03.32	02.52
	15.48	76	13.52 (35)	17.30	9	09.13 (49)	18.54	21.29	23.05	23.55
28	09.16		10.11 (45)	07.35			05.56	05.06	03.29	02.53
	15.52	72	13.51 (35)	17.33			18.57	21.32	23.09	23.54
29	09.13		10.09 (45)				06.53	05.03	03.26	02.55
	15.55	68	13.50 (35)				20.00	21.35	23.12	23.53
30	09.10		10.08 (45)				06.49	04.59	03.23	02.56
	15.58	67	13.49 (35)				20.03	21.38	23.15	23.52
31	09.07		10.08 (45)				06.46		03.21	
	16.02	64	13.47 (35)				20.06		23.17	
Potential sun hours	171			238			363	451	570	625
Total, worst case		1480			883					
Sun reduction		0,19			0,33					
Oper. time red.		0,99			0,99					
Wind dir. red.		0,66			0,66					
Total reduction		0,12			0,22					
Total, real		180			192					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** G - Lomarakennus G (Ollilantie, Siliakuru)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October			November			December		
1	02.58		04.24		06.00		07.26			08.01		09.37 (45)	09.36		12.01 (39)
	23.50		22.27		20.40		18.53			16.06	37	11.19 (40)	14.42	26	13.17 (35)
2	03.00		04.27		06.03		07.29			08.04		09.37 (45)	09.39		12.02 (39)
	23.49		22.24		20.36		18.49			16.03	43	11.22 (40)	14.40	20	12.22 (39)
3	03.00		04.30		06.06		07.32			08.07		09.37 (45)	09.41		12.02 (39)
	23.47		22.20		20.32		18.46			16.00	49	11.25 (40)	14.38	20	12.22 (39)
4	03.02		04.33		06.08		07.35			08.10		09.37 (45)	09.44		12.03 (39)
	23.45		22.17		20.29		18.42			15.57	51	11.26 (40)	14.36	19	12.22 (39)
5	03.04		04.37		06.11		07.38			08.13		09.37 (45)	09.47		12.05 (39)
	23.43		22.14		20.25		18.39			15.53	53	11.27 (40)	14.34	17	12.22 (39)
6	03.07		04.40		06.14		07.41			08.17		09.37 (45)	09.49		12.05 (39)
	23.41		22.10		20.22		18.35			15.50	54	11.28 (40)	14.32	17	12.22 (39)
7	03.09		04.43		06.17		07.44			08.20		09.37 (45)	09.52		12.06 (39)
	23.39		22.07		20.18		18.32			15.47	56	11.29 (40)	14.31	16	12.22 (39)
8	03.11		04.46		06.20		07.47			08.23		09.38 (45)	09.54		12.07 (39)
	23.37		22.04		20.15		18.28			15.44	56	11.30 (40)	14.29	15	12.22 (39)
9	03.14		04.49		06.23		07.50			08.26		09.38 (45)	09.56		12.08 (39)
	23.35		22.00		20.11		18.25			15.41	57	11.30 (40)	14.28	14	12.22 (39)
10	03.17		04.53		06.26		07.53			08.30		09.39 (45)	09.58		
	23.32		21.57		20.07		18.21			15.38	56	11.31 (40)	14.27		
11	03.19		04.56		06.29		07.56			08.33		09.39 (45)	10.01		
	23.30		21.53		20.04		18.18			15.35	65	13.19 (35)	14.26		
12	03.22		04.59		06.32		07.59			08.36		09.40 (45)	10.02		
	23.28		21.50		20.00		18.14			15.32	67	13.21 (35)	14.25		
13	03.25		05.02		06.35		08.02			08.39		09.41 (45)	10.04		
	23.25		21.46		19.57		18.11			15.29	68	13.22 (35)	14.24		
14	03.28		05.05		06.37		08.05			08.43		09.43 (45)	10.06		
	23.22		21.43		19.53		18.07			15.26	74	13.24 (35)	14.23		
15	03.31		05.08		06.40		08.08		09.35 (49)	08.46		09.45 (45)	10.08		
	23.20		21.39		19.50		18.04	12	09.47 (49)	15.23	76	13.24 (35)	14.22		
16	03.33		05.11		06.43		08.11		09.33 (49)	08.49		09.47 (45)	10.09		
	23.17		21.36		19.46		18.00	15	09.48 (49)	15.20	76	13.25 (35)	14.22		
17	03.36		05.14		06.46		08.14		09.31 (49)	08.53		11.00 (40)	10.10		
	23.14		21.33		19.42		17.57	18	09.49 (49)	15.17	70	13.26 (35)	14.22		
18	03.40		05.17		06.49		08.17		09.31 (49)	08.56		11.01 (40)	10.12		
	23.11		21.29		19.39		17.53	20	09.51 (49)	15.14	69	13.26 (35)	14.21		
19	03.43		05.21		06.52		08.20		09.29 (49)	08.59		11.01 (40)	10.13		
	23.08		21.26		19.35		17.50	22	09.51 (49)	15.11	72	13.26 (35)	14.21		
20	03.46		05.24		06.55		08.23		09.28 (49)	09.02		11.02 (40)	10.14		
	23.05		21.22		19.32		17.47	23	09.51 (49)	15.09	72	13.27 (35)	14.21		
21	03.49		05.27		06.58		08.26		09.28 (49)	09.05		11.02 (40)	10.14		
	23.02		21.18		19.28		17.43	23	09.51 (49)	15.06	70	13.26 (35)	14.22		
22	03.52		05.30		07.00		08.29		09.28 (49)	09.09		11.03 (40)	10.15		
	22.59		21.15		19.25		17.40	23	09.51 (49)	15.03	71	13.27 (35)	14.22		
23	03.55		05.33		07.03		08.32		09.28 (49)	09.12		11.04 (40)	10.15		
	22.56		21.11		19.21		17.36	23	09.51 (49)	15.01	69	13.27 (35)	14.23		
24	03.58		05.36		07.06		08.35		09.28 (49)	09.15		11.06 (40)	10.16		
	22.53		21.08		19.18		17.33	22	09.50 (49)	14.58	67	13.28 (35)	14.23		
25	04.01		05.39		07.09		07.38		08.29 (49)	09.18		11.06 (40)	10.16		
	22.50		21.04		19.14		16.30	21	08.50 (49)	14.56	66	13.27 (35)	14.24		
26	04.05		05.42		07.12		07.41		08.29 (49)	09.21		11.07 (40)	10.16		
	22.47		21.01		19.10		16.26	22	09.51 (45)	14.53	63	13.27 (35)	14.25		
27	04.08		05.45		07.15		07.45		08.30 (49)	09.24		11.09 (40)	10.16		
	22.43		20.57		19.07		16.23	31	09.57 (45)	14.51	59	13.27 (35)	14.26		
28	04.11		05.48		07.18		07.48		08.32 (49)	09.27		11.10 (40)	10.16		
	22.40		20.54		19.03		16.20	32	09.59 (45)	14.48	56	13.27 (35)	14.28		
29	04.14		05.51		07.21		07.51		08.35 (49)	09.30		11.12 (40)	10.15		
	22.37		20.50		19.00		16.16	30	10.00 (45)	14.46	50	13.26 (35)	14.29		
30	04.17		05.54		07.23		07.54		08.39 (49)	09.33		11.15 (40)	10.15		
	22.34		20.47		18.56		16.13	25	10.02 (45)	14.44	41	13.23 (35)	14.30		
31	04.21		05.57				07.57		09.39 (45)				10.14		
	22.30		20.43				16.10	24	10.03 (45)				14.32		
Potential sun hours	609		509		393		305			198			136		
Total, worst case								386			1833			164	
Sun reduction								0,35			0,24			0,22	
Oper. time red.								0,99			0,99			0,99	
Wind dir. red.								0,65			0,66			0,67	
Total reduction								0,22			0,16			0,14	
Total, real								86			288			24	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** H - Asuinrakennus H (Pinolantie 406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June
1	10.13	09.04	07.32	06.43		04.57		03.19
	14.36	16.06	17.37	20.09		21.42		23.20
2	10.12	09.01	07.28	06.39		04.53		03.17
	14.38	16.09	17.40	20.12		21.45		23.23
3	10.11	08.58	07.25	06.36	07.08 (14)	04.50		03.14
	14.40	16.13	17.43	20.15	6 07.14 (14)	21.48		23.26
4	10.10	08.55	07.22	06.32	07.04 (14)	04.47		03.12
	14.42	16.16	17.46	20.18	11 07.15 (14)	21.51		23.29
5	10.09	08.52	07.18	06.28	07.01 (14)	04.43	05.23 (13)	03.09
	14.44	16.19	17.49	20.21	16 07.17 (14)	21.55	3 05.26 (13)	23.31
6	10.07	08.49	07.15	06.25	06.58 (14)	04.40	05.20 (13)	03.07
	14.46	16.23	17.52	20.24	19 07.17 (14)	21.58	7 05.27 (13)	23.34
7	10.06	08.45	07.11	06.21	06.57 (14)	04.36	05.17 (13)	03.05
	14.49	16.26	17.55	20.27	21 07.18 (14)	22.01	12 05.29 (13)	23.36
8	10.04	08.42	07.08	06.18	06.56 (14)	04.33	05.14 (13)	03.03
	14.51	16.29	17.58	20.30	21 07.17 (14)	22.04	15 05.29 (13)	23.38
9	10.02	08.39	07.04	06.14	06.56 (14)	04.30	05.11 (13)	03.01
	14.54	16.33	18.01	20.33	22 07.18 (14)	22.08	19 05.30 (13)	23.41
10	10.00	08.36	07.01	06.11	06.55 (14)	04.26	05.11 (13)	02.58
	14.57	16.36	18.04	20.36	22 07.17 (14)	22.11	20 05.31 (13)	23.43
11	09.58	08.33	06.57	06.07	06.56 (14)	04.23	05.11 (13)	02.56
	14.59	16.39	18.07	20.40	21 07.17 (14)	22.14	20 05.31 (13)	23.45
12	09.56	08.29	06.54	06.04	06.56 (14)	04.20	05.10 (13)	02.55
	15.02	16.42	18.10	20.43	20 07.16 (14)	22.18	21 05.31 (13)	23.47
13	09.54	08.26	06.50	06.00	06.56 (14)	04.16	05.10 (13)	02.53
	15.05	16.46	18.13	20.46	19 07.15 (14)	22.21	21 05.31 (13)	23.48
14	09.52	08.23	06.47	05.56	06.57 (14)	04.13	05.10 (13)	02.52
	15.08	16.49	18.16	20.49	17 07.14 (14)	22.24	21 05.31 (13)	23.50
15	09.50	08.19	06.43	05.53	06.58 (14)	04.10	05.10 (13)	02.51
	15.11	16.52	18.19	20.52	13 07.11 (14)	22.27	21 05.31 (13)	23.51
16	09.48	08.16	06.39	05.49	07.00 (14)	04.07	05.10 (13)	02.51
	15.14	16.55	18.22	20.55	9 07.09 (14)	22.31	20 05.30 (13)	23.53
17	09.45	08.13	06.36	05.46		04.03	05.11 (13)	02.50
	15.17	16.59	18.25	20.58		22.34	20 05.31 (13)	23.54
18	09.43	08.09	06.32	05.42		04.00	05.11 (13)	02.49
	15.20	17.02	18.28	21.01		22.37	19 05.30 (13)	23.55
19	09.40	08.06	06.29	05.39		03.57	05.12 (13)	02.49
	15.23	17.05	18.31	21.04		22.40	18 05.30 (13)	23.55
20	09.38	08.03	06.25	05.35		03.54	05.13 (13)	02.49
	15.27	17.08	18.34	21.07		22.44	17 05.30 (13)	23.56
21	09.35	07.59	06.22	05.32		03.51	05.13 (13)	02.49
	15.30	17.11	18.37	21.10		22.47	15 05.28 (13)	23.56
22	09.33	07.56	06.18	05.28		03.48	05.14 (13)	02.49
	15.33	17.15	18.40	21.13		22.50	14 05.28 (13)	23.56
23	09.30	07.53	06.15	05.25		03.45	05.15 (13)	02.50
	15.36	17.18	18.43	21.16		22.53	12 05.27 (13)	23.56
24	09.27	07.49	06.11	05.21		03.42	05.16 (13)	02.50
	15.39	17.21	18.46	21.20		22.56	8 05.24 (13)	23.56
25	09.24	07.46	06.08	05.18		03.39	05.19 (13)	02.51
	15.43	17.24	18.49	21.23		22.59	3 05.22 (13)	23.56
26	09.22	07.42	06.04	05.14		03.36		02.52
	15.46	17.27	18.52	21.26		23.03		23.55
27	09.19	07.39	06.00	05.11		03.33		02.53
	15.49	17.30	18.55	21.29		23.06		23.55
28	09.16	07.35	05.57	05.07		03.30		02.55
	15.53	17.33	18.58	21.32		23.09		23.54
29	09.13		06.53	05.04		03.27		02.56
	15.56		20.01	21.35		23.12		23.53
30	09.10		06.50	05.00		03.24		02.58
	15.59		20.04	21.39		23.15		23.51
31	09.07		06.46			03.22		
	16.03		20.07			23.18		
Potential sun hours	171	238	363	451		570		624
Total, worst case					237		326	
Sun reduction					0,41		0,47	
Oper. time red.					0,99		0,99	
Wind dir. red.					0,62		0,62	
Total reduction					0,25		0,29	
Total, real					59		94	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** H - Asuinrakennus H (Pinolantie 406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	03.00		04.25		05.21 (13)	06.00	06.55 (14)	07.27	08.01	09.36
	23.50		22.27	21	05.42 (13)	20.40	21 07.16 (14)	18.53	16.07	14.43
2	03.00		04.28		05.21 (13)	06.03	06.54 (14)	07.30	08.04	09.39
	23.49		22.24	20	05.41 (13)	20.37	22 07.16 (14)	18.50	16.04	14.41
3	03.01		04.31		05.21 (13)	06.06	06.54 (14)	07.33	08.07	09.42
	23.47		22.21	20	05.41 (13)	20.33	22 07.16 (14)	18.46	16.01	14.39
4	03.04		04.34		05.22 (13)	06.09	06.53 (14)	07.36	08.11	09.44
	23.45		22.17	17	05.39 (13)	20.29	21 07.14 (14)	18.43	15.58	14.37
5	03.06		04.38		05.25 (13)	06.12	06.54 (14)	07.39	08.14	09.47
	23.43		22.14	14	05.39 (13)	20.26	20 07.14 (14)	18.39	15.54	14.35
6	03.08		04.41		05.28 (13)	06.15	06.54 (14)	07.41	08.17	09.49
	23.41		22.11	10	05.38 (13)	20.22	19 07.13 (14)	18.36	15.51	14.34
7	03.10		04.44		05.31 (13)	06.18	06.56 (14)	07.44	08.20	09.52
	23.39		22.07	6	05.37 (13)	20.19	16 07.12 (14)	18.32	15.48	14.32
8	03.13		04.47		05.33 (13)	06.21	06.58 (14)	07.47	08.24	09.54
	23.37		22.04	1	05.34 (13)	20.15	12 07.10 (14)	18.29	15.45	14.31
9	03.15		04.50			06.24	07.01 (14)	07.50	08.27	09.56
	23.35		22.01			20.12	6 07.07 (14)	18.25	15.42	14.29
10	03.18		04.53			06.27		07.53	08.30	09.59
	23.33		21.57			20.08		18.22	15.39	14.28
11	03.20		04.57			06.30		07.56	08.33	10.01
	23.30		21.54			20.04		18.18	15.36	14.27
12	03.23		05.00			06.32		07.59	08.37	10.03
	23.28		21.50			20.01		18.15	15.33	14.26
13	03.26		05.03			06.35		08.02	08.40	10.04
	23.25		21.47			19.57		18.11	15.30	14.25
14	03.29		05.06			06.38		08.05	08.43	10.06
	23.22		21.43			19.54		18.08	15.27	14.24
15	03.32		05.09			06.41		08.08	08.46	10.08
	23.20		21.40			19.50		18.04	15.24	14.24
16	03.35		05.12			06.44		08.11	08.50	10.09
	23.17		21.36			19.47		18.01	15.21	14.23
17	03.38		05.15			06.47		08.14	08.53	10.11
	23.14		21.33			19.43		17.58	15.18	14.23
18	03.41		05.18			06.50		08.17	08.56	10.12
	23.11		21.29			19.40		17.54	15.15	14.23
19	03.44		05.27 (13)	05.21		06.52		08.20	08.59	10.13
	23.08	7	05.34 (13)	21.26		19.36		17.51	15.12	14.23
20	03.47		05.25 (13)	05.24		06.55		08.23	09.03	10.14
	23.05	10	05.35 (13)	21.22		19.32		17.47	15.10	14.23
21	03.50		05.25 (13)	05.28		06.58		08.26	09.06	10.14
	23.02	12	05.37 (13)	21.19		19.29		17.44	15.07	14.23
22	03.53		05.23 (13)	05.31		07.01		08.29	09.09	10.15
	22.59	15	05.38 (13)	21.15		19.25		17.40	15.04	14.23
23	03.56		05.22 (13)	05.34		07.04		08.33	09.12	10.16
	22.56	16	05.38 (13)	21.12		19.22		17.37	15.02	14.24
24	03.59		05.22 (13)	05.37		07.07		08.36	09.15	10.16
	22.53	18	05.40 (13)	21.08		19.18		17.34	14.59	14.24
25	04.02		05.21 (13)	05.40		07.10		07.39	09.18	10.16
	22.50	19	05.40 (13)	21.05		19.15		16.30	14.57	14.25
26	04.06		05.21 (13)	05.43		07.13		07.42	09.21	10.16
	22.47	20	05.41 (13)	21.01		19.11		16.27	14.54	14.26
27	04.09		05.20 (13)	05.46		07.02 (14)	07.15	07.45	09.24	10.16
	22.44	21	05.41 (13)	20.58	9	07.11 (14)	19.08	16.24	14.52	14.27
28	04.12		05.21 (13)	05.49		06.59 (14)	07.18	07.48	09.27	10.16
	22.41	20	05.41 (13)	20.54	14	07.13 (14)	19.04	16.20	14.49	14.29
29	04.15		05.21 (13)	05.52		06.58 (14)	07.21	07.51	09.30	10.15
	22.37	21	05.42 (13)	20.51	16	07.14 (14)	19.00	16.17	14.47	14.30
30	04.18		05.20 (13)	05.55		06.57 (14)	07.24	07.55	09.33	10.15
	22.34	21	05.41 (13)	20.47	18	07.15 (14)	18.57	16.14	14.45	14.32
31	04.22		05.21 (13)	05.57		06.55 (14)		07.58		10.14
	22.31	21	05.42 (13)	20.44	20	07.15 (14)		16.10		14.33
Potential sun hours	609			509			393	305	198	137
Total, worst case		221			186		159			
Sun reduction		0,38			0,31		0,33			
Oper. time red.		0,99			0,99		0,99			
Wind dir. red.		0,62			0,62		0,62			
Total reduction		0,23			0,19		0,20			
Total, real		51			36		32			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** I - Asuinrakennus I (Kortenevantie 116)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	July	August		September	October	November	December
1	10.13	09.04	07.32	06.43		04.57	20.26 (9)	03.19	03.00	04.25		06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09		21.42	15 20.41 (9)	23.20	23.50	22.27		20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39		04.54	20.27 (9)	03.17	03.00	04.28		06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12		21.45	13 20.40 (9)	23.23	23.48	22.24		20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36		04.50	20.29 (9)	03.14	03.02	04.31		06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15		21.48	9 20.38 (9)	23.26	23.47	22.21		20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32		04.47		03.12	03.04	04.35		06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18		21.51		23.28	23.45	22.17		20.29	18.43	15.58	14.37
5	10.08	08.52	07.18	06.28		04.43		03.10	03.06	04.38		06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21		21.55		23.31	23.43	22.14		20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25		04.40		03.08	03.08	04.41		06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24		21.58		23.33	23.41	22.11		20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21		04.37		03.05	03.11	04.44		06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27		22.01		23.36	23.39	22.07		20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18		04.33		03.03	03.13	04.47		06.21	07.47	08.24	09.54
	14.52	16.29	17.58	20.30		22.04		23.38	23.37	22.04		20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14		04.30		03.01	03.15	04.50		06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33		22.08		23.40	23.35	22.00	5 20.45 (9)	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11		04.26		03.00	03.18	04.54	20.37 (9)	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36		22.11		23.43	23.32	21.57	11 20.48 (9)	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07		04.23		02.56	03.21	04.57	20.36 (9)	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39		22.14		23.44	23.30	21.54	13 20.49 (9)	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04		04.20		02.55	03.23	05.00	20.34 (9)	06.32	07.59	08.37	10.02
	15.02	16.43	18.10	20.43		22.17		23.46	23.27	21.50	16 20.50 (9)	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00		04.17		02.54	03.26	05.03	20.33 (9)	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46		22.21		23.48	23.25	21.47	18 20.51 (9)	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57		04.13		02.53	03.29	05.06	20.33 (9)	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49		22.24		23.50	23.22	21.43	18 20.51 (9)	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53		04.10		02.52	03.32	05.09	20.31 (9)	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52		22.27		23.51	23.19	21.40	20 20.51 (9)	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49		04.07		02.51	03.35	05.12	20.31 (9)	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55		22.30		23.52	23.17	21.36	20 20.51 (9)	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46		04.04		02.50	03.38	05.15	20.31 (9)	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58		22.34		23.53	23.14	21.33	20 20.51 (9)	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00		02.50	03.41	05.18	20.31 (9)	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01		22.37		23.54	23.11	21.29	17 20.48 (9)	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39		03.57		02.49	03.44	05.21	20.31 (9)	06.52	08.20	08.59	10.13
	15.24	17.05	18.31	21.04		22.40		23.55	23.08	21.26	13 20.44 (9)	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35		03.54		02.49	03.47	05.25	20.31 (9)	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07		22.43		23.56	23.05	21.22	10 20.41 (9)	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	20.28 (9)	03.51		02.49	03.50	05.28	20.32 (9)	06.58	08.26	09.06	10.14
	15.30	17.12	18.37	21.10	3 20.31 (9)	22.47		23.56	23.02	21.19	6 20.38 (9)	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	20.26 (9)	03.48		02.50	03.53	05.31	20.33 (9)	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	7 20.33 (9)	22.50		23.56	22.59	21.15	2 20.35 (9)	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	20.26 (9)	03.45		02.50	03.56	05.34		07.04	08.33	09.12	10.15
	15.36	17.18	18.43	21.16	10 20.36 (9)	22.53		23.56	22.56	21.12		19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	20.25 (9)	03.42		02.51	03.59	05.37		07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	14 20.39 (9)	22.56		23.56	22.53	21.08		19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	20.25 (9)	03.39		02.52	04.03	05.40		07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	17 20.42 (9)	22.59		23.56	22.50	21.05		19.15	16.30	14.57	14.26
26	09.22	07.42	06.04	05.14	20.25 (9)	03.36		02.53	04.06	05.43		07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	20 20.45 (9)	23.02		23.55	22.47	21.01		19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	20.24 (9)	03.33		02.54	04.09	05.46		07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	20 20.44 (9)	23.05		23.54	22.44	20.58		19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	20.24 (9)	03.30		02.55	04.12	05.49		07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	19 20.43 (9)	23.08		23.53	22.40	20.54		19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	20.24 (9)	03.27		02.57	04.15	05.52		07.21	07.51	09.30	10.15
	15.56		20.01	21.35	19 20.43 (9)	23.11		23.52	22.37	20.51		19.01	16.17	14.47	14.30
30	09.10		06.50	05.00	20.25 (9)	03.25		02.58	04.19	05.55		07.24	07.55	09.33	10.15
	15.59		20.04	21.39	17 20.42 (9)	23.14		23.51	22.34	20.47		18.57	16.14	14.45	14.32
31	09.07		06.46			03.22			04.22	05.58			07.58		10.14
	16.03		20.07			23.17			22.31	20.44			16.11		14.34
Potential sun hours	171	238	363	451		570		624	609	508		393	305	198	137
Total, worst case					146		37				189				
Sun reduction					0,41		0,47				0,31				
Oper. time red.					0,99		0,99				0,99				
Wind dir. red.					0,64		0,64				0,64				
Total reduction					0,26		0,30				0,20				
Total, real					37		11				37				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** J - Asuinrakennus J (Haapavesitie 1406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102**Shadow receptor:** K - Lomarakennus K (Kurunoja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** L - Laskentapiste L (Perkkiontie, Ilmola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August		September	October	November	December
1	10.12	09.03	07.31	06.42	04.56		03.19		05.13 (50)	02.59	05.18 (50)	04.24	05.33 (50)	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41		23.19	73	21.39 (36)	23.49	21.43 (36)	22.27	21.37 (32)	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.38	04.53		03.16		05.13 (50)	03.01	05.18 (50)	04.28	05.35 (50)	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44		23.22	72	21.39 (36)	23.47	21.43 (36)	22.23	05.53 (50)	20.36	18.49	16.03	14.41
3	10.10	08.57	07.24	06.35	04.50		03.14		05.12 (50)	03.01	05.18 (50)	04.31	05.38 (50)	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47		23.25	72	21.38 (36)	23.46	21.43 (36)	22.20	05.50 (50)	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46		03.12		05.13 (50)	03.03	05.19 (50)	04.34		06.09	07.35	08.10	09.43
	14.42	16.15	17.45	20.18	21.51		23.28	73	21.39 (36)	23.44	21.44 (36)	22.17		20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43		03.09		05.13 (50)	03.05	05.19 (50)	04.37		06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.30	72	21.39 (36)	23.42	21.44 (36)	22.13		20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39		03.07		05.13 (50)	03.08	05.19 (50)	04.40		06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33	71	21.38 (36)	23.40	21.45 (36)	22.10		20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36		03.05		05.13 (50)	03.10	05.19 (50)	04.43		06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.00		23.35	72	21.39 (36)	23.38	21.45 (36)	22.07		20.18	18.32	15.48	14.32
8	10.03	08.41	07.07	06.17	04.33		03.03		05.14 (50)	03.12	05.20 (50)	04.47		06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.37	70	21.39 (36)	23.36	21.45 (36)	22.03		20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29		05.31 (50)		03.01	05.14 (50)	03.15	05.20 (50)	04.50		06.23	07.50	08.26	09.55
	14.54	16.32	18.00	20.33	22.07	6	05.37 (50)		23.40	71	21.39 (36)	23.34	73	21.46 (36)	22.00		20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26		05.26 (50)		02.58	05.14 (50)	03.18	05.20 (50)	04.53		06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	15	05.41 (50)		23.42	70	21.39 (36)	23.31	72	21.46 (36)	21.56		20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23		05.24 (50)		02.56	05.14 (50)	03.20	05.21 (50)	04.56		06.29	07.55	08.33	10.00
	14.59	16.39	18.06	20.39	22.13	19	05.43 (50)		23.44	70	21.39 (36)	23.29	72	21.47 (36)	21.53		20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19		05.22 (50)		02.55	05.14 (50)	03.23	05.21 (50)	04.59		06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	32	21.28 (32)		23.45	69	21.38 (36)	23.27	73	21.47 (36)	21.49		20.00	18.14	15.32	14.26
13	09.53	08.25	06.49	05.59	04.16		05.20 (50)		02.53	04.04 (51)	03.26	05.20 (50)	05.02		06.35	08.01	08.39	10.03
	15.05	16.45	18.12	20.45	22.20	41	21.31 (32)		23.47	72	21.39 (36)	23.24	73	21.46 (32)	21.46		19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13		05.19 (50)		02.52	04.03 (51)	03.29	05.21 (50)	05.05		06.38	08.04	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	47	21.33 (32)		23.49	74	21.39 (36)	23.21	74	21.48 (32)	21.43		19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09		05.18 (50)		02.51	04.03 (51)	03.31	05.21 (50)	05.09		06.40	08.07	08.46	10.07
	15.11	16.52	18.18	20.51	22.26	54	21.36 (32)		23.50	75	21.39 (36)	23.19	73	21.48 (32)	21.39		19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06		05.17 (50)		02.50	04.02 (51)	03.34	05.22 (50)	05.12		06.43	08.10	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	58	21.38 (32)		23.51	76	21.39 (36)	23.16	73	21.49 (32)	21.36		19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45	04.03		05.15 (50)		02.50	04.02 (51)	03.37	05.22 (50)	05.15		06.46	08.13	08.52	10.09
	15.17	16.58	18.24	20.57	22.33	64	21.40 (32)		23.52	76	21.39 (36)	23.13	73	21.49 (32)	21.32		19.42	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00		05.15 (50)		02.49	04.02 (51)	03.40	05.22 (50)	05.18		06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	66	21.40 (32)		23.53	77	21.39 (36)	23.10	73	21.49 (32)	21.29		19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57		05.14 (50)		02.49	04.02 (51)	03.43	05.23 (50)	05.21		06.52	08.20	08.58	10.12
	15.23	17.05	18.30	21.03	22.39	68	21.40 (32)		23.54	77	21.40 (36)	23.07	72	21.50 (32)	21.25		19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54		05.14 (50)		02.49	04.02 (51)	03.46	05.23 (50)	05.24		06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	69	21.40 (32)		23.55	79	21.40 (36)	23.04	72	21.50 (32)	21.22		19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50		05.14 (50)		02.49	04.02 (51)	03.50	05.23 (50)	05.27		06.58	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	71	21.41 (32)		23.55	79	21.40 (36)	23.01	72	21.50 (32)	21.18		19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47		05.13 (50)		02.49	04.02 (51)	03.53	05.24 (50)	05.30		07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	72	21.40 (32)		23.55	79	21.40 (36)	22.58	71	21.51 (32)	21.15		19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44		05.13 (50)		02.50	04.03 (51)	03.56	05.24 (50)	05.33		07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	72	21.40 (32)		23.55	79	21.41 (36)	22.55	70	21.51 (32)	21.11		19.21	17.37	15.01	14.24
24	09.26	07.48	06.10	05.21	03.41		05.13 (50)		02.50	04.03 (51)	03.59	05.24 (50)	05.36		07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	72	21.40 (32)		23.55	76	21.40 (36)	22.52	69	21.50 (32)	21.08		19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38		05.13 (50)		02.51	04.04 (51)	04.02	05.25 (50)	05.39		07.09	07.38	09.17	10.15
	15.42	17.24	18.48	21.22	22.58	72	21.40 (32)		23.55	77	21.41 (36)	22.49	68	21.51 (32)	21.04		19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35		05.13 (50)		02.52	04.04 (51)	04.05	05.25 (50)	05.42		07.12	07.41	09.20	10.15
	15.46	17.27	18.51	21.25	23.02	73	21.40 (32)		23.54	77	21.41 (36)	22.46	64	21.50 (32)	21.01		19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33		05.13 (50)		02.53	04.05 (51)	04.08	05.27 (50)	05.45		07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05	73	21.40 (32)		23.53	75	21.41 (36)	22.43	61	21.50 (32)	20.57		19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30		05.13 (50)		02.55	04.06 (51)	04.12	05.28 (50)	05.48		07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	72	21.39 (32)		23.52	74	21.42 (36)	22.40	57	21.48 (32)	20.54		19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27		05.12 (50)		02.56	04.07 (51)	04.15	05.28 (50)	05.51		07.20	07.51	09.29	10.14
	15.56		20.00	21.35	23.11	74	21.39 (32)		23.51	74	21.42 (36)	22.36	51	21.45 (32)	20.50		19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24		05.12 (50)		02.58	05.18 (50)	04.18	05.30 (50)	05.54		07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	74	21.39 (36)		23.50	70	21.43 (36)	22.33	45	21.43 (32)	20.46		18.56	16.13	14.45	14.31
31	09.06		06.46		03.22		05.12 (50)				04.21	05.31 (50)	05.57			07.57		10.13
	16.02		20.06		23.16	73	21.38 (36)				22.30	37	21.39 (32)	20.43		16.10		14.33
Potential sun hours	171	238	363	451	569			624			608			508		393	305	198	137
Total, worst case						1337			2221			2105			56				
Sun reduction						0,47			0,48			0,38			0,31				
Oper. time red.						0,99			0,99			0,99			0,99				
Wind dir. red.						0,63			0,63			0,63			0,62				
Total reduction						0,29			0,30			0,24			0,19				
Total, real						392			661			497			11				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **Shadow receptor:** M - Lomarakennus M (Riskalan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	12.12 (49)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00		09.36	11.47 (49)
	14.34		16.05 50	14.53 (40)	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06		14.42 32	13.17 (45)
2	10.12		09.01	12.14 (49)	07.28	06.38	04.52	03.15	03.00	04.27	06.02	07.29	08.04		09.39	11.48 (49)
	14.36		16.08 36	14.53 (40)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03		14.40 25	13.13 (45)
3	10.11		08.57	12.17 (49)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	14.08 (40)	09.41	11.49 (49)
	14.38		16.12 29	14.53 (40)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00 10	14.18 (40)	14.38 17	12.06 (49)
4	10.10	12.11 (49)	08.54	14.33 (40)	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	14.06 (40)	09.44	11.50 (49)
	14.40 2	12.13 (49)	16.15 19	14.52 (40)	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57 14	14.20 (40)	14.36 15	12.05 (49)
5	10.08	12.08 (49)	08.51	14.34 (40)	07.17	06.28	04.42	03.08	03.04	04.36	06.11	07.38	08.13	14.05 (40)	09.47	11.52 (49)
	14.43 8	12.16 (49)	16.18 18	14.52 (40)	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53 16	14.21 (40)	14.34 13	12.05 (49)
6	10.07	12.07 (49)	08.48	14.35 (40)	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	14.04 (40)	09.49	11.54 (49)
	14.45 11	12.18 (49)	16.22 16	14.51 (40)	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50 18	14.22 (40)	14.32 11	12.05 (49)
7	10.05	12.07 (49)	08.45	14.37 (40)	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	14.04 (40)	09.52	11.55 (49)
	14.48 13	12.20 (49)	16.25 13	14.50 (40)	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.31	15.47 19	14.23 (40)	14.31 8	12.03 (49)
8	10.04	12.07 (49)	08.42	14.39 (40)	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	14.24 (40)	09.54	11.58 (49)
	14.50 14	12.21 (49)	16.28 9	14.48 (40)	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44 31	14.24 (40)	14.29 3	12.01 (49)
9	10.02	12.05 (49)	08.38		07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	14.24 (40)	09.56	
	14.53 17	12.22 (49)	16.32		18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.24	15.41 38	14.24 (40)	14.28	
10	10.00	12.05 (49)	08.35		07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	14.24 (40)	09.58	
	14.55 24	13.29 (45)	16.35		18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38 50	14.24 (40)	14.27	
11	09.58	12.05 (49)	08.32		06.56	06.06	04.22	02.54	03.19	04.56	06.29	07.56	08.33	14.24 (40)	10.00	
	14.58 30	13.34 (45)	16.38		18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.17	15.35 55	14.24 (40)	14.25	
12	09.56	12.05 (49)	08.29		06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	14.24 (40)	10.02	
	15.01 38	13.40 (45)	16.41		18.09	20.42	22.17	23.47	23.27	21.50	20.00	18.14	15.32 61	14.24 (40)	14.24	
13	09.54	12.04 (49)	08.25		06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	14.24 (40)	10.04	
	15.04 40	13.40 (45)	16.45		18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29 64	14.24 (40)	14.24	
14	09.52	12.05 (49)	08.22		06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.04	08.43	14.24 (40)	10.06	
	15.07 42	13.42 (45)	16.48		18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26 66	14.24 (40)	14.23	
15	09.50	12.04 (49)	08.19		06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.07	08.46	14.24 (40)	10.08	
	15.10 44	13.42 (45)	16.51		18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23 67	14.24 (40)	14.22	
16	09.47	12.04 (49)	08.16		06.39	05.48	04.05	02.49	03.33	05.11	06.43	08.11	08.49	14.24 (40)	10.09	
	15.13 46	13.43 (45)	16.54		18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20 66	14.24 (40)	14.22	
17	09.45	12.05 (49)	08.12		06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	14.24 (40)	10.10	
	15.16 47	13.44 (45)	16.58		18.24	20.57	22.33	23.54	23.14	21.32	19.42	17.57	15.17 60	14.24 (40)	14.21	
18	09.43	12.04 (49)	08.09		06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	14.24 (40)	10.12	
	15.19 49	13.44 (45)	17.01		18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14 57	14.24 (40)	14.21	
19	09.40	12.04 (49)	08.05		06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	14.24 (40)	10.13	
	15.22 50	13.45 (45)	17.04		18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11 51	14.24 (40)	14.21	
20	09.38	12.04 (49)	08.02		06.25	05.34	03.53	02.47	03.45	05.23	06.55	08.23	09.02	14.24 (40)	10.14	
	15.25 51	13.46 (45)	17.07		18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.08 50	14.24 (40)	14.21	
21	09.35	12.05 (49)	07.59		06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	14.24 (40)	10.14	
	15.29 51	13.46 (45)	17.11		18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06 51	14.24 (40)	14.21	
22	09.32	12.05 (49)	07.55		06.17	05.27	03.46	02.48	03.52	05.30	07.00	08.29	09.09	14.24 (40)	10.15	
	15.32 50	13.46 (45)	17.14		18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03 51	14.24 (40)	14.22	
23	09.30	12.05 (49)	07.52		06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	14.24 (40)	10.15	
	15.35 51	13.47 (45)	17.17		18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.00 50	14.24 (40)	14.22	
24	09.27	12.06 (49)	07.48		06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	14.24 (40)	10.16	
	15.38 56	14.39 (40)	17.20		18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58 48	14.24 (40)	14.23	
25	09.24	12.06 (49)	07.45		06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	14.24 (40)	10.16	
	15.42 61	14.44 (40)	17.23		18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.29	14.55 48	14.24 (40)	14.24	
26	09.21	12.06 (49)	07.42		06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	14.24 (40)	10.16	
	15.45 66	14.48 (40)	17.26		18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53 46	14.24 (40)	14.25	
27	09.18	12.07 (49)	07.38		06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	14.24 (40)	10.16	
	15.48 67	14.51 (40)	17.29		18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51 44	14.24 (40)	14.26	
28	09.15	12.08 (49)	07.35		05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	14.24 (40)	10.16	
	15.52 64	14.51 (40)	17.33		18.57	21.32	23.08	23.54	22.40	20.54	19.03	16.19	14.48 42	14.24 (40)	14.27	
29	09.13	12.08 (49)			06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	14.24 (40)	10.15	
	15.55 65	14.52 (40)			20.00	21.35	23.11	23.53	22.37	20.50	19.00	16.16	14.46 40	14.24 (40)	14.29	
30	09.10	12.09 (49)			06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	14.24 (40)	10.15	
	15.58 60	14.52 (40)			20.03	21.38	23.14	23.52	22.34	20.47	18.56	16.13	14.44 38	13.21 (45)	14.30	
31	09.07	12.10 (49)			06.45		03.20		04.20	05.57		07.57			10.14	
	16.02 55	14.52 (40)			20.06		23.17		22.30	20.43		16.10			14.32	
Potential sun hours	170		238		363	451	570	625	609	509	393	305	198		136	
Total, worst case		1172		190										1251		124
Sun reduction		0,19		0,33										0,24		0,22
Oper. time red.		0,99		0,99										0,99		0,99
Wind dir. red.		0,66		0,65										0,65		0,67
Total reduction		0,12		0,21										0,16		0,14
Total, real		142		41										195		18

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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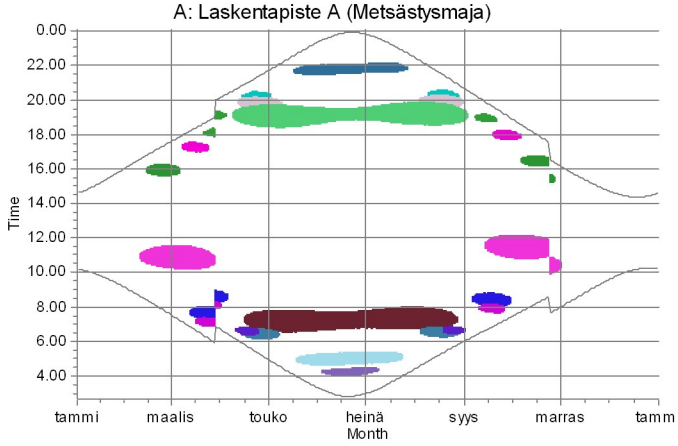
Calculated:
18.11.2020 15.18/3.4.388

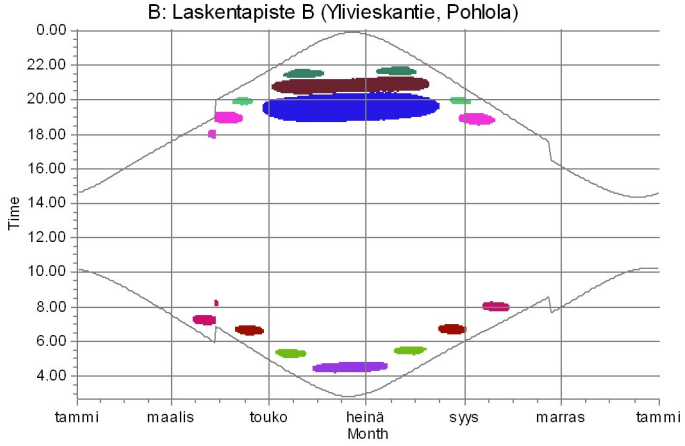
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

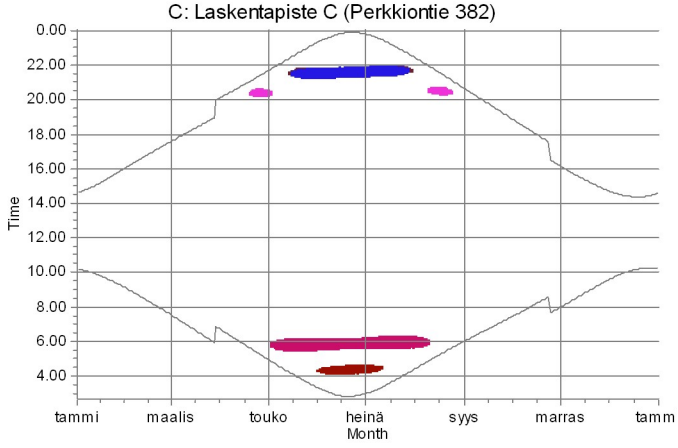
A: Laskentapiste A (Metsästysmaja)



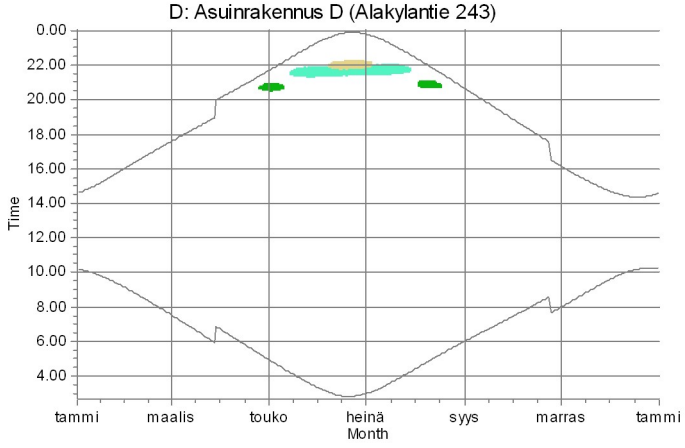
B: Laskentapiste B (Ylivieskantie, Pohlola)



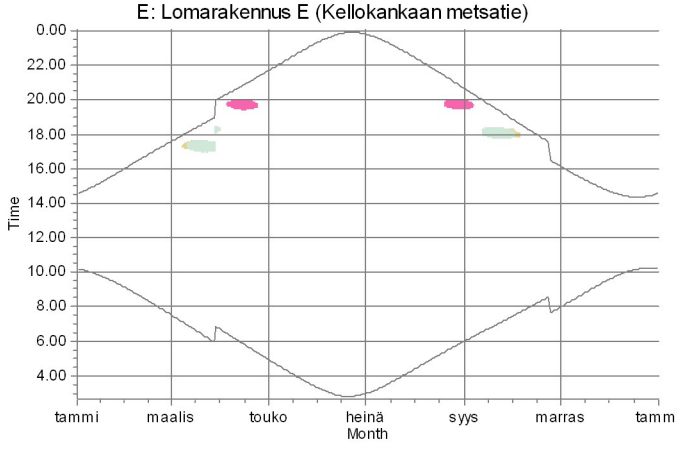
C: Laskentapiste C (Perkkiontie 382)



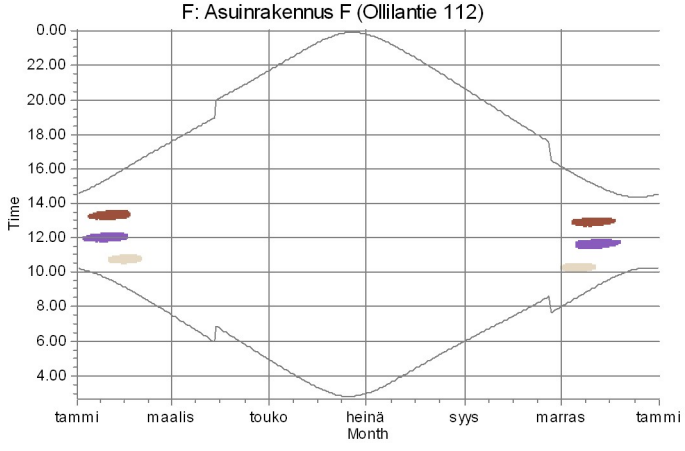
D: Asuinrakennus D (Alakylantie 243)



E: Lomarakennus E (Kellokankaan metsatie)



F: Asuinrakennus F (Ollilantie 112)





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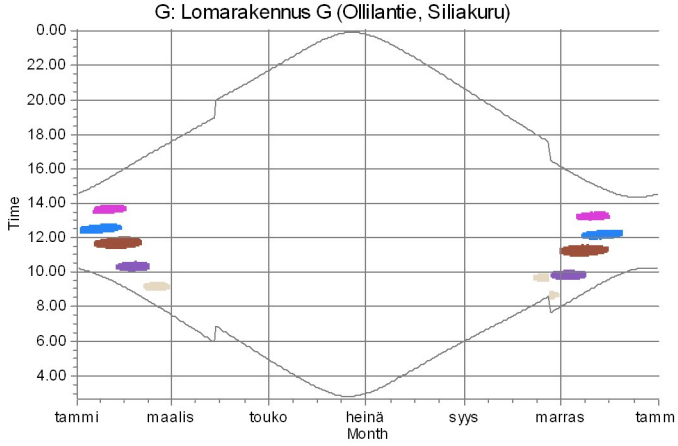
Calculated:
18.11.2020 15.18/3.4.388

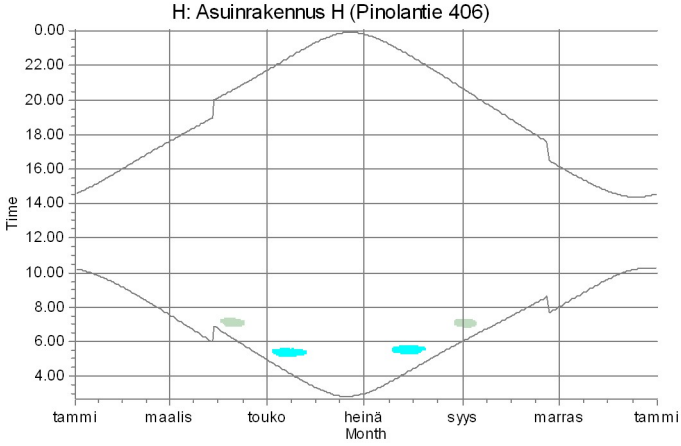
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

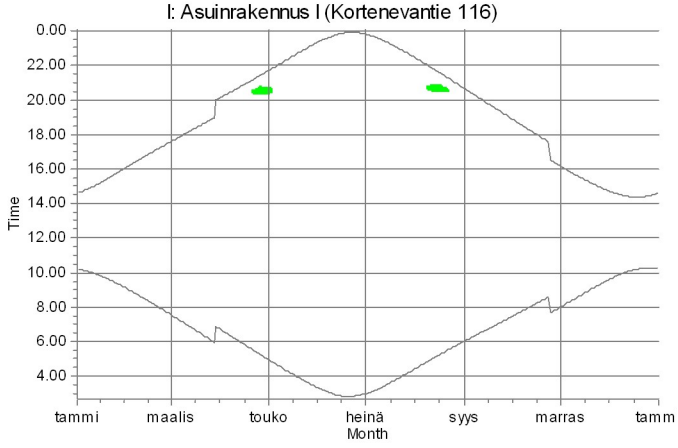
G: Lomarakennus G (Ollilantie, Siliakuru)



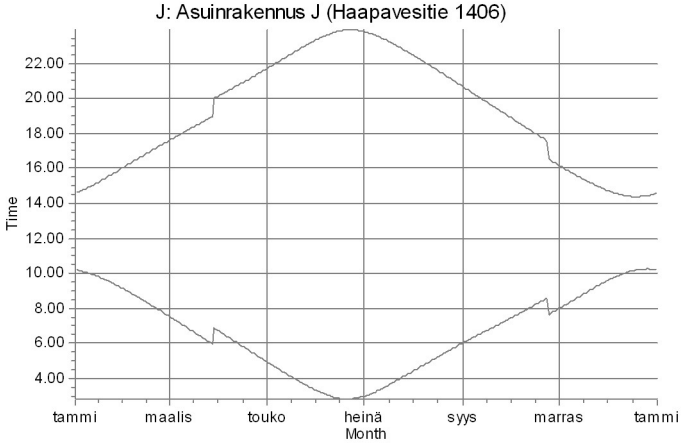
H: Asuinrakennus H (Pinolantie 406)



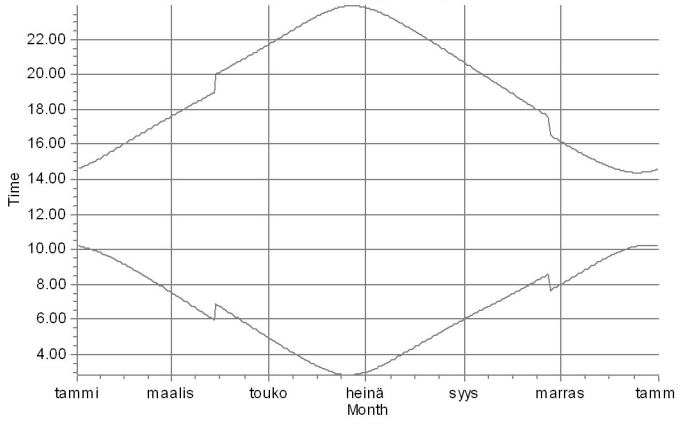
I: Asuinrakennus I (Kortenevantie 116)



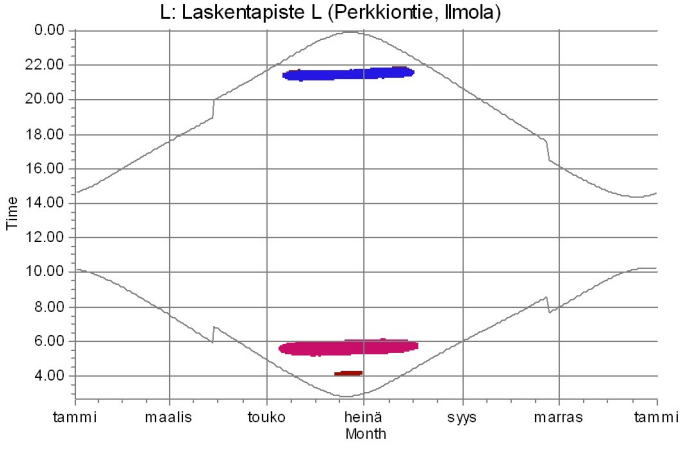
J: Asuinrakennus J (Haapavesitie 1406)



K: Lomarakennus K (Kurunoja)



L: Laskentapiste L (Perkkiontie, Ilmola)





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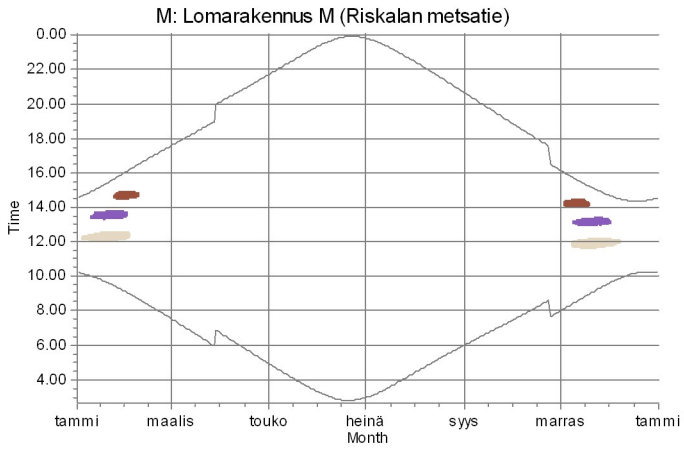
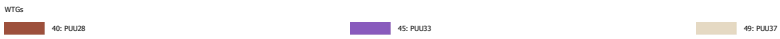
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102





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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 1 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (235)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.18	07.44	08.20	09.52
	14.48	16.25	17.55	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.27	14.53	14.26
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 2 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.58	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.02	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.08	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.59	08.32	06.57	06.07	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.01	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.23	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.49	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.36	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.24
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.26	14.53	14.25
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 3 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (237)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 4 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.04
	15.04	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.16	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.26	14.53	14.26
27	09.19	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 5 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (239)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.13	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.05	09.39
	14.38	16.10	17.40	20.13	21.45	23.24	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.46	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.32	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.02	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.55
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.16	18.29	15.45	14.31
9	10.03	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.39	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	08.00	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.53	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.52	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.12	08.50	10.10
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.15	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.12	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.56	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.59	08.27	09.06	10.15
	15.30	17.12	18.37	21.11	22.47	23.57	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.16	10.16
	15.40	17.21	18.46	21.20	22.57	23.57	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.56	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.34	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.48	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 6 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.28	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 7 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (241)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.24
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.49	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 8 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (242)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.40	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.51	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.57	23.56	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 9 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57 20.26-20.41/15	03.19	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54 20.27-20.40/13	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50 20.29-20.38/9	03.14	03.02	04.31	06.06	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.46	07.11	06.21	04.37	03.05	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.29	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50 20.40-20.45/5	06.24	07.50	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54 20.37-20.48/11	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57 20.36-20.49/13	06.30	07.56	08.33	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.23	05.00 20.34-20.50/16	06.33	07.59	08.37	10.03
	15.02	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03 20.33-20.51/18	06.35	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06 20.33-20.51/18	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.24
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09 20.31-20.51/20	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12 20.31-20.51/20	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15 20.31-20.51/20	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19 20.31-20.48/17	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.49	03.44	05.22 20.31-20.44/13	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.25 20.31-20.41/10	06.55	08.23	09.03	10.14
	15.27	17.08	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32 20.28-20.31/3	03.51	02.49	03.50	05.28 20.32-20.38/6	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28 20.26-20.33/7	03.48	02.50	03.53	05.31 20.33-20.35/2	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.16	19.25	17.41	15.04	14.24
23	09.30	07.53	06.15	05.25 20.26-20.36/10	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21 20.25-20.39/14	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18 20.25-20.42/17	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.14 20.25-20.45/20	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11 20.24-20.44/20	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.07 20.24-20.43/19	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04 20.24-20.43/19	03.27	02.57	04.15	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01 20.25-20.42/17	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	146	37	0	0	189	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 10 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (244)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 11 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (245)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.07	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.23	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 12 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (246)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.38
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.45	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.09	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.33
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.48	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.56
	14.55	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.29
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.40	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.46	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.27	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.26
14	09.52	08.23	06.47	05.57	04.14	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.09	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.12	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.15	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.51	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.16	14.23
19	09.41	08.06	06.29	05.39	03.58	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.54	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.51	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	15.00	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.31	02.55	04.12	05.49	07.19	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.59	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.46	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 13 - PUU01

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24 05.21-05.42/21	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28 05.21-05.41/20	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31 05.21-05.41/20	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34 05.22-05.39/17	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43 05.23-05.26/3	03.09	03.05	04.37 05.25-05.39/14	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40 05.20-05.27/7	03.07	03.07	04.40 05.28-05.38/10	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36 05.17-05.29/12	03.05	03.10	04.44 05.31-05.37/6	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33 05.14-05.29/15	03.03	03.12	04.47 05.33-05.34/1	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 05.11-05.30/19	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26 05.11-05.31/20	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 05.11-05.31/20	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.10-05.31/21	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 05.10-05.31/21	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13 05.10-05.31/21	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10 05.10-05.31/21	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06 05.10-05.30/20	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03 05.11-05.31/20	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00 05.11-05.30/19	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57 05.12-05.30/18	02.49	03.43 05.27-05.34/7	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54 05.13-05.30/17	02.49	03.46 05.25-05.35/10	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50 05.13-05.28/15	02.49	03.50 05.25-05.37/12	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47 05.14-05.28/14	02.49	03.53 05.23-05.38/15	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44 05.15-05.27/12	02.49	03.56 05.22-05.38/16	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 05.16-05.24/8	02.50	03.59 05.22-05.40/18	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38 05.19-05.22/3	02.51	04.02 05.21-05.40/19	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05 05.21-05.41/20	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08 05.20-05.41/21	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12 05.21-05.41/20	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15 05.21-05.42/21	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18 05.20-05.41/21	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21 05.21-05.42/21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	326	0	221	109	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 14 - PUU02

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May	June	July	August		September		October	November	December
1	10.13	09.04	07.32	06.42		04.57	03.19	02.59	04.25		06.00	06.55-07.16/21	07.27	08.01	09.36
	14.35	16.06	17.36	20.09		21.42	23.20	23.50	22.27		20.40		18.53	16.07	14.43
2	10.12	09.01	07.28	06.39		04.53	03.16	03.01	04.28		06.03	06.54-07.16/22	07.30	08.04	09.39
	14.37	16.09	17.39	20.12		21.45	23.23	23.49	22.24		20.36		18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	07.08-07.14/6	04.50	03.14	03.01	04.31		06.06	06.54-07.16/22	07.33	08.07	09.41
	14.39	16.12	17.43	20.15		21.48	23.26	23.47	22.21		20.33		18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	07.04-07.15/11	04.46	03.12	03.03	04.34		06.09	06.53-07.14/21	07.35	08.10	09.44
	14.42	16.16	17.46	20.18		21.51	23.28	23.45	22.17		20.29		18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	07.01-07.17/16	04.43	03.09	03.05	04.37		06.12	06.54-07.14/20	07.38	08.14	09.47
	14.44	16.19	17.49	20.21		21.55	23.31	23.43	22.14		20.26		18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	06.58-07.17/19	04.40	03.07	03.08	04.41		06.15	06.54-07.13/19	07.41	08.17	09.49
	14.46	16.22	17.52	20.24		21.58	23.34	23.41	22.11		20.22		18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	06.57-07.18/21	04.36	03.05	03.10	04.44		06.18	06.56-07.12/16	07.44	08.20	09.52
	14.49	16.26	17.55	20.27		22.01	23.36	23.39	22.07		20.19		18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	06.56-07.17/21	04.33	03.03	03.12	04.47		06.21	06.58-07.10/12	07.47	08.23	09.54
	14.51	16.29	17.58	20.30		22.04	23.38	23.37	22.04		20.15		18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	06.56-07.18/22	04.29	03.01	03.15	04.50		06.24	07.01-07.07/6	07.50	08.27	09.56
	14.54	16.32	18.01	20.33		22.08	23.41	23.35	22.00		20.11		18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	06.55-07.17/22	04.26	02.57	03.18	04.53		06.26		07.53	08.30	09.58
	14.56	16.36	18.04	20.36		22.11	23.43	23.32	21.57		20.08		18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	06.56-07.17/21	04.23	02.56	03.20	04.56		06.29		07.56	08.33	10.01
	14.59	16.39	18.07	20.39		22.14	23.45	23.30	21.54		20.04		18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	06.56-07.16/20	04.19	02.54	03.23	05.00		06.32		07.59	08.36	10.02
	15.02	16.42	18.10	20.42		22.17	23.46	23.27	21.50		20.01		18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	06.56-07.15/19	04.16	02.53	03.26	05.03		06.35		08.02	08.40	10.04
	15.05	16.46	18.13	20.45		22.21	23.48	23.25	21.47		19.57		18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	06.57-07.14/17	04.13	02.52	03.29	05.06		06.38		08.05	08.43	10.06
	15.08	16.49	18.16	20.48		22.24	23.50	23.22	21.43		19.54		18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	06.58-07.11/13	04.10	02.51	03.32	05.09		06.41		08.08	08.46	10.08
	15.11	16.52	18.19	20.52		22.27	23.51	23.20	21.40		19.50		18.04	15.24	14.23
16	09.48	08.16	06.39	05.49	07.00-07.09/9	04.06	02.50	03.34	05.12		06.44		08.11	08.49	10.09
	15.14	16.55	18.22	20.55		22.30	23.52	23.17	21.36		19.46		18.01	15.21	14.23
17	09.45	08.13	06.36	05.46		04.03	02.50	03.37	05.15		06.47		08.14	08.53	10.10
	15.17	16.58	18.25	20.58		22.34	23.54	23.14	21.33		19.43		17.57	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00	02.49	03.40	05.18		06.49		08.17	08.56	10.12
	15.20	17.02	18.28	21.01		22.37	23.54	23.11	21.29		19.39		17.54	15.15	14.22
19	09.40	08.06	06.29	05.39		03.57	02.49	03.43	05.21		06.52		08.20	08.59	10.13
	15.23	17.05	18.31	21.04		22.40	23.55	23.08	21.26		19.36		17.51	15.12	14.22
20	09.38	08.03	06.25	05.35		03.54	02.49	03.47	05.24		06.55		08.23	09.02	10.14
	15.26	17.08	18.34	21.07		22.43	23.56	23.05	21.22		19.32		17.47	15.09	14.22
21	09.35	07.59	06.22	05.32		03.51	02.49	03.50	05.27		06.58		08.26	09.06	10.14
	15.30	17.11	18.37	21.10		22.47	23.56	23.02	21.19		19.29		17.44	15.07	14.23
22	09.33	07.56	06.18	05.28		03.47	02.49	03.53	05.30		07.01		08.29	09.09	10.15
	15.33	17.14	18.40	21.13		22.50	23.56	22.59	21.15		19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	05.25		03.44	02.50	03.56	05.33		07.04		08.32	09.12	10.15
	15.36	17.18	18.43	21.16		22.53	23.56	22.56	21.12		19.22		17.37	15.01	14.24
24	09.27	07.49	06.11	05.21		03.41	02.50	03.59	05.36		07.07		08.36	09.15	10.16
	15.39	17.21	18.46	21.19		22.56	23.56	22.53	21.08		19.18		17.34	14.59	14.24
25	09.24	07.46	06.07	05.18		03.38	02.51	04.02	05.39		07.09		07.39	09.18	10.16
	15.43	17.24	18.49	21.23		22.59	23.56	22.50	21.05		19.14		16.30	14.56	14.25
26	09.22	07.42	06.04	05.14		03.36	02.52	04.05	05.42		07.12		07.42	09.21	10.16
	15.46	17.27	18.52	21.26		23.02	23.55	22.47	21.01		19.11		16.27	14.54	14.26
27	09.19	07.39	06.00	05.11		03.33	02.53	04.09	05.45	07.02-07.11/9	07.15		07.45	09.24	10.16
	15.49	17.30	18.54	21.29		23.05	23.54	22.44	20.58		19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	05.07		03.30	02.55	04.12	05.48	06.59-07.13/14	07.18		07.48	09.27	10.16
	15.52	17.33	18.57	21.32		23.08	23.54	22.40	20.54		19.04		16.20	14.49	14.29
29	09.13		06.53	05.04		03.27	02.56	04.15	05.51	06.58-07.14/16	07.21		07.51	09.30	10.15
	15.56		20.00	21.35		23.12	23.53	22.37	20.51		19.00		16.17	14.47	14.30
30	09.10		06.50	05.00		03.24	02.58	04.18	05.54	06.57-07.15/18	07.24		07.54	09.33	10.15
	15.59		20.03	21.38		23.14	23.51	22.34	20.47		18.57		16.14	14.45	14.31
31	09.07		06.46			03.22		04.21	05.57	06.55-07.15/20			07.58		10.14
	16.02		20.06			23.17		22.31	20.43				16.10		14.33
Potential sun hours	171	238	363	451		570	624	609	509		393		305	198	137
Sum of minutes with flicker	0	0	0	237		0	0	0	77		159		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 15 - PUU03

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 16 - PUU04

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 17 - PUU05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 18 - PUU06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 19 - PUU07

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 20 - PUU08

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August	September		October	November	December
1	10.13	09.04	07.32		06.42	18.56-19.14/18	04.57	03.19	03.00	04.25	06.00		07.27	08.01	09.36
	14.36	16.06	17.36		20.09		21.41	23.20	23.50	22.27	20.40		18.53	16.07	14.43
2	10.12	09.01	07.28		06.39	18.58-19.13/15	04.53	03.17	03.00	04.28	06.03		07.30	08.04	09.38
	14.38	16.09	17.39		20.12		21.45	23.23	23.48	22.24	20.36		18.50	16.04	14.41
3	10.11	08.58	07.25		06.35	18.59-19.10/11	04.50	03.14	03.02	04.31	06.06		07.32	08.07	09.41
	14.40	16.12	17.42		20.15		21.48	23.25	23.46	22.20	20.33		18.46	16.01	14.39
4	10.09	08.54	07.21		06.32	19.03-19.07/4	04.46	03.12	03.04	04.34	06.09		07.35	08.10	09.44
	14.42	16.16	17.46		20.18		21.51	23.28	23.45	22.17	20.29		18.43	15.57	14.37
5	10.08	08.51	07.18		06.28		04.43	03.09	03.06	04.37	06.12		07.38	08.14	09.46
	14.44	16.19	17.49		20.21		21.54	23.31	23.43	22.14	20.26		18.39	15.54	14.35
6	10.07	08.48	07.14		06.25		04.40	03.07	03.08	04.41	06.15		07.41	08.17	09.49
	14.46	16.22	17.52		20.24		21.58	23.33	23.41	22.10	20.22		18.36	15.51	14.34
7	10.05	08.45	07.11		06.21		04.36	03.05	03.10	04.44	06.18		07.44	08.20	09.51
	14.49	16.26	17.55		20.27		22.01	23.36	23.39	22.07	20.18		18.32	15.48	14.32
8	10.04	08.42	07.07		06.18		04.33	03.03	03.13	04.47	06.21	18.58-19.00/2	07.47	08.23	09.54
	14.51	16.29	17.58		20.30		22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04		06.14		04.30	03.01	03.15	04.50	06.24	18.53-19.04/11	07.50	08.26	09.56
	14.54	16.32	18.01		20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00		06.10		04.26	02.58	03.18	04.53	06.26	18.50-19.05/15	07.53	08.30	09.58
	14.57	16.36	18.04		20.36		22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57		06.07		04.23	02.56	03.20	04.56	06.29	18.49-19.06/17	07.56	08.33	10.00
	14.59	16.39	18.07		20.39		22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53		06.03		04.20	02.55	03.23	05.00	06.32	18.48-19.07/19	07.59	08.36	10.02
	15.02	16.42	18.10		20.42		22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50		06.00		04.16	02.53	03.26	05.03	06.35	18.47-19.07/20	08.02	08.40	10.04
	15.05	16.45	18.13		20.45		22.20	23.48	23.25	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46		05.56		04.13	02.52	03.29	05.06	06.38	18.46-19.08/22	08.05	08.43	10.06
	15.08	16.49	18.16		20.48		22.24	23.49	23.22	21.43	19.54		18.08	15.26	14.24
15	09.50	08.19	06.43		05.53		04.10	02.51	03.32	05.09	06.41	18.45-19.07/22	08.08	08.46	10.07
	15.11	16.52	18.19		20.51		22.27	23.51	23.19	21.40	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39		05.49		04.06	02.51	03.35	05.12	06.44	18.45-19.06/21	08.11	08.49	10.09
	15.14	16.55	18.22		20.54		22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36		05.46		04.03	02.50	03.38	05.15	06.46	18.45-19.05/20	08.14	08.52	10.10
	15.17	16.58	18.25		20.58		22.33	23.53	23.14	21.33	19.43		17.57	15.18	14.23
18	09.43	08.09	06.32		05.42		04.00	02.49	03.41	05.18	06.49	18.46-19.02/16	08.17	08.56	10.11
	15.20	17.02	18.28		21.01		22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22
19	09.40	08.06	06.29		05.39		03.57	02.49	03.44	05.21	06.52	18.46-18.58/12	08.20	08.59	10.12
	15.23	17.05	18.31		21.04		22.40	23.55	23.08	21.26	19.36		17.50	15.12	14.22
20	09.38	08.02	06.25		05.35		03.54	02.49	03.47	05.24	06.55	18.46-18.54/8	08.23	09.02	10.13
	15.26	17.08	18.34		21.07		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.23
21	09.35	07.59	06.21		05.32		03.51	02.49	03.50	05.27	06.58	18.48-18.50/2	08.26	09.05	10.14
	15.30	17.11	18.37		21.10		22.46	23.56	23.02	21.19	19.29		17.44	15.07	14.23
22	09.32	07.56	06.18	18.04-18.05/1	05.28		03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
	15.33	17.14	18.40		21.13		22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	18.01-18.07/6	05.25		03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
	15.36	17.18	18.43		21.16		22.53	23.56	22.56	21.12	19.21		17.37	15.01	14.24
24	09.27	07.49	06.11	17.59-18.10/11	05.21		03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
	15.39	17.21	18.45		21.19		22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24
25	09.24	07.45	06.07	17.58-18.13/15	05.18		03.39	02.51	04.02	05.39	07.09		07.38	09.18	10.16
	15.43	17.24	18.48		21.22		22.59	23.55	22.50	21.05	19.14		16.30	14.56	14.25
26	09.21	07.42	06.04	17.57-18.16/19	05.14		03.36	02.52	04.05	05.42	07.12		07.42	09.21	10.16
	15.46	17.27	18.51		21.26		23.02	23.55	22.46	21.01	19.11		16.27	14.54	14.26
27	09.18	07.39	06.00	17.56-18.18/22	05.11		03.33	02.53	04.09	05.45	07.15		07.45	09.24	10.16
	15.49	17.30	18.54		21.29		23.05	23.54	22.43	20.57	19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	17.55-18.17/22	05.07		03.30	02.55	04.12	05.48	07.18		07.48	09.27	10.15
	15.53	17.33	18.57		21.32		23.08	23.53	22.40	20.54	19.04		16.20	14.49	14.29
29	09.13		06.53	18.56-19.17/21	05.04		03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35		23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.10		06.50	18.55-19.16/21	05.00		03.24	02.58	04.18	05.54	07.24		07.54	09.33	10.14
	15.59		20.03		21.38		23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.32
31	09.07		06.46	18.56-19.16/20			03.22		04.21	05.57			07.57		10.14
	16.02		20.06				23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363		451		570	624	609	508	393		305	198	137
Sum of minutes with flicker	0	0	158		48		0	0	0	0	207		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 21 - PUU09

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 20.06-20.20/14	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 20.08-20.18/10	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.18	04.53 20.18-20.23/5	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 20.15-20.27/12	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.55	03.23	04.59 20.13-20.29/16	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03 20.12-20.30/18	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06 20.10-20.30/20	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 20.11-20.13/2	04.10	02.51	03.32	05.09 20.09-20.31/22	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 20.09-20.16/7	04.06	02.50	03.34	05.12 20.09-20.32/23	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 20.06-20.18/12	04.03	02.50	03.37	05.15 20.07-20.31/24	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42 20.05-20.21/16	04.00	02.49	03.40	05.18 20.07-20.32/25	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39 20.04-20.25/21	03.57	02.49	03.43	05.21 20.07-20.32/25	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35 20.02-20.25/23	03.54	02.49	03.47	05.24 20.07-20.32/25	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 20.02-20.26/24	03.51	02.49	03.50	05.27 20.06-20.31/25	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 20.02-20.26/24	03.47	02.49	03.53	05.30 20.06-20.30/24	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 20.01-20.26/25	03.44	02.50	03.56	05.33 20.07-20.30/23	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 20.01-20.25/24	03.41	02.50	03.59	05.36 20.08-20.28/20	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 20.01-20.25/24	03.38	02.51	04.02	05.39 20.08-20.24/16	07.09	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 20.01-20.25/24	03.36	02.52	04.05	05.42 20.09-20.21/12	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.11 20.01-20.24/23	03.33	02.53	04.09	05.45 20.11-20.18/7	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 20.02-20.24/22	03.30	02.55	04.12	05.48 20.14-20.15/1	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 20.03-20.23/20	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 20.04-20.22/18	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 22 - PUU10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57		03.19	21.31-21.58/27	02.59	21.37-22.03/26	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41		23.20		23.50		22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53		03.16	21.30-21.58/28	03.01	21.37-22.03/26	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45		23.23		23.48		22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50		03.14	21.31-21.59/28	03.01	21.38-22.04/26	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48		23.26		23.47		22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46		03.11	21.31-21.58/27	03.03	21.37-22.04/27	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51		23.28		23.45		22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43		03.09	21.31-21.59/28	03.05	21.37-22.04/27	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54		23.31		23.43		22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39		03.07	21.31-21.58/27	03.08	21.38-22.05/27	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58		23.33		23.41		22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36		03.05	21.31-21.59/28	03.10	21.38-22.05/27	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01		23.36		23.39		22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33		03.03	21.32-21.59/27	03.12	21.38-22.05/27	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04		23.38		23.37		22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29		03.01	21.32-21.59/27	03.15	21.38-22.05/27	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07		23.40		23.35		22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26		02.57	21.32-21.59/27	03.17	21.38-22.06/28	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11		23.42		23.32		21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23		02.56	21.32-21.59/27	03.20	21.39-22.06/27	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44		23.30		21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19		02.54	21.32-21.59/27	03.23	21.39-22.06/27	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46		23.27		21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16		02.53	21.33-22.00/27	03.26	21.39-22.06/27	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20		23.48		23.25		21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13		02.52	21.33-21.59/26	03.28	21.39-22.06/27	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24		23.50		23.22		21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10		02.51	21.34-22.00/26	03.31	21.39-22.06/27	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51		23.19		21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06		02.50	21.34-21.59/25	03.34	21.40-22.06/26	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30		23.52		23.17		21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.46	04.03	21.38-21.42/4	02.50	21.34-22.00/26	03.37	21.40-22.06/26	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.33		23.53		23.14		21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	21.36-21.44/8	02.49	21.34-22.00/26	03.40	21.40-22.05/25	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37		23.54		23.11		21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	21.35-21.47/12	02.49	21.35-22.00/25	03.43	21.41-22.06/25	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40		23.55		23.08		21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	21.33-21.49/16	02.49	21.35-22.01/26	03.46	21.41-22.05/24	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43		23.55		23.05		21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	21.33-21.51/18	02.49	21.35-22.01/26	03.50	21.41-22.04/23	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46		23.56		23.02		21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	21.33-21.54/21	02.49	21.35-22.01/26	03.53	21.43-22.03/20	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50		23.56		22.59		21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	21.31-21.54/23	02.50	21.36-22.02/26	03.56	21.43-22.00/17	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53		23.56		22.56		21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	21.31-21.55/24	02.50	21.36-22.01/25	03.59	21.45-21.58/13	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56		23.56		22.53		21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	21.31-21.56/25	02.51	21.36-22.02/26	04.02	21.45-21.55/10	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59		23.56		22.50		21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	21.31-21.56/25	02.52	21.36-22.02/26	04.05	21.47-21.53/6	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02		23.55		22.47		21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.10	03.33	21.31-21.57/26	02.53	21.36-22.02/26	04.08	21.49-21.50/1	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	21.31-21.57/26	02.54	21.36-22.03/27	04.12		05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53		22.40		20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	21.30-21.57/27	02.56	21.37-22.03/26	04.15		05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11		23.52		22.37		20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	21.30-21.57/27	02.58	21.37-22.03/26	04.18		05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51		22.34		20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21	21.30-21.57/27			04.21		05.57		07.57		10.14
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	309		795		619		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 23 - PUU11

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 24 - PUU12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27 17.44-18.09/25	08.01	09.36
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29 17.44-18.08/24	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32 17.45-18.06/21	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35 17.46-18.03/17	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38 17.48-18.00/12	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41 17.51-17.56/5	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07 17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04 17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00 17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57 17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53 17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50 17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46 17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43 17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39 17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36 17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32 17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29 17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52 17.59-18.04/5	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25 17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55 17.54-18.07/13	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21 17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58 17.51-18.09/18	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18 17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01 17.49-18.10/21	08.29	09.08	10.15
	15.33	17.14	18.40	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14 17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04 17.48-18.11/23	08.32	09.12	10.15
	15.36	17.18	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11 17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06 17.47-18.11/24	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09 17.46-18.12/26	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12 17.45-18.12/27	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15 17.44-18.11/27	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18 17.43-18.11/28	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21 17.43-18.10/27	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24 17.43-18.10/27	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 25 - PUU13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 19.33-20.05/32	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 19.34-20.05/31	03.16	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50 19.35-20.04/29	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46 19.35-20.03/28	03.12	03.03	04.34 19.54-20.03/9	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43 19.37-20.01/24	03.09	03.05	04.37 19.51-20.06/15	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40 19.38-20.00/22	03.07	03.08	04.40 19.49-20.08/19	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 19.40-19.58/18	03.05	03.10	04.44 19.47-20.09/22	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33 19.42-19.55/13	03.03	03.12	04.47 19.45-20.11/26	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 19.47-19.50/3	03.01	03.15	04.50 19.44-20.12/28	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53 19.42-20.12/30	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 19.42-20.13/31	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03 19.47-19.58/11	04.19	02.55	03.23	04.59 19.41-20.14/33	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00 19.44-20.02/18	04.16	02.53	03.26	05.03 19.40-20.14/34	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56 19.40-20.03/23	04.13	02.52	03.29	05.06 19.39-20.14/35	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 19.39-20.05/26	04.10	02.51	03.32	05.09 19.39-20.14/35	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 19.38-20.06/28	04.06	02.50	03.34	05.12 19.39-20.15/36	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 19.36-20.06/30	04.03	02.50	03.37	05.15 19.37-20.14/37	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42 19.35-20.07/32	04.00	02.49	03.40	05.18 19.37-20.14/37	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38 19.34-20.08/34	03.57	02.49	03.43	05.21 19.37-20.14/37	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 19.33-20.08/35	03.54	02.49	03.47	05.24 19.37-20.14/37	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 19.32-20.08/36	03.51	02.49	03.50	05.27 19.37-20.13/36	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 19.32-20.09/37	03.47	02.49	03.53	05.30 19.37-20.13/36	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 19.32-20.09/37	03.44	02.50	03.56	05.33 19.38-20.12/34	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 19.31-20.08/37	03.41	02.50	03.59	05.36 19.38-20.12/34	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 19.31-20.08/37	03.38	02.51	04.02	05.39 19.38-20.10/32	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 19.31-20.08/37	03.36	02.52	04.05	05.42 19.39-20.09/30	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10 19.31-20.07/36	03.33	02.53	04.09	05.45 19.40-20.08/28	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 19.32-20.07/35	03.30	02.55	04.12	05.48 19.41-20.07/26	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 19.32-20.07/35	03.27	02.56	04.15	05.51 19.41-20.04/23	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 19.32-20.06/34	03.24	02.58	04.18	05.54 19.44-20.01/17	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57 19.47-19.58/11		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 26 - PUU14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 27 - PUU15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April	May	June	July	August	September	October		November	December
1	10.12	09.04		07.32	15.40-16.09/29	06.42	04.57	03.19	03.00	04.25	06.00	07.27		08.01	09.35
	14.36	16.06		17.36		20.09	21.41	23.20	23.49	22.27	20.40	18.53		16.07	14.43
2	10.12	09.01		07.28	15.40-16.08/28	06.39	04.53	03.17	03.00	04.28	06.03	07.29		08.04	09.38
	14.38	16.09		17.39		20.12	21.45	23.22	23.48	22.24	20.36	18.50		16.04	14.41
3	10.10	08.57		07.25	15.41-16.06/25	06.35	04.50	03.14	03.02	04.31	06.06	07.32		08.07	09.41
	14.40	16.12		17.42		20.15	21.48	23.25	23.46	22.20	20.33	18.46		16.00	14.39
4	10.09	08.54		07.21	15.43-16.05/22	06.32	04.46	03.12	03.04	04.34	06.09	07.35		08.10	09.44
	14.42	16.16		17.45		20.18	21.51	23.28	23.44	22.17	20.29	18.43		15.57	14.37
5	10.08	08.51		07.18	15.44-16.03/19	06.28	04.43	03.09	03.06	04.37	06.12	07.38		08.13	09.46
	14.44	16.19		17.49		20.21	21.54	23.30	23.43	22.14	20.25	18.39		15.54	14.35
6	10.06	08.48		07.14	15.47-15.59/12	06.25	04.40	03.07	03.08	04.41	06.15	07.41		08.17	09.49
	14.46	16.22		17.52		20.24	21.57	23.33	23.41	22.10	20.22	18.35		15.51	14.34
7	10.05	08.45		07.11		06.21	04.36	03.05	03.10	04.44	06.18	07.44	16.25-16.33/8	08.20	09.51
	14.49	16.26		17.55		20.27	22.01	23.35	23.39	22.07	20.18	18.32		15.48	14.32
8	10.03	08.42		07.07		06.17	04.33	03.03	03.13	04.47	06.21	07.47	16.21-16.37/16	08.23	09.54
	14.51	16.29		17.58		20.30	22.04	23.38	23.36	22.03	20.15	18.28		15.45	14.31
9	10.02	08.39		07.04		06.14	04.29	03.01	03.15	04.50	06.23	07.50	16.18-16.39/21	08.26	09.56
	14.54	16.32		18.01		20.33	22.07	23.40	23.34	22.00	20.11	18.25		15.42	14.29
10	10.00	08.35		07.00		06.10	04.26	02.58	03.18	04.53	06.26	07.53	16.16-16.40/24	08.30	09.58
	14.57	16.36		18.04		20.36	22.10	23.42	23.32	21.57	20.08	18.22		15.38	14.28
11	09.58	08.32		06.57		06.07	04.23	02.56	03.20	04.56	06.29	07.56	16.15-16.41/26	08.33	10.00
	14.59	16.39		18.07		20.39	22.14	23.44	23.29	21.53	20.04	18.18		15.35	14.27
12	09.56	08.29		06.53		06.03	04.20	02.55	03.23	05.00	06.32	07.59	16.13-16.42/29	08.36	10.02
	15.02	16.42		18.10		20.42	22.17	23.46	23.27	21.50	20.01	18.15		15.32	14.26
13	09.54	08.26		06.50		06.00	04.16	02.54	03.26	05.03	06.35	08.02	16.12-16.42/30	08.39	10.04
	15.05	16.45		18.13		20.45	22.20	23.48	23.24	21.46	19.57	18.11		15.29	14.25
14	09.52	08.22	15.49-16.01/12	06.46		05.56	04.13	02.52	03.29	05.06	06.38	08.05	16.12-16.43/31	08.43	10.05
	15.08	16.49		18.16		20.48	22.23	23.49	23.22	21.43	19.53	18.08		15.26	14.24
15	09.49	08.19	15.46-16.04/18	06.43		05.53	04.10	02.51	03.32	05.09	06.41	08.08	16.11-16.43/32	08.46	10.07
	15.11	16.52		18.19		20.51	22.27	23.50	23.19	21.39	19.50	18.04		15.24	14.24
16	09.47	08.16	15.45-16.07/22	06.39		05.49	04.06	02.51	03.35	05.12	06.44	08.11	16.10-16.43/33	08.49	10.09
	15.14	16.55		18.22		20.54	22.30	23.52	23.16	21.36	19.46	18.01		15.21	14.23
17	09.45	08.12	15.43-16.08/25	06.36		05.46	04.03	02.50	03.38	05.15	06.46	08.14	16.10-16.42/32	08.52	10.10
	15.17	16.58		18.25		20.57	22.33	23.53	23.13	21.32	19.43	17.57		15.18	14.23
18	09.42	08.09	15.42-16.08/26	06.32		05.42	04.00	02.50	03.41	05.18	06.49	08.17	16.10-16.43/33	08.56	10.11
	15.20	17.02		18.28		21.00	22.36	23.54	23.11	21.29	19.39	17.54		15.15	14.23
19	09.40	08.06	15.41-16.10/29	06.28		05.39	03.57	02.49	03.44	05.21	06.52	08.20	16.10-16.42/32	08.59	10.12
	15.23	17.05		18.31		21.04	22.40	23.54	23.08	21.25	19.36	17.50		15.12	14.22
20	09.37	08.02	15.40-16.10/30	06.25		05.35	03.54	02.49	03.47	05.24	06.55	08.23	16.10-16.41/31	09.02	10.13
	15.26	17.08		18.34		21.07	22.43	23.55	23.05	21.22	19.32	17.47		15.09	14.23
21	09.35	07.59	15.39-16.11/32	06.21		05.32	03.51	02.49	03.50	05.27	06.58	08.26	16.10-16.41/31	09.05	10.14
	15.30	17.11		18.37		21.10	22.46	23.55	23.02	21.18	19.29	17.44		15.07	14.23
22	09.32	07.56	15.39-16.11/32	06.18		05.28	03.48	02.50	03.53	05.30	07.01	08.29	16.10-16.40/30	09.08	10.14
	15.33	17.14		18.39		21.13	22.49	23.56	22.59	21.15	19.25	17.40		15.04	14.23
23	09.29	07.52	15.39-16.11/32	06.14		05.24	03.45	02.50	03.56	05.33	07.04	08.32	16.12-16.40/28	09.11	10.15
	15.36	17.18		18.42		21.16	22.52	23.56	22.56	21.11	19.21	17.37		15.01	14.24
24	09.27	07.49	15.38-16.11/33	06.11		05.21	03.42	02.51	03.59	05.36	07.06	08.35	16.12-16.38/26	09.15	10.15
	15.39	17.21		18.45		21.19	22.56	23.55	22.53	21.08	19.18	17.33		14.59	14.24
25	09.24	07.45	15.38-16.11/33	06.07		05.17	03.39	02.51	04.02	05.39	07.09	07.38	15.13-15.37/24	09.18	10.15
	15.43	17.24		18.48		21.22	22.59	23.55	22.49	21.04	19.14	16.30		14.56	14.25
26	09.21	07.42	15.39-16.11/32	06.04		05.14	03.36	02.52	04.05	05.42	07.12	07.41	15.14-15.35/21	09.21	10.15
	15.46	17.27		18.51		21.25	23.02	23.54	22.46	21.01	19.11	16.27		14.54	14.26
27	09.18	07.38	15.38-16.10/32	06.00		05.11	03.33	02.54	04.09	05.45	07.15	07.45	15.16-15.33/17	09.24	10.15
	15.49	17.30		18.54		21.29	23.05	23.54	22.43	20.57	19.07	16.23		14.52	14.27
28	09.15	07.35	15.38-16.09/31	05.57		05.07	03.30	02.55	04.12	05.48	07.18	07.48	15.19-15.30/11	09.27	10.15
	15.52	17.33		18.57		21.32	23.08	23.53	22.40	20.54	19.04	16.20		14.49	14.29
29	09.12			06.53		05.04	03.27	02.56	04.15	05.51	07.21	07.51		09.30	10.15
	15.56			20.00		21.35	23.11	23.52	22.37	20.50	19.00	16.17		14.47	14.30
30	09.10			06.49		05.00	03.24	02.58	04.18	05.54	07.24	07.54		09.33	10.14
	15.59			20.03		21.38	23.14	23.51	22.33	20.47	18.57	16.14		14.45	14.32
31	09.07			06.46			03.22		04.21	05.57		07.57			10.13
	16.02			20.06			23.17		22.30	20.43		16.10			14.33
Potential sun hours	171	238		363		451	570	624	608	508	393	305		198	137
Sum of minutes with flicker	0	419		135		0	0	0	0	0	0	566		0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 28 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	
1	10.13	09.04	07.32	06.42		04.57	18.27-19.39/72	03.19	18.40-19.31/51
	14.35	16.06	17.36	20.09		21.41		23.20	
2	10.12	09.01	07.28	06.39		04.53	18.27-19.39/72	03.16	18.40-19.30/50
	14.37	16.09	17.39	20.12		21.45		23.23	
3	10.11	08.57	07.25	06.35		04.50	18.27-19.39/72	03.14	18.42-19.30/48
	14.39	16.12	17.42	20.15		21.48		23.25	
4	10.09	08.54	07.21	06.32		04.46	18.27-19.39/72	03.12	18.42-19.29/47
	14.42	16.16	17.45	20.18		21.51		23.28	
5	10.08	08.51	07.18	06.28		04.43	18.27-19.39/72	03.09	18.43-19.29/46
	14.44	16.19	17.48	20.21		21.54		23.31	
6	10.07	08.48	07.14	06.25		04.39	18.26-19.39/73	03.07	18.43-19.28/45
	14.46	16.22	17.52	20.24		21.57		23.33	
7	10.05	08.45	07.11	06.21		04.36	18.26-19.39/73	03.05	18.45-19.28/43
	14.49	16.26	17.55	20.27		22.01		23.36	
8	10.03	08.42	07.07	06.17		04.33	18.26-19.38/72	03.03	18.45-19.28/43
	14.51	16.29	17.58	20.30		22.04		23.38	
9	10.02	08.39	07.04	06.14	19.50-19.56/6	04.29	18.26-19.38/72	03.01	18.46-19.28/42
	14.54	16.32	18.01	20.33	19.02-19.11/9	22.07		23.40	
10	10.00	08.35	07.00	06.10	19.49-19.59/10	04.26	18.26-19.38/72	02.58	18.47-19.27/40
	14.56	16.36	18.04	20.36	18.56-19.18/22	22.10		23.42	
11	09.58	08.32	06.57	06.07	19.47-20.01/14	04.23	18.26-19.37/71	02.56	18.48-19.27/39
	14.59	16.39	18.07	20.39	18.52-19.22/30	22.14		23.44	
12	09.56	08.29	06.53	06.03	19.47-20.04/17	04.19	18.27-19.38/71	02.55	18.48-19.27/39
	15.02	16.42	18.10	20.42	18.48-19.24/36	22.17		23.46	
13	09.54	08.26	06.50	06.00	19.47-20.07/20	04.16	18.27-19.37/70	02.53	18.50-19.27/37
	15.05	16.45	18.13	20.45	18.46-19.27/41	22.20		23.48	
14	09.52	08.22	06.46	05.56	19.46-20.06/20	04.13	18.27-19.36/69	02.52	18.50-19.26/36
	15.08	16.49	18.16	20.48	18.43-19.28/45	22.24		23.49	
15	09.49	08.19	06.43	05.53	19.46-20.06/20	04.10	18.28-19.37/69	02.51	18.51-19.27/36
	15.11	16.52	18.19	20.51	18.42-19.30/48	22.27		23.51	
16	09.47	08.16	06.39	05.49	19.47-20.05/18	04.06	18.28-19.36/68	02.50	18.51-19.26/35
	15.14	16.55	18.22	20.54	18.40-19.31/51	22.30		23.52	
17	09.45	08.12	06.36	05.46	19.46-20.04/18	04.03	18.29-19.36/67	02.50	18.51-19.26/35
	15.17	16.58	18.25	20.57	18.38-19.32/54	22.33		23.53	
18	09.42	08.09	06.32	05.42	19.47-20.03/16	04.00	18.29-19.35/66	02.49	18.52-19.27/35
	15.20	17.02	18.28	21.00	18.37-19.33/56	22.37		23.54	
19	09.40	08.06	06.28	05.38	19.49-20.01/12	03.57	18.30-19.36/66	02.49	18.52-19.27/35
	15.23	17.05	18.31	21.04	18.36-19.34/58	22.40		23.55	
20	09.37	08.02	06.25	05.35	19.51-19.58/7	03.54	18.30-19.35/65	02.49	18.53-19.27/34
	15.26	17.08	18.34	21.07	18.34-19.34/60	22.43		23.55	
21	09.35	07.59	06.21	05.31	18.33-19.35/62	03.51	18.31-19.35/64	02.49	18.53-19.27/34
	15.29	17.11	18.36	21.10		22.46		23.56	
22	09.32	07.56	06.18	05.28	18.32-19.36/64	03.47	18.32-19.35/63	02.49	18.53-19.27/34
	15.33	17.14	18.39	21.13		22.49		23.56	
23	09.29	07.52	06.14	05.24	18.32-19.37/65	03.44	18.32-19.33/61	02.50	18.54-19.28/34
	15.36	17.17	18.42	21.16		22.53		23.56	
24	09.27	07.49	06.11	05.21	18.30-19.37/67	03.41	18.33-19.33/60	02.50	18.53-19.28/35
	15.39	17.21	18.45	21.19		22.56		23.56	
25	09.24	07.45	06.07	05.17	18.29-19.37/68	03.38	18.34-19.33/59	02.51	18.54-19.28/34
	15.42	17.24	18.48	21.22		22.59		23.55	
26	09.21	07.42	06.04	05.14	18.29-19.38/69	03.36	18.35-19.33/58	02.52	18.53-19.28/35
	15.46	17.27	18.51	21.25		23.02		23.55	
27	09.18	07.38	06.00	05.10	18.29-19.38/69	03.33	18.36-19.32/56	02.53	18.53-19.29/36
	15.49	17.30	18.54	21.29		23.05		23.54	
28	09.15	07.35	05.57	05.07	18.28-19.38/70	03.30	18.36-19.32/56	02.55	18.53-19.30/37
	15.52	17.33	18.57	21.32		23.08		23.53	
29	09.13		06.53	05.04	18.28-19.39/71	03.27	18.37-19.32/55	02.56	18.53-19.30/37
	15.56		20.00	21.35		23.11		23.52	
30	09.10		06.49	05.00	18.27-19.39/72	03.24	18.38-19.31/53	02.58	18.53-19.31/38
	15.59		20.03	21.38		23.14		23.51	
31	09.07		06.46			03.22	18.38-19.30/52		
	16.02		20.06			23.17			
Potential sun hours	171	238	363	451		570		624	
Sum of minutes with flicker	0	0	0	1365		2041		1170	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 28 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	18.52-19.31/39	04.25	18.37-19.48/71	06.00	19.47-20.01/14	07.27	08.01	09.36
	23.49		22.27		20.40	18.51-19.21/30	18.53	16.07	14.43
2	03.01	18.52-19.32/40	04.28	18.37-19.48/71	06.03	19.47-19.57/10	07.29	08.04	09.38
	23.48		22.24		20.36	18.54-19.16/22	18.50	16.04	14.41
3	03.01	18.52-19.33/41	04.31	18.36-19.48/72	06.06	19.48-19.54/6	07.32	08.07	09.41
	23.46		22.20		20.33	19.00-19.09/9	18.46	16.00	14.39
4	03.03	18.51-19.33/42	04.34	18.36-19.48/72	06.09	19.50-19.51/1	07.35	08.10	09.44
	23.45		22.17		20.29		18.42	15.57	14.37
5	03.05	18.50-19.33/43	04.37	18.36-19.48/72	06.12		07.38	08.13	09.46
	23.43		22.14		20.25		18.39	15.54	14.35
6	03.08	18.50-19.35/45	04.40	18.36-19.49/73	06.15		07.41	08.17	09.49
	23.41		22.10		20.22		18.35	15.51	14.33
7	03.10	18.50-19.36/46	04.44	18.35-19.48/73	06.18		07.44	08.20	09.51
	23.39		22.07		20.18		18.32	15.48	14.32
8	03.12	18.49-19.36/47	04.47	18.36-19.48/72	06.20		07.47	08.23	09.54
	23.37		22.04		20.15		18.28	15.45	14.30
9	03.15	18.49-19.37/48	04.50	18.36-19.48/72	06.23		07.50	08.26	09.56
	23.34		22.00		20.11		18.25	15.41	14.29
10	03.18	18.49-19.37/48	04.53	18.35-19.47/72	06.26		07.53	08.30	09.58
	23.32		21.57		20.08		18.21	15.38	14.28
11	03.20	18.48-19.38/50	04.56	18.35-19.47/72	06.29		07.56	08.33	10.00
	23.30		21.53		20.04		18.18	15.35	14.27
12	03.23	18.48-19.39/51	04.59	18.35-19.47/72	06.32		07.59	08.36	10.02
	23.27		21.50		20.01		18.14	15.32	14.26
13	03.26	18.47-19.40/53	05.03	18.36-19.47/71	06.35		08.02	08.39	10.04
	23.24		21.46		19.57		18.11	15.29	14.25
14	03.29	18.46-19.40/54	05.06	18.35-19.46/71	06.38		08.05	08.43	10.06
	23.22		21.43		19.53		18.08	15.26	14.24
15	03.32	18.46-19.41/55	05.09	18.35-19.46/71	06.41		08.08	08.46	10.07
	23.19		21.39		19.50		18.04	15.23	14.23
16	03.34	18.45-19.41/56	05.12	18.36-19.45/69	06.43		08.11	08.49	10.09
	23.16		21.36		19.46		18.01	15.21	14.23
17	03.37	18.44-19.42/58	05.15	18.35-19.44/69	06.46		08.14	08.52	10.10
	23.14		21.32		19.43		17.57	15.18	14.23
18	03.40	18.44-19.42/58	05.18	18.36-19.43/67	06.49		08.17	08.56	10.11
	23.11		21.29		19.39		17.54	15.15	14.22
19	03.43	18.44-19.43/59	05.21	18.37-19.43/66	06.52		08.20	08.59	10.12
	23.08		21.26		19.36		17.50	15.12	14.22
20	03.47	18.43-19.43/60	05.24	18.37-19.42/65	06.55		08.23	09.02	10.13
	23.05		21.22		19.32		17.47	15.09	14.22
21	03.50	18.42-19.44/62	05.27	18.37-19.41/64	06.58		08.26	09.05	10.14
	23.02		21.19		19.28		17.44	15.07	14.23
22	03.53	18.42-19.45/63	05.30	18.38-19.40/62	07.01		08.29	09.08	10.15
	22.59		21.15		19.25		17.40	15.04	14.23
23	03.56	18.41-19.45/64	05.33	19.55-20.03/8	07.04		08.32	09.12	10.15
	22.56		21.11	18.39-19.39/60	19.21		17.37	15.01	14.24
24	03.59	18.41-19.46/65	05.36	19.52-20.05/13	07.06		08.35	09.15	10.15
	22.53		21.08	18.40-19.38/58	19.18		17.33	14.59	14.24
25	04.02	18.40-19.46/66	05.39	19.50-20.05/15	07.09		07.38	09.18	10.16
	22.50		21.04	18.40-19.36/56	19.14		16.30	14.56	14.25
26	04.05	18.40-19.47/67	05.42	19.49-20.06/17	07.12		07.41	09.21	10.16
	22.46		21.01	18.41-19.34/53	19.11		16.27	14.54	14.26
27	04.09	18.39-19.46/67	05.45	19.48-20.07/19	07.15		07.45	09.24	10.15
	22.43		20.57	18.42-19.33/51	19.07		16.23	14.51	14.27
28	04.12	18.39-19.47/68	05.48	19.48-20.07/19	07.18		07.48	09.27	10.15
	22.40		20.54	18.44-19.31/47	19.04		16.20	14.49	14.29
29	04.15	18.38-19.47/69	05.51	19.47-20.06/19	07.21		07.51	09.30	10.15
	22.37		20.50	18.44-19.28/44	19.00		16.17	14.47	14.30
30	04.18	18.38-19.48/70	05.54	19.47-20.06/19	07.24		07.54	09.33	10.14
	22.34		20.47	18.46-19.26/40	18.57		16.13	14.45	14.31
31	04.21	18.38-19.48/70	05.57	19.47-20.04/17			07.57		10.14
	22.30		20.43	18.48-19.24/36			16.10		14.33
Potential sun hours	609		509		393		305	198	137
Sum of minutes with flicker	1724		2130		92		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 29 - PUU17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.19 21.26-21.38/12	02.59	04.24 21.34-21.37/3	06.00	07.26	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16 21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40
3	10.11	08.57	07.25	06.35	04.50	03.14 21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11 21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12 21.38-21.40/2	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15 21.36-21.43/7	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17 21.35-21.44/9	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 21.24-21.25/1	02.56	03.20 21.34-21.46/12	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 21.24-21.28/4	02.54	03.23 21.33-21.46/13	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 21.22-21.31/9	02.53	03.26 21.32-21.46/14	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.21-21.33/12	02.52	03.28 21.32-21.48/16	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09 21.21-21.36/15	02.51	03.31 21.32-21.49/17	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.20-21.38/18	02.50	03.34 21.31-21.49/18	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.20-21.40/20	02.49	03.37 21.31-21.49/18	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.20-21.41/21	02.49	03.40 21.30-21.50/20	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57 21.19-21.40/21	02.49	03.43 21.31-21.51/20	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 21.20-21.41/21	02.49	03.46 21.30-21.51/21	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.20-21.41/21	02.49	03.49 21.30-21.51/21	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47 21.19-21.41/22	02.49	03.53 21.30-21.51/21	05.30	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44 21.20-21.41/21	02.49	03.56 21.30-21.51/21	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 21.20-21.41/21	02.50	03.59 21.30-21.51/21	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.21-21.41/20	02.51	04.02 21.30-21.51/21	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35 21.21-21.41/20	02.52	04.05 21.30-21.51/21	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32 21.22-21.40/18	02.53	04.08 21.31-21.50/19	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30 21.23-21.40/17	02.54	04.12 21.31-21.48/17	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27 21.23-21.39/16	02.56	04.15 21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24 21.24-21.39/15	02.57	04.18 21.32-21.43/11	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21 21.24-21.38/14		04.21 21.33-21.40/7	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 30 - PUU18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 31 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June
1	10.12	09.03		07.31	10.17-11.31/74	06.42	18.43-19.15/32	04.57	20.16-20.31/15	03.19
	14.35	16.06		17.36		20.09		21.41		23.20
2	10.11	09.00		07.28	10.17-11.31/74	06.39	18.42-19.14/32	04.53	20.18-20.29/11	03.16
	14.37	16.09		17.39		20.12		21.44		23.22
3	10.10	08.57		07.25	10.16-11.30/74	06.35	18.42-19.15/33	04.50	20.20-20.26/6	03.14
	14.39	16.12		17.42		20.15		21.48		23.25
4	10.09	08.54		07.21	10.16-11.31/75	06.32	18.41-19.14/33	04.46		03.12
	14.42	16.16		17.45		20.18		21.51		23.28
5	10.08	08.51		07.18	10.15-11.31/76	06.28	18.42-19.14/32	04.43		03.09
	14.44	16.19		17.48		20.21		21.54		23.30
6	10.06	08.48		07.14	10.15-11.30/75	06.24	18.42-19.14/32	04.39		03.07
	14.46	16.22		17.51		20.24		21.57		23.33
7	10.05	08.45		07.11	10.15-11.31/76	06.21	18.42-19.13/31	04.36		03.05
	14.49	16.26		17.55		20.27		22.01		23.35
8	10.03	08.42		07.07	10.14-11.30/76	06.17	18.42-19.12/30	04.33		03.03
	14.51	16.29		17.58		20.30		22.04		23.38
9	10.02	08.38		07.04	10.14-11.30/76	06.14	18.42-19.11/29	04.29		03.01
	14.54	16.32		18.01		20.33		22.07		23.40
10	10.00	08.35	10.48-11.03/15	07.00	10.15-11.30/75	06.10	18.43-19.10/27	04.26		02.58
	14.56	16.35		18.04		20.36		22.10		23.42
11	09.58	08.32	10.43-11.08/25	06.57	10.14-11.29/75	06.07	18.44-19.08/24	04.23		02.56
	14.59	16.39		18.07		20.39		22.14		23.44
12	09.56	08.29	10.40-11.12/32	06.53	10.15-11.29/74	06.03	18.46-19.06/20	04.19		02.55
	15.02	16.42		18.10		20.42		22.17		23.46
13	09.54	08.25	10.37-11.14/37	06.50	10.15-11.28/73	06.00	18.48-19.04/16	04.16		02.53
	15.05	16.45		18.13		20.45		22.20		23.47
14	09.52	08.22	10.34-11.16/42	06.46	10.14-11.27/73	05.56	18.51-19.00/9	04.13		02.52
	15.08	16.49		18.16		20.48		22.23		23.49
15	09.49	08.19	10.32-11.18/46	06.43	10.15-11.26/71	05.53		04.10		02.51
	15.11	16.52		18.19		20.51		22.27		23.50
16	09.47	08.16	10.31-11.20/49	06.39	10.15-11.25/70	05.49		04.06		02.50
	15.14	16.55		18.22		20.54		22.30		23.52
17	09.45	08.12	10.29-11.22/53	06.35	10.15-11.23/68	05.45		04.03		02.50
	15.17	16.58		18.25		20.57		22.33		23.53
18	09.42	08.09	10.27-11.23/56	06.32	10.16-11.23/67	05.42		04.00		02.49
	15.20	17.01		18.28		21.00		22.36		23.54
19	09.40	08.06	10.27-11.25/58	06.28	10.16-11.21/65	05.38	20.21-20.25/4	03.57		02.49
	15.23	17.05		18.30		21.03		22.40		23.54
20	09.37	08.02	10.25-11.25/60	06.25	10.18-11.20/62	05.35	20.18-20.27/9	03.54		02.49
	15.26	17.08		18.33		21.07		22.43		23.55
21	09.35	07.59	10.24-11.26/62	06.21	10.18-11.18/60	05.31	20.17-20.30/13	03.51		02.49
	15.29	17.11		18.36		21.10		22.46		23.55
22	09.32	07.55	10.22-11.27/65	06.18	10.20-11.16/56	05.28	20.16-20.33/17	03.47		02.49
	15.33	17.14		18.39		21.13		22.49		23.56
23	09.29	07.52	10.22-11.28/66	06.14	10.20-11.14/54	05.24	20.16-20.36/20	03.44		02.50
	15.36	17.17		18.42		21.16		22.52		23.56
24	09.27	07.49	10.21-11.29/68	06.11	10.21-11.11/50	05.21	20.15-20.35/20	03.41		02.50
	15.39	17.21		18.45		21.19		22.56		23.55
25	09.24	07.45	10.19-11.29/70	06.07	17.55-18.08/13	05.17	20.14-20.35/21	03.38		02.51
	15.42	17.24		18.48	10.24-11.08/44	21.22		22.59		23.55
26	09.21	07.42	10.19-11.30/71	06.04	17.52-18.10/18	05.14	20.14-20.35/21	03.36		02.52
	15.46	17.27		18.51	10.26-11.05/39	21.25		23.02		23.54
27	09.18	07.38	10.18-11.30/72	06.00	17.50-18.12/22	05.10	20.15-20.35/20	03.33		02.53
	15.49	17.30		18.54	10.29-11.01/32	21.28		23.05		23.54
28	09.15	07.35	10.17-11.30/73	05.56	17.48-18.13/25	05.07	20.15-20.34/19	03.30		02.55
	15.52	17.33		18.57	10.33-10.54/21	21.32		23.08		23.53
29	09.12			06.53	18.47-19.14/27	05.03	20.15-20.34/19	03.27		02.56
	15.56			20.00		21.35		23.11		23.52
30	09.09			06.49	18.45-19.14/29	05.00	20.15-20.32/17	03.24		02.58
	15.59			20.03		21.38		23.14		23.51
31	09.06			06.46	18.44-19.14/30			03.22		
	16.02			20.06				23.17		
Potential sun hours	171	238		363		451		570		624
Sum of minutes with flicker	0	1020		1969		580		32		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 31 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November		December
1	03.00	04.24		06.00	18.44-19.08/24	07.26	10.53-12.07/74	08.00	10.19-10.31/12	09.35
	23.49	22.27		20.40		18.53		16.07		14.43
2	03.00	04.28		06.03	18.41-19.08/27	07.29	10.53-12.07/74	08.04		09.38
	23.48	22.24		20.36		18.49		16.04		14.41
3	03.01	04.31		06.06	18.40-19.09/29	07.32	10.52-12.07/75	08.07		09.41
	23.46	22.20		20.32		18.46		16.00		14.39
4	03.03	04.34		06.09	18.39-19.09/30	07.35	10.52-12.07/75	08.10		09.44
	23.44	22.17		20.29		18.42		15.57		14.37
5	03.06	04.37		06.12	18.39-19.10/31	07.38	10.51-12.07/76	08.13		09.46
	23.43	22.14		20.25		18.39		15.54		14.35
6	03.08	04.40		06.15	18.37-19.09/32	07.41	10.51-12.06/75	08.17		09.49
	23.41	22.10		20.22		18.35		15.51		14.33
7	03.10	04.44		06.18	18.37-19.09/32	07.44	10.50-12.06/76	08.20		09.51
	23.39	22.07		20.18		18.32		15.48		14.32
8	03.13	04.47		06.20	18.37-19.09/32	07.47	10.51-12.07/76	08.23		09.53
	23.36	22.03		20.15		18.28		15.45		14.30
9	03.15	04.50		06.23	18.36-19.09/33	07.50	10.51-12.06/75	08.26		09.56
	23.34	22.00		20.11		18.25		15.41		14.29
10	03.18	04.53	20.29-20.37/8	06.26	18.35-19.08/33	07.53	10.50-12.05/75	08.30		09.58
	23.32	21.57		20.08		18.21		15.38		14.28
11	03.20	04.56	20.26-20.39/13	06.29	18.36-19.07/31	07.56	10.50-12.05/75	08.33		10.00
	23.29	21.53		20.04		18.18		15.35		14.27
12	03.23	04.59	20.25-20.40/15	06.32	18.36-19.07/31	07.59	10.50-12.04/74	08.36		10.02
	23.27	21.50		20.00		18.14		15.32		14.26
13	03.26	05.02	20.23-20.40/17	06.35	18.37-19.06/29	08.02	10.50-12.03/73	08.39		10.04
	23.24	21.46		19.57		18.11		15.29		14.25
14	03.29	05.06	20.23-20.41/18	06.38	18.36-19.04/28	08.05	10.51-12.03/72	08.43		10.05
	23.22	21.43		19.53		18.08		15.26		14.24
15	03.32	05.09	20.22-20.42/20	06.41	18.37-19.03/26	08.08	10.51-12.02/71	08.46		10.07
	23.19	21.39		19.50	11.24-11.43/19	18.04		15.23		14.23
16	03.34	05.12	20.22-20.42/20	06.43	18.38-19.01/23	08.11	10.51-12.01/70	08.49		10.08
	23.16	21.36		19.46	11.18-11.49/31	18.01		15.20		14.23
17	03.37	05.15	20.21-20.41/20	06.46	18.40-18.59/19	08.14	10.51-12.00/69	08.52		10.10
	23.13	21.32		19.43	11.15-11.52/37	17.57		15.18		14.23
18	03.40	05.18	20.21-20.41/20	06.49	18.42-18.56/14	08.17	10.53-12.00/67	08.55		10.11
	23.11	21.29		19.39	11.12-11.55/43	17.54		15.15		14.22
19	03.43	05.21	20.21-20.41/20	06.52	18.47-18.49/2	08.20	10.53-11.59/66	08.59		10.12
	23.08	21.25		19.36	11.10-11.58/48	17.50		15.12		14.22
20	03.47	05.24	20.21-20.41/20	06.55	11.07-11.59/52	08.23	10.53-11.57/64	09.02		10.13
	23.05	21.22		19.32		17.47		15.09		14.22
21	03.50	05.27	20.21-20.37/16	06.58	11.05-12.01/56	08.26	10.55-11.57/62	09.05		10.14
	23.02	21.18		19.28		17.43		15.07		14.23
22	03.53	05.30	20.22-20.34/12	07.01	11.03-12.02/59	08.29	10.55-11.55/60	09.08		10.14
	22.59	21.15		19.25		17.40		15.04		14.23
23	03.56	05.33	20.23-20.31/8	07.03	11.02-12.03/61	08.32	10.57-11.54/57	09.11		10.15
	22.56	21.11		19.21		17.37		15.01		14.24
24	03.59	05.36	20.25-20.28/3	07.06	11.01-12.04/63	08.35	10.58-11.52/54	09.15		10.15
	22.53	21.08		19.18		17.33		14.59		14.24
25	04.02	05.39		07.09	10.59-12.05/66	07.38	09.59-10.51/52	09.18		10.15
	22.49	21.04		19.14		16.30		14.56		14.25
26	04.05	05.42		07.12	10.58-12.06/68	07.41	10.00-10.49/49	09.21		10.15
	22.46	21.01		19.11		16.27		14.54		14.26
27	04.09	05.45		07.15	10.56-12.06/70	07.45	10.02-10.48/46	09.24		10.15
	22.43	20.57		19.07		16.23		14.51		14.27
28	04.12	05.48		07.18	10.56-12.06/70	07.48	10.04-10.45/41	09.27		10.15
	22.40	20.54		19.04		16.20		14.49		14.29
29	04.15	05.51	18.51-19.01/10	07.21	10.55-12.07/72	07.51	10.06-10.43/37	09.30		10.15
	22.37	20.50		19.00		16.17		14.47		14.30
30	04.18	05.54	18.48-19.04/16	07.24	10.54-12.07/73	07.54	10.10-10.41/31	09.33		10.14
	22.33	20.47		18.56		16.13		14.45		14.31
31	04.21	05.57	18.46-19.06/20			07.57	10.14-10.37/23			10.13
	22.30	20.43				16.10				14.33
Potential sun hours	608	508		393		305		198		137
Sum of minutes with flicker	0	276		1394		1964		12		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 32 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	
1	10.12	09.03	07.31	06.42		04.56	06.40-07.45/65	03.19	21.26-21.46/20 06.41-07.42/61
	14.35	16.06	17.36	20.09		21.41		23.20	20.27-21.08/41
2	10.12	09.00	07.28	06.39		04.53	06.40-07.45/65	03.16	21.27-21.46/19 06.42-07.42/60
	14.37	16.09	17.39	20.12		21.44		23.23	20.27-21.08/41
3	10.10	08.57	07.25	06.35		04.50	06.39-07.45/66	03.14	21.28-21.45/17 06.42-07.42/60
	14.39	16.12	17.42	20.15		21.48		23.25	20.27-21.07/40
4	10.09	08.54	07.21	06.32		04.46	20.40-20.51/11	03.11	21.29-21.45/16 06.42-07.41/59
	14.41	16.16	17.45	20.18		21.51	06.39-07.46/67	23.28	20.27-21.08/41
5	10.08	08.51	07.18	06.28		04.43	20.36-20.54/18	03.09	21.30-21.45/15 06.43-07.42/59
	14.44	16.19	17.48	20.21		21.54	06.38-07.46/68	23.31	20.28-21.08/40
6	10.06	08.48	07.14	06.24		04.39	20.35-20.57/22	03.07	21.30-21.44/14 06.43-07.41/58
	14.46	16.22	17.51	20.24		21.57	06.38-07.46/68	23.33	20.28-21.07/39
7	10.05	08.45	07.11	06.21		04.36	20.33-20.59/26	03.05	21.31-21.44/13 06.44-07.41/57
	14.49	16.26	17.54	20.27		22.01	06.37-07.46/69	23.35	20.28-21.07/39
8	10.03	08.42	07.07	06.17		04.33	20.32-21.00/28	03.03	21.32-21.44/12 06.44-07.41/57
	14.51	16.29	17.57	20.30		22.04	06.37-07.46/69	23.38	20.29-21.07/38
9	10.02	08.38	07.04	06.14		04.29	20.30-21.01/31	03.01	21.33-21.43/10 06.45-07.41/56
	14.54	16.32	18.01	20.33		22.07	06.37-07.46/69	23.40	20.29-21.08/39
10	10.00	08.35	07.00	06.10		04.26	20.29-21.02/33	02.57	21.34-21.43/9 06.45-07.40/55
	14.56	16.35	18.04	20.36		22.10	06.36-07.46/70	23.42	20.30-21.08/38
11	09.58	08.32	06.57	06.07		04.23	20.28-21.03/35	02.56	21.35-21.42/7 06.45-07.40/55
	14.59	16.39	18.07	20.39		22.14	06.36-07.46/70	23.44	20.30-21.07/37
12	09.56	08.29	06.53	06.03		04.19	21.24-21.28/4 06.36-07.46/70	02.54	21.36-21.41/5 06.45-07.40/55
	15.02	16.42	18.10	20.42		22.17	20.28-21.04/36	23.46	20.30-21.07/37
13	09.54	08.25	06.50	06.00		04.16	21.22-21.31/9 06.36-07.46/70	02.53	21.39-21.40/1 06.46-07.40/54
	15.05	16.45	18.13	20.45		22.20	20.27-21.04/37	23.48	20.31-21.08/37
14	09.52	08.22	06.46	05.56		04.13	21.21-21.33/12 06.36-07.46/70	02.52	20.31-21.08/37
	15.08	16.49	18.16	20.48		22.23	20.26-21.05/39	23.49	06.46-07.40/54
15	09.49	08.19	06.42	05.52		04.09	21.21-21.36/15 06.36-07.46/70	02.51	20.32-21.08/36
	15.11	16.52	18.19	20.51		22.27	20.26-21.06/40	23.51	06.47-07.40/53
16	09.47	08.16	06.39	05.49	07.09-07.23/14	04.06	21.21-21.38/17 06.36-07.46/70	02.50	20.31-21.08/37
	15.14	16.55	18.22	20.54		22.30	20.26-21.06/40	23.52	06.47-07.40/53
17	09.45	08.12	06.35	05.45	07.03-07.27/24	04.03	21.20-21.40/20 06.37-07.46/69	02.50	20.32-21.08/36
	15.17	16.58	18.24	20.57		22.33	20.25-21.06/41	23.53	06.47-07.40/53
18	09.42	08.09	06.32	05.42	07.00-07.30/30	04.00	21.20-21.44/24 06.36-07.45/69	02.49	20.32-21.08/36
	15.20	17.01	18.27	21.00		22.36	20.25-21.06/41	23.54	06.48-07.40/52
19	09.40	08.06	06.28	05.38	06.57-07.33/36	03.57	21.19-21.45/26 06.37-07.46/69	02.49	20.33-21.09/36
	15.23	17.05	18.30	21.03		22.40	20.24-21.06/42	23.55	06.48-07.41/53
20	09.37	08.02	06.25	05.35	06.54-07.34/40	03.54	21.20-21.46/26 06.37-07.45/68	02.49	20.33-21.09/36
	15.26	17.08	18.33	21.07		22.43	20.25-21.07/42	23.55	06.48-07.41/53
21	09.35	07.59	06.21	05.31	06.52-07.36/44	03.50	21.20-21.47/27 06.37-07.45/68	02.49	20.33-21.09/36
	15.29	17.11	18.36	21.10		22.46	20.25-21.07/42	23.55	06.49-07.41/52
22	09.32	07.55	06.18	05.28	06.50-07.38/48	03.47	21.20-21.46/26 06.38-07.45/67	02.49	20.33-21.09/36
	15.33	17.14	18.39	21.13		22.49	20.24-21.07/43	23.56	06.48-07.41/53
23	09.29	07.52	06.14	05.24	06.49-07.39/50	03.44	21.20-21.46/26 06.37-07.44/67	02.50	20.34-21.10/36
	15.36	17.17	18.42	21.16		22.52	20.24-21.07/43	23.56	06.49-07.42/53
24	09.27	07.49	06.11	05.21	06.47-07.39/52	03.41	21.21-21.47/26 06.38-07.44/66	02.50	20.33-21.09/36
	15.39	17.20	18.45	21.19		22.56	20.25-21.07/42	23.55	06.49-07.42/53
25	09.24	07.45	06.07	05.17	06.45-07.40/55	03.38	21.21-21.47/26 06.38-07.44/66	02.51	20.34-21.10/36
	15.42	17.24	18.48	21.22		22.59	20.25-21.08/43	23.55	06.50-07.42/52
26	09.21	07.42	06.04	05.14	06.44-07.41/57	03.35	21.22-21.47/25 06.39-07.44/65	02.52	20.34-21.10/36
	15.46	17.27	18.51	21.25		23.02	20.25-21.08/43	23.55	06.49-07.42/53
27	09.18	07.38	06.00	05.10	06.43-07.42/59	03.33	21.22-21.47/25 06.39-07.44/65	02.53	20.34-21.10/36
	15.49	17.30	18.54	21.28		23.05	20.25-21.08/43	23.54	06.49-07.43/54
28	09.15	07.35	05.56	05.07	06.43-07.43/60	03.30	21.23-21.47/24 06.40-07.43/63	02.54	20.34-21.11/37
	15.52	17.33	18.57	21.32		23.08	20.25-21.08/43	23.53	06.50-07.43/53
29	09.12		06.53	05.03	06.42-07.44/62	03.27	21.23-21.47/24 06.40-07.43/63	02.56	20.34-21.11/37
	15.56		20.00	21.35		23.11	20.26-21.08/42	23.52	06.50-07.44/54
30	09.09		06.49	05.00	06.41-07.44/63	03.24	21.24-21.46/22 06.40-07.42/62	02.58	21.41-21.45/4 06.50-07.44/54
	15.59		20.03	21.38		23.14	20.26-21.08/42	23.51	20.34-21.12/38
31	09.06		06.46			03.21	21.25-21.46/21 06.40-07.42/62		
	16.02		20.06			23.17	20.26-21.07/41		
Potential sun hours	171	238	363	451		570		624	
Sum of minutes with flicker	0	0	0	694		3539		2935	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 32 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.59 21.40-21.46/6 06.50-07.44/54	04.24 21.34-21.37/3 06.46-07.56/70	06.00	07.26	08.00	09.35
	23.49 20.34-21.12/38	22.27 20.38-21.14/36	20.40	18.53	16.07	14.43
2	03.01 21.39-21.47/8 06.49-07.45/56	04.28 20.39-21.13/34	06.03	07.29	08.04	09.38
	23.48 20.34-21.12/38	22.24 06.47-07.57/70	20.36	18.49	16.04	14.40
3	03.01 21.38-21.48/10 06.50-07.46/56	04.31 20.39-21.12/33	06.06	07.32	08.07	09.41
	23.46 20.34-21.12/38	22.20 06.46-07.56/70	20.32	18.46	16.00	14.39
4	03.03 21.38-21.49/11 06.50-07.46/56	04.34 20.41-21.11/30	06.09	07.35	08.10	09.44
	23.45 20.34-21.13/39	22.17 06.47-07.56/69	20.29	18.42	15.57	14.37
5	03.05 21.37-21.49/12 06.49-07.46/57	04.37 20.42-21.10/28	06.12	07.38	08.13	09.46
	23.43 20.34-21.13/39	22.14 06.47-07.56/69	20.25	18.39	15.54	14.35
6	03.08 21.37-21.51/14 06.50-07.47/57	04.40 20.43-21.08/25	06.15	07.41	08.17	09.49
	23.41 20.34-21.14/40	22.10 06.47-07.56/69	20.22	18.35	15.51	14.33
7	03.10 21.36-21.51/15 06.50-07.48/58	04.44 20.45-21.06/21	06.17	07.44	08.20	09.51
	23.39 20.34-21.13/39	22.07 06.47-07.55/68	20.18	18.32	15.48	14.32
8	03.12 21.36-21.52/16 06.49-07.48/59	04.47 20.47-21.03/16	06.20	07.47	08.23	09.54
	23.36 20.34-21.14/40	22.03 06.47-07.55/68	20.15	18.28	15.44	14.30
9	03.15 21.36-21.53/17 06.49-07.49/60	04.50 20.51-21.00/9	06.23	07.50	08.26	09.56
	23.34 20.34-21.15/41	22.00 06.48-07.55/67	20.11	18.25	15.41	14.29
10	03.17 21.36-21.53/17 06.49-07.49/60	04.53 06.47-07.53/66	06.26	07.53	08.30	09.58
	23.32 20.35-21.15/40	21.57	20.08	18.21	15.38	14.28
11	03.20 21.35-21.54/19 06.49-07.50/61	04.56 06.48-07.53/65	06.29	07.56	08.33	10.00
	23.29 20.35-21.16/41	21.53	20.04	18.18	15.35	14.26
12	03.23 21.34-21.55/21 06.49-07.51/62	04.59 06.49-07.53/64	06.32	07.59	08.36	10.02
	23.27 20.34-21.15/41	21.50	20.00	18.14	15.32	14.25
13	03.26 21.32-21.55/23 06.49-07.51/62	05.02 06.49-07.52/63	06.35	08.02	08.39	10.04
	23.24 20.34-21.15/41	21.46	19.57	18.11	15.29	14.25
14	03.29 21.33-21.55/22 06.49-07.52/63	05.06 06.49-07.51/62	06.38	08.05	08.43	10.05
	23.22 20.35-21.17/42	21.43	19.53	18.07	15.26	14.24
15	03.31 21.32-21.56/24 06.49-07.52/63	05.09 06.50-07.50/60	06.41	08.08	08.46	10.07
	23.19 20.34-21.17/43	21.39	19.50	18.04	15.23	14.23
16	03.34 21.32-21.56/24 06.48-07.52/64	05.12 06.51-07.49/58	06.43	08.11	08.49	10.09
	23.16 20.34-21.17/43	21.36	19.46	18.01	15.20	14.23
17	03.37 21.31-21.56/25 06.48-07.53/65	05.15 06.51-07.47/56	06.46	08.14	08.52	10.10
	23.13 20.34-21.17/43	21.32	19.43	17.57	15.18	14.22
18	03.40 21.30-21.56/26 06.48-07.53/65	05.18 06.52-07.47/55	06.49	08.17	08.56	10.11
	23.11 20.34-21.17/43	21.29	19.39	17.54	15.15	14.22
19	03.43 21.31-21.57/26 06.48-07.54/66	05.21 06.53-07.45/52	06.52	08.20	08.59	10.12
	23.08 20.35-21.17/42	21.25	19.35	17.50	15.12	14.22
20	03.46 21.30-21.57/27 06.48-07.54/66	05.24 06.55-07.44/49	06.55	08.23	09.02	10.13
	23.05 20.35-21.17/42	21.22	19.32	17.47	15.09	14.22
21	03.50 21.30-21.56/26 06.47-07.54/67	05.27 06.55-07.42/47	06.58	08.26	09.05	10.14
	23.02 20.34-21.17/43	21.18	19.28	17.43	15.06	14.23
22	03.53 21.30-21.57/27 06.48-07.55/67	05.30 06.57-07.40/43	07.01	08.29	09.08	10.14
	22.59 20.35-21.18/43	21.15	19.25	17.40	15.04	14.23
23	03.56 21.30-21.56/26 06.47-07.55/68	05.33 06.59-07.38/39	07.03	08.32	09.11	10.15
	22.56 20.35-21.17/42	21.11	19.21	17.37	15.01	14.23
24	03.59 21.30-21.57/27 06.47-07.56/69	05.36 07.01-07.36/35	07.06	08.35	09.15	10.15
	22.53 20.35-21.16/41	21.08	19.18	17.33	14.59	14.24
25	04.02 21.30-21.55/25 06.47-07.56/69	05.39 07.03-07.33/30	07.09	07.38	09.18	10.15
	22.49 20.35-21.17/42	21.04	19.14	16.30	14.56	14.25
26	04.05 21.30-21.53/23 06.47-07.56/69	05.42 07.06-07.29/23	07.12	07.41	09.21	10.15
	22.46 20.35-21.16/41	21.01	19.11	16.27	14.54	14.26
27	04.08 21.31-21.50/19 06.47-07.56/69	05.45 07.11-07.24/13	07.15	07.45	09.24	10.15
	22.43 20.36-21.16/40	20.57	19.07	16.23	14.51	14.27
28	04.12 21.32-21.48/16 06.47-07.57/70	05.48	07.18	07.48	09.27	10.15
	22.40 20.37-21.16/39	20.54	19.04	16.20	14.49	14.28
29	04.15 21.31-21.45/14 06.46-07.56/70	05.51	07.21	07.51	09.30	10.15
	22.37 20.37-21.15/38	20.50	19.00	16.17	14.47	14.30
30	04.18 21.33-21.43/10 06.47-07.57/70	05.54	07.24	07.54	09.33	10.14
	22.33 20.37-21.15/38	20.47	18.56	16.13	14.45	14.31
31	04.21 21.33-21.39/6 06.47-07.57/70	05.57		07.57		10.13
	22.30 20.37-21.14/37	20.43		16.10		14.33
Potential sun hours	609	509	393	305	198	137
Sum of minutes with flicker	3807	1735	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 33 - PUU21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56		03.19	04.41-05.13/32	02.59	04.45-05.20/35	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41		23.20		23.50		22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53		03.16	04.40-05.13/33	03.01	04.45-05.20/35	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44		23.23		23.48		22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.50		03.14	04.40-05.14/34	03.01	04.46-05.21/35	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48		23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46		03.11	04.40-05.13/33	03.03	04.46-05.20/34	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51		23.28		23.45		22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43		03.09	04.40-05.14/34	03.05	04.45-05.20/35	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.31		23.43		22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39		03.07	04.40-05.14/34	03.07	04.46-05.20/34	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57		23.33		23.41		22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36		03.05	04.40-05.14/34	03.10	04.47-05.21/34	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01		23.36		23.39		22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33		03.03	04.40-05.15/35	03.12	04.47-05.20/33	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04		23.38		23.37		22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29		03.01	04.40-05.15/35	03.15	04.47-05.20/33	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07		23.40		23.34		22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26		02.57	04.40-05.15/35	03.17	04.48-05.21/33	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10		23.42		23.32		21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22		02.56	04.40-05.15/35	03.20	04.48-05.21/33	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14		23.44		23.30		21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19		02.54	04.40-05.15/35	03.23	04.49-05.21/32	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17		23.46		23.27		21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	05.59	04.16		02.53	04.41-05.16/35	03.25	04.49-05.20/31	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20		23.48		23.24		21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13		02.52	04.41-05.16/35	03.28	04.50-05.20/30	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.23		23.49		23.22		21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09		02.51	04.41-05.17/36	03.31	04.50-05.20/30	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27		23.51		23.19		21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06		02.50	04.41-05.16/35	03.34	04.51-05.19/28	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30		23.52		23.16		21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03		02.49	04.41-05.17/36	03.37	04.51-05.18/27	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33		23.53		23.14		21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00		02.49	04.42-05.17/35	03.40	04.52-05.18/26	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37		23.54		23.11		21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	04.53-04.58/5	02.49	04.42-05.18/36	03.43	04.53-05.18/25	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40		23.55		23.08		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	04.49-05.01/12	02.49	04.42-05.18/36	03.46	04.54-05.17/23	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43		23.55		23.05		21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	04.47-05.04/17	02.49	04.42-05.18/36	03.49	04.55-05.15/20	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46		23.56		23.02		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	04.46-05.05/19	02.49	04.42-05.18/36	03.52	04.57-05.15/18	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49		23.56		22.59		21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	04.44-05.06/22	02.49	04.43-05.19/36	03.56	04.58-05.13/15	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53		23.56		22.56		21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	04.44-05.07/23	02.50	04.43-05.18/35	03.59	05.01-05.11/10	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56		23.56		22.53		21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	04.43-05.08/25	02.51	04.43-05.19/36	04.02		05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59		23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	04.42-05.09/27	02.52	04.43-05.19/36	04.05		05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02		23.55		22.46		21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	04.42-05.10/28	02.53	04.44-05.19/35	04.08		05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	04.41-05.10/29	02.54	04.44-05.19/35	04.11		05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08		23.53		22.40		20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	04.41-05.11/30	02.56	04.44-05.20/36	04.15		05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11		23.52		22.37		20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	04.40-05.11/31	02.57	04.44-05.20/36	04.18		05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14		23.51		22.33		20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21	04.40-05.11/31			04.21		05.57		07.57		10.14
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	299		1050		689		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 34 - PUU22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19		02.59	04.09-04.25/16	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20		23.50		22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16		03.01	04.10-04.24/14	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23		23.48		22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14		03.01	04.12-04.25/13	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25		23.47		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	04.13-04.16/3	03.03	04.13-04.25/12	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28		23.45		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	04.12-04.17/5	03.05	04.14-04.24/10	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31		23.43		22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	04.10-04.17/7	03.07	04.16-04.24/8	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33		23.41		22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	04.09-04.18/9	03.10	04.18-04.24/6	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36		23.39		22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	04.08-04.19/11	03.12	04.19-04.23/4	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38		23.37		22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	04.07-04.19/12	03.15	04.21-04.22/1	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	04.06-04.20/14	03.17		04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.32		21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	04.05-04.20/15	03.20		04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44		23.30		21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	04.04-04.20/16	03.23		04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46		23.27		21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	04.04-04.21/17	03.25		05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48		23.25		21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	04.03-04.21/18	03.28		05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49		23.22		21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51	04.03-04.22/19	03.31		05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51		23.19		21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	04.02-04.22/20	03.34		05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	04.02-04.22/20	03.37		05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53		23.14		21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	04.02-04.23/21	03.40		05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54		23.11		21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	04.03-04.23/20	03.43		05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55		23.08		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	04.03-04.23/20	03.46		05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55		23.05		21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	04.03-04.23/20	03.49		05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56		23.02		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	04.03-04.23/20	03.52		05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56		22.59		21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	04.04-04.24/20	03.56		05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56		22.56		21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	04.03-04.24/21	03.59		05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56		22.53		21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.04-04.25/21	04.02		05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55		22.50		21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.04-04.24/20	04.05		05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55		22.46		21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.05-04.24/19	04.08		05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.06-04.25/19	04.11		05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53		22.40		20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.07-04.25/18	04.15		05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52		22.37		20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.08-04.25/17	04.18		05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51		22.34		20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21			04.21		05.57		07.57		10.14
	16.02		20.06		23.17			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	442		84		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 35 - PUU23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February	March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00		09.36	13.12-13.17/5
	14.35		16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07		14.42	
2	10.12		09.01	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04		09.38	
	14.37		16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03		14.40	
3	10.11		08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07		09.41	
	14.39		16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00		14.38	
4	10.09		08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10		09.44	
	14.41		16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57		14.36	
5	10.08		08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13		09.46	
	14.43		16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54		14.35	
6	10.07		08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17		09.49	
	14.46		16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50		14.33	
7	10.05		08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20		09.51	
	14.48		16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47		14.31	
8	10.04		08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23		09.54	
	14.51		16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44		14.30	
9	10.02		08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26		09.56	
	14.53		16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41		14.28	
10	10.00		08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30		09.58	
	14.56		16.35	18.03	20.36	22.11	23.42	23.32	21.57	20.07	18.21	15.38		14.27	
11	09.58	13.30-13.35/5	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	13.10-13.19/9	10.00	
	14.59		16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35		14.26	
12	09.56	13.30-13.41/11	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	13.08-13.21/13	10.02	
	15.01		16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32		14.25	
13	09.54	13.30-13.46/16	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	13.06-13.22/16	10.04	
	15.04		16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29		14.24	
14	09.52	13.30-13.47/17	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	13.06-13.24/18	10.06	
	15.07		16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26		14.23	
15	09.50	13.29-13.48/19	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	13.05-13.24/19	10.07	
	15.10		16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23		14.23	
16	09.47	13.29-13.49/20	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	13.05-13.25/20	10.09	
	15.13		16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20		14.22	
17	09.45	13.29-13.50/21	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	13.05-13.26/21	10.10	
	15.16		16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17		14.22	
18	09.42	13.29-13.50/21	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.56	13.05-13.26/21	10.11	
	15.20		17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.14		14.22	
19	09.40	13.29-13.50/21	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	13.04-13.26/22	10.12	
	15.23		17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12		14.22	
20	09.37	13.29-13.51/22	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	13.05-13.27/22	10.13	
	15.26		17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09		14.22	
21	09.35	13.30-13.51/21	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	13.05-13.26/21	10.14	
	15.29		17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06		14.22	
22	09.32	13.30-13.52/22	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	13.05-13.27/22	10.15	
	15.32		17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04		14.22	
23	09.30	13.30-13.52/22	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	13.06-13.27/21	10.15	
	15.35		17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01		14.23	
24	09.27	13.31-13.52/21	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	13.07-13.28/21	10.16	
	15.39		17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58		14.24	
25	09.24	13.31-13.52/21	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	13.07-13.27/20	10.16	
	15.42		17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56		14.25	
26	09.21	13.32-13.52/20	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	13.07-13.27/20	10.16	
	15.45		17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53		14.26	
27	09.18	13.33-13.52/19	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	13.08-13.27/19	10.16	
	15.49		17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51		14.27	
28	09.15	13.33-13.51/18	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	13.09-13.27/18	10.15	
	15.52		17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49		14.28	
29	09.13	13.34-13.50/16		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	13.10-13.26/16	10.15	
	15.55			20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46		14.29	
30	09.10	13.36-13.49/13		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	13.12-13.23/11	10.14	
	15.59			20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44		14.31	
31	09.07	13.38-13.47/9		06.46		03.21		04.21	05.57		07.57			10.14	
	16.02			20.06		23.17		22.30	20.43		16.10			14.33	
Potential sun hours	171		238	363	451	570	625	609	509	393	305	198		136	
Sum of minutes with flicker	375		0	0	0	0	0	0	0	0	0	370		5	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 36 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May		June	
1	10.12	09.03	07.31		06.42	08.20-08.50/30	04.56	19.08-19.48/40	03.19	21.11-21.47/36
	14.35	16.06	17.36		20.09		21.41		23.20	18.46-20.14/88
2	10.11	09.00	07.28		06.39	08.22-08.49/27	04.53	19.06-19.51/45	03.16	21.11-21.47/36
	14.37	16.09	17.39		20.12		21.44		23.22	18.46-20.14/88
3	10.10	08.57	07.24		06.35	08.22-08.47/25	04.50	19.04-19.53/49	03.14	21.11-21.47/36
	14.39	16.12	17.42		20.15		21.48		23.25	18.46-20.14/88
4	10.09	08.54	07.21		06.31	08.25-08.44/19	04.46	19.02-19.55/53	03.12	21.11-21.48/37
	14.41	16.16	17.45		20.18		21.51		23.28	18.46-20.15/89
5	10.08	08.51	07.18		06.28	08.27-08.40/13	04.43	19.00-19.56/56	03.09	21.12-21.48/36
	14.44	16.19	17.48		20.21		21.54		23.30	18.47-20.16/89
6	10.06	08.48	07.14		06.24		04.39	19.00-19.59/59	03.07	21.12-21.48/36
	14.46	16.22	17.51		20.24		21.57		23.33	18.46-20.15/89
7	10.05	08.45	07.11		06.21		04.36	18.58-20.00/62	03.05	21.12-21.48/36
	14.49	16.25	17.54		20.27		22.01		23.35	18.46-20.16/90
8	10.03	08.42	07.07		06.17		04.33	18.57-20.01/64	03.03	21.13-21.48/35
	14.51	16.29	17.57		20.30		22.04		23.38	18.47-20.16/89
9	10.01	08.38	07.04		06.14		04.29	18.56-20.02/66	03.01	21.13-21.48/35
	14.54	16.32	18.00		20.33		22.07		23.40	18.47-20.16/89
10	10.00	08.35	07.00		06.10		04.26	18.54-20.03/69	02.57	21.14-21.49/35
	14.56	16.35	18.04		20.36		22.10		23.42	18.47-20.16/89
11	09.58	08.32	06.57		06.07		04.23	18.53-20.03/70	02.56	21.14-21.48/34
	14.59	16.39	18.07		20.39		22.14		23.44	18.47-20.17/90
12	09.56	08.29	06.53		06.03		04.19	21.20-21.27/7	02.54	21.14-21.48/34
	15.02	16.42	18.10		20.42		22.17	18.53-20.05/72	23.46	18.47-20.17/90
13	09.54	08.25	06.49	07.37-07.46/9	06.00		04.16	21.17-21.30/13	02.53	21.15-21.49/34
	15.05	16.45	18.13		20.45		22.20	18.52-20.05/73	23.47	18.48-20.17/89
14	09.52	08.22	06.46	07.32-07.50/18	05.56		04.13	21.15-21.31/16	02.52	21.15-21.49/34
	15.08	16.48	18.16		20.48		22.23	18.51-20.06/75	23.49	18.47-20.17/90
15	09.49	08.19	06.42	07.30-07.53/23	05.52		04.09	21.14-21.33/19	02.51	21.16-21.50/34
	15.11	16.52	18.18		20.51		22.27	18.51-20.07/76	23.50	18.48-20.18/90
16	09.47	08.16	06.39	07.27-07.54/27	05.49		04.06	21.13-21.35/22	02.50	21.15-21.49/34
	15.14	16.55	18.21		20.54		22.30	18.50-20.07/77	23.52	18.48-20.18/90
17	09.45	08.12	06.35	07.25-07.55/30	05.45		04.03	21.12-21.37/25	02.50	21.16-21.49/33
	15.17	16.58	18.24		20.57		22.33	18.49-20.07/78	23.53	18.48-20.18/90
18	09.42	08.09	06.32	07.24-07.56/32	05.42		04.00	21.11-21.39/28	02.49	21.16-21.50/34
	15.20	17.01	18.27		21.00		22.36	18.49-20.08/79	23.54	18.48-20.18/90
19	09.40	08.05	06.28	07.23-07.56/33	05.38		03.57	21.10-21.40/30	02.49	21.17-21.50/33
	15.23	17.05	18.30		21.03		22.40	18.48-20.08/80	23.54	18.49-20.19/90
20	09.37	08.02	06.25	07.22-07.57/35	05.35		03.54	21.10-21.41/31	02.49	21.17-21.50/33
	15.26	17.08	18.33		21.06		22.43	18.48-20.09/81	23.55	18.49-20.19/90
21	09.35	07.59	06.21	07.21-07.57/36	05.31		03.50	21.10-21.43/33	02.49	21.17-21.50/33
	15.29	17.11	18.36		21.10		22.46	18.48-20.10/82	23.55	18.49-20.19/90
22	09.32	07.55	06.18	07.21-07.58/37	05.28		03.47	21.09-21.43/34	02.49	21.17-21.50/33
	15.33	17.14	18.39		21.13		22.49	18.47-20.10/83	23.55	18.49-20.19/90
23	09.29	07.52	06.14	07.20-07.57/37	05.24		03.44	21.09-21.44/35	02.50	21.18-21.51/33
	15.36	17.17	18.42		21.16		22.52	18.47-20.11/84	23.55	18.50-20.20/90
24	09.27	07.49	06.11	07.19-07.57/38	05.21		03.41	21.10-21.44/34	02.50	21.18-21.51/33
	15.39	17.20	18.45		21.19		22.56	18.47-20.11/84	23.55	18.50-20.20/90
25	09.24	07.45	06.07	07.19-07.57/38	05.17		03.38	21.10-21.45/35	02.51	21.18-21.52/34
	15.42	17.24	18.48		21.22		22.59	18.47-20.12/85	23.55	18.50-20.20/90
26	09.21	07.42	06.03	07.18-07.56/38	05.14		03.35	21.10-21.45/35	02.52	21.18-21.51/33
	15.46	17.27	18.51		21.25		23.02	18.47-20.12/85	23.54	18.50-20.20/90
27	09.18	07.38	06.00	07.19-07.56/37	05.10		03.33	21.10-21.46/36	02.53	21.18-21.52/34
	15.49	17.30	18.54		21.28		23.05	18.46-20.13/87	23.54	18.50-20.20/90
28	09.15	07.35	05.56	07.18-07.55/37	05.07	19.21-19.39/18	03.30	21.10-21.46/36	02.55	21.18-21.52/34
	15.52	17.33	18.57		21.32		23.08	18.46-20.13/87	23.53	18.51-20.21/90
29	09.12		06.53	08.19-08.55/36	05.03	19.16-19.44/28	03.27	21.10-21.46/36	02.56	21.18-21.53/35
	15.56		20.00		21.35		23.11	18.46-20.13/87	23.52	18.51-20.21/90
30	09.09		06.49	08.19-08.53/34	05.00	19.12-19.47/35	03.24	21.10-21.47/37	02.58	21.18-21.53/35
	15.59		20.03		21.38		23.14	18.46-20.13/87	23.51	18.51-20.21/90
31	09.06		06.46	08.20-08.52/32			03.22	21.10-21.47/37		
	16.02		20.06				23.17	18.46-20.13/87		
Potential sun hours	171	238	363		451		570		624	
Sum of minutes with flicker	0	0	607		195		2841		3719	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 36 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	21.18-21.53/35	04.24	21.33-21.34/1	06.00		07.26	08.00	09.35
	23.49	18.51-20.21/90	22.27	19.03-20.14/71	20.39		18.53	16.07	14.43
2	03.01	21.18-21.53/35	04.28	19.04-20.14/70	06.03		07.29	08.04	09.38
	23.48	18.51-20.21/90	22.23		20.36		18.49	16.04	14.41
3	03.01	21.18-21.53/35	04.31	19.05-20.12/67	06.06		07.32	08.07	09.41
	23.46	18.51-20.21/90	22.20		20.32		18.46	16.00	14.39
4	03.03	21.18-21.54/36	04.34	19.06-20.11/65	06.09		07.35	08.10	09.44
	23.44	18.52-20.22/90	22.17		20.29		18.42	15.57	14.37
5	03.05	21.18-21.54/36	04.37	19.07-20.10/63	06.12		07.38	08.13	09.46
	23.43	18.52-20.21/89	22.13		20.25		18.39	15.54	14.35
6	03.08	21.18-21.54/36	04.40	19.08-20.08/60	06.15		07.41	08.16	09.49
	23.41	18.53-20.22/89	22.10		20.22		18.35	15.51	14.33
7	03.10	21.18-21.54/36	04.44	19.09-20.07/58	06.17	08.22-08.35/13	07.44	08.20	09.51
	23.39	18.52-20.21/89	22.07		20.18		18.32	15.48	14.32
8	03.12	21.18-21.54/36	04.47	19.11-20.06/55	06.20	08.19-08.38/19	07.47	08.23	09.53
	23.36	18.53-20.22/89	22.03		20.15		18.28	15.44	14.30
9	03.15	21.18-21.55/37	04.50	19.13-20.04/51	06.23	08.17-08.41/24	07.50	08.26	09.56
	23.34	18.53-20.22/89	22.00		20.11		18.25	15.41	14.29
10	03.18	21.19-21.55/36	04.53	19.14-20.01/47	06.26	08.14-08.41/27	07.53	08.29	09.58
	23.32	18.54-20.22/88	21.57		20.07		18.21	15.38	14.28
11	03.20	21.19-21.55/36	04.56	19.16-19.59/43	06.29	08.13-08.43/30	07.56	08.33	10.00
	23.29	18.54-20.22/88	21.53		20.04		18.18	15.35	14.27
12	03.23	21.19-21.55/36	04.59	19.18-19.57/39	06.32	08.12-08.44/32	07.59	08.36	10.02
	23.27	18.53-20.21/88	21.50		20.00		18.14	15.32	14.25
13	03.26	21.18-21.55/37	05.02	19.20-19.53/33	06.35	08.11-08.44/33	08.02	08.39	10.04
	23.24	18.54-20.21/87	21.46		19.57		18.11	15.29	14.25
14	03.29	21.19-21.55/36	05.06	19.24-19.50/26	06.38	08.10-08.45/35	08.05	08.42	10.05
	23.22	18.55-20.22/87	21.43		19.53		18.07	15.26	14.24
15	03.31	21.19-21.55/36	05.09	19.29-19.45/16	06.40	08.08-08.44/36	08.08	08.46	10.07
	23.19	18.55-20.22/87	21.39		19.50		18.04	15.23	14.23
16	03.34	21.19-21.55/36	05.12		06.43	08.07-08.45/38	08.11	08.49	10.08
	23.16	18.55-20.22/87	21.36		19.46		18.01	15.20	14.23
17	03.37	21.19-21.55/36	05.15		06.46	08.07-08.45/38	08.14	08.52	10.10
	23.13	18.56-20.21/85	21.32		19.43		17.57	15.18	14.22
18	03.40	21.19-21.54/35	05.18		06.49	08.07-08.45/38	08.17	08.55	10.11
	23.10	18.56-20.21/85	21.29		19.39		17.54	15.15	14.22
19	03.43	21.20-21.55/35	05.21		06.52	08.06-08.45/39	08.20	08.59	10.12
	23.08	18.57-20.22/85	21.25		19.35		17.50	15.12	14.22
20	03.46	21.20-21.54/34	05.24		06.55	08.05-08.43/38	08.23	09.02	10.13
	23.05	18.57-20.21/84	21.22		19.32		17.47	15.09	14.22
21	03.50	21.19-21.53/34	05.27		06.58	08.05-08.43/38	08.26	09.05	10.14
	23.02	18.57-20.20/83	21.18		19.28		17.43	15.06	14.23
22	03.53	21.20-21.53/33	05.30		07.00	08.06-08.42/36	08.29	09.08	10.14
	22.59	18.58-20.21/83	21.15		19.25		17.40	15.04	14.23
23	03.56	21.20-21.52/32	05.33		07.03	08.06-08.41/35	08.32	09.11	10.15
	22.56	18.58-20.20/82	21.11		19.21		17.37	15.01	14.24
24	03.59	21.20-21.52/32	05.36		07.06	08.06-08.40/34	08.35	09.14	10.15
	22.52	18.58-20.19/81	21.08		19.18		17.33	14.59	14.24
25	04.02	21.21-21.50/29	05.39		07.09	08.07-08.39/32	07.38	09.18	10.15
	22.49	18.59-20.19/80	21.04		19.14		16.30	14.56	14.25
26	04.05	21.22-21.49/27	05.42		07.12	08.08-08.38/30	07.41	09.21	10.15
	22.46	18.59-20.18/79	21.01		19.11		16.27	14.54	14.26
27	04.08	21.23-21.47/24	05.45		07.15	08.08-08.35/27	07.44	09.24	10.15
	22.43	19.00-20.18/78	20.57		19.07		16.23	14.51	14.27
28	04.12	21.24-21.45/21	05.48		07.18	08.09-08.34/25	07.48	09.27	10.15
	22.40	19.01-20.18/77	20.54		19.03		16.20	14.49	14.28
29	04.15	21.25-21.42/17	05.51		07.21	08.11-08.31/20	07.51	09.30	10.15
	22.37	19.01-20.17/76	20.50		19.00		16.17	14.47	14.30
30	04.18	21.26-21.41/15	05.54		07.23	08.14-08.28/14	07.54	09.33	10.14
	22.33	19.02-20.16/74	20.47		18.56		16.13	14.45	14.31
31	04.21	21.28-21.38/10	05.57				07.57		10.13
	22.30	19.02-20.15/73	20.43				16.10		14.33
Potential sun hours	608		508		393		305	198	137
Sum of minutes with flicker	3611		765		731		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 37 - PUU25

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 06.13-06.39/26	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53 06.13-06.38/25	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50 06.14-06.37/23	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46 06.15-06.36/21	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43 06.16-06.35/19	03.09	03.05	04.37 06.31-06.38/7	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 06.17-06.33/16	03.07	03.07	04.40 06.28-06.41/13	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 06.19-06.30/11	03.05	03.10	04.43 06.26-06.43/17	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33 06.23-06.26/3	03.03	03.12	04.47 06.24-06.44/20	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50 06.23-06.46/23	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53 06.22-06.46/24	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.07	04.22	02.56	03.20	04.56 06.21-06.47/26	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59 06.21-06.48/27	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02 06.20-06.48/28	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05 06.19-06.48/29	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09 06.19-06.48/29	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 06.25-06.33/8	04.06	02.50	03.34	05.12 06.19-06.48/29	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45 06.20-06.35/15	04.03	02.49	03.37	05.15 06.18-06.47/29	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.18-06.37/19	04.00	02.49	03.40	05.18 06.18-06.47/29	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38 06.17-06.39/22	03.57	02.49	03.43	05.21 06.18-06.47/29	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.15-06.39/24	03.53	02.49	03.46	05.24 06.18-06.47/29	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 06.14-06.40/26	03.50	02.49	03.49	05.27 06.18-06.45/27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28 06.13-06.41/28	03.47	02.49	03.52	05.30 06.19-06.44/25	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.13-06.41/28	03.44	02.49	03.56	05.33 06.20-06.43/23	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21 06.12-06.41/29	03.41	02.50	03.59	05.36 06.21-06.42/21	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 06.11-06.41/30	03.38	02.51	04.02	05.39 06.21-06.40/19	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14 06.11-06.41/30	03.35	02.52	04.05	05.42 06.23-06.38/15	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10 06.11-06.41/30	03.32	02.53	04.08	05.45 06.27-06.34/7	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 06.11-06.41/30	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 06.12-06.40/28	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00 06.12-06.40/28	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	375	144	0	0	525	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 38 - PUU26

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 39 - PUU27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February	March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00		09.36	12.01-12.22/21
	14.35		16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06		14.42	
2	10.12		09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04		09.38	12.02-12.22/20
	14.37		16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03		14.40	
3	10.11	12.19-12.33/14	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07		09.41	12.02-12.22/20
	14.39		16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00		14.38	
4	10.09	12.19-12.34/15	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10		09.44	12.03-12.22/19
	14.41		16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57		14.36	
5	10.08	12.19-12.35/16	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13		09.46	12.05-12.22/17
	14.43		16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54		14.34	
6	10.07	12.19-12.36/17	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17		09.49	12.05-12.22/17
	14.46		16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50		14.33	
7	10.05	12.19-12.37/18	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20		09.51	12.06-12.22/16
	14.48		16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47		14.31	
8	10.03	12.19-12.37/18	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23		09.54	12.07-12.22/15
	14.51		16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44		14.30	
9	10.02	12.19-12.38/19	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26		09.56	12.08-12.22/14
	14.53		16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41		14.28	
10	10.00	12.19-12.39/20	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30		09.58	
	14.56		16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38		14.27	
11	09.58	12.19-12.40/21	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33		10.00	
	14.59		16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35		14.26	
12	09.56	12.20-12.41/21	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36		10.02	
	15.01		16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32		14.25	
13	09.54	12.20-12.41/21	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39		10.04	
	15.04		16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29		14.24	
14	09.52	12.20-12.42/22	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	12.05-12.11/6	10.06	
	15.07		16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26		14.23	
15	09.50	12.20-12.42/22	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	12.02-12.13/11	10.07	
	15.10		16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23		14.23	
16	09.47	12.20-12.43/23	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	12.00-12.15/15	10.09	
	15.13		16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20		14.22	
17	09.45	12.21-12.43/22	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	12.00-12.17/17	10.10	
	15.16		16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17		14.22	
18	09.42	12.21-12.43/22	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	11.59-12.17/18	10.11	
	15.19		17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14		14.22	
19	09.40	12.21-12.43/22	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	11.58-12.18/20	10.12	
	15.23		17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12		14.22	
20	09.37	12.22-12.44/22	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	11.58-12.19/21	10.13	
	15.26		17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09		14.22	
21	09.35	12.22-12.44/22	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	11.58-12.19/21	10.14	
	15.29		17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06		14.22	
22	09.32	12.23-12.44/21	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	11.58-12.20/22	10.15	
	15.32		17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03		14.22	
23	09.29	12.24-12.44/20	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	11.58-12.20/22	10.15	
	15.35		17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01		14.23	
24	09.27	12.25-12.43/18	07.49	06.10	05.21	03.41	02.50	03.58	05.36	07.06	08.35	09.15	11.59-12.21/22	10.15	
	15.39		17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58		14.24	
25	09.24	12.26-12.43/17	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	11.58-12.21/23	10.16	
	15.42		17.23	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56		14.24	
26	09.21	12.27-12.42/15	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	11.59-12.21/22	10.16	
	15.45		17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53		14.25	
27	09.18	12.29-12.40/11	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	11.59-12.21/22	10.16	
	15.49		17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51		14.27	
28	09.15	12.32-12.37/5	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	11.59-12.21/22	10.15	
	15.52		17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49		14.28	
29	09.12			06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	12.00-12.21/21	10.15	
	15.55			20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46		14.29	
30	09.10			06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	12.01-12.22/21	10.14	
	15.59			20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44		14.31	
31	09.07			06.46		03.21		04.21	05.57		07.57			10.14	
	16.02			20.06		23.17		22.30	20.43		16.10			14.32	
Potential sun hours	171		238	363	451	570	625	609	509	393	305	198		136	
Sum of minutes with flicker	484		0	0	0	0	0	0	0	0	0	326		159	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 40 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13	09.04 14.32-14.53/21 13.15-13.31/16	07.31	06.42	04.56	03.18
	14.35	16.05 11.28-12.00/32	17.36	20.09	21.41	23.20
2	10.12	09.00 14.32-14.53/21 13.17-13.29/12	07.28	06.38	04.53	03.16
	14.37	16.08 11.29-12.00/31	17.39	20.12	21.44	23.23
3	10.11	08.57 14.33-14.53/20 13.21-13.25/4	07.24	06.35	04.49	03.13
	14.39	16.12 11.29-11.59/30	17.42	20.15	21.48	23.26
4	10.10	08.54 14.33-14.52/19	07.21	06.31	04.46	03.11
	14.41	16.15 11.30-11.58/28	17.45	20.18	21.51	23.28
5	10.08	08.51 14.34-14.52/18	07.17	06.28	04.42	03.08
	14.43	16.18 11.30-11.58/28	17.48	20.21	21.54	23.31
6	10.07	08.48 14.35-14.51/16	07.14	06.24	04.39	03.06
	14.45	16.22 11.31-11.57/26	17.51	20.24	21.57	23.33
7	10.05	08.45 14.37-14.50/13	07.10	06.21	04.36	03.04
	14.48	16.25 11.33-11.56/23	17.54	20.27	22.01	23.36
8	10.04 13.14-13.17/3	08.42 14.39-14.48/9	07.07	06.17	04.32	03.02
	14.50	16.28 11.34-11.55/21	17.57	20.30	22.04	23.38
9	10.02 13.11-13.19/8	08.38 11.36-11.53/17	07.03	06.13	04.29	03.00
	14.53	16.32	18.00	20.33	22.07	23.40
10	10.00 13.10-13.21/11	08.35 11.39-11.49/10	07.00	06.10	04.25	02.57
	14.56	16.35	18.03	20.36	22.10	23.43
11	09.58 13.09-13.23/14	08.32	06.56	06.06	04.22	02.55
	14.59	16.38	18.06	20.39	22.14	23.45
12	09.56 11.34-11.43/9	08.29	06.53	06.03	04.19	02.54
	15.01 13.09-13.25/16	16.42	18.09	20.42	22.17	23.46
13	09.54 11.32-11.45/13	08.25	06.49	05.59	04.16	02.52
	15.04 13.08-13.26/18	16.45	18.12	20.45	22.20	23.48
14	09.52 11.31-11.47/16	08.22	06.46	05.56	04.12	02.51
	15.07 13.09-13.27/18	16.48	18.15	20.48	22.24	23.50
15	09.50 11.30-11.48/18	08.19	06.42	05.52	04.09	02.50
	15.10 13.08-13.28/20	16.51	18.18	20.51	22.27	23.51
16	09.47 11.29-11.50/21	08.16	06.39	05.49	04.06	02.49
	15.13 13.08-13.29/21	16.55	18.21	20.54	22.30	23.52
17	09.45 11.29-11.51/22	08.12	06.35	05.45	04.02	02.49
	15.16 13.08-13.30/22	16.58	18.24	20.57	22.33	23.53
18	09.42 11.28-11.52/24	08.09	06.32	05.42	03.59	02.48
	15.19 13.07-13.30/23	17.01	18.27	21.00	22.37	23.54
19	09.40 11.27-11.53/26	08.06	06.28	05.38	03.56	02.48
	15.22 13.07-13.31/24	17.04	18.30	21.03	22.40	23.55
20	09.37 11.27-11.54/27	08.02	06.25	05.35	03.53	02.48
	15.26 13.07-13.31/24	17.08	18.33	21.07	22.43	23.56
21	09.35 11.27-11.55/28	07.59	06.21	05.31	03.50	02.48
	15.29 13.08-13.32/24	17.11	18.36	21.10	22.46	23.56
22	09.32 11.27-11.56/29	07.55	06.18	05.27	03.47	02.48
	15.32 13.08-13.32/24	17.14	18.39	21.13	22.50	23.56
23	09.30 11.27-11.57/30	07.52	06.14	05.24	03.44	02.49
	15.35 13.08-13.33/25	17.17	18.42	21.16	22.53	23.56
24	09.27 14.34-14.39/5 13.08-13.33/25	07.49	06.10	05.20	03.41	02.49
	15.39 11.27-11.57/30	17.20	18.45	21.19	22.56	23.56
25	09.24 14.33-14.44/11 13.09-13.33/24	07.45	06.07	05.17	03.38	02.50
	15.42 11.27-11.58/31	17.23	18.48	21.22	22.59	23.56
26	09.21 14.32-14.48/16 13.09-13.33/24	07.42	06.03	05.13	03.35	02.51
	15.45 11.27-11.58/31	17.26	18.51	21.25	23.02	23.55
27	09.18 14.32-14.51/19 13.10-13.33/23	07.38	06.00	05.10	03.32	02.52
	15.49 11.27-11.59/32	17.30	18.54	21.28	23.05	23.54
28	09.15 14.31-14.51/20 13.10-13.33/23	07.35	05.56	05.06	03.29	02.54
	15.52 11.27-11.59/32	17.33	18.57	21.32	23.08	23.53
29	09.12 14.31-14.52/21 13.11-13.32/21		06.53	05.03	03.26	02.55
	15.55 11.27-11.59/32		20.00	21.35	23.11	23.52
30	09.10 14.31-14.52/21 13.12-13.32/20		06.49	05.00	03.24	02.57
	15.58 11.27-11.59/32		20.03	21.38	23.14	23.51
31	09.07 14.31-14.52/21 13.13-13.31/18		06.46		03.21	
	16.02 11.27-11.59/32		20.06		23.17	
Potential sun hours	171	238	363	451	570	625
Sum of minutes with flicker	1122	415	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 40 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58	04.24	06.00	07.26	08.00 11.08-11.19/11	09.36 12.51-13.05/14
	23.50	22.27	20.39	18.53	16.06	14.42
2	03.00	04.27	06.03	07.29	08.04 11.05-11.22/17	09.38 12.53-13.05/12
	23.48	22.24	20.36	18.49	16.03	14.40
3	03.00	04.30	06.06	07.32	08.07 14.08-14.18/10	09.41 12.54-13.03/9
	23.47	22.20	20.32	18.46	16.00 11.03-11.25/22	14.38
4	03.02	04.34	06.08	07.35	08.10 14.06-14.20/14	09.44 12.57-13.01/4
	23.45	22.17	20.29	18.42	15.57 11.02-11.26/24	14.36
5	03.05	04.37	06.11	07.38	08.13 14.05-14.21/16	09.46
	23.43	22.14	20.25	18.39	15.54 11.01-11.27/26	14.34
6	03.07	04.40	06.14	07.41	08.17 14.04-14.22/18	09.49
	23.41	22.10	20.22	18.35	15.50 11.01-11.28/27	14.33
7	03.09	04.43	06.17	07.44	08.20 14.04-14.23/19	09.51
	23.39	22.07	20.18	18.32	15.47 11.00-11.29/29	14.31
8	03.12	04.46	06.20	07.47	08.23 14.03-14.24/21 12.51-12.56/5	09.54
	23.37	22.03	20.15	18.28	15.44 11.00-11.30/30	14.30
9	03.14	04.49	06.23	07.50	08.26 14.03-14.24/21 12.47-13.00/13	09.56
	23.35	22.00	20.11	18.25	15.41 10.59-11.30/31	14.28
10	03.17	04.53	06.26	07.53	08.30 14.03-14.24/21 12.46-13.01/15	09.58
	23.32	21.57	20.07	18.21	15.38 10.59-11.31/32	14.27
11	03.19	04.56	06.29	07.56	08.33 14.03-14.24/21 12.44-13.03/19	10.00
	23.30	21.53	20.04	18.18	15.35 10.59-11.31/32	14.26
12	03.22	04.59	06.32	07.59	08.36 14.03-14.24/21 12.43-13.04/21	10.02
	23.27	21.50	20.00	18.14	15.32 10.59-11.31/32	14.25
13	03.25	05.02	06.35	08.02	08.39 14.03-14.24/21 12.43-13.04/21	10.04
	23.25	21.46	19.57	18.11	15.29 10.59-11.31/32	14.24
14	03.28	05.05	06.37	08.05	08.43 14.03-14.23/20 12.43-13.06/23	10.06
	23.22	21.43	19.53	18.07	15.26 10.59-11.32/33	14.23
15	03.31	05.08	06.40	08.08	08.46 14.05-14.24/19 12.42-13.06/24	10.07
	23.19	21.39	19.50	18.04	15.23 10.59-11.31/32	14.23
16	03.34	05.11	06.43	08.11	08.49 14.05-14.21/16 12.42-13.06/24	10.09
	23.17	21.36	19.46	18.00	15.20 10.59-11.31/32	14.22
17	03.37	05.14	06.46	08.14	08.52 14.06-14.16/10 12.43-13.07/24	10.10
	23.14	21.32	19.42	17.57	15.17 11.00-11.32/32	14.22
18	03.40	05.18	06.49	08.17	08.56 14.07-14.13/6 12.42-13.07/25	10.11
	23.11	21.29	19.39	17.53	15.14 11.01-11.31/30	14.22
19	03.43	05.21	06.52	08.20	08.59 11.01-11.31/30	10.12
	23.08	21.25	19.35	17.50	15.11 12.42-13.07/25	14.22
20	03.46	05.24	06.55	08.23	09.02 11.02-11.31/29	10.13
	23.05	21.22	19.32	17.47	15.09 12.43-13.07/24	14.22
21	03.49	05.27	06.57	08.26	09.05 11.02-11.30/28	10.14
	23.02	21.18	19.28	17.43	15.06 12.44-13.08/24	14.22
22	03.52	05.30	07.00	08.29	09.08 11.03-11.30/27	10.15
	22.59	21.15	19.25	17.40	15.03 12.44-13.07/23	14.22
23	03.55	05.33	07.03	08.32	09.12 11.04-11.30/26	10.15
	22.56	21.11	19.21	17.36	15.01 12.44-13.08/24	14.23
24	03.58	05.36	07.06	08.35	09.15 11.06-11.30/24	10.16
	22.53	21.08	19.18	17.33	14.58 12.45-13.08/23	14.24
25	04.02	05.39	07.09	07.38	09.18 11.06-11.29/23	10.16
	22.50	21.04	19.14	16.30	14.56 12.45-13.07/22	14.24
26	04.05	05.42	07.12	07.41	09.21 11.07-11.28/21	10.16
	22.46	21.01	19.10	16.26	14.53 12.46-13.07/21	14.25
27	04.08	05.45	07.15	07.45	09.24 11.09-11.27/18	10.16
	22.43	20.57	19.07	16.23	14.51 12.47-13.07/20	14.26
28	04.11	05.48	07.18	07.48	09.27 11.10-11.26/16	10.15
	22.40	20.54	19.03	16.20	14.49 12.48-13.06/18	14.28
29	04.14	05.51	07.20	07.51	09.30 11.12-11.25/13	10.15
	22.37	20.50	19.00	16.16	14.46 12.49-13.06/17	14.29
30	04.17	05.54	07.23	07.54	09.33 11.15-11.24/9	10.14
	22.34	20.47	18.56	16.13	14.44 12.51-13.06/15	14.31
31	04.21	05.57		07.57		10.14
	22.30	20.43		16.10		14.32
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	1512	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 41 - PUU29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August	September		October	November	December
1	10.12	09.03	07.31		06.42	08.01-08.08/7	04.56	03.19	02.59	04.24	06.00		07.26	08.00	09.35
	14.35	16.05	17.36		20.09		21.41	23.20	23.49	22.27	20.39		18.53	16.07	14.42
2	10.11	09.00	07.28		06.39		04.53	03.16	03.01	04.28	06.03		07.29	08.03	09.38
	14.37	16.09	17.39		20.12		21.44	23.22	23.48	22.23	20.36		18.49	16.03	14.40
3	10.10	08.57	07.24		06.35		04.50	03.14	03.01	04.31	06.06		07.32	08.07	09.41
	14.39	16.12	17.42		20.15		21.48	23.25	23.46	22.20	20.32		18.46	16.00	14.38
4	10.09	08.54	07.21		06.31		04.46	03.11	03.03	04.34	06.09		07.35	08.10	09.43
	14.41	16.15	17.45		20.18		21.51	23.28	23.44	22.17	20.29		18.42	15.57	14.37
5	10.08	08.51	07.17		06.28		04.43	03.09	03.05	04.37	06.12		07.38	08.13	09.46
	14.44	16.19	17.48		20.21		21.54	23.30	23.43	22.13	20.25		18.39	15.54	14.35
6	10.06	08.48	07.14		06.24		04.39	03.07	03.08	04.40	06.15		07.41	08.16	09.49
	14.46	16.22	17.51		20.24		21.57	23.33	23.41	22.10	20.22		18.35	15.51	14.33
7	10.05	08.45	07.10		06.21		04.36	03.05	03.10	04.43	06.17		07.44	08.20	09.51
	14.48	16.25	17.54		20.27		22.00	23.35	23.38	22.07	20.18		18.32	15.48	14.32
8	10.03	08.42	07.07		06.17		04.33	03.03	03.12	04.47	06.20		07.47	08.23	09.53
	14.51	16.29	17.57		20.30		22.04	23.38	23.36	22.03	20.15		18.28	15.44	14.30
9	10.01	08.38	07.03		06.14		04.29	03.01	03.15	04.50	06.23		07.50	08.26	09.56
	14.54	16.32	18.00		20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.41	14.29
10	10.00	08.35	07.00		06.10		04.26	02.57	03.17	04.53	06.26		07.53	08.29	09.58
	14.56	16.35	18.03		20.36		22.10	23.42	23.32	21.56	20.07		18.21	15.38	14.28
11	09.58	08.32	06.56		06.07		04.23	02.56	03.20	04.56	06.29	07.54-08.00/6	07.56	08.33	10.00
	14.59	16.39	18.06		20.39		22.14	23.44	23.29	21.53	20.04		18.18	15.35	14.26
12	09.56	08.29	06.53		06.03		04.19	02.54	03.23	04.59	06.32	07.50-08.04/14	07.59	08.36	10.02
	15.02	16.42	18.09		20.42		22.17	23.46	23.27	21.50	20.00		18.14	15.32	14.25
13	09.54	08.25	06.49		05.59		04.16	02.53	03.26	05.02	06.35	07.48-08.06/18	08.02	08.39	10.04
	15.05	16.45	18.12		20.45		22.20	23.47	23.24	21.46	19.57		18.11	15.29	14.25
14	09.51	08.22	06.46		05.56		04.13	02.52	03.28	05.05	06.38	07.47-08.07/20	08.05	08.42	10.05
	15.08	16.48	18.15		20.48		22.23	23.49	23.22	21.43	19.53		18.07	15.26	14.24
15	09.49	08.19	06.42		05.52		04.09	02.51	03.31	05.09	06.40	07.45-08.07/22	08.08	08.46	10.07
	15.11	16.52	18.18		20.51		22.27	23.50	23.19	21.39	19.50		18.04	15.23	14.23
16	09.47	08.15	06.39		05.49		04.06	02.50	03.34	05.12	06.43	07.44-08.07/23	08.11	08.49	10.08
	15.14	16.55	18.21		20.54		22.30	23.52	23.16	21.36	19.46		18.00	15.20	14.23
17	09.45	08.12	06.35	07.07-07.14/7	05.45		04.03	02.50	03.37	05.15	06.46	07.43-08.08/25	08.14	08.52	10.10
	15.17	16.58	18.24		20.57		22.33	23.53	23.13	21.32	19.42		17.57	15.17	14.22
18	09.42	08.09	06.32	07.04-07.17/13	05.42		04.00	02.49	03.40	05.18	06.49	07.43-08.08/25	08.17	08.55	10.11
	15.20	17.01	18.27		21.00		22.36	23.54	23.10	21.29	19.39		17.54	15.15	14.22
19	09.40	08.05	06.28	07.00-07.18/18	05.38		03.57	02.49	03.43	05.21	06.52	07.43-08.08/25	08.20	08.59	10.12
	15.23	17.05	18.30		21.03		22.40	23.54	23.08	21.25	19.35		17.50	15.12	14.22
20	09.37	08.02	06.25	06.59-07.20/21	05.35		03.53	02.49	03.46	05.24	06.55	07.41-08.06/25	08.23	09.02	10.13
	15.26	17.08	18.33		21.06		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.22
21	09.35	07.59	06.21	06.57-07.20/23	05.31		03.50	02.49	03.49	05.27	06.58	07.42-08.06/24	08.26	09.05	10.14
	15.29	17.11	18.36		21.10		22.46	23.55	23.02	21.18	19.28		17.43	15.06	14.22
22	09.32	07.55	06.18	06.57-07.21/24	05.28		03.47	02.49	03.53	05.30	07.00	07.42-08.05/23	08.29	09.08	10.14
	15.33	17.14	18.39		21.13		22.49	23.55	22.59	21.15	19.25		17.40	15.04	14.23
23	09.29	07.52	06.14	06.56-07.20/24	05.24		03.44	02.50	03.56	05.33	07.03	07.42-08.04/22	08.32	09.11	10.15
	15.36	17.17	18.42		21.16		22.52	23.55	22.55	21.11	19.21		17.37	15.01	14.23
24	09.27	07.48	06.11	06.55-07.20/25	05.21		03.41	02.50	03.59	05.36	07.06	07.43-08.03/20	08.35	09.14	10.15
	15.39	17.20	18.45		21.19		22.55	23.55	22.52	21.08	19.18		17.33	14.59	14.24
25	09.24	07.45	06.07	06.55-07.20/25	05.17		03.38	02.51	04.02	05.39	07.09	07.46-08.01/15	07.38	09.18	10.15
	15.42	17.24	18.48		21.22		22.59	23.55	22.49	21.04	19.14		16.30	14.56	14.25
26	09.21	07.42	06.03	06.55-07.19/24	05.14		03.35	02.52	04.05	05.42	07.12	07.49-07.58/9	07.41	09.21	10.15
	15.46	17.27	18.51		21.25		23.02	23.54	22.46	21.01	19.11		16.26	14.54	14.26
27	09.18	07.38	06.00	06.55-07.19/24	05.10		03.32	02.53	04.08	05.45	07.15		07.44	09.24	10.15
	15.49	17.30	18.54		21.28		23.05	23.54	22.43	20.57	19.07		16.23	14.51	14.27
28	09.15	07.35	05.56	06.55-07.17/22	05.07		03.30	02.54	04.12	05.48	07.18		07.48	09.27	10.15
	15.52	17.33	18.57		21.32		23.08	23.53	22.40	20.54	19.03		16.20	14.49	14.28
29	09.12		06.53	07.56-08.17/21	05.03		03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35		23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.09		06.49	07.57-08.14/17	05.00		03.24	02.58	04.18	05.54	07.23		07.54	09.32	10.14
	15.59		20.03		21.38		23.14	23.51	22.33	20.47	18.56		16.13	14.45	14.31
31	09.06		06.46	07.59-08.13/14			03.21		04.21	05.57			07.57		10.13
	16.02		20.06				23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363		451		570	624	608	508	393		305	198	137
Sum of minutes with flicker	0	0	302		7		0	0	0	0	316		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 42 - PUU30

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00 06.39-06.43/4	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 06.40-06.44/4	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03 06.36-06.45/9	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59 06.33-06.47/14	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56 06.29-06.46/17	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52 06.27-06.47/20	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49 06.27-06.48/21	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45 06.26-06.47/21	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.26-06.47/21	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38 06.26-06.47/21	03.56	02.49	03.43	05.21 06.36-06.46/10	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.26-06.45/19	03.53	02.49	03.46	05.24 06.34-06.48/14	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 06.26-06.44/18	03.50	02.49	03.49	05.27 06.32-06.48/16	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28 06.27-06.43/16	03.47	02.49	03.52	05.30 06.31-06.49/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.29-06.42/13	03.44	02.49	03.56	05.33 06.30-06.50/20	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.10	05.21 06.30-06.39/9	03.41	02.50	03.59	05.36 06.30-06.50/20	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39 06.28-06.49/21	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42 06.28-06.49/21	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45 06.28-06.49/21	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48 06.29-06.49/20	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51 06.30-06.47/17	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54 06.33-06.46/13	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57 06.36-06.45/9		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	223	0	0	0	220	4	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 43 - PUU31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 44 - PUU32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 45 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.13	09.03 13.32-13.43/11 12.01-12.10/9	07.31	06.42	04.56	03.18
	14.35	16.05 10.08-10.33/25	17.36	20.09	21.41	23.20
2	10.12	09.00 10.08-10.33/25	07.28	06.38	04.53	03.16
	14.37	16.08	17.39	20.12	21.44	23.23
3	10.11	08.57 10.07-10.33/26	07.24	06.35	04.49	03.13
	14.39	16.12	17.42	20.15	21.48	23.26
4	10.09	08.54 10.07-10.34/27	07.21	06.31	04.46	03.11
	14.41	16.15	17.45	20.18	21.51	23.28
5	10.08 11.54-11.59/5	08.51 10.07-10.34/27	07.17	06.28	04.42	03.08
	14.43	16.18	17.48	20.21	21.54	23.31
6	10.07 11.52-12.01/9	08.48 10.07-10.34/27	07.14	06.24	04.39	03.06
	14.45	16.22	17.51	20.24	21.57	23.33
7	10.05 11.52-12.03/11	08.45 10.08-10.35/27	07.10	06.21	04.36	03.04
	14.48	16.25	17.54	20.27	22.01	23.36
8	10.03 11.52-12.05/13	08.42 10.08-10.34/26	07.07	06.17	04.32	03.02
	14.50	16.28	17.57	20.30	22.04	23.38
9	10.02 11.50-12.05/15	08.38 10.08-10.34/26	07.03	06.13	04.29	03.00
	14.53	16.32	18.00	20.33	22.07	23.40
10	10.00 13.23-13.29/6	08.35 10.08-10.33/25	07.00	06.10	04.25	02.57
	14.56 11.50-12.07/17	16.35	18.03	20.36	22.10	23.42
11	09.58 13.23-13.34/11	08.32 10.09-10.32/23	06.56	06.06	04.22	02.55
	14.58 11.50-12.07/17	16.38	18.06	20.39	22.14	23.44
12	09.56 13.23-13.40/17	08.29 10.10-10.32/22	06.53	06.03	04.19	02.54
	15.01 11.50-12.09/19	16.42	18.09	20.42	22.17	23.46
13	09.54 13.22-13.40/18	08.25 10.11-10.31/20	06.49	05.59	04.15	02.52
	15.04 11.49-12.10/21	16.45	18.12	20.45	22.20	23.48
14	09.52 13.23-13.42/19	08.22 10.13-10.29/16	06.46	05.56	04.12	02.51
	15.07 11.50-12.11/21	16.48	18.15	20.48	22.24	23.50
15	09.50 13.22-13.42/20	08.19 10.15-10.26/11	06.42	05.52	04.09	02.50
	15.10 11.49-12.11/22	16.51	18.18	20.51	22.27	23.51
16	09.47 13.22-13.43/21	08.15	06.39	05.49	04.06	02.49
	15.13 11.49-12.12/23	16.55	18.21	20.54	22.30	23.52
17	09.45 13.22-13.44/22	08.12	06.35	05.45	04.02	02.49
	15.16 11.50-12.13/23	16.58	18.24	20.57	22.33	23.53
18	09.42 13.21-13.44/23	08.09	06.32	05.42	03.59	02.48
	15.19 11.49-12.13/24	17.01	18.27	21.00	22.37	23.54
19	09.40 13.22-13.45/23	08.05	06.28	05.38	03.56	02.48
	15.22 11.49-12.14/25	17.04	18.30	21.03	22.40	23.55
20	09.37 13.22-13.46/24	08.02	06.25	05.34	03.53	02.48
	15.26 11.50-12.14/24	17.07	18.33	21.06	22.43	23.56
21	09.35 13.22-13.46/24	07.59	06.21	05.31	03.50	02.48
	15.29 11.50-12.15/25	17.11	18.36	21.10	22.46	23.56
22	09.32 13.23-13.46/23	07.55	06.17	05.27	03.47	02.48
	15.32 11.50-12.15/25	17.14	18.39	21.13	22.49	23.56
23	09.29 13.23-13.47/24	07.52	06.14	05.24	03.44	02.49
	15.35 11.51-12.15/24	17.17	18.42	21.16	22.53	23.56
24	09.27 13.23-13.47/24	07.48	06.10	05.20	03.41	02.49
	15.39 11.51-12.15/24	17.20	18.45	21.19	22.56	23.56
25	09.24 13.24-13.47/23	07.45	06.07	05.17	03.38	02.50
	15.42 11.52-12.15/23	17.23	18.48	21.22	22.59	23.56
26	09.21 13.24-13.47/23 11.52-12.15/23	07.42	06.03	05.13	03.35	02.51
	15.45 10.14-10.24/10	17.26	18.51	21.25	23.02	23.55
27	09.18 13.25-13.47/22 11.53-12.15/22	07.38	06.00	05.10	03.32	02.52
	15.48 10.12-10.26/14	17.30	18.54	21.28	23.05	23.54
28	09.15 13.26-13.46/20 11.54-12.15/21	07.35	05.56	05.06	03.29	02.54
	15.52 10.11-10.28/17	17.33	18.57	21.32	23.08	23.53
29	09.12 13.26-13.46/20 11.55-12.14/19		06.53	05.03	03.26	02.55
	15.55 10.09-10.29/20		20.00	21.35	23.11	23.52
30	09.09 13.28-13.45/17 11.56-12.13/17		06.49	05.00	03.23	02.57
	15.58 10.08-10.30/22		20.03	21.38	23.14	23.51
31	09.06 13.29-13.43/14 11.57-12.11/14		06.45		03.21	
	16.02 10.08-10.31/23		20.06		23.17	
Potential sun hours	171	238	363	451	570	625
Sum of minutes with flicker	1070	373	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 45 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.58	04.24	06.00	07.26	08.00 09.37-10.03/26	09.36 13.05-13.17/12
	23.50	22.27	20.39	18.53	16.06	14.42 11.32-11.50/18
2	03.00	04.27	06.03	07.29	08.04 09.37-10.03/26	09.38 13.07-13.13/6
	23.48	22.24	20.36	18.49	16.03	14.40 11.33-11.50/17
3	03.00	04.30	06.06	07.32	08.07 09.37-10.04/27	09.41 11.34-11.49/15
	23.47	22.20	20.32	18.46	16.00	14.38
4	03.02	04.33	06.08	07.35	08.10 09.37-10.04/27	09.44 11.35-11.48/13
	23.45	22.17	20.29	18.42	15.57	14.36
5	03.05	04.37	06.11	07.38	08.13 09.37-10.04/27	09.46 11.37-11.48/11
	23.43	22.14	20.25	18.39	15.53	14.34
6	03.07	04.40	06.14	07.41	08.16 09.37-10.04/27	09.49 11.39-11.48/9
	23.41	22.10	20.22	18.35	15.50	14.33
7	03.09	04.43	06.17	07.44	08.20 09.37-10.04/27	09.51 11.41-11.46/5
	23.39	22.07	20.18	18.32	15.47	14.31
8	03.12	04.46	06.20	07.47	08.23 09.38-10.04/26	09.54
	23.37	22.03	20.15	18.28	15.44	14.30
9	03.14	04.49	06.23	07.50	08.26 13.07-13.09/2	09.56
	23.35	22.00	20.11	18.25	15.41 09.38-10.04/26	14.28
10	03.17	04.53	06.26	07.53	08.30 13.02-13.13/11 11.31-11.41/10	09.58
	23.32	21.57	20.07	18.21	15.38 09.39-10.03/24	14.27
11	03.19	04.56	06.29	07.56	08.33 13.01-13.15/14 11.29-11.43/14	10.00
	23.30	21.53	20.04	18.18	15.35 09.39-10.03/24	14.26
12	03.22	04.59	06.32	07.58	08.36 12.59-13.17/18 11.27-11.45/18	10.02
	23.27	21.50	20.00	18.14	15.32 09.40-10.02/22	14.25
13	03.25	05.02	06.35	08.01	08.39 12.58-13.17/19 11.26-11.46/20	10.04
	23.25	21.46	19.57	18.11	15.29 09.41-10.01/20	14.24
14	03.28	05.05	06.37	08.04	08.43 12.57-13.18/21 11.26-11.47/21	10.06
	23.22	21.43	19.53	18.07	15.26 09.43-10.00/17	14.23
15	03.31	05.08	06.40	08.07	08.46 12.58-13.20/22 11.26-11.48/22	10.07
	23.19	21.39	19.50	18.04	15.23 09.45-09.59/14	14.23
16	03.34	05.11	06.43	08.10	08.49 12.57-13.20/23 11.25-11.48/23	10.09
	23.16	21.36	19.46	18.00	15.20 09.47-09.56/9	14.22
17	03.37	05.14	06.46	08.14	08.52 12.57-13.20/23	10.10
	23.14	21.32	19.42	17.57	15.17 11.26-11.49/23	14.22
18	03.40	05.17	06.49	08.17	08.56 12.57-13.21/24	10.11
	23.11	21.29	19.39	17.53	15.14 11.25-11.49/24	14.22
19	03.43	05.21	06.52	08.20	08.59 12.57-13.21/24	10.12
	23.08	21.25	19.35	17.50	15.11 11.25-11.49/24	14.21
20	03.46	05.24	06.55	08.23	09.02 12.58-13.21/23	10.13
	23.05	21.22	19.32	17.47	15.09 11.25-11.50/25	14.22
21	03.49	05.27	06.57	08.26	09.05 12.57-13.21/24	10.14
	23.02	21.18	19.28	17.43	15.06 11.26-11.51/25	14.22
22	03.52	05.30	07.00	08.29	09.08 12.58-13.22/24	10.15
	22.59	21.15	19.25	17.40	15.03 11.26-11.50/24	14.22
23	03.55	05.33	07.03	08.32	09.12 12.59-13.22/23	10.15
	22.56	21.11	19.21	17.36	15.01 11.26-11.51/25	14.23
24	03.58	05.36	07.06	08.35	09.15 13.00-13.22/22	10.15
	22.53	21.08	19.17	17.33	14.58 11.27-11.51/24	14.23
25	04.01	05.39	07.09	07.38	09.18 12.59-13.22/23	10.16
	22.50	21.04	19.14	16.30	14.56 11.27-11.50/23	14.24
26	04.05	05.42	07.12	07.41 09.49-09.51/2	09.21 13.00-13.22/22	10.16
	22.46	21.01	19.10	16.26	14.53 11.28-11.50/22	14.25
27	04.08	05.45	07.15	07.44 09.44-09.57/13	09.24 13.01-13.21/20	10.16
	22.43	20.57	19.07	16.23	14.51 11.28-11.50/22	14.26
28	04.11	05.48	07.18	07.48 09.42-09.59/17	09.27 13.02-13.21/19	10.15
	22.40	20.54	19.03	16.20	14.48 11.29-11.50/21	14.28
29	04.14	05.51	07.20	07.51 09.40-10.00/20	09.30 13.03-13.21/18	10.15
	22.37	20.50	19.00	16.16	14.46 11.30-11.50/20	14.29
30	04.17	05.54	07.23	07.54 09.39-10.02/23	09.33 13.04-13.21/17	10.14
	22.34	20.47	18.56	16.13	14.44 11.31-11.51/20	14.31
31	04.21	05.57		07.57 09.39-10.03/24		10.14
	22.30	20.43		16.10		14.32
Potential sun hours	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	99	1255	106

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 46 - PUU34

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.34/16	02.59 04.19-04.45/26	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.17-04.35/18	03.01 04.19-04.44/25	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.16-04.35/19	03.01 04.19-04.44/25	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.16-04.37/21	03.03 04.20-04.45/25	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.16-04.38/22	03.05 04.20-04.44/24	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.15-04.38/23	03.07 04.21-04.44/23	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.15-04.38/23	03.10 04.21-04.44/23	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02 04.15-04.39/24	03.12 04.22-04.44/22	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01 04.15-04.40/25	03.15 04.23-04.43/20	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.15-04.40/25	03.17 04.24-04.43/19	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56 04.15-04.40/25	03.20 04.26-04.43/17	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54 04.14-04.40/26	03.23 04.26-04.41/15	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53 04.15-04.41/26	03.25 04.28-04.40/12	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52 04.15-04.41/26	03.28 04.31-04.39/8	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51 04.15-04.42/27	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50 04.15-04.42/27	03.34	05.12	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49 04.15-04.42/27	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49 04.15-04.43/28	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49 04.16-04.43/27	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48 04.16-04.43/27	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49 04.16-04.43/27	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49 04.16-04.43/27	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49 04.17-04.44/27	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50 04.16-04.44/28	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51 04.17-04.44/27	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52 04.17-04.44/27	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53 04.17-04.44/27	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.18-04.45/27	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27 04.23-04.29/6	02.56 04.18-04.45/27	04.15	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24 04.21-04.31/10	02.57 04.19-04.45/26	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21 04.19-04.32/13		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	29	752	284	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 47 - PUU35

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 48 - PUU36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 49 - PUU37

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October		November		December	
1	10.13		09.03	12.12-12.30/18	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26		08.00	10.12-10.20/8	09.36	11.47-12.07/20
	14.35		16.05	10.34-10.59/25	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53		16.06		14.42	
2	10.12		09.00	12.14-12.29/15	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29		08.04	10.09-10.23/14	09.38	11.48-12.07/19
	14.36		16.08	10.34-10.59/25	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49		16.03		14.40	
3	10.11		08.57	12.17-12.26/9	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32		08.07	10.08-10.25/17	09.41	11.49-12.06/17
	14.39		16.12	10.35-10.58/23	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46		16.00		14.38	
4	10.09	12.11-12.13/2	08.54	10.35-10.58/23	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35		08.10	10.07-10.26/19	09.44	11.50-12.05/15
	14.41		16.15		17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42		15.57		14.36	
5	10.08	12.08-12.16/8	08.51	10.35-10.58/23	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38		08.13	10.06-10.27/21	09.46	11.52-12.05/13
	14.43		16.18		17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39		15.53		14.34	
6	10.07	12.07-12.18/11	08.48	10.36-10.57/21	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41		08.16	10.06-10.28/22	09.49	11.54-12.05/11
	14.45		16.22		17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35		15.50		14.33	
7	10.05	12.07-12.20/13	08.45	10.38-10.57/19	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44		08.20	10.05-10.29/24	09.51	11.55-12.03/8
	14.48		16.25		17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32		15.47		14.31	
8	10.03	12.07-12.21/14	08.42	10.39-10.55/16	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47		08.23	11.47-11.57/10	09.54	11.58-12.01/3
	14.50		16.28		17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28		15.44	10.05-10.29/24	14.29	
9	10.02	12.05-12.22/17	08.38	10.40-10.53/13	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50		08.26	11.44-11.59/15	09.56	
	14.53		16.32		18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24		15.41	10.05-10.29/24	14.28	
10	10.00	12.05-12.23/18	08.35	10.43-10.50/7	07.00	06.10	04.25	02.56	03.17	04.52	06.26	07.53		08.29	11.43-12.01/18	09.58	
	14.56		16.35		18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21		15.38	10.05-10.29/24	14.27	
11	09.58	12.05-12.24/19	08.32		06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55		08.33	11.42-12.02/20	10.00	
	14.58		16.38		18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18		15.35	10.05-10.29/24	14.26	
12	09.56	12.05-12.26/21	08.29	09.09-09.13/4	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58		08.36	11.41-12.03/22	10.02	
	15.01		16.42		18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14		15.32	10.05-10.29/24	14.25	
13	09.54	12.04-12.26/22	08.25	09.05-09.16/11	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01		08.39	11.40-12.04/24	10.04	
	15.04		16.45		18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11		15.29	10.05-10.29/24	14.24	
14	09.52	12.05-12.28/23	08.22	09.01-09.17/16	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04		08.43	11.39-12.04/25	10.06	
	15.07		16.48		18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07		15.26	10.06-10.29/23	14.23	
15	09.49	12.04-12.28/24	08.19	09.00-09.18/18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	09.35-09.47/12	08.46	11.40-12.06/26	10.07	
	15.10		16.51		18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04		15.23	10.07-10.29/22	14.22	
16	09.47	12.04-12.29/25	08.15	09.00-09.20/20	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	09.33-09.48/15	08.49	11.39-12.06/27	10.09	
	15.13		16.55		18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00		15.20	10.07-10.28/21	14.22	
17	09.45	12.05-12.30/25	08.12	08.59-09.20/21	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	09.31-09.49/18	08.52	11.39-12.06/27	10.10	
	15.16		16.58		18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57		15.17	10.09-10.28/19	14.22	
18	09.42	12.04-12.30/26	08.09	08.58-09.20/22	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17	09.31-09.51/20	08.56	11.40-12.07/27	10.11	
	15.19		17.01		18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53		15.14	10.09-10.27/18	14.21	
19	09.40	12.04-12.31/27	08.05	08.58-09.21/23	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	09.29-09.51/22	08.59	11.39-12.06/27	10.12	
	15.22		17.04		18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50		15.11	10.10-10.26/16	14.21	
20	09.37	12.04-12.31/27	08.02	08.58-09.21/23	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.28-09.51/23	09.02	11.40-12.07/27	10.13	
	15.26		17.07		18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46		15.09	10.13-10.25/12	14.21	
21	09.35	12.05-12.32/27	07.59	08.58-09.21/23	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.28-09.51/23	09.05	11.40-12.07/27	10.14	
	15.29	10.39-10.48/9	17.11		18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43		15.06	10.15-10.24/9	14.22	
22	09.32	12.05-12.32/27	07.55	08.58-09.20/22	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.28-09.51/23	09.08	11.40-12.07/27	10.15	
	15.32	10.38-10.50/12	17.14		18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40		15.03		14.22	
23	09.29	12.05-12.32/27	07.52	08.59-09.20/21	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.28-09.51/23	09.11	11.41-12.08/27	10.15	
	15.35	10.36-10.52/16	17.17		18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36		15.01		14.23	
24	09.27	12.06-12.33/27	07.48	08.59-09.19/20	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.28-09.50/22	09.15	11.42-12.08/26	10.15	
	15.38	10.36-10.53/17	17.20		18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33		14.58		14.23	
25	09.24	12.06-12.33/27	07.45	09.00-09.17/17	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	08.29-08.50/21	09.18	11.42-12.07/25	10.16	
	15.42	10.35-10.54/19	17.23		18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30		14.56		14.24	
26	09.21	12.06-12.33/27	07.42	09.02-09.16/14	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	08.29-08.49/20	09.21	11.43-12.07/24	10.16	
	15.45	10.34-10.55/21	17.26		18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26		14.53		14.25	
27	09.18	12.07-12.33/26	07.38	09.04-09.13/9	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	08.30-08.48/18	09.24	11.43-12.07/24	10.16	
	15.48	10.34-10.56/22	17.29		18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23		14.51		14.26	
28	09.15	12.08-12.32/24	07.35		05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48	08.32-08.47/15	09.27	11.44-12.07/23	10.15	
	15.52	10.34-10.57/23	17.33		18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19		14.48		14.28	
29	09.12	12.08-12.32/24			06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	08.35-08.45/10	09.30	11.45-12.07/22	10.15	
	15.55	10.33-10.57/24			20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16		14.46		14.29	
30	09.09	12.09-12.31/22			06.49	04.59	03.23	02.57	04.17	05.54	07.23	07.54	08.39-08.41/2	09.33	11.46-12.07/21	10.14	
	15.58	10.33-10.57/24			20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13		14.44		14.31	
31	09.06	12.10-12.30/20			06.45		03.21		04.21	05.57		07.57				10.14	
	16.02	10.33-10.58/25			20.06		23.17		22.30	20.43		16.10				14.32	
Potential sun hours	171		238		363	451	570	625	609	509	393	305		198		136	
Sum of minutes with flicker	812		521		0	0	0	0	0	0	0	287		950		106	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 50 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May		June	
1	10.12	09.03	07.31		06.42	04.56		03.19	05.13-06.08/55
	14.35	16.05	17.36		20.09	21.41		23.19	
2	10.11	09.00	07.28		06.38	04.53		03.16	05.13-06.07/54
	14.37	16.09	17.39		20.12	21.44		23.22	
3	10.10	08.57	07.24		06.35	04.49	05.42-05.53/11	03.14	05.12-06.07/55
	14.39	16.12	17.42		20.15	21.47		23.25	
4	10.09	08.54	07.21		06.31	04.46	05.39-05.56/17	03.11	05.13-06.07/54
	14.41	16.15	17.45		20.18	21.51		23.28	
5	10.08	08.51	07.17		06.28	04.43	05.36-05.58/22	03.09	05.13-06.07/54
	14.44	16.19	17.48		20.21	21.54		23.30	
6	10.06	08.48	07.14		06.24	04.39	05.34-06.00/26	03.07	05.13-06.06/53
	14.46	16.22	17.51		20.24	21.57		23.33	
7	10.05	08.45	07.10		06.21	04.36	05.34-06.02/28	03.05	05.13-06.07/54
	14.48	16.25	17.54		20.27	22.00		23.35	
8	10.03	08.41	07.07		06.17	04.32	05.32-06.03/31	03.03	05.14-06.07/53
	14.51	16.29	17.57		20.30	22.04		23.37	
9	10.01	08.38	07.03		06.14	04.29	05.31-06.03/32	03.01	05.14-06.07/53
	14.54	16.32	18.00		20.33	22.07		23.40	
10	09.59	08.35	07.00		06.10	04.26	05.26-06.04/38	02.57	05.14-06.06/52
	14.56	16.35	18.03		20.36	22.10		23.42	
11	09.57	08.32	06.56		06.06	04.22	05.24-06.04/40	02.56	05.14-06.06/52
	14.59	16.39	18.06		20.39	22.13		23.44	
12	09.56	08.28	06.53		06.03	04.19	05.22-06.06/44	02.54	05.14-06.06/52
	15.02	16.42	18.09		20.42	22.17		23.45	
13	09.53	08.25	06.49		05.59	04.16	05.20-06.06/46	02.53	05.15-06.07/52
	15.05	16.45	18.12		20.45	22.20		23.47	
14	09.51	08.22	06.46		05.56	04.13	05.19-06.06/47	02.52	05.15-06.06/51
	15.08	16.48	18.15		20.48	22.23		23.49	
15	09.49	08.19	06.42	07.15-07.22/7	05.52	04.09	05.18-06.07/49	02.51	05.15-06.07/52
	15.11	16.52	18.18		20.51	22.26		23.50	
16	09.47	08.15	06.39	07.11-07.24/13	05.49	04.06	05.17-06.07/50	02.50	05.15-06.06/51
	15.14	16.55	18.21		20.54	22.30		23.51	
17	09.44	08.12	06.35	07.07-07.25/18	05.45	04.03	05.15-06.07/52	02.50	05.16-06.06/50
	15.17	16.58	18.24		20.57	22.33		23.52	
18	09.42	08.09	06.32	07.06-07.27/21	05.42	04.00	05.15-06.07/52	02.49	05.16-06.07/51
	15.20	17.01	18.27		21.00	22.36		23.53	
19	09.40	08.05	06.28	07.04-07.27/23	05.38	03.57	05.14-06.07/53	02.49	05.16-06.07/51
	15.23	17.04	18.30		21.03	22.39		23.54	
20	09.37	08.02	06.25	07.04-07.28/24	05.35	03.53	05.14-06.07/53	02.49	05.16-06.07/51
	15.26	17.08	18.33		21.06	22.43		23.55	
21	09.34	07.59	06.21	07.03-07.27/24	05.31	03.50	05.14-06.08/54	02.49	05.16-06.07/51
	15.29	17.11	18.36		21.09	22.46		23.55	
22	09.32	07.55	06.17	07.02-07.27/25	05.28	03.47	05.13-06.07/54	02.49	05.16-06.07/51
	15.32	17.14	18.39		21.12	22.49		23.55	
23	09.29	07.52	06.14	07.02-07.27/25	05.24	03.44	05.13-06.08/55	02.50	05.17-06.08/51
	15.36	17.17	18.42		21.16	22.52		23.55	
24	09.26	07.48	06.10	07.01-07.26/25	05.21	03.41	05.13-06.08/55	02.50	05.17-06.08/51
	15.39	17.20	18.45		21.19	22.55		23.55	
25	09.24	07.45	06.07	07.02-07.26/24	05.17	03.38	05.13-06.08/55	02.51	05.18-06.09/51
	15.42	17.23	18.48		21.22	22.58		23.55	
26	09.21	07.41	06.03	07.02-07.25/23	05.14	03.35	05.13-06.08/55	02.52	05.17-06.08/51
	15.45	17.27	18.51		21.25	23.02		23.54	
27	09.18	07.38	06.00	07.03-07.24/21	05.10	03.32	05.13-06.08/55	02.53	05.18-06.09/51
	15.49	17.30	18.54		21.28	23.05		23.53	
28	09.15	07.35	05.56	07.03-07.22/19	05.07	03.30	05.13-06.08/55	02.54	05.18-06.09/51
	15.52	17.33	18.57		21.31	23.08		23.53	
29	09.12		06.53	08.05-08.20/15	05.03	03.27	05.12-06.08/56	02.56	05.18-06.10/52
	15.55		20.00		21.35	23.11		23.51	
30	09.09		06.49	08.07-08.17/10	05.00	03.24	05.12-06.07/55	02.58	05.18-06.10/52
	15.59		20.03		21.38	23.14		23.50	
31	09.06		06.46			03.21	05.12-06.07/55		
	16.02		20.06			23.16			
Potential sun hours	171	238	363		451	570		624	
Sum of minutes with flicker	0	0	317		0	1295		1562	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 50 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	05.18-06.11/53	04.24	05.33-06.15/42	06.00		07.26	08.00	09.35
	23.49		22.27		20.39		18.53	16.07	14.42
2	03.01	05.18-06.11/53	04.27	05.35-06.15/40	06.03		07.29	08.03	09.38
	23.47		22.23		20.36		18.49	16.03	14.40
3	03.01	05.18-06.11/53	04.31	05.38-06.14/36	06.06		07.32	08.07	09.41
	23.46		22.20		20.32		18.46	16.00	14.38
4	03.03	05.19-06.12/53	04.34	05.41-06.13/32	06.09		07.35	08.10	09.43
	23.44		22.17		20.29		18.42	15.57	14.37
5	03.05	05.19-06.12/53	04.37	05.43-06.12/29	06.11		07.38	08.13	09.46
	23.42		22.13		20.25		18.39	15.54	14.35
6	03.08	05.19-06.13/54	04.40	05.43-06.10/27	06.14		07.41	08.16	09.48
	23.40		22.10		20.22		18.35	15.51	14.33
7	03.10	05.19-06.13/54	04.43	05.45-06.09/24	06.17		07.44	08.19	09.51
	23.38		22.06		20.18		18.32	15.47	14.32
8	03.12	05.20-06.14/54	04.47	05.47-06.08/21	06.20		07.47	08.23	09.53
	23.36		22.03		20.14		18.28	15.44	14.30
9	03.15	05.20-06.14/54	04.50	05.49-06.05/16	06.23		07.50	08.26	09.55
	23.34		22.00		20.11		18.25	15.41	14.29
10	03.17	05.20-06.15/55	04.53	05.52-06.01/9	06.26		07.52	08.29	09.58
	23.31		21.56		20.07		18.21	15.38	14.28
11	03.20	05.21-06.15/54	04.56		06.29		07.55	08.32	10.00
	23.29		21.53		20.04		18.18	15.35	14.26
12	03.23	05.21-06.16/55	04.59		06.32		07.58	08.36	10.02
	23.27		21.49		20.00		18.14	15.32	14.25
13	03.26	05.20-06.16/56	05.02		06.35	07.59-08.07/8	08.01	08.39	10.03
	23.24		21.46		19.57		18.11	15.29	14.24
14	03.28	05.21-06.17/56	05.05		06.37	07.55-08.09/14	08.04	08.42	10.05
	23.21		21.43		19.53		18.07	15.26	14.24
15	03.31	05.21-06.17/56	05.08		06.40	07.53-08.11/18	08.07	08.45	10.07
	23.19		21.39		19.49		18.04	15.23	14.23
16	03.34	05.22-06.17/55	05.12		06.43	07.52-08.12/20	08.10	08.49	10.08
	23.16		21.36		19.46		18.00	15.20	14.23
17	03.37	05.22-06.17/55	05.15		06.46	07.51-08.13/22	08.13	08.52	10.09
	23.13		21.32		19.42		17.57	15.17	14.22
18	03.40	05.22-06.17/55	05.18		06.49	07.50-08.14/24	08.16	08.55	10.11
	23.10		21.29		19.39		17.53	15.15	14.22
19	03.43	05.23-06.18/55	05.21		06.52	07.48-08.13/25	08.19	08.58	10.12
	23.07		21.25		19.35		17.50	15.12	14.22
20	03.46	05.23-06.18/55	05.24		06.55	07.48-08.13/25	08.23	09.02	10.13
	23.04		21.22		19.32		17.47	15.09	14.22
21	03.49	05.23-06.17/54	05.27		06.57	07.47-08.13/26	08.26	09.05	10.13
	23.01		21.18		19.28		17.43	15.06	14.22
22	03.52	05.24-06.18/54	05.30		07.00	07.47-08.12/25	08.29	09.08	10.14
	22.58		21.15		19.25		17.40	15.04	14.23
23	03.56	05.24-06.18/54	05.33		07.03	07.48-08.12/24	08.32	09.11	10.15
	22.55		21.11		19.21		17.36	15.01	14.23
24	03.59	05.24-06.18/54	05.36		07.06	07.48-08.11/23	08.35	09.14	10.15
	22.52		21.08		19.17		17.33	14.59	14.24
25	04.02	05.25-06.18/53	05.39		07.09	07.48-08.10/22	07.38	09.17	10.15
	22.49		21.04		19.14		16.30	14.56	14.25
26	04.05	05.25-06.18/53	05.42		07.12	07.48-08.08/20	07.41	09.20	10.15
	22.46		21.01		19.10		16.26	14.54	14.26
27	04.08	05.27-06.17/50	05.45		07.15	07.51-08.06/15	07.44	09.23	10.15
	22.43		20.57		19.07		16.23	14.51	14.27
28	04.11	05.28-06.18/50	05.48		07.18	07.54-08.03/9	07.47	09.26	10.15
	22.40		20.53		19.03		16.20	14.49	14.28
29	04.15	05.28-06.17/49	05.51		07.20		07.51	09.29	10.14
	22.36		20.50		19.00		16.16	14.47	14.30
30	04.18	05.30-06.17/47	05.54		07.23		07.54	09.32	10.14
	22.33		20.46		18.56		16.13	14.44	14.31
31	04.21	05.31-06.15/44	05.57				07.57		10.13
	22.30		20.43				16.10		14.33
Potential sun hours	608		508		393		305	198	137
Sum of minutes with flicker	1650		276		320		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 51 - PUU39

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.19/1	02.59 04.13-04.34/21	04.24	06.00 06.39-06.47/8	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.16-04.22/6	03.01 04.13-04.34/21	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.14-04.23/9	03.01 04.13-04.33/20	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.13-04.25/12	03.03 04.14-04.34/20	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.12-04.26/14	03.05 04.15-04.33/18	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.10-04.26/16	03.07 04.16-04.33/17	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.09-04.27/18	03.10 04.17-04.32/15	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.03 04.09-04.28/19	03.12 04.19-04.32/13	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.01 04.09-04.29/20	03.15 04.21-04.31/10	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.09-04.29/20	03.17 04.23-04.30/7	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 06.39-06.47/8	04.22	02.56 04.08-04.30/22	03.20 04.25-04.29/4	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03 06.36-06.49/13	04.19	02.54 04.08-04.30/22	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59 06.33-06.50/17	04.16	02.53 04.04-04.08/4	03.25	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47 04.09-04.31/22	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56 06.30-06.50/20	04.12	02.52 04.03-04.31/28	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52 06.29-06.51/22	04.09	02.51 04.03-04.32/29	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49 06.28-06.52/24	04.06	02.50 04.02-04.31/29	03.34	05.11 06.41-06.48/7	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45 06.27-06.51/24	04.03	02.49 04.02-04.32/30	03.37	05.15 06.37-06.50/13	06.46	08.13	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.27-06.52/25	04.00	02.49 04.02-04.32/30	03.40	05.18 06.36-06.52/16	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38 06.27-06.52/25	03.56	02.49 04.02-04.33/31	03.43	05.21 06.35-06.53/18	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.27-06.50/23	03.53	02.49 04.02-04.33/31	03.46	05.24 06.34-06.54/20	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31 06.27-06.50/23	03.50	02.49 04.02-04.33/31	03.49	05.27 06.32-06.54/22	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28 06.28-06.50/22	03.47	02.49 04.02-04.33/31	03.52	05.30 06.31-06.55/24	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.28-06.49/21	03.44	02.49 04.03-04.34/31	03.56	05.33 06.31-06.55/24	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21 06.28-06.47/19	03.41	02.50 04.03-04.33/30	03.59	05.36 06.31-06.55/24	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 06.30-06.45/15	03.38	02.51 04.04-04.34/30	04.02	05.39 06.30-06.54/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14 06.31-06.43/12	03.35	02.52 04.04-04.34/30	04.05	05.42 06.30-06.54/24	07.12	07.41	09.20	10.15
	15.45	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10 06.35-06.40/5	03.32	02.53 04.05-04.34/29	04.08	05.45 06.30-06.54/24	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.06-04.34/28	04.11	05.48 06.31-06.53/22	07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56 04.07-04.34/27	04.15	05.51 06.30-06.51/21	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57 04.12-04.34/22	04.18	05.54 06.33-06.50/17	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 06.36-06.49/13		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	318	0	702	166	313	8	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 52 - PUU40

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21 05.16-05.37/21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 53 - PUU41

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 54 - PUU42

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 20.35-20.55/20	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53 20.34-20.55/21	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49 20.34-20.55/21	03.14	03.01	04.30 20.51-20.58/7	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46 20.35-20.54/19	03.11	03.03	04.34 20.49-21.01/12	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42 20.35-20.54/19	03.09	03.05	04.37 20.47-21.01/14	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 20.35-20.53/18	03.07	03.07	04.40 20.46-21.02/16	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 20.36-20.52/16	03.04	03.10	04.43 20.45-21.03/18	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 20.37-20.51/14	03.02	03.12	04.46 20.44-21.03/19	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 20.39-20.50/11	03.01	03.15	04.50 20.44-21.03/19	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26 20.42-20.47/5	02.57	03.17	04.53 20.44-21.04/20	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56 20.44-21.04/20	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.23	04.59 20.43-21.03/20	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	03.25	05.02 20.43-21.02/19	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	03.28	05.05 20.44-20.59/15	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08 20.44-20.56/12	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11 20.44-20.52/8	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	03.37	05.15 20.45-20.50/5	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.35	03.53	02.48	03.46	05.24	06.55	08.22	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 20.40-20.41/1	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13 20.39-20.44/5	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10 20.37-20.46/9	03.32	02.53	04.08	05.45	07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 20.36-20.49/13	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 20.35-20.52/17	03.27	02.56	04.14	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00 20.35-20.54/19	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 55 - PUU43

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 56 - PUU44

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56		03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41		23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53		03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44		23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49		03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47		23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46		03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51		23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42		03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54		23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39		03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36		03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00		23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32		03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04		23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29		03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07		23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26		02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22		02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13		23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19		02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17		23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16		02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20		23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12		02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23		23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	21.31-21.35/4	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26		23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	21.29-21.38/9	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30		23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	21.27-21.41/14	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33		23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	21.27-21.44/17	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36		23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	21.25-21.46/21	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39		23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	21.25-21.47/22	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43		23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	21.24-21.47/23	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46		23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	21.24-21.48/24	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49		23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	21.23-21.49/26	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52		23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	21.23-21.50/27	02.50	21.29-21.54/25	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55		23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	21.22-21.49/27	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58		23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	21.22-21.50/28	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02		23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	21.22-21.50/28	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	21.22-21.50/28	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08		23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	21.22-21.50/28	02.56	21.29-21.55/26	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11		23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	21.23-21.51/28	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14		23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	21.23-21.51/28			04.21		05.57		07.57		10.13
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382		786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 57 - PUU45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 58 - PUU46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May	June		July		August	September		October		November	December
1	10.12	09.03	07.31		06.42	04.56	03.18		02.59	21.56-22.11/15	04.24	06.00		07.26	17.53-18.13/20	08.00	09.35
	14.35	16.05	17.36		20.09	21.41	23.19		23.49		22.26	20.39		18.53		16.06	14.42
2	10.11	09.00	07.28		06.38	04.53	03.16		03.01	21.56-22.10/14	04.27	06.02		07.29	17.53-18.11/18	08.03	09.38
	14.37	16.08	17.39		20.12	21.44	23.22		23.47		22.23	20.36		18.49		16.03	14.40
3	10.10	08.57	07.24		06.35	04.49	03.13		03.01	21.58-22.09/11	04.30	06.05		07.32	17.53-18.07/14	08.06	09.41
	14.39	16.12	17.42		20.15	21.47	23.25		23.46		22.20	20.32		18.45		16.00	14.38
4	10.09	08.54	07.21		06.31	04.46	03.11		03.03	21.59-22.07/8	04.34	06.08		07.35	17.54-18.03/9	08.10	09.43
	14.41	16.15	17.45		20.18	21.50	23.27		23.44		22.16	20.28		18.42		15.57	14.36
5	10.07	08.51	07.17		06.28	04.42	03.09		03.05		04.37	06.11		07.38	17.55-18.00/5	08.13	09.46
	14.43	16.18	17.48		20.20	21.54	23.30		23.42		22.13	20.25		18.38		15.53	14.35
6	10.06	08.48	07.14		06.24	04.39	03.07		03.07		04.40	06.14		07.41		08.16	09.48
	14.46	16.22	17.51		20.23	21.57	23.33		23.40		22.10	20.21		18.35		15.50	14.33
7	10.05	08.44	07.10		06.20	04.36	03.04		03.10		04.43	06.17		07.43		08.19	09.51
	14.48	16.25	17.54		20.26	22.00	23.35		23.38		22.06	20.18		18.31		15.47	14.31
8	10.03	08.41	07.07	17.19-17.20/1	06.17	04.32	03.02	21.56-22.01/5	03.12		04.46	06.20		07.46		08.23	09.53
	14.51	16.28	17.57		20.29	22.03	23.37		23.36		22.03	20.14		18.28		15.44	14.30
9	10.01	08.38	07.03	17.17-17.24/7	06.13	04.29	03.00	21.54-22.04/10	03.14		04.49	06.23		07.49		08.26	09.55
	14.53	16.32	18.00		20.33	22.07	23.40		23.34		22.00	20.11		18.24		15.41	14.28
10	09.59	08.35	07.00	17.15-17.27/12	06.10	04.26	02.57	21.52-22.05/13	03.17		04.53	06.26		07.52		08.29	09.58
	14.56	16.35	18.03		20.36	22.10	23.42		23.31		21.56	20.07		18.21		15.38	14.27
11	09.57	08.32	06.56	17.15-17.31/16	06.06	04.22	02.55	21.51-22.07/16	03.20		04.56	06.29		07.55		08.32	10.00
	14.59	16.38	18.06		20.39	22.13	23.44		23.29		21.53	20.04		18.17		15.35	14.26
12	09.55	08.28	06.53	17.14-17.33/19	06.03	04.19	02.54	21.51-22.07/16	03.22		04.59	06.31		07.58		08.36	10.02
	15.01	16.42	18.09		20.42	22.16	23.45		23.26		21.49	20.00		18.14		15.32	14.25
13	09.53	08.25	06.49	17.13-17.33/20	05.59	04.16	02.53	21.50-22.08/18	03.25		05.02	06.34		08.01		08.39	10.03
	15.04	16.45	18.12		20.45	22.20	23.47		23.24		21.46	19.56		18.11		15.29	14.24
14	09.51	08.22	06.46	17.13-17.34/21	05.56	04.12	02.52	21.50-22.09/19	03.28		05.05	06.37		08.04		08.42	10.05
	15.07	16.48	18.15		20.48	22.23	23.49		23.21		21.42	19.53		18.07		15.26	14.23
15	09.49	08.18	06.42	17.13-17.33/20	05.52	04.09	02.51	21.49-22.10/21	03.31		05.08	06.40		08.07		08.45	10.07
	15.10	16.51	18.18		20.51	22.26	23.50		23.19		21.39	19.49		18.04		15.23	14.23
16	09.47	08.15	06.39	17.13-17.31/18	05.49	04.06	02.50	21.49-22.11/22	03.34		05.11	06.43		08.10		08.49	10.08
	15.13	16.55	18.21		20.54	22.30	23.51		23.16		21.35	19.46		18.00		15.20	14.22
17	09.44	08.12	06.35	17.14-17.31/17	05.45	04.03	02.49	21.50-22.11/21	03.37		05.14	06.46		08.13		08.52	10.09
	15.16	16.58	18.24		20.57	22.33	23.52		23.13		21.32	19.42		17.57		15.17	14.22
18	09.42	08.08	06.31	17.14-17.29/15	05.41	03.59	02.49	21.50-22.12/22	03.40		05.17	06.49		08.16		08.55	10.11
	15.19	17.01	18.27		21.00	22.36	23.53		23.10		21.28	19.39		17.53		15.14	14.22
19	09.39	08.05	06.28	17.17-17.27/10	05.38	03.56	02.48	21.49-22.11/22	03.43		05.21	06.52		08.19		08.58	10.12
	15.23	17.04	18.30		21.03	22.39	23.54		23.07		21.25	19.35		17.50		15.12	14.22
20	09.37	08.02	06.24		05.34	03.53	02.48	21.50-22.13/23	03.46		05.24	06.54		08.22		09.02	10.13
	15.26	17.07	18.33		21.06	22.42	23.55		23.04		21.21	19.32		17.46		15.09	14.22
21	09.34	07.58	06.21		05.31	03.50	02.48	21.50-22.13/23	03.49		05.27	06.57		08.25		09.05	10.13
	15.29	17.11	18.36		21.09	22.46	23.55		23.01		21.18	19.28		17.43		15.06	14.22
22	09.32	07.55	06.17		05.27	03.47	02.49	21.50-22.13/23	03.52		05.30	07.00		08.29		09.08	10.14
	15.32	17.14	18.39		21.12	22.49	23.55		22.58		21.14	19.24		17.40		15.03	14.23
23	09.29	07.52	06.14		05.24	03.44	02.49	21.50-22.13/23	03.55		05.33	07.03		08.32		09.11	10.14
	15.35	17.17	18.42		21.15	22.52	23.55		22.55		21.11	19.21		17.36		15.01	14.23
24	09.26	07.48	06.10		05.20	03.41	02.50	21.51-22.13/22	03.58		05.36	07.06	18.01-18.10/9	08.35		09.14	10.15
	15.39	17.20	18.45		21.19	22.55	23.55		22.52		21.07	19.17		17.33		14.58	14.24
25	09.23	07.45	06.07		05.17	03.38	02.51	21.51-22.13/22	04.02		05.39	07.09	17.58-18.12/14	07.38		09.17	10.15
	15.42	17.23	18.48		21.22	22.58	23.55		22.49		21.04	19.14		16.30		14.56	14.25
26	09.21	07.41	06.03		05.13	03.35	02.52	21.51-22.13/22	04.05		05.42	07.12	17.56-18.13/17	07.41		09.20	10.15
	15.45	17.26	18.51		21.25	23.01	23.54		22.46		21.00	19.10		16.26		14.53	14.26
27	09.18	07.38	06.00		05.10	03.32	02.53	21.52-22.13/21	04.08		05.45	07.14	17.55-18.13/18	07.44		09.23	10.15
	15.49	17.29	18.54		21.28	23.05	23.53		22.43		20.57	19.07		16.23		14.51	14.27
28	09.15	07.34	05.56		05.06	03.29	02.54	21.53-22.13/20	04.11		05.48	07.17	17.54-18.14/20	07.47		09.26	10.15
	15.52	17.33	18.57		21.31	23.08	23.53		22.39		20.53	19.03		16.20		14.49	14.28
29	09.12		06.52		05.03	03.26	02.56	21.53-22.12/19	04.14		05.51	07.20	17.53-18.14/21	07.50		09.29	10.14
	15.55		20.00		21.34	23.11	23.51		22.36		20.50	19.00		16.16		14.46	14.29
30	09.09		06.49		05.00	03.24	02.57	21.54-22.11/17	04.18		05.54	07.23	17.53-18.14/21	07.54		09.32	10.14
	15.58		20.03		21.38	23.14	23.50		22.33		20.46	18.56		16.13		14.44	14.31
31	09.06		06.45			03.21			04.21		05.57			07.57			10.13
	16.02		20.06			23.16			22.30		20.43			16.10			14.33
Potential sun hours	171	238	363		451	570	624		609		509	393		305		198	137
Sum of minutes with flicker	0	0	176		0	0	440		48		0	120		66		0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 59 - PUU47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00 19.36-19.55/19	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02 19.36-19.55/19	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05 19.35-19.53/18	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08 19.35-19.50/15	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28 19.42-19.44/2	04.42	03.09	03.05	04.37	06.11 19.36-19.46/10	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24 19.41-19.47/6	04.39	03.06	03.07	04.40	06.14 19.37-19.43/6	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20 19.40-19.50/10	04.36	03.04	03.09	04.43	06.17 19.38-19.40/2	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17 19.38-19.52/14	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13 19.38-19.56/18	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10 19.37-19.56/19	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 19.37-19.56/19	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03 19.36-19.55/19	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59 19.37-19.55/18	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56 19.38-19.54/16	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52 19.38-19.52/14	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48 19.40-19.50/10	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45 19.43-19.47/4	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42 19.45-19.51/6	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45 19.41-19.52/11	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48 19.39-19.54/15	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51 19.38-19.55/17	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54 19.37-19.56/19	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 19.36-19.55/19		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	169	0	0	0	87	89	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 60 - PUU48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59 19.30-19.54/24	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02 19.30-19.53/23	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05 19.30-19.51/21	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08 19.31-19.50/19	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28	18.42	15.57	14.36
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11 19.33-19.46/13	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24 19.40-19.47/7	04.39	03.06	03.07	04.40	06.14 19.36-19.43/7	07.41	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20 19.37-19.50/13	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17 19.34-19.52/18	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13 19.33-19.54/21	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10 19.31-19.54/23	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06 19.31-19.55/24	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03 19.29-19.55/26	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59 19.29-19.55/26	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56 19.29-19.55/26	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52 19.28-19.54/26	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48 19.28-19.54/26	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45 19.29-19.54/25	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41 19.29-19.52/23	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38 19.29-19.52/23	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34 19.30-19.51/21	03.53	02.48	03.46	05.24 19.41-19.50/9	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31 19.32-19.50/18	03.50	02.48	03.49	05.27 19.38-19.53/15	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27 19.33-19.47/14	03.47	02.49	03.52	05.30 19.36-19.54/18	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24 19.36-19.44/8	03.44	02.49	03.55	05.33 19.34-19.55/21	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36 19.33-19.55/22	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39 19.32-19.56/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42 19.32-19.57/25	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45 19.30-19.56/26	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48 19.30-19.56/26	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51 19.30-19.56/26	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54 19.30-19.56/26	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 19.29-19.55/26		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	368	0	0	0	264	107	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102 **WTG:** 61 - PUU49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.12	09.03	07.31		06.42	04.56	03.18	02.59	04.24	05.59		07.26	17.52-18.10/18	08.00	09.35
	14.35	16.05	17.36		20.08	21.41	23.19	23.49	22.26	20.39		18.52		16.06	14.42
2	10.11	09.00	07.27		06.38	04.53	03.16	03.01	04.27	06.02		07.29	17.54-18.06/12	08.03	09.38
	14.37	16.08	17.39		20.11	21.44	23.22	23.47	22.23	20.36		18.49		16.03	14.40
3	10.10	08.57	07.24		06.35	04.49	03.13	03.01	04.30	06.05		07.32		08.06	09.41
	14.39	16.12	17.42		20.14	21.47	23.25	23.46	22.20	20.32		18.45		16.00	14.38
4	10.09	08.54	07.21		06.31	04.46	03.11	03.03	04.33	06.08		07.35		08.10	09.43
	14.41	16.15	17.45		20.17	21.50	23.27	23.44	22.16	20.28		18.42		15.57	14.36
5	10.07	08.51	07.17		06.27	04.42	03.09	03.05	04.37	06.11		07.38		08.13	09.46
	14.43	16.18	17.48		20.20	21.54	23.30	23.42	22.13	20.25		18.38		15.53	14.34
6	10.06	08.48	07.14		06.24	04.39	03.06	03.07	04.40	06.14		07.40		08.16	09.48
	14.46	16.22	17.51		20.23	21.57	23.33	23.40	22.10	20.21		18.35		15.50	14.33
7	10.04	08.44	07.10		06.20	04.35	03.04	03.09	04.43	06.17		07.43		08.19	09.51
	14.48	16.25	17.54		20.26	22.00	23.35	23.38	22.06	20.18		18.31		15.47	14.31
8	10.03	08.41	07.07		06.17	04.32	03.02	03.12	04.46	06.20		07.46		08.23	09.53
	14.51	16.28	17.57		20.29	22.03	23.37	23.36	22.03	20.14		18.28		15.44	14.30
9	10.01	08.38	07.03		06.13	04.29	03.00	03.14	04.49	06.23		07.49		08.26	09.55
	14.53	16.32	18.00		20.32	22.07	23.40	23.34	22.00	20.11		18.24		15.41	14.28
10	09.59	08.35	07.00		06.10	04.25	02.57	03.17	04.53	06.26		07.52		08.29	09.57
	14.56	16.35	18.03		20.35	22.10	23.42	23.31	21.56	20.07		18.21		15.38	14.27
11	09.57	08.32	06.56	17.18-17.26/8	06.06	04.22	02.55	03.20	04.56	06.29		07.55		08.32	10.00
	14.59	16.38	18.06		20.38	22.13	23.44	23.29	21.53	20.03		18.17		15.35	14.26
12	09.55	08.28	06.53	17.13-17.29/16	06.03	04.19	02.54	03.22	04.59	06.31		07.58		08.36	10.01
	15.01	16.41	18.09		20.42	22.16	23.45	23.26	21.49	20.00		18.14		15.32	14.25
13	09.53	08.25	06.49	17.11-17.31/20	05.59	04.15	02.53	03.25	05.02	06.34	18.01-18.14/13	08.01		08.39	10.03
	15.04	16.45	18.12		20.45	22.20	23.47	23.24	21.46	19.56		18.10		15.29	14.24
14	09.51	08.22	06.46	17.09-17.33/24	05.56	04.12	02.51	03.28	05.05	06.37	17.58-18.16/18	08.04		08.42	10.05
	15.07	16.48	18.15		20.48	22.23	23.49	23.21	21.42	19.53		18.07		15.26	14.23
15	09.49	08.18	06.42	17.07-17.34/27	05.52	04.09	02.51	03.31	05.08	06.40	17.56-18.18/22	08.07		08.45	10.07
	15.10	16.51	18.18		20.51	22.26	23.50	23.19	21.39	19.49		18.04		15.23	14.23
16	09.47	08.15	06.38	17.06-17.34/28	05.48	04.06	02.50	03.34	05.11	06.43	17.53-18.18/25	08.10		08.49	10.08
	15.13	16.54	18.21		20.54	22.29	23.51	23.16	21.35	19.46		18.00		15.20	14.22
17	09.44	08.12	06.35	17.05-17.35/30	05.45	04.02	02.49	03.37	05.14	06.46	17.52-18.19/27	08.13		08.52	10.09
	15.16	16.58	18.24		20.57	22.33	23.52	23.13	21.32	19.42		17.57		15.17	14.22
18	09.42	08.08	06.31	17.04-17.35/31	05.41	03.59	02.49	03.40	05.17	06.49	17.51-18.20/29	08.16		08.55	10.11
	15.19	17.01	18.27		21.00	22.36	23.53	23.10	21.28	19.39		17.53		15.14	14.22
19	09.39	08.05	06.28	17.04-17.36/32	05.38	03.56	02.48	03.43	05.20	06.51	17.50-18.20/30	08.19		08.58	10.12
	15.22	17.04	18.30		21.03	22.39	23.54	23.07	21.25	19.35		17.50		15.11	14.22
20	09.37	08.02	06.24	17.03-17.35/32	05.34	03.53	02.48	03.46	05.24	06.54	17.49-18.20/31	08.22		09.01	10.13
	15.26	17.07	18.33		21.06	22.42	23.55	23.04	21.21	19.31		17.46		15.09	14.22
21	09.34	07.58	06.21	17.02-17.34/32	05.31	03.50	02.48	03.49	05.27	06.57	17.48-18.20/32	08.25		09.05	10.13
	15.29	17.11	18.36		21.09	22.46	23.55	23.01	21.18	19.28		17.43		15.06	14.22
22	09.32	07.55	06.17	17.03-17.35/32	05.27	03.47	02.49	03.52	05.30	07.00	17.47-18.19/32	08.28		09.08	10.14
	15.32	17.14	18.39		21.12	22.49	23.55	22.58	21.14	19.24		17.40		15.03	14.22
23	09.29	07.52	06.14	17.02-17.34/32	05.24	03.44	02.49	03.55	05.33	07.03	17.47-18.19/32	08.32		09.11	10.14
	15.35	17.17	18.42		21.15	22.52	23.55	22.55	21.11	19.21		17.36		15.01	14.23
24	09.26	07.48	06.10	17.03-17.33/30	05.20	03.41	02.50	03.58	05.36	07.06	17.47-18.19/32	08.35		09.14	10.15
	15.39	17.20	18.45		21.19	22.55	23.55	22.52	21.07	19.17		17.33		14.58	14.24
25	09.23	07.45	06.07	17.03-17.32/29	05.17	03.38	02.51	04.02	05.39	07.09	17.47-18.18/31	07.38		09.17	10.15
	15.42	17.23	18.48		21.22	22.58	23.55	22.49	21.04	19.14		16.29		14.56	14.25
26	09.21	07.41	06.03	17.04-17.31/27	05.13	03.35	02.52	04.05	05.42	07.12	17.47-18.17/30	07.41		09.20	10.15
	15.45	17.26	18.51		21.25	23.01	23.54	22.46	21.00	19.10		16.26		14.53	14.25
27	09.18	07.38	05.59	17.04-17.30/26	05.10	03.32	02.53	04.08	05.45	07.14	17.48-18.16/28	07.44		09.23	10.15
	15.48	17.29	18.54		21.28	23.04	23.53	22.43	20.57	19.07		16.23		14.51	14.27
28	09.15	07.34	05.56	17.06-17.29/23	05.06	03.29	02.54	04.11	05.48	07.17	17.48-18.15/27	07.47		09.26	10.15
	15.52	17.32	18.57		21.31	23.08	23.53	22.39	20.53	19.03		16.19		14.49	14.28
29	09.12		06.52	18.07-18.26/19	05.03	03.26	02.55	04.14	05.51	07.20	17.49-18.14/25	07.50		09.29	10.14
	15.55		20.00		21.34	23.11	23.51	22.36	20.50	19.00		16.16		14.46	14.29
30	09.09		06.49	18.09-18.23/14	04.59	03.24	02.57	04.17	05.54	07.23	17.50-18.12/22	07.54		09.32	10.14
	15.58		20.03		21.38	23.13	23.50	22.33	20.46	18.56		16.13		14.44	14.31
31	09.06		06.45	18.15-18.18/3		03.21		04.21	05.57			07.57			10.13
	16.02		20.06			23.16		22.30	20.43			16.10			14.32
Potential sun hours	171	238	363		451	570	624	609	509	393		305		198	137
Sum of minutes with flicker	0	0	515		0	0	0	0	0	486		30		0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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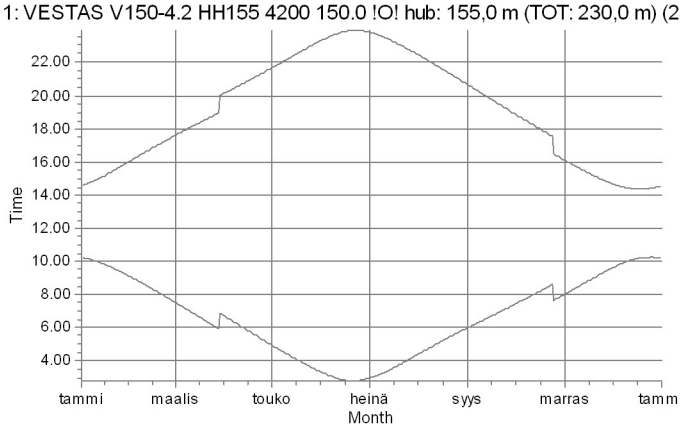
Calculated:
18.11.2020 15.18/3.4.388

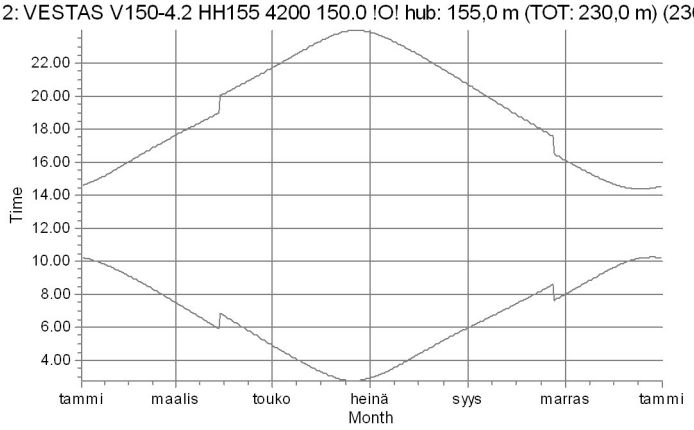
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

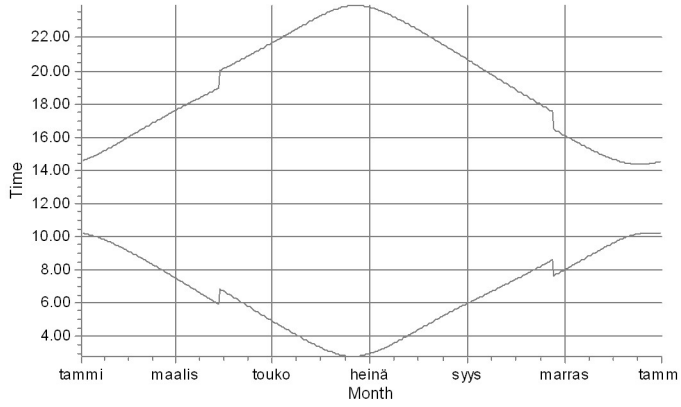
1: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2



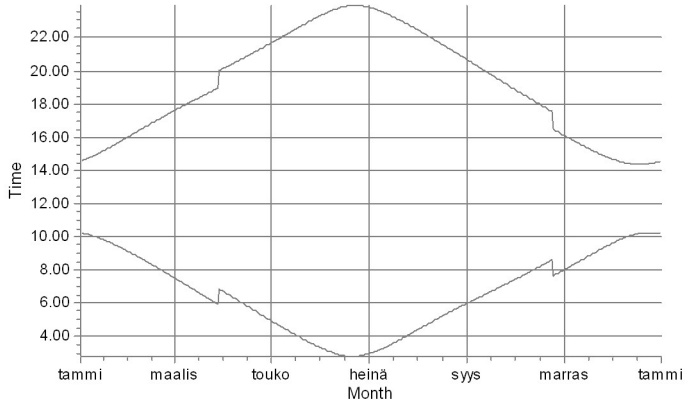
2: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)



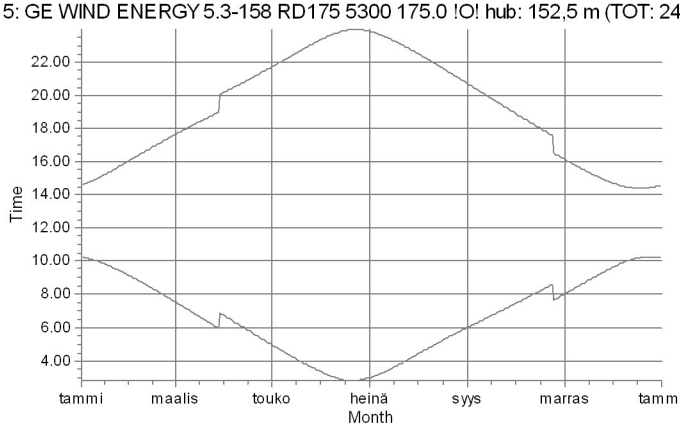
3: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2



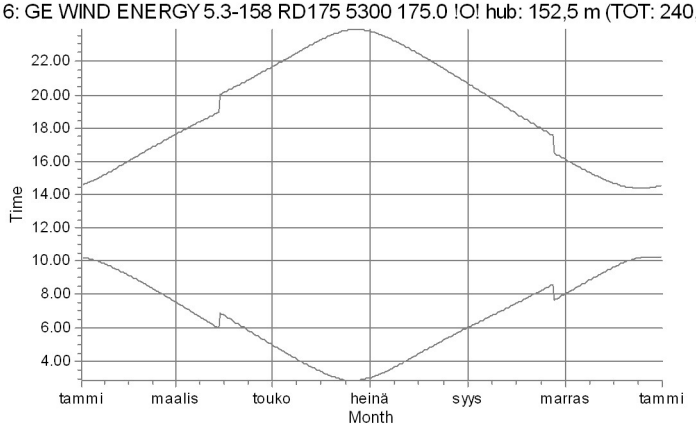
4: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)



5: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



6: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (



Shadow receptors

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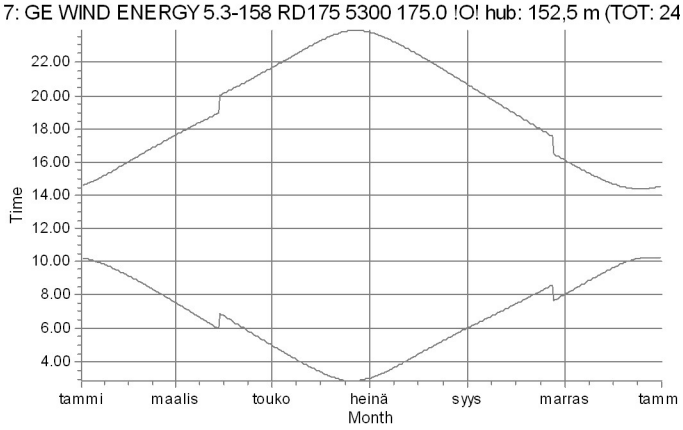
Calculated:
18.11.2020 15.18/3.4.388

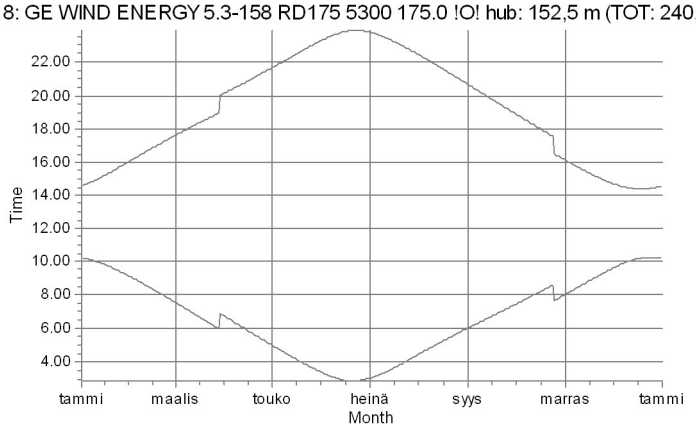
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102

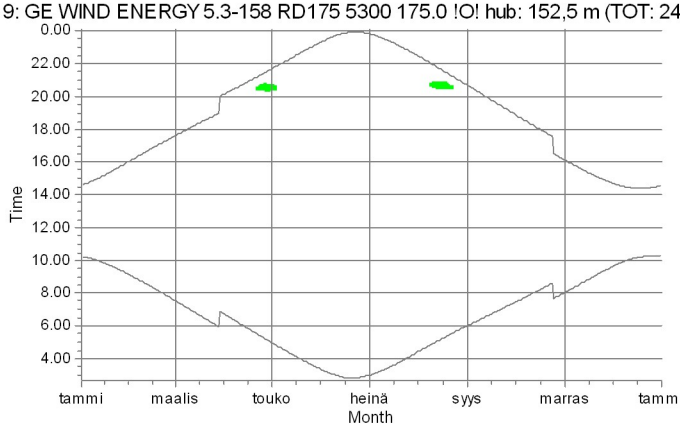
7: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



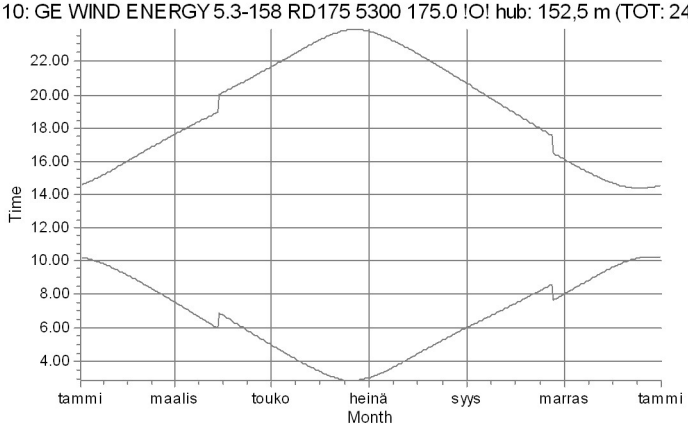
8: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (



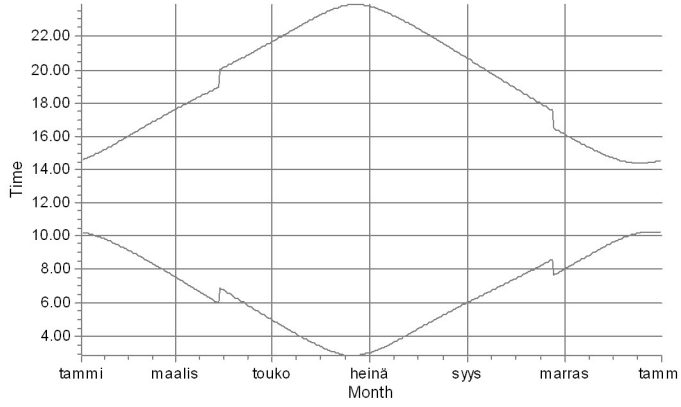
9: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



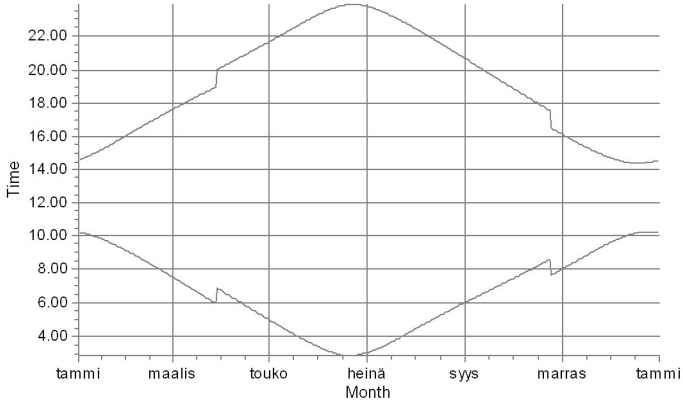
10: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



11: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 2



12: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



Shadow receptors

I: Asuinrakennus I (Kortenevantie 116)

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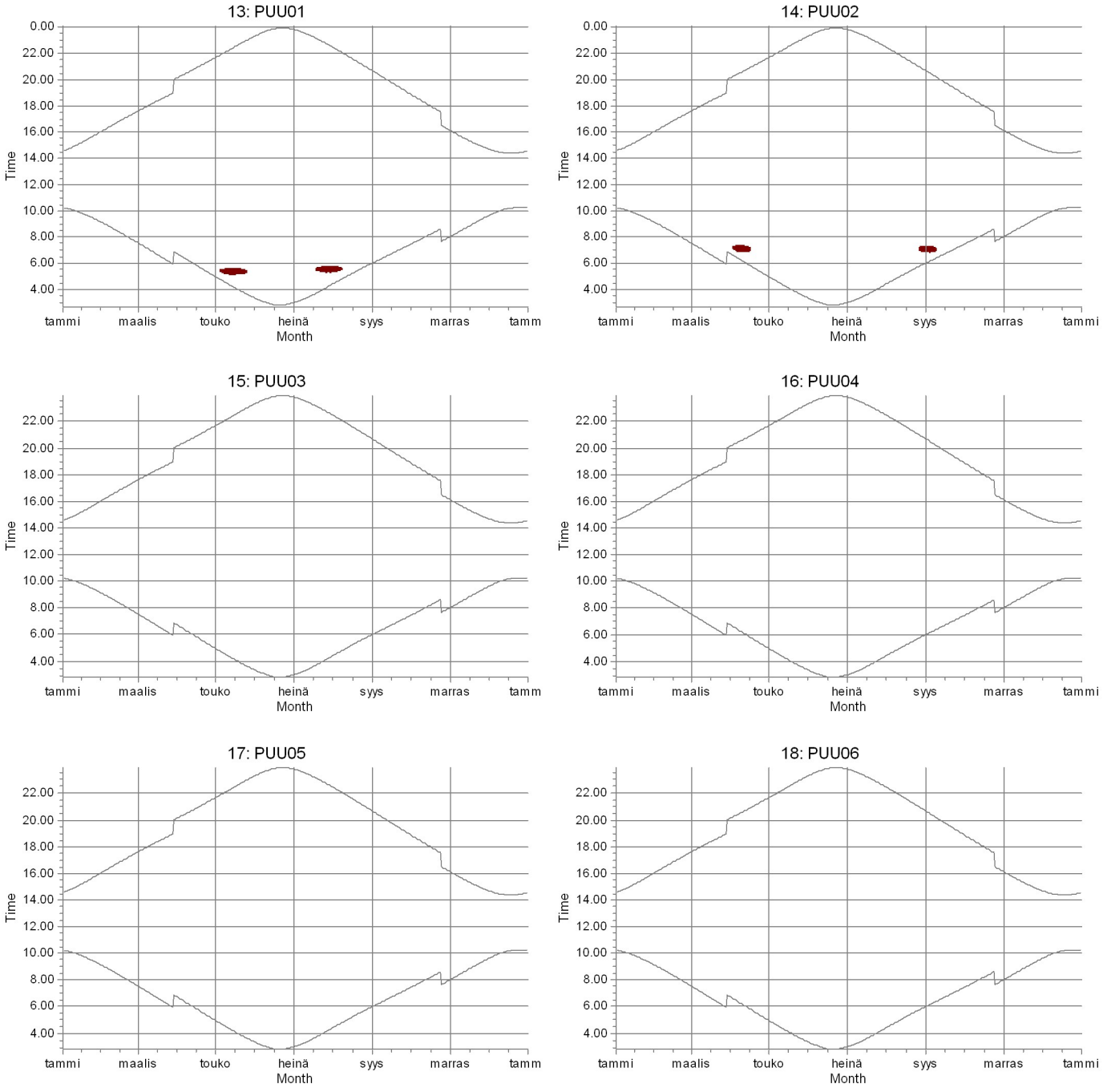
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

H: Asuinrakennus H (Pinolantie 406)

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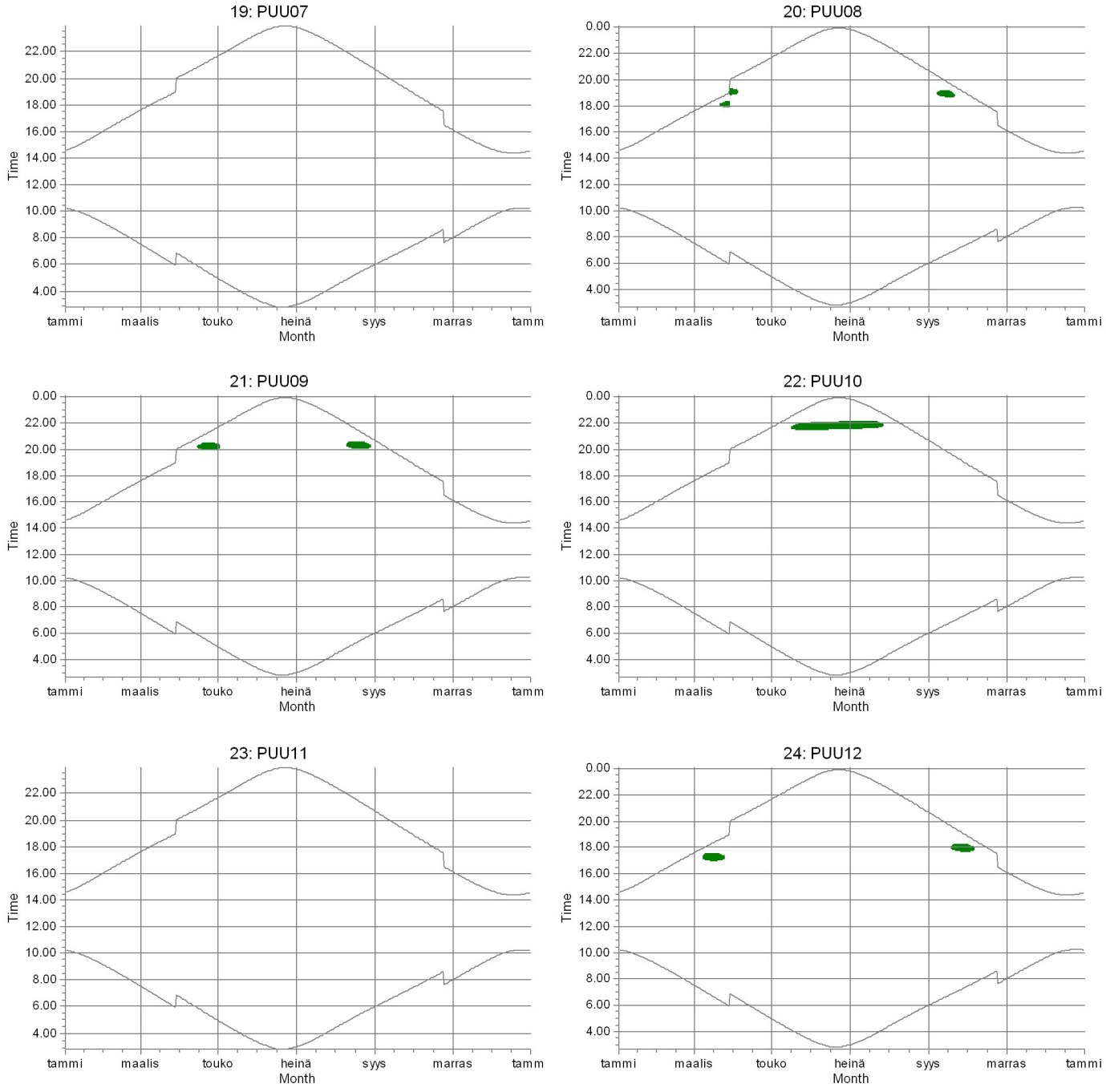
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

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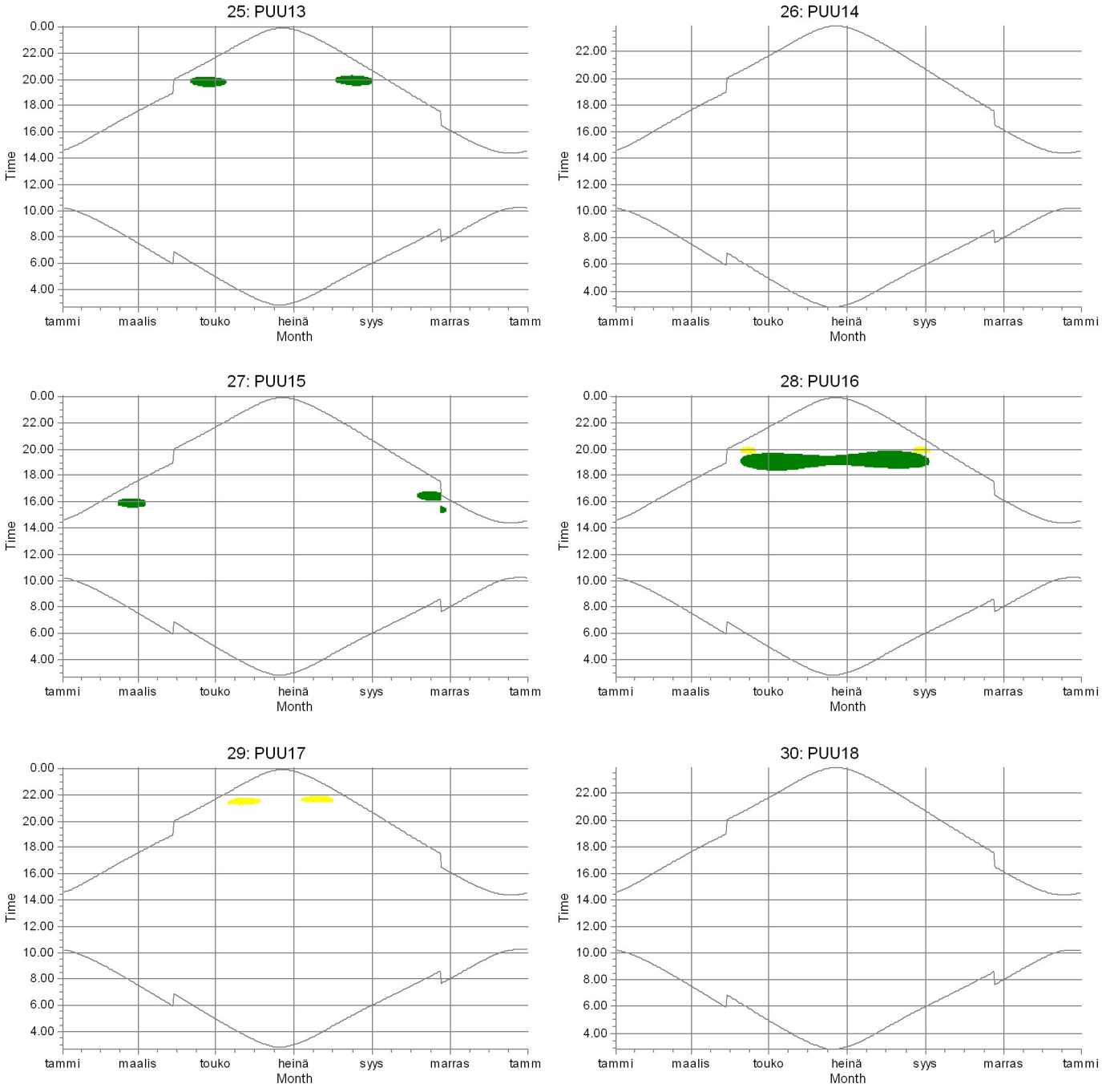
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

B: Laskentapiste B (Ylivieskantie, Pohlola)

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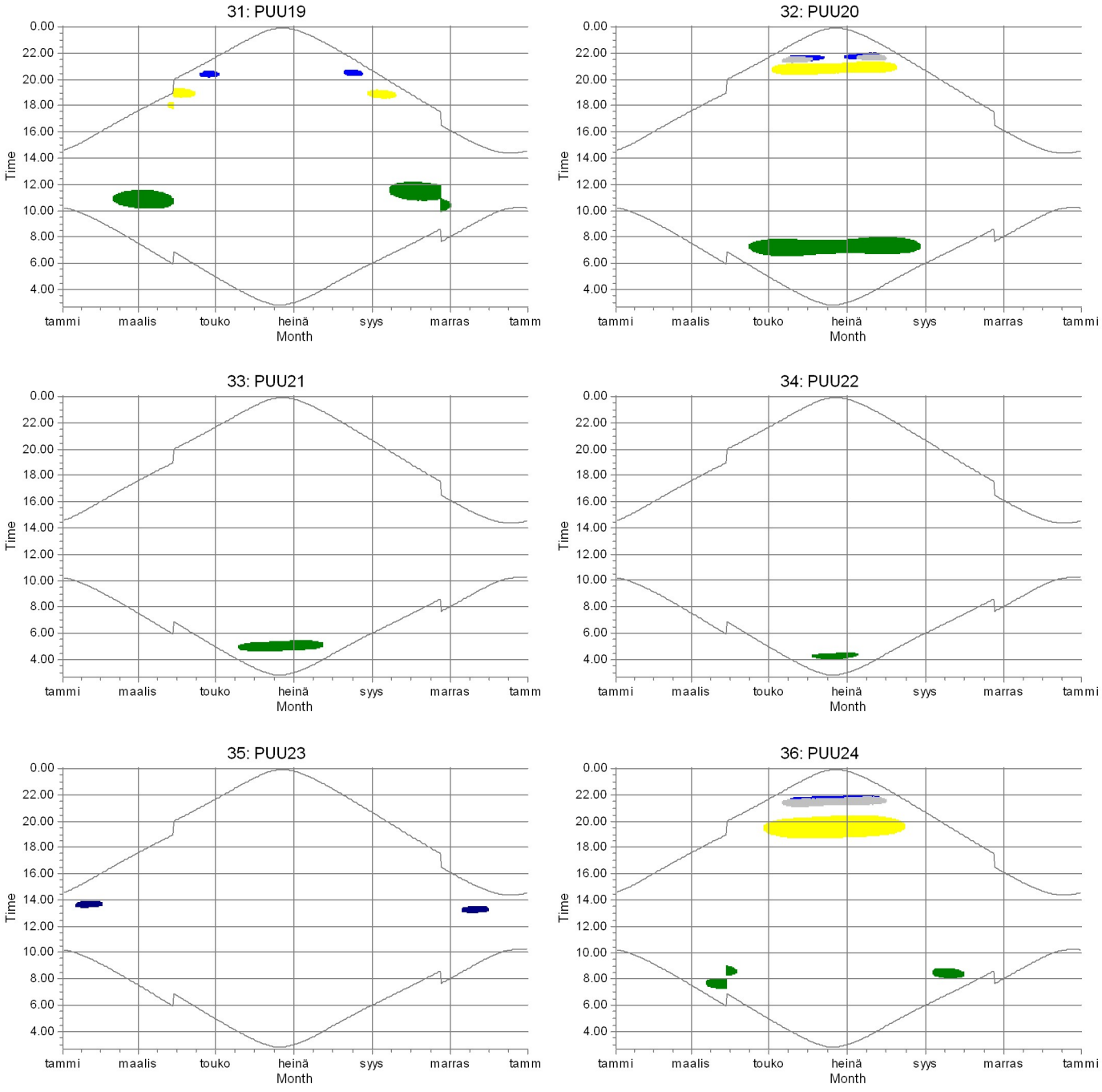
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

- A: Laskentapiste A (Metsästysmaja)
- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- L: Laskentapiste L (Perkkiontie, Ilmola)

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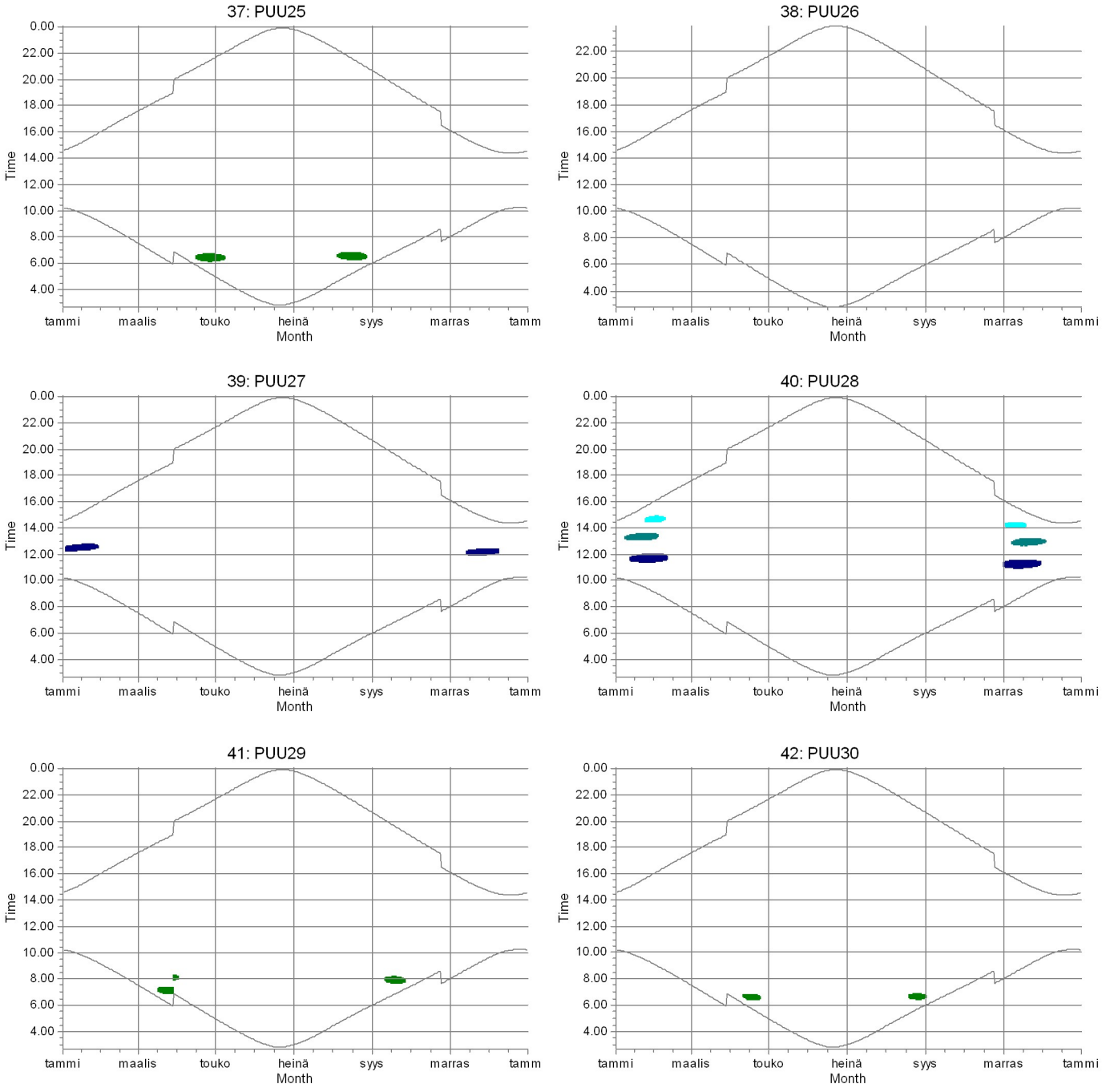
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

- A: Laskentapiste A (Metsästysmaja)
- F: Asuinrakennus F (Ollilantie 112)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- M: Lomarakennus M (Riskalan metsatie)

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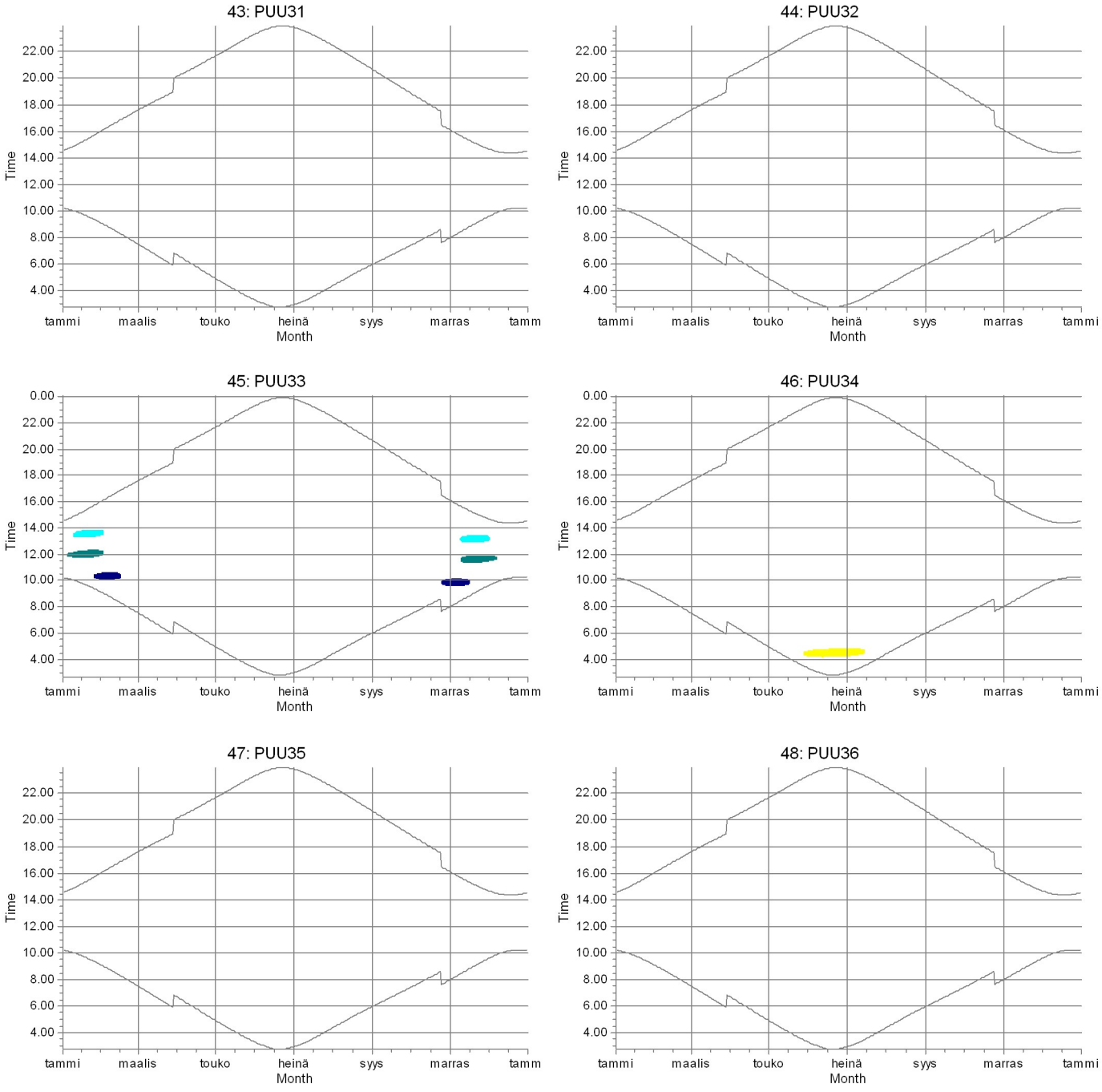
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- F: Asuinrakennus F (Ollilantie 112)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- M: Lomarakennus M (Riskalan metsatie)

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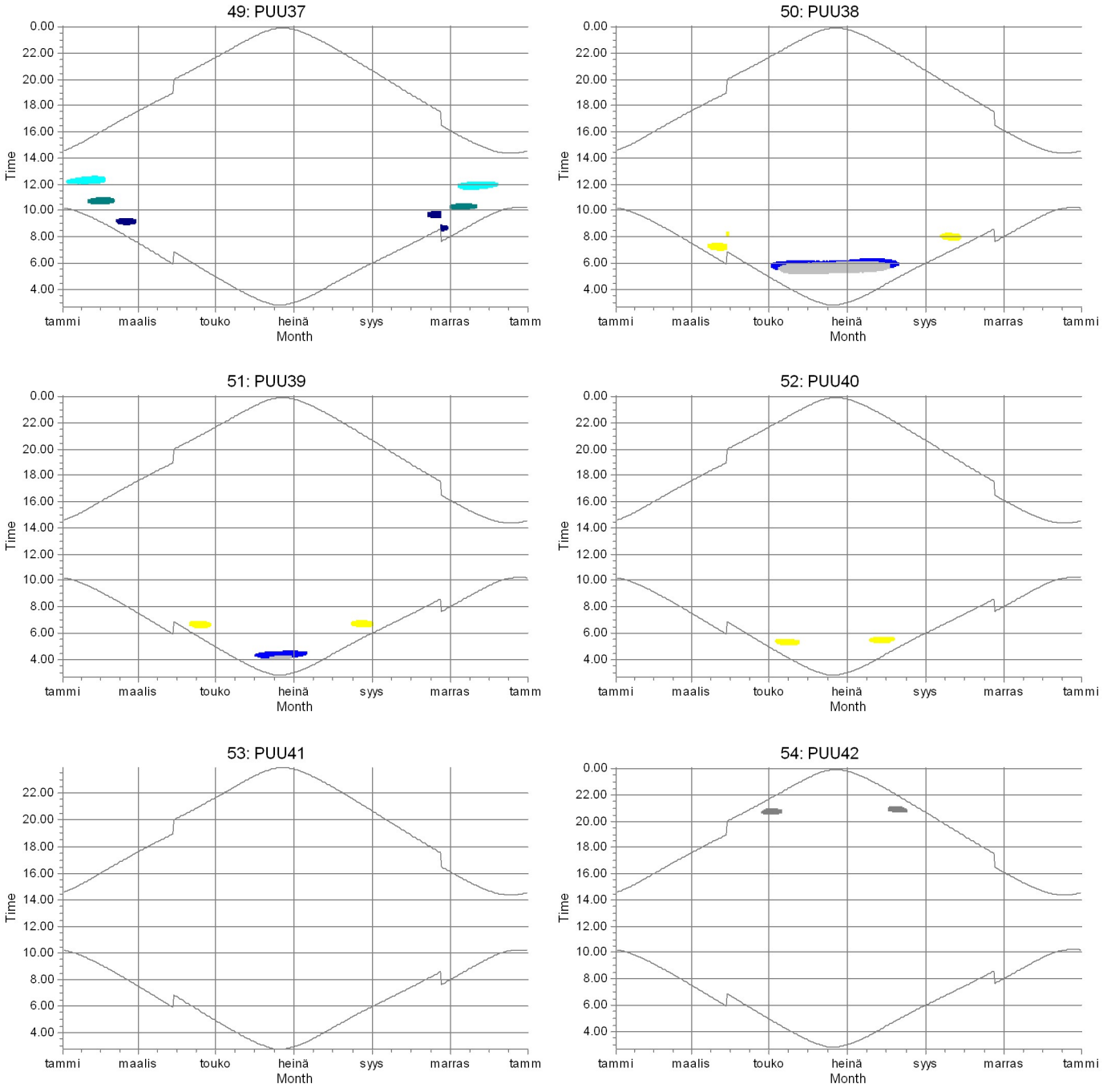
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- D: Asuinrakennus D (Alakylantie 243)
- F: Asuinrakennus F (Ollilantie 112)
- G: Lomarakennus G (Ollilantie, Siliakuru)
- L: Laskentapiste L (Perkkiontie, Ilmola)
- M: Lomarakennus M (Riskalan metsatie)

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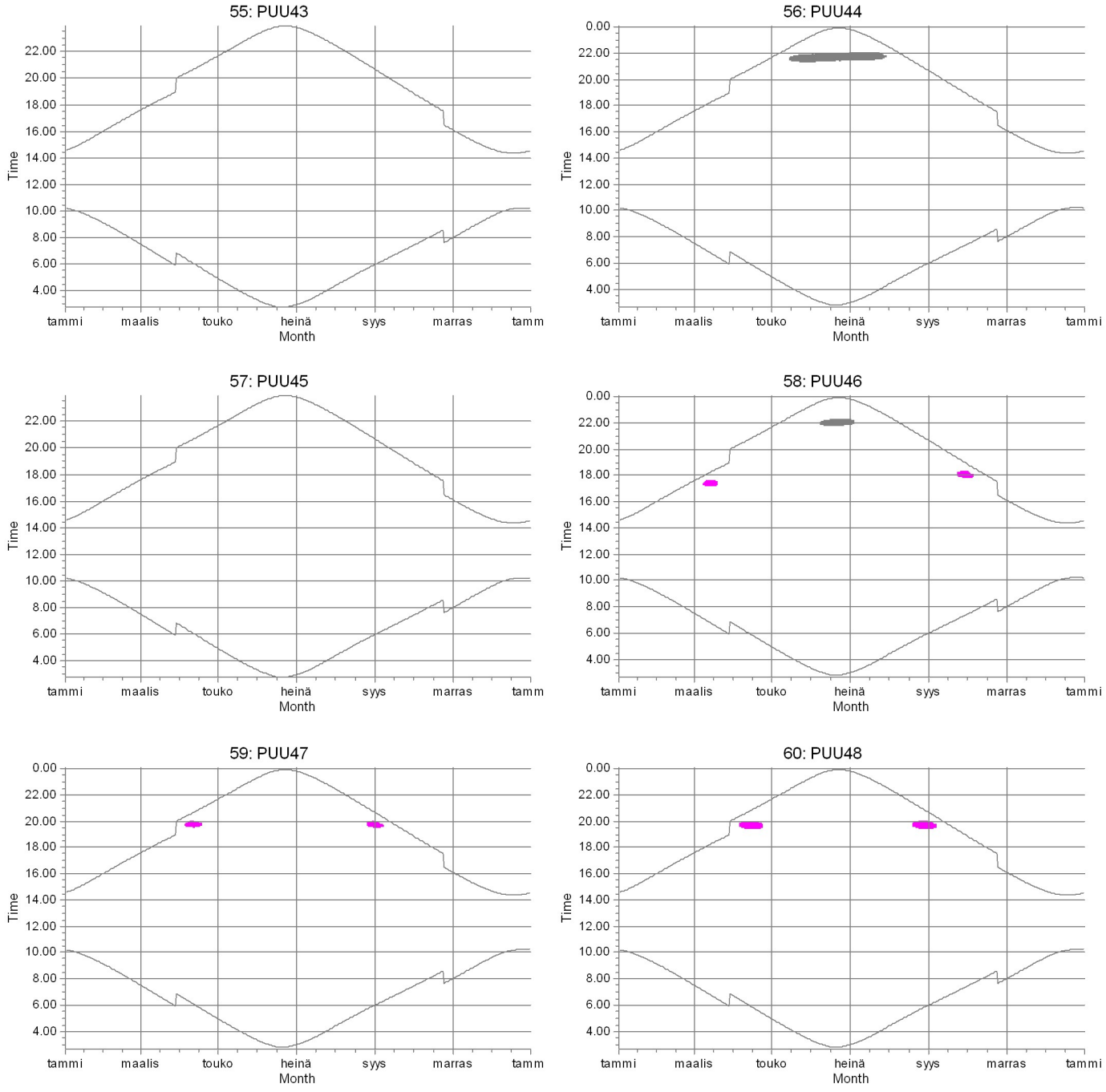
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

D: Asuinrakennus D (Alakylantie 243)

E: Lomarakennus E (Kellokankaan metsatie)

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+358104095666
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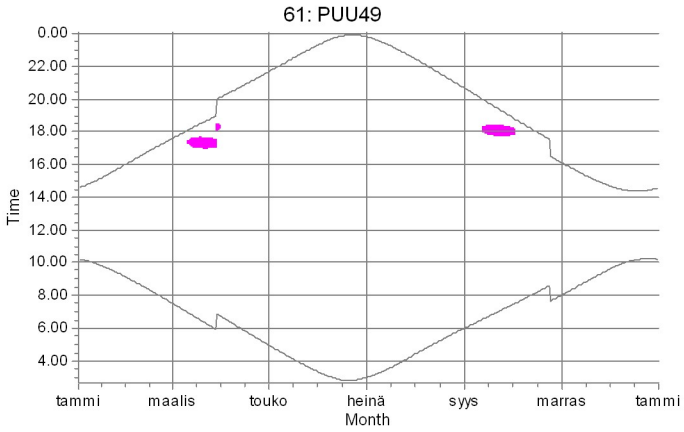
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Shadow receptors

E: Lomarakennus E (Kellokankaan metsatie)

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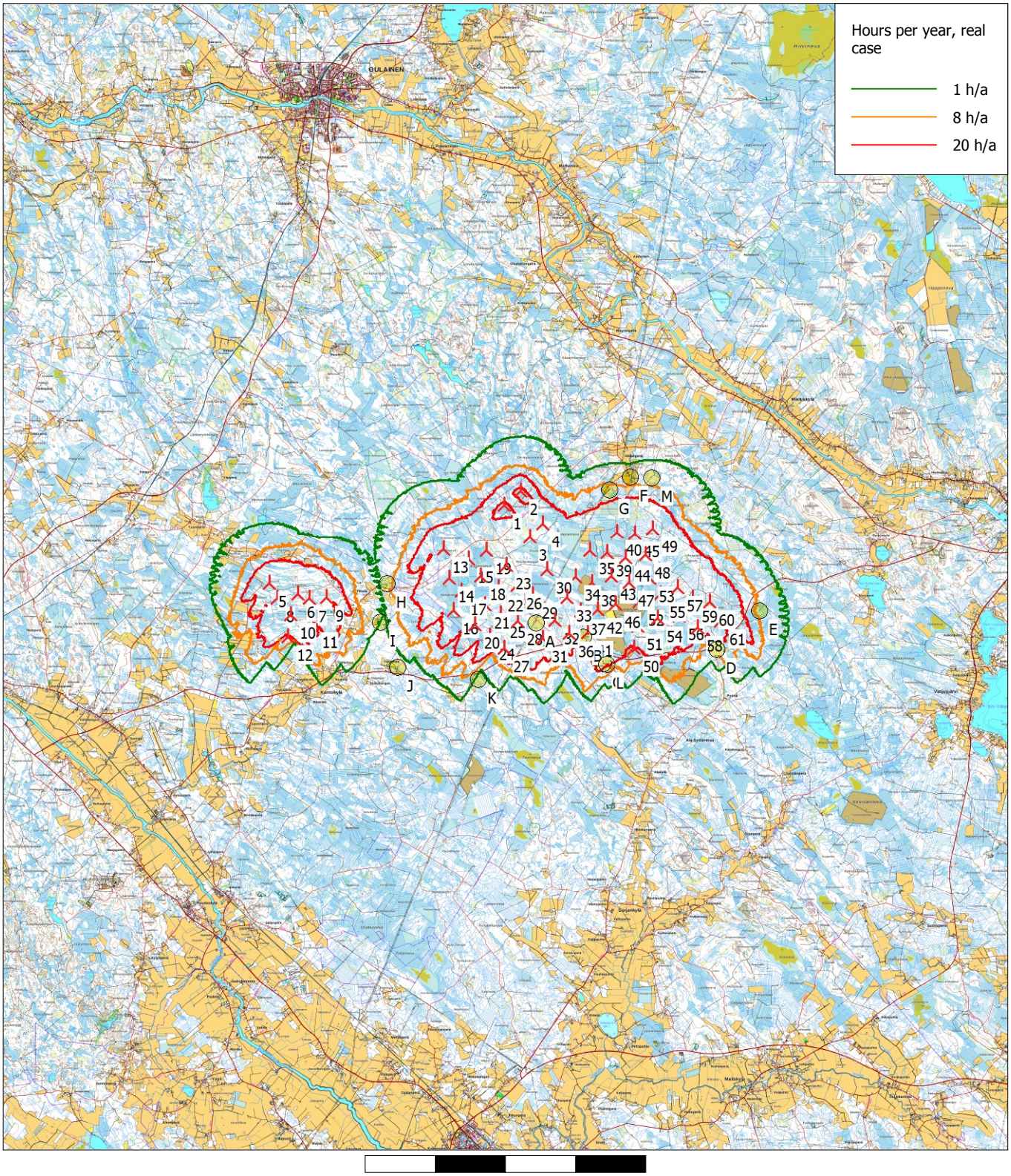
Calculated:
18.11.2020 15.18/3.4.388

SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_no forest_20201102



Map: Maastokarttarasteri50K , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 401 070 North: 7 111 410

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)

Liite 8: Puutionsaari – Varjostuksen yhteismallinnusten tulokset ”real case, Luke forest”

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence	3 °
Day step for calculation	1 days
Time step for calculation	1 minutes

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational hours are calculated from WTGs in calculation and wind distribution:
MERRA_basic_E25.335_N64.000 (3)

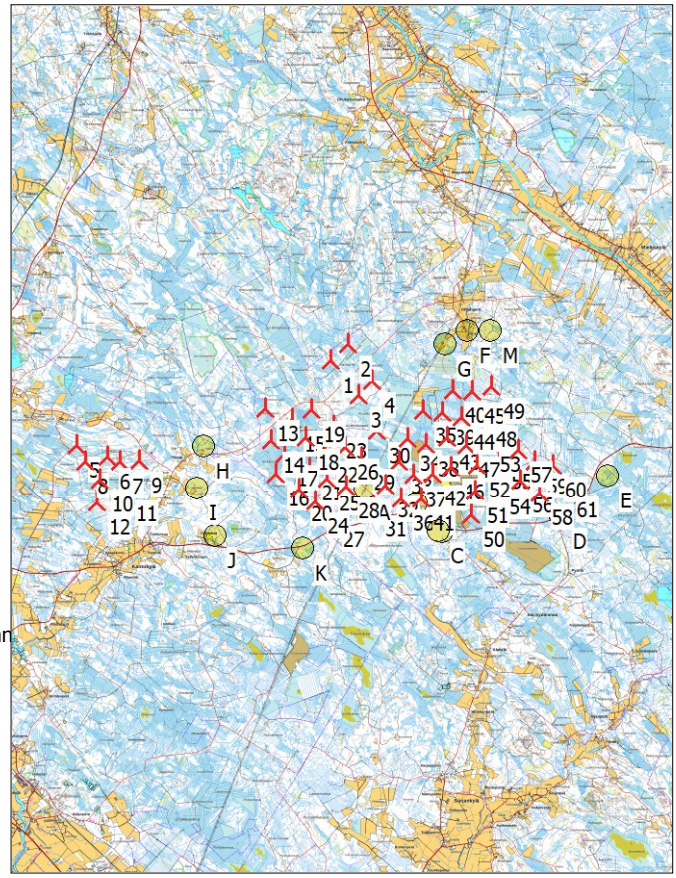
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Puutionsaari_Riskalan
Area object(s) used in calculation:
Area object (Luke2017_SE): (1)
Area object (Luke2017_SW): (2)
Area object (Luke2017_NE): (3)
Area object (Luke2017_NW): (4)
Obstacles used in calculation
Eye height for map: 1,5 m
Grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	401 061	7 113 928	105,0	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
2	401 644	7 114 439	105,4	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
3	401 997	7 112 772	109,3	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
4	402 450	7 113 258	106,6	VESTAS V150-4.2 HH...	Yes	VESTAS	V150-4.2 HH155-4 200	4 200	150,0	155,0	1 902	10,4
5	392 697	7 111 104	81,0	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
6	393 696	7 110 723	85,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
7	394 124	7 110 573	88,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
8	392 964	7 110 572	83,6	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
9	394 736	7 110 600	89,9	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
10	393 462	7 109 982	84,9	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
11	394 233	7 109 674	87,5	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
12	393 349	7 109 200	83,7	GE WIND ENERGY 5....	Yes	GE WIND ENERGY	5.3-158 RD175-5 300	5 300	175,0	152,5	2 141	10,4
13	398 896	7 112 332	92,5	PUU01	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
14	399 097	7 111 286	95,0	PUU02	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
15	399 784	7 111 972	97,5	PUU03	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
16	399 264	7 110 151	97,1	PUU04	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
17	399 536	7 110 832	96,4	PUU05	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
18	400 239	7 111 382	97,5	PUU06	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
19	400 444	7 112 292	97,0	PUU07	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
20	400 019	7 109 649	100,0	PUU08	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
21	400 380	7 110 348	100,0	PUU09	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
22	400 876	7 110 966	99,5	PUU10	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
23	401 152	7 111 752	100,0	PUU11	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
24	400 549	7 109 232	102,5	PUU12	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4
25	400 953	7 110 020	102,5	PUU13	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

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					WTG type							Shadow data	
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM	
			[m]					[kW]	[m]	[m]	[m]	[RPM]	
26	401 537	7 111 046	104,5	PUU14	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
27	401 068	7 108 792	105,3	PUU15	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
28	401 564	7 109 758	103,4	PUU16	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
29	402 089	7 110 702	107,5	PUU17	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
30	402 589	7 111 603	106,8	PUU18	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
31	402 455	7 109 148	112,5	PUU19	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
32	402 889	7 109 778	110,0	PUU20	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
33	403 318	7 110 593	108,0	PUU21	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
34	403 622	7 111 352	106,9	PUU22	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
35	404 117	7 112 276	103,6	PUU23	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
36	403 379	7 109 327	115,0	PUU24	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
37	403 790	7 110 129	108,4	PUU25	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
38	404 210	7 111 152	105,6	PUU26	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
39	404 739	7 112 199	105,0	PUU27	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
40	405 100	7 112 943	100,4	PUU28	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
41	404 061	7 109 351	110,0	PUU29	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
42	404 420	7 110 174	107,1	PUU30	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
43	404 900	7 111 381	105,1	PUU31	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
44	405 395	7 112 030	102,4	PUU32	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
45	405 740	7 112 891	100,2	PUU33	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
46	405 042	7 110 380	105,8	PUU34	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
47	405 532	7 111 130	103,9	PUU35	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
48	406 114	7 112 133	103,1	PUU36	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
49	406 380	7 113 067	107,2	PUU37	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
50	405 707	7 108 791	110,8	PUU38	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
51	405 822	7 109 587	108,8	PUU39	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
52	405 893	7 110 455	104,9	PUU40	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
53	406 257	7 111 298	103,9	PUU41	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
54	406 558	7 109 872	106,6	PUU42	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
55	406 638	7 110 744	105,9	PUU43	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
56	407 324	7 109 954	108,4	PUU44	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
57	407 269	7 110 957	112,6	PUU45	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
58	407 963	7 109 542	113,6	PUU46	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
59	407 809	7 110 582	116,1	PUU47	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
60	408 414	7 110 457	120,0	PUU48	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	
61	408 786	7 109 772	117,5	PUU49	Yes	Generic	RD200-5 600	5 600	200,0	200,0	2 448	10,4	

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste A (Metsästysmaja)	402 212	7 109 691	112,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste B (Ylivieskantie, Pohlola)	403 894	7 109 182	114,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste C (Perkkiontie 382)	404 620	7 108 247	113,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Asuinrakennus D (Alakylantie 243)	408 659	7 108 752	119,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Lomarakennus E (Kellokankaan metsatie)	410 199	7 110 115	122,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Ollilantie 112)	405 573	7 114 900	87,7	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Lomarakennus G (Ollilantie, Siliakuru)	404 837	7 114 441	100,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Pinolantie 406)	396 893	7 111 098	88,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Asuinrakennus I (Kortenevantie 116)	396 670	7 109 704	87,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Asuinrakennus J (Haapavesitie 1406)	397 273	7 108 116	89,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Lomarakennus K (Kurunoja)	400 152	7 107 685	102,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Muu käyttöt. L (Perkkiontie, Ilmola)	404 739	7 108 222	113,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Riskalan metsatie)	406 348	7 114 887	102,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste A (Metsästysmaja)	65:52
B	Autiotalo B (Ylivieskantie, Pohlola)	51:30
C	Autiotalo C (Perkkiontie 382)	30:25
D	Asuinrakennus D (Alakylantie 243)	12:35
E	Lomarakennus E (Kellokankaan metsatie)	0:00
F	Asuinrakennus F (Ollilantie 112)	4:51
G	Lomarakennus G (Ollilantie, Siliakuru)	0:00
H	Asuinrakennus H (Pinolantie 406)	0:00
I	Asuinrakennus I (Kortenevantie 116)	1:25
J	Asuinrakennus J (Haapavesitie 1406)	0:00
K	Lomarakennus K (Kurunoja)	0:00
L	Muu käyttöt. L (Perkkiontie, Ilmola)	25:16
M	Lomarakennus M (Riskalan metsatie)	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case [h/year]	Expected [h/year]
1	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (235)	0:00	0:00
2	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)	0:00	0:00
3	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (237)	0:00	0:00
4	VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)	0:00	0:00
5	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (239)	0:00	0:00
6	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)	0:00	0:00
7	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (241)	0:00	0:00
8	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (242)	0:00	0:00
9	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (243)	6:12	1:25
10	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (244)	0:00	0:00
11	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (245)	0:00	0:00
12	GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (246)	0:00	0:00
13	PUU01	0:00	0:00
14	PUU02	0:00	0:00
15	PUU03	0:00	0:00
16	PUU04	0:00	0:00
17	PUU05	0:00	0:00
18	PUU06	0:00	0:00
19	PUU07	0:00	0:00
20	PUU08	6:53	1:25
21	PUU09	11:16	2:30
22	PUU10	0:00	0:00
23	PUU11	0:00	0:00
24	PUU12	12:12	2:21
25	PUU13	26:46	5:55
26	PUU14	0:00	0:00
27	PUU15	0:00	0:00
28	PUU16	136:07	33:43
29	PUU17	12:46	3:26
30	PUU18	0:00	0:00
31	PUU19	102:31	22:40
32	PUU20	19:32	5:15
33	PUU21	0:00	0:00
34	PUU22	0:00	0:00
35	PUU23	0:00	0:00
36	PUU24	183:37	48:22
37	PUU25	0:00	0:00
38	PUU26	0:00	0:00
39	PUU27	0:00	0:00
40	PUU28	16:54	2:20
41	PUU29	0:00	0:00
42	PUU30	0:00	0:00
43	PUU31	0:00	0:00
44	PUU32	0:00	0:00
45	PUU33	17:53	2:30

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SHADOW - Main Result

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
46	PUU34	17:45	4:50
47	PUU35	0:00	0:00
48	PUU36	0:00	0:00
49	PUU37	0:00	0:00
50	PUU38	90:20	23:11
51	PUU39	23:20	5:49
52	PUU40	10:01	2:32
53	PUU41	0:00	0:00
54	PUU42	7:32	1:49
55	PUU43	0:00	0:00
56	PUU44	31:06	8:38
57	PUU45	0:00	0:00
58	PUU46	8:08	2:26
59	PUU47	0:00	0:00
60	PUU48	0:00	0:00
61	PUU49	0:00	0:00

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May		June	
1	10.13		09.04		07.31		10.17 (31)	06.42	18.56 (20)	04.57	18.27 (28)	03.19	18.40 (28)
	14.35		16.06		17.36	74	11.31 (31)	20.09	18	19.14 (20)	21.41	112	20.20 (21)	23.20	51	19.31 (28)
2	10.12		09.00		07.28		10.17 (31)	06.39		18.58 (20)	04.53		18.27 (28)	03.16		18.40 (28)
	14.37		16.09		17.39	74	11.31 (31)	20.12	15	19.13 (20)	21.45	108	20.18 (21)	23.23	50	19.30 (28)
3	10.10		08.57		07.25		10.16 (31)	06.35		18.59 (20)	04.50		18.27 (28)	03.14		18.42 (28)
	14.39		16.12		17.42	74	11.30 (31)	20.15	11	19.10 (20)	21.48	97	20.04 (25)	23.25	48	19.30 (28)
4	10.09		08.54		07.21		10.16 (31)	06.32		19.03 (20)	04.46		18.27 (28)	03.12		18.42 (28)
	14.42		16.16		17.45	75	11.31 (31)	20.18	4	19.07 (20)	21.51	96	20.03 (25)	23.28	47	19.29 (28)
5	10.08		08.51		07.18		10.15 (31)	06.28			04.43		18.27 (28)	03.09		18.43 (28)
	14.44		16.19		17.48	76	11.31 (31)	20.21			21.54	94	20.01 (25)	23.31	46	19.29 (28)
6	10.07		08.48		07.14		10.15 (31)	06.24			04.39		18.26 (28)	03.07		18.43 (28)
	14.46		16.22		17.51	75	11.30 (31)	20.24			21.57	94	20.00 (25)	23.33	45	19.28 (28)
7	10.05		08.45		07.11		10.15 (31)	06.21			04.36		18.26 (28)	03.05		18.45 (28)
	14.49		16.26		17.55	76	11.31 (31)	20.27			22.01	91	19.58 (25)	23.35	43	19.28 (28)
8	10.03		08.42		07.07		10.14 (31)	06.17			04.33		18.26 (28)	03.03		18.45 (28)
	14.51		16.29		17.58	85	17.21 (24)	20.30			22.04	85	19.55 (25)	23.38	43	19.28 (28)
9	10.02		08.39		07.04		10.14 (31)	06.14		19.02 (28)	04.29		18.26 (28)	03.01		18.46 (28)
	14.54		16.32		18.01	91	17.24 (24)	20.33	9	19.11 (28)	22.07	75	19.50 (25)	23.40	42	19.28 (28)
10	10.00		08.35		10.48 (31)	07.00		10.15 (31)	06.10		18.56 (28)	04.26		18.26 (28)	02.57		18.47 (28)
	14.56		16.35	15	11.03 (31)	18.04	95	17.28 (24)	20.36	22	19.18 (28)	22.10	72	19.38 (28)	23.42	40	19.27 (28)
11	09.58		08.32		10.43 (31)	06.57		10.14 (31)	06.07		18.52 (28)	04.23		18.26 (28)	02.56		18.48 (28)
	14.59		16.39	25	11.08 (31)	18.07	98	17.29 (24)	20.39	30	19.22 (28)	22.14	71	19.37 (28)	23.44	39	19.27 (28)
12	09.56		08.29		10.40 (31)	06.53		10.15 (31)	06.03		18.48 (28)	04.19		18.27 (28)	02.54		18.48 (28)
	15.02		16.42	32	11.12 (31)	18.10	98	17.30 (24)	20.42	47	19.58 (25)	22.17	71	19.38 (28)	23.46	39	19.27 (28)
13	09.54		08.26		10.37 (31)	06.50		10.15 (31)	06.00		18.46 (28)	04.16		18.27 (28)	02.53		18.50 (28)
	15.05		16.45	37	11.14 (31)	18.13	99	17.30 (24)	20.45	59	20.02 (25)	22.20	70	19.37 (28)	23.48	37	19.27 (28)
14	09.52		08.22		10.34 (31)	06.46		10.14 (31)	05.56		18.43 (28)	04.13		18.27 (28)	02.52		18.50 (28)
	15.08		16.49	42	11.16 (31)	18.16	100	17.30 (24)	20.48	68	20.03 (25)	22.23	69	19.36 (28)	23.49	36	19.26 (28)
15	09.49		08.19		10.32 (31)	06.43		10.15 (31)	05.53		18.42 (28)	04.10		18.28 (28)	02.51		18.51 (28)
	15.11		16.52	46	11.18 (31)	18.19	98	17.30 (24)	20.51	76	20.13 (21)	22.27	69	19.37 (28)	23.51	36	19.27 (28)
16	09.47		08.16		10.31 (31)	06.39		10.15 (31)	05.49		18.40 (28)	04.06		18.28 (28)	02.50		18.51 (28)
	15.14		16.55	49	11.20 (31)	18.22	97	17.30 (24)	20.54	86	20.16 (21)	22.30	68	19.36 (28)	23.52	35	19.26 (28)
17	09.45		08.12		10.29 (31)	06.35		10.15 (31)	05.45		18.38 (28)	04.03		18.29 (28)	02.50		18.51 (28)
	15.17		16.58	53	11.22 (31)	18.25	95	17.29 (24)	20.57	96	20.18 (21)	22.33	67	19.36 (28)	23.53	35	19.26 (28)
18	09.42		08.09		10.27 (31)	06.32		10.16 (31)	05.42		18.37 (28)	04.00		18.29 (28)	02.49		18.52 (28)
	15.20		17.01	56	11.23 (31)	18.28	93	17.29 (24)	21.00	102	20.21 (21)	22.36	66	19.35 (28)	23.54	35	19.27 (28)
19	09.40		08.06		10.27 (31)	06.28		10.16 (31)	05.38		18.36 (28)	03.57		18.30 (28)	02.49		18.52 (28)
	15.23		17.05	58	11.25 (31)	18.30	91	17.28 (24)	21.03	109	20.25 (21)	22.40	66	19.36 (28)	23.55	35	19.27 (28)
20	09.37		08.02		10.25 (31)	06.25		10.18 (31)	05.35		18.34 (28)	03.54		18.30 (28)	02.49		18.53 (28)
	15.26		17.08	60	11.25 (31)	18.33	85	17.27 (24)	21.07	111	20.25 (21)	22.43	65	19.35 (28)	23.55	34	19.27 (28)
21	09.35		07.59		10.24 (31)	06.21		10.18 (31)	05.31		18.33 (28)	03.50		18.31 (28)	02.49		18.53 (28)
	15.29		17.11	62	11.26 (31)	18.36	81	17.25 (24)	21.10	113	20.26 (21)	22.46	64	19.35 (28)	23.55	34	19.27 (28)
22	09.32		07.55		10.22 (31)	06.18		10.20 (31)	05.28		18.32 (28)	03.47		18.32 (28)	02.49		18.53 (28)
	15.33		17.14	65	11.27 (31)	18.39	75	18.05 (20)	21.13	114	20.26 (21)	22.49	63	19.35 (28)	23.56	34	19.27 (28)
23	09.29		07.52		10.22 (31)	06.14		10.20 (31)	05.24		18.32 (28)	03.44		18.32 (28)	02.50		18.54 (28)
	15.36		17.17	66	11.28 (31)	18.42	75	18.07 (20)	21.16	114	20.26 (21)	22.53	61	19.33 (28)	23.56	34	19.28 (28)
24	09.27		07.49		10.21 (31)	06.11		10.21 (31)	05.21		18.30 (28)	03.41		18.33 (28)	02.50		18.53 (28)
	15.39		17.21	68	11.29 (31)	18.45	69	18.10 (20)	21.19	115	20.25 (21)	22.56	60	19.33 (28)	23.55	35	19.28 (28)
25	09.24		07.45		10.19 (31)	06.07		10.24 (31)	05.17		18.29 (28)	03.38		18.34 (28)	02.51		18.54 (28)
	15.42		17.24	70	11.29 (31)	18.48	59	18.13 (20)	21.22	116	20.25 (21)	22.59	59	19.33 (28)	23.55	34	19.28 (28)
26	09.21		07.42		10.19 (31)	06.04		10.26 (31)	05.14		18.29 (28)	03.35		18.35 (28)	02.52		18.53 (28)
	15.46		17.27	71	11.30 (31)	18.51	58	18.16 (20)	21.25	116	20.25 (21)	23.02	58	19.33 (28)	23.55	35	19.28 (28)
27	09.18		07.38		10.18 (31)	06.00		10.29 (31)	05.10		18.29 (28)	03.33		18.36 (28)	02.53		18.53 (28)
	15.49		17.30	72	11.30 (31)	18.54	54	18.18 (20)	21.29	115	20.24 (21)	23.05	56	19.32 (28)	23.54	36	19.29 (28)
28	09.15		07.35		10.17 (31)	05.56		10.33 (31)	05.07		18.28 (28)	03.30		18.36 (28)	02.55		18.53 (28)
	15.52		17.33	73	11.30 (31)	18.57	43	18.17 (20)	21.32	116	20.24 (21)	23.08	56	19.32 (28)	23.53	37	19.30 (28)
29	09.12					06.53		18.56 (20)	05.03		18.28 (28)	03.27		18.37 (28)	02.56		18.53 (28)
	15.56					20.00	21	19.17 (20)	21.35	115	20.23 (21)	23.11	55	19.32 (28)	23.52	37	19.30 (28)
30	09.10					06.49		18.55 (20)	05.00		18.27 (28)	03.24		18.38 (28)	02.58		18.53 (28)
	15.59					20.03	21	19.16 (20)	21.38	115	20.22 (21)	23.14	53	19.31 (28)	23.51	38	19.31 (28)
31	09.07					06.46		18.56 (20)				03.22		18.38 (28)			
	16.02					20.06	20	19.16 (20)				23.17	52	19.30 (28)			
Potential sun hours	171		238			363			451			570			624		
Total, worst case				1020			2325			2012			2243			1170	
Sun reduction				0,33			0,32			0,41			0,47			0,48	
Oper. time red.				0,99			0,99			0,99			0,99			0,99	
Wind dir. red.				0,67			0,65			0,62			0,62			0,62	
Total reduction				0,22			0,21			0,25			0,29			0,29	
Total, real				225			485			503			647			344	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** A - Laskentapiste A (Metsästysmaja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

July		August		September		October		November		December	
1	02.59	18.52 (28)	04.24	18.37 (28)	06.00	18.51 (28)	07.26	10.53 (31)	08.00	10.19 (31)	09.35
	23.49 39	19.31 (28)	22.27 71	19.48 (28)	20.40 30	19.21 (28)	18.53 99	18.09 (24)	16.07 12	10.31 (31)	14.43
2	03.01	18.52 (28)	04.28	18.37 (28)	06.03	18.54 (28)	07.29	10.53 (31)	08.04		09.38
	23.48 40	19.32 (28)	22.24 71	19.48 (28)	20.36 22	19.16 (28)	18.49 98	18.08 (24)	16.04		14.41
3	03.01	18.52 (28)	04.31	18.36 (28)	06.06	19.00 (28)	07.32	10.52 (31)	08.07		09.41
	23.46 41	19.33 (28)	22.20 72	19.48 (28)	20.32 9	19.09 (28)	18.46 96	18.06 (24)	16.00		14.39
4	03.03	18.51 (28)	04.34	18.36 (28)	06.09		07.35	10.52 (31)	08.10		09.44
	23.45 42	19.33 (28)	22.17 81	20.03 (25)	20.29		18.42 92	18.03 (24)	15.57		14.37
5	03.05	18.50 (28)	04.37	18.36 (28)	06.12		07.38	10.51 (31)	08.13		09.46
	23.43 43	19.33 (28)	22.14 87	20.06 (25)	20.25		18.39 88	18.00 (24)	15.54		14.35
6	03.08	18.50 (28)	04.40	18.36 (28)	06.15		07.41	10.51 (31)	08.17		09.49
	23.41 45	19.35 (28)	22.10 92	20.08 (25)	20.22		18.35 80	17.56 (24)	15.51		14.33
7	03.10	18.50 (28)	04.44	18.35 (28)	06.18		07.44	10.50 (31)	08.20		09.51
	23.39 46	19.36 (28)	22.07 94	20.09 (25)	20.18		18.32 76	12.06 (31)	15.48		14.32
8	03.12	18.49 (28)	04.47	18.36 (28)	06.20	18.58 (20)	07.47	10.51 (31)	08.23		09.54
	23.37 47	19.36 (28)	22.03 95	20.11 (25)	20.15 2	19.00 (20)	18.28 76	12.07 (31)	15.45		14.30
9	03.15	18.49 (28)	04.50	18.36 (28)	06.23	18.53 (20)	07.50	10.51 (31)	08.26		09.56
	23.34 48	19.37 (28)	22.00 96	20.12 (25)	20.11 11	19.04 (20)	18.25 75	12.06 (31)	15.41		14.29
10	03.18	18.49 (28)	04.53	18.35 (28)	06.26	18.50 (20)	07.53	10.50 (31)	08.30		09.58
	23.32 48	19.37 (28)	21.57 102	20.23 (21)	20.08 15	19.05 (20)	18.21 75	12.05 (31)	15.38		14.28
11	03.20	18.48 (28)	04.56	18.35 (28)	06.29	18.49 (20)	07.56	10.50 (31)	08.33		10.00
	23.29 50	19.38 (28)	21.53 110	20.27 (21)	20.04 17	19.06 (20)	18.18 75	12.05 (31)	15.35		14.27
12	03.23	18.48 (28)	04.59	18.35 (28)	06.32	18.48 (20)	07.59	10.50 (31)	08.36		10.02
	23.27 51	19.39 (28)	21.50 114	20.29 (21)	20.00 19	19.07 (20)	18.14 74	12.04 (31)	15.32		14.26
13	03.26	18.47 (28)	05.02	18.36 (28)	06.35	18.47 (20)	08.02	10.50 (31)	08.39		10.04
	23.24 53	19.40 (28)	21.46 114	20.30 (21)	19.57 20	19.07 (20)	18.11 73	12.03 (31)	15.29		14.25
14	03.29	18.46 (28)	05.06	18.35 (28)	06.38	18.46 (20)	08.05	10.51 (31)	08.43		10.06
	23.22 54	19.40 (28)	21.43 115	20.30 (21)	19.53 22	19.08 (20)	18.08 72	12.03 (31)	15.26		14.24
15	03.31	18.46 (28)	05.09	18.35 (28)	06.41	11.24 (31)	08.08	10.51 (31)	08.46		10.07
	23.19 55	19.41 (28)	21.39 116	20.31 (21)	19.50 41	19.07 (20)	18.04 71	12.02 (31)	15.23		14.23
16	03.34	18.45 (28)	05.12	18.36 (28)	06.43	11.18 (31)	08.11	10.51 (31)	08.49		10.09
	23.16 56	19.41 (28)	21.36 116	20.32 (21)	19.46 52	19.06 (20)	18.01 70	12.01 (31)	15.20		14.23
17	03.37	18.44 (28)	05.15	18.35 (28)	06.46	11.15 (31)	08.14	10.51 (31)	08.52		10.10
	23.13 58	19.42 (28)	21.32 116	20.31 (21)	19.43 57	19.05 (20)	17.57 69	12.00 (31)	15.18		14.22
18	03.40	18.44 (28)	05.18	18.36 (28)	06.49	11.12 (31)	08.17	10.53 (31)	08.56		10.11
	23.11 58	19.42 (28)	21.29 116	20.32 (21)	19.39 59	19.02 (20)	17.54 67	12.00 (31)	15.15		14.22
19	03.43	18.44 (28)	05.21	18.37 (28)	06.52	11.10 (31)	08.20	10.53 (31)	08.59		10.12
	23.08 59	19.43 (28)	21.25 115	20.32 (21)	19.36 65	18.58 (20)	17.50 66	11.59 (31)	15.12		14.22
20	03.46	18.43 (28)	05.24	18.37 (28)	06.55	11.07 (31)	08.23	10.53 (31)	09.02		10.13
	23.05 60	19.43 (28)	21.22 115	20.32 (21)	19.32 73	18.54 (20)	17.47 64	11.57 (31)	15.09		14.22
21	03.50	18.42 (28)	05.27	18.37 (28)	06.58	11.05 (31)	08.26	10.55 (31)	09.05		10.14
	23.02 62	19.44 (28)	21.18 114	20.31 (21)	19.28 76	18.50 (20)	17.43 62	11.57 (31)	15.07		14.23
22	03.53	18.42 (28)	05.30	18.38 (28)	07.01	11.03 (31)	08.29	10.55 (31)	09.08		10.14
	22.59 63	19.45 (28)	21.15 112	20.30 (21)	19.25 80	18.10 (24)	17.40 60	11.55 (31)	15.04		14.23
23	03.56	18.41 (28)	05.33	18.39 (28)	07.03	11.02 (31)	08.32	10.57 (31)	09.11		10.15
	22.56 64	19.45 (28)	21.11 111	20.30 (21)	19.21 84	18.11 (24)	17.37 57	11.54 (31)	15.01		14.24
24	03.59	18.41 (28)	05.36	18.40 (28)	07.06	11.01 (31)	08.35	10.58 (31)	09.15		10.15
	22.53 65	19.46 (28)	21.08 108	20.28 (21)	19.18 87	18.11 (24)	17.33 54	11.52 (31)	14.59		14.24
25	04.02	18.40 (28)	05.39	18.40 (28)	07.09	10.59 (31)	07.38	09.59 (31)	09.18		10.15
	22.49 66	19.46 (28)	21.04 102	20.24 (21)	19.14 92	18.12 (24)	16.30 52	10.51 (31)	14.56		14.25
26	04.05	18.40 (28)	05.42	18.41 (28)	07.12	10.58 (31)	07.41	10.00 (31)	09.21		10.15
	22.46 67	19.47 (28)	21.01 95	20.21 (21)	19.11 95	18.12 (24)	16.27 49	10.49 (31)	14.54		14.26
27	04.08	18.39 (28)	05.45	18.42 (28)	07.15	10.56 (31)	07.45	10.02 (31)	09.24		10.15
	22.43 67	19.46 (28)	20.57 86	20.18 (21)	19.07 97	18.11 (24)	16.23 46	10.48 (31)	14.51		14.27
28	04.12	18.39 (28)	05.48	18.44 (28)	07.18	10.56 (31)	07.48	10.04 (31)	09.27		10.15
	22.40 68	19.47 (28)	20.54 74	20.15 (21)	19.04 98	18.11 (24)	16.20 41	10.45 (31)	14.49		14.28
29	04.15	18.38 (28)	05.51	18.44 (28)	07.21	10.55 (31)	07.51	10.06 (31)	09.30		10.15
	22.37 69	19.47 (28)	20.50 67	20.04 (25)	19.00 99	18.10 (24)	16.17 37	10.43 (31)	14.47		14.30
30	04.18	18.38 (28)	05.54	18.46 (28)	07.24	10.54 (31)	07.54	10.10 (31)	09.33		10.14
	22.33 70	19.48 (28)	20.47 57	20.01 (25)	18.57 100	18.10 (24)	16.13 31	10.41 (31)	14.45		14.31
31	04.21	18.38 (28)	05.57	18.48 (28)			07.57	10.14 (31)			10.14
	22.30 70	19.48 (28)	20.43 47	19.58 (25)			16.10 23	10.37 (31)			14.33
Potential sun hours	609		508		393		305		198		137
Total, worst case	1724		2981		1422		2068		12		
Sun reduction	0,38		0,31		0,33		0,35		0,24		
Oper. time red.	0,99		0,99		0,99		0,99		0,99		
Wind dir. red.	0,62		0,62		0,64		0,66		0,67		
Total reduction	0,23		0,19		0,21		0,23		0,16		
Total, real	401		571		299		474		2		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102**Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April			May		June		
1	10.12	09.03	07.31		06.42			04.56		19.08 (36)	03.19	04.18 (46)
	14.35	16.06	17.36		20.09			21.41	40	19.48 (36)	23.20	116 21.38 (29)
2	10.11	09.00	07.28		06.39			04.53		19.06 (36)	03.16	04.17 (46)
	14.37	16.09	17.39		20.12			21.44	45	19.51 (36)	23.22	116 21.37 (29)
3	10.10	08.57	07.24		06.35			04.50		19.04 (36)	03.14	04.16 (46)
	14.39	16.12	17.42		20.15			21.48	49	19.53 (36)	23.25	115 21.36 (29)
4	10.09	08.54	07.21		06.31			04.46		19.02 (36)	03.11	04.16 (46)
	14.41	16.15	17.45		20.18			21.51	53	19.55 (36)	23.28	115 21.35 (29)
5	10.08	08.51	07.17		06.28			04.43		19.00 (36)	03.09	04.16 (46)
	14.44	16.19	17.48		20.21			21.54	56	19.56 (36)	23.30	111 20.16 (36)
6	10.06	08.48	07.14		06.24			04.39		05.20 (52)	03.07	04.15 (46)
	14.46	16.22	17.51		20.24			21.57	63	19.59 (36)	23.33	112 20.15 (36)
7	10.05	08.45	07.10		06.21			04.36		05.17 (52)	03.05	04.15 (46)
	14.48	16.25	17.54		20.27			22.00	70	20.00 (36)	23.35	113 20.16 (36)
8	10.03	08.42	07.07		06.17			04.33		05.14 (52)	03.03	04.15 (46)
	14.51	16.29	17.57		20.30			22.04	76	20.01 (36)	23.38	113 20.16 (36)
9	10.01	08.38	07.03		06.14			04.29		05.11 (52)	03.01	04.15 (46)
	14.54	16.32	18.00		20.33			22.07	81	20.02 (36)	23.40	114 20.16 (36)
10	10.00	08.35	07.00		06.10			04.26		05.08 (52)	02.57	04.15 (46)
	14.56	16.35	18.03		20.36			22.10	87	20.03 (36)	23.42	114 20.16 (36)
11	09.58	08.32	06.56		06.07		06.39 (51)	04.23		05.06 (52)	02.56	04.15 (46)
	14.59	16.39	18.06		20.39	8	06.47 (51)	22.14	91	21.25 (29)	23.44	115 20.17 (36)
12	09.56	08.29	06.53		06.03		06.36 (51)	04.19		05.07 (52)	02.54	04.14 (46)
	15.02	16.42	18.09		20.42	13	06.49 (51)	22.17	96	21.28 (29)	23.46	116 20.17 (36)
13	09.54	08.25	06.49		05.59		06.33 (51)	04.16		05.06 (52)	02.53	04.15 (46)
	15.05	16.45	18.12		20.45	17	06.50 (51)	22.20	103	21.31 (29)	23.47	115 20.17 (36)
14	09.51	08.22	06.46		05.56		06.30 (51)	04.13		05.06 (52)	02.52	04.15 (46)
	15.08	16.48	18.15		20.48	20	06.50 (51)	22.23	108	21.33 (29)	23.49	116 20.17 (36)
15	09.49	08.19	06.42	07.15 (50)	05.52		06.29 (51)	04.09		05.07 (52)	02.51	04.15 (46)
	15.11	16.52	18.18	7 07.22 (50)	20.51	22	06.51 (51)	22.27	111	21.36 (29)	23.50	117 20.18 (36)
16	09.47	08.15	06.39	07.11 (50)	05.49		06.28 (51)	04.06		05.07 (52)	02.50	04.15 (46)
	15.14	16.55	18.21	13 07.24 (50)	20.54	24	06.52 (51)	22.30	115	21.38 (29)	23.52	117 20.18 (36)
17	09.45	08.12	06.35	07.07 (50)	05.45		06.27 (51)	04.03		05.06 (52)	02.50	04.15 (46)
	15.17	16.58	18.24	18 07.25 (50)	20.57	24	06.51 (51)	22.33	118	21.40 (29)	23.53	117 20.18 (36)
18	09.42	08.09	06.32	07.06 (50)	05.42		06.27 (51)	04.00		05.07 (52)	02.49	04.15 (46)
	15.20	17.01	18.27	21 07.27 (50)	21.00	25	06.52 (51)	22.36	119	21.41 (29)	23.54	118 20.18 (36)
19	09.40	08.05	06.28	07.04 (50)	05.38		06.27 (51)	03.57		05.07 (52)	02.49	04.16 (46)
	15.23	17.05	18.30	23 07.27 (50)	21.03	25	06.52 (51)	22.40	119	21.40 (29)	23.54	117 20.19 (36)
20	09.37	08.02	06.25	07.04 (50)	05.35		06.27 (51)	03.53		05.08 (52)	02.49	04.16 (46)
	15.26	17.08	18.33	24 07.28 (50)	21.06	23	06.50 (51)	22.43	119	21.41 (29)	23.55	117 20.19 (36)
21	09.35	07.59	06.21	07.03 (50)	05.31		06.27 (51)	03.50		05.10 (52)	02.49	04.16 (46)
	15.29	17.11	18.36	24 07.27 (50)	21.10	23	06.50 (51)	22.46	117	21.41 (29)	23.55	117 20.19 (36)
22	09.32	07.55	06.18	07.02 (50)	05.28		06.28 (51)	03.47		05.10 (52)	02.49	04.16 (46)
	15.33	17.14	18.39	25 07.27 (50)	21.13	22	06.50 (51)	22.49	118	21.41 (29)	23.55	117 20.19 (36)
23	09.29	07.52	06.14	07.02 (50)	05.24		06.28 (51)	03.44		05.11 (52)	02.50	04.17 (46)
	15.36	17.17	18.42	25 07.27 (50)	21.16	21	06.49 (51)	22.52	116	21.41 (29)	23.55	117 20.20 (36)
24	09.27	07.49	06.11	07.01 (50)	05.21		06.28 (51)	03.41		05.13 (52)	02.50	04.16 (46)
	15.39	17.20	18.45	25 07.26 (50)	21.19	19	06.47 (51)	22.55	112	21.41 (29)	23.55	118 20.20 (36)
25	09.24	07.45	06.07	07.02 (50)	05.17		06.30 (51)	03.38		18.47 (36)	02.51	04.17 (46)
	15.42	17.24	18.48	24 07.26 (50)	21.22	15	06.45 (51)	22.59	105	21.41 (29)	23.55	117 20.20 (36)
26	09.21	07.42	06.03	07.02 (50)	05.14		06.31 (51)	03.35		18.47 (36)	02.52	04.17 (46)
	15.46	17.27	18.51	23 07.25 (50)	21.25	12	06.43 (51)	23.02	105	21.41 (29)	23.54	117 20.20 (36)
27	09.18	07.38	06.00	07.03 (50)	05.10		06.35 (51)	03.32		18.46 (36)	02.53	04.17 (46)
	15.49	17.30	18.54	21 07.24 (50)	21.28	5	06.40 (51)	23.05	105	21.40 (29)	23.54	117 20.20 (36)
28	09.15	07.35	05.56	07.03 (50)	05.07		19.21 (36)	03.30		18.46 (36)	02.55	04.18 (46)
	15.52	17.33	18.57	19 07.22 (50)	21.32	18	19.39 (36)	23.08	104	21.40 (29)	23.53	117 20.21 (36)
29	09.12		06.53	08.05 (50)	05.03		19.16 (36)	03.27		04.23 (46)	02.56	04.18 (46)
	15.56		20.00	15 08.20 (50)	21.35	28	19.44 (36)	23.11	109	21.39 (29)	23.52	117 20.21 (36)
30	09.09		06.49	08.07 (50)	05.00		19.12 (36)	03.24		04.21 (46)	02.58	04.19 (46)
	15.59		20.03	10 08.17 (50)	21.38	35	19.47 (36)	23.14	112	21.39 (29)	23.51	116 20.21 (36)
31	09.06		06.46					03.21		04.19 (46)		
	16.02		20.06					23.17	114	21.38 (29)		
Potential sun hours	171	238	363		451			570			624	
Total, worst case				317		399			2936			3474
Sun reduction				0,32		0,41			0,47			0,48
Oper. time red.				0,99		0,99			0,99			0,99
Wind dir. red.				0,61		0,60			0,61			0,61
Total reduction				0,20		0,24			0,29			0,29
Total, real				62		97			838			1003

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102**Shadow receptor:** B - Laskentapiste B (Ylivieskantie, Pohlola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59		04.19 (46)	04.24		05.17 (52)	06.00	06.39 (51)	07.26	08.00	09.35
	23.49	116	20.21 (36)	22.27	94	21.37 (29)	20.39	8 06.47 (51)	18.53	16.07	14.42
2	03.01		04.19 (46)	04.28		05.17 (52)	06.03		07.29	08.04	09.38
	23.48	115	20.21 (36)	22.23	90	20.14 (36)	20.36		18.49	16.03	14.40
3	03.01		04.19 (46)	04.31		05.19 (52)	06.06		07.32	08.07	09.41
	23.46	115	20.21 (36)	22.20	84	20.12 (36)	20.32		18.46	16.00	14.39
4	03.03		04.20 (46)	04.34		05.22 (52)	06.09		07.35	08.10	09.43
	23.44	115	20.22 (36)	22.17	79	20.11 (36)	20.29		18.42	15.57	14.37
5	03.05		04.20 (46)	04.37		05.25 (52)	06.12		07.38	08.13	09.46
	23.43	113	20.21 (36)	22.13	74	20.10 (36)	20.25		18.39	15.54	14.35
6	03.08		04.21 (46)	04.40		05.27 (52)	06.15		07.41	08.16	09.49
	23.41	112	20.22 (36)	22.10	67	20.08 (36)	20.22		18.35	15.51	14.33
7	03.10		04.21 (46)	04.43		05.30 (52)	06.17		07.44	08.20	09.51
	23.38	112	20.21 (36)	22.07	61	20.07 (36)	20.18		18.32	15.48	14.32
8	03.12		04.22 (46)	04.47		19.11 (36)	06.20		07.47	08.23	09.53
	23.36	113	21.40 (29)	22.03	55	20.06 (36)	20.15		18.28	15.44	14.30
9	03.15		04.23 (46)	04.50		19.13 (36)	06.23		07.50	08.26	09.56
	23.34	116	21.43 (29)	22.00	51	20.04 (36)	20.11		18.25	15.41	14.29
10	03.17		04.24 (46)	04.53		19.14 (36)	06.26		07.53	08.29	09.58
	23.32	116	21.44 (29)	21.56	47	20.01 (36)	20.07		18.21	15.38	14.28
11	03.20		04.26 (46)	04.56		19.16 (36)	06.29		07.56	08.33	10.00
	23.29	117	21.46 (29)	21.53	43	19.59 (36)	20.04		18.18	15.35	14.26
12	03.23		04.26 (46)	04.59		19.18 (36)	06.32		07.59	08.36	10.02
	23.27	116	21.46 (29)	21.50	39	19.57 (36)	20.00		18.14	15.32	14.25
13	03.26		04.28 (46)	05.02		19.20 (36)	06.35	07.59 (50)	08.02	08.39	10.04
	23.24	113	21.46 (29)	21.46	33	19.53 (36)	19.57	8 08.07 (50)	18.11	15.29	14.25
14	03.29		04.31 (46)	05.05		19.24 (36)	06.38	07.55 (50)	08.05	08.42	10.05
	23.22	111	21.48 (29)	21.43	26	19.50 (36)	19.53	14 08.09 (50)	18.07	15.26	14.24
15	03.31		18.55 (36)	05.09		19.29 (36)	06.40	07.53 (50)	08.08	08.46	10.07
	23.19	104	21.49 (29)	21.39	16	19.45 (36)	19.50	18 08.11 (50)	18.04	15.23	14.23
16	03.34		18.55 (36)	05.12		06.41 (51)	06.43	07.52 (50)	08.11	08.49	10.08
	23.16	105	21.49 (29)	21.36	7	06.48 (51)	19.46	20 08.12 (50)	18.00	15.20	14.23
17	03.37		18.56 (36)	05.15		06.37 (51)	06.46	07.51 (50)	08.14	08.52	10.10
	23.13	103	21.49 (29)	21.32	13	06.50 (51)	19.43	22 08.13 (50)	17.57	15.18	14.22
18	03.40		18.56 (36)	05.18		06.36 (51)	06.49	07.50 (50)	08.17	08.55	10.11
	23.10	105	21.50 (29)	21.29	16	06.52 (51)	19.39	24 08.14 (50)	17.54	15.15	14.22
19	03.43		05.25 (52)	05.21		06.35 (51)	06.52	07.48 (50)	08.20	08.59	10.12
	23.07	109	21.51 (29)	21.25	18	06.53 (51)	19.35	25 08.13 (50)	17.50	15.12	14.22
20	03.46		05.22 (52)	05.24		06.34 (51)	06.55	07.48 (50)	08.23	09.02	10.13
	23.05	114	21.51 (29)	21.22	20	06.54 (51)	19.32	25 08.13 (50)	17.47	15.09	14.22
21	03.49		05.21 (52)	05.27		06.32 (51)	06.58	07.47 (50)	08.26	09.05	10.14
	23.02	115	21.51 (29)	21.18	22	06.54 (51)	19.28	26 08.13 (50)	17.43	15.06	14.23
22	03.53		05.20 (52)	05.30		06.31 (51)	07.00	07.47 (50)	08.29	09.08	10.14
	22.59	118	21.51 (29)	21.15	24	06.55 (51)	19.25	25 08.12 (50)	17.40	15.04	14.23
23	03.56		05.19 (52)	05.33		06.31 (51)	07.03	07.48 (50)	08.32	09.11	10.15
	22.55	119	21.51 (29)	21.11	24	06.55 (51)	19.21	24 08.12 (50)	17.37	15.01	14.23
24	03.59		05.18 (52)	05.36		06.31 (51)	07.06	07.48 (50)	08.35	09.14	10.15
	22.52	119	21.51 (29)	21.08	24	06.55 (51)	19.18	23 08.11 (50)	17.33	14.59	14.24
25	04.02		05.18 (52)	05.39		06.30 (51)	07.09	07.48 (50)	07.38	09.18	10.15
	22.49	119	21.51 (29)	21.04	24	06.54 (51)	19.14	22 08.10 (50)	16.30	14.56	14.25
26	04.05		05.17 (52)	05.42		06.30 (51)	07.12	07.48 (50)	07.41	09.21	10.15
	22.46	119	21.51 (29)	21.01	24	06.54 (51)	19.11	20 08.08 (50)	16.27	14.54	14.26
27	04.08		05.17 (52)	05.45		06.30 (51)	07.15	07.51 (50)	07.44	09.24	10.15
	22.43	117	21.50 (29)	20.57	24	06.54 (51)	19.07	15 08.06 (50)	16.23	14.51	14.27
28	04.12		05.17 (52)	05.48		06.31 (51)	07.18	07.54 (50)	07.48	09.27	10.15
	22.40	115	21.48 (29)	20.54	22	06.53 (51)	19.03	9 08.03 (50)	16.20	14.49	14.28
29	04.15		05.17 (52)	05.51		06.30 (51)	07.21		07.51	09.30	10.15
	22.37	110	21.45 (29)	20.50	21	06.51 (51)	19.00		16.17	14.47	14.30
30	04.18		05.17 (52)	05.54		06.33 (51)	07.23		07.54	09.32	10.14
	22.33	106	21.43 (29)	20.47	17	06.50 (51)	18.56		16.13	14.45	14.31
31	04.21		05.16 (52)	05.57		06.36 (51)			07.57		10.13
	22.30	101	21.40 (29)	20.43	13	06.49 (51)			16.10		14.33
Potential sun hours	608			508			393		305	198	137
Total, worst case		3498			1172			328			
Sun reduction		0,38			0,31			0,33			
Oper. time red.		0,99			0,99			0,99			
Wind dir. red.		0,61			0,61			0,61			
Total reduction		0,23			0,19			0,20			
Total, real		804			221			66			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April			May			June		
1	10.12		09.03		07.31		06.42			04.56		20.16 (31)	03.19		04.18 (51)
	14.35		16.06		17.36		20.09			21.41	15	20.31 (31)	23.19	69	21.47 (36)
2	10.11		09.00		07.28		06.38			04.53		20.18 (31)	03.16		04.16 (51)
	14.37		16.09		17.39		20.12			21.44	11	20.29 (31)	23.22	74	21.47 (36)
3	10.10		08.57		07.24		06.35			04.50		05.42 (50)	03.14		04.14 (51)
	14.39		16.12		17.42		20.15			21.47	17	20.26 (31)	23.25	77	21.47 (36)
4	10.09		08.54		07.21		06.31			04.46		05.39 (50)	03.12		04.13 (51)
	14.42		16.15		17.45		20.18			21.51	17	05.56 (50)	23.28	79	21.48 (36)
5	10.08		08.51		07.17		06.28			04.43		05.36 (50)	03.09		04.12 (51)
	14.44		16.19		17.48		20.21			21.54	22	05.58 (50)	23.30	81	21.48 (36)
6	10.06		08.48		07.14		06.24			04.39		05.34 (50)	03.07		04.10 (51)
	14.46		16.22		17.51		20.24			21.57	26	06.00 (50)	23.33	82	21.48 (36)
7	10.05		08.45		07.10		06.21			04.36		05.34 (50)	03.05		04.09 (51)
	14.49		16.25		17.54		20.27			22.00	28	06.02 (50)	23.35	84	21.48 (36)
8	10.03		08.41		07.07		06.17			04.33		05.32 (50)	03.03		04.09 (51)
	14.51		16.29		17.57		20.30			22.04	31	06.03 (50)	23.37	84	21.48 (36)
9	10.01		08.38		07.03		06.14			04.29		05.31 (50)	03.01		04.09 (51)
	14.54		16.32		18.00		20.33			22.07	32	06.03 (50)	23.40	84	21.48 (36)
10	09.59		08.35		07.00		06.10			04.26		05.30 (50)	02.58		04.09 (51)
	14.56		16.35		18.03		20.36			22.10	34	06.04 (50)	23.42	84	21.49 (36)
11	09.58		08.32		06.56		06.07			04.23		05.29 (50)	02.56		04.08 (51)
	14.59		16.39		18.06		20.39			22.13	35	06.04 (50)	23.44	85	21.48 (36)
12	09.56		08.29		06.53		06.03			04.19		05.29 (50)	02.55		04.08 (51)
	15.02		16.42		18.09		20.42			22.17	37	06.06 (50)	23.45	85	21.48 (36)
13	09.53		08.25		06.49		05.59			04.16		05.28 (50)	02.53		04.09 (51)
	15.05		16.45		18.12		20.45			22.20	38	06.06 (50)	23.47	85	21.49 (36)
14	09.51		08.22		06.46		05.56			04.13		05.28 (50)	02.52		04.08 (51)
	15.08		16.48		18.15		20.48			22.23	42	21.33 (32)	23.49	85	21.49 (36)
15	09.49		08.19		06.42		05.52			04.09		05.28 (50)	02.51		04.09 (51)
	15.11		16.52		18.18		20.51			22.26	47	21.36 (32)	23.50	85	21.50 (36)
16	09.47		08.15		06.39		05.49			04.06		05.27 (50)	02.50		04.08 (51)
	15.14		16.55		18.21		20.54			22.30	53	21.38 (32)	23.51	84	21.49 (36)
17	09.44		08.12		06.35		05.45			04.03		05.26 (50)	02.50		04.09 (51)
	15.17		16.58		18.24		20.57			22.33	58	21.40 (32)	23.52	82	21.49 (36)
18	09.42		08.09		06.32		05.42			04.00		05.27 (50)	02.49		04.09 (51)
	15.20		17.01		18.27		21.00			22.36	62	21.44 (32)	23.53	84	21.50 (36)
19	09.40		08.05		06.28		05.38		20.21 (31)	03.57		05.26 (50)	02.49		04.09 (51)
	15.23		17.05		18.30		21.03	4	20.25 (31)	22.39	66	21.45 (32)	23.54	85	21.50 (36)
20	09.37		08.02		06.25		05.35		20.18 (31)	03.54		05.27 (50)	02.49		04.09 (51)
	15.26		17.08		18.33		21.06	9	20.27 (31)	22.43	67	21.46 (32)	23.55	83	21.50 (36)
21	09.34		07.59		06.21		05.31		20.17 (31)	03.50		05.27 (50)	02.49		04.09 (51)
	15.29		17.11		18.36		21.09	13	20.30 (31)	22.46	69	21.47 (32)	23.55	83	21.50 (36)
22	09.32		07.55		06.18		05.28		20.16 (31)	03.47		05.26 (50)	02.49		04.09 (51)
	15.33		17.14		18.39		21.13	17	20.33 (31)	22.49	69	21.46 (32)	23.55	83	21.50 (36)
23	09.29		07.52		06.14		05.24		20.16 (31)	03.44		05.27 (50)	02.50		04.10 (51)
	15.36		17.17		18.42		21.16	20	20.36 (31)	22.52	69	21.46 (32)	23.55	85	21.51 (36)
24	09.26		07.48		06.10		05.21		20.15 (31)	03.41		05.27 (50)	02.50		04.10 (51)
	15.39		17.20		18.45		21.19	20	20.35 (31)	22.55	71	21.47 (32)	23.55	84	21.51 (36)
25	09.24		07.45		06.07		05.17		20.14 (31)	03.38		05.27 (50)	02.51		04.11 (51)
	15.42		17.24		18.48		21.22	21	20.35 (31)	22.58	71	21.47 (32)	23.55	84	21.52 (36)
26	09.21		07.42		06.03		05.14		20.14 (31)	03.35		05.28 (50)	02.52		04.10 (51)
	15.46		17.27		18.51		21.25	21	20.35 (31)	23.02	70	21.47 (32)	23.54	85	21.51 (36)
27	09.18		07.38		06.00		05.10		20.15 (31)	03.33		05.28 (50)	02.53		04.11 (51)
	15.49		17.30		18.54		21.28	20	20.35 (31)	23.05	70	21.47 (32)	23.53	84	21.52 (36)
28	09.15		07.35		05.56		05.07		20.15 (31)	03.30		05.28 (50)	02.55		04.12 (51)
	15.52		17.33		18.57		21.31	19	20.34 (31)	23.08	70	21.47 (32)	23.52	83	21.52 (36)
29	09.12				06.53		05.03		20.15 (31)	03.27		05.28 (50)	02.56		04.12 (51)
	15.56				20.00		21.35	19	20.34 (31)	23.11	70	21.47 (32)	23.51	85	21.53 (36)
30	09.09				06.49		05.00		20.15 (31)	03.24		05.29 (50)	02.58		04.12 (51)
	15.59				20.03		21.38	17	20.32 (31)	23.14	69	21.47 (36)	23.50	85	21.53 (36)
31	09.06				06.46					03.22		05.29 (50)			
	16.02				20.06					23.16	69	21.47 (36)			
Potential sun hours	171		238		363		451			569			624		
Total, worst case								200			1505			2482	
Sun reduction								0,41			0,47			0,48	
Oper. time red.								0,99			0,99			0,99	
Wind dir. red.								0,63			0,63			0,63	
Total reduction								0,25			0,29			0,30	
Total, real								51			438			736	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** C - Laskentapiste C (Perkkiontie 382)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September	October	November	December
1	02.59		04.13 (51)	04.24	05.39 (50)	06.00	07.26	08.00	09.35
	23.49	85	21.53 (36)	22.27 36	06.15 (50)	20.39	18.53	16.07	14.43
2	03.01		04.13 (51)	04.28	05.40 (50)	06.03	07.29	08.03	09.38
	23.47	85	21.53 (36)	22.23 35	06.15 (50)	20.36	18.49	16.03	14.41
3	03.01		04.13 (51)	04.31	05.40 (50)	06.06	07.32	08.07	09.41
	23.46	85	21.53 (36)	22.20 34	06.14 (50)	20.32	18.46	16.00	14.39
4	03.03		04.14 (51)	04.34	05.41 (50)	06.09	07.35	08.10	09.43
	23.44	85	21.54 (36)	22.17 32	06.13 (50)	20.29	18.42	15.57	14.37
5	03.06		04.15 (51)	04.37	05.43 (50)	06.12	07.38	08.13	09.46
	23.42	84	21.54 (36)	22.13 29	06.12 (50)	20.25	18.39	15.54	14.35
6	03.08		04.16 (51)	04.40	05.43 (50)	06.14	07.41	08.16	09.48
	23.40	83	21.54 (36)	22.10 27	06.10 (50)	20.22	18.35	15.51	14.33
7	03.10		04.17 (51)	04.43	05.45 (50)	06.17	07.44	08.20	09.51
	23.38	82	21.54 (36)	22.07 24	06.09 (50)	20.18	18.32	15.48	14.32
8	03.12		04.19 (51)	04.47	05.47 (50)	06.20	07.47	08.23	09.53
	23.36	81	21.54 (36)	22.03 21	06.08 (50)	20.14	18.28	15.44	14.30
9	03.15		04.21 (51)	04.50	05.49 (50)	06.23	07.50	08.26	09.55
	23.34	77	21.55 (36)	22.00 16	06.05 (50)	20.11	18.25	15.41	14.29
10	03.18		04.23 (51)	04.53	05.52 (50)	06.26	07.53	08.29	09.58
	23.31	75	21.55 (36)	21.56 17	20.37 (31)	20.07	18.21	15.38	14.28
11	03.20		04.25 (51)	04.56	20.26 (31)	06.29	07.56	08.33	10.00
	23.29	71	21.55 (36)	21.53 13	20.39 (31)	20.04	18.18	15.35	14.27
12	03.23		05.38 (50)	04.59	20.25 (31)	06.32	07.58	08.36	10.02
	23.27	68	21.55 (32)	21.49 15	20.40 (31)	20.00	18.14	15.32	14.26
13	03.26		05.38 (50)	05.02	20.23 (31)	06.35	08.01	08.39	10.03
	23.24	68	21.55 (32)	21.46 17	20.40 (31)	19.57	18.11	15.29	14.25
14	03.29		05.37 (50)	05.05	20.23 (31)	06.38	08.04	08.42	10.05
	23.21	70	21.55 (32)	21.43 18	20.41 (31)	19.53	18.07	15.26	14.24
15	03.31		05.37 (50)	05.09	20.22 (31)	06.40	08.07	08.46	10.07
	23.19	70	21.56 (32)	21.39 20	20.42 (31)	19.50	18.04	15.23	14.23
16	03.34		05.37 (50)	05.12	20.22 (31)	06.43	08.10	08.49	10.08
	23.16	70	21.56 (32)	21.36 20	20.42 (31)	19.46	18.00	15.20	14.23
17	03.37		05.37 (50)	05.15	20.21 (31)	06.46	08.13	08.52	10.09
	23.13	70	21.56 (32)	21.32 20	20.41 (31)	19.42	17.57	15.18	14.22
18	03.40		05.37 (50)	05.18	20.21 (31)	06.49	08.17	08.55	10.11
	23.10	70	21.56 (32)	21.29 20	20.41 (31)	19.39	17.54	15.15	14.22
19	03.43		05.37 (50)	05.21	20.21 (31)	06.52	08.20	08.58	10.12
	23.07	71	21.57 (32)	21.25 20	20.41 (31)	19.35	17.50	15.12	14.22
20	03.46		05.37 (50)	05.24	20.21 (31)	06.55	08.23	09.02	10.13
	23.04	71	21.57 (32)	21.22 20	20.41 (31)	19.32	17.47	15.09	14.22
21	03.50		05.37 (50)	05.27	20.21 (31)	06.58	08.26	09.05	10.13
	23.01	68	21.56 (32)	21.18 16	20.37 (31)	19.28	17.43	15.06	14.23
22	03.53		05.37 (50)	05.30	20.22 (31)	07.00	08.29	09.08	10.14
	22.58	69	21.57 (32)	21.15 12	20.34 (31)	19.25	17.40	15.04	14.23
23	03.56		05.37 (50)	05.33	20.23 (31)	07.03	08.32	09.11	10.15
	22.55	68	21.56 (32)	21.11 8	20.31 (31)	19.21	17.37	15.01	14.24
24	03.59		05.37 (50)	05.36	20.25 (31)	07.06	08.35	09.14	10.15
	22.52	67	21.57 (32)	21.08 3	20.28 (31)	19.18	17.33	14.59	14.24
25	04.02		05.37 (50)	05.39		07.09	07.38	09.17	10.15
	22.49	65	21.55 (32)	21.04		19.14	16.30	14.56	14.25
26	04.05		05.38 (50)	05.42		07.12	07.41	09.20	10.15
	22.46	60	21.53 (32)	21.01		19.10	16.26	14.54	14.26
27	04.08		05.37 (50)	05.45		07.15	07.44	09.23	10.15
	22.43	56	21.50 (32)	20.57		19.07	16.23	14.51	14.27
28	04.12		05.38 (50)	05.48		07.18	07.47	09.26	10.15
	22.40	51	21.48 (32)	20.54		19.03	16.20	14.49	14.28
29	04.15		05.38 (50)	05.51		07.20	07.51	09.29	10.14
	22.36	45	21.45 (32)	20.50		19.00	16.17	14.47	14.30
30	04.18		05.39 (50)	05.54		07.23	07.54	09.32	10.14
	22.33	41	21.43 (32)	20.46		18.56	16.13	14.45	14.31
31	04.21		05.38 (50)	05.57			07.57		10.13
	22.30	37	06.15 (50)	20.43			16.10		14.33
Potential sun hours	608			508		393	305	198	137
Total, worst case		2148		493					
Sun reduction		0,38		0,31					
Oper. time red.		0,99		0,99					
Wind dir. red.		0,63		0,62					
Total reduction		0,24		0,19					
Total, real		505		95					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April			May			June		
1	10.12	09.03	07.31	06.42			04.56		20.35 (54)	03.19		21.23 (56)
	14.35	16.05	17.36	20.08			21.41	20	20.55 (54)	23.19	28	21.51 (56)
2	10.11	09.00	07.27	06.38			04.53		20.34 (54)	03.16		21.23 (56)
	14.37	16.08	17.39	20.11			21.44	21	20.55 (54)	23.22	29	21.52 (56)
3	10.10	08.57	07.24	06.35			04.49		20.34 (54)	03.14		21.23 (56)
	14.39	16.12	17.42	20.14			21.47	21	20.55 (54)	23.25	28	21.51 (56)
4	10.09	08.54	07.21	06.31			04.46		20.35 (54)	03.11		21.24 (56)
	14.41	16.15	17.45	20.17			21.50	19	20.54 (54)	23.27	28	21.52 (56)
5	10.07	08.51	07.17	06.27			04.42		20.35 (54)	03.09		21.24 (56)
	14.43	16.18	17.48	20.20			21.54	19	20.54 (54)	23.30	27	21.51 (56)
6	10.06	08.47	07.14	06.24			04.39		20.35 (54)	03.07		21.24 (56)
	14.46	16.22	17.51	20.23			21.57	18	20.53 (54)	23.32	28	21.52 (56)
7	10.04	08.44	07.10	06.20			04.36		20.36 (54)	03.04		21.25 (56)
	14.48	16.25	17.54	20.26			22.00	16	20.52 (54)	23.35	27	21.52 (56)
8	10.03	08.41	07.07	06.17			04.32		20.37 (54)	03.02		21.25 (56)
	14.51	16.28	17.57	20.29			22.03	14	20.51 (54)	23.37	32	22.01 (58)
9	10.01	08.38	07.03	06.13			04.29		20.39 (54)	03.01		21.25 (56)
	14.53	16.32	18.00	20.32			22.07	11	20.50 (54)	23.39	37	22.04 (58)
10	09.59	08.35	07.00	06.10			04.26		20.42 (54)	02.57		21.26 (56)
	14.56	16.35	18.03	20.35			22.10	5	20.47 (54)	23.41	39	22.05 (58)
11	09.57	08.31	06.56	06.06			04.22			02.56		21.26 (56)
	14.59	16.38	18.06	20.38			22.13			23.43	41	22.07 (58)
12	09.55	08.28	06.53	06.03			04.19			02.54		21.26 (56)
	15.02	16.42	18.09	20.42			22.16			23.45	41	22.07 (58)
13	09.53	08.25	06.49	05.59			04.16			02.53		21.26 (56)
	15.04	16.45	18.12	20.45			22.20			23.47	42	22.08 (58)
14	09.51	08.22	06.46	05.56			04.12			02.52		21.27 (56)
	15.07	16.48	18.15	20.48			22.23			23.48	42	22.09 (58)
15	09.49	08.18	06.42	05.52			04.09		21.31 (56)	02.51		21.26 (56)
	15.10	16.51	18.18	20.51			22.26	4	21.35 (56)	23.50	44	22.10 (58)
16	09.47	08.15	06.38	05.48			04.06		21.29 (56)	02.50		21.27 (56)
	15.13	16.55	18.21	20.54			22.29	9	21.38 (56)	23.51	44	22.11 (58)
17	09.44	08.12	06.35	05.45			04.03		21.27 (56)	02.49		21.28 (56)
	15.16	16.58	18.24	20.57			22.33	14	21.41 (56)	23.52	43	22.11 (58)
18	09.42	08.08	06.31	05.41			03.59		21.27 (56)	02.49		21.28 (56)
	15.19	17.01	18.27	21.00			22.36	17	21.44 (56)	23.53	44	22.12 (58)
19	09.39	08.05	06.28	05.38			03.56		21.25 (56)	02.49		21.27 (56)
	15.23	17.04	18.30	21.03			22.39	21	21.46 (56)	23.54	44	22.11 (58)
20	09.37	08.02	06.24	05.34			03.53		21.25 (56)	02.49		21.29 (56)
	15.26	17.07	18.33	21.06			22.42	22	21.47 (56)	23.54	44	22.13 (58)
21	09.34	07.58	06.21	05.31			03.50		21.24 (56)	02.49		21.29 (56)
	15.29	17.11	18.36	21.09			22.46	23	21.47 (56)	23.55	44	22.13 (58)
22	09.32	07.55	06.17	05.27			03.47		21.24 (56)	02.49		21.29 (56)
	15.32	17.14	18.39	21.12			22.49	24	21.48 (56)	23.55	44	22.13 (58)
23	09.29	07.52	06.14	05.24			03.44		21.23 (56)	02.49		21.28 (56)
	15.35	17.17	18.42	21.15			22.52	26	21.49 (56)	23.55	45	22.13 (58)
24	09.26	07.48	06.10	05.20			03.41		21.23 (56)	02.50		21.29 (56)
	15.39	17.20	18.45	21.19			22.55	27	21.50 (56)	23.55	44	22.13 (58)
25	09.23	07.45	06.07	05.17		20.40 (54)	03.38		21.22 (56)	02.51		21.29 (56)
	15.42	17.23	18.48	21.22	1	20.41 (54)	22.58	27	21.49 (56)	23.54	44	22.13 (58)
26	09.21	07.41	06.03	05.13		20.39 (54)	03.35		21.22 (56)	02.52		21.29 (56)
	15.45	17.26	18.51	21.25	5	20.44 (54)	23.01	28	21.50 (56)	23.54	44	22.13 (58)
27	09.18	07.38	05.59	05.10		20.37 (54)	03.32		21.22 (56)	02.53		21.30 (56)
	15.49	17.29	18.54	21.28	9	20.46 (54)	23.04	28	21.50 (56)	23.53	43	22.13 (58)
28	09.15	07.34	05.56	05.06		20.36 (54)	03.29		21.22 (56)	02.54		21.30 (56)
	15.52	17.33	18.57	21.31	13	20.49 (54)	23.07	28	21.50 (56)	23.52	43	22.13 (58)
29	09.12		06.52	05.03		20.35 (54)	03.27		21.22 (56)	02.56		21.29 (56)
	15.55		20.00	21.34	17	20.52 (54)	23.10	28	21.50 (56)	23.51	43	22.12 (58)
30	09.09		06.49	05.00		20.35 (54)	03.24		21.23 (56)	02.57		21.29 (56)
	15.58		20.03	21.38	19	20.54 (54)	23.13	28	21.51 (56)	23.50	42	22.11 (58)
31	09.06		06.45				03.21		21.23 (56)			
	16.02		20.06				23.16	28	21.51 (56)			
Potential sun hours	171	238	363	451			570			624		
Total, worst case					64			546			1168	
Sun reduction					0,41			0,47			0,48	
Oper. time red.					0,99			0,99			0,99	
Wind dir. red.					0,64			0,64			0,64	
Total reduction					0,26			0,30			0,30	
Total, real					17			162			355	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** D - Asuinrakennus D (Alakylantie 243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August			September	October	November	December
1	02.59		21.30 (56)	04.24		06.00	07.26	08.00	09.35
	23.49	41	22.11 (58)	22.26		20.39	18.52	16.06	14.42
2	03.01		21.30 (56)	04.27		06.02	07.29	08.03	09.38
	23.47	40	22.10 (58)	22.23		20.35	18.49	16.03	14.40
3	03.01		21.30 (56)	04.30		20.51 (54)	06.05	07.32	08.06	09.40
	23.46	38	22.09 (58)	22.20	7	20.58 (54)	20.32	18.45	16.00	14.38
4	03.03		21.30 (56)	04.34		20.49 (54)	06.08	07.35	08.10	09.43
	23.44	35	22.07 (58)	22.16	12	21.01 (54)	20.28	18.42	15.57	14.36
5	03.05		21.30 (56)	04.37		20.47 (54)	06.11	07.38	08.13	09.46
	23.42	27	21.57 (56)	22.13	14	21.01 (54)	20.25	18.38	15.53	14.35
6	03.07		21.30 (56)	04.40		20.46 (54)	06.14	07.40	08.16	09.48
	23.40	27	21.57 (56)	22.10	16	21.02 (54)	20.21	18.35	15.50	14.33
7	03.10		21.30 (56)	04.43		20.45 (54)	06.17	07.43	08.19	09.51
	23.38	28	21.58 (56)	22.06	18	21.03 (54)	20.18	18.31	15.47	14.31
8	03.12		21.31 (56)	04.46		20.44 (54)	06.20	07.46	08.22	09.53
	23.36	28	21.59 (56)	22.03	19	21.03 (54)	20.14	18.28	15.44	14.30
9	03.15		21.30 (56)	04.49		20.44 (54)	06.23	07.49	08.26	09.55
	23.34	28	21.58 (56)	21.59	19	21.03 (54)	20.11	18.24	15.41	14.28
10	03.17		21.30 (56)	04.53		20.44 (54)	06.26	07.52	08.29	09.57
	23.31	28	21.58 (56)	21.56	20	21.04 (54)	20.07	18.21	15.38	14.27
11	03.20		21.31 (56)	04.56		20.44 (54)	06.29	07.55	08.32	09.59
	23.29	28	21.59 (56)	21.53	20	21.04 (54)	20.03	18.17	15.35	14.26
12	03.23		21.31 (56)	04.59		20.43 (54)	06.31	07.58	08.35	10.01
	23.26	28	21.59 (56)	21.49	20	21.03 (54)	20.00	18.14	15.32	14.25
13	03.25		21.31 (56)	05.02		20.43 (54)	06.34	08.01	08.39	10.03
	23.24	28	21.59 (56)	21.46	19	21.02 (54)	19.56	18.10	15.29	14.24
14	03.28		21.31 (56)	05.05		20.44 (54)	06.37	08.04	08.42	10.05
	23.21	28	21.59 (56)	21.42	15	20.59 (54)	19.53	18.07	15.26	14.23
15	03.31		21.31 (56)	05.08		20.44 (54)	06.40	08.07	08.45	10.06
	23.18	28	21.59 (56)	21.39	12	20.56 (54)	19.49	18.04	15.23	14.23
16	03.34		21.31 (56)	05.11		20.44 (54)	06.43	08.10	08.48	10.08
	23.16	28	21.59 (56)	21.35	8	20.52 (54)	19.46	18.00	15.20	14.22
17	03.37		21.32 (56)	05.14		20.45 (54)	06.46	08.13	08.52	10.09
	23.13	28	22.00 (56)	21.32	5	20.50 (54)	19.42	17.57	15.17	14.22
18	03.40		21.32 (56)	05.17			06.49	08.16	08.55	10.10
	23.10	27	21.59 (56)	21.28			19.39	17.53	15.14	14.22
19	03.43		21.32 (56)	05.21			06.51	08.19	08.58	10.12
	23.07	27	21.59 (56)	21.25			19.35	17.50	15.12	14.22
20	03.46		21.32 (56)	05.24			06.54	08.22	09.01	10.12
	23.04	26	21.58 (56)	21.21			19.31	17.46	15.09	14.22
21	03.49		21.34 (56)	05.27			06.57	08.25	09.05	10.13
	23.01	25	21.59 (56)	21.18			19.28	17.43	15.06	14.22
22	03.52		21.34 (56)	05.30			07.00	08.28	09.08	10.14
	22.58	24	21.58 (56)	21.14			19.24	17.40	15.03	14.23
23	03.55		21.35 (56)	05.33			07.03	08.32	09.11	10.14
	22.55	23	21.58 (56)	21.11			19.21	17.36	15.01	14.23
24	03.59		21.35 (56)	05.36			07.06	08.35	09.14	10.15
	22.52	22	21.57 (56)	21.07			19.17	17.33	14.58	14.24
25	04.02		21.36 (56)	05.39			07.09	07.38	09.17	10.15
	22.49	19	21.55 (56)	21.04			19.14	16.29	14.56	14.25
26	04.05		21.37 (56)	05.42			07.12	07.41	09.20	10.15
	22.46	15	21.52 (56)	21.00			19.10	16.26	14.53	14.26
27	04.08		21.39 (56)	05.45			07.14	07.44	09.23	10.15
	22.43	11	21.50 (56)	20.57			19.07	16.23	14.51	14.27
28	04.11		21.40 (56)	05.48			07.17	07.47	09.26	10.14
	22.39	7	21.47 (56)	20.53			19.03	16.19	14.49	14.28
29	04.14		21.43 (56)	05.51			07.20	07.50	09.29	10.14
	22.36	2	21.45 (56)	20.50			19.00	16.16	14.46	14.29
30	04.18			05.54			07.23	07.54	09.32	10.14
	22.33			20.46			18.56	16.13	14.44	14.31
31	04.21			05.57				07.57		10.13
	22.30			20.43				16.10		14.33
Potential sun hours	608			508			393	305	198	137
Total, worst case		744			224					
Sun reduction		0,38			0,31					
Oper. time red.		0,99			0,99					
Wind dir. red.		0,64			0,64					
Total reduction		0,24			0,20					
Total, real		178			44					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** E - Lomarakennus E (Kellokankaan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.35	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.52	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.35	18.49	16.03	14.40
3	10.10	08.57	07.24	06.34	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.40
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.20	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.09	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.56	14.36
5	10.07	08.51	07.17	06.27	04.42	03.08	03.05	04.37	06.11	07.37	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.47	07.13	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.06	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.22	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.31	18.00	20.32	22.07	23.39	23.34	21.59	20.11	18.24	15.41	14.28
10	09.59	08.35	06.59	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.31	06.56	06.06	04.22	02.55	03.19	04.56	06.28	07.55	08.32	09.59
	14.58	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.52	06.02	04.19	02.54	03.22	04.59	06.31	07.58	08.35	10.01
	15.01	16.41	18.09	20.41	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.44	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.45	05.55	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.18	21.39	19.49	18.03	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.48	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.56	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.48	03.40	05.17	06.48	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.38	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.23	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.26	06.57	08.25	09.05	10.13
	15.29	17.10	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.29	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.39	15.03	14.22
23	09.29	07.51	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.31	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.38	17.20	18.45	21.18	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.23
25	09.23	07.45	06.06	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.11	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.52	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.06	16.23	14.51	14.26
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.07	23.52	22.39	20.53	19.03	16.19	14.48	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.50	07.20	07.50	09.29	10.14
	15.55		19.59	21.34	23.10	23.51	22.36	20.50	18.59	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.53	07.23	07.53	09.32	10.14
	15.58		20.02	21.37	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.56		07.57		10.13
	16.02		20.05		23.16		22.30	20.43		16.09		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** F - Asuinrakennus F (Ollilantie 112)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January		February		March	April	May	June	July	August	September	October	November		December	
1	10.13		09.04	12.01 (45)	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00		09.36	11.32 (45)
	14.34		16.05 25	13.31 (40)	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06		14.42 32	13.05 (40)
2	10.12		09.01	13.17 (40)	07.28	06.38	04.52	03.15	03.00	04.27	06.03	07.29	08.04		09.39	11.33 (45)
	14.36		16.08 12	13.29 (40)	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03		14.40 29	13.05 (40)
3	10.11		08.58	13.21 (40)	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07		09.41	11.34 (45)
	14.38		16.12 4	13.25 (40)	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00		14.38 24	13.03 (40)
4	10.10		08.54		07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10		09.44	11.35 (45)
	14.41		16.15		17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57		14.36 17	13.01 (40)
5	10.08	11.54 (45)	08.51		07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13		09.47	11.37 (45)
	14.43 5	11.59 (45)	16.18		17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53		14.34 11	11.48 (45)
6	10.07	11.52 (45)	08.48		07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17		09.49	11.39 (45)
	14.45 9	12.01 (45)	16.22		17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50		14.32 9	11.48 (45)
7	10.05	11.52 (45)	08.45		07.10	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20		09.52	11.41 (45)
	14.48 11	12.03 (45)	16.25		17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47		14.31 5	11.46 (45)
8	10.04	11.52 (45)	08.42		07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	12.51 (40)	09.54	
	14.50 16	13.17 (40)	16.28		17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44 5	12.56 (40)	14.29	
9	10.02	11.50 (45)	08.39		07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	12.47 (40)	09.56	
	14.53 23	13.19 (40)	16.32		18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41 13	13.00 (40)	14.28	
10	10.00	11.50 (45)	08.35		07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	11.31 (45)	09.58	
	14.55 28	13.21 (40)	16.35		18.03	20.36	22.11	23.43	23.33	21.57	20.07	18.21	15.38 25	13.01 (40)	14.27	
11	09.58	11.50 (45)	08.32		06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	11.29 (45)	10.01	
	14.58 31	13.23 (40)	16.38		18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35 33	13.03 (40)	14.26	
12	09.56	11.50 (45)	08.29		06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	11.27 (45)	10.02	
	15.01 35	13.25 (40)	16.42		18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32 39	13.04 (40)	14.25	
13	09.54	11.49 (45)	08.26		06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.02	08.39	11.26 (45)	10.04	
	15.04 39	13.26 (40)	16.45		18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29 41	13.04 (40)	14.24	
14	09.52	11.50 (45)	08.22		06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.05	08.43	11.26 (45)	10.06	
	15.07 39	13.27 (40)	16.48		18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26 44	13.06 (40)	14.23	
15	09.50	11.49 (45)	08.19		06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.08	08.46	11.26 (45)	10.08	
	15.10 42	13.28 (40)	16.51		18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23 46	13.06 (40)	14.22	
16	09.47	11.49 (45)	08.16		06.39	05.49	04.05	02.49	03.33	05.11	06.43	08.11	08.49	11.25 (45)	10.09	
	15.13 44	13.29 (40)	16.55		18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20 47	13.06 (40)	14.22	
17	09.45	11.50 (45)	08.12		06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	11.26 (45)	10.10	
	15.16 45	13.30 (40)	16.58		18.24	20.57	22.34	23.54	23.14	21.32	19.42	17.57	15.17 47	13.07 (40)	14.21	
18	09.43	11.49 (45)	08.09		06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	11.25 (45)	10.12	
	15.19 47	13.30 (40)	17.01		18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14 49	13.07 (40)	14.21	
19	09.40	11.49 (45)	08.06		06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	11.25 (45)	10.13	
	15.22 49	13.31 (40)	17.04		18.30	21.03	22.40	23.56	23.08	21.25	19.35	17.50	15.11 49	13.07 (40)	14.21	
20	09.38	11.50 (45)	08.02		06.25	05.34	03.53	02.47	03.46	05.24	06.55	08.23	09.02	11.25 (45)	10.14	
	15.25 48	13.31 (40)	17.07		18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.09 49	13.07 (40)	14.21	
21	09.35	11.50 (45)	07.59		06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	11.26 (45)	10.14	
	15.29 49	13.32 (40)	17.11		18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06 49	13.08 (40)	14.22	
22	09.32	11.50 (45)	07.55		06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	11.26 (45)	10.15	
	15.32 49	13.32 (40)	17.14		18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03 47	13.07 (40)	14.22	
23	09.30	11.51 (45)	07.52		06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	11.26 (45)	10.15	
	15.35 49	13.33 (40)	17.17		18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01 49	13.08 (40)	14.22	
24	09.27	11.51 (45)	07.49		06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	11.27 (45)	10.16	
	15.38 49	13.33 (40)	17.20		18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58 47	13.08 (40)	14.23	
25	09.24	11.52 (45)	07.45		06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	11.27 (45)	10.16	
	15.42 47	13.33 (40)	17.23		18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.55 45	13.07 (40)	14.24	
26	09.21	11.52 (45)	07.42		06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	11.28 (45)	10.16	
	15.45 47	13.33 (40)	17.26		18.51	21.25	23.02	23.56	22.47	21.01	19.10	16.26	14.53 43	13.07 (40)	14.25	
27	09.18	11.53 (45)	07.38		06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	11.28 (45)	10.16	
	15.48 45	13.33 (40)	17.30		18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51 42	13.07 (40)	14.26	
28	09.16	11.54 (45)	07.35		05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	11.29 (45)	10.16	
	15.52 44	13.33 (40)	17.33		18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.19	14.48 39	13.06 (40)	14.27	
29	09.13	11.55 (45)			06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	11.30 (45)	10.15	
	15.55 40	13.32 (40)			20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46 37	13.06 (40)	14.29	
30	09.10	11.56 (45)			06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	11.31 (45)	10.15	
	15.58 37	13.32 (40)			20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44 35	13.06 (40)	14.30	
31	09.07	11.57 (45)			06.45		03.20		04.20	05.57		07.57			10.14	
	16.02 32	13.31 (40)			20.06		23.17		22.30	20.43		16.10			14.32	
Potential sun hours	170		238		363	451	570	625	609	509	393	305	198		136	
Total, worst case		999		41										920		127
Sun reduction		0,19		0,33										0,24		0,22
Oper. time red.		0,99		0,99										0,99		0,99
Wind dir. red.		0,66		0,65										0,66		0,66
Total reduction		0,12		0,22										0,16		0,14
Total, real		121		9										144		18

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102**Shadow receptor:** G - Lomarakennus G (Ollilantie, Siliakuru)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.01	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.53	03.15	03.00	04.27	06.03	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.11	06.21	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.39	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.47	23.28	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.20	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.49	04.06	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.53	10.10
	15.16	16.58	18.24	20.57	22.34	23.54	23.14	21.33	19.42	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.04	22.40	23.55	23.08	21.26	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.44	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.48	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.26
28	09.16	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.03	16.20	14.48	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	14.30
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** H - Asuinrakennus H (Pinolantie 406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.40	16.13	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.34	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.58	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.23	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.08	23.41	23.35	22.01	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.26	02.58	03.18	04.53	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07	04.23	02.56	03.20	04.57	06.30	07.56	08.33	10.01
	14.59	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04	04.20	02.55	03.23	05.00	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.24
16	09.48	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.03	10.14
	15.27	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.49	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.37	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.20	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.08	05.18	03.39	02.51	04.02	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.30	14.57	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.46	07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.01	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.55	07.24	07.55	09.33	10.15
	15.59		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** I - Asuinrakennus I (Kortenevantie 116)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	July	August		September	October	November	December
1	10.13	09.04	07.32	06.43		04.57	20.26 (9)	03.19	03.00	04.25		06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09		21.42	15 20.41 (9)	23.20	23.50	22.27		20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39		04.54	20.27 (9)	03.17	03.00	04.28		06.03	07.30	08.04	09.39
	14.38	16.09	17.40	20.12		21.45	13 20.40 (9)	23.23	23.48	22.24		20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36		04.50	20.29 (9)	03.14	03.02	04.31		06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15		21.48	9 20.38 (9)	23.26	23.47	22.21		20.33	18.46	16.01	14.39
4	10.10	08.55	07.22	06.32		04.47		03.12	03.04	04.35		06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.18		21.51		23.28	23.45	22.17		20.29	18.43	15.58	14.37
5	10.08	08.52	07.18	06.28		04.43		03.10	03.06	04.38		06.12	07.39	08.14	09.47
	14.44	16.19	17.49	20.21		21.55		23.31	23.43	22.14		20.26	18.39	15.54	14.35
6	10.07	08.49	07.15	06.25		04.40		03.08	03.08	04.41		06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24		21.58		23.33	23.41	22.11		20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21		04.37		03.05	03.11	04.44		06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27		22.01		23.36	23.39	22.07		20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18		04.33		03.03	03.13	04.47		06.21	07.47	08.24	09.54
	14.52	16.29	17.58	20.30		22.04		23.38	23.37	22.04		20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14		04.30		03.01	03.15	04.50		06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33		22.08		23.40	23.35	22.00	5 20.45 (9)	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11		04.26		03.00	03.18	04.54		20.37 (9)	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36		22.11		23.43	23.32	21.57	11 20.48 (9)	20.08	18.22	15.39	14.28
11	09.58	08.33	06.57	06.07		04.23		02.56	03.21	04.57		20.36 (9)	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39		22.14		23.44	23.30	21.54	13 20.49 (9)	20.04	18.18	15.36	14.27
12	09.56	08.29	06.54	06.04		04.20		02.55	03.23	05.00		20.34 (9)	06.32	07.59	08.37	10.02
	15.02	16.43	18.10	20.43		22.17		23.46	23.27	21.50	16 20.50 (9)	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00		04.17		02.54	03.26	05.03		20.33 (9)	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.46		22.21		23.48	23.25	21.47	18 20.51 (9)	19.57	18.11	15.30	14.25
14	09.52	08.23	06.47	05.57		04.13		02.53	03.29	05.06		20.33 (9)	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49		22.24		23.50	23.22	21.43	18 20.51 (9)	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53		04.10		02.52	03.32	05.09		20.31 (9)	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52		22.27		23.51	23.19	21.40	20 20.51 (9)	19.50	18.05	15.24	14.24
16	09.48	08.16	06.39	05.49		04.07		02.51	03.35	05.12		20.31 (9)	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55		22.30		23.52	23.17	21.36	20 20.51 (9)	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46		04.04		02.50	03.38	05.15		20.31 (9)	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58		22.34		23.53	23.14	21.33	20 20.51 (9)	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42		04.00		02.50	03.41	05.18		20.31 (9)	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01		22.37		23.54	23.11	21.29	17 20.48 (9)	19.40	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39		03.57		02.49	03.44	05.21		20.31 (9)	06.52	08.20	08.59	10.13
	15.24	17.05	18.31	21.04		22.40		23.55	23.08	21.26	13 20.44 (9)	19.36	17.51	15.12	14.23
20	09.38	08.03	06.25	05.35		03.54		02.49	03.47	05.25		20.31 (9)	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07		22.43		23.56	23.05	21.22	10 20.41 (9)	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	20.28 (9)	03.51		02.49	03.50	05.28		20.32 (9)	06.58	08.26	09.06	10.14
	15.30	17.12	18.37	21.10	3 20.31 (9)	22.47		23.56	23.02	21.19	6 20.38 (9)	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	20.26 (9)	03.48		02.50	03.53	05.31		20.33 (9)	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	7 20.33 (9)	22.50		23.56	22.59	21.15	2 20.35 (9)	19.25	17.41	15.04	14.23
23	09.30	07.53	06.15	05.25	20.26 (9)	03.45		02.50	03.56	05.34		07.04	08.33	09.12	10.15
	15.36	17.18	18.43	21.16	10 20.36 (9)	22.53		23.56	22.56	21.12		19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	20.25 (9)	03.42		02.51	03.59	05.37		07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	14 20.39 (9)	22.56		23.56	22.53	21.08		19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	20.25 (9)	03.39		02.52	04.03	05.40		07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	17 20.42 (9)	22.59		23.56	22.50	21.05		19.15	16.30	14.57	14.26
26	09.22	07.42	06.04	05.14	20.25 (9)	03.36		02.53	04.06	05.43		07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	20 20.45 (9)	23.02		23.55	22.47	21.01		19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	20.24 (9)	03.33		02.54	04.09	05.46		07.15	07.45	09.24	10.16
	15.49	17.30	18.55	21.29	20 20.44 (9)	23.05		23.54	22.44	20.58		19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	20.24 (9)	03.30		02.55	04.12	05.49		07.18	07.48	09.27	10.16
	15.53	17.33	18.58	21.32	19 20.43 (9)	23.08		23.53	22.40	20.54		19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	20.24 (9)	03.27		02.57	04.15	05.52		07.21	07.51	09.30	10.15
	15.56		20.01	21.35	19 20.43 (9)	23.11		23.52	22.37	20.51		19.01	16.17	14.47	14.30
30	09.10		06.50	05.00	20.25 (9)	03.25		02.58	04.19	05.55		07.24	07.55	09.33	10.15
	15.59		20.04	21.39	17 20.42 (9)	23.14		23.51	22.34	20.47		18.57	16.14	14.45	14.32
31	09.07		06.46			03.22			04.22	05.58			07.58		10.14
	16.03		20.07			23.17			22.31	20.44			16.11		14.34
Potential sun hours	171	238	363	451		570		624	609	508		393	305	198	137
Total, worst case					146		37				189				
Sun reduction					0,41		0,47				0,31				
Oper. time red.					0,99		0,99				0,99				
Wind dir. red.					0,64		0,64				0,64				
Total reduction					0,26		0,30				0,20				
Total, real					37		11				37				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** J - Asuinrakennus J (Haapavesitie 1406)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.37	20.09	21.42	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.54	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.40	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.06	07.33	08.07	09.41
	14.40	16.13	17.43	20.15	21.48	23.25	23.46	22.21	20.33	18.46	16.01	14.39
4	10.09	08.55	07.21	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.58	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.14	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.36
6	10.07	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.37	03.06	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.47	08.23	09.54
	14.52	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.50	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.33	22.07	23.40	23.34	22.00	20.12	18.25	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.04	04.20	02.55	03.24	05.00	06.32	07.59	08.36	10.02
	15.03	16.43	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.30	14.25
14	09.52	08.23	06.46	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.52	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.56	18.22	20.55	22.30	23.52	23.16	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.50	08.17	08.56	10.11
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.52	08.20	08.59	10.12
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.50	03.47	05.25	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.26	09.05	10.14
	15.30	17.12	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.29	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.41	15.04	14.24
23	09.30	07.52	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.15
	15.40	17.21	18.46	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.55	22.50	21.05	19.15	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.43	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.00	05.11	03.33	02.54	04.09	05.46	07.15	07.45	09.24	10.16
	15.50	17.30	18.55	21.29	23.05	23.54	22.43	20.58	19.08	16.24	14.52	14.28
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.15
	15.53	17.33	18.58	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.13		06.53	05.04	03.28	02.57	04.15	05.52	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.51	19.00	16.17	14.47	14.31
30	09.10		06.50	05.00	03.25	02.58	04.19	05.55	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.11		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201103 **Shadow receptor:** K - Lomarakennus K (Kurunoja)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.11	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.13	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.47	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.10	03.06	04.38	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.08	03.08	04.41	06.15	07.41	08.17	09.49
	14.47	16.23	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.11	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.53
	14.52	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.15	04.50	06.24	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	03.00	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.21	04.57	06.29	07.56	08.33	10.00
	15.00	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.36	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.46	18.13	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.30	14.25
14	09.52	08.22	06.46	05.56	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.27	14.24
15	09.49	08.19	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.07	02.51	03.35	05.12	06.44	08.11	08.49	10.08
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.59	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29	05.39	03.57	02.50	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.26	19.36	17.51	15.12	14.23
20	09.37	08.02	06.25	05.35	03.54	02.50	03.47	05.24	06.55	08.23	09.02	10.13
	15.27	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.10	14.23
21	09.35	07.59	06.21	05.32	03.51	02.50	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.40	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.43	21.16	22.52	23.55	22.56	21.11	19.21	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.34	14.59	14.25
25	09.24	07.45	06.07	05.18	03.39	02.52	04.03	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.57	14.26
26	09.21	07.42	06.04	05.14	03.36	02.53	04.06	05.42	07.12	07.42	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.27
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.24	14.52	14.28
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.50	14.29
29	09.12		06.53	05.04	03.27	02.57	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.25	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.57		07.57		10.13
	16.03		20.06		23.17		22.30	20.43		16.10		14.34
Potential sun hours	171	238	363	451	569	624	608	508	393	305	198	137
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** L - Laskentapiste L (Perkkiontie, Ilmola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August		September	October	November	December
1	10.12	09.03	07.31	06.42	04.56		03.19		05.13 (50)	02.59	05.18 (50)	04.24	05.33 (50)	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41		23.19	73	21.39 (36)	23.49	70	21.43 (36)	22.27	26	21.37 (32)	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.38	04.53		03.16		05.13 (50)	03.01	05.18 (50)	04.28	05.35 (50)	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44		23.22	72	21.39 (36)	23.47	70	21.43 (36)	22.23	18	05.53 (50)	20.36	18.49	16.03	14.41
3	10.10	08.57	07.24	06.35	04.50		03.14		05.12 (50)	03.01	05.18 (50)	04.31	05.38 (50)	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47		23.25	72	21.38 (36)	23.46	70	21.43 (36)	22.20	12	05.50 (50)	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46		03.12		05.13 (50)	03.03	05.19 (50)	04.34				06.09	07.35	08.10	09.43
	14.42	16.15	17.45	20.18	21.51		23.28	73	21.39 (36)	23.44	71	21.44 (36)	22.17			20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43		03.09		05.13 (50)	03.05	05.19 (50)	04.37				06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54		23.30	72	21.39 (36)	23.42	71	21.44 (36)	22.13			20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39		03.07		05.13 (50)	03.08	05.19 (50)	04.40				06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33	71	21.38 (36)	23.40	72	21.45 (36)	22.10			20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36		03.05		05.13 (50)	03.10	05.19 (50)	04.43				06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.00		23.35	72	21.39 (36)	23.38	72	21.45 (36)	22.07			20.18	18.32	15.48	14.32
8	10.03	08.41	07.07	06.17	04.33		03.03		05.14 (50)	03.12	05.20 (50)	04.47				06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04		23.37	70	21.39 (36)	23.36	71	21.45 (36)	22.03			20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29		05.31 (50)	03.01	05.14 (50)	03.15	05.20 (50)	04.50				06.23	07.50	08.26	09.55
	14.54	16.32	18.00	20.33	22.07	6	05.37 (50)	23.40	71	21.39 (36)	23.34	73	21.46 (36)	22.00			20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26		05.26 (50)	02.58	05.14 (50)	03.18	05.20 (50)	04.53				06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	15	05.41 (50)	23.42	70	21.39 (36)	23.31	72	21.46 (36)	21.56			20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23		05.24 (50)	02.56	05.14 (50)	03.20	05.21 (50)	04.56				06.29	07.55	08.33	10.00
	14.59	16.39	18.06	20.39	22.13	19	05.43 (50)	23.44	70	21.39 (36)	23.29	72	21.47 (36)	21.53			20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19		05.22 (50)	02.55	05.14 (50)	03.23	05.21 (50)	04.59				06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	32	21.28 (32)	23.45	69	21.38 (36)	23.27	73	21.47 (36)	21.49			20.00	18.14	15.32	14.26
13	09.53	08.25	06.49	05.59	04.16		05.20 (50)	02.53	05.15 (50)	03.26	05.20 (50)	05.02				06.35	08.01	08.39	10.03
	15.05	16.45	18.12	20.45	22.20	41	21.31 (32)	23.47	68	21.39 (36)	23.24	73	21.46 (32)	21.46			19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13		05.19 (50)	02.52	05.15 (50)	03.29	05.21 (50)	05.05				06.38	08.04	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	47	21.33 (32)	23.49	68	21.39 (36)	23.21	74	21.48 (32)	21.43			19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09		05.18 (50)	02.51	05.15 (50)	03.31	05.21 (50)	05.09				06.40	08.07	08.46	10.07
	15.11	16.52	18.18	20.51	22.26	54	21.36 (32)	23.50	68	21.39 (36)	23.19	73	21.48 (32)	21.39			19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06		05.17 (50)	02.50	05.15 (50)	03.34	05.22 (50)	05.12				06.43	08.10	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	58	21.38 (32)	23.51	68	21.39 (36)	23.16	73	21.49 (32)	21.36			19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45	04.03		05.15 (50)	02.50	05.16 (50)	03.37	05.22 (50)	05.15				06.46	08.13	08.52	10.09
	15.17	16.58	18.24	20.57	22.33	64	21.40 (32)	23.52	67	21.39 (36)	23.13	73	21.49 (32)	21.32			19.42	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00		05.15 (50)	02.49	05.16 (50)	03.40	05.22 (50)	05.18				06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	66	21.40 (32)	23.53	67	21.39 (36)	23.10	73	21.49 (32)	21.29			19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57		05.14 (50)	02.49	05.16 (50)	03.43	05.23 (50)	05.21				06.52	08.20	08.58	10.12
	15.23	17.05	18.30	21.03	22.39	68	21.40 (32)	23.54	67	21.40 (36)	23.07	72	21.50 (32)	21.25			19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54		05.14 (50)	02.49	05.16 (50)	03.46	05.23 (50)	05.24				06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	69	21.40 (32)	23.55	68	21.40 (36)	23.04	72	21.50 (32)	21.22			19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50		05.14 (50)	02.49	05.16 (50)	03.50	05.23 (50)	05.27				06.58	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	71	21.41 (32)	23.55	68	21.40 (36)	23.01	72	21.50 (32)	21.18			19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47		05.13 (50)	02.49	05.16 (50)	03.53	05.24 (50)	05.30				07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	72	21.40 (32)	23.55	68	21.40 (36)	22.58	71	21.51 (32)	21.15			19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44		05.13 (50)	02.50	05.17 (50)	03.56	05.24 (50)	05.33				07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	72	21.40 (32)	23.55	68	21.41 (36)	22.55	70	21.51 (32)	21.11			19.21	17.37	15.01	14.24
24	09.26	07.48	06.10	05.21	03.41		05.13 (50)	02.50	05.17 (50)	03.59	05.24 (50)	05.36				07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	72	21.40 (32)	23.55	66	21.40 (36)	22.52	69	21.50 (32)	21.08			19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38		05.13 (50)	02.51	05.18 (50)	04.02	05.25 (50)	05.39				07.09	07.38	09.17	10.15
	15.42	17.24	18.48	21.22	22.58	72	21.40 (32)	23.55	67	21.41 (36)	22.49	68	21.51 (32)	21.04			19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35		05.13 (50)	02.52	05.17 (50)	04.05	05.25 (50)	05.42				07.12	07.41	09.20	10.15
	15.46	17.27	18.51	21.25	23.02	73	21.40 (32)	23.54	68	21.41 (36)	22.46	64	21.50 (32)	21.01			19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33		05.13 (50)	02.53	05.18 (50)	04.08	05.27 (50)	05.45				07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05	73	21.40 (32)	23.53	67	21.41 (36)	22.43	61	21.50 (32)	20.57			19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30		05.13 (50)	02.55	05.18 (50)	04.12	05.28 (50)	05.48				07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	72	21.39 (32)	23.52	68	21.42 (36)	22.40	57	21.48 (32)	20.54			19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27		05.12 (50)	02.56	05.18 (50)	04.15	05.28 (50)	05.51				07.20	07.51	09.29	10.14
	15.56		20.00	21.35	23.11	74	21.39 (32)	23.51	69	21.42 (36)	22.36	51	21.45 (32)	20.50			19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24		05.12 (50)	02.58	05.18 (50)	04.18	05.30 (50)	05.54				07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	74	21.39 (36)	23.50	70	21.43 (36)	22.33	45	21.43 (32)	20.46			18.56	16.13	14.45	14.31
31	09.06		06.46		03.22		05.12 (50)				04.21		05.31 (50)	05.57				07.57		10.13
	16.02		20.06		23.16	73	21.38 (36)				22.30	37	21.39 (32)	20.43				16.10		14.33
Potential sun hours	171	238	363	451	569			624		608		508		393	305	198	137
Total, worst case						1337			2075		2105		56				
Sun reduction						0,47			0,48		0,38		0,31				
Oper. time red.						0,99			0,99		0,99		0,99				
Wind dir. red.						0,63			0,63		0,63		0,62				
Total reduction						0,29			0,30		0,24		0,19				
Total, real						392			617		497		11				

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi

Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **Shadow receptor:** M - Lomarakennus M (Riskalan metsatie)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.34	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.01	07.28	06.38	04.52	03.15	03.00	04.27	06.02	07.29	08.04	09.39
	14.36	16.08	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.38	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.10	03.02	04.33	06.08	07.35	08.10	09.44
	14.40	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.36	06.11	07.38	08.13	09.47
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.06	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.50	14.32
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.31	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.41	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.16	04.52	06.26	07.53	08.30	09.58
	14.55	16.35	18.03	20.36	22.11	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.54	03.19	04.56	06.29	07.56	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.17	15.35	14.25
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.47	23.27	21.50	20.00	18.14	15.32	14.24
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.27	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.30	05.08	06.40	08.07	08.46	10.08
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.22
16	09.47	08.16	06.39	05.48	04.05	02.49	03.33	05.11	06.43	08.11	08.49	10.09
	15.13	16.54	18.21	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.48	03.36	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.54	23.14	21.32	19.42	17.57	15.17	14.21
18	09.43	08.09	06.32	05.41	03.59	02.48	03.39	05.17	06.49	08.17	08.56	10.12
	15.19	17.01	18.27	21.00	22.37	23.55	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.47	03.42	05.20	06.52	08.20	08.59	10.13
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.38	08.02	06.25	05.34	03.53	02.47	03.45	05.23	06.55	08.23	09.02	10.14
	15.25	17.07	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.46	15.08	14.21
21	09.35	07.59	06.21	05.31	03.50	02.47	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.21
22	09.32	07.55	06.17	05.27	03.46	02.48	03.52	05.30	07.00	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30	07.52	06.14	05.24	03.43	02.48	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.57	22.56	21.11	19.21	17.36	15.00	14.22
24	09.27	07.48	06.10	05.20	03.40	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.37	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.29	14.55	14.24
26	09.21	07.42	06.03	05.13	03.34	02.51	04.04	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.47	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.03	16.19	14.48	14.27
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	04.59	03.23	02.56	04.17	05.54	07.23	07.54	09.33	10.15
	15.58		20.03	21.38	23.14	23.52	22.34	20.47	18.56	16.13	14.44	14.30
31	09.07		06.45		03.20		04.20	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	170	238	363	451	570	625	609	509	393	305	198	136
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

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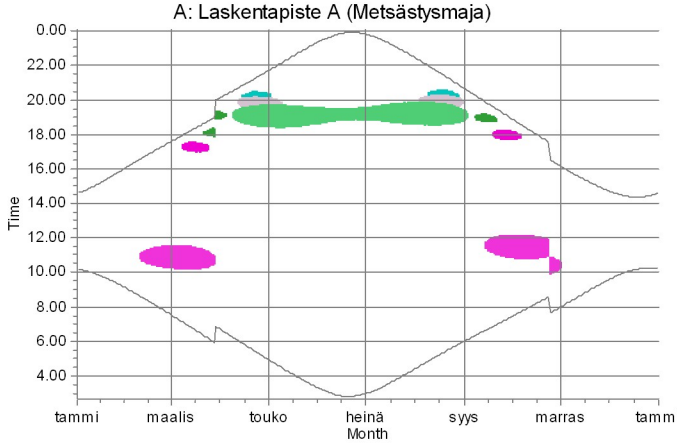
Calculated:
18.11.2020 15.10/3.4.388

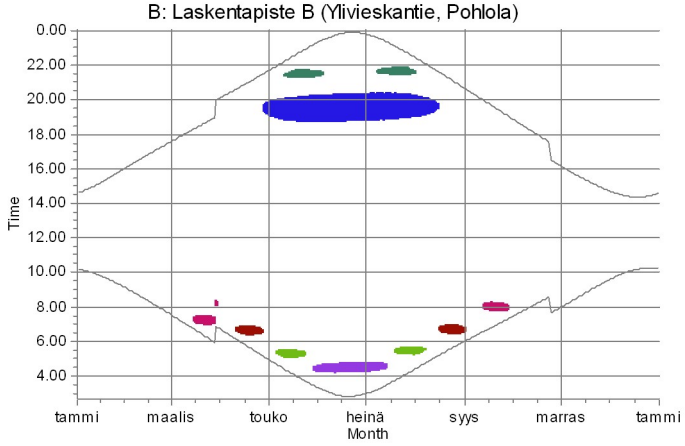
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

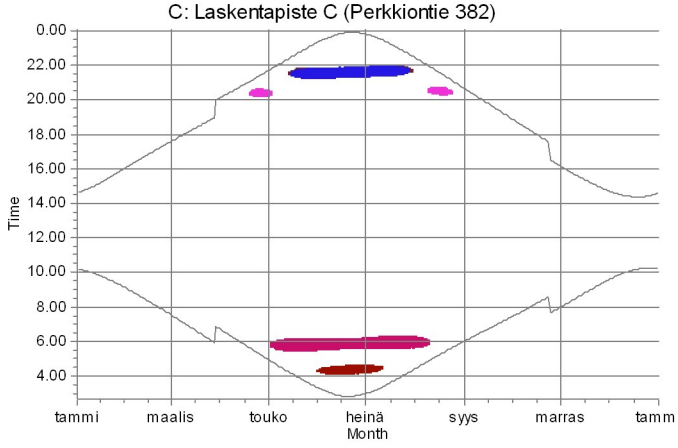
A: Laskentapiste A (Metsästysmaja)



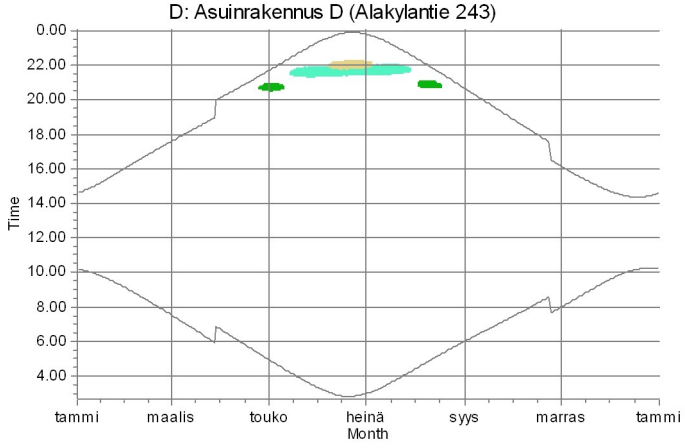
B: Laskentapiste B (Ylivieskantie, Pohlola)



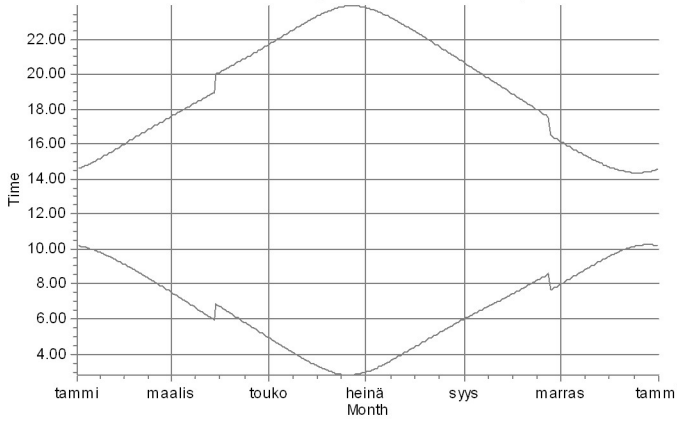
C: Laskentapiste C (Perkkiontie 382)



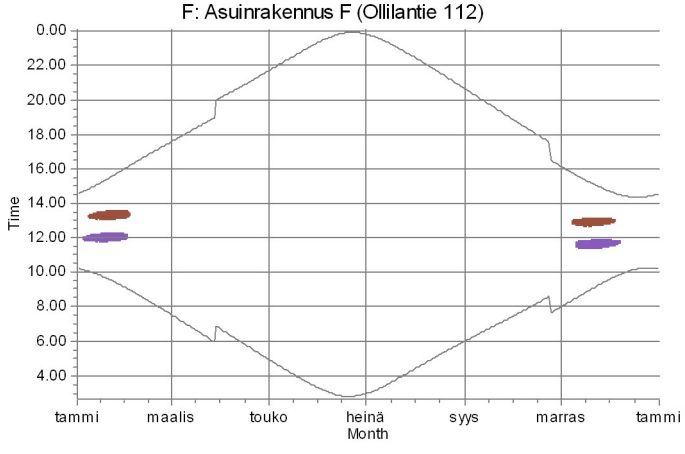
D: Asuinrakennus D (Alakylantie 243)



E: Lomarakennus E (Kellokankaan metsatie)



F: Asuinrakennus F (Ollilantie 112)





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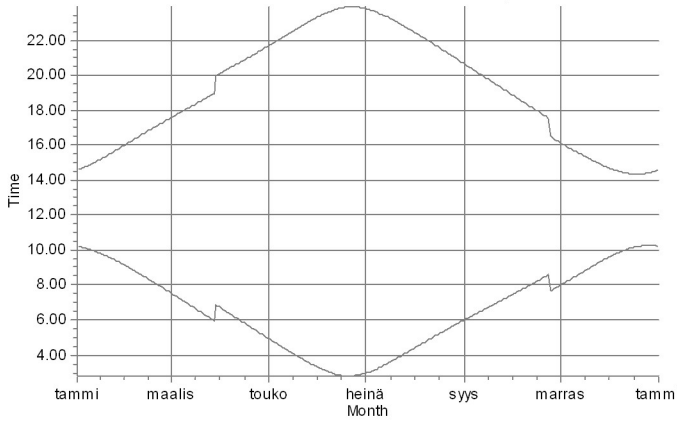
Calculated:
18.11.2020 15.10/3.4.388

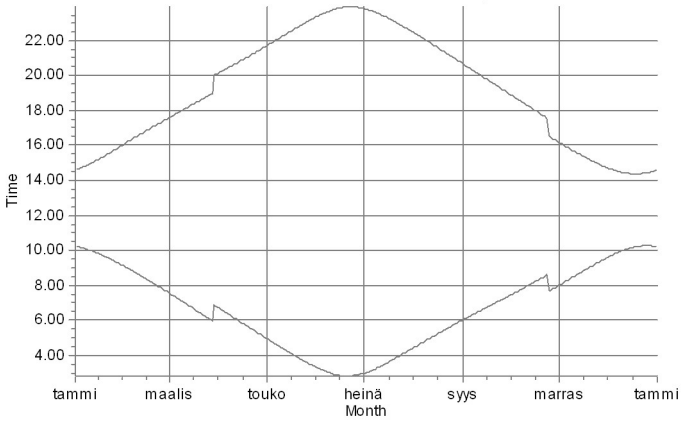
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

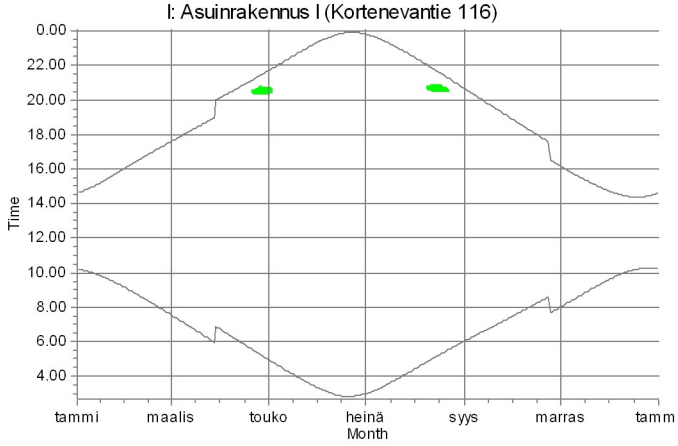
G: Lomarakennus G (Ollilantie, Siliakuru)



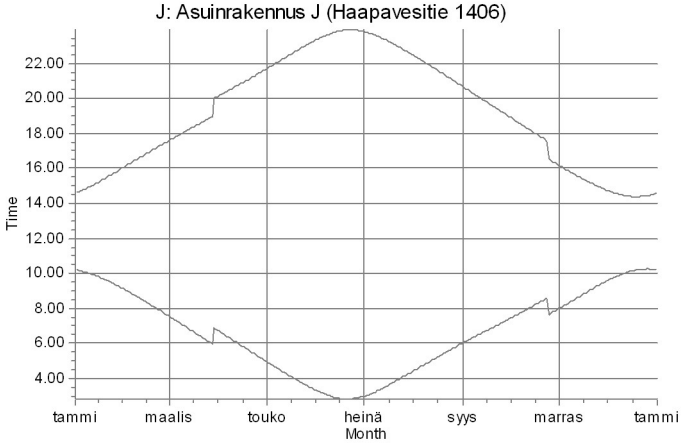
H: Asuinrakennus H (Pinolantie 406)



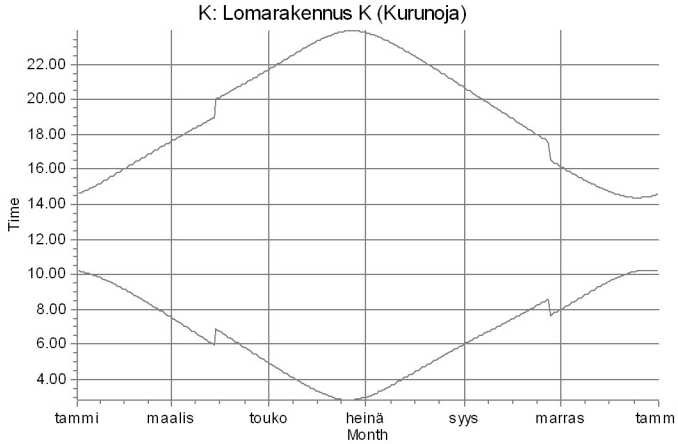
I: Asuinrakennus I (Kortenevantie 116)



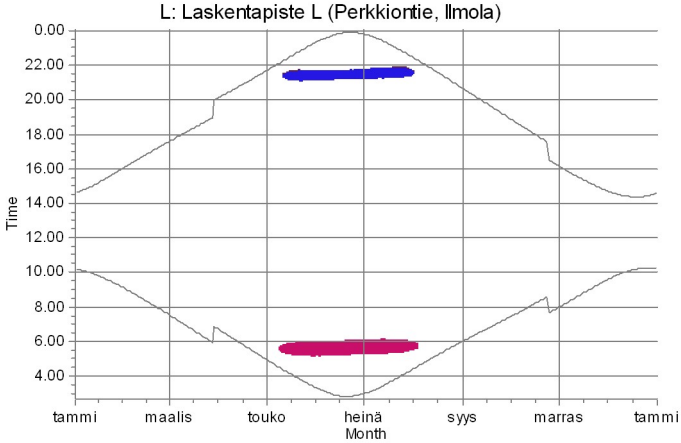
J: Asuinrakennus J (Haapavesitie 1406)



K: Lomarakennus K (Kurunoja)



L: Laskentapiste L (Perkkiontie, Ilmola)





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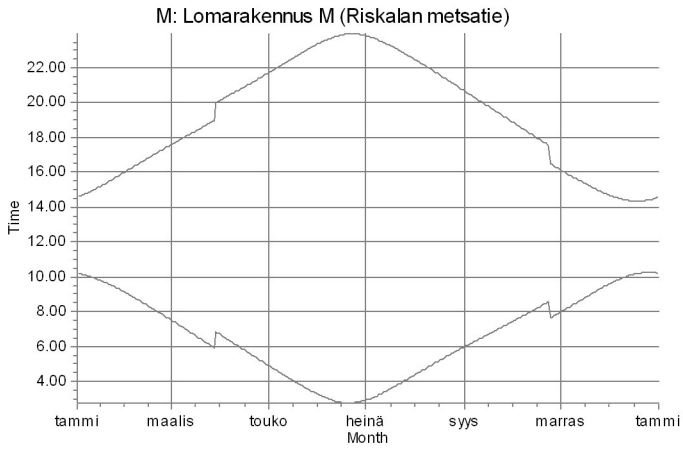
SHADOW - Calendar, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



WTGs

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 1 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (235)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.18	07.44	08.20	09.52
	14.48	16.25	17.55	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.27	14.53	14.26
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 2 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.58	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.21	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.42
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.02	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.46	22.17	20.29	18.42	15.57	14.36
5	10.09	08.52	07.18	06.28	04.43	03.08	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.55	23.31	23.44	22.14	20.26	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.42	22.11	20.22	18.35	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.40	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.57
	14.53	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.35	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.21	15.38	14.27
11	09.59	08.32	06.57	06.07	04.22	02.55	03.19	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.03
	15.01	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.05
	15.04	16.45	18.13	20.45	22.21	23.49	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.23	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.52	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.49	03.34	05.12	06.43	08.11	08.50	10.09
	15.13	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.13	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.11
	15.16	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.56	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.36	21.10	22.47	23.57	23.02	21.19	19.29	17.43	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.04	08.32	09.12	10.16
	15.36	17.17	18.42	21.16	22.53	23.57	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.57	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.24
26	09.22	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.03	23.56	22.47	21.01	19.11	16.26	14.53	14.25
27	09.19	07.39	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 3 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (237)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.09	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.22
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.55	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 4 - VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.49	03.13	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.52
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.27	09.56
	14.53	16.32	18.01	20.33	22.07	23.41	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.40	10.04
	15.04	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.43	05.52	04.09	02.50	03.31	05.08	06.41	08.08	08.46	10.08
	15.10	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.22	20.54	22.30	23.53	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.16	16.58	18.25	20.57	22.34	23.54	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.01	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.47	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.48	03.52	05.30	07.01	08.29	09.09	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.49	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.51	04.05	05.42	07.12	07.42	09.21	10.16
	15.45	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.26	14.53	14.26
27	09.19	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.52	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 5 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (239)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.13	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.05	09.39
	14.38	16.10	17.40	20.13	21.45	23.24	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.46	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.32	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.02	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.55
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.16	18.29	15.45	14.31
9	10.03	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.39	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	08.00	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.53	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.52	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.12	08.50	10.10
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.15	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.12	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.56	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.59	08.27	09.06	10.15
	15.30	17.12	18.37	21.11	22.47	23.57	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.16	10.16
	15.40	17.21	18.46	21.20	22.57	23.57	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.56	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.34	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.48	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 6 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (240)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.28	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 7 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (241)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.31	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.05	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.35	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.24
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.49	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.49	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.49	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.15	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 8 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (242)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.21	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.49	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.45
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.44	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.42	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.40	22.08	20.19	18.33	15.48	14.32
8	10.04	08.43	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.54	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.57	08.34	10.01
	15.00	16.40	18.07	20.40	22.15	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.51	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.49	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.23	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.28	23.51	23.20	21.40	19.51	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.46	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.18	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	09.00	10.13
	15.24	17.05	18.31	21.04	22.41	23.55	23.09	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.06	21.23	19.33	17.48	15.10	14.23
21	09.36	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.03	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.19	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.57	23.00	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.57	22.57	21.12	19.22	17.37	15.02	14.24
24	09.28	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.57	23.56	22.53	21.09	19.19	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.19	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.22	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.49	09.28	10.16
	15.53	17.34	18.58	21.33	23.09	23.54	22.41	20.55	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.31	10.16
	15.56		20.01	21.36	23.12	23.53	22.38	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201103 **WTG:** 9 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (243)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57 20.26-20.41/15	03.19	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54 20.27-20.40/13	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50 20.29-20.38/9	03.14	03.02	04.31	06.06	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.43	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.46	07.11	06.21	04.37	03.05	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.32	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.03	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.29	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50 20.40-20.45/5	06.24	07.50	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.25	15.42	14.29
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54 20.37-20.48/11	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.56	03.21	04.57 20.36-20.49/13	06.30	07.56	08.33	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.23	05.00 20.34-20.50/16	06.33	07.59	08.37	10.03
	15.02	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03 20.33-20.51/18	06.35	08.02	08.40	10.05
	15.05	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06 20.33-20.51/18	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.24
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09 20.31-20.51/20	06.41	08.08	08.47	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12 20.31-20.51/20	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.15 20.31-20.51/20	06.47	08.14	08.53	10.11
	15.17	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.00	02.50	03.41	05.19 20.31-20.48/17	06.50	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.49	03.44	05.22 20.31-20.44/13	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.25 20.31-20.41/10	06.55	08.23	09.03	10.14
	15.27	17.08	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.47	15.10	14.23
21	09.35	07.59	06.22	05.32 20.28-20.31/3	03.51	02.49	03.50	05.28 20.32-20.38/6	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28 20.26-20.33/7	03.48	02.50	03.53	05.31 20.33-20.35/2	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.16	19.25	17.41	15.04	14.24
23	09.30	07.53	06.15	05.25 20.26-20.36/10	03.45	02.50	03.56	05.34	07.04	08.33	09.12	10.16
	15.36	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21 20.25-20.39/14	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18 20.25-20.42/17	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.14 20.25-20.45/20	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11 20.24-20.44/20	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.07 20.24-20.43/19	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04 20.24-20.43/19	03.27	02.57	04.15	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.47	14.30
30	09.10		06.50	05.01 20.25-20.42/17	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	146	37	0	0	189	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 10 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (244)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.50
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.21	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.39	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.57
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.01	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.33	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.34	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.30	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.55	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.05
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.11	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.53	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.55	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.21	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.15
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	23.00	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.25	10.16
	15.50	17.31	18.55	21.29	23.06	23.55	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.19	07.48	09.28	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 11 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (245)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.07	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.09	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.37
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.44	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.08	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.07	20.19	18.33	15.48	14.32
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.47	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.14	04.30	03.02	03.16	04.51	06.24	07.50	08.27	09.56
	14.54	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.28
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.39	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.47	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.26	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.25
14	09.52	08.23	06.47	05.57	04.13	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.12	06.44	08.11	08.50	10.09
	15.14	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.50	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.15	14.23
19	09.41	08.06	06.29	05.39	03.57	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.23	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	07.59	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.53	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.13	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.50	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	14.59	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.42	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.30	02.55	04.12	05.49	07.18	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.58	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	609	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 12 - GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (246)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.43	04.57	03.20	03.00	04.25	06.01	07.27	08.01	09.36
	14.36	16.06	17.37	20.10	21.42	23.20	23.50	22.28	20.40	18.54	16.08	14.43
2	10.12	09.01	07.29	06.39	04.54	03.17	03.00	04.28	06.04	07.30	08.04	09.39
	14.38	16.10	17.40	20.13	21.45	23.23	23.49	22.24	20.37	18.50	16.04	14.41
3	10.11	08.58	07.25	06.36	04.50	03.15	03.02	04.32	06.07	07.33	08.08	09.42
	14.40	16.13	17.43	20.16	21.48	23.26	23.47	22.21	20.33	18.47	16.01	14.39
4	10.10	08.55	07.22	06.32	04.47	03.12	03.04	04.35	06.10	07.36	08.11	09.44
	14.42	16.16	17.46	20.19	21.52	23.29	23.45	22.18	20.30	18.43	15.58	14.38
5	10.09	08.52	07.18	06.29	04.44	03.10	03.06	04.38	06.12	07.39	08.14	09.47
	14.45	16.20	17.49	20.22	21.55	23.31	23.43	22.14	20.26	18.40	15.55	14.36
6	10.07	08.49	07.15	06.25	04.40	03.08	03.09	04.41	06.15	07.42	08.17	09.49
	14.47	16.23	17.52	20.25	21.58	23.34	23.41	22.11	20.23	18.36	15.52	14.34
7	10.06	08.46	07.11	06.22	04.37	03.06	03.11	04.44	06.18	07.45	08.20	09.52
	14.49	16.26	17.55	20.28	22.01	23.36	23.39	22.08	20.19	18.33	15.48	14.33
8	10.04	08.42	07.08	06.18	04.33	03.04	03.13	04.48	06.21	07.48	08.24	09.54
	14.52	16.30	17.58	20.31	22.05	23.38	23.37	22.04	20.15	18.29	15.45	14.31
9	10.02	08.39	07.04	06.15	04.30	03.02	03.16	04.51	06.24	07.51	08.27	09.56
	14.55	16.33	18.01	20.34	22.08	23.41	23.35	22.01	20.12	18.26	15.42	14.30
10	10.00	08.36	07.01	06.11	04.27	03.00	03.18	04.54	06.27	07.53	08.30	09.59
	14.57	16.36	18.04	20.37	22.11	23.43	23.32	21.57	20.08	18.22	15.39	14.29
11	09.59	08.33	06.57	06.07	04.23	02.57	03.21	04.57	06.30	07.56	08.33	10.01
	15.00	16.40	18.07	20.40	22.14	23.45	23.30	21.54	20.05	18.19	15.36	14.27
12	09.57	08.29	06.54	06.04	04.20	02.55	03.24	05.00	06.33	07.59	08.37	10.03
	15.03	16.43	18.10	20.43	22.18	23.46	23.28	21.50	20.01	18.15	15.33	14.26
13	09.54	08.26	06.50	06.00	04.17	02.54	03.27	05.03	06.36	08.02	08.40	10.04
	15.06	16.46	18.13	20.46	22.21	23.48	23.25	21.47	19.58	18.12	15.30	14.26
14	09.52	08.23	06.47	05.57	04.14	02.53	03.29	05.06	06.38	08.05	08.43	10.06
	15.09	16.49	18.16	20.49	22.24	23.50	23.22	21.44	19.54	18.08	15.27	14.25
15	09.50	08.20	06.43	05.53	04.10	02.52	03.32	05.09	06.41	08.08	08.47	10.08
	15.12	16.53	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.05	15.24	14.24
16	09.48	08.16	06.40	05.50	04.07	02.51	03.35	05.13	06.44	08.11	08.50	10.09
	15.15	16.56	18.22	20.55	22.31	23.52	23.17	21.37	19.47	18.01	15.21	14.24
17	09.45	08.13	06.36	05.46	04.04	02.51	03.38	05.16	06.47	08.14	08.53	10.11
	15.18	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.58	15.18	14.23
18	09.43	08.10	06.33	05.43	04.01	02.50	03.41	05.19	06.50	08.17	08.56	10.12
	15.21	17.02	18.28	21.01	22.37	23.54	23.11	21.30	19.40	17.54	15.16	14.23
19	09.41	08.06	06.29	05.39	03.58	02.50	03.44	05.22	06.53	08.20	08.59	10.13
	15.24	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.13	14.23
20	09.38	08.03	06.26	05.36	03.54	02.50	03.47	05.25	06.56	08.24	09.03	10.14
	15.27	17.09	18.34	21.07	22.44	23.56	23.05	21.23	19.33	17.48	15.10	14.23
21	09.35	08.00	06.22	05.32	03.51	02.50	03.50	05.28	06.58	08.27	09.06	10.14
	15.30	17.12	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.29	03.48	02.50	03.54	05.31	07.01	08.30	09.09	10.15
	15.33	17.15	18.40	21.14	22.50	23.56	22.59	21.16	19.26	17.41	15.05	14.24
23	09.30	07.53	06.15	05.25	03.45	02.51	03.57	05.34	07.04	08.33	09.12	10.16
	15.37	17.18	18.43	21.17	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.22	03.42	02.51	04.00	05.37	07.07	08.36	09.15	10.16
	15.40	17.21	18.46	21.20	22.56	23.56	22.53	21.09	19.18	17.34	15.00	14.25
25	09.25	07.46	06.08	05.18	03.39	02.52	04.03	05.40	07.10	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.15	16.31	14.57	14.26
26	09.22	07.43	06.04	05.15	03.36	02.53	04.06	05.43	07.13	07.42	09.21	10.16
	15.46	17.28	18.52	21.26	23.03	23.55	22.47	21.02	19.11	16.27	14.55	14.27
27	09.19	07.39	06.01	05.11	03.33	02.54	04.09	05.46	07.16	07.45	09.24	10.16
	15.50	17.31	18.55	21.29	23.06	23.54	22.44	20.58	19.08	16.24	14.52	14.28
28	09.16	07.36	05.57	05.08	03.31	02.55	04.12	05.49	07.19	07.48	09.27	10.16
	15.53	17.34	18.58	21.32	23.09	23.54	22.41	20.54	19.04	16.21	14.50	14.29
29	09.13		06.54	05.04	03.28	02.57	04.16	05.52	07.21	07.52	09.30	10.15
	15.56		20.01	21.36	23.12	23.53	22.37	20.51	19.01	16.17	14.48	14.31
30	09.10		06.50	05.01	03.25	02.59	04.19	05.55	07.24	07.55	09.33	10.15
	16.00		20.04	21.39	23.15	23.51	22.34	20.47	18.57	16.14	14.46	14.32
31	09.07		06.47		03.22		04.22	05.58		07.58		10.14
	16.03		20.07		23.18		22.31	20.44		16.11		14.34
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 13 - PUU01

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.42
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.11	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.09	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.49	07.14	06.25	04.40	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.42	22.11	20.22	18.36	15.51	14.33
7	10.06	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.24	09.54
	14.51	16.29	17.58	20.30	22.04	23.39	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.01	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.59
	14.56	16.36	18.04	20.36	22.11	23.43	23.33	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.37	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.49	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.50	10.09
	15.14	16.55	18.22	20.55	22.31	23.53	23.17	21.36	19.47	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.47	08.14	08.53	10.11
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.44	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.15
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.57	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.16
	15.36	17.18	18.43	21.16	22.53	23.57	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.03	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.06	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.39	23.15	23.52	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.18		22.31	20.44		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 14 - PUU02

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.52	22.27	23.51	23.20	21.40	19.50	18.04	15.24	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.36	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.46	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.52	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.44	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 15 - PUU03

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.46	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.03
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.03	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.46	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.22	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.51	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 16 - PUU04

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.36
	14.36	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.30	08.04	09.39
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.40	16.12	17.43	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.30	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.46	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.27	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.38	05.15	06.47	08.14	08.53	10.10
	15.17	16.59	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.51	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.45	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.02	14.24
24	09.27	07.49	06.11	05.21	03.42	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.06	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.24	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.53	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.03		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 17 - PUU05

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.33	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.01	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.19	18.32	15.48	14.32
8	10.04	08.42	07.07	06.18	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.24	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.42	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.18	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.23	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.24	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.47	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.22	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.25	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.22	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.07	08.35	09.15	10.16
	15.39	17.21	18.46	21.19	22.56	23.56	22.53	21.08	19.18	17.34	14.59	14.24
25	09.24	07.45	06.07	05.18	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.43	17.24	18.49	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.11	03.33	02.53	04.09	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.50	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 18 - PUU06

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.13	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 19 - PUU07

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.49	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.29	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.52	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.55	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.11	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.08	23.41	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.22	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.01
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.54	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.47	23.28	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.23	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.54	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.20	21.40	19.50	18.04	15.23	14.23
16	09.48	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.55	22.30	23.53	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.13	06.36	05.46	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.54	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.12
	15.20	17.02	18.28	21.01	22.37	23.55	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.14
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.06	10.14
	15.29	17.11	18.37	21.10	22.47	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.33	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.39	09.18	10.16
	15.42	17.24	18.48	21.23	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.55	22.44	20.58	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.09	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.12	23.53	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.15	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.58		10.14
	16.02		20.06		23.17		22.31	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 20 - PUU08

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August	September		October	November	December
1	10.13	09.04	07.32		06.42	18.56-19.14/18	04.57	03.19	03.00	04.25	06.00		07.27	08.01	09.36
	14.36	16.06	17.36		20.09		21.41	23.20	23.50	22.27	20.40		18.53	16.07	14.43
2	10.12	09.01	07.28		06.39	18.58-19.13/15	04.53	03.17	03.00	04.28	06.03		07.30	08.04	09.38
	14.38	16.09	17.39		20.12		21.45	23.23	23.48	22.24	20.36		18.50	16.04	14.41
3	10.11	08.58	07.25		06.35	18.59-19.10/11	04.50	03.14	03.02	04.31	06.06		07.32	08.07	09.41
	14.40	16.12	17.42		20.15		21.48	23.25	23.46	22.20	20.33		18.46	16.01	14.39
4	10.09	08.54	07.21		06.32	19.03-19.07/4	04.46	03.12	03.04	04.34	06.09		07.35	08.10	09.44
	14.42	16.16	17.46		20.18		21.51	23.28	23.45	22.17	20.29		18.43	15.57	14.37
5	10.08	08.51	07.18		06.28		04.43	03.09	03.06	04.37	06.12		07.38	08.14	09.46
	14.44	16.19	17.49		20.21		21.54	23.31	23.43	22.14	20.26		18.39	15.54	14.35
6	10.07	08.48	07.14		06.25		04.40	03.07	03.08	04.41	06.15		07.41	08.17	09.49
	14.46	16.22	17.52		20.24		21.58	23.33	23.41	22.10	20.22		18.36	15.51	14.34
7	10.05	08.45	07.11		06.21		04.36	03.05	03.10	04.44	06.18		07.44	08.20	09.51
	14.49	16.26	17.55		20.27		22.01	23.36	23.39	22.07	20.18		18.32	15.48	14.32
8	10.04	08.42	07.07		06.18		04.33	03.03	03.13	04.47	06.21	18.58-19.00/2	07.47	08.23	09.54
	14.51	16.29	17.58		20.30		22.04	23.38	23.37	22.04	20.15		18.29	15.45	14.30
9	10.02	08.39	07.04		06.14		04.30	03.01	03.15	04.50	06.24	18.53-19.04/11	07.50	08.26	09.56
	14.54	16.32	18.01		20.33		22.07	23.40	23.34	22.00	20.11		18.25	15.42	14.29
10	10.00	08.35	07.00		06.10		04.26	02.58	03.18	04.53	06.26	18.50-19.05/15	07.53	08.30	09.58
	14.57	16.36	18.04		20.36		22.11	23.42	23.32	21.57	20.08		18.22	15.39	14.28
11	09.58	08.32	06.57		06.07		04.23	02.56	03.20	04.56	06.29	18.49-19.06/17	07.56	08.33	10.00
	14.59	16.39	18.07		20.39		22.14	23.44	23.30	21.53	20.04		18.18	15.35	14.27
12	09.56	08.29	06.53		06.03		04.20	02.55	03.23	05.00	06.32	18.48-19.07/19	07.59	08.36	10.02
	15.02	16.42	18.10		20.42		22.17	23.46	23.27	21.50	20.01		18.15	15.32	14.26
13	09.54	08.26	06.50		06.00		04.16	02.53	03.26	05.03	06.35	18.47-19.07/20	08.02	08.40	10.04
	15.05	16.45	18.13		20.45		22.20	23.48	23.25	21.46	19.57		18.11	15.29	14.25
14	09.52	08.22	06.46		05.56		04.13	02.52	03.29	05.06	06.38	18.46-19.08/22	08.05	08.43	10.06
	15.08	16.49	18.16		20.48		22.24	23.49	23.22	21.43	19.54		18.08	15.26	14.24
15	09.50	08.19	06.43		05.53		04.10	02.51	03.32	05.09	06.41	18.45-19.07/22	08.08	08.46	10.07
	15.11	16.52	18.19		20.51		22.27	23.51	23.19	21.40	19.50		18.04	15.24	14.24
16	09.47	08.16	06.39		05.49		04.06	02.51	03.35	05.12	06.44	18.45-19.06/21	08.11	08.49	10.09
	15.14	16.55	18.22		20.54		22.30	23.52	23.16	21.36	19.46		18.01	15.21	14.23
17	09.45	08.12	06.36		05.46		04.03	02.50	03.38	05.15	06.46	18.45-19.05/20	08.14	08.52	10.10
	15.17	16.58	18.25		20.58		22.33	23.53	23.14	21.33	19.43		17.57	15.18	14.23
18	09.43	08.09	06.32		05.42		04.00	02.49	03.41	05.18	06.49	18.46-19.02/16	08.17	08.56	10.11
	15.20	17.02	18.28		21.01		22.37	23.54	23.11	21.29	19.39		17.54	15.15	14.22
19	09.40	08.06	06.29		05.39		03.57	02.49	03.44	05.21	06.52	18.46-18.58/12	08.20	08.59	10.12
	15.23	17.05	18.31		21.04		22.40	23.55	23.08	21.26	19.36		17.50	15.12	14.22
20	09.38	08.02	06.25		05.35		03.54	02.49	03.47	05.24	06.55	18.46-18.54/8	08.23	09.02	10.13
	15.26	17.08	18.34		21.07		22.43	23.55	23.05	21.22	19.32		17.47	15.09	14.23
21	09.35	07.59	06.21		05.32		03.51	02.49	03.50	05.27	06.58	18.48-18.50/2	08.26	09.05	10.14
	15.30	17.11	18.37		21.10		22.46	23.56	23.02	21.19	19.29		17.44	15.07	14.23
22	09.32	07.56	06.18	18.04-18.05/1	05.28		03.48	02.49	03.53	05.30	07.01		08.29	09.09	10.15
	15.33	17.14	18.40		21.13		22.50	23.56	22.59	21.15	19.25		17.40	15.04	14.23
23	09.30	07.52	06.14	18.01-18.07/6	05.25		03.45	02.50	03.56	05.33	07.04		08.32	09.12	10.15
	15.36	17.18	18.43		21.16		22.53	23.56	22.56	21.12	19.21		17.37	15.01	14.24
24	09.27	07.49	06.11	17.59-18.10/11	05.21		03.42	02.51	03.59	05.36	07.07		08.35	09.15	10.15
	15.39	17.21	18.45		21.19		22.56	23.56	22.53	21.08	19.18		17.34	14.59	14.24
25	09.24	07.45	06.07	17.58-18.13/15	05.18		03.39	02.51	04.02	05.39	07.09		07.38	09.18	10.16
	15.43	17.24	18.48		21.22		22.59	23.55	22.50	21.05	19.14		16.30	14.56	14.25
26	09.21	07.42	06.04	17.57-18.16/19	05.14		03.36	02.52	04.05	05.42	07.12		07.42	09.21	10.16
	15.46	17.27	18.51		21.26		23.02	23.55	22.46	21.01	19.11		16.27	14.54	14.26
27	09.18	07.39	06.00	17.56-18.18/22	05.11		03.33	02.53	04.09	05.45	07.15		07.45	09.24	10.16
	15.49	17.30	18.54		21.29		23.05	23.54	22.43	20.57	19.07		16.23	14.52	14.27
28	09.16	07.35	05.57	17.55-18.17/22	05.07		03.30	02.55	04.12	05.48	07.18		07.48	09.27	10.15
	15.53	17.33	18.57		21.32		23.08	23.53	22.40	20.54	19.04		16.20	14.49	14.29
29	09.13		06.53	18.56-19.17/21	05.04		03.27	02.56	04.15	05.51	07.21		07.51	09.30	10.15
	15.56		20.00		21.35		23.11	23.52	22.37	20.50	19.00		16.17	14.47	14.30
30	09.10		06.50	18.55-19.16/21	05.00		03.24	02.58	04.18	05.54	07.24		07.54	09.33	10.14
	15.59		20.03		21.38		23.14	23.51	22.34	20.47	18.57		16.14	14.45	14.32
31	09.07		06.46	18.56-19.16/20			03.22		04.21	05.57			07.57		10.14
	16.02		20.06				23.17		22.30	20.43			16.10		14.33
Potential sun hours	171	238	363		451		570	624	609	508	393		305	198	137
Sum of minutes with flicker	0	0	158		48		0	0	0	0	207		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 21 - PUU09

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 20.06-20.20/14	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 20.08-20.18/10	03.16	03.01	04.28	06.03	07.30	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.12	03.03	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.18	04.53 20.18-20.23/5	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 20.15-20.27/12	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19	02.55	03.23	04.59 20.13-20.29/16	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03 20.12-20.30/18	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06 20.10-20.30/20	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 20.11-20.13/2	04.10	02.51	03.32	05.09 20.09-20.31/22	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 20.09-20.16/7	04.06	02.50	03.34	05.12 20.09-20.32/23	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 20.06-20.18/12	04.03	02.50	03.37	05.15 20.07-20.31/24	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.43	08.09	06.32	05.42 20.05-20.21/16	04.00	02.49	03.40	05.18 20.07-20.32/25	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.39 20.04-20.25/21	03.57	02.49	03.43	05.21 20.07-20.32/25	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35 20.02-20.25/23	03.54	02.49	03.47	05.24 20.07-20.32/25	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 20.02-20.26/24	03.51	02.49	03.50	05.27 20.06-20.31/25	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 20.02-20.26/24	03.47	02.49	03.53	05.30 20.06-20.30/24	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 20.01-20.26/25	03.44	02.50	03.56	05.33 20.07-20.30/23	07.04	08.32	09.12	10.15
	15.36	17.18	18.43	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 20.01-20.25/24	03.41	02.50	03.59	05.36 20.08-20.28/20	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 20.01-20.25/24	03.38	02.51	04.02	05.39 20.08-20.24/16	07.09	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 20.01-20.25/24	03.36	02.52	04.05	05.42 20.09-20.21/12	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.11 20.01-20.24/23	03.33	02.53	04.09	05.45 20.11-20.18/7	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 20.02-20.24/22	03.30	02.55	04.12	05.48 20.14-20.15/1	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 20.03-20.23/20	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 20.04-20.22/18	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	309	24	0	0	343	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 22 - PUU10

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.39
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.47	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.10	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.29	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.54	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.40	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.39	06.00	05.10	03.33	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 23 - PUU11

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.42	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.21	20.33	18.46	16.00	14.38
4	10.10	08.55	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.14	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.34	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.52
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.27	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.36	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.43	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.40	10.04
	15.05	16.45	18.13	20.45	22.21	23.48	23.25	21.47	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.08
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.53	10.10
	15.17	16.58	18.25	20.58	22.34	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.13
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.05	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.19	07.39	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.57	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.16
	15.52	17.33	18.57	21.32	23.08	23.54	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.15
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 24 - PUU12

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27 17.44-18.09/25	08.01	09.36
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29 17.44-18.08/24	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32 17.45-18.06/21	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.01	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35 17.46-18.03/17	08.10	09.44
	14.42	16.16	17.46	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38 17.48-18.00/12	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.26	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41 17.51-17.56/5	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.36	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07 17.12-17.21/9	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.29	15.45	14.30
9	10.02	08.39	07.04 17.09-17.24/15	06.14	04.30	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00 17.08-17.28/20	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.39	14.28
11	09.58	08.32	06.57 17.06-17.29/23	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53 17.06-17.30/24	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50 17.04-17.30/26	06.00	04.16	02.53	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46 17.03-17.30/27	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43 17.03-17.30/27	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39 17.03-17.30/27	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36 17.02-17.29/27	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32 17.03-17.29/26	05.42	04.00	02.49	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.29 17.02-17.28/26	05.39	03.57	02.49	03.44	05.21	06.52 17.59-18.04/5	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25 17.04-17.27/23	05.35	03.54	02.49	03.47	05.24	06.55 17.54-18.07/13	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21 17.04-17.25/21	05.32	03.51	02.49	03.50	05.27	06.58 17.51-18.09/18	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18 17.06-17.24/18	05.28	03.48	02.49	03.53	05.30	07.01 17.49-18.10/21	08.29	09.08	10.15
	15.33	17.14	18.40	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14 17.07-17.22/15	05.25	03.45	02.50	03.56	05.33	07.04 17.48-18.11/23	08.32	09.12	10.15
	15.36	17.18	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11 17.10-17.18/8	05.21	03.42	02.51	03.59	05.36	07.06 17.47-18.11/24	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.18	03.39	02.51	04.02	05.39	07.09 17.46-18.12/26	07.38	09.18	10.16
	15.43	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12 17.45-18.12/27	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15 17.44-18.11/27	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18 17.43-18.11/28	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04	03.27	02.56	04.15	05.51	07.21 17.43-18.10/27	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24 17.43-18.10/27	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	362	0	0	0	0	0	266	104	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 25 - PUU13

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57 19.33-20.05/32	03.19	02.59	04.25	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53 19.34-20.05/31	03.16	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.41
3	10.11	08.58	07.25	06.35	04.50 19.35-20.04/29	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46 19.35-20.03/28	03.12	03.03	04.34 19.54-20.03/9	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43 19.37-20.01/24	03.09	03.05	04.37 19.51-20.06/15	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.25	04.40 19.38-20.00/22	03.07	03.08	04.40 19.49-20.08/19	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 19.40-19.58/18	03.05	03.10	04.44 19.47-20.09/22	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33 19.42-19.55/13	03.03	03.12	04.47 19.45-20.11/26	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.45	14.30
9	10.02	08.39	07.04	06.14	04.29 19.47-19.50/3	03.01	03.15	04.50 19.44-20.12/28	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53 19.42-20.12/30	06.26	07.53	08.30	09.58
	14.56	16.36	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56 19.42-20.13/31	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03 19.47-19.58/11	04.19	02.55	03.23	04.59 19.41-20.14/33	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00 19.44-20.02/18	04.16	02.53	03.26	05.03 19.40-20.14/34	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56 19.40-20.03/23	04.13	02.52	03.29	05.06 19.39-20.14/35	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53 19.39-20.05/26	04.10	02.51	03.32	05.09 19.39-20.14/35	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49 19.38-20.06/28	04.06	02.50	03.34	05.12 19.39-20.15/36	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46 19.36-20.06/30	04.03	02.50	03.37	05.15 19.37-20.14/37	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42 19.35-20.07/32	04.00	02.49	03.40	05.18 19.37-20.14/37	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38 19.34-20.08/34	03.57	02.49	03.43	05.21 19.37-20.14/37	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 19.33-20.08/35	03.54	02.49	03.47	05.24 19.37-20.14/37	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31 19.32-20.08/36	03.51	02.49	03.50	05.27 19.37-20.13/36	06.58	08.26	09.05	10.14
	15.29	17.11	18.37	21.10	22.46	23.56	23.02	21.19	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28 19.32-20.09/37	03.47	02.49	03.53	05.30 19.37-20.13/36	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24 19.32-20.09/37	03.44	02.50	03.56	05.33 19.38-20.12/34	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21 19.31-20.08/37	03.41	02.50	03.59	05.36 19.38-20.12/34	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17 19.31-20.08/37	03.38	02.51	04.02	05.39 19.38-20.10/32	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14 19.31-20.08/37	03.36	02.52	04.05	05.42 19.39-20.09/30	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10 19.31-20.07/36	03.33	02.53	04.09	05.45 19.40-20.08/28	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.16	07.35	05.57	05.07 19.32-20.07/35	03.30	02.55	04.12	05.48 19.41-20.07/26	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.13		06.53	05.04 19.32-20.07/35	03.27	02.56	04.15	05.51 19.41-20.04/23	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00 19.32-20.06/34	03.24	02.58	04.18	05.54 19.44-20.01/17	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.22		04.21	05.57 19.47-19.58/11		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	598	200	0	0	808	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 26 - PUU14

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.57	03.19	02.59	04.24	06.00	07.27	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.04	09.39
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.50	16.04	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.39
4	10.10	08.54	07.21	06.32	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.47
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.04	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.08	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.40	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.36	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.01	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.44	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.53	05.30	07.01	08.29	09.09	10.15
	15.33	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.04	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.12	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.42	09.21	10.16
	15.46	17.27	18.51	21.26	23.02	23.55	22.47	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 27 - PUU15

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.04	07.32	06.42	04.57	03.19	03.00	04.25	06.00	07.27	08.01	09.35
	14.36	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.01	07.28	06.39	04.53	03.17	03.00	04.28	06.03	07.29	08.04	09.38
	14.38	16.09	17.39	20.12	21.45	23.22	23.48	22.24	20.36	18.50	16.04	14.41
3	10.10	08.57	07.25	06.35	04.50	03.14	03.02	04.31	06.06	07.32	08.07	09.41
	14.40	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.12	03.04	04.34	06.09	07.35	08.10	09.44
	14.42	16.16	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.43	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.06	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.49	20.21	21.54	23.30	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.25	04.40	03.07	03.08	04.41	06.15	07.41	08.17	09.49
	14.46	16.22	17.52	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.34
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.49	16.26	17.55	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.13	04.47	06.21	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.45	14.31
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.42	14.29
10	10.00	08.35	07.00	06.10	04.26	02.58	03.18	04.53	06.26	07.53	08.30	09.58
	14.57	16.36	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.22	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.20	02.55	03.23	05.00	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.01	18.15	15.32	14.26
13	09.54	08.26	06.50	06.00	04.16	02.54	03.26	05.03	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13	02.52	03.29	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.08	15.26	14.24
15	09.49	08.19	06.43	05.53	04.10	02.51	03.32	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.24	14.24
16	09.47	08.16	06.39	05.49	04.06	02.51	03.35	05.12	06.44	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.21	14.23
17	09.45	08.12	06.36	05.46	04.03	02.50	03.38	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.23
18	09.42	08.09	06.32	05.42	04.00	02.50	03.41	05.18	06.49	08.17	08.56	10.11
	15.20	17.02	18.28	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.23
19	09.40	08.06	06.28	05.39	03.57	02.49	03.44	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.54	23.08	21.25	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54	02.49	03.47	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.34	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.23
21	09.35	07.59	06.21	05.32	03.51	02.49	03.50	05.27	06.58	08.26	09.05	10.14
	15.30	17.11	18.37	21.10	22.46	23.55	23.02	21.18	19.29	17.44	15.07	14.23
22	09.32	07.56	06.18	05.28	03.48	02.50	03.53	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.45	02.50	03.56	05.33	07.04	08.32	09.11	10.15
	15.36	17.18	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.42	02.51	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.39	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.43	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.36	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.11	03.33	02.54	04.09	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.52	14.27
28	09.15	07.35	05.57	05.07	03.30	02.55	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.29
29	09.12		06.53	05.04	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.58	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.57	16.14	14.45	14.32
31	09.07		06.46		03.22		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 28 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April		May		June	
1	10.13	09.04	07.32	06.42		04.57	18.27-19.39/72	03.19	18.40-19.31/51
	14.35	16.06	17.36	20.09		21.41		23.20	
2	10.12	09.01	07.28	06.39		04.53	18.27-19.39/72	03.16	18.40-19.30/50
	14.37	16.09	17.39	20.12		21.45		23.23	
3	10.11	08.57	07.25	06.35		04.50	18.27-19.39/72	03.14	18.42-19.30/48
	14.39	16.12	17.42	20.15		21.48		23.25	
4	10.09	08.54	07.21	06.32		04.46	18.27-19.39/72	03.12	18.42-19.29/47
	14.42	16.16	17.45	20.18		21.51		23.28	
5	10.08	08.51	07.18	06.28		04.43	18.27-19.39/72	03.09	18.43-19.29/46
	14.44	16.19	17.48	20.21		21.54		23.31	
6	10.07	08.48	07.14	06.25		04.39	18.26-19.39/73	03.07	18.43-19.28/45
	14.46	16.22	17.52	20.24		21.57		23.33	
7	10.05	08.45	07.11	06.21		04.36	18.26-19.39/73	03.05	18.45-19.28/43
	14.49	16.26	17.55	20.27		22.01		23.36	
8	10.03	08.42	07.07	06.17		04.33	18.26-19.38/72	03.03	18.45-19.28/43
	14.51	16.29	17.58	20.30		22.04		23.38	
9	10.02	08.39	07.04	06.14	19.02-19.11/9	04.29	18.26-19.38/72	03.01	18.46-19.28/42
	14.54	16.32	18.01	20.33		22.07		23.40	
10	10.00	08.35	07.00	06.10	18.56-19.18/22	04.26	18.26-19.38/72	02.58	18.47-19.27/40
	14.56	16.36	18.04	20.36		22.10		23.42	
11	09.58	08.32	06.57	06.07	18.52-19.22/30	04.23	18.26-19.37/71	02.56	18.48-19.27/39
	14.59	16.39	18.07	20.39		22.14		23.44	
12	09.56	08.29	06.53	06.03	18.48-19.24/36	04.19	18.27-19.38/71	02.55	18.48-19.27/39
	15.02	16.42	18.10	20.42		22.17		23.46	
13	09.54	08.26	06.50	06.00	18.46-19.27/41	04.16	18.27-19.37/70	02.53	18.50-19.27/37
	15.05	16.45	18.13	20.45		22.20		23.48	
14	09.52	08.22	06.46	05.56	18.43-19.28/45	04.13	18.27-19.36/69	02.52	18.50-19.26/36
	15.08	16.49	18.16	20.48		22.24		23.49	
15	09.49	08.19	06.43	05.53	18.42-19.30/48	04.10	18.28-19.37/69	02.51	18.51-19.27/36
	15.11	16.52	18.19	20.51		22.27		23.51	
16	09.47	08.16	06.39	05.49	18.40-19.31/51	04.06	18.28-19.36/68	02.50	18.51-19.26/35
	15.14	16.55	18.22	20.54		22.30		23.52	
17	09.45	08.12	06.36	05.46	18.38-19.32/54	04.03	18.29-19.36/67	02.50	18.51-19.26/35
	15.17	16.58	18.25	20.57		22.33		23.53	
18	09.42	08.09	06.32	05.42	18.37-19.33/56	04.00	18.29-19.35/66	02.49	18.52-19.27/35
	15.20	17.02	18.28	21.00		22.37		23.54	
19	09.40	08.06	06.28	05.38	18.36-19.34/58	03.57	18.30-19.36/66	02.49	18.52-19.27/35
	15.23	17.05	18.31	21.04		22.40		23.55	
20	09.37	08.02	06.25	05.35	18.34-19.34/60	03.54	18.30-19.35/65	02.49	18.53-19.27/34
	15.26	17.08	18.34	21.07		22.43		23.55	
21	09.35	07.59	06.21	05.31	18.33-19.35/62	03.51	18.31-19.35/64	02.49	18.53-19.27/34
	15.29	17.11	18.36	21.10		22.46		23.56	
22	09.32	07.56	06.18	05.28	18.32-19.36/64	03.47	18.32-19.35/63	02.49	18.53-19.27/34
	15.33	17.14	18.39	21.13		22.49		23.56	
23	09.29	07.52	06.14	05.24	18.32-19.37/65	03.44	18.32-19.33/61	02.50	18.54-19.28/34
	15.36	17.17	18.42	21.16		22.53		23.56	
24	09.27	07.49	06.11	05.21	18.30-19.37/67	03.41	18.33-19.33/60	02.50	18.53-19.28/35
	15.39	17.21	18.45	21.19		22.56		23.56	
25	09.24	07.45	06.07	05.17	18.29-19.37/68	03.38	18.34-19.33/59	02.51	18.54-19.28/34
	15.42	17.24	18.48	21.22		22.59		23.55	
26	09.21	07.42	06.04	05.14	18.29-19.38/69	03.36	18.35-19.33/58	02.52	18.53-19.28/35
	15.46	17.27	18.51	21.25		23.02		23.55	
27	09.18	07.38	06.00	05.10	18.29-19.38/69	03.33	18.36-19.32/56	02.53	18.53-19.29/36
	15.49	17.30	18.54	21.29		23.05		23.54	
28	09.15	07.35	05.57	05.07	18.28-19.38/70	03.30	18.36-19.32/56	02.55	18.53-19.30/37
	15.52	17.33	18.57	21.32		23.08		23.53	
29	09.13		06.53	05.04	18.28-19.39/71	03.27	18.37-19.32/55	02.56	18.53-19.30/37
	15.56		20.00	21.35		23.11		23.52	
30	09.10		06.49	05.00	18.27-19.39/72	03.24	18.38-19.31/53	02.58	18.53-19.31/38
	15.59		20.03	21.38		23.14		23.51	
31	09.07		06.46			03.22	18.38-19.30/52		
	16.02		20.06			23.17			
Potential sun hours	171	238	363	451		570		624	
Sum of minutes with flicker	0	0	0	1187		2041		1170	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 28 - PUU16

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59 23.49	18.52-19.31/39	04.25 22.27	18.37-19.48/71	06.00 20.40	18.51-19.21/30	07.27 18.53	08.01 16.07	09.36 14.43
2	03.01 23.48	18.52-19.32/40	04.28 22.24	18.37-19.48/71	06.03 20.36	18.54-19.16/22	07.29 18.50	08.04 16.04	09.38 14.41
3	03.01 23.46	18.52-19.33/41	04.31 22.20	18.36-19.48/72	06.06 20.33	19.00-19.09/9	07.32 18.46	08.07 16.00	09.41 14.39
4	03.03 23.45	18.51-19.33/42	04.34 22.17	18.36-19.48/72	06.09 20.29		07.35 18.42	08.10 15.57	09.44 14.37
5	03.05 23.43	18.50-19.33/43	04.37 22.14	18.36-19.48/72	06.12 20.25		07.38 18.39	08.13 15.54	09.46 14.35
6	03.08 23.41	18.50-19.35/45	04.40 22.10	18.36-19.49/73	06.15 20.22		07.41 18.35	08.17 15.51	09.49 14.33
7	03.10 23.39	18.50-19.36/46	04.44 22.07	18.35-19.48/73	06.18 20.18		07.44 18.32	08.20 15.48	09.51 14.32
8	03.12 23.37	18.49-19.36/47	04.47 22.04	18.36-19.48/72	06.20 20.15		07.47 18.28	08.23 15.45	09.54 14.30
9	03.15 23.34	18.49-19.37/48	04.50 22.00	18.36-19.48/72	06.23 20.11		07.50 18.25	08.26 15.41	09.56 14.29
10	03.18 23.32	18.49-19.37/48	04.53 21.57	18.35-19.47/72	06.26 20.08		07.53 18.21	08.30 15.38	09.58 14.28
11	03.20 23.30	18.48-19.38/50	04.56 21.53	18.35-19.47/72	06.29 20.04		07.56 18.18	08.33 15.35	10.00 14.27
12	03.23 23.27	18.48-19.39/51	04.59 21.50	18.35-19.47/72	06.32 20.01		07.59 18.14	08.36 15.32	10.02 14.26
13	03.26 23.24	18.47-19.40/53	05.03 21.46	18.36-19.47/71	06.35 19.57		08.02 18.11	08.39 15.29	10.04 14.25
14	03.29 23.22	18.46-19.40/54	05.06 21.43	18.35-19.46/71	06.38 19.53		08.05 18.08	08.43 15.26	10.06 14.24
15	03.32 23.19	18.46-19.41/55	05.09 21.39	18.35-19.46/71	06.41 19.50		08.08 18.04	08.46 15.23	10.07 14.23
16	03.34 23.16	18.45-19.41/56	05.12 21.36	18.36-19.45/69	06.43 19.46		08.11 18.01	08.49 15.21	10.09 14.23
17	03.37 23.14	18.44-19.42/58	05.15 21.32	18.35-19.44/69	06.46 19.43		08.14 17.57	08.52 15.18	10.10 14.23
18	03.40 23.11	18.44-19.42/58	05.18 21.29	18.36-19.43/67	06.49 19.39		08.17 17.54	08.56 15.15	10.11 14.22
19	03.43 23.08	18.44-19.43/59	05.21 21.26	18.37-19.43/66	06.52 19.36		08.20 17.50	08.59 15.12	10.12 14.22
20	03.47 23.05	18.43-19.43/60	05.24 21.22	18.37-19.42/65	06.55 19.32		08.23 17.47	09.02 15.09	10.13 14.22
21	03.50 23.02	18.42-19.44/62	05.27 21.19	18.37-19.41/64	06.58 19.28		08.26 17.44	09.05 15.07	10.14 14.23
22	03.53 22.59	18.42-19.45/63	05.30 21.15	18.38-19.40/62	07.01 19.25		08.29 17.40	09.08 15.04	10.15 14.23
23	03.56 22.56	18.41-19.45/64	05.33 21.11	18.39-19.39/60	07.04 19.21		08.32 17.37	09.12 15.01	10.15 14.24
24	03.59 22.53	18.41-19.46/65	05.36 21.08	18.40-19.38/58	07.06 19.18		08.35 17.33	09.15 14.59	10.15 14.24
25	04.02 22.50	18.40-19.46/66	05.39 21.04	18.40-19.36/56	07.09 19.14		07.38 16.30	09.18 14.56	10.16 14.25
26	04.05 22.46	18.40-19.47/67	05.42 21.01	18.41-19.34/53	07.12 19.11		07.41 16.27	09.21 14.54	10.16 14.26
27	04.09 22.43	18.39-19.46/67	05.45 20.57	18.42-19.33/51	07.15 19.07		07.45 16.23	09.24 14.51	10.15 14.27
28	04.12 22.40	18.39-19.47/68	05.48 20.54	18.44-19.31/47	07.18 19.04		07.48 16.20	09.27 14.49	10.15 14.29
29	04.15 22.37	18.38-19.47/69	05.51 20.50	18.44-19.28/44	07.21 19.00		07.51 16.17	09.30 14.47	10.15 14.30
30	04.18 22.34	18.38-19.48/70	05.54 20.47	18.46-19.26/40	07.24 18.57		07.54 16.13	09.33 14.45	10.14 14.31
31	04.21 22.30	18.38-19.48/70	05.57 20.43	18.48-19.24/36			07.57 16.10		10.14 14.33
Potential sun hours	609		509		393		305	198	137
Sum of minutes with flicker	1724		1984		61		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 29 - PUU17

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.32	06.42	04.56	03.19 21.26-21.38/12	02.59	04.24 21.34-21.37/3	06.00	07.26	08.01	09.36
	14.35	16.06	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16 21.27-21.37/10	03.01	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.04	14.40
3	10.11	08.57	07.25	06.35	04.50	03.14 21.28-21.36/8	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.33	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11 21.30-21.35/5	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.44	06.18	07.44	08.20	09.51
	14.48	16.26	17.55	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12 21.38-21.40/2	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.58	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15 21.36-21.43/7	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17 21.35-21.44/9	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 21.24-21.25/1	02.56	03.20 21.34-21.46/12	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 21.24-21.28/4	02.54	03.23 21.33-21.46/13	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16 21.22-21.31/9	02.53	03.26 21.32-21.46/14	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.21-21.33/12	02.52	03.28 21.32-21.48/16	05.06	06.38	08.05	08.43	10.06
	15.08	16.49	18.16	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.53	04.09 21.21-21.36/15	02.51	03.31 21.32-21.49/17	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.20-21.38/18	02.50	03.34 21.31-21.49/18	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.20-21.40/20	02.49	03.37 21.31-21.49/18	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.20-21.41/21	02.49	03.40 21.30-21.50/20	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.28	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57 21.19-21.40/21	02.49	03.43 21.31-21.51/20	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.31	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 21.20-21.41/21	02.49	03.46 21.30-21.51/21	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.20-21.41/21	02.49	03.49 21.30-21.51/21	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47 21.19-21.41/22	02.49	03.53 21.30-21.51/21	05.30	07.01	08.29	09.08	10.15
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44 21.20-21.41/21	02.49	03.56 21.30-21.51/21	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 21.20-21.41/21	02.50	03.59 21.30-21.51/21	05.36	07.06	08.35	09.15	10.15
	15.39	17.21	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.21-21.41/20	02.51	04.02 21.30-21.51/21	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35 21.21-21.41/20	02.52	04.05 21.30-21.51/21	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32 21.22-21.40/18	02.53	04.08 21.31-21.50/19	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30 21.23-21.40/17	02.54	04.12 21.31-21.48/17	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27 21.23-21.39/16	02.56	04.15 21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24 21.24-21.39/15	02.57	04.18 21.32-21.43/11	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.57	16.13	14.45	14.31
31	09.07		06.46		03.21 21.24-21.38/14		04.21 21.33-21.40/7	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	347	35	381	3	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 30 - PUU18

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.01	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.58	07.25	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.33	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.58	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.33	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.04	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.01	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.11	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.50	06.00	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.43	05.52	04.09	02.51	03.31	05.09	06.41	08.08	08.46	10.07
	15.10	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.17	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.25	20.57	22.33	23.53	23.14	21.33	19.43	17.57	15.17	14.22
18	09.43	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.04	22.40	23.55	23.08	21.26	19.36	17.50	15.12	14.22
20	09.38	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.19	19.28	17.43	15.06	14.22
22	09.32	07.56	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.30	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.16	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.13		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 31 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June
1	10.12	09.03		07.31	10.17-11.31/74	06.42		04.57	20.16-20.31/15	03.19
	14.35	16.06		17.36		20.09		21.41		23.20
2	10.11	09.00		07.28	10.17-11.31/74	06.39		04.53	20.18-20.29/11	03.16
	14.37	16.09		17.39		20.12		21.44		23.22
3	10.10	08.57		07.25	10.16-11.30/74	06.35		04.50	20.20-20.26/6	03.14
	14.39	16.12		17.42		20.15		21.48		23.25
4	10.09	08.54		07.21	10.16-11.31/75	06.32		04.46		03.12
	14.42	16.16		17.45		20.18		21.51		23.28
5	10.08	08.51		07.18	10.15-11.31/76	06.28		04.43		03.09
	14.44	16.19		17.48		20.21		21.54		23.30
6	10.06	08.48		07.14	10.15-11.30/75	06.24		04.39		03.07
	14.46	16.22		17.51		20.24		21.57		23.33
7	10.05	08.45		07.11	10.15-11.31/76	06.21		04.36		03.05
	14.49	16.26		17.55		20.27		22.01		23.35
8	10.03	08.42		07.07	10.14-11.30/76	06.17		04.33		03.03
	14.51	16.29		17.58		20.30		22.04		23.38
9	10.02	08.38		07.04	10.14-11.30/76	06.14		04.29		03.01
	14.54	16.32		18.01		20.33		22.07		23.40
10	10.00	08.35	10.48-11.03/15	07.00	10.15-11.30/75	06.10		04.26		02.58
	14.56	16.35		18.04		20.36		22.10		23.42
11	09.58	08.32	10.43-11.08/25	06.57	10.14-11.29/75	06.07		04.23		02.56
	14.59	16.39		18.07		20.39		22.14		23.44
12	09.56	08.29	10.40-11.12/32	06.53	10.15-11.29/74	06.03		04.19		02.55
	15.02	16.42		18.10		20.42		22.17		23.46
13	09.54	08.25	10.37-11.14/37	06.50	10.15-11.28/73	06.00		04.16		02.53
	15.05	16.45		18.13		20.45		22.20		23.47
14	09.52	08.22	10.34-11.16/42	06.46	10.14-11.27/73	05.56		04.13		02.52
	15.08	16.49		18.16		20.48		22.23		23.49
15	09.49	08.19	10.32-11.18/46	06.43	10.15-11.26/71	05.53		04.10		02.51
	15.11	16.52		18.19		20.51		22.27		23.50
16	09.47	08.16	10.31-11.20/49	06.39	10.15-11.25/70	05.49		04.06		02.50
	15.14	16.55		18.22		20.54		22.30		23.52
17	09.45	08.12	10.29-11.22/53	06.35	10.15-11.23/68	05.45		04.03		02.50
	15.17	16.58		18.25		20.57		22.33		23.53
18	09.42	08.09	10.27-11.23/56	06.32	10.16-11.23/67	05.42		04.00		02.49
	15.20	17.01		18.28		21.00		22.36		23.54
19	09.40	08.06	10.27-11.25/58	06.28	10.16-11.21/65	05.38	20.21-20.25/4	03.57		02.49
	15.23	17.05		18.30		21.03		22.40		23.54
20	09.37	08.02	10.25-11.25/60	06.25	10.18-11.20/62	05.35	20.18-20.27/9	03.54		02.49
	15.26	17.08		18.33		21.07		22.43		23.55
21	09.35	07.59	10.24-11.26/62	06.21	10.18-11.18/60	05.31	20.17-20.30/13	03.51		02.49
	15.29	17.11		18.36		21.10		22.46		23.55
22	09.32	07.55	10.22-11.27/65	06.18	10.20-11.16/56	05.28	20.16-20.33/17	03.47		02.49
	15.33	17.14		18.39		21.13		22.49		23.56
23	09.29	07.52	10.22-11.28/66	06.14	10.20-11.14/54	05.24	20.16-20.36/20	03.44		02.50
	15.36	17.17		18.42		21.16		22.52		23.56
24	09.27	07.49	10.21-11.29/68	06.11	10.21-11.11/50	05.21	20.15-20.35/20	03.41		02.50
	15.39	17.21		18.45		21.19		22.56		23.55
25	09.24	07.45	10.19-11.29/70	06.07	10.24-11.08/44	05.17	20.14-20.35/21	03.38		02.51
	15.42	17.24		18.48		21.22		22.59		23.55
26	09.21	07.42	10.19-11.30/71	06.04	10.26-11.05/39	05.14	20.14-20.35/21	03.36		02.52
	15.46	17.27		18.51		21.25		23.02		23.54
27	09.18	07.38	10.18-11.30/72	06.00	10.29-11.01/32	05.10	20.15-20.35/20	03.33		02.53
	15.49	17.30		18.54		21.28		23.05		23.54
28	09.15	07.35	10.17-11.30/73	05.56	10.33-10.54/21	05.07	20.15-20.34/19	03.30		02.55
	15.52	17.33		18.57		21.32		23.08		23.53
29	09.12			06.53		05.03	20.15-20.34/19	03.27		02.56
	15.56			20.00		21.35		23.11		23.52
30	09.09			06.49		05.00	20.15-20.32/17	03.24		02.58
	15.59			20.03		21.38		23.14		23.51
31	09.06			06.46				03.22		
	16.02			20.06				23.17		
Potential sun hours	171	238		363		451		570		624
Sum of minutes with flicker	0	1020		1805		200		32		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 31 - PUU19

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July	August		September		October		November		December
1	03.00	04.24		06.00		07.26	10.53-12.07/74	08.00	10.19-10.31/12	09.35
	23.49	22.27		20.40		18.53		16.07		14.43
2	03.00	04.28		06.03		07.29	10.53-12.07/74	08.04		09.38
	23.48	22.24		20.36		18.49		16.04		14.41
3	03.01	04.31		06.06		07.32	10.52-12.07/75	08.07		09.41
	23.46	22.20		20.32		18.46		16.00		14.39
4	03.03	04.34		06.09		07.35	10.52-12.07/75	08.10		09.44
	23.44	22.17		20.29		18.42		15.57		14.37
5	03.06	04.37		06.12		07.38	10.51-12.07/76	08.13		09.46
	23.43	22.14		20.25		18.39		15.54		14.35
6	03.08	04.40		06.15		07.41	10.51-12.06/75	08.17		09.49
	23.41	22.10		20.22		18.35		15.51		14.33
7	03.10	04.44		06.18		07.44	10.50-12.06/76	08.20		09.51
	23.39	22.07		20.18		18.32		15.48		14.32
8	03.13	04.47		06.20		07.47	10.51-12.07/76	08.23		09.53
	23.36	22.03		20.15		18.28		15.45		14.30
9	03.15	04.50		06.23		07.50	10.51-12.06/75	08.26		09.56
	23.34	22.00		20.11		18.25		15.41		14.29
10	03.18	04.53	20.29-20.37/8	06.26		07.53	10.50-12.05/75	08.30		09.58
	23.32	21.57		20.08		18.21		15.38		14.28
11	03.20	04.56	20.26-20.39/13	06.29		07.56	10.50-12.05/75	08.33		10.00
	23.29	21.53		20.04		18.18		15.35		14.27
12	03.23	04.59	20.25-20.40/15	06.32		07.59	10.50-12.04/74	08.36		10.02
	23.27	21.50		20.00		18.14		15.32		14.26
13	03.26	05.02	20.23-20.40/17	06.35		08.02	10.50-12.03/73	08.39		10.04
	23.24	21.46		19.57		18.11		15.29		14.25
14	03.29	05.06	20.23-20.41/18	06.38		08.05	10.51-12.03/72	08.43		10.05
	23.22	21.43		19.53		18.08		15.26		14.24
15	03.32	05.09	20.22-20.42/20	06.41	11.24-11.43/19	08.08	10.51-12.02/71	08.46		10.07
	23.19	21.39		19.50		18.04		15.23		14.23
16	03.34	05.12	20.22-20.42/20	06.43	11.18-11.49/31	08.11	10.51-12.01/70	08.49		10.08
	23.16	21.36		19.46		18.01		15.20		14.23
17	03.37	05.15	20.21-20.41/20	06.46	11.15-11.52/37	08.14	10.51-12.00/69	08.52		10.10
	23.13	21.32		19.43		17.57		15.18		14.23
18	03.40	05.18	20.21-20.41/20	06.49	11.12-11.55/43	08.17	10.53-12.00/67	08.55		10.11
	23.11	21.29		19.39		17.54		15.15		14.22
19	03.43	05.21	20.21-20.41/20	06.52	11.10-11.58/48	08.20	10.53-11.59/66	08.59		10.12
	23.08	21.25		19.36		17.50		15.12		14.22
20	03.47	05.24	20.21-20.41/20	06.55	11.07-11.59/52	08.23	10.53-11.57/64	09.02		10.13
	23.05	21.22		19.32		17.47		15.09		14.22
21	03.50	05.27	20.21-20.37/16	06.58	11.05-12.01/56	08.26	10.55-11.57/62	09.05		10.14
	23.02	21.18		19.28		17.43		15.07		14.23
22	03.53	05.30	20.22-20.34/12	07.01	11.03-12.02/59	08.29	10.55-11.55/60	09.08		10.14
	22.59	21.15		19.25		17.40		15.04		14.23
23	03.56	05.33	20.23-20.31/8	07.03	11.02-12.03/61	08.32	10.57-11.54/57	09.11		10.15
	22.56	21.11		19.21		17.37		15.01		14.24
24	03.59	05.36	20.25-20.28/3	07.06	11.01-12.04/63	08.35	10.58-11.52/54	09.15		10.15
	22.53	21.08		19.18		17.33		14.59		14.24
25	04.02	05.39		07.09	10.59-12.05/66	07.38	09.59-10.51/52	09.18		10.15
	22.49	21.04		19.14		16.30		14.56		14.25
26	04.05	05.42		07.12	10.58-12.06/68	07.41	10.00-10.49/49	09.21		10.15
	22.46	21.01		19.11		16.27		14.54		14.26
27	04.09	05.45		07.15	10.56-12.06/70	07.45	10.02-10.48/46	09.24		10.15
	22.43	20.57		19.07		16.23		14.51		14.27
28	04.12	05.48		07.18	10.56-12.06/70	07.48	10.04-10.45/41	09.27		10.15
	22.40	20.54		19.04		16.20		14.49		14.29
29	04.15	05.51		07.21	10.55-12.07/72	07.51	10.06-10.43/37	09.30		10.15
	22.37	20.50		19.00		16.17		14.47		14.30
30	04.18	05.54		07.24	10.54-12.07/73	07.54	10.10-10.41/31	09.33		10.14
	22.33	20.47		18.56		16.13		14.45		14.31
31	04.21	05.57				07.57	10.14-10.37/23			10.13
	22.30	20.43				16.10				14.33
Potential sun hours	608	508		393		305		198		137
Sum of minutes with flicker	0	230		888		1964		12		0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 32 - PUU20

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 21.26-21.46/20	02.59 21.40-21.46/6	04.24 21.34-21.37/3	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41	23.20	23.49	22.27	20.40	18.53	16.07	14.43
2	10.12	09.00	07.28	06.39	04.53	03.16 21.27-21.46/19	03.01 21.39-21.47/8	04.28	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.04	14.40
3	10.10	08.57	07.25	06.35	04.50	03.14 21.28-21.45/17	03.01 21.38-21.48/10	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.32	04.46	03.11 21.29-21.45/16	03.03 21.38-21.49/11	04.34	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09 21.30-21.45/15	03.05 21.37-21.49/12	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 21.30-21.44/14	03.08 21.37-21.51/14	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05 21.31-21.44/13	03.10 21.36-21.51/15	04.44	06.17	07.44	08.20	09.51
	14.49	16.26	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03 21.32-21.44/12	03.12 21.36-21.52/16	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01 21.33-21.43/10	03.15 21.36-21.53/17	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.01	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 21.34-21.43/9	03.17 21.36-21.53/17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.04	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23	02.56 21.35-21.42/7	03.20 21.35-21.54/19	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 21.24-21.28/4	02.54 21.36-21.41/5	03.23 21.34-21.55/21	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	06.00	04.16 21.22-21.31/9	02.53 21.39-21.40/1	03.26 21.32-21.55/23	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.21-21.33/12	02.52	03.29 21.33-21.55/22	05.06	06.38	08.05	08.43	10.05
	15.08	16.49	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09 21.21-21.36/15	02.51	03.31 21.32-21.56/24	05.09	06.41	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.21-21.38/17	02.50	03.34 21.32-21.56/24	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.22	20.54	22.30	23.52	23.16	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.20-21.40/20	02.50	03.37 21.31-21.56/25	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.20-21.44/24	02.49	03.40 21.30-21.56/26	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57 21.19-21.45/26	02.49	03.43 21.31-21.57/26	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54 21.20-21.46/26	02.49	03.46 21.30-21.57/27	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.20-21.47/27	02.49	03.50 21.30-21.56/26	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47 21.20-21.46/26	02.49	03.53 21.30-21.57/27	05.30	07.01	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 21.20-21.46/26	02.50	03.56 21.30-21.56/26	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41 21.21-21.47/26	02.50	03.59 21.30-21.57/27	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.21-21.47/26	02.51	04.02 21.30-21.55/25	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.04	05.14	03.35 21.22-21.47/25	02.52	04.05 21.30-21.53/23	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33 21.22-21.47/25	02.53	04.08 21.31-21.50/19	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30 21.23-21.47/24	02.54	04.12 21.32-21.48/16	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.04	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27 21.23-21.47/24	02.56	04.15 21.31-21.45/14	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24 21.24-21.46/22	02.58 21.41-21.45/4	04.18 21.33-21.43/10	05.54	07.24	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21 21.25-21.46/21		04.21 21.33-21.39/6	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	425	162	582	3	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 33 - PUU21

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.50	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.08	16.48	18.16	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.19	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.01	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.15
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 34 - PUU22

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.08	18.21	15.38	14.27
11	09.58	08.32	06.57	06.07	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.50	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.12	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.24	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 35 - PUU23

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.40	18.53	16.07	14.42
2	10.12	09.01	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.45	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.18	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.11	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.39	07.04	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.11	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.26	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.04	14.22
23	09.30	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.45	09.24	10.16
	15.49	17.30	18.54	21.29	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.13		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 36 - PUU24

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 19.08-19.48/40	03.19 21.11-21.47/36	02.59 21.18-21.53/35	04.24 21.33-21.34/1	06.00	07.26	08.00	09.35
	14.35	16.06	17.36	20.09	21.41	23.20 18.46-20.14/88	23.49 18.51-20.21/90	22.27 19.03-20.14/71	20.39	18.53	16.07	14.43
2	10.11	09.00	07.28	06.39	04.53 19.06-19.51/45	03.16 21.11-21.47/36	03.01 21.18-21.53/35	04.28 19.04-20.14/70	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22 18.46-20.14/88	23.48 18.51-20.21/90	22.23	20.36	18.49	16.04	14.41
3	10.10	08.57	07.24	06.35	04.50 19.04-19.53/49	03.14 21.11-21.47/36	03.01 21.18-21.53/35	04.31 19.05-20.12/67	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25 18.46-20.14/88	23.46 18.51-20.21/90	22.20	20.32	18.46	16.00	14.39
4	10.09	08.54	07.21	06.31	04.46 19.02-19.55/53	03.12 21.11-21.48/37	03.03 21.18-21.54/36	04.34 19.06-20.11/65	06.09	07.35	08.10	09.44
	14.41	16.16	17.45	20.18	21.51	23.28 18.46-20.15/89	23.44 18.52-20.22/90	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.18	06.28	04.43 19.00-19.56/56	03.09 21.12-21.48/36	03.05 21.18-21.54/36	04.37 19.07-20.10/63	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30 18.47-20.16/89	23.43 18.52-20.21/89	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 19.00-19.59/59	03.07 21.12-21.48/36	03.08 21.18-21.54/36	04.40 19.08-20.08/60	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33 18.46-20.15/89	23.41 18.53-20.22/89	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36 18.58-20.00/62	03.05 21.12-21.48/36	03.10 21.18-21.54/36	04.44 19.09-20.07/58	06.17	07.44	08.20	09.51
	14.49	16.25	17.54	20.27	22.01	23.35 18.46-20.16/90	23.39 18.52-20.21/89	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33 18.57-20.01/64	03.03 21.13-21.48/35	03.12 21.18-21.54/36	04.47 19.11-20.06/55	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38 18.47-20.16/89	23.36 18.53-20.22/89	22.03	20.15	18.28	15.44	14.30
9	10.01	08.38	07.04	06.14	04.29 18.56-20.02/66	03.01 21.13-21.48/35	03.15 21.18-21.55/37	04.50 19.13-20.04/51	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40 18.47-20.16/89	23.34 18.53-20.22/89	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 18.54-20.03/69	02.57 21.14-21.49/35	03.18 21.19-21.55/36	04.53 19.14-20.01/47	06.26	07.53	08.29	09.58
	14.56	16.35	18.04	20.36	22.10	23.42 18.47-20.16/89	23.32 18.54-20.22/88	21.57	20.07	18.21	15.38	14.28
11	09.58	08.32	06.57	06.07	04.23 18.53-20.03/70	02.56 21.14-21.48/34	03.20 21.19-21.55/36	04.56 19.16-19.59/43	06.29	07.56	08.33	10.00
	14.59	16.39	18.07	20.39	22.14	23.44 18.47-20.17/90	23.29 18.54-20.22/88	21.53	20.04	18.18	15.35	14.27
12	09.56	08.29	06.53	06.03	04.19 21.20-21.27/7	02.54 21.14-21.48/34	03.23 21.19-21.55/36	04.59 19.18-19.57/39	06.32	07.59	08.36	10.02
	15.02	16.42	18.10	20.42	22.17 18.53-20.05/72	23.46 18.47-20.17/90	23.27 18.53-20.21/88	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	06.00	04.16 21.17-21.30/13	02.53 21.15-21.49/34	03.26 21.18-21.55/37	05.02 19.20-19.53/33	06.35	08.02	08.39	10.04
	15.05	16.45	18.13	20.45	22.20 18.52-20.05/73	23.47 18.48-20.17/89	23.24 18.54-20.21/87	21.46	19.57	18.11	15.29	14.25
14	09.52	08.22	06.46	05.56	04.13 21.15-21.31/16	02.52 21.15-21.49/34	03.29 21.19-21.55/36	05.06 19.24-19.50/26	06.38	08.05	08.42	10.05
	15.08	16.48	18.16	20.48	22.23 18.51-20.06/75	23.49 18.47-20.17/90	23.22 18.55-20.22/87	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09 21.14-21.33/19	02.51 21.16-21.50/34	03.31 21.19-21.55/36	05.09 19.29-19.45/16	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27 18.51-20.07/76	23.50 18.48-20.18/90	23.19 18.55-20.22/87	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06 21.13-21.35/22	02.50 21.15-21.49/34	03.34 21.19-21.55/36	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30 18.50-20.07/77	23.52 18.48-20.18/90	23.16 18.55-20.22/87	21.36	19.46	18.01	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03 21.12-21.37/25	02.50 21.16-21.49/33	03.37 21.19-21.55/36	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33 18.49-20.07/78	23.53 18.48-20.18/90	23.13 18.56-20.21/85	21.32	19.43	17.57	15.18	14.22
18	09.42	08.09	06.32	05.42	04.00 21.11-21.39/28	02.49 21.16-21.50/34	03.40 21.19-21.54/35	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36 18.49-20.08/79	23.54 18.48-20.18/90	23.10 18.56-20.21/85	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57 21.10-21.40/30	02.49 21.17-21.50/33	03.43 21.20-21.55/35	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40 18.48-20.08/80	23.54 18.49-20.19/90	23.08 18.57-20.22/85	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.54 21.10-21.41/31	02.49 21.17-21.50/33	03.46 21.20-21.54/34	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43 18.48-20.09/81	23.55 18.49-20.19/90	23.05 18.57-20.21/84	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 21.10-21.43/33	02.49 21.17-21.50/33	03.50 21.19-21.53/34	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46 18.48-20.10/82	23.55 18.49-20.19/90	23.02 18.57-20.20/83	21.18	19.28	17.43	15.06	14.23
22	09.32	07.55	06.18	05.28	03.47 21.09-21.43/34	02.49 21.17-21.50/33	03.53 21.20-21.53/33	05.30	07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49 18.47-20.10/83	23.55 18.49-20.19/90	22.59 18.58-20.21/83	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 21.09-21.44/35	02.50 21.18-21.51/33	03.56 21.20-21.52/32	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52 18.47-20.11/84	23.55 18.50-20.20/90	22.56 18.58-20.20/82	21.11	19.21	17.37	15.01	14.24
24	09.27	07.49	06.11	05.21	03.41 21.10-21.44/34	02.50 21.18-21.51/33	03.59 21.20-21.52/32	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56 18.47-20.11/84	23.55 18.50-20.20/90	22.52 18.58-20.19/81	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38 21.10-21.45/35	02.51 21.18-21.52/34	04.02 21.21-21.50/29	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59 18.47-20.12/85	23.55 18.50-20.20/90	22.49 18.59-20.19/80	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35 21.10-21.45/35	02.52 21.18-21.51/33	04.05 21.22-21.49/27	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02 18.47-20.12/85	23.54 18.50-20.20/90	22.46 18.59-20.18/79	21.01	19.11	16.27	14.54	14.26
27	09.18	07.38	06.00	05.10	03.33 21.10-21.46/36	02.53 21.18-21.52/34	04.08 21.23-21.47/24	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05 18.46-20.13/87	23.54 18.50-20.20/90	22.43 19.00-20.18/78	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 19.21-19.39/18	03.30 21.10-21.46/36	02.55 21.18-21.52/34	04.12 21.24-21.45/21	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08 18.46-20.13/87	23.53 18.51-20.21/90	22.40 19.01-20.18/77	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 19.16-19.44/28	03.27 21.10-21.46/36	02.56 21.18-21.53/35	04.15 21.25-21.42/17	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11 18.46-20.13/87	23.52 18.51-20.21/90	22.37 19.01-20.17/76	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00 19.12-19.47/35	03.24 21.10-21.47/37	02.58 21.18-21.53/35	04.18 21.26-21.41/15	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14 18.46-20.13/87	23.51 18.51-20.21/90	22.33 19.02-20.16/74	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.22 21.10-21.47/37		04.21 21.28-21.38/10	05.57		07.57		10.13
	16.02		20.06		23.17 18.46-20.13/87		22.30 19.02-20.15/73	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	81	2841	3719	3611	765	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 37 - PUU25

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.39	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.11	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.04	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.07	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.49	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.53	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 38 - PUU26

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52	03.28	05.05	06.38	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.43	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.56	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.54	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.11	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 39 - PUU27

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.30	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.16	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.07	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.49	06.10	05.21	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 40 - PUU28

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.04 13.15-13.31/16	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36 12.51-13.05/14
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00 13.17-13.29/12	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38 12.53-13.05/12
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57 13.21-13.25/4	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41 12.54-13.03/9
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.10	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44 12.57-13.01/4
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.17	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.04 13.14-13.17/3	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23 12.51-12.56/5	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02 13.11-13.19/8	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26 12.47-13.00/13	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00 13.10-13.21/11	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30 12.46-13.01/15	09.58
	14.56	16.35	18.03	20.36	22.10	23.43	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58 13.09-13.23/14	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33 12.44-13.03/19	10.00
	14.59	16.38	18.06	20.39	22.14	23.45	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56 13.09-13.25/16	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36 12.43-13.04/21	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54 13.08-13.26/18	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.02	08.39 12.43-13.04/21	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52 13.09-13.27/18	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43 12.43-13.06/23	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50 13.08-13.28/20	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.08	08.46 12.42-13.06/24	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47 13.08-13.29/21	08.16	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.11	08.49 12.42-13.06/24	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.17	21.36	19.46	18.00	15.20	14.22
17	09.45 13.08-13.30/22	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52 12.43-13.07/24	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42 13.07-13.30/23	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56 12.42-13.07/25	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40 13.07-13.31/24	08.06	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59 12.42-13.07/25	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37 13.07-13.31/24	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02 12.43-13.07/24	10.13
	15.26	17.08	18.33	21.07	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35 13.08-13.32/24	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05 12.44-13.08/24	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32 13.08-13.32/24	07.55	06.18	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08 12.44-13.07/23	10.15
	15.32	17.14	18.39	21.13	22.50	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.30 13.08-13.33/25	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12 12.44-13.08/24	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27 13.08-13.33/25	07.49	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15 12.45-13.08/23	10.16
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24 13.09-13.33/24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18 12.45-13.07/22	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21 13.09-13.33/24	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21 12.46-13.07/21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18 13.10-13.33/23	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.45	09.24 12.47-13.07/20	10.16
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15 13.10-13.33/23	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27 12.48-13.06/18	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12 13.11-13.32/21		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30 12.49-13.06/17	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.10 13.12-13.32/20		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33 12.51-13.06/15	10.14
	15.58		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.07 13.13-13.31/18		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	473	32	0	0	0	0	0	0	0	0	470	39

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 41 - PUU29

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.39	04.53	03.16	03.01	04.28	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.50	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.08	04.40	06.15	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.48	14.32
8	10.03	08.42	07.07	06.17	04.33	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.54	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.28
11	09.58	08.32	06.56	06.07	04.23	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.26	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.25
14	09.51	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.09	06.40	08.08	08.46	10.07
	15.11	16.52	18.18	20.51	22.27	23.50	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.50	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.57	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.05	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.53	05.30	07.00	08.29	09.08	10.14
	15.33	17.14	18.39	21.13	22.49	23.55	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.50	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.11	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.24	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.46	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.11	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.30	02.54	04.12	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.56		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.17	14.47	14.30
30	09.09		06.49	05.00	03.24	02.58	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.45	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	608	508	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 42 - PUU30

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14	03.01	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.37
5	10.08	08.51	07.17	06.28	04.43	03.09	03.05	04.37	06.12	07.38	08.13	09.46
	14.44	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05	03.10	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.03	03.12	04.47	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.01	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.39	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.23	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.13	02.52	03.28	05.05	06.38	08.05	08.42	10.05
	15.08	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.12	06.43	08.11	08.49	10.08
	15.14	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.54	15.15	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.49	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.56	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.37	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.59	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.15	05.51	07.21	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 43 - PUU31

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.07	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.35
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.14	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.02	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.05	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.08	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.11	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.58	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 44 - PUU32

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.04	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.54	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.59	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.52	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.14	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.47	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 45 - PUU33

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03 12.01-12.10/9	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36 11.32-11.50/18
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38 11.33-11.50/17
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41 11.34-11.49/15
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44 11.35-11.48/13
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08 11.54-11.59/5	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46 11.37-11.48/11
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07 11.52-12.01/9	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49 11.39-11.48/9
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05 11.52-12.03/11	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51 11.41-11.46/5
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03 11.52-12.05/13	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.15	18.28	15.44	14.30
9	10.02 11.50-12.05/15	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.25	15.41	14.28
10	10.00 11.50-12.07/17	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.30 11.31-11.41/10	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58 11.50-12.07/17	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.56	08.33 11.29-11.43/14	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56 11.50-12.09/19	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36 11.27-11.45/18	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54 11.49-12.10/21	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.35	08.01	08.39 11.26-11.46/20	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52 11.50-12.11/21	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43 11.26-11.47/21	10.06
	15.07	16.48	18.15	20.48	22.24	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.50 11.49-12.11/22	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46 11.26-11.48/22	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47 11.49-12.12/23	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49 11.25-11.48/23	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45 11.50-12.13/23	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.14	08.52 11.26-11.49/23	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42 11.49-12.13/24	08.09	06.32	05.42	03.59	02.48	03.40	05.17	06.49	08.17	08.56 11.25-11.49/24	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40 11.49-12.14/25	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59 11.25-11.49/24	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37 11.50-12.14/24	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02 11.25-11.50/25	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35 11.50-12.15/25	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05 11.26-11.51/25	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32 11.50-12.15/25	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08 11.26-11.50/24	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29 11.51-12.15/24	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.12 11.26-11.51/25	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27 11.51-12.15/24	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15 11.27-11.51/24	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24 11.52-12.15/23	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18 11.27-11.50/23	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21 11.52-12.15/23	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21 11.28-11.50/22	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18 11.53-12.15/22	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24 11.28-11.50/22	10.16
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15 11.54-12.15/21	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27 11.29-11.50/21	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.48	14.28
29	09.12 11.55-12.14/19		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30 11.30-11.50/20	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09 11.56-12.13/17		06.49	05.00	03.23	02.57	04.17	05.54	07.23	07.54	09.33 11.31-11.51/20	10.14
	15.58		20.03	21.38	23.14	23.51	22.34	20.47	18.56	16.13	14.44	14.31
31	09.06 11.57-12.11/14		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	526	9	0	0	0	0	0	0	0	0	450	88

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 46 - PUU34

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.34/16	02.59 04.19-04.45/26	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.17-04.35/18	03.01 04.19-04.44/25	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.16-04.35/19	03.01 04.19-04.44/25	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.16-04.37/21	03.03 04.20-04.45/25	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.16-04.38/22	03.05 04.20-04.44/24	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.15-04.38/23	03.07 04.21-04.44/23	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.51	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.15-04.38/23	03.10 04.21-04.44/23	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02 04.15-04.39/24	03.12 04.22-04.44/22	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.14	04.29	03.01 04.15-04.40/25	03.15 04.23-04.43/20	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.15-04.40/25	03.17 04.24-04.43/19	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.56 04.15-04.40/25	03.20 04.26-04.43/17	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54 04.14-04.40/26	03.23 04.26-04.41/15	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53 04.15-04.41/26	03.25 04.28-04.40/12	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.52 04.15-04.41/26	03.28 04.31-04.39/8	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51 04.15-04.42/27	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50 04.15-04.42/27	03.34	05.12	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49 04.15-04.42/27	03.37	05.15	06.46	08.14	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	04.00	02.49 04.15-04.43/28	03.40	05.18	06.49	08.17	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49 04.16-04.43/27	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48 04.16-04.43/27	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.49 04.16-04.43/27	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.18	05.28	03.47	02.49 04.16-04.43/27	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49 04.17-04.44/27	03.55	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50 04.16-04.44/28	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.55	22.52	21.08	19.18	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51 04.17-04.44/27	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52 04.17-04.44/27	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.27	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53 04.17-04.44/27	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.18-04.45/27	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27 04.23-04.29/6	02.56 04.18-04.45/27	04.15	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24 04.21-04.31/10	02.57 04.19-04.45/26	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.46		03.21 04.19-04.32/13		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	29	752	284	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 47 - PUU35

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.09	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.51	16.29	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.56	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.50	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.21	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 48 - PUU36

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.06
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.48	03.40	05.18	06.49	08.17	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.18	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 49 - PUU37

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.03	07.31	06.42	04.56	03.18	02.58	04.24	06.00	07.26	08.00	09.36
	14.35	16.05	17.36	20.09	21.41	23.20	23.50	22.27	20.39	18.53	16.06	14.42
2	10.12	09.00	07.28	06.38	04.53	03.16	03.00	04.27	06.03	07.29	08.04	09.38
	14.36	16.08	17.39	20.12	21.44	23.23	23.48	22.24	20.36	18.49	16.03	14.40
3	10.11	08.57	07.24	06.35	04.49	03.13	03.00	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.26	23.47	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.02	04.33	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.08	03.04	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.14	20.25	18.39	15.53	14.34
6	10.07	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.45	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.01	23.36	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.42	07.07	06.17	04.32	03.02	03.11	04.46	06.20	07.47	08.23	09.54
	14.50	16.28	17.57	20.30	22.04	23.38	23.37	22.03	20.14	18.28	15.44	14.29
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.35	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.56	03.17	04.52	06.26	07.53	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.57	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.19	04.56	06.29	07.55	08.33	10.00
	14.58	16.38	18.06	20.39	22.14	23.44	23.30	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.53	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.15	02.52	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.25	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.43	10.06
	15.07	16.48	18.15	20.48	22.23	23.50	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.22
16	09.47	08.15	06.39	05.49	04.06	02.49	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.14	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.48	03.40	05.17	06.49	08.17	08.56	10.11
	15.19	17.01	18.27	21.00	22.37	23.54	23.11	21.29	19.39	17.53	15.14	14.21
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.22	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.11	14.21
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.56	23.05	21.22	19.32	17.46	15.09	14.21
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.10	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.15
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.53	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.49	03.58	05.36	07.06	08.35	09.15	10.15
	15.38	17.20	18.45	21.19	22.56	23.56	22.53	21.08	19.17	17.33	14.58	14.23
25	09.24	07.45	06.07	05.17	03.38	02.50	04.01	05.39	07.09	07.38	09.18	10.16
	15.42	17.23	18.48	21.22	22.59	23.56	22.50	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.16
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.52	04.08	05.45	07.15	07.44	09.24	10.16
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.26
28	09.15	07.35	05.56	05.06	03.29	02.53	04.11	05.48	07.17	07.48	09.27	10.15
	15.52	17.33	18.57	21.32	23.08	23.53	22.40	20.54	19.03	16.19	14.48	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.23	02.57	04.17	05.54	07.23	07.54	09.33	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.14
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	625	609	509	393	305	198	136
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 50 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April	May		June	
1	10.12	09.03	07.31		06.42	04.56		03.19	05.13-06.08/55
	14.35	16.05	17.36		20.09	21.41		23.19	
2	10.11	09.00	07.28		06.38	04.53		03.16	05.13-06.07/54
	14.37	16.09	17.39		20.12	21.44		23.22	
3	10.10	08.57	07.24		06.35	04.49	05.42-05.53/11	03.14	05.12-06.07/55
	14.39	16.12	17.42		20.15	21.47		23.25	
4	10.09	08.54	07.21		06.31	04.46	05.39-05.56/17	03.11	05.13-06.07/54
	14.41	16.15	17.45		20.18	21.51		23.28	
5	10.08	08.51	07.17		06.28	04.43	05.36-05.58/22	03.09	05.13-06.07/54
	14.44	16.19	17.48		20.21	21.54		23.30	
6	10.06	08.48	07.14		06.24	04.39	05.34-06.00/26	03.07	05.13-06.06/53
	14.46	16.22	17.51		20.24	21.57		23.33	
7	10.05	08.45	07.10		06.21	04.36	05.34-06.02/28	03.05	05.13-06.07/54
	14.48	16.25	17.54		20.27	22.00		23.35	
8	10.03	08.41	07.07		06.17	04.32	05.32-06.03/31	03.03	05.14-06.07/53
	14.51	16.29	17.57		20.30	22.04		23.37	
9	10.01	08.38	07.03		06.14	04.29	05.31-06.03/32	03.01	05.14-06.07/53
	14.54	16.32	18.00		20.33	22.07		23.40	
10	09.59	08.35	07.00		06.10	04.26	05.26-06.04/38	02.57	05.14-06.06/52
	14.56	16.35	18.03		20.36	22.10		23.42	
11	09.57	08.32	06.56		06.06	04.22	05.24-06.04/40	02.56	05.14-06.06/52
	14.59	16.39	18.06		20.39	22.13		23.44	
12	09.56	08.28	06.53		06.03	04.19	05.22-06.06/44	02.54	05.14-06.06/52
	15.02	16.42	18.09		20.42	22.17		23.45	
13	09.53	08.25	06.49		05.59	04.16	05.20-06.06/46	02.53	05.15-06.07/52
	15.05	16.45	18.12		20.45	22.20		23.47	
14	09.51	08.22	06.46		05.56	04.13	05.19-06.06/47	02.52	05.15-06.06/51
	15.08	16.48	18.15		20.48	22.23		23.49	
15	09.49	08.19	06.42	07.15-07.22/7	05.52	04.09	05.18-06.07/49	02.51	05.15-06.07/52
	15.11	16.52	18.18		20.51	22.26		23.50	
16	09.47	08.15	06.39	07.11-07.24/13	05.49	04.06	05.17-06.07/50	02.50	05.15-06.06/51
	15.14	16.55	18.21		20.54	22.30		23.51	
17	09.44	08.12	06.35	07.07-07.25/18	05.45	04.03	05.15-06.07/52	02.50	05.16-06.06/50
	15.17	16.58	18.24		20.57	22.33		23.52	
18	09.42	08.09	06.32	07.06-07.27/21	05.42	04.00	05.15-06.07/52	02.49	05.16-06.07/51
	15.20	17.01	18.27		21.00	22.36		23.53	
19	09.40	08.05	06.28	07.04-07.27/23	05.38	03.57	05.14-06.07/53	02.49	05.16-06.07/51
	15.23	17.04	18.30		21.03	22.39		23.54	
20	09.37	08.02	06.25	07.04-07.28/24	05.35	03.53	05.14-06.07/53	02.49	05.16-06.07/51
	15.26	17.08	18.33		21.06	22.43		23.55	
21	09.34	07.59	06.21	07.03-07.27/24	05.31	03.50	05.14-06.08/54	02.49	05.16-06.07/51
	15.29	17.11	18.36		21.09	22.46		23.55	
22	09.32	07.55	06.17	07.02-07.27/25	05.28	03.47	05.13-06.07/54	02.49	05.16-06.07/51
	15.32	17.14	18.39		21.12	22.49		23.55	
23	09.29	07.52	06.14	07.02-07.27/25	05.24	03.44	05.13-06.08/55	02.50	05.17-06.08/51
	15.36	17.17	18.42		21.16	22.52		23.55	
24	09.26	07.48	06.10	07.01-07.26/25	05.21	03.41	05.13-06.08/55	02.50	05.17-06.08/51
	15.39	17.20	18.45		21.19	22.55		23.55	
25	09.24	07.45	06.07	07.02-07.26/24	05.17	03.38	05.13-06.08/55	02.51	05.18-06.09/51
	15.42	17.23	18.48		21.22	22.58		23.55	
26	09.21	07.41	06.03	07.02-07.25/23	05.14	03.35	05.13-06.08/55	02.52	05.17-06.08/51
	15.45	17.27	18.51		21.25	23.02		23.54	
27	09.18	07.38	06.00	07.03-07.24/21	05.10	03.32	05.13-06.08/55	02.53	05.18-06.09/51
	15.49	17.30	18.54		21.28	23.05		23.53	
28	09.15	07.35	05.56	07.03-07.22/19	05.07	03.30	05.13-06.08/55	02.54	05.18-06.09/51
	15.52	17.33	18.57		21.31	23.08		23.53	
29	09.12		06.53	08.05-08.20/15	05.03	03.27	05.12-06.08/56	02.56	05.18-06.10/52
	15.55		20.00		21.35	23.11		23.51	
30	09.09		06.49	08.07-08.17/10	05.00	03.24	05.12-06.07/55	02.58	05.18-06.10/52
	15.59		20.03		21.38	23.14		23.50	
31	09.06		06.46			03.21	05.12-06.07/55		
	16.02		20.06			23.16			
Potential sun hours	171	238	363		451	570		624	
Sum of minutes with flicker	0	0	317		0	1295		1562	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 50 - PUU38

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October	November	December
1	02.59	05.18-06.11/53	04.24	05.33-06.15/42	06.00		07.26	08.00	09.35
	23.49		22.27		20.39		18.53	16.07	14.42
2	03.01	05.18-06.11/53	04.27	05.35-06.15/40	06.03		07.29	08.03	09.38
	23.47		22.23		20.36		18.49	16.03	14.40
3	03.01	05.18-06.11/53	04.31	05.38-06.14/36	06.06		07.32	08.07	09.41
	23.46		22.20		20.32		18.46	16.00	14.38
4	03.03	05.19-06.12/53	04.34	05.41-06.13/32	06.09		07.35	08.10	09.43
	23.44		22.17		20.29		18.42	15.57	14.37
5	03.05	05.19-06.12/53	04.37	05.43-06.12/29	06.11		07.38	08.13	09.46
	23.42		22.13		20.25		18.39	15.54	14.35
6	03.08	05.19-06.13/54	04.40	05.43-06.10/27	06.14		07.41	08.16	09.48
	23.40		22.10		20.22		18.35	15.51	14.33
7	03.10	05.19-06.13/54	04.43	05.45-06.09/24	06.17		07.44	08.19	09.51
	23.38		22.06		20.18		18.32	15.47	14.32
8	03.12	05.20-06.14/54	04.47	05.47-06.08/21	06.20		07.47	08.23	09.53
	23.36		22.03		20.14		18.28	15.44	14.30
9	03.15	05.20-06.14/54	04.50	05.49-06.05/16	06.23		07.50	08.26	09.55
	23.34		22.00		20.11		18.25	15.41	14.29
10	03.17	05.20-06.15/55	04.53	05.52-06.01/9	06.26		07.52	08.29	09.58
	23.31		21.56		20.07		18.21	15.38	14.28
11	03.20	05.21-06.15/54	04.56		06.29		07.55	08.32	10.00
	23.29		21.53		20.04		18.18	15.35	14.26
12	03.23	05.21-06.16/55	04.59		06.32		07.58	08.36	10.02
	23.27		21.49		20.00		18.14	15.32	14.25
13	03.26	05.20-06.16/56	05.02		06.35	07.59-08.07/8	08.01	08.39	10.03
	23.24		21.46		19.57		18.11	15.29	14.24
14	03.28	05.21-06.17/56	05.05		06.37	07.55-08.09/14	08.04	08.42	10.05
	23.21		21.43		19.53		18.07	15.26	14.24
15	03.31	05.21-06.17/56	05.08		06.40	07.53-08.11/18	08.07	08.45	10.07
	23.19		21.39		19.49		18.04	15.23	14.23
16	03.34	05.22-06.17/55	05.12		06.43	07.52-08.12/20	08.10	08.49	10.08
	23.16		21.36		19.46		18.00	15.20	14.23
17	03.37	05.22-06.17/55	05.15		06.46	07.51-08.13/22	08.13	08.52	10.09
	23.13		21.32		19.42		17.57	15.17	14.22
18	03.40	05.22-06.17/55	05.18		06.49	07.50-08.14/24	08.16	08.55	10.11
	23.10		21.29		19.39		17.53	15.15	14.22
19	03.43	05.23-06.18/55	05.21		06.52	07.48-08.13/25	08.19	08.58	10.12
	23.07		21.25		19.35		17.50	15.12	14.22
20	03.46	05.23-06.18/55	05.24		06.55	07.48-08.13/25	08.23	09.02	10.13
	23.04		21.22		19.32		17.47	15.09	14.22
21	03.49	05.23-06.17/54	05.27		06.57	07.47-08.13/26	08.26	09.05	10.13
	23.01		21.18		19.28		17.43	15.06	14.22
22	03.52	05.24-06.18/54	05.30		07.00	07.47-08.12/25	08.29	09.08	10.14
	22.58		21.15		19.25		17.40	15.04	14.23
23	03.56	05.24-06.18/54	05.33		07.03	07.48-08.12/24	08.32	09.11	10.15
	22.55		21.11		19.21		17.36	15.01	14.23
24	03.59	05.24-06.18/54	05.36		07.06	07.48-08.11/23	08.35	09.14	10.15
	22.52		21.08		19.17		17.33	14.59	14.24
25	04.02	05.25-06.18/53	05.39		07.09	07.48-08.10/22	07.38	09.17	10.15
	22.49		21.04		19.14		16.30	14.56	14.25
26	04.05	05.25-06.18/53	05.42		07.12	07.48-08.08/20	07.41	09.20	10.15
	22.46		21.01		19.10		16.26	14.54	14.26
27	04.08	05.27-06.17/50	05.45		07.15	07.51-08.06/15	07.44	09.23	10.15
	22.43		20.57		19.07		16.23	14.51	14.27
28	04.11	05.28-06.18/50	05.48		07.18	07.54-08.03/9	07.47	09.26	10.15
	22.40		20.53		19.03		16.20	14.49	14.28
29	04.15	05.28-06.17/49	05.51		07.20		07.51	09.29	10.14
	22.36		20.50		19.00		16.16	14.47	14.30
30	04.18	05.30-06.17/47	05.54		07.23		07.54	09.32	10.14
	22.33		20.46		18.56		16.13	14.44	14.31
31	04.21	05.31-06.15/44	05.57				07.57		10.13
	22.30		20.43				16.10		14.33
Potential sun hours	608		508		393		305	198	137
Sum of minutes with flicker	1650		276		320		0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 51 - PUU39

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19 04.18-04.19/1	02.59 04.13-04.34/21	04.24	06.00 06.39-06.47/8	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.07	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16 04.16-04.22/6	03.01 04.13-04.34/21	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.14 04.14-04.23/9	03.01 04.13-04.33/20	04.31	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11 04.13-04.25/12	03.03 04.14-04.34/20	04.34	06.09	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.43	03.09 04.12-04.26/14	03.05 04.15-04.33/18	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07 04.10-04.26/16	03.07 04.16-04.33/17	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.05 04.09-04.27/18	03.10 04.17-04.32/15	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.03 04.09-04.28/19	03.12 04.19-04.32/13	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.01 04.09-04.29/20	03.15 04.21-04.31/10	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26	02.57 04.09-04.29/20	03.17 04.23-04.30/7	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06 06.39-06.47/8	04.22	02.56 04.08-04.30/22	03.20 04.25-04.29/4	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03 06.36-06.49/13	04.19	02.54 04.08-04.30/22	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59 06.33-06.50/17	04.16	02.53 04.09-04.31/22	03.25	05.02	06.35	08.01	08.39	10.04
	15.05	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56 06.30-06.50/20	04.12	02.52 04.08-04.31/23	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52 06.29-06.51/22	04.09	02.51 04.09-04.32/23	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.52	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49 06.28-06.52/24	04.06	02.50 04.08-04.31/23	03.34	05.11 06.41-06.48/7	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.23
17	09.44	08.12	06.35	05.45 06.27-06.51/24	04.03	02.49 04.09-04.32/23	03.37	05.15 06.37-06.50/13	06.46	08.13	08.52	10.10
	15.17	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42 06.27-06.52/25	04.00	02.49 04.09-04.32/23	03.40	05.18 06.36-06.52/16	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38 06.27-06.52/25	03.56	02.49 04.09-04.33/24	03.43	05.21 06.35-06.53/18	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35 06.27-06.50/23	03.53	02.49 04.09-04.33/24	03.46	05.24 06.34-06.54/20	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31 06.27-06.50/23	03.50	02.49 04.09-04.33/24	03.49	05.27 06.32-06.54/22	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28 06.28-06.50/22	03.47	02.49 04.09-04.33/24	03.52	05.30 06.31-06.55/24	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24 06.28-06.49/21	03.44	02.49 04.10-04.34/24	03.56	05.33 06.31-06.55/24	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21 06.28-06.47/19	03.41	02.50 04.10-04.33/23	03.59	05.36 06.31-06.55/24	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 06.30-06.45/15	03.38	02.51 04.11-04.34/23	04.02	05.39 06.30-06.54/24	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14 06.31-06.43/12	03.35	02.52 04.10-04.34/24	04.05	05.42 06.30-06.54/24	07.12	07.41	09.20	10.15
	15.45	17.27	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.54	14.26
27	09.18	07.38	06.00	05.10 06.35-06.40/5	03.32	02.53 04.11-04.34/23	04.08	05.45 06.30-06.54/24	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54 04.12-04.34/22	04.11	05.48 06.31-06.53/22	07.18	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56 04.12-04.34/22	04.15	05.51 06.30-06.51/21	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.47	14.30
30	09.09		06.49	05.00	03.24	02.57 04.12-04.34/22	04.18	05.54 06.33-06.50/17	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57 06.36-06.49/13		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	318	0	595	166	313	8	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 52 - PUU40

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.19	02.59	04.24 05.17-05.37/20	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27 05.17-05.37/20	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30 05.19-05.36/17	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34 05.22-05.36/14	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37 05.25-05.36/11	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 05.20-05.24/4	03.07	03.07	04.40 05.27-05.34/7	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 05.17-05.25/8	03.04	03.10	04.43 05.30-05.33/3	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 05.14-05.26/12	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 05.11-05.26/15	03.00	03.15	04.50	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	10.00	08.35	07.00	06.10	04.26 05.08-05.26/18	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22 05.06-05.26/20	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19 05.07-05.27/20	02.54	03.23	04.59	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16 05.06-05.27/21	02.53	03.25	05.02	06.35	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12 05.06-05.27/21	02.52	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09 05.07-05.27/20	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06 05.07-05.27/20	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03 05.06-05.26/20	02.49	03.37	05.15	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59 05.07-05.26/19	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56 05.07-05.25/18	02.48	03.43 05.25-05.29/4	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.54	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.35	03.53 05.08-05.25/17	02.48	03.46 05.22-05.31/9	05.24	06.55	08.23	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50 05.10-05.24/14	02.48	03.49 05.21-05.32/11	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.28	03.47 05.10-05.23/13	02.49	03.52 05.20-05.34/14	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44 05.11-05.22/11	02.49	03.55 05.19-05.35/16	05.33	07.03	08.32	09.11	10.15
	15.36	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.21	03.41 05.13-05.20/7	02.50	03.59 05.18-05.35/17	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.51	04.02 05.18-05.36/18	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.42	06.03	05.14	03.35	02.52	04.05 05.17-05.36/19	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08 05.17-05.37/20	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07	03.29	02.54	04.11 05.17-05.38/21	05.48	07.18	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.27	02.56	04.14 05.17-05.37/20	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18 05.17-05.38/21	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21 05.16-05.37/21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	298	0	211	92	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 53 - PUU41

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.23	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.48	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.44
	14.41	16.15	17.45	20.18	21.51	23.28	23.45	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.31	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.22	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.02	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.50	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.14	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.50	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.52	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.51	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.09
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.11	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.20	08.59	10.12
	15.23	17.04	18.30	21.03	22.40	23.55	23.08	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.25	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.47	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.56	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.56	21.11	19.21	17.36	15.01	14.23
24	09.27	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.56	23.56	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.18	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.42	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.55	22.46	21.01	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.54	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.37	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.33	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 54 - PUU42

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56 20.35-20.55/20	03.19	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53 20.34-20.55/21	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49 20.34-20.55/21	03.14	03.01	04.30 20.51-20.58/7	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46 20.35-20.54/19	03.11	03.03	04.34 20.49-21.01/12	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42 20.35-20.54/19	03.09	03.05	04.37 20.47-21.01/14	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.39	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39 20.35-20.53/18	03.07	03.07	04.40 20.46-21.02/16	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36 20.36-20.52/16	03.04	03.10	04.43 20.45-21.03/18	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32 20.37-20.51/14	03.02	03.12	04.46 20.44-21.03/19	06.20	07.47	08.23	09.53
	14.51	16.29	17.57	20.30	22.04	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29 20.39-20.50/11	03.01	03.15	04.50 20.44-21.03/19	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.29
10	09.59	08.35	07.00	06.10	04.26 20.42-20.47/5	02.57	03.17	04.53 20.44-21.04/20	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56 20.44-21.04/20	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.23	04.59 20.43-21.03/20	06.32	07.58	08.36	10.02
	15.02	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	03.25	05.02 20.43-21.02/19	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	03.28	05.05 20.44-20.59/15	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.43	19.53	18.07	15.26	14.24
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08 20.44-20.56/12	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11 20.44-20.52/8	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	03.37	05.15 20.45-20.50/5	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.20	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.49	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.35	03.53	02.48	03.46	05.24	06.55	08.22	09.02	10.13
	15.26	17.08	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.47	15.09	14.22
21	09.34	07.59	06.21	05.31	03.50	02.49	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.25	17.40	15.04	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.59	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17 20.40-20.41/1	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13 20.39-20.44/5	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10 20.37-20.46/9	03.32	02.53	04.08	05.45	07.15	07.44	09.23	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.07 20.36-20.49/13	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03 20.35-20.52/17	03.27	02.56	04.14	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00 20.35-20.54/19	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	64	164	0	0	224	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 55 - PUU43

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.06	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.19	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.39	15.54	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.21	04.36	03.04	03.09	04.43	06.17	07.44	08.20	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.32	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.47	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.25	15.41	14.28
10	10.00	08.35	07.00	06.10	04.26	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.18	15.35	14.26
12	09.56	08.29	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.27	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.42	03.59	02.49	03.40	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.59	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.55	08.23	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.35	07.59	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.13	22.49	23.56	22.59	21.15	19.25	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.01	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.49	17.30	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.53	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.30	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 56 - PUU44

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56		03.18	21.23-21.51/28	02.59	21.30-21.57/27	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41		23.19		23.49		22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53		03.16	21.23-21.52/29	03.01	21.30-21.57/27	04.27	06.03	07.29	08.03	09.38
	14.37	16.09	17.39	20.12	21.44		23.22		23.48		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49		03.13	21.23-21.51/28	03.01	21.30-21.57/27	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47		23.25		23.46		22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46		03.11	21.24-21.52/28	03.03	21.30-21.57/27	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51		23.28		23.44		22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42		03.09	21.24-21.51/27	03.05	21.30-21.57/27	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54		23.30		23.42		22.13	20.25	18.38	15.54	14.35
6	10.06	08.48	07.14	06.24	04.39		03.07	21.24-21.52/28	03.07	21.30-21.57/27	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57		23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36		03.04	21.25-21.52/27	03.10	21.30-21.58/28	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00		23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32		03.02	21.25-21.52/27	03.12	21.31-21.59/28	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04		23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29		03.00	21.25-21.52/27	03.14	21.30-21.58/28	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07		23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26		02.57	21.26-21.52/26	03.17	21.30-21.58/28	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10		23.42		23.32		21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22		02.55	21.26-21.52/26	03.20	21.31-21.59/28	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13		23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19		02.54	21.26-21.52/26	03.22	21.31-21.59/28	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17		23.46		23.27		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16		02.53	21.26-21.52/26	03.25	21.31-21.59/28	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20		23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12		02.52	21.27-21.52/25	03.28	21.31-21.59/28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23		23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	21.31-21.35/4	02.51	21.26-21.52/26	03.31	21.31-21.59/28	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26		23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	21.29-21.38/9	02.50	21.27-21.53/26	03.34	21.31-21.59/28	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30		23.52		23.16		21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	21.27-21.41/14	02.49	21.28-21.53/25	03.37	21.32-22.00/28	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33		23.53		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	21.27-21.44/17	02.49	21.28-21.53/25	03.40	21.32-21.59/27	05.18	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36		23.53		23.10		21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	21.25-21.46/21	02.48	21.27-21.53/26	03.43	21.32-21.59/27	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39		23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	21.25-21.47/22	02.48	21.29-21.54/25	03.46	21.32-21.58/26	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43		23.55		23.04		21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	21.24-21.47/23	02.48	21.29-21.54/25	03.49	21.34-21.59/25	05.27	06.57	08.26	09.05	10.13
	15.29	17.11	18.36	21.09	22.46		23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	21.24-21.48/24	02.49	21.29-21.54/25	03.52	21.34-21.58/24	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49		23.55		22.58		21.15	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	21.23-21.49/26	02.49	21.28-21.54/26	03.55	21.35-21.58/23	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52		23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	21.23-21.50/27	02.50	21.29-21.54/25	03.58	21.35-21.57/22	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55		23.55		22.52		21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	21.22-21.49/27	02.51	21.29-21.54/25	04.02	21.36-21.55/19	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58		23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	21.22-21.50/28	02.52	21.29-21.55/26	04.05	21.37-21.52/15	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02		23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	21.22-21.50/28	02.53	21.30-21.55/25	04.08	21.39-21.50/11	05.45	07.15	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05		23.54		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	21.22-21.50/28	02.54	21.30-21.56/26	04.11	21.40-21.47/7	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08		23.53		22.40		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	21.22-21.50/28	02.56	21.29-21.55/26	04.14	21.43-21.45/2	05.51	07.20	07.51	09.29	10.14
	15.55		20.00	21.34	23.11		23.52		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	21.23-21.51/28	02.57	21.29-21.55/26	04.18		05.54	07.23	07.54	09.32	10.14
	15.59		20.03	21.38	23.14		23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21	21.23-21.51/28			04.21		05.57		07.57		10.13
	16.02		20.06		23.17				22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570		624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	382		786		698		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 57 - PUU45

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.20	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.03	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.07	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.46	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.43	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.49
	14.46	16.22	17.51	20.24	21.57	23.33	23.41	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.39	22.07	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	10.00	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.33	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.32	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.54	08.25	06.49	05.59	04.16	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.48	23.24	21.46	19.57	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.22	21.43	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.46	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.45	08.12	06.35	05.45	04.03	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.32	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.05	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.26	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.02	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.48	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.56	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.56	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.08	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.59	23.55	22.49	21.04	19.14	16.30	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.21	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.15	07.44	09.24	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.27	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.51	09.29	10.15
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.18	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 58 - PUU46

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18		02.59	21.56-22.11/15	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19		23.49		22.26	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16		03.01	21.56-22.10/14	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22		23.47		22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13		03.01	21.58-22.09/11	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25		23.46		22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11		03.03	21.59-22.07/8	04.34	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.50	23.27		23.44		22.16	20.28	18.42	15.57	14.36
5	10.07	08.51	07.17	06.28	04.42	03.09		03.05		04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30		23.42		22.13	20.25	18.38	15.53	14.35
6	10.06	08.48	07.14	06.24	04.39	03.07		03.07		04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33		23.40		22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20	04.36	03.04		03.10		04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35		23.38		22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	21.56-22.01/5	03.12		04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37		23.36		22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	21.54-22.04/10	03.14		04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40		23.34		22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.26	02.57	21.52-22.05/13	03.17		04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42		23.31		21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	21.51-22.07/16	03.20		04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44		23.29		21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	21.51-22.07/16	03.22		04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.16	23.45		23.26		21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.16	02.53	21.50-22.08/18	03.25		05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47		23.24		21.46	19.56	18.11	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.52	21.50-22.09/19	03.28		05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49		23.21		21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.51	21.49-22.10/21	03.31		05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50		23.19		21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.49	04.06	02.50	21.49-22.11/22	03.34		05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.51		23.16		21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.03	02.49	21.50-22.11/21	03.37		05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52		23.13		21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	21.50-22.12/22	03.40		05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53		23.10		21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	21.49-22.11/22	03.43		05.21	06.52	08.19	08.58	10.12
	15.23	17.04	18.30	21.03	22.39	23.54		23.07		21.25	19.35	17.50	15.12	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	21.50-22.13/23	03.46		05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.42	23.55		23.04		21.21	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	21.50-22.13/23	03.49		05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55		23.01		21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	21.50-22.13/23	03.52		05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55		22.58		21.14	19.24	17.40	15.03	14.23
23	09.29	07.52	06.14	05.24	03.44	02.49	21.50-22.13/23	03.55		05.33	07.03	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55		22.55		21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	21.51-22.13/22	03.58		05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55		22.52		21.07	19.17	17.33	14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	21.51-22.13/22	04.02		05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55		22.49		21.04	19.14	16.30	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	21.51-22.13/22	04.05		05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54		22.46		21.00	19.10	16.26	14.53	14.26
27	09.18	07.38	06.00	05.10	03.32	02.53	21.52-22.13/21	04.08		05.45	07.14	07.44	09.23	10.15
	15.49	17.29	18.54	21.28	23.05	23.53		22.43		20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	21.53-22.13/20	04.11		05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53		22.39		20.53	19.03	16.20	14.49	14.28
29	09.12		06.52	05.03	03.26	02.56	21.53-22.12/19	04.14		05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51		22.36		20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	05.00	03.24	02.57	21.54-22.11/17	04.18		05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50		22.33		20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21			04.21		05.57		07.57		10.13
	16.02		20.06		23.16			22.30		20.43		16.10		14.33
Potential sun hours	171	238	363	451	570	624		609		509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	440		48		0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 59 - PUU47

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	06.00	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.27	20.39	18.53	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.15	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.18	21.51	23.28	23.44	22.17	20.29	18.42	15.57	14.36
5	10.08	08.51	07.17	06.28	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.21	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.46	16.22	17.51	20.24	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.45	07.10	06.20	04.36	03.04	03.09	04.43	06.17	07.44	08.19	09.51
	14.48	16.25	17.54	20.27	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.30	22.04	23.38	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.56
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.58	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.56	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.42	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.04
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.19	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.36	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.09	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.29	19.39	17.53	15.14	14.22
19	09.40	08.05	06.28	05.38	03.56	02.48	03.43	05.21	06.52	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.22	19.32	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.14
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.15	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.16	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	06.00	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.35	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.33	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.35	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.51	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 60 - PUU48

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.09	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.28	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.12	21.44	23.22	23.48	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.51	23.28	23.44	22.17	20.28	18.42	15.57	14.36
5	10.08	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.41	08.16	09.48
	14.45	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.05	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.50	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.33	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.52	06.26	07.52	08.29	09.58
	14.56	16.35	18.03	20.36	22.10	23.42	23.32	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.39	22.13	23.44	23.29	21.53	20.04	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.02
	15.01	16.41	18.09	20.42	22.17	23.46	23.27	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.50	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.39	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.55	18.21	20.54	22.30	23.52	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.10
	15.16	16.58	18.24	20.57	22.33	23.53	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.54	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.02	10.13
	15.26	17.07	18.33	21.06	22.43	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.29	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.15
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.24	07.45	06.07	05.17	03.38	02.50	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.24
26	09.21	07.41	06.03	05.13	03.35	02.51	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.02	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.05	23.54	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.40	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.52	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.14	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.17		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102 **WTG:** 61 - PUU49

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [UMEA]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,02	2,84	3,78	6,14	8,62	9,94	7,42	5,13	4,32	3,43	1,58	0,96

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
576	423	402	429	548	894	1 047	1 090	994	842	717	711	8 674

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	09.03	07.31	06.42	04.56	03.18	02.59	04.24	05.59	07.26	08.00	09.35
	14.35	16.05	17.36	20.08	21.41	23.19	23.49	22.26	20.39	18.52	16.06	14.42
2	10.11	09.00	07.27	06.38	04.53	03.16	03.01	04.27	06.02	07.29	08.03	09.38
	14.37	16.08	17.39	20.11	21.44	23.22	23.47	22.23	20.36	18.49	16.03	14.40
3	10.10	08.57	07.24	06.35	04.49	03.13	03.01	04.30	06.05	07.32	08.06	09.41
	14.39	16.12	17.42	20.14	21.47	23.25	23.46	22.20	20.32	18.45	16.00	14.38
4	10.09	08.54	07.21	06.31	04.46	03.11	03.03	04.33	06.08	07.35	08.10	09.43
	14.41	16.15	17.45	20.17	21.50	23.27	23.44	22.16	20.28	18.42	15.57	14.36
5	10.07	08.51	07.17	06.27	04.42	03.09	03.05	04.37	06.11	07.38	08.13	09.46
	14.43	16.18	17.48	20.20	21.54	23.30	23.42	22.13	20.25	18.38	15.53	14.34
6	10.06	08.48	07.14	06.24	04.39	03.06	03.07	04.40	06.14	07.40	08.16	09.48
	14.46	16.22	17.51	20.23	21.57	23.33	23.40	22.10	20.21	18.35	15.50	14.33
7	10.04	08.44	07.10	06.20	04.35	03.04	03.09	04.43	06.17	07.43	08.19	09.51
	14.48	16.25	17.54	20.26	22.00	23.35	23.38	22.06	20.18	18.31	15.47	14.31
8	10.03	08.41	07.07	06.17	04.32	03.02	03.12	04.46	06.20	07.46	08.23	09.53
	14.51	16.28	17.57	20.29	22.03	23.37	23.36	22.03	20.14	18.28	15.44	14.30
9	10.01	08.38	07.03	06.13	04.29	03.00	03.14	04.49	06.23	07.49	08.26	09.55
	14.53	16.32	18.00	20.32	22.07	23.40	23.34	22.00	20.11	18.24	15.41	14.28
10	09.59	08.35	07.00	06.10	04.25	02.57	03.17	04.53	06.26	07.52	08.29	09.57
	14.56	16.35	18.03	20.35	22.10	23.42	23.31	21.56	20.07	18.21	15.38	14.27
11	09.57	08.32	06.56	06.06	04.22	02.55	03.20	04.56	06.29	07.55	08.32	10.00
	14.59	16.38	18.06	20.38	22.13	23.44	23.29	21.53	20.03	18.17	15.35	14.26
12	09.55	08.28	06.53	06.03	04.19	02.54	03.22	04.59	06.31	07.58	08.36	10.01
	15.01	16.41	18.09	20.42	22.16	23.45	23.26	21.49	20.00	18.14	15.32	14.25
13	09.53	08.25	06.49	05.59	04.15	02.53	03.25	05.02	06.34	08.01	08.39	10.03
	15.04	16.45	18.12	20.45	22.20	23.47	23.24	21.46	19.56	18.10	15.29	14.24
14	09.51	08.22	06.46	05.56	04.12	02.51	03.28	05.05	06.37	08.04	08.42	10.05
	15.07	16.48	18.15	20.48	22.23	23.49	23.21	21.42	19.53	18.07	15.26	14.23
15	09.49	08.18	06.42	05.52	04.09	02.51	03.31	05.08	06.40	08.07	08.45	10.07
	15.10	16.51	18.18	20.51	22.26	23.50	23.19	21.39	19.49	18.04	15.23	14.23
16	09.47	08.15	06.38	05.48	04.06	02.50	03.34	05.11	06.43	08.10	08.49	10.08
	15.13	16.54	18.21	20.54	22.29	23.51	23.16	21.35	19.46	18.00	15.20	14.22
17	09.44	08.12	06.35	05.45	04.02	02.49	03.37	05.14	06.46	08.13	08.52	10.09
	15.16	16.58	18.24	20.57	22.33	23.52	23.13	21.32	19.42	17.57	15.17	14.22
18	09.42	08.08	06.31	05.41	03.59	02.49	03.40	05.17	06.49	08.16	08.55	10.11
	15.19	17.01	18.27	21.00	22.36	23.53	23.10	21.28	19.39	17.53	15.14	14.22
19	09.39	08.05	06.28	05.38	03.56	02.48	03.43	05.20	06.51	08.19	08.58	10.12
	15.22	17.04	18.30	21.03	22.39	23.54	23.07	21.25	19.35	17.50	15.11	14.22
20	09.37	08.02	06.24	05.34	03.53	02.48	03.46	05.24	06.54	08.22	09.01	10.13
	15.26	17.07	18.33	21.06	22.42	23.55	23.04	21.21	19.31	17.46	15.09	14.22
21	09.34	07.58	06.21	05.31	03.50	02.48	03.49	05.27	06.57	08.25	09.05	10.13
	15.29	17.11	18.36	21.09	22.46	23.55	23.01	21.18	19.28	17.43	15.06	14.22
22	09.32	07.55	06.17	05.27	03.47	02.49	03.52	05.30	07.00	08.28	09.08	10.14
	15.32	17.14	18.39	21.12	22.49	23.55	22.58	21.14	19.24	17.40	15.03	14.22
23	09.29	07.52	06.14	05.24	03.44	02.49	03.55	05.33	07.03	08.32	09.11	10.14
	15.35	17.17	18.42	21.15	22.52	23.55	22.55	21.11	19.21	17.36	15.01	14.23
24	09.26	07.48	06.10	05.20	03.41	02.50	03.58	05.36	07.06	08.35	09.14	10.15
	15.39	17.20	18.45	21.19	22.55	23.55	22.52	21.07	19.17	17.33	14.58	14.24
25	09.23	07.45	06.07	05.17	03.38	02.51	04.02	05.39	07.09	07.38	09.17	10.15
	15.42	17.23	18.48	21.22	22.58	23.55	22.49	21.04	19.14	16.29	14.56	14.25
26	09.21	07.41	06.03	05.13	03.35	02.52	04.05	05.42	07.12	07.41	09.20	10.15
	15.45	17.26	18.51	21.25	23.01	23.54	22.46	21.00	19.10	16.26	14.53	14.25
27	09.18	07.38	05.59	05.10	03.32	02.53	04.08	05.45	07.14	07.44	09.23	10.15
	15.48	17.29	18.54	21.28	23.04	23.53	22.43	20.57	19.07	16.23	14.51	14.27
28	09.15	07.34	05.56	05.06	03.29	02.54	04.11	05.48	07.17	07.47	09.26	10.15
	15.52	17.32	18.57	21.31	23.08	23.53	22.39	20.53	19.03	16.19	14.49	14.28
29	09.12		06.52	05.03	03.26	02.55	04.14	05.51	07.20	07.50	09.29	10.14
	15.55		20.00	21.34	23.11	23.51	22.36	20.50	19.00	16.16	14.46	14.29
30	09.09		06.49	04.59	03.24	02.57	04.17	05.54	07.23	07.54	09.32	10.14
	15.58		20.03	21.38	23.13	23.50	22.33	20.46	18.56	16.13	14.44	14.31
31	09.06		06.45		03.21		04.21	05.57		07.57		10.13
	16.02		20.06		23.16		22.30	20.43		16.10		14.32
Potential sun hours	171	238	363	451	570	624	609	509	393	305	198	137
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

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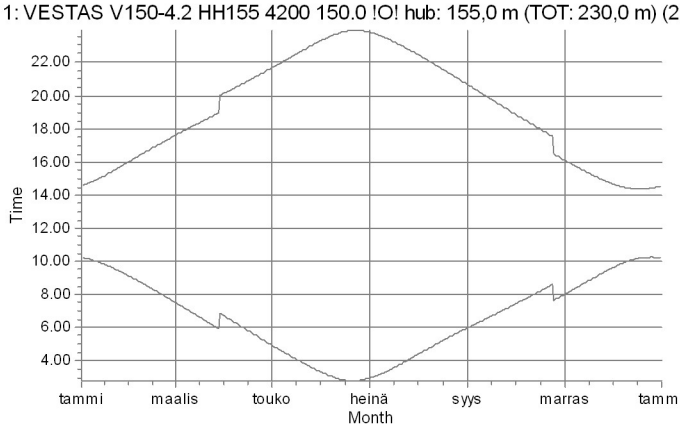
Calculated:
18.11.2020 15.10/3.4.388

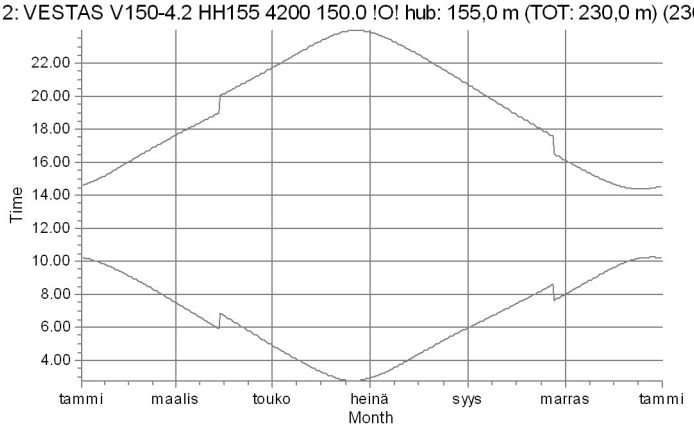
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

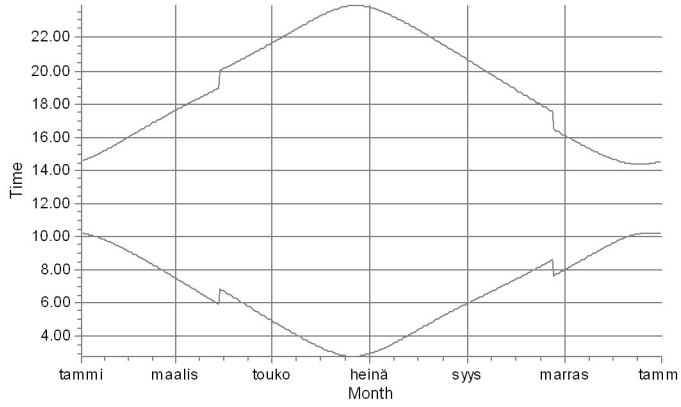
1: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2



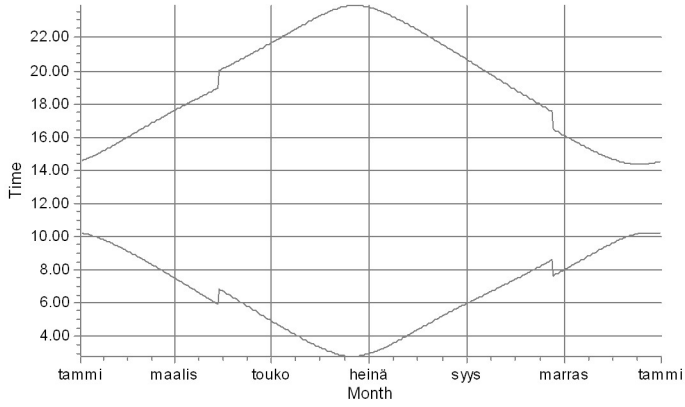
2: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (236)



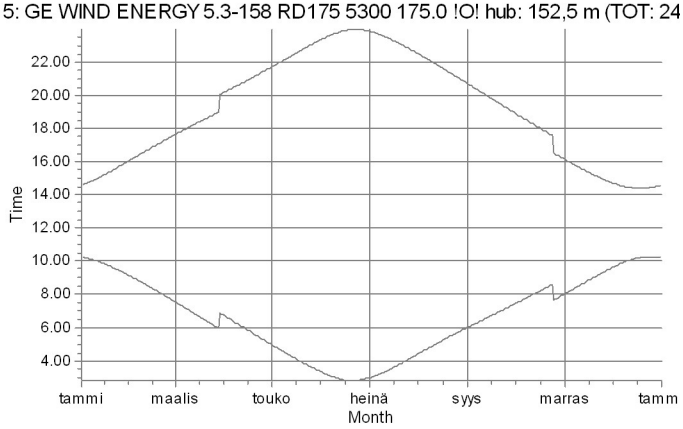
3: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (2



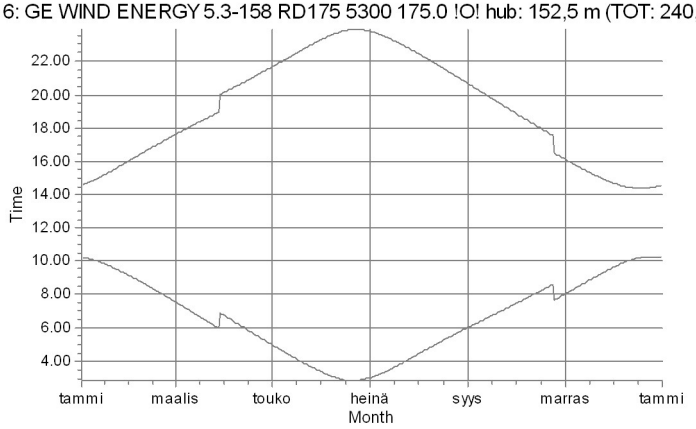
4: VESTAS V150-4.2 HH155 4200 150.0 !O! hub: 155,0 m (TOT: 230,0 m) (238)



5: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



6: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (



Shadow receptors

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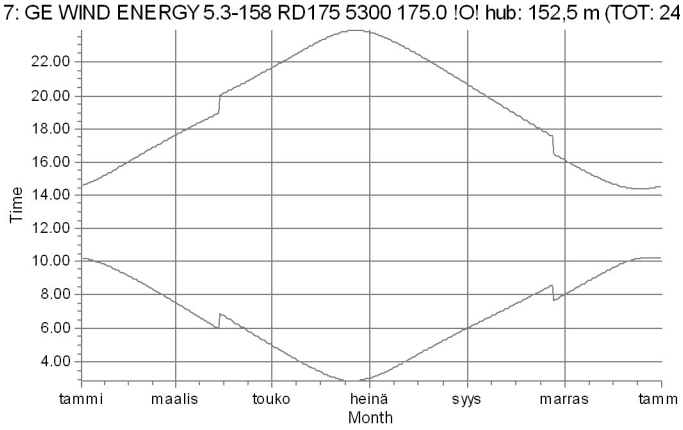
Calculated:
18.11.2020 15.10/3.4.388

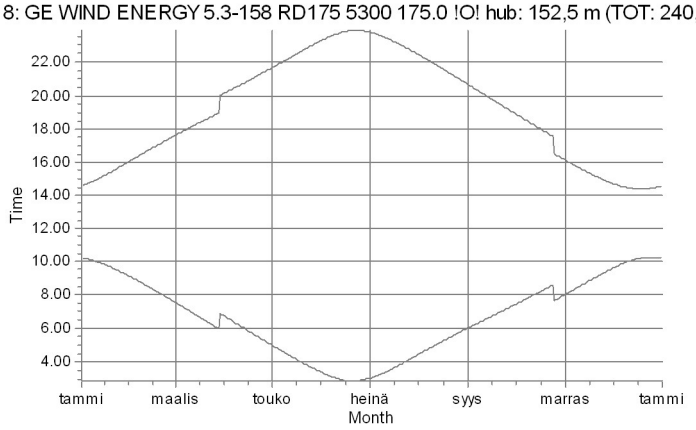
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

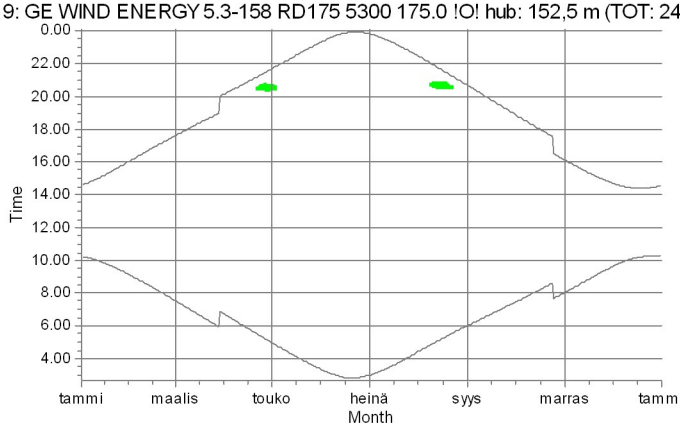
7: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



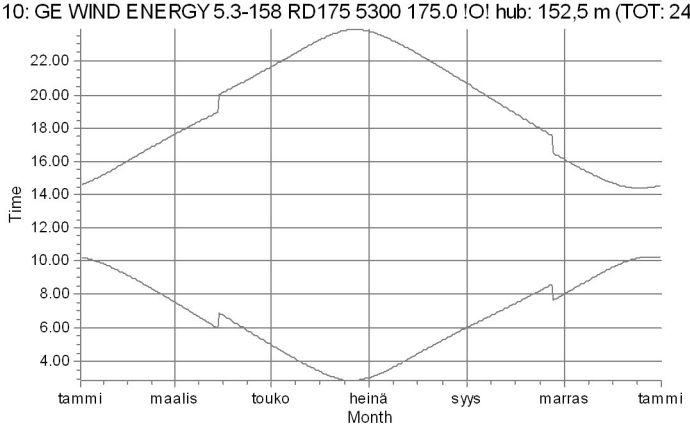
8: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m) (



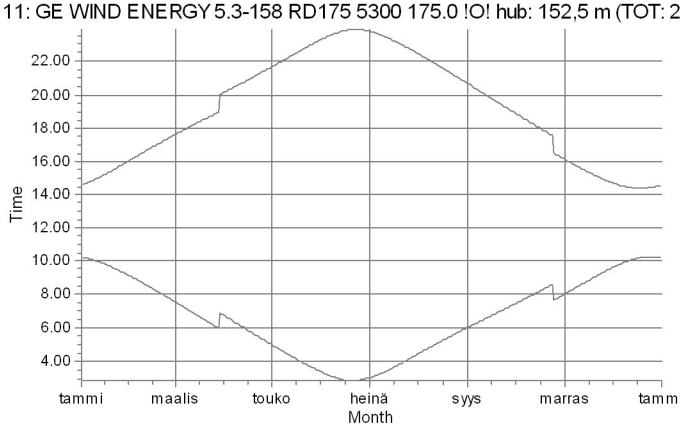
9: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 24



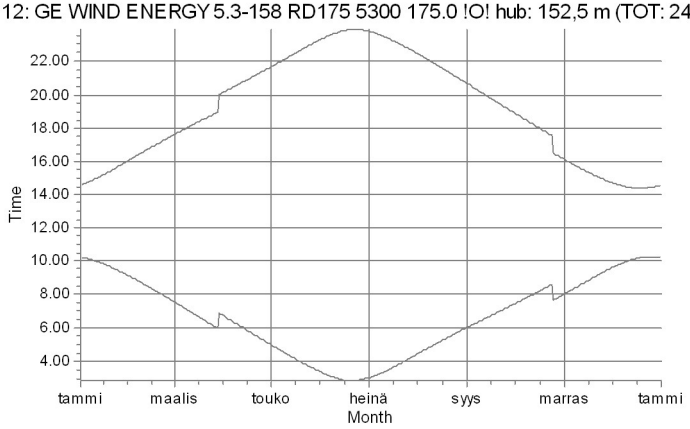
10: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



11: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 2



12: GE WIND ENERGY 5.3-158 RD175 5300 175.0 !O! hub: 152,5 m (TOT: 240,0 m)



Shadow receptors

I: Asuinrakennus I (Kortenevantie 116)

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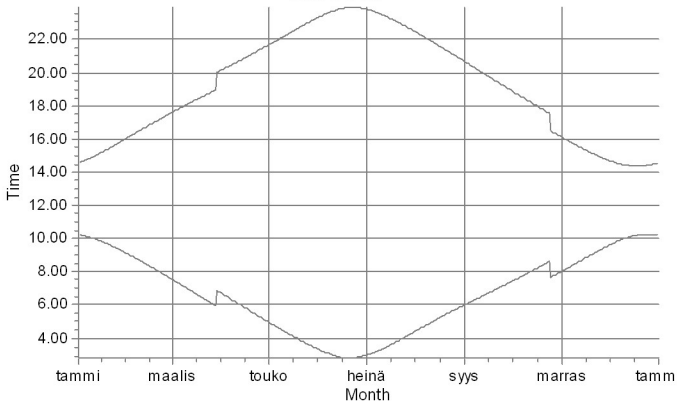
Calculated:
18.11.2020 15.10/3.4.388

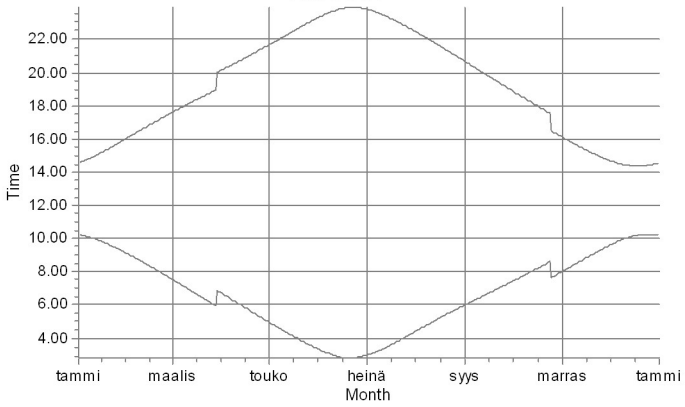
SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

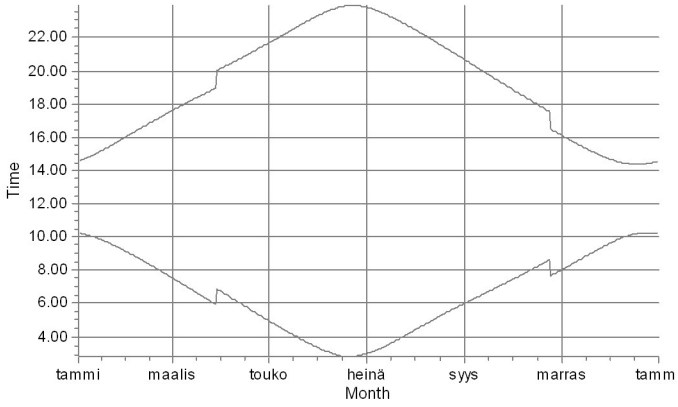
13: PUU01



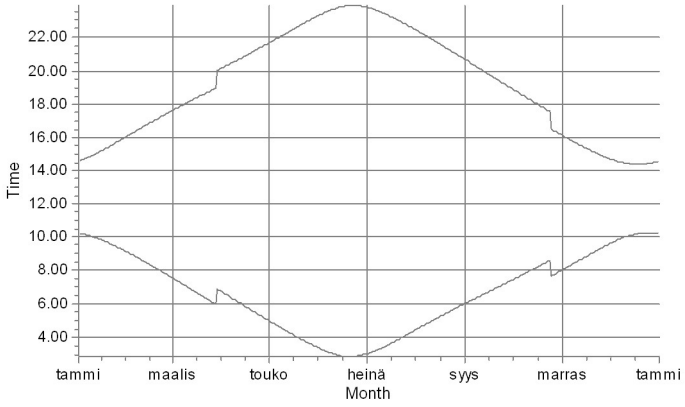
14: PUU02



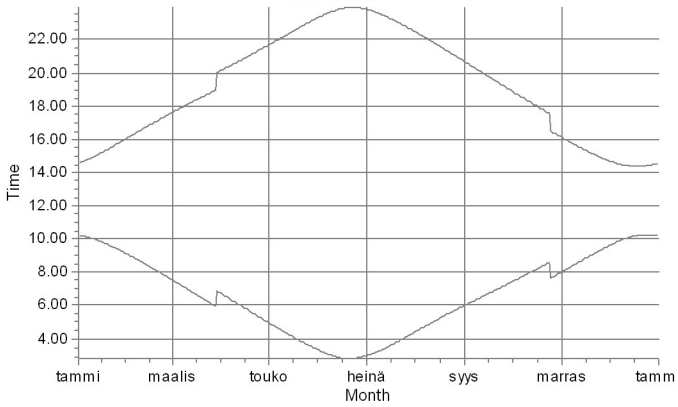
15: PUU03



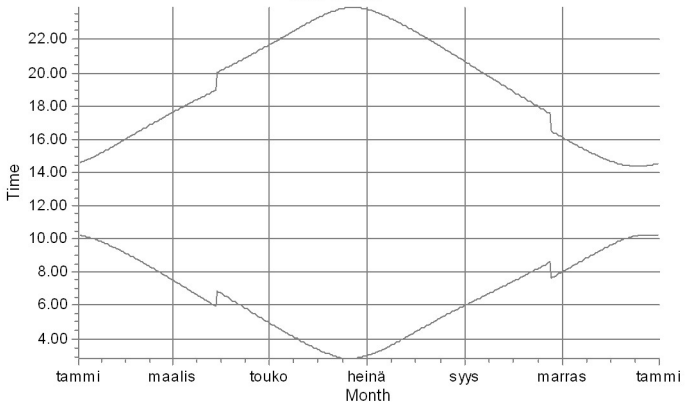
16: PUU04



17: PUU05



18: PUU06



Shadow receptors

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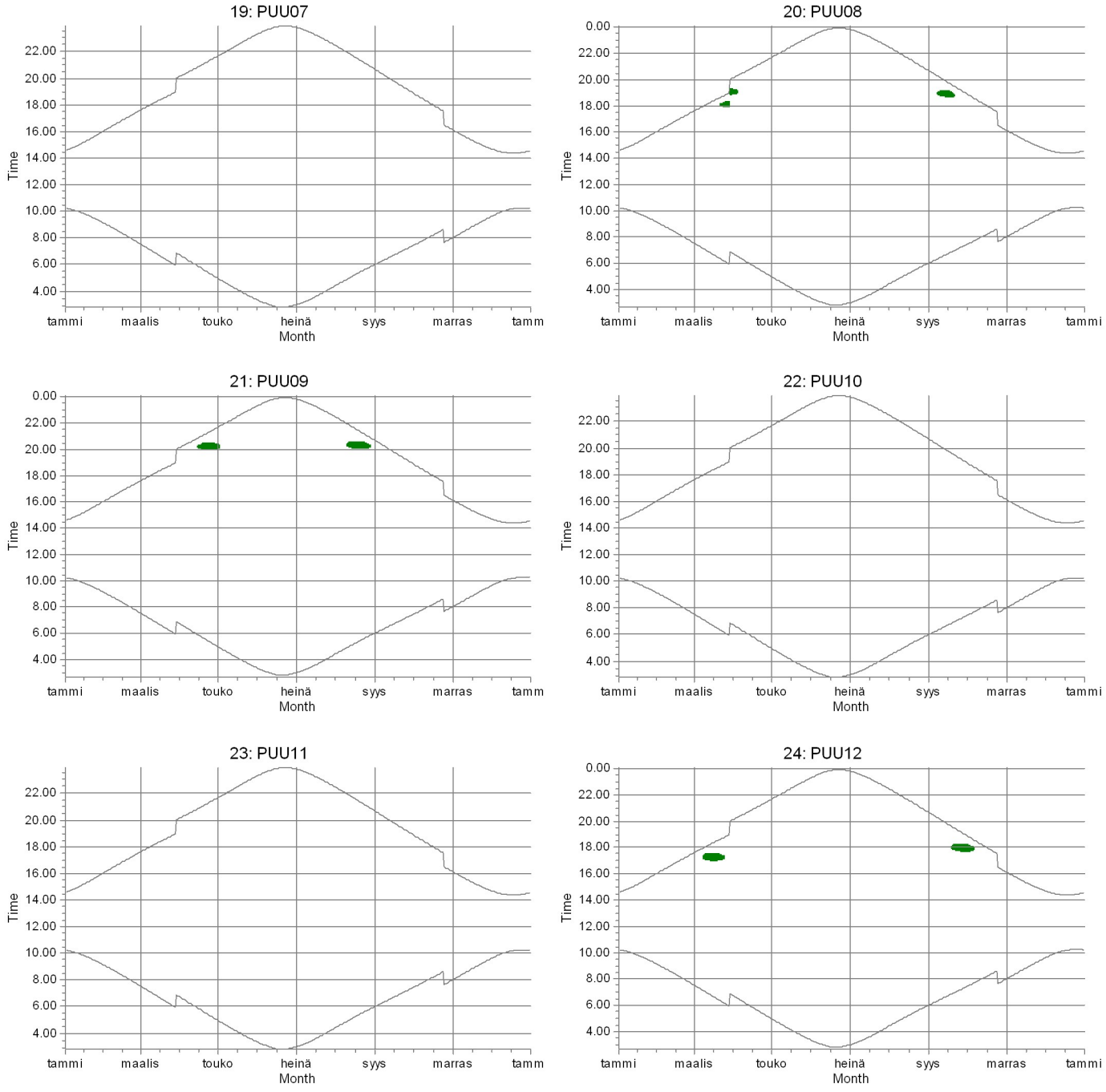
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Henna-Riikka Rintamäki / henna-riikka.rintamaki@fcg.fi

Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

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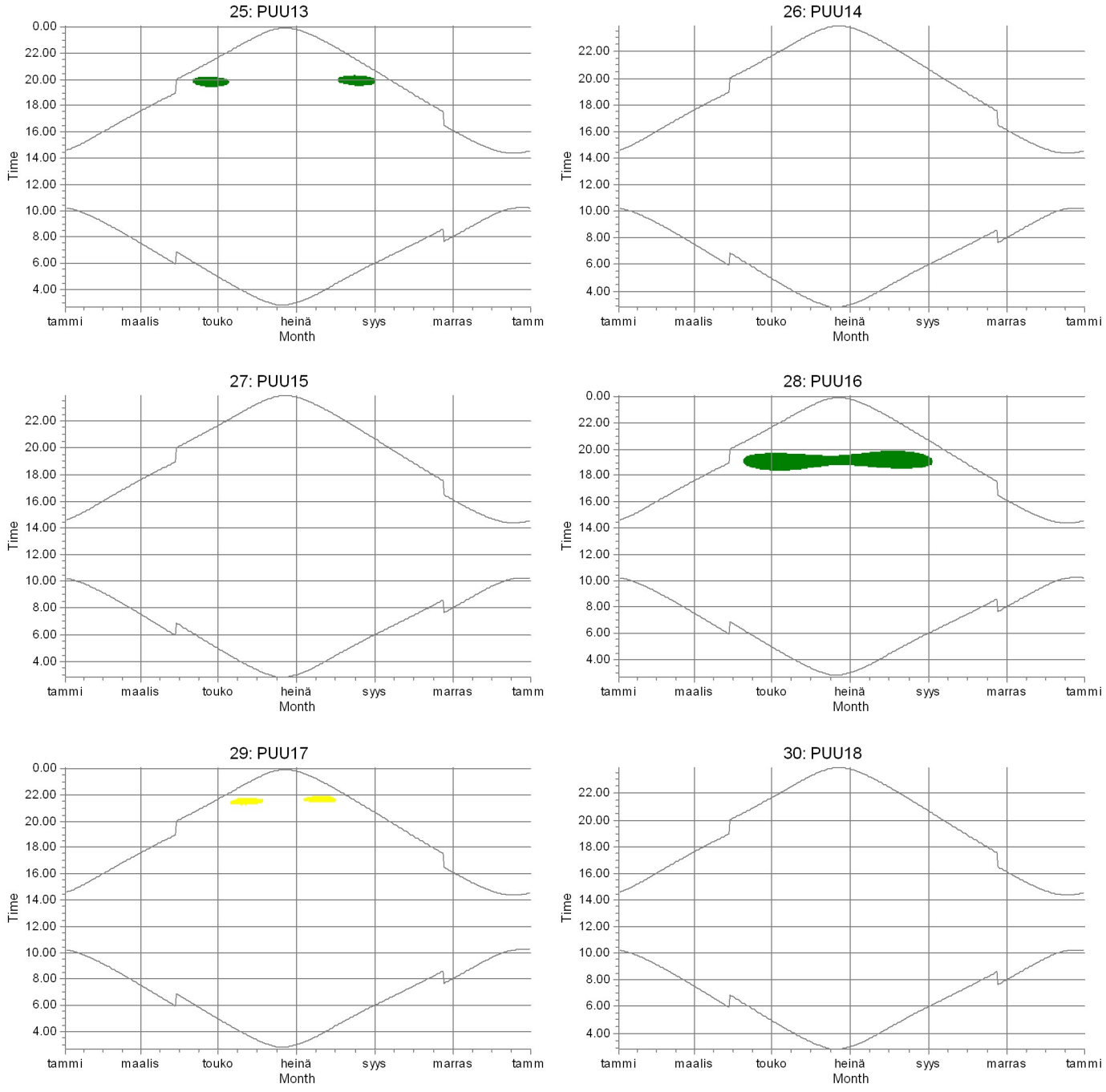
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

A: Laskentapiste A (Metsästysmaja)

B: Laskentapiste B (Ylivieskantie, Pohlola)

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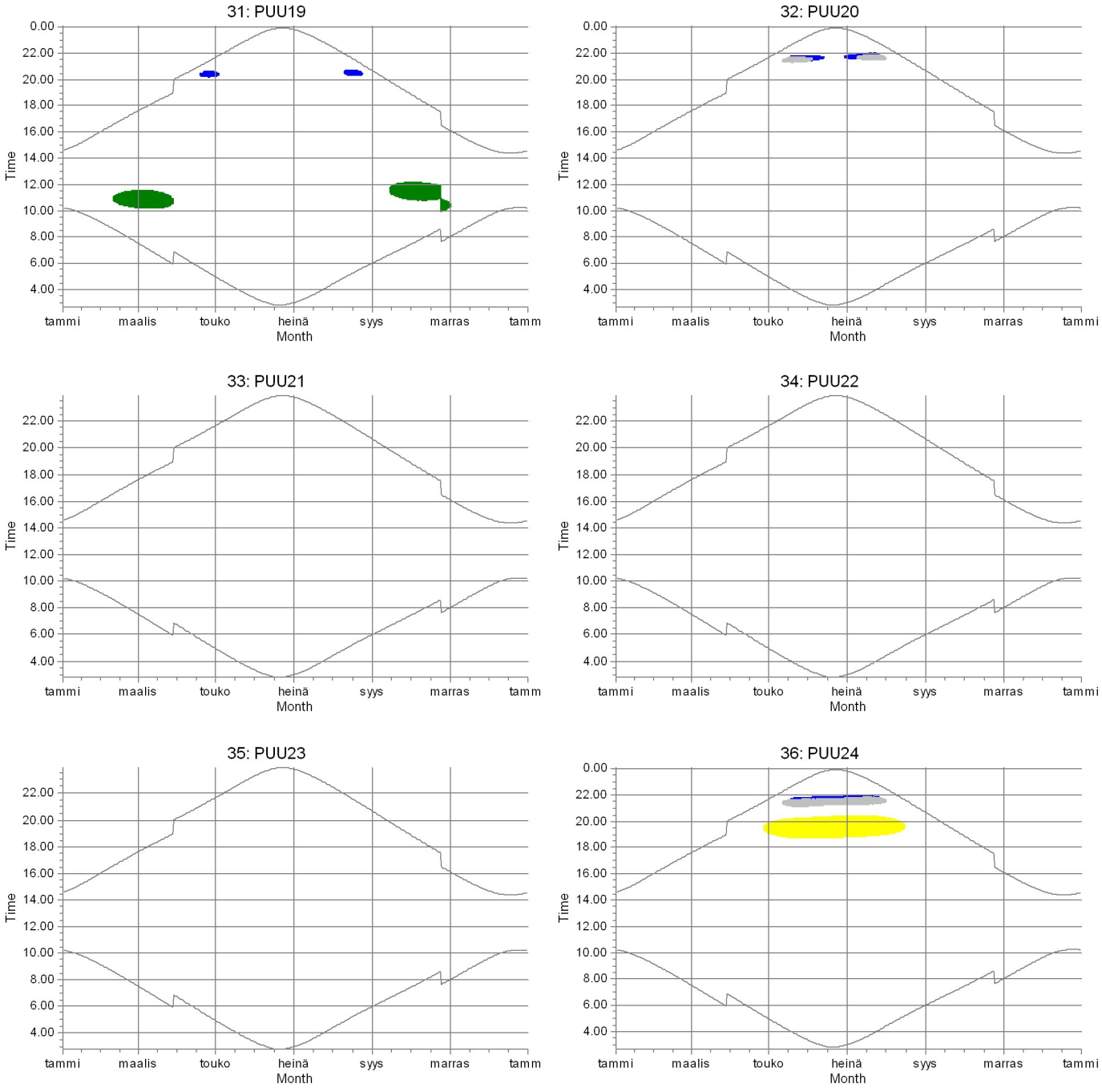
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

- A: Laskentapiste A (Metsästysmaja)
- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- L: Laskentapiste L (Perkkiontie, Ilmola)

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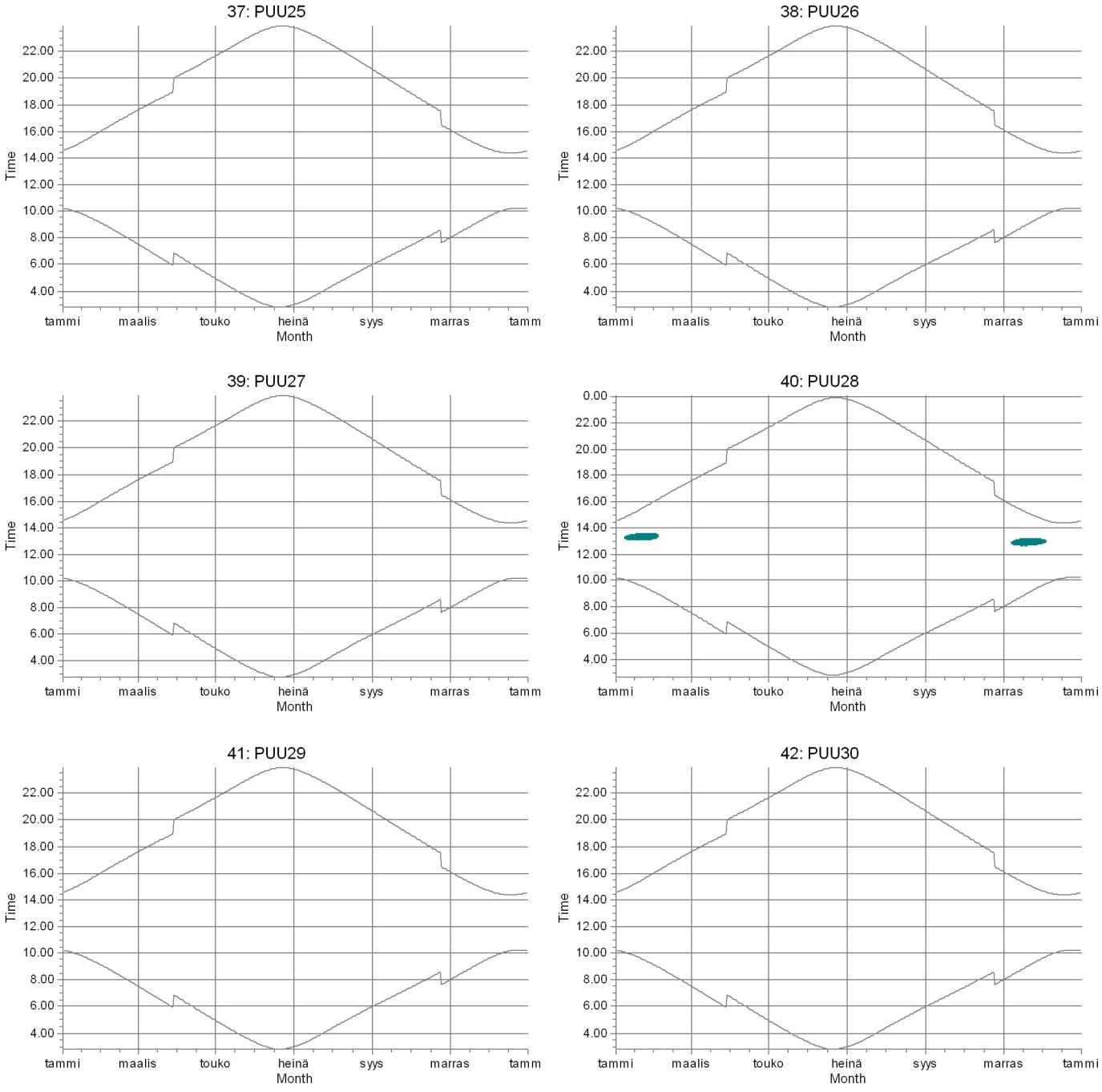
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

F: Asuinrakennus F (Ollilantie 112)

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Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
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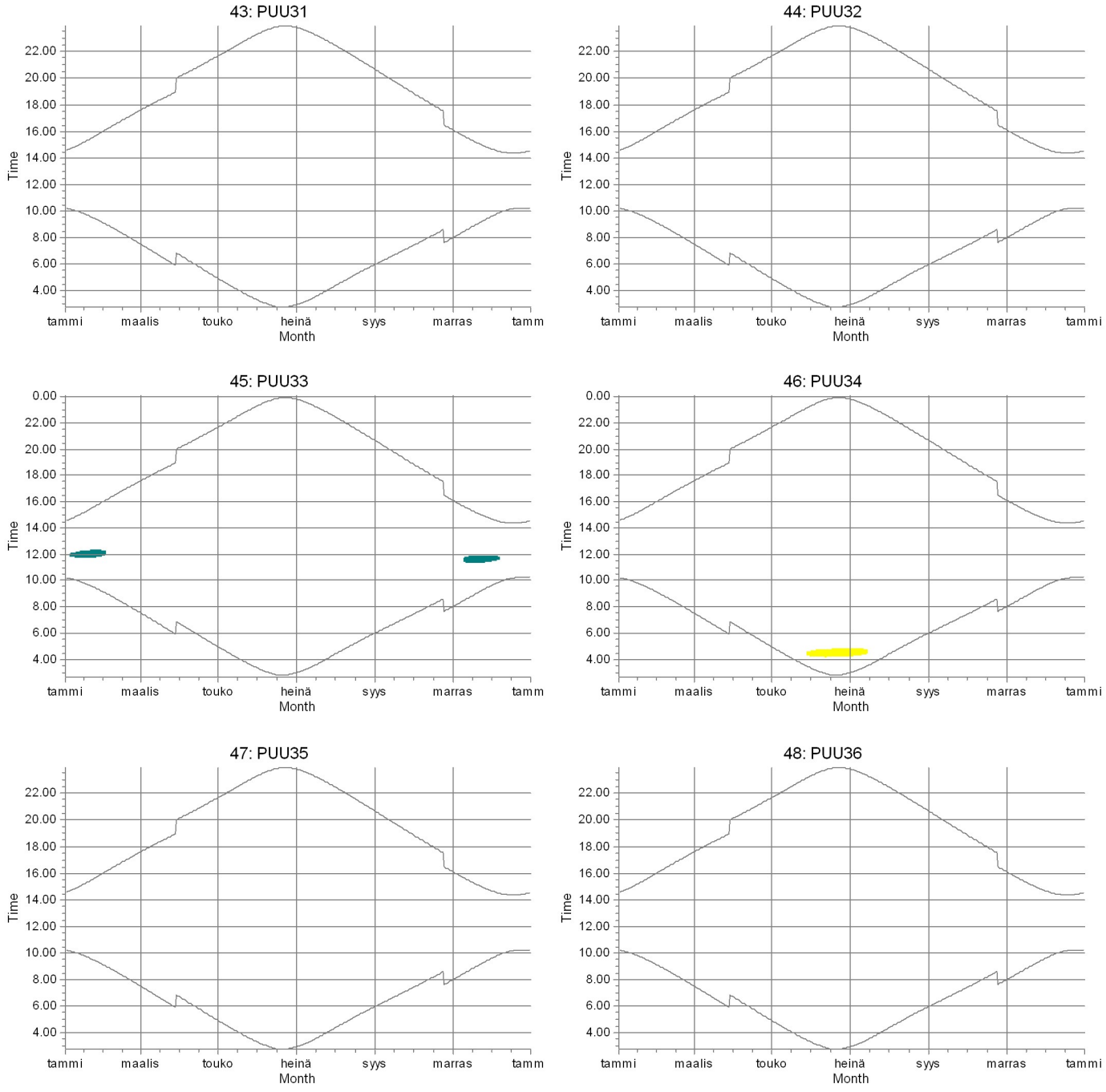
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

B: Laskentapiste B (Ylivieskantie, Pohlola)

F: Asuinrakennus F (Ollilantie 112)

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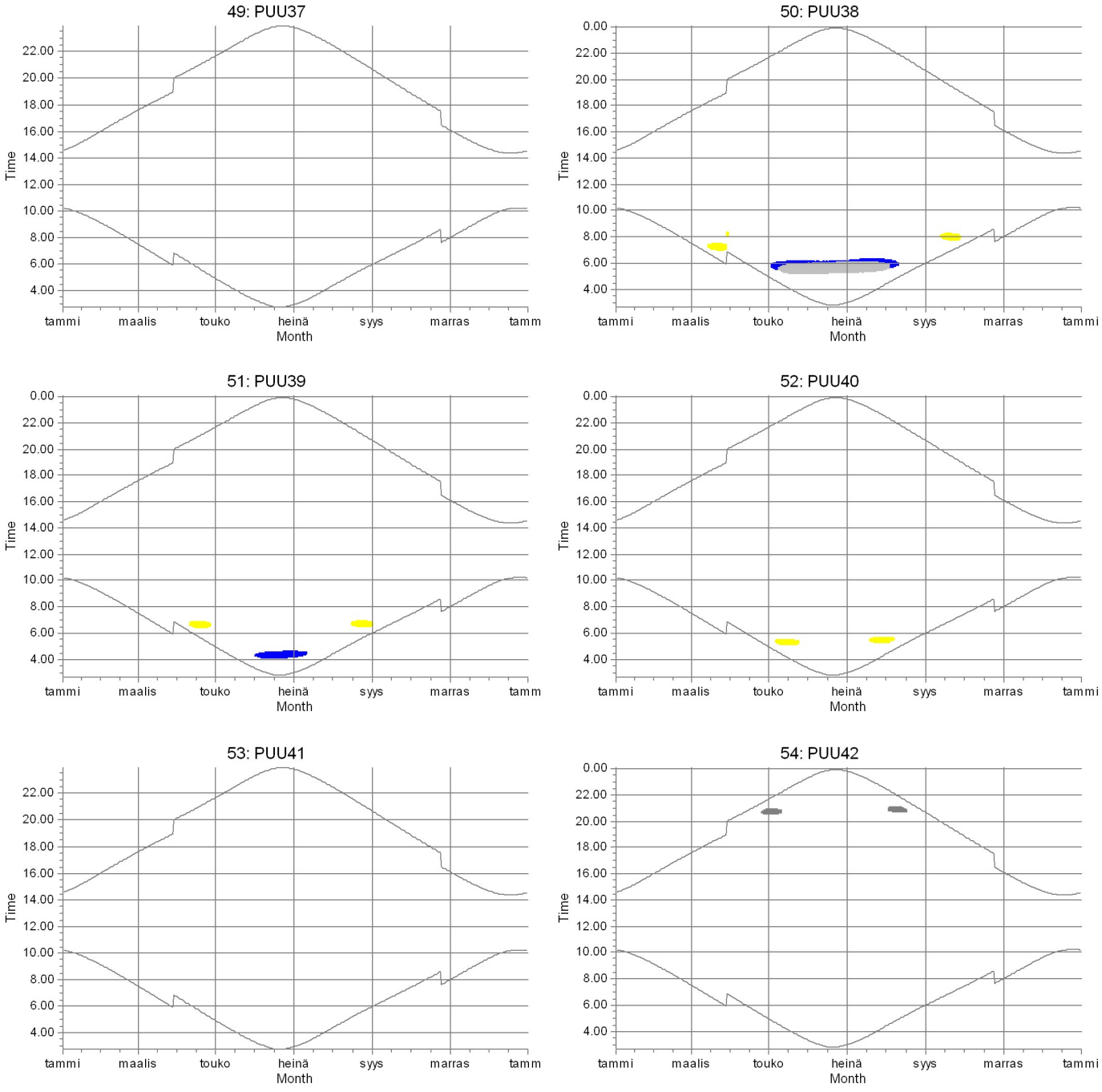
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

- B: Laskentapiste B (Ylivieskantie, Pohlola)
- C: Laskentapiste C (Perkkiontie 382)
- D: Asuinrakennus D (Alakylantie 243)
- L: Laskentapiste L (Perkkiontie, Ilmola)

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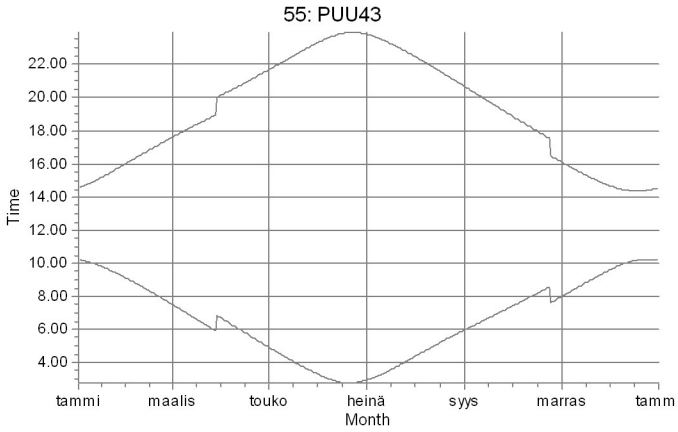
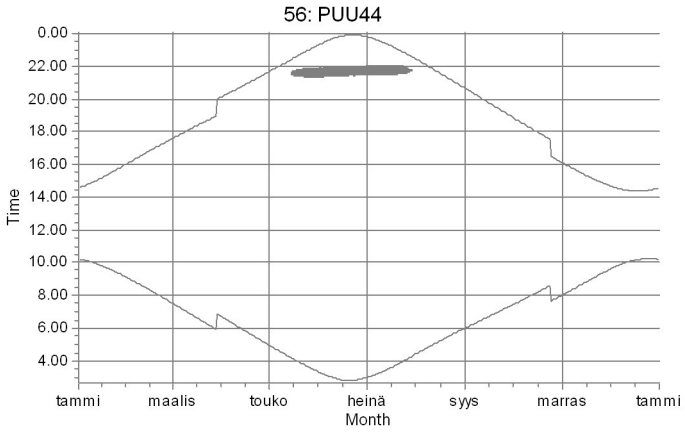
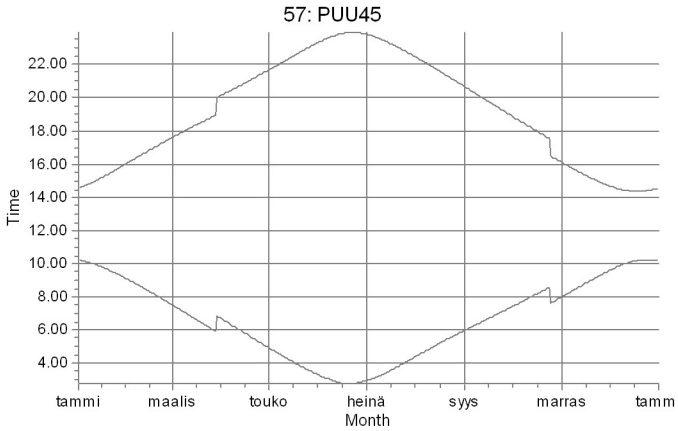
Calculated:
18.11.2020 15.10/3.4.388

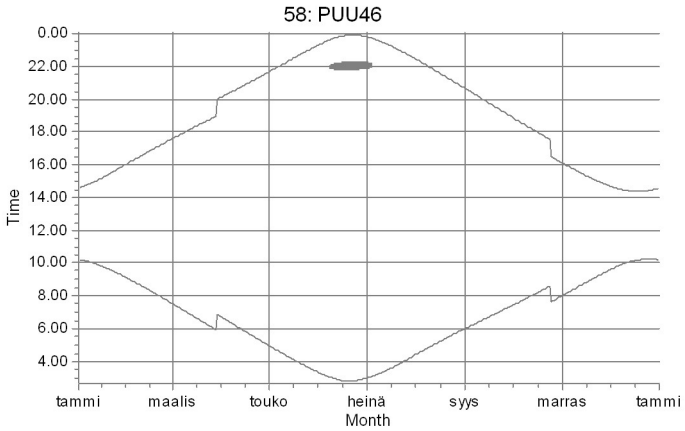
SHADOW - Calendar per WTG, graphical

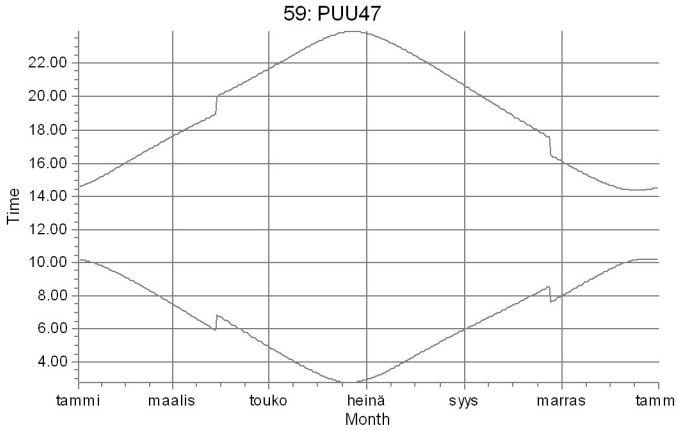
Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102

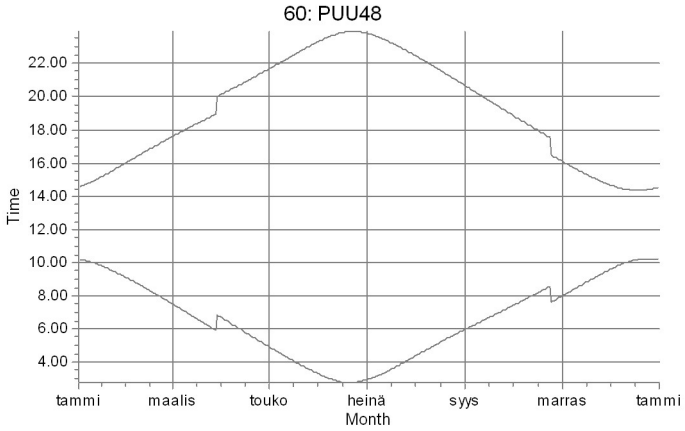












Shadow receptors

D: Asuinrakennus D (Alakylantie 243)

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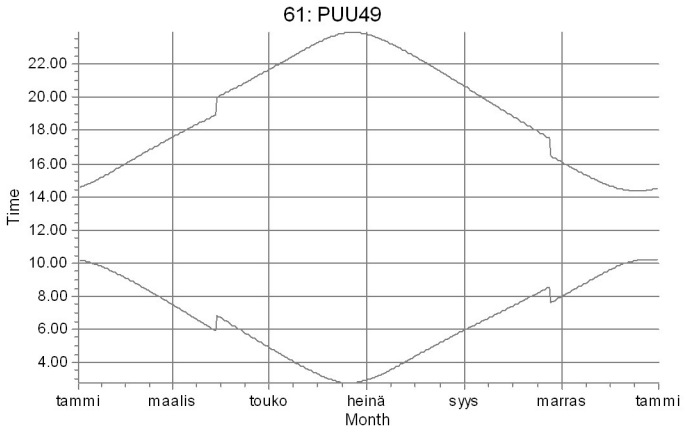
Calculated:
18.11.2020 15.10/3.4.388

SHADOW - Calendar per WTG, graphical

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Shadow receptors

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Calculated:
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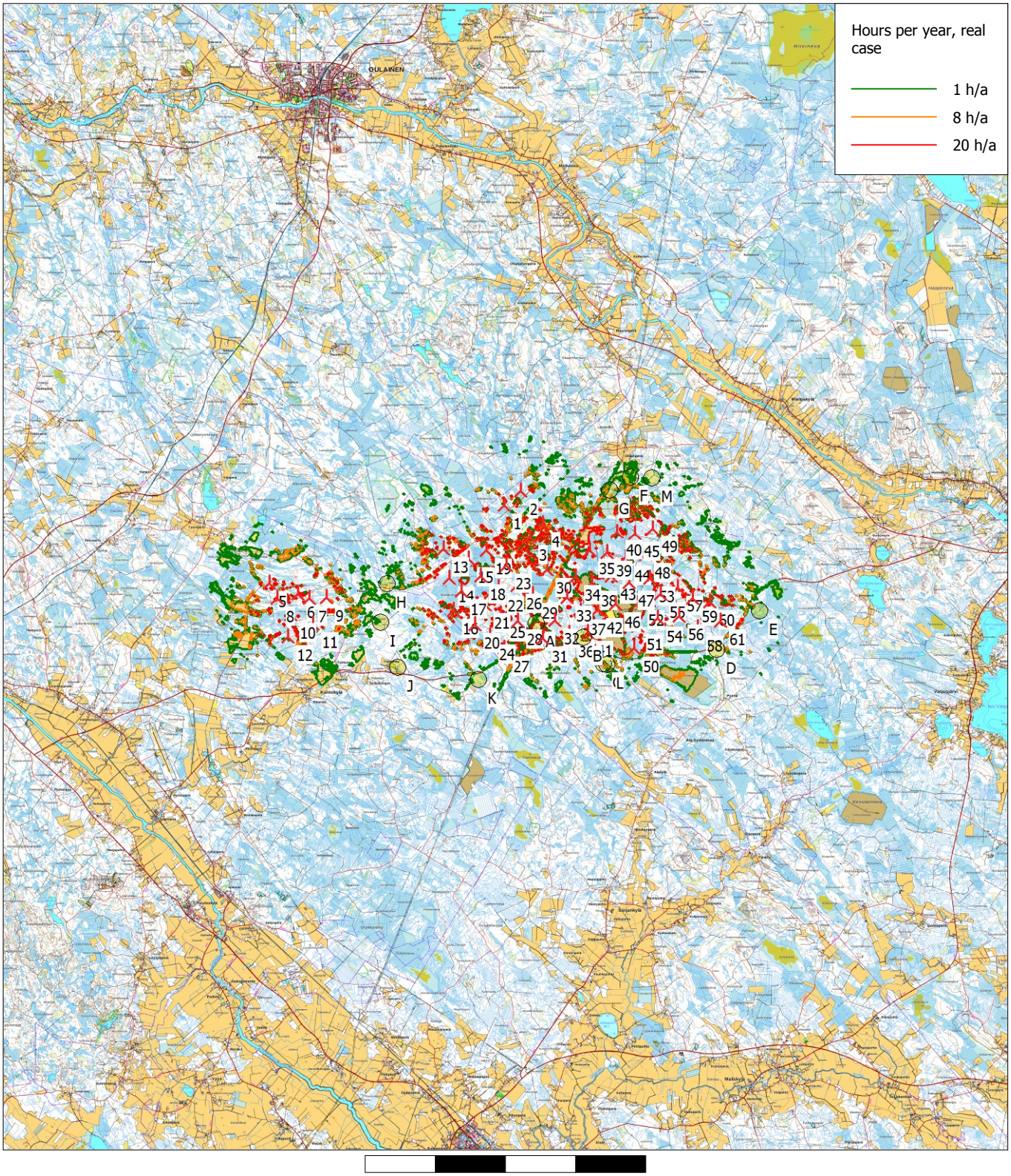
SHADOW - Map

Calculation: Puutionsaari_RD200x49xHH200_Rahkola_V150x4xHH155+Tuomiperä_RD175x8xHH152,5_Luke forest_20201102



Map: Maastokarttarasteri50K , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 401 070 North: 7 111 410

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Puutionsaari_Riskalankangas_20200327_1.wpo (2)