Skuggmodellering för Söderskogens vindkraftspark

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INNEHÅLLSFÖRTECKNING

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1 Inledning

wpd Finland Oy planerar att bygga en vindkraftspark som omfattar högst åtta vindkraftverk i området kring Söderskogen i Vörå kommun. I denna utredning, som är en del av konsekvensbedömningen i planbeskrivningen, redovisas resultatet av skuggmodelleringen av vindkraftverken.

Skuggmodelleringen är gjord med hjälp av SHADOW modulen i programmet WindPro version 3.3. Vindkraftverken i modelleringen härleds från modellen Nordex N163 till modellen Future F180 med 180 meters rotordiameter, navhöjden 210 meter och effekten 5,6 MW.

2 Skuggeffekter från vindkraftverk

Vindkraftverk är en betydligt högre konstruktion jämfört med resten av den närliggande miljön, och därför orsakar de långtgående skuggor. Bladens rotation orsakar rörliga skuggor speciellt vid soligt väder, så kallade skuggeffekter, som kan upplevas som störande.

Förekomsten av skuggeffekterna beror på avståndet från vindkraftverket, solens läge i förhållande till vindkraftverket och observationspunkten, väderförhållandena och möjliga visuella hinder som träd och byggnader.

3 Utvärderingsmetod och utgångsdata

I Finland har det inte fastställts gränsvärden eller getts rekommendationer angående skuggeffekten. Miljöministeriet hänvisar däremot till andra länders rekommendationer som med fördel kan användas. Situationen worst case står för den teoretiska maximisituationen, där man utgår från att vindkraftverken alltid är i drift, rotorn är alltid riktad rakt mot observationspunkten och solen skiner konstant från soluppgång till solnedgång. För verkliga situationer, real case, tas däremot både solskenstimmar och vinddata i beaktande.

I Tyskland är gränsvärdena för worst case 30 timmar per år och 30 minuter per dag. I Danmark tillämpas i allmänhet högst tio timmar per år som gränsvärde för real case. Motsvarande rekommendation i Sverige är högst åtta timmar per år och 30 minuter per dag. [Miljöförvaltningens anvisningar 5/2016, Planering av vindkraftsutbyggnad. Uppdatering 2016]

Skuggmodelleringen motsvarar situationen i konsekvensbedömningen i planbeskrivningen med åtta vindkraftverk där navhöjden är 210 meter och rotorns diameter är 180 meter. Skuggmodelleringen är gjord med hjälp av SHADOW modulen i programmet WindPro version 3.3 för båda situationerna. Modelleringen tar i beaktande verkens och observationspunkternas positioner, terrängdata samt solens position på himlen. Vid beräkningen real case tas även solskenstimmarna och vinddata i beaktande. Programmet räknar ut skuggeffektstiden vid

varje observationspunkt som varje enskilt vindkraftverk åstadkommer med en minuts noggrannhet för hela året. Skuggeffekterna antas inte uppstå i sådant fall att terrängdata visar att det inte är fri sikt mellan vindkraftverket och observationspunkten ifråga. Trädbeståndets inverkan har inte beaktats i modelleringen. Trädbeståndet fungerar i många positioner som ett synlighetshinder till vindkraftverken. Ifall vindkraftverken inte syns, bildas heller inte skuggor i observationspunkten. På grund av detta så kan resultatet även från real case modelleringen vara större än i verkligheten.

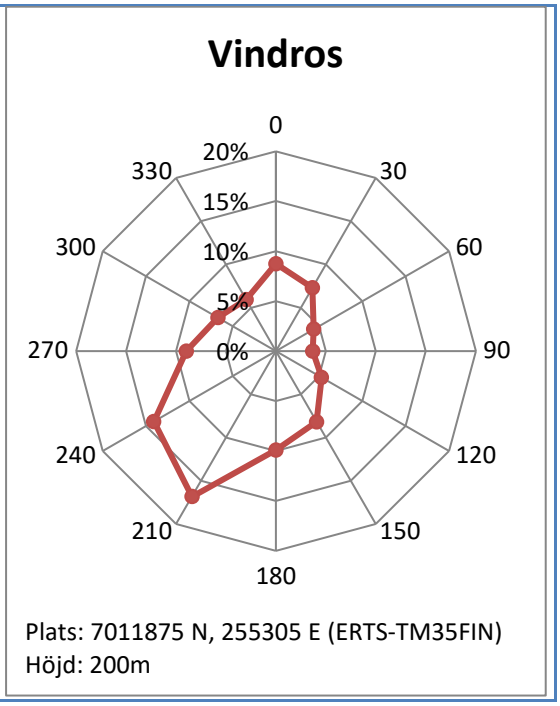
Solskenstimmarna som används i beräkningen real case kommer från Seinäjokis meteorologiska institut och är medelvärden från åren 1981–2011 (Tabell 1). Tabell 2 innehåller winddata som används i beräkningen real case och kommer från vindatlasen i punkten 7011875 N, 255305 E på 200 meters höjd. Beräkningen begränsas till den tid då solen är minst tre grader över horisontlinjen. Då solen är lägre än det, är ljusets brytning så stor, att skuggeffekter inte anses uppstå. Skuggeffekter antas även uppstå då minst 20 % av solen täcks av bladet, därav definieras beräkningsavståndet. De parametrar som används i beräkningen är listade i tabell 3.

Tabell 1. Medelvärden av dagliga solskenstimmar vid Seinäjoki meteorologiska institut från åren 1981-2011.

Månad	1	2	3	4	5	6	7	8	9	10	11	12
h/dygn	1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Tabell 2. Vindatlasens vindfördelning på 200 meters höjd i punkten 7011875 N, 255305 E

Vindriktning	Andel (%)	Vindhsatighet (m/s)
0	8,8	8,1
30	7,3	7,8
60	4,4	6,5
90	3,7	6,5
120	5,3	7,6
150	8,2	8,9
180	9,9	9,1
210	16,8	9,9
240	14,1	9,1
270	9,0	8,7
300	6,7	7,2
330	6,0	7,5
Medelvärde		8,5



Tabell 3. Beräkningsparametrar

Parameter	Värde
Solens position över horistonten	3 °
Beräkningsavstånd (beroende av dimensionen på bladet)	2102 m
Vågrät upplösning	10 m
Terrängmodell	10 m (lantmäteriverket)
Observationshöjd	1,5 m

De bostadshus och fritidshus som är närmast de preliminära vindkraftspositionerna i planbeskrivningen har valts till modelleringen (observationspunkter). Avståndet till dessa är ungefär 1,5 – 2,6 km. Bostadshusen RH01-14 (RH = residential house) och fritidshusen HH01-02 (HH = holiday house) är namngivna i slumpmässig ordning (Bild 1). Närmaste bostadshuset (RH04) ligger på 1,5 km avstånd från vindkraftverk 4. Husen i modelleringen är av så kallad ”växthusmodell”, vilket betyder att placeringen av fönster inte har tagits i beaktande. På detta sätt antas skuggeffekter uppstå i alla fall där skuggan når fram till observationspunkten.

Det är viktigt att även analysera de kumulativa konsekvenserna som för Söderskogens del betyder de sammanslagna konsekvenserna med vindkraftsparkerna Märkenkall, Lotlax och Lålax. Alla dessa projekt ligger inom en radie om 10 km och det är motiverat att analysera dessa tillsammans. För Märkenkall, Lotlax och Lålax del är modellen av vindkraftverken den som har använts i planläggningen eller i byggloven, beroende på vilket skede projektet befinner sig i (Tabell 4).

Tabell 4. Vindkraftsparkerna Märkenkall, Lotlax och Lålax

Projekt	Modell	Rotordiameter	Navhöjd
Märkenkall, 15 vindkraftverk	GE 5.5-158 5,5 MW	158 m	161 m
Lålax, 4 vindkraftverk	Vestas V150 4,2 MW	150 m	140 m
Lotlax, 3 vindkraftverk	Prokon P3000 3 MW	116,7 m	122 m

4 Resultat och slutsatser

Resultaten är presenterade i kartan i bild 1 och i bilaga 1 (real case) och tabell 5 innehåller antalet skuggeffekttimmar för de närliggande husen. Resultatet av worst case modelleringen presenteras i bilaga 2. Resultatet av skuggmodelleringen för de sammanslagna konsekvenserna, som är jämförelsebar med riktvärden, presenteras i kartan i bild 2 och i bilagan 3.

Resultatet av worst case modelleringen för de sammanslagna konsekvenserna presenteras i bilaga 4.

I närheten av vindkraftverken uppstår det mycket skuggeffekter som avtar då avståndet ökar. Skuggeffekterna är främst på östra, norra och västra sidan av vindkraftverken på grund av solens bana på norra delen av jordklotet. Från skuggutbredningskartan kan man se att skuggeffekter når längst i riktningen sydost och sydväst, vilket kan observeras i observationspunkterna RH01-RH05. Vid observationspunkterna RH01-RH04 uppstår ungefär 5 – 6 timmar per år i beräkningen real case. Från de noggrannare modelleringsresultat (bilaga 1, sida 19) kan man se att till exempel för RH02 kan skuggeffekter uppstå endast mellan klockan 5.00 – 6.00 under sommarmånaderna.

Sammanfattningsvis kan man konstatera att riktvärden för skuggeffekter inte överskrids i något bostadshus eller fritidshus. Riktvärden är 30 timmar per år och 30 minuter per dag för de beräknade maximisituationerna samt åtta timmar per år för de verkliga situationerna. På basen av skuggmodelleringen av de sammanslagna konsekvenserna kan man konstatera att riktvärden inte överskrids som en följd av de sammanslagna konsekvenserna. Skuggeffekter vid observationspunkt RH12 uppstår inte från projektet Söderskogen, däremot uppstår delvis skuggor i denna punkt från projektet Lotlax.

Tabell 5. Resultat av skuggmodelleringen vid de närmast belägna byggnaderna

Bostad	den verkliga situationen (real case) (h/år)	den teoretiska maximi-situationen (worst case) (min/dag)	den teoretiska max-imisituationen (worst case) (h/år)
HH01	0:00	0:00	0:00
HH02	0:00	0:00	0:00
RH01	3:34	0:21	12:05
RH02	5:17	0:25	18:00
RH03	3:14	0:22	11:06
RH04	5:14	0:24	17:49
RH05	1:36	0:15	5:27
RH06	0:00	0:00	0:00
RH07	0:00	0:00	0:00
RH08	4:12	0:23	15:43
RH09	2:45	0:22	11:01
RH10	0:00	0:00	0:00
RH11	0:00	0:00	0:00
RH12	0:00	0:00	0:00
RH13	1:14	0:21	7:14
RH14	0:00	0:00	0:00

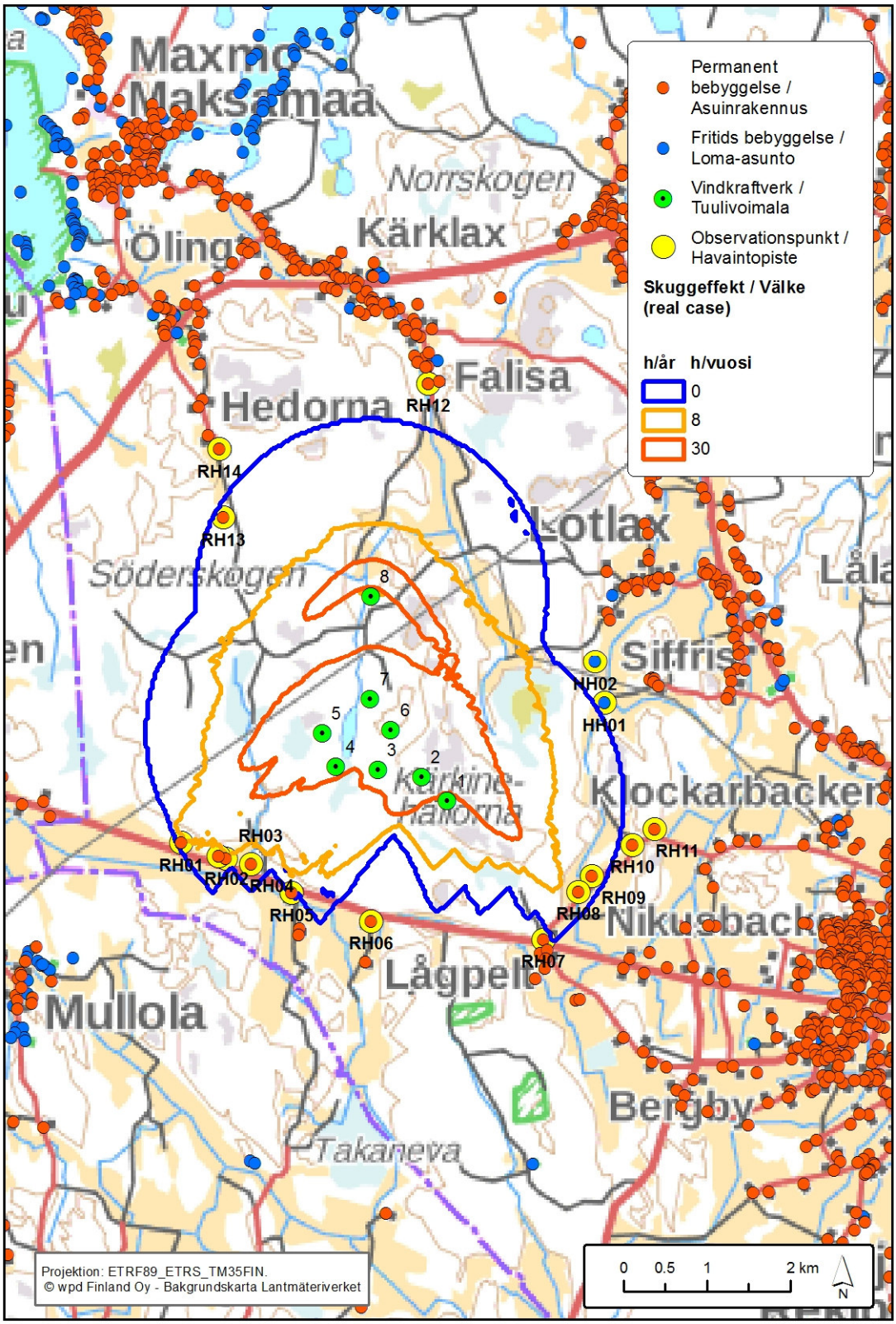


Bild 1. Skuggutbredningskarta, real case

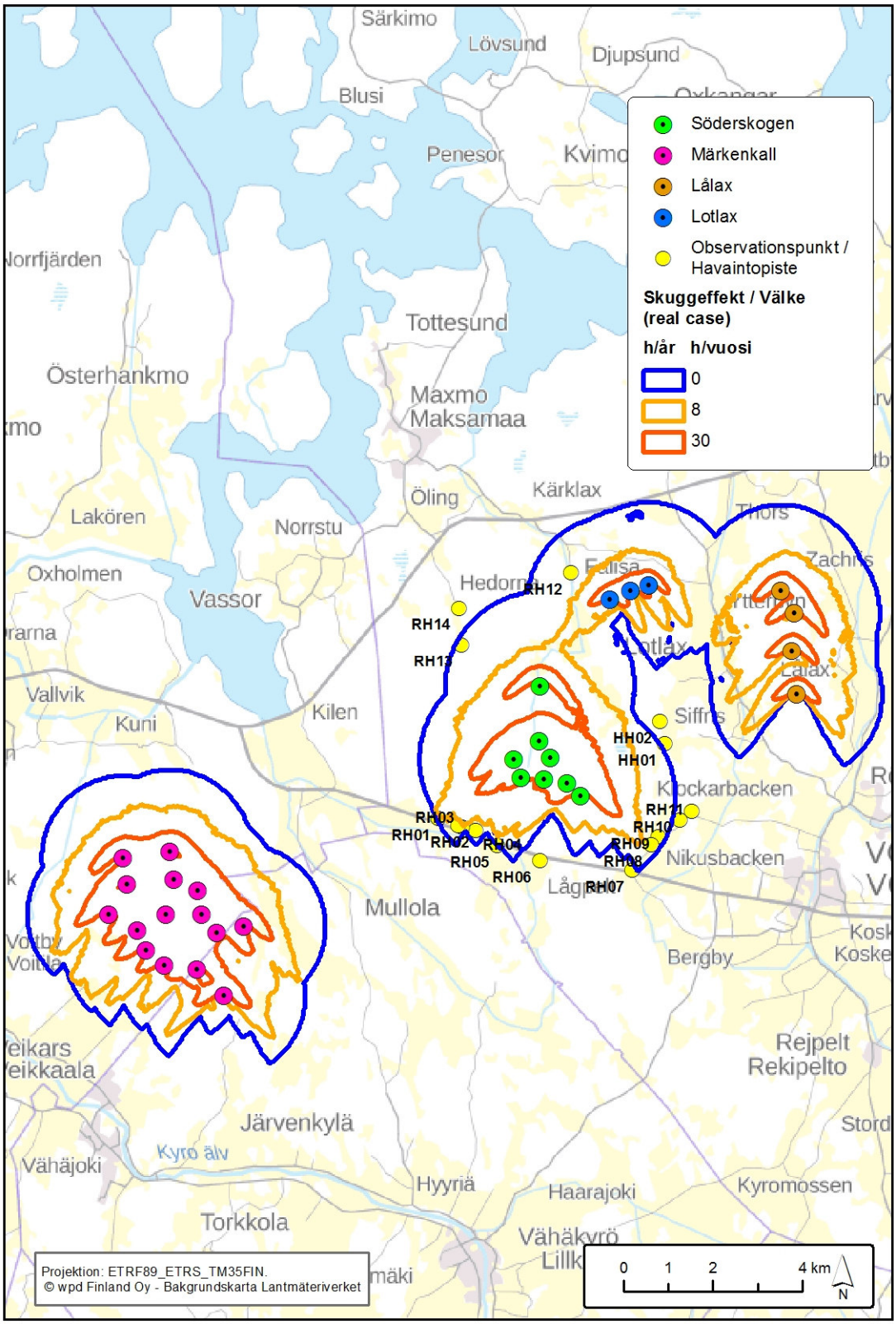


Bild 2. Skuggutbredningskarta, kumulativa konsekvenser, real case

5 Bilagor

Bilaga 1 - Modelleringens utgångsdata och resultat, real case Söderskogen

Bilaga 2 - Modelleringens utgångsdata och resultat, worst case Söderskogen

Bilaga 3 - Modelleringens utgångsdata och resultat, real case kumulativa konsekvenser

Bilaga 4 - Modelleringens utgångsdata och resultat, worst case kumulativa konsekvenser

Bilaga 1

Modelleringens utgångsdata och resultat,

real case Söderskogen

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Söderskogen

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27.8.2021 14.58/3.3.294

SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Real case

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) [SEINAJOKI]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational hours are calculated from WTGs in calculation and wind distribution:
Finnish Wind Atlas (gp=30279, lat=63.153, lon=22.140)

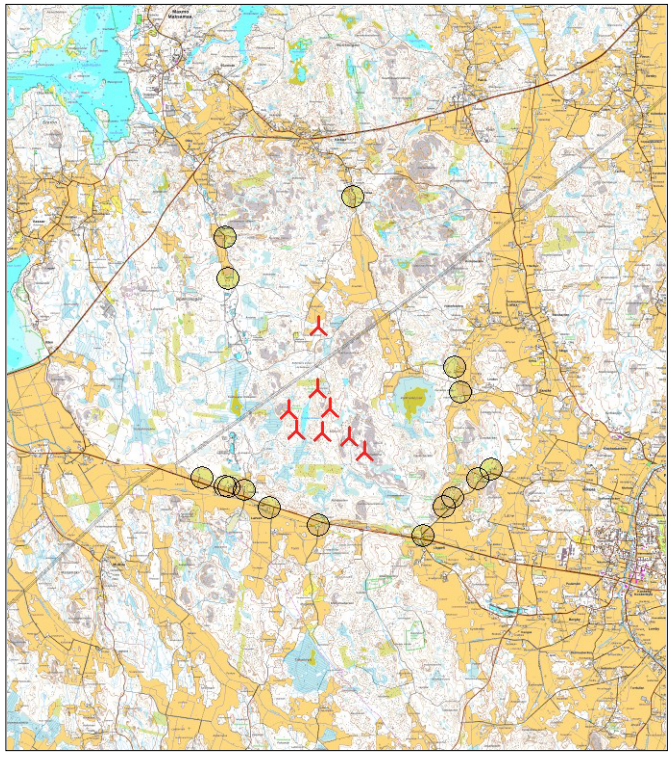
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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: DEM 2m
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 1:150 000
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	255445	7011327	46,5	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
2	255137	7011612	50,4	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
3	254614	7011705	38,8	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
4	254111	7011739	25,6	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
5	253945	7012144	33,9	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
6	254771	7012174	40,0	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
7	254521	7012552	35,1	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
8	254528	7013790	19,3	FUTURE F180 5.6 MW 5600 180....	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1

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]
HH01	HH01	257331	7012499	17,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
HH02	HH02	257219	7012995	17,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH01	RH01	252257	7010823	13,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH02	RH02	252700	7010660	15,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH03	RH03	252789	7010635	15,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH04	RH04	253090	7010568	15,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH05	RH05	253574	7010222	14,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH06	RH06	254528	7009881	18,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH07	RH07	256594	7009667	21,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH08	RH08	257015	7010236	19,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH09	RH09	257177	7010423	17,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH10	RH10	257669	7010798	18,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH11	RH11	257929	7010986	18,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH12	RH12	255219	7016333	14,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH13	RH13	252762	7014727	25,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH14	RH14	252714	7015547	21,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0

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SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Real case

Calculation Results

Shadow receptor

No.	Name	Shadow, worst case: Shadow hours per year [h/year]	Shadow, worst case: Shadow days per year [days/year]	Shadow, worst case: Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
HH01	HH01	0:00	0	0:00	0:00
HH02	HH02	0:00	0	0:00	0:00
RH01	RH01	12:05	45	0:21	3:34
RH02	RH02	18:00	52	0:25	5:17
RH03	RH03	11:06	38	0:22	3:14
RH04	RH04	17:49	53	0:24	5:14
RH05	RH05	5:27	28	0:15	1:36
RH06	RH06	0:00	0	0:00	0:00
RH07	RH07	0:00	0	0:00	0:00
RH08	RH08	15:43	53	0:23	4:12
RH09	RH09	11:01	38	0:22	2:45
RH10	RH10	0:00	0	0:00	0:00
RH11	RH11	0:00	0	0:00	0:00
RH12	RH12	0:00	0	0:00	0:00
RH13	RH13	7:14	26	0:21	1:14
RH14	RH14	0:00	0	0:00	0:00

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)	26:44	6:58
2	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)	5:27	1:36
3	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)	17:49	5:14
4	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)	34:16	10:06
5	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)	0:00	0:00
6	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)	0:00	0:00
7	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)	0:00	0:00
8	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)	7:14	1:14

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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** HH01 - HH01

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.35
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.03
3	10.08	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.04	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.36	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.11	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.51
12	09.56	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.48
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.07
	15.38	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.10	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.13	03.21	04.13	05.43	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.27	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.57	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.55
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** HH02 - HH02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.35
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.03
3	10.08	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.04	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.36	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.04	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.07	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.11	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.13	18.31	15.54	14.51
12	09.56	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	10.00
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.48
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.07
	15.38	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.10	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.13	03.21	04.13	05.43	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.49
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.24	05.55	07.21	08.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.17	14.51
26	09.24	07.50	06.16	05.31	03.59	03.23	04.27	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.52	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.25	04.33	06.03	07.29	07.55	09.27	10.12
	16.11	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.55
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.29	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH01 - RH01

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May		June	July		August		September	October	November	December
1	10.10	09.08	07.41	06.56	05.15		03.46	03.29		04.45		05.46 (4)	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46		23.16	23.42		22.29	20	06.06 (4)	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11		03.44	03.31		04.48		05.47 (4)	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49		23.18	23.40		22.26	19	06.06 (4)	20.45	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08		03.42	03.32		04.51		05.47 (4)	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52		23.21	23.39		22.23	18	06.05 (4)	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05		03.40	03.34		04.54		05.49 (4)	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55		23.23	23.38		22.20	15	06.04 (4)	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02		03.38	03.36		04.57		05.49 (4)	06.26	07.49	08.19	09.45
	15.09	16.37	18.02	20.30	21.58		23.25	23.36		22.17	14	06.03 (4)	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	05.44 (4)	03.36	03.37		05.00		05.51 (4)	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	6 05.50 (4)	23.27	23.35		22.14	10	06.01 (4)	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	05.41 (4)	03.34	03.39		05.03		05.54 (4)	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	11 05.52 (4)	23.29	23.33		22.11	3	05.57 (4)	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	05.39 (4)	03.32	03.41		05.06			06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	14 05.53 (4)	23.31	23.31		22.08			20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	05.38 (4)	03.31	03.44		05.09			06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	17 05.55 (4)	23.33	23.29		22.04			20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	05.37 (4)	03.29	03.46		05.12			06.40	08.03	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	18 05.55 (4)	23.35	23.27		22.01			20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	05.36 (4)	03.28	03.48		05.15			06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	19 05.55 (4)	23.36	23.25		21.58			20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	05.36 (4)	03.27	03.50		05.18			06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	20 05.56 (4)	23.38	23.23		21.55			20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	05.36 (4)	03.26	03.53		05.21			06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	20 05.56 (4)	23.39	23.21		21.51			20.07	18.25	15.48	14.51
14	09.52	08.29	06.57	06.11	04.34	05.36 (4)	03.25	03.55		05.24			06.51	08.14	08.47	10.03
	15.31	17.05	18.28	20.56	22.25	21 05.57 (4)	23.41	23.19		21.48			20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	05.35 (4)	03.24	03.58		05.27			06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	21 05.56 (4)	23.42	23.16		21.45			20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.05	04.28	05.36 (4)	03.23	04.00	05.54 (4)	05.30			06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	21 05.57 (4)	23.43	23.14	2 05.56 (4)	21.42			19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	05.35 (4)	03.23	04.03	05.51 (4)	05.32			06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	21 05.56 (4)	23.44	23.11	8 05.59 (4)	21.38			19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	05.36 (4)	03.22	04.06	05.51 (4)	05.35			07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	20 05.56 (4)	23.45	23.09	11 06.02 (4)	21.35			19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	05.36 (4)	03.22	04.08	05.50 (4)	05.38			07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	20 05.56 (4)	23.45	23.06	13 06.03 (4)	21.32			19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	05.36 (4)	03.22	04.11	05.49 (4)	05.41			07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	19 05.55 (4)	23.46	23.04	15 06.04 (4)	21.28			19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	05.37 (4)	03.22	04.14	05.48 (4)	05.44			07.10	08.34	09.08	10.11
	15.51	17.26	18.48	21.17	22.46	18 05.55 (4)	23.46	23.01	16 06.04 (4)	21.25			19.40	17.59	15.27	14.49
22	09.34	08.04	06.30	05.44	04.11	05.37 (4)	03.22	04.17	05.47 (4)	05.47			07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	18 05.55 (4)	23.46	22.58	18 06.05 (4)	21.22			19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	05.38 (4)	03.22	04.19	05.47 (4)	05.50			07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	16 05.54 (4)	23.46	22.56	19 06.06 (4)	21.18			19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	05.39 (4)	03.22	04.22	05.47 (4)	05.53			07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	14 05.53 (4)	23.46	22.53	19 06.06 (4)	21.15			19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	05.40 (4)	03.23	04.25	05.46 (4)	05.55			07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	12 05.52 (4)	23.46	22.50	20 06.06 (4)	21.12			19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	05.42 (4)	03.24	04.28	05.47 (4)	05.58			07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	9 05.51 (4)	23.46	22.47	20 06.07 (4)	21.08			19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	05.43 (4)	03.24	04.31	05.46 (4)	06.01			07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	6 05.49 (4)	23.45	22.44	21 06.07 (4)	21.05			19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55		03.25	04.34	05.46 (4)	06.04			07.29	07.55	09.28	10.12
	16.12	17.47	19.08	21.37	23.06		23.44	22.41	21 06.07 (4)	21.01			19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53		03.26	04.37	05.46 (4)	06.07			07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08		23.44	22.38	21 06.07 (4)	20.58			19.12	16.33	15.10	14.56
30	09.14		07.02	05.18	03.50		03.28	04.40	05.46 (4)	06.10			07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11		23.43	22.35	21 06.07 (4)	20.55			19.09	16.30	15.08	14.57
31	09.11		06.59		03.48			04.43	05.47 (4)	06.12				08.04		10.11
	16.21		20.16		23.13			22.32	20 06.07 (4)	20.51				16.27		14.59
Potential sun hours	182	242	363	447	559		605	594		502			392	308	206	151
Total, worst case						361			265		99					
Sun reduction						0,49			0,46		0,42					
Oper. time red.						0,98			0,98		0,98					
Wind dir. red.						0,65			0,65		0,65					
Total reduction						0,31			0,29		0,27					
Total, real						111			78		26					

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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH02 - RH02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46	04.56 (4)	03.29	04.59 (4)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16 18	05.14 (4)	23.42 24	05.23 (4)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	04.55 (4)	03.30	05.00 (4)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18 20	05.15 (4)	23.40 24	05.24 (4)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.42	04.55 (4)	03.32	05.00 (4)	04.51	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52	23.21 21	05.16 (4)	23.39 23	05.23 (4)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.40	04.56 (4)	03.34	05.00 (4)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23 20	05.16 (4)	23.38 23	05.23 (4)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.55 (4)	03.36	05.00 (4)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25 21	05.16 (4)	23.36 23	05.23 (4)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.55 (4)	03.37	05.01 (4)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27 22	05.17 (4)	23.35 22	05.23 (4)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.55 (4)	03.39	05.01 (4)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29 22	05.17 (4)	23.33 22	05.23 (4)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.55 (4)	03.41	05.02 (4)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31 23	05.18 (4)	23.31 21	05.23 (4)	22.08	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.55 (4)	03.44	05.02 (4)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33 23	05.18 (4)	23.29 20	05.22 (4)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.55 (4)	03.46	05.03 (4)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35 23	05.18 (4)	23.27 19	05.22 (4)	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	04.55 (4)	03.48	05.04 (4)	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36 24	05.19 (4)	23.25 18	05.22 (4)	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.55 (4)	03.50	05.05 (4)	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38 24	05.19 (4)	23.23 17	05.22 (4)	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.55 (4)	03.53	05.05 (4)	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39 24	05.19 (4)	23.21 16	05.21 (4)	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.55 (4)	03.55	05.06 (4)	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41 25	05.20 (4)	23.19 14	05.20 (4)	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.55 (4)	03.58	05.07 (4)	05.27	06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42 25	05.20 (4)	23.16 12	05.19 (4)	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.55 (4)	04.00	05.09 (4)	05.30	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43 25	05.20 (4)	23.14 9	05.18 (4)	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.56 (4)	04.03	05.11 (4)	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44 25	05.21 (4)	23.11 4	05.15 (4)	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.56 (4)	04.06		05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44 25	05.21 (4)	23.09		21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.56 (4)	04.08		05.38	07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45 25	05.21 (4)	23.06		21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	03.22	04.57 (4)	04.11		05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46 24	05.21 (4)	23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	03.22	04.57 (4)	04.14		05.44	07.10	08.34	09.08	10.10
	15.51	17.26	18.48	21.16	22.46	23.46 24	05.21 (4)	23.01		21.25	19.39	17.59	15.27	14.49
22	09.34	08.04	06.30	05.44	04.11	03.22	04.57 (4)	04.17		05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46 24	05.21 (4)	22.58		21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.57 (4)	04.19		05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46 25	05.22 (4)	22.56		21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.57 (4)	04.22		05.53	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46 25	05.22 (4)	22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.57 (4)	04.25		05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46 25	05.22 (4)	22.50		21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.58 (4)	04.28		05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45 24	05.22 (4)	22.47		21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	05.01 (4) 03.24	04.58 (4)	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 7	05.08 (4) 23.45	05.23 (4)	22.44		21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	04.59 (4) 03.25	04.59 (4)	04.34		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06 11	05.10 (4) 23.44	05.23 (4)	22.41		21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	04.58 (4) 03.26	04.58 (4)	04.37		06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08 14	05.12 (4) 23.44	05.22 (4)	22.38		20.58	19.12	16.33	15.10	14.56
30	09.14		07.02	05.18	03.50	04.57 (4) 03.28	04.58 (4)	04.40		06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11 16	05.13 (4) 23.43	05.23 (4)	22.35		20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48	04.56 (4)		04.43		06.12		08.04		10.11
	16.21		20.16		23.13 17	05.13 (4)		22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case					65	704		311						
Sun reduction					0,49	0,45		0,46						
Oper. time red.					0,98	0,98		0,98						
Wind dir. red.					0,66	0,66		0,66						
Total reduction					0,31	0,29		0,30						
Total, real					20	205		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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH03 - RH03

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46		03.29		04.52 (4)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.42	19	05.11 (4)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44		03.30		04.53 (4)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18		23.40	18	05.11 (4)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.42	04.52 (4)	03.32		04.53 (4)	04.51	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52	23.21	8 05.00 (4)	23.39	18	05.11 (4)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	04.51 (4)	03.34		04.54 (4)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23	11 05.02 (4)	23.38	17	05.11 (4)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.50 (4)	03.36		04.54 (4)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25	12 05.02 (4)	23.36	16	05.10 (4)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.49 (4)	03.37		04.55 (4)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	14 05.03 (4)	23.35	15	05.10 (4)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.49 (4)	03.39		04.56 (4)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	15 05.04 (4)	23.33	13	05.09 (4)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.48 (4)	03.41		04.57 (4)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	17 05.05 (4)	23.31	12	05.09 (4)	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.48 (4)	03.44		04.58 (4)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33	17 05.05 (4)	23.29	9	05.07 (4)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.48 (4)	03.46		05.01 (4)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35	18 05.06 (4)	23.27	5	05.06 (4)	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	04.48 (4)	03.48			05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	19 05.07 (4)	23.25			21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.48 (4)	03.50			05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	19 05.07 (4)	23.23			21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.48 (4)	03.53			05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	19 05.07 (4)	23.21			21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.48 (4)	03.55			05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41	20 05.08 (4)	23.19			21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.47 (4)	03.58			05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	21 05.08 (4)	23.16			21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.48 (4)	04.00			05.30	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43	21 05.09 (4)	23.14			21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.48 (4)	04.03			05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	21 05.09 (4)	23.11			21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.48 (4)	04.06			05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	22 05.10 (4)	23.09			21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.49 (4)	04.08			05.38	07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	21 05.10 (4)	23.06			21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	03.22	04.49 (4)	04.11			05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46	21 05.10 (4)	23.04			21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	03.22	04.49 (4)	04.14			05.44	07.10	08.34	09.08	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	21 05.10 (4)	23.01			21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	04.49 (4)	04.17			05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46	21 05.10 (4)	22.58			21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.50 (4)	04.19			05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46	21 05.11 (4)	22.56			21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.49 (4)	04.22			05.53	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46	22 05.11 (4)	22.53			21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.49 (4)	04.25			05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	21 05.10 (4)	22.50			21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.50 (4)	04.28			05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	21 05.11 (4)	22.47			21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	03.24	04.51 (4)	04.31			06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	20 05.11 (4)	22.44			21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25	04.51 (4)	04.34			06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06	23.44	21 05.12 (4)	22.41			21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26	04.51 (4)	04.37			06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	20 05.11 (4)	22.38			20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28	04.51 (4)	04.40			06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	20 05.11 (4)	22.35			20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48			04.43			06.12		08.04		10.11
	16.21		20.16		23.13			22.32			20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151	
Total, worst case						524		142							
Sun reduction						0,45		0,46							
Oper. time red.						0,98		0,98							
Wind dir. red.						0,66		0,66							
Total reduction						0,29		0,30							
Total, real						152		42							

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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH04 - RH04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.55	05.15	03.46	04.59 (3)	03.29	05.02 (3)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16 18	05.17 (3)	23.42 23	05.25 (3)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	04.58 (3)	03.30	05.03 (3)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18 19	05.17 (3)	23.40 23	05.26 (3)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	04.58 (3)	03.32	05.03 (3)	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.25	21.52	23.21 20	05.18 (3)	23.39 23	05.26 (3)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	04.58 (3)	03.34	05.03 (3)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23 21	05.19 (3)	23.38 23	05.26 (3)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.58 (3)	03.35	05.03 (3)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25 21	05.19 (3)	23.36 22	05.25 (3)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.58 (3)	03.37	05.04 (3)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27 21	05.19 (3)	23.35 22	05.26 (3)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.58 (3)	03.39	05.04 (3)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29 22	05.20 (3)	23.33 21	05.25 (3)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.58 (3)	03.41	05.05 (3)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31 22	05.20 (3)	23.31 21	05.26 (3)	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.58 (3)	03.44	05.05 (3)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33 22	05.20 (3)	23.29 20	05.25 (3)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.58 (3)	03.46	05.06 (3)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35 22	05.20 (3)	23.27 19	05.25 (3)	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	04.59 (3)	03.48	05.06 (3)	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36 23	05.22 (3)	23.25 19	05.25 (3)	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.58 (3)	03.50	05.07 (3)	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38 23	05.21 (3)	23.23 18	05.25 (3)	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.58 (3)	03.53	05.07 (3)	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39 23	05.21 (3)	23.21 17	05.24 (3)	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.59 (3)	03.55	05.08 (3)	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41 23	05.22 (3)	23.19 15	05.23 (3)	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.58 (3)	03.58	05.09 (3)	05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42 24	05.22 (3)	23.16 14	05.23 (3)	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.59 (3)	04.00	05.10 (3)	05.29	06.56	08.20	08.52	10.06
	15.36	17.11	18.34	21.02	22.31	23.43 23	05.22 (3)	23.14 12	05.22 (3)	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.59 (3)	04.03	05.12 (3)	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44 24	05.23 (3)	23.11 8	05.20 (3)	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	05.00 (3)	04.06		05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44 23	05.23 (3)	23.09		21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	05.00 (3)	04.08		05.38	07.04	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45 23	05.23 (3)	23.06		21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22	05.00 (3)	04.11		05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46 23	05.23 (3)	23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22	05.00 (3)	04.14		05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46 24	05.24 (3)	23.01		21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	05.00 (3)	04.17		05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46 24	05.24 (3)	22.58		21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	05.00 (3)	04.19		05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46 23	05.23 (3)	22.56		21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	05.01 (3)	04.22		05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46 23	05.24 (3)	22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	05.00 (3)	04.25		05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46 24	05.24 (3)	22.50		21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00 05.04 (3)	03.24	05.01 (3)	04.28		05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00 6 05.10 (3)	23.45 23	05.24 (3)	22.47		21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58 05.02 (3)	03.24	05.02 (3)	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 10 05.12 (3)	23.45 23	05.25 (3)	22.44		21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55 05.01 (3)	03.25	05.02 (3)	04.34		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06 12 05.13 (3)	23.44 23	05.25 (3)	22.41		21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53 05.01 (3)	03.26	05.01 (3)	04.37		06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08 14 05.15 (3)	23.43 24	05.25 (3)	22.38		20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50 05.00 (3)	03.28	05.02 (3)	04.40		06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11 16 05.16 (3)	23.43 23	05.25 (3)	22.35		20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48 04.59 (3)			04.43		06.12		08.04		10.11
	16.21		20.16		23.13 17 05.16 (3)			22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case					75	674		320						
Sun reduction					0,49	0,45		0,46						
Oper. time red.					0,98	0,98		0,98						
Wind dir. red.					0,66	0,66		0,66						
Total reduction					0,31	0,29		0,30						
Total, real					23	196		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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH05 - RH05

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.15	03.46		03.29		04.48 (2)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.41	10	04.58 (2)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44		03.30		04.48 (2)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18		23.40	10	04.58 (2)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41		03.32		04.50 (2)	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.24	21.52	23.20		23.39	8	04.58 (2)	22.23	20.41	18.58	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39		03.34		04.51 (2)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23		23.38	6	04.57 (2)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38		03.35		04.53 (2)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25		23.36	2	04.55 (2)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36		03.37			05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27		23.35			22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.20	06.35	04.55	03.34		03.39			05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29		23.33			22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32		03.41			05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	5	04.51 (2)		23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31		04.45 (2)		03.44	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	7	04.52 (2)		23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29		04.44 (2)		03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.44	22.13	23.35	9	04.53 (2)		23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28		04.43 (2)		03.48	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	11	04.54 (2)		23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27		04.44 (2)		03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	11	04.55 (2)		23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26		04.43 (2)		03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	12	04.55 (2)		23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25		04.44 (2)		03.55	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41	12	04.56 (2)		23.19	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24		04.43 (2)		03.58	05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	13	04.56 (2)		23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23		04.43 (2)		04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.34	21.02	22.31	23.43	14	04.57 (2)		23.14	21.41	19.57	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.23		04.43 (2)		04.03	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	15	04.58 (2)		23.11	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22		04.44 (2)		04.06	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	14	04.58 (2)		23.09	21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22		04.44 (2)		04.08	05.38	07.04	08.28	09.01	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	14	04.58 (2)		23.06	21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22		04.44 (2)		04.11	05.41	07.07	08.31	09.04	10.10
	15.48	17.23	18.45	21.13	22.43	23.45	15	04.59 (2)		23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22		04.44 (2)		04.14	05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	15	04.59 (2)		23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22		04.44 (2)		04.17	05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46	15	04.59 (2)		22.58	21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22		04.44 (2)		04.19	05.50	07.15	08.40	09.13	10.11
	15.57	17.32	18.53	21.22	22.52	23.46	15	04.59 (2)		22.55	21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22		04.45 (2)		04.22	05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.54	23.46	14	04.59 (2)		22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23		04.45 (2)		04.25	05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	14	04.59 (2)		22.50	21.11	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24		04.45 (2)		04.28	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	14	04.59 (2)		22.47	21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	03.24		04.46 (2)		04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	14	05.00 (2)		22.44	21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25		04.47 (2)		04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	13	05.00 (2)		22.41	21.01	19.15	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26		04.46 (2)		04.37	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	13	04.59 (2)		22.38	20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28		04.47 (2)		04.40	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.42	12	04.59 (2)		22.35	20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48					04.42	06.12		08.04		10.11
	16.21		20.16		23.13					22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594			502	392	308	206	151
Total, worst case							291		36						
Sun reduction							0,45		0,46						
Oper. time red.							0,98		0,98						
Wind dir. red.							0,66		0,66						
Total reduction							0,29		0,30						
Total, real							86		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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case **Shadow receptor:** RH06 - RH06

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.15	03.46	03.29	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.41	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.18	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.34	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	03.35	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.36	03.37	05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.34	22.14	20.31	18.48	16.08	14.58
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	03.43	05.09	06.37	07.59	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.26	03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	03.55	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.58	05.27	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.23	04.03	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.43	23.11	21.38	19.53	18.12	15.38	14.49
18	09.43	08.16	06.43	05.58	04.22	03.22	04.06	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	23.09	21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.08	05.38	07.04	08.28	09.01	10.09
	15.45	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22	04.11	05.41	07.07	08.31	09.04	10.09
	15.48	17.23	18.45	21.13	22.43	23.45	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22	04.14	05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	04.17	05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.50	07.15	08.40	09.13	10.11
	15.57	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.25	05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.28	05.58	07.23	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.28	03.58	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26	04.37	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28	04.40	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.42	22.35	20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH07 - RH07

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.46	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46	23.15	23.41	22.29	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.09	09.38
	15.03	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.34	04.54	06.23	07.45	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.22	23.37	22.20	20.37	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.36	03.37	05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.34	22.13	20.31	18.48	16.08	14.58
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.14	06.28	04.49	03.31	03.43	05.09	06.37	07.59	08.31	09.54
	15.18	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40	03.27	03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.20	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	03.55	05.23	06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.58	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.41	23.16	21.44	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.42	23.13	21.41	19.56	18.15	15.40	14.49
17	09.45	08.19	06.46	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.49
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.07
	15.42	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.08	05.38	07.04	08.28	09.01	10.08
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13	03.21	04.14	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.45	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.11	03.22	04.16	05.47	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.11
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.51
25	09.26	07.53	06.19	05.34	04.02	03.23	04.25	05.55	07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.45	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.48	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.31	06.01	07.26	07.51	09.24	10.12
	16.09	17.44	19.04	21.34	23.02	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.55
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.39	06.09	07.34	08.00	09.32	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.48		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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27.8.2021 14.58/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH08 - RH08

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	21.01 (1)	03.29	04.45	21.07 (1)	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46	23.15 11	21.12 (1)	23.41	22.29 18	21.25 (1)	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	21.03 (1)	03.30	04.48	21.08 (1)	06.18	07.40	08.09	09.38
	15.03	16.27	17.53	20.21	21.49	23.18 8	21.11 (1)	23.40	22.26 16	21.24 (1)	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	21.06 (1)	03.32	04.51	21.10 (1)	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20 4	21.10 (1)	23.39	22.23 13	21.23 (1)	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39		03.33	04.54	21.11 (1)	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23		23.37	22.20 10	21.21 (1)	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.01	03.37		03.35	04.57		06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25		23.36	22.17		20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35		03.37	05.00		06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27		23.34	22.13		20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.34		03.39	05.03		06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29		23.33	22.10		20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 21.03 (1)	03.32		03.41	05.06		06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.38	22.07 6 21.09 (1)	23.31		23.31	22.07		20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49 21.00 (1)	03.30		03.43	05.09		06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 11 21.11 (1)	23.33		23.29	22.04		20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46 20.59 (1)	03.29		03.45 21.12 (1)	05.12		06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 15 21.14 (1)	23.34		23.27 6 21.18 (1)	22.01		20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43 20.57 (1)	03.28		03.48 21.11 (1)	05.15		06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16 17 21.14 (1)	23.36		23.25 9 21.20 (1)	21.58		20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40 20.56 (1)	03.26		03.50 21.09 (1)	05.18		06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19 19 21.15 (1)	23.38		23.23 12 21.21 (1)	21.54		20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 20.56 (1)	03.25		03.52 21.08 (1)	05.20		06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 20 21.16 (1)	23.39		23.21 14 21.22 (1)	21.51		20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33 20.55 (1)	03.24		03.55 21.08 (1)	05.23		06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25 21 21.16 (1)	23.40		23.18 15 21.23 (1)	21.48		20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 20.55 (1)	03.24		03.57 21.07 (1)	05.26		06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28 22 21.17 (1)	23.41		23.16 17 21.24 (1)	21.45		20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28 20.54 (1)	03.23		04.00 21.07 (1)	05.29		06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 23 21.17 (1)	23.42		23.14 18 21.25 (1)	21.41		19.56	18.15	15.40	14.49
17	09.45	08.19	06.46	06.01	04.25 20.54 (1)	03.22		04.03 21.06 (1)	05.32		06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34 23 21.17 (1)	23.43		23.11 19 21.25 (1)	21.38		19.53	18.11	15.37	14.49
18	09.43	08.16	06.43	05.57	04.22 20.55 (1)	03.22		04.05 21.06 (1)	05.35		07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37 23 21.18 (1)	23.44		23.09 20 21.26 (1)	21.35		19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 20.54 (1)	03.21		04.08 21.05 (1)	05.38		07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40 23 21.17 (1)	23.45		23.06 21 21.26 (1)	21.31		19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16 20.54 (1)	03.21		04.11 21.05 (1)	05.41		07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43 23 21.17 (1)	23.45		23.03 21 21.26 (1)	21.28		19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13 20.55 (1)	03.21		04.13 21.05 (1)	05.44		07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46 22 21.17 (1)	23.46		23.01 22 21.27 (1)	21.25		19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10 20.55 (1)	03.21		04.16 21.05 (1)	05.46		07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49 22 21.17 (1)	23.46		22.58 22 21.27 (1)	21.21		19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 20.56 (1)	03.22		04.19 21.05 (1)	05.49		07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51 21 21.17 (1)	23.46		22.55 22 21.27 (1)	21.18		19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05 20.56 (1)	03.22		04.22 21.04 (1)	05.52		07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54 21 21.17 (1)	23.46		22.52 23 21.27 (1)	21.15		19.29	17.49	15.20	14.51
25	09.27	07.53	06.19	05.34	04.02 20.56 (1)	03.23		04.25 21.05 (1)	05.55		07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57 21 21.17 (1)	23.45		22.50 23 21.28 (1)	21.11		19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 20.57 (1)	03.23		04.28 21.05 (1)	05.58		07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00 19 21.16 (1)	23.45		22.47 22 21.27 (1)	21.08		19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57 20.57 (1)	03.24		04.31 21.05 (1)	06.01		07.26	07.51	09.24	10.12
	16.09	17.44	19.04	21.34	23.03 19 21.16 (1)	23.45		22.44 23 21.28 (1)	21.04		19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55 20.58 (1)	03.25		04.33 21.05 (1)	06.04		07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05 17 21.15 (1)	23.44		22.41 22 21.27 (1)	21.01		19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52 20.59 (1)	03.26		04.36 21.05 (1)	06.06		07.32	07.57	09.30	10.11
	16.15		20.10	21.40	23.08 15 21.14 (1)	23.43		22.38 22 21.27 (1)	20.58		19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 21.00 (1)	03.27		04.39 21.06 (1)	06.09		07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10 14 21.14 (1)	23.42		22.35 21 21.27 (1)	20.54		19.08	16.30	15.07	14.57
31	09.10		06.59		03.48 21.01 (1)			04.42 21.06 (1)	06.12			08.03		10.10
	16.21		20.16		23.13 12 21.13 (1)			22.32 20 21.26 (1)	20.51			16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case					449	23	414	57				
Sun reduction					0,49	0,45	0,46	0,42				
Oper. time red.					0,98	0,98	0,98	0,98				
Wind dir. red.					0,58	0,58	0,58	0,58				
Total reduction					0,28	0,26	0,26	0,24				
Total, real					124	6	109	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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH09 - RH09

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	20.31 (1)	03.45	03.29	04.45	20.40 (1)	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46 18	20.49 (1)	23.15	23.41	22.29 18	20.58 (1)	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	20.30 (1)	03.43	03.30	04.48	20.39 (1)	06.18	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49 19	20.49 (1)	23.18	23.40	22.26 20	20.59 (1)	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	20.29 (1)	03.41	03.32	04.51	20.39 (1)	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52 21	20.50 (1)	23.20	23.39	22.23 20	20.59 (1)	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	20.28 (1)	03.39	03.33	04.54	20.38 (1)	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55 22	20.50 (1)	23.23	23.37	22.20 21	20.59 (1)	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	20.28 (1)	03.37	03.35	04.57	20.38 (1)	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58 22	20.50 (1)	23.25	23.36	22.17 22	21.00 (1)	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	20.28 (1)	03.35	03.37	05.00	20.37 (1)	06.29	07.51	08.22	09.47
	15.10	16.40	18.05	20.33	22.01 22	20.50 (1)	23.27	23.34	22.13 22	20.59 (1)	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	20.28 (1)	03.34	03.39	05.03	20.38 (1)	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04 22	20.50 (1)	23.29	23.33	22.10 22	21.00 (1)	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	20.28 (1)	03.32	03.41	05.06	20.37 (1)	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07 22	20.50 (1)	23.31	23.31	22.07 22	20.59 (1)	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	20.28 (1)	03.30	03.43	05.09	20.38 (1)	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 21	20.49 (1)	23.33	23.29	22.04 21	20.59 (1)	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	20.29 (1)	03.29	03.45	05.12	20.38 (1)	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 20	20.49 (1)	23.34	23.27	22.01 21	20.59 (1)	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	20.29 (1)	03.28	03.48	05.15	20.38 (1)	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16 19	20.48 (1)	23.36	23.25	21.58 20	20.58 (1)	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40	20.29 (1)	03.26	03.50	05.17	20.39 (1)	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19 18	20.47 (1)	23.38	23.23	21.54 18	20.57 (1)	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	20.31 (1)	03.25	03.52	05.20	20.40 (1)	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 16	20.47 (1)	23.39	23.21	21.51 15	20.55 (1)	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	20.32 (1)	03.24	03.55	05.23	20.41 (1)	06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25 13	20.45 (1)	23.40	23.18	21.48 13	20.54 (1)	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.07	04.30	20.34 (1)	03.23	03.57	05.26	20.44 (1)	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28 10	20.44 (1)	23.41	23.16	21.44 7	20.51 (1)	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28	20.36 (1)	03.23	04.00	05.29		06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 5	20.41 (1)	23.42	23.14	21.41		19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.25		03.22	04.03	05.32		06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34		23.43	23.11	21.38		19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22		03.22	04.05	05.35		07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37		23.44	23.09	21.35		19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19		03.21	04.08	05.38		07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40		23.45	23.06	21.31		19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16		03.21	04.11	05.41		07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43		23.45	23.03	21.28		19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13		03.21	04.13	05.44		07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46		23.46	23.01	21.25		19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10		03.21	04.16	05.46		07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49		23.46	22.58	21.21		19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08		03.22	04.19	05.49		07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51		23.46	22.55	21.18		19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05		03.22	04.22	05.52		07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54		23.46	22.52	21.15		19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02		03.23	04.25	05.55		07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57		23.46	22.50	21.11		19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00		03.23	04.28	05.58		07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00		23.45	22.47	21.08		19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57		03.24	04.30	06.01		07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03		23.45	22.44	21.04		19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24 20.35 (1)	03.55		03.25	04.33 20.45 (1)	06.03		07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37 9 20.44 (1)	23.05		23.44	22.41 8 20.53 (1)	21.01		19.15	16.36	15.11	14.54
29	09.16		07.05	05.21 20.33 (1)	03.52		03.26	04.36 20.43 (1)	06.06		07.32	07.57	09.30	10.11
	16.15		20.10	21.40 13 20.46 (1)	23.08		23.43	22.38 12 20.55 (1)	20.58		19.12	16.33	15.09	14.56
30	09.13		07.02	05.18 20.31 (1)	03.50		03.27	04.39 20.42 (1)	06.09		07.34	08.00	09.33	10.11
	16.18		20.13	21.43 16 20.47 (1)	23.10		23.42	22.35 15 20.57 (1)	20.54		19.08	16.30	15.07	14.57
31	09.10		06.59		03.48			04.42 20.41 (1)	06.12			08.03		10.10
	16.21		20.16		23.13			22.32 16 20.57 (1)	20.51			16.26		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case				38	290		51	282				
Sun reduction				0,44	0,49		0,46	0,42				
Oper. time red.				0,98	0,98		0,98	0,98				
Wind dir. red.				0,56	0,56		0,56	0,56				
Total reduction				0,24	0,27		0,26	0,23				
Total, real				9	78		13	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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case **Shadow receptor:** RH10 - RH10

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.18	21.46	23.15	23.41	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.12	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.34	22.13	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.56	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.06	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.50	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.41	23.16	21.44	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.27	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.24	03.22	04.03	05.32	06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.42	18.01	15.29	14.48
21	09.36	08.06	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.22	05.37	04.05	03.22	04.22	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.43	06.09	05.24	03.55	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.31	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.48		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.26		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case **Shadow receptor:** RH11 - RH11

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.18	21.46	23.15	23.41	22.29	20.47	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.12	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.23	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.34	22.13	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.48	05.14	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.06	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.50	08.13	08.46	10.02
	15.30	17.05	18.27	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.44	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.06
	15.38	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.42	18.01	15.29	14.48
21	09.36	08.06	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.21	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.22	05.37	04.05	03.22	04.22	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.20	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.27	05.58	07.23	07.48	09.22	10.12
	16.05	17.41	19.01	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.43	06.09	05.24	03.55	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.31	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.47		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH12 - RH12

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.11	09.08	07.41	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.36
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.30	20.48	19.05	16.23	15.05
2	10.10	09.05	07.37	06.52	05.11	03.43	03.29	04.48	06.18	07.40	08.10	09.38
	15.02	16.27	17.53	20.22	21.49	23.19	23.41	22.27	20.44	19.02	16.20	15.03
3	10.09	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.40	22.23	20.41	18.58	16.17	15.02
4	10.08	08.59	07.31	06.45	05.04	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.24	23.38	22.20	20.38	18.55	16.14	15.00
5	10.07	08.57	07.27	06.42	05.01	03.37	03.34	04.57	06.26	07.48	08.19	09.46
	15.08	16.36	18.02	20.30	21.59	23.26	23.37	22.17	20.34	18.52	16.11	14.58
6	10.06	08.54	07.24	06.38	04.58	03.35	03.36	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.05	20.33	22.02	23.28	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.51	07.20	06.35	04.55	03.33	03.38	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.08	20.36	22.05	23.30	23.34	22.11	20.27	18.45	16.05	14.56
8	10.03	08.48	07.17	06.31	04.52	03.31	03.40	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.08	23.32	23.32	22.08	20.24	18.41	16.02	14.54
9	10.01	08.45	07.14	06.28	04.49	03.30	03.43	05.08	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.11	23.34	23.30	22.05	20.21	18.38	15.59	14.53
10	10.00	08.42	07.10	06.24	04.45	03.28	03.45	05.11	06.40	08.02	08.34	09.56
	15.19	16.52	18.16	20.45	22.14	23.36	23.28	22.01	20.17	18.35	15.56	14.52
11	09.58	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.38	09.58
	15.22	16.55	18.19	20.47	22.17	23.37	23.26	21.58	20.14	18.31	15.54	14.51
12	09.56	08.35	07.04	06.18	04.39	03.26	03.49	05.17	06.45	08.08	08.41	10.00
	15.25	16.58	18.22	20.50	22.20	23.39	23.24	21.55	20.10	18.28	15.51	14.50
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.44	10.02
	15.27	17.01	18.25	20.53	22.23	23.40	23.21	21.52	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.54	05.23	06.51	08.14	08.47	10.03
	15.30	17.05	18.28	20.56	22.26	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.17	08.50	10.05
	15.33	17.08	18.31	20.59	22.29	23.43	23.17	21.45	20.00	18.18	15.42	14.49
16	09.48	08.23	06.50	06.04	04.27	03.22	03.59	05.29	06.56	08.20	08.53	10.06
	15.35	17.11	18.33	21.02	22.32	23.44	23.14	21.42	19.56	18.15	15.40	14.48
17	09.46	08.20	06.47	06.01	04.24	03.21	04.02	05.32	06.59	08.22	08.56	10.07
	15.38	17.14	18.36	21.05	22.35	23.45	23.12	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.02	08.25	08.59	10.08
	15.41	17.17	18.39	21.08	22.38	23.45	23.09	21.35	19.50	18.08	15.34	14.48
19	09.42	08.13	06.40	05.54	04.18	03.21	04.07	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.41	23.46	23.07	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.20	04.10	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.44	23.46	23.04	21.28	19.43	18.02	15.29	14.48
21	09.37	08.07	06.33	05.47	04.13	03.20	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.17	22.46	23.47	23.02	21.25	19.39	17.58	15.27	14.48
22	09.35	08.04	06.30	05.44	04.10	03.21	04.16	05.46	07.13	08.37	09.11	10.12
	15.53	17.29	18.50	21.20	22.49	23.47	22.59	21.22	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.14	10.12
	15.56	17.32	18.53	21.22	22.52	23.47	22.56	21.18	19.32	17.52	15.22	14.49
24	09.30	07.57	06.23	05.37	04.05	03.21	04.21	05.52	07.18	08.43	09.17	10.12
	15.59	17.35	18.56	21.25	22.55	23.47	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.24	05.55	07.21	08.46	09.19	10.13
	16.02	17.38	18.59	21.28	22.58	23.47	22.50	21.12	19.26	16.45	15.17	14.51
26	09.25	07.50	06.16	05.31	03.59	03.22	04.27	05.58	07.23	07.49	09.22	10.13
	16.05	17.41	19.02	21.31	23.01	23.46	22.48	21.08	19.22	16.42	15.15	14.52
27	09.22	07.47	06.12	05.27	03.57	03.23	04.30	06.01	07.26	07.52	09.25	10.13
	16.08	17.44	19.05	21.34	23.03	23.46	22.45	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.24	04.33	06.03	07.29	07.55	09.28	10.13
	16.11	17.47	19.07	21.37	23.06	23.45	22.42	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.25	04.36	06.06	07.32	07.58	09.31	10.12
	16.14		20.10	21.40	23.09	23.44	22.39	20.58	19.12	16.33	15.09	14.55
30	09.14		07.02	05.17	03.49	03.27	04.39	06.09	07.34	08.01	09.33	10.12
	16.18		20.13	21.43	23.11	23.43	22.36	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.14		22.33	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	606	595	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH13 - RH13

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.11	09.08	07.41		08.16 (8)	06.55	05.14	03.45	03.28	04.45	06.15		07.37	08.49 (8)	08.07	09.36
	15.01	16.24	17.50	6	08.22 (8)	20.19	21.46	23.16	23.42	22.30	20.48		19.05	13 09.02 (8)	16.24	15.05
2	10.10	09.05	07.37		08.12 (8)	06.52	05.11	03.43	03.30	04.48	06.18		07.40	08.47 (8)	08.10	09.38
	15.02	16.27	17.53	13	08.25 (8)	20.22	21.49	23.19	23.41	22.27	20.45		19.02	17 09.04 (8)	16.20	15.04
3	10.09	09.02	07.34		08.11 (8)	06.49	05.08	03.41	03.31	04.51	06.21		07.43	08.46 (8)	08.13	09.41
	15.04	16.30	17.56	16	08.27 (8)	20.25	21.53	23.21	23.40	22.24	20.41		18.59	18 09.04 (8)	16.17	15.02
4	10.08	09.00	07.31		08.09 (8)	06.45	05.05	03.39	03.33	04.54	06.23		07.46	08.45 (8)	08.16	09.43
	15.06	16.34	17.59	18	08.27 (8)	20.27	21.56	23.23	23.38	22.20	20.38		18.55	20 09.05 (8)	16.14	15.00
5	10.07	08.57	07.27		08.09 (8)	06.42	05.02	03.37	03.35	04.57	06.26		07.49	08.44 (8)	08.19	09.46
	15.08	16.37	18.02	19	08.28 (8)	20.30	21.59	23.26	23.37	22.17	20.34		18.52	20 09.04 (8)	16.11	14.59
6	10.05	08.54	07.24		08.08 (8)	06.38	04.58	03.35	03.37	05.00	06.29		07.51	08.43 (8)	08.22	09.48
	15.10	16.40	18.05	20	08.28 (8)	20.33	22.02	23.28	23.35	22.14	20.31		18.48	21 09.04 (8)	16.08	14.57
7	10.04	08.51	07.21		08.08 (8)	06.35	04.55	03.33	03.39	05.03	06.32		07.54	08.43 (8)	08.25	09.50
	15.13	16.43	18.08	20	08.28 (8)	20.36	22.05	23.30	23.34	22.11	20.28		18.45	21 09.04 (8)	16.05	14.56
8	10.03	08.48	07.17		08.07 (8)	06.32	04.52	03.32	03.41	05.06	06.34		07.57	08.43 (8)	08.28	09.52
	15.15	16.46	18.11	21	08.28 (8)	20.39	22.08	23.32	23.32	22.08	20.24		18.42	20 09.03 (8)	16.02	14.55
9	10.01	08.45	07.14		08.08 (8)	06.28	04.49	03.30	03.43	05.09	06.37		08.00	08.44 (8)	08.31	09.54
	15.17	16.49	18.14	20	08.28 (8)	20.42	22.11	23.34	23.30	22.05	20.21		18.38	18 09.02 (8)	16.00	14.54
10	10.00	08.42	07.11		08.07 (8)	06.25	04.46	03.29	03.45	05.12	06.40		08.03	08.44 (8)	08.35	09.56
	15.20	16.52	18.16	19	08.26 (8)	20.45	22.14	23.35	23.28	22.01	20.17		18.35	17 09.01 (8)	15.57	14.53
11	09.58	08.39	07.07		08.08 (8)	06.21	04.43	03.27	03.47	05.15	06.43		08.05	08.45 (8)	08.38	09.58
	15.22	16.56	18.19	18	08.26 (8)	20.48	22.17	23.37	23.26	21.58	20.14		18.32	15 09.00 (8)	15.54	14.52
12	09.56	08.35	07.04		08.09 (8)	06.18	04.40	03.26	03.50	05.18	06.45		08.08	08.47 (8)	08.41	10.00
	15.25	16.59	18.22	15	08.24 (8)	20.50	22.20	23.39	23.24	21.55	20.10		18.28	10 08.57 (8)	15.51	14.51
13	09.54	08.32	07.00		08.11 (8)	06.15	04.37	03.25	03.52	05.21	06.48		08.11		08.44	10.02
	15.28	17.02	18.25	11	08.22 (8)	20.53	22.23	23.40	23.21	21.52	20.07		18.25		15.48	14.50
14	09.52	08.29	06.57			06.11	04.34	03.24	03.55	05.23	06.51		08.14		08.47	10.03
	15.30	17.05	18.28			20.56	22.26	23.41	23.19	21.48	20.04		18.22		15.45	14.49
15	09.50	08.26	06.54			06.08	04.31	03.23	03.57	05.26	06.54		08.17		08.50	10.05
	15.33	17.08	18.31			20.59	22.29	23.43	23.17	21.45	20.00		18.18		15.43	14.49
16	09.48	08.23	06.50			06.04	04.28	03.22	04.00	05.29	06.56		08.20		08.53	10.06
	15.36	17.11	18.34			21.02	22.32	23.44	23.14	21.42	19.57		18.15		15.40	14.49
17	09.46	08.20	06.47			06.01	04.25	03.22	04.02	05.32	06.59		08.23		08.56	10.07
	15.39	17.14	18.36			21.05	22.35	23.44	23.12	21.38	19.53		18.12		15.37	14.48
18	09.44	08.17	06.43			05.58	04.22	03.21	04.05	05.35	07.02		08.25		08.59	10.08
	15.41	17.17	18.39			21.08	22.38	23.45	23.09	21.35	19.50		18.08		15.35	14.48
19	09.42	08.13	06.40			05.54	04.19	03.21	04.08	05.38	07.05		08.28		09.02	10.09
	15.44	17.20	18.42			21.11	22.41	23.46	23.07	21.32	19.46		18.05		15.32	14.48
20	09.39	08.10	06.37			05.51	04.16	03.21	04.11	05.41	07.07		08.31		09.05	10.10
	15.47	17.23	18.45			21.14	22.44	23.46	23.04	21.29	19.43		18.02		15.30	14.48
21	09.37	08.07	06.33			05.48	04.13	03.21	04.13	05.44	07.10		08.34		09.08	10.11
	15.50	17.26	18.48			21.17	22.46	23.47	23.02	21.25	19.40		17.59		15.27	14.49
22	09.35	08.04	06.30			05.44	04.10	03.21	04.16	05.47	07.13		08.37		09.11	10.12
	15.53	17.29	18.51			21.20	22.49	23.47	22.59	21.22	19.36		17.55		15.25	14.49
23	09.32	08.00	06.26			05.41	04.08	03.21	04.19	05.50	07.15		08.40		09.14	10.12
	15.56	17.32	18.53			21.23	22.52	23.47	22.56	21.18	19.33		17.52		15.22	14.50
24	09.30	07.57	06.23			05.37	04.05	03.22	04.22	05.52	07.18		08.43		09.17	10.12
	15.59	17.35	18.56			21.26	22.55	23.47	22.53	21.15	19.29		17.49		15.20	14.50
25	09.27	07.54	06.19			05.34	04.02	03.22	04.25	05.55	07.21		07.46		09.20	10.13
	16.02	17.38	18.59			21.29	22.58	23.47	22.50	21.12	19.26		16.46		15.18	14.51
26	09.25	07.51	06.16			05.31	04.00	03.23	04.28	05.58	07.24		07.49		09.22	10.13
	16.05	17.41	19.02			21.31	23.01	23.46	22.48	21.08	19.22		16.42		15.16	14.52
27	09.22	07.47	06.13			05.28	03.57	03.24	04.30	06.01	07.26		07.52		09.25	10.13
	16.09	17.44	19.05			21.34	23.03	23.46	22.45	21.05	19.19		16.39		15.13	14.53
28	09.19	07.44	06.09			05.24	03.55	03.25	04.33	06.04	07.29		07.55		09.28	10.13
	16.12	17.47	19.08			21.37	23.06	23.45	22.42	21.02	19.16		16.36		15.11	14.54
29	09.17		07.06			05.21	03.52	03.26	04.36	06.07	07.32		07.58		09.31	10.12
	16.15		20.10			21.40	23.09	23.44	22.39	20.58	19.12		16.33		15.09	14.56
30	09.14		07.02			05.18	03.50	03.27	04.39	06.09	07.35	08.52 (8)	08.01		09.33	10.12
	16.18		20.13			21.43	23.11	23.43	22.36	20.55	19.09	8 09.00 (8)	16.30		15.07	14.57
31	09.11		06.59				03.47		04.42	06.12			08.04			10.11
	16.21		20.16				23.14		22.33	20.51			16.27			14.59
Potential sun hours	182	242	363		447	559	605	594	502	392			308		206	151
Total, worst case				216							8			210		
Sun reduction				0,36							0,36			0,25		
Oper. time red.				0,98							0,98			0,98		
Wind dir. red.				0,56							0,56			0,56		
Total reduction				0,20							0,20			0,14		
Total, real				43							2			30		

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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
27.8.2021 14.58/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case**Shadow receptor:** RH14 - RH14

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.11	09.08	07.41	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.47	23.16	23.42	22.30	20.48	19.05	16.24	15.05
2	10.10	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.39
	15.02	16.27	17.53	20.22	21.50	23.19	23.41	22.27	20.45	19.02	16.20	15.04
3	10.09	09.03	07.34	06.49	05.08	03.41	03.31	04.51	06.21	07.43	08.13	09.41
	15.04	16.30	17.56	20.25	21.53	23.21	23.40	22.24	20.41	18.59	16.17	15.02
4	10.08	09.00	07.31	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.28	21.56	23.24	23.39	22.20	20.38	18.55	16.14	15.00
5	10.07	08.57	07.27	06.42	05.01	03.37	03.35	04.57	06.26	07.49	08.19	09.46
	15.08	16.37	18.02	20.30	21.59	23.26	23.37	22.17	20.34	18.52	16.11	14.59
6	10.06	08.54	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.05	20.33	22.02	23.28	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.51	07.21	06.35	04.55	03.33	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.05	23.30	23.34	22.11	20.28	18.45	16.05	14.56
8	10.03	08.48	07.17	06.32	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.53
	15.15	16.46	18.11	20.39	22.08	23.32	23.32	22.08	20.24	18.42	16.02	14.55
9	10.01	08.45	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.32	09.55
	15.17	16.49	18.14	20.42	22.11	23.34	23.30	22.05	20.21	18.38	16.00	14.53
10	10.00	08.42	07.11	06.25	04.46	03.29	03.45	05.12	06.40	08.03	08.35	09.57
	15.20	16.52	18.16	20.45	22.14	23.36	23.28	22.01	20.17	18.35	15.57	14.52
11	09.58	08.39	07.07	06.21	04.43	03.27	03.47	05.15	06.43	08.05	08.38	09.58
	15.22	16.55	18.19	20.48	22.17	23.37	23.26	21.58	20.14	18.32	15.54	14.51
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.41	10.00
	15.25	16.59	18.22	20.50	22.20	23.39	23.24	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.36	03.25	03.52	05.21	06.48	08.11	08.44	10.02
	15.27	17.02	18.25	20.53	22.23	23.40	23.22	21.52	20.07	18.25	15.48	14.50
14	09.53	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.47	10.03
	15.30	17.05	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.45	14.49
15	09.51	08.26	06.54	06.08	04.30	03.23	03.57	05.26	06.54	08.17	08.50	10.05
	15.33	17.08	18.31	20.59	22.29	23.43	23.17	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.32	23.44	23.15	21.42	19.57	18.15	15.40	14.48
17	09.46	08.20	06.47	06.01	04.25	03.22	04.02	05.32	06.59	08.23	08.56	10.07
	15.39	17.14	18.36	21.05	22.35	23.45	23.12	21.39	19.53	18.12	15.37	14.48
18	09.44	08.17	06.43	05.58	04.22	03.21	04.05	05.35	07.02	08.25	08.59	10.09
	15.41	17.17	18.39	21.08	22.38	23.45	23.10	21.35	19.50	18.08	15.35	14.48
19	09.42	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.05	08.28	09.02	10.10
	15.44	17.20	18.42	21.11	22.41	23.46	23.07	21.32	19.46	18.05	15.32	14.48
20	09.40	08.10	06.37	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.44	23.46	23.04	21.29	19.43	18.02	15.30	14.48
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.17	22.47	23.47	23.02	21.25	19.40	17.59	15.27	14.49
22	09.35	08.04	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.11	10.12
	15.53	17.29	18.51	21.20	22.49	23.47	22.59	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.21	04.19	05.49	07.15	08.40	09.14	10.12
	15.56	17.32	18.53	21.23	22.52	23.47	22.56	21.19	19.33	17.52	15.22	14.50
24	09.30	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.17	10.13
	15.59	17.35	18.56	21.26	22.55	23.47	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.20	10.13
	16.02	17.38	18.59	21.29	22.58	23.47	22.50	21.12	19.26	16.46	15.18	14.51
26	09.25	07.51	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.13
	16.05	17.41	19.02	21.32	23.01	23.46	22.48	21.08	19.22	16.42	15.15	14.52
27	09.22	07.47	06.13	05.28	03.57	03.24	04.30	06.01	07.26	07.52	09.25	10.13
	16.09	17.44	19.05	21.35	23.03	23.46	22.45	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.28	10.13
	16.12	17.47	19.08	21.38	23.06	23.45	22.42	21.02	19.16	16.36	15.11	14.54
29	09.17		07.06	05.21	03.52	03.26	04.36	06.07	07.32	07.58	09.31	10.12
	16.15		20.10	21.41	23.09	23.44	22.39	20.58	19.12	16.33	15.09	14.55
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.12
	16.18		20.13	21.44	23.11	23.43	22.36	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.14		22.33	20.51		16.27		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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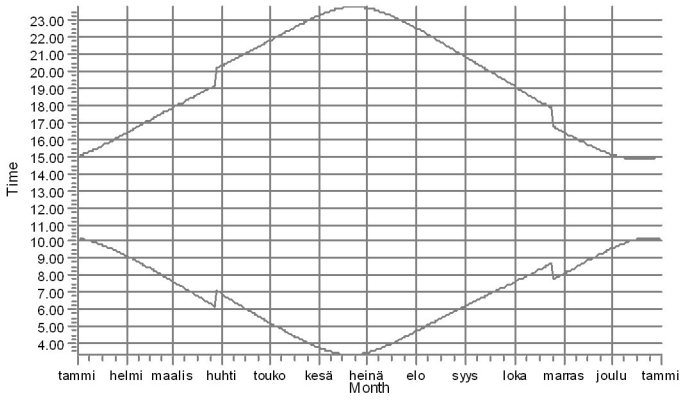
Calculated:
27.8.2021 14.58/3.3.294

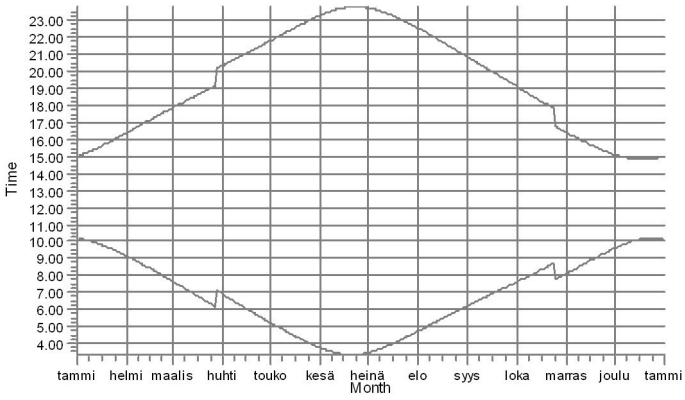
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case

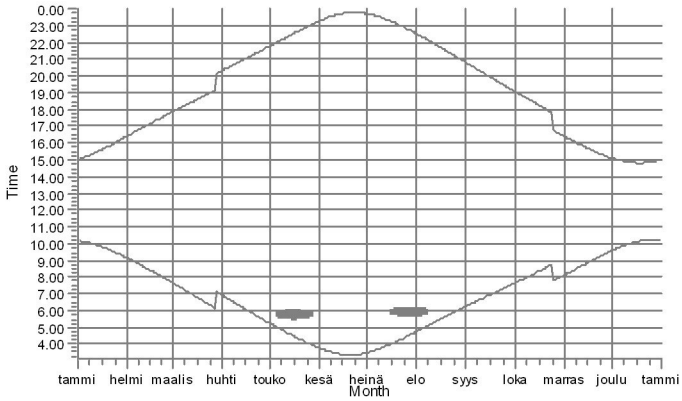
HH01: HH01



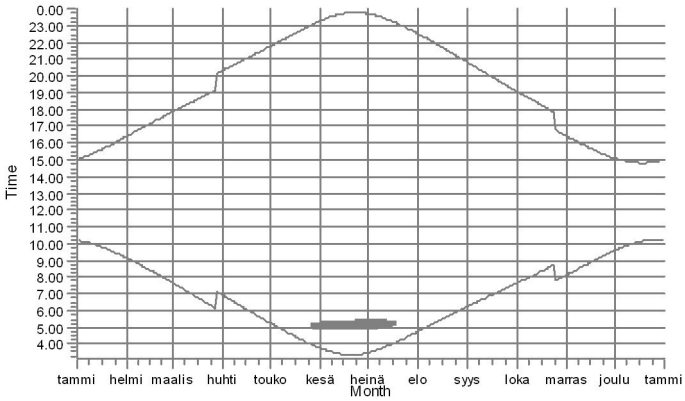
HH02: HH02



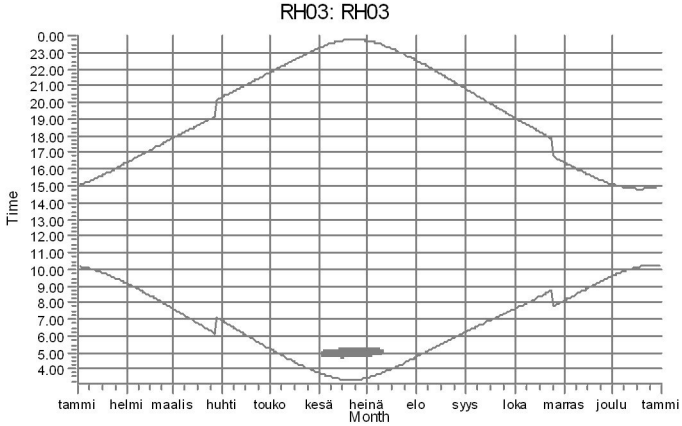
RH01: RH01



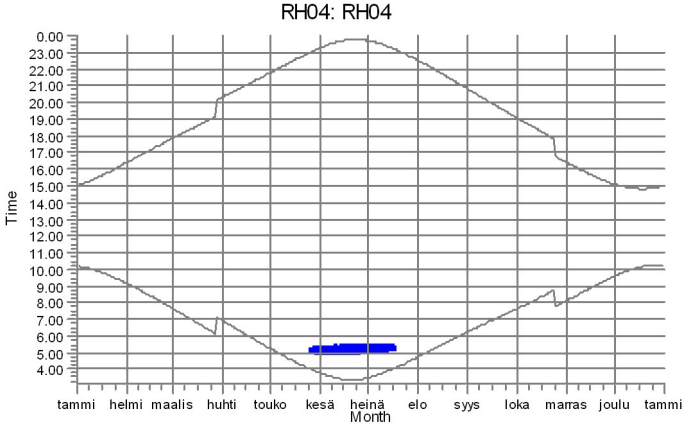
RH02: RH02



RH03: RH03



RH04: RH04



WTGs

3: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)

4: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

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Calculated:
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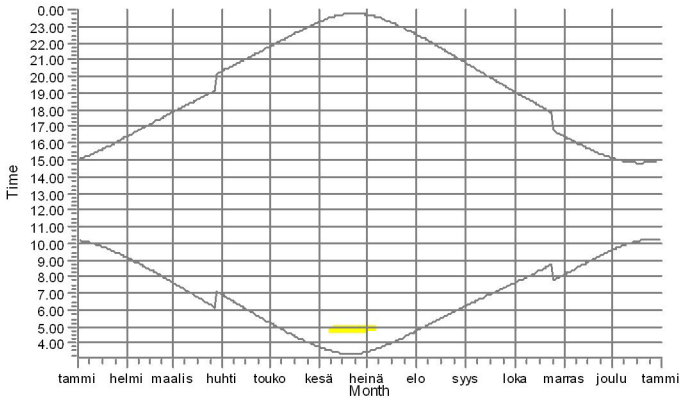
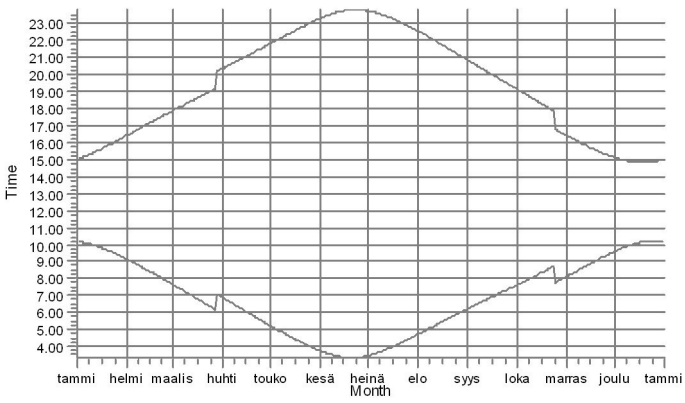
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case

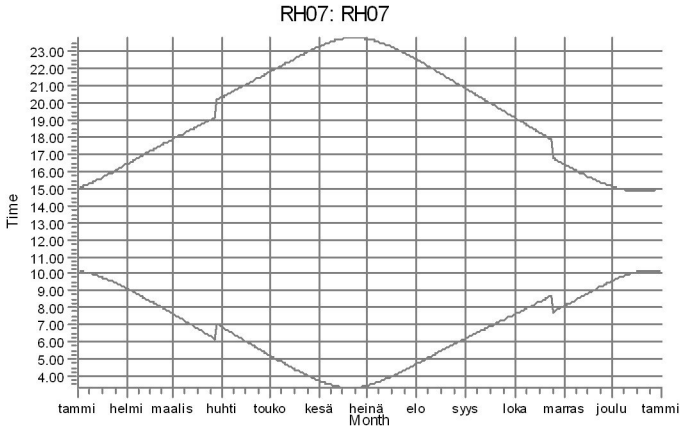
RH05: RH05



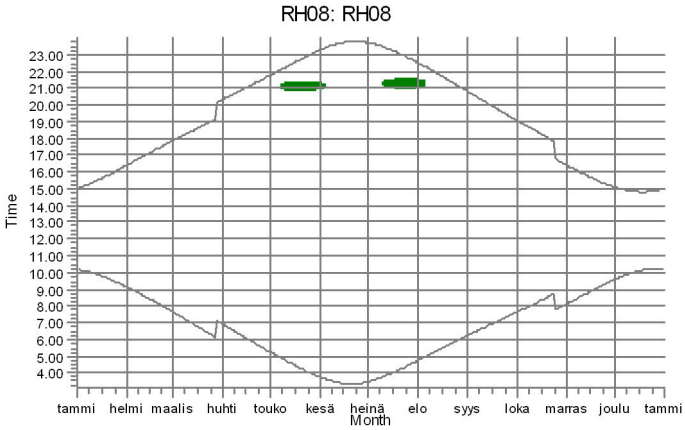
RH06: RH06



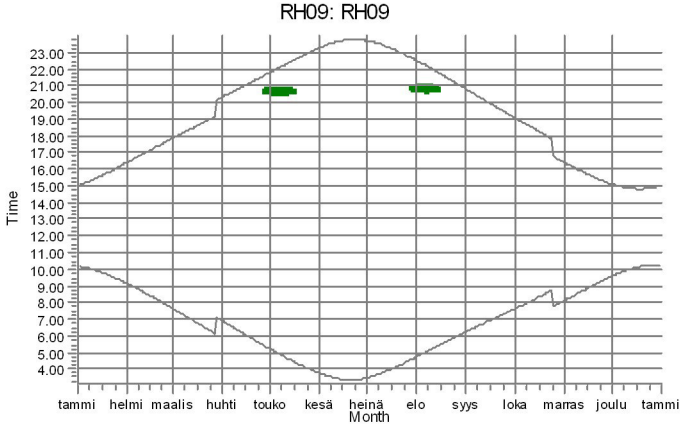
RH07: RH07



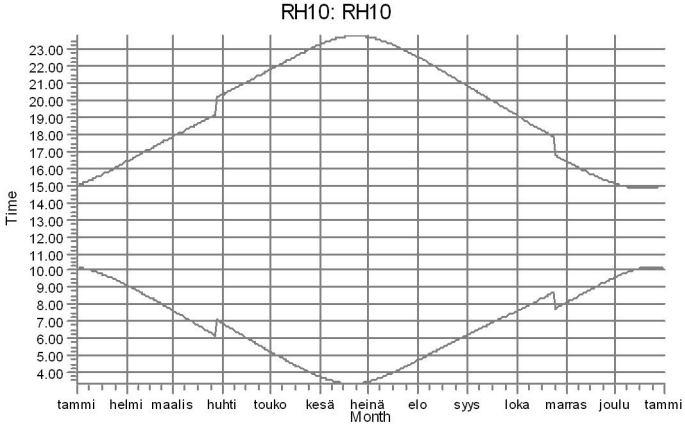
RH08: RH08



RH09: RH09



RH10: RH10



WTGs

1: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)

2: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

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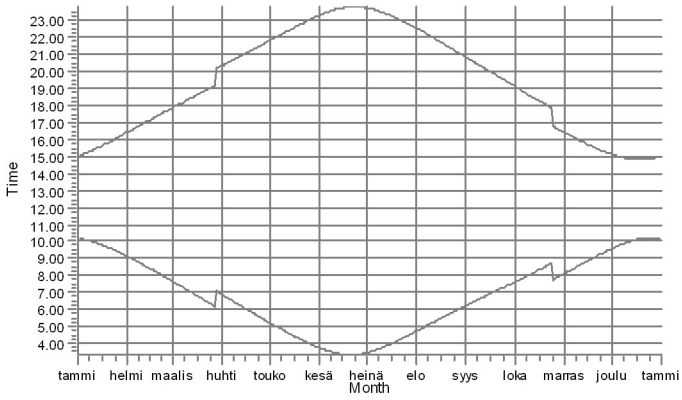
Calculated:
27.8.2021 14.58/3.3.294

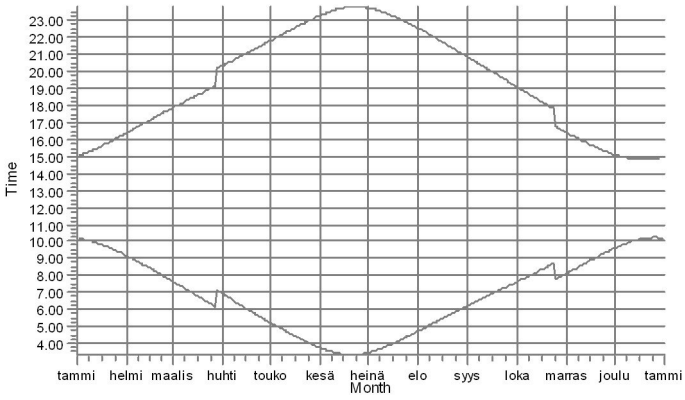
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case

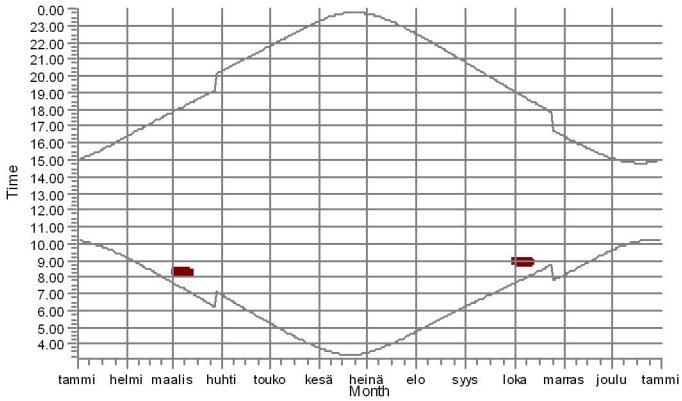
RH11: RH11



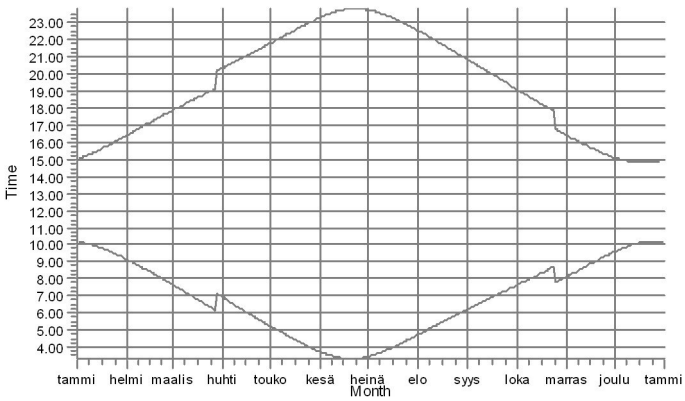
RH12: RH12



RH13: RH13



RH14: RH14



WTGs

8: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)

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Calculated:
27.8.2021 14.58/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 1 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14 20.31-20.49/18	03.45 21.01-21.12/11	03.29	04.45 20.40-20.58/18	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.41	22.29 21.07-21.25/18	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11 20.30-20.49/19	03.43 21.03-21.11/8	03.30	04.48 20.39-20.59/20	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26 21.08-21.24/16	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08 20.29-20.50/21	03.41 21.06-21.10/4	03.32	04.51 20.39-20.59/20	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23 21.10-21.23/13	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05 20.28-20.50/22	03.39	03.33	04.54 20.38-20.59/21	06.23	07.45	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20 21.11-21.21/10	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02 20.28-20.50/22	03.37	03.35	04.57 20.38-21.00/22	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58 20.28-20.50/22	03.35	03.37	05.00 20.37-20.59/22	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55 20.28-20.50/22	03.34	03.39	05.03 20.38-21.00/22	06.31	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 20.28-20.50/22	03.32	03.41	05.06 20.37-20.59/22	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07 21.03-21.09/6	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49 20.28-20.49/21	03.30	03.43	05.09 20.38-20.59/21	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 21.00-21.11/11	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46 20.29-20.49/20	03.29	03.45 21.12-21.18/6	05.12 20.38-20.59/21	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 20.59-21.14/15	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43 20.29-20.48/19	03.28	03.48 21.11-21.20/9	05.15 20.38-20.58/20	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16 20.57-21.14/17	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.03	06.18	04.40 20.29-20.47/18	03.26	03.50 21.09-21.21/12	05.18 20.39-20.57/18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19 20.56-21.15/19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 20.31-20.47/16	03.25	03.52 21.08-21.22/14	05.21 20.40-20.55/15	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 20.56-21.16/20	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34 20.32-20.45/13	03.24	03.55 21.08-21.23/15	05.23 20.41-20.54/13	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25 20.55-21.16/21	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 20.34-20.44/10	03.24	03.57 21.07-21.24/17	05.26 20.44-20.51/7	06.53	08.16	08.49	10.04
	15.33	17.08	18.31	20.59	22.28 20.55-21.17/22	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28 20.36-20.41/5	03.23	04.00 21.07-21.25/18	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 20.54-21.17/23	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25 20.54-21.17/23	03.22	04.03 21.06-21.25/19	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.49
18	09.44	08.16	06.43	05.57	04.22 20.55-21.18/23	03.22	04.05 21.06-21.26/20	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 20.54-21.17/23	03.21	04.08 21.05-21.26/21	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16 20.54-21.17/23	03.21	04.11 21.05-21.26/21	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13 20.55-21.17/22	03.21	04.13 21.05-21.27/22	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10 20.55-21.17/22	03.21	04.16 21.05-21.27/22	05.47	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 20.56-21.17/21	03.22	04.19 21.05-21.27/22	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05 20.56-21.17/21	03.22	04.22 21.04-21.27/23	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02 20.56-21.17/21	03.23	04.25 21.05-21.28/23	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 20.57-21.16/19	03.23	04.28 21.05-21.27/22	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57 20.57-21.16/19	03.24	04.31 21.05-21.28/23	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24 20.35-20.44/9	03.55 20.58-21.15/17	03.25	04.33 20.45-20.53/8	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41 21.05-21.27/22	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21 20.33-20.46/13	03.52 20.59-21.14/15	03.26	04.36 20.43-20.55/12	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	22.38 21.05-21.27/22	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18 20.31-20.47/16	03.50 21.00-21.14/14	03.27	04.39 20.42-20.57/15	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35 21.06-21.27/21	20.54	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 21.01-21.13/12		04.42 20.41-20.57/16	06.12		08.04		10.11
	16.21		20.16		23.13		22.32 21.06-21.26/20	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	38	739	23	465	339	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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 2 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45		03.29	04.48-04.58/10	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.42		22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43		03.30	04.48-04.58/10	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18		23.40		22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41		03.32	04.50-04.58/8	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21		23.39		22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39		03.33	04.51-04.57/6	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23		23.38		22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37		03.35	04.53-04.55/2	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25		23.36		22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35		03.37		05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27		23.35		22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34		03.39		05.03	06.31	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29		23.33		22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	04.46-04.51/5	03.41		05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31		23.31		22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	04.45-04.52/7	03.43		05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33		23.29		22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.44-04.53/9	03.45		05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35		23.27		22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	04.43-04.54/11	03.48		05.15	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36		23.25		21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	04.44-04.55/11	03.50		05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38		23.23		21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	04.43-04.55/12	03.52		05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39		23.21		21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	04.44-04.56/12	03.55		05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41		23.19		21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	04.43-04.56/13	03.57		05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42		23.16		21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.43-04.57/14	04.00		05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43		23.14		21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22	04.43-04.58/15	04.03		05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44		23.11		21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.44-04.58/14	04.05		05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44		23.09		21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.44-04.58/14	04.08		05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45		23.06		21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.44-04.59/15	04.11		05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46		23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.44-04.59/15	04.13		05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46		23.01		21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.44-04.59/15	04.16		05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46		22.58		21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.44-04.59/15	04.19		05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46		22.56		21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.45-04.59/14	04.22		05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46		22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23	04.45-04.59/14	04.25		05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46		22.50		21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.45-04.59/14	04.28		05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45		22.47		21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.27	03.57	03.24	04.46-05.00/14	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45		22.44		21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.47-05.00/13	04.33		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44		22.41		21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.46-04.59/13	04.36		06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44		22.38		20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.47-04.59/12	04.39		06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43		22.35		20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48			04.42		06.12		08.04		10.11
	16.21		20.16		23.13			22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	0	291		36		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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 3 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45 04.59-05.17/18	03.29 05.02-05.25/23	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43 04.58-05.17/19	03.30 05.03-05.26/23	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41 04.58-05.18/20	03.32 05.03-05.26/23	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39 04.58-05.19/21	03.33 05.03-05.26/23	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37 04.58-05.19/21	03.35 05.03-05.25/22	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35 04.58-05.19/21	03.37 05.04-05.26/22	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34 04.58-05.20/22	03.39 05.04-05.25/21	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32 04.58-05.20/22	03.41 05.05-05.26/21	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30 04.58-05.20/22	03.43 05.05-05.25/20	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29 04.58-05.20/22	03.45 05.06-05.25/19	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28 04.59-05.22/23	03.48 05.06-05.25/19	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26 04.58-05.21/23	03.50 05.07-05.25/18	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25 04.58-05.21/23	03.52 05.07-05.24/17	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24 04.59-05.22/23	03.55 05.08-05.23/15	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24 04.58-05.22/24	03.57 05.09-05.23/14	05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23 04.59-05.22/23	04.00 05.10-05.22/12	05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22 04.59-05.23/24	04.03 05.12-05.20/8	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22 05.00-05.23/23	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21 05.00-05.23/23	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21 05.00-05.23/23	04.11	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21 05.00-05.24/24	04.14	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21 05.00-05.24/24	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22 05.00-05.23/23	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22 05.01-05.24/23	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23 05.00-05.24/24	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 05.04-05.10/6	03.23 05.01-05.24/23	04.28	05.58	07.23	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57 05.02-05.12/10	03.24 05.02-05.25/23	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55 05.01-05.13/12	03.25 05.02-05.25/23	04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52 05.01-05.15/14	03.26 05.01-05.25/24	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 05.00-05.16/16	03.27 05.02-05.25/23	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 04.59-05.16/17		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	75	674	320	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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 4 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.46 04.56-05.14/18	03.29 04.52-05.23/31	04.45 05.46-06.06/20	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43 04.55-05.15/20	03.30 04.53-05.24/31	04.48 05.47-06.06/19	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41 04.52-05.16/24	03.32 04.53-05.23/30	04.51 05.47-06.05/18	06.21	07.43	08.13	09.41
	15.04	16.31	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39 04.51-05.16/25	03.33 04.54-05.23/29	04.54 05.49-06.04/15	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.37 04.50-05.16/26	03.35 04.54-05.23/29	04.57 05.49-06.03/14	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58 05.44-05.50/6	03.35 04.49-05.17/28	03.37 04.55-05.23/28	05.00 05.51-06.01/10	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.58
7	10.04	08.50	07.20	06.35	04.55 05.41-05.52/11	03.34 04.49-05.17/28	03.39 04.56-05.23/27	05.03 05.54-05.57/3	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 05.39-05.53/14	03.32 04.48-05.18/30	03.41 04.57-05.23/26	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49 05.38-05.55/17	03.31 04.48-05.18/30	03.43 04.58-05.22/24	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46 05.37-05.55/18	03.29 04.48-05.18/30	03.45 05.01-05.22/21	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43 05.36-05.55/19	03.28 04.48-05.19/31	03.48 05.04-05.22/18	05.15	06.43	08.05	08.37	09.58
	15.22	16.56	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40 05.36-05.56/20	03.26 04.48-05.19/31	03.50 05.05-05.22/17	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 05.36-05.56/20	03.25 04.48-05.19/31	03.53 05.05-05.21/16	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34 05.36-05.57/21	03.24 04.48-05.20/32	03.55 05.06-05.20/14	05.24	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.22	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 05.35-05.56/21	03.24 04.47-05.20/33	03.58 05.07-05.19/12	05.26	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28 05.36-05.57/21	03.23 04.48-05.20/32	04.00 05.09-05.18/9	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14 05.54-05.56/2	21.42	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25 05.35-05.56/21	03.22 04.48-05.21/33	04.03 05.11-05.15/4	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11 05.51-05.59/8	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22 05.36-05.56/20	03.22 04.48-05.21/33	04.05 05.51-06.02/11	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 05.36-05.56/20	03.21 04.49-05.21/32	04.08 05.50-06.03/13	05.38	07.04	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16 05.36-05.55/19	03.21 04.49-05.21/32	04.11 05.49-06.04/15	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13 05.37-05.55/18	03.21 04.49-05.21/32	04.14 05.48-06.04/16	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11 05.37-05.55/18	03.21 04.49-05.21/32	04.16 05.47-06.05/18	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 05.38-05.54/16	03.22 04.50-05.22/32	04.19 05.47-06.06/19	05.50	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.33	17.52	15.22	14.50
24	09.29	07.57	06.23	05.38	04.05 05.39-05.53/14	03.22 04.49-05.22/33	04.22 05.47-06.06/19	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02 05.40-05.52/12	03.23 04.49-05.22/33	04.25 05.46-06.06/20	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 05.42-05.51/9	03.23 04.50-05.22/32	04.28 05.47-06.07/20	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57 05.01-05.08/7	03.24 04.51-05.23/32	04.31 05.46-06.07/21	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 05.43-05.49/6	23.45	22.44	21.05	19.19	16.39	15.14	14.53
28	09.19	07.44	06.09	05.24	03.55 04.59-05.10/11	03.25 04.51-05.23/32	04.34 05.46-06.07/21	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.55
29	09.16		07.06	05.21	03.52 04.58-05.12/14	03.26 04.51-05.22/31	04.36 05.46-06.07/21	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 04.57-05.13/16	03.27 04.51-05.23/32	04.39 05.46-06.07/21	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 04.56-05.13/17		04.42 05.47-06.07/20	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	426	900	631	99	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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 5 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.21	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.08	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.56	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.40	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.24	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.22	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.57	05.26	06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43	23.14	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.12	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.21	04.14	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.51	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.50	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.33	17.52	15.22	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.13	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.14	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.55	09.28	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 6 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	03.57	05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.12	15.37	14.48
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
27.8.2021 14.58/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 7 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.02	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.08	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.40	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	03.57	05.26	06.53	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.42	19.56	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.12	21.38	19.53	18.12	15.37	14.48
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.28	10.12
	16.12	17.47	19.07	21.37	23.06	23.45	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case**WTG:** 8 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.10	09.08	07.40	08.16-08.22/6	06.55	05.14	03.45	03.28	04.45	06.15		07.37	08.49-09.02/13	08.07	09.36
	15.01	16.24	17.50		20.19	21.46	23.16	23.42	22.29	20.48		19.05		16.23	15.05
2	10.10	09.05	07.37	08.12-08.25/13	06.52	05.11	03.43	03.30	04.48	06.18		07.40	08.47-09.04/17	08.10	09.38
	15.02	16.27	17.53		20.22	21.49	23.19	23.41	22.26	20.44		19.02		16.20	15.04
3	10.09	09.02	07.34	08.11-08.27/16	06.49	05.08	03.41	03.31	04.51	06.20		07.43	08.46-09.04/18	08.13	09.41
	15.04	16.30	17.56		20.24	21.52	23.21	23.40	22.23	20.41		18.58		16.17	15.02
4	10.08	08.59	07.31	08.09-08.27/18	06.45	05.05	03.39	03.33	04.54	06.23		07.46	08.45-09.05/20	08.16	09.43
	15.06	16.34	17.59		20.27	21.55	23.23	23.38	22.20	20.38		18.55		16.14	15.00
5	10.06	08.56	07.27	08.09-08.28/19	06.42	05.01	03.37	03.35	04.57	06.26		07.48	08.44-09.04/20	08.19	09.46
	15.08	16.37	18.02		20.30	21.58	23.25	23.37	22.17	20.34		18.52		16.11	14.59
6	10.05	08.53	07.24	08.08-08.28/20	06.38	04.58	03.35	03.37	05.00	06.29		07.51	08.43-09.04/21	08.22	09.48
	15.10	16.40	18.05		20.33	22.01	23.28	23.35	22.14	20.31		18.48		16.08	14.57
7	10.04	08.51	07.20	08.08-08.28/20	06.35	04.55	03.33	03.39	05.03	06.32		07.54	08.43-09.04/21	08.25	09.50
	15.13	16.43	18.08		20.36	22.04	23.30	23.33	22.11	20.27		18.45		16.05	14.56
8	10.03	08.47	07.17	08.07-08.28/21	06.31	04.52	03.32	03.41	05.06	06.34		07.57	08.43-09.03/20	08.28	09.52
	15.15	16.46	18.10		20.39	22.07	23.32	23.31	22.08	20.24		18.42		16.02	14.55
9	10.01	08.44	07.14	08.08-08.28/20	06.28	04.49	03.30	03.43	05.09	06.37		08.00	08.44-09.02/18	08.31	09.54
	15.17	16.49	18.13		20.42	22.10	23.33	23.30	22.04	20.21		18.38		15.59	14.54
10	09.59	08.41	07.10	08.07-08.26/19	06.25	04.46	03.29	03.45	05.12	06.40		08.02	08.44-09.01/17	08.34	09.56
	15.20	16.52	18.16		20.45	22.14	23.35	23.28	22.01	20.17		18.35		15.57	14.52
11	09.58	08.38	07.07	08.08-08.26/18	06.21	04.43	03.27	03.47	05.15	06.43		08.05	08.45-09.00/15	08.37	09.58
	15.22	16.55	18.19		20.47	22.17	23.37	23.26	21.58	20.14		18.31		15.54	14.52
12	09.56	08.35	07.04	08.09-08.24/15	06.18	04.40	03.26	03.50	05.18	06.45		08.08	08.47-08.57/10	08.40	10.00
	15.25	16.59	18.22		20.50	22.20	23.38	23.23	21.55	20.10		18.28		15.51	14.51
13	09.54	08.32	07.00	08.11-08.22/11	06.14	04.36	03.25	03.52	05.20	06.48		08.11		08.44	10.01
	15.27	17.02	18.25		20.53	22.23	23.40	23.21	21.51	20.07		18.25		15.48	14.50
14	09.52	08.29	06.57		06.11	04.33	03.24	03.55	05.23	06.51		08.14		08.47	10.03
	15.30	17.05	18.28		20.56	22.26	23.41	23.19	21.48	20.03		18.21		15.45	14.49
15	09.50	08.26	06.53		06.08	04.30	03.23	03.57	05.26	06.53		08.17		08.50	10.05
	15.33	17.08	18.31		20.59	22.29	23.42	23.17	21.45	20.00		18.18		15.43	14.49
16	09.48	08.23	06.50		06.04	04.27	03.22	04.00	05.29	06.56		08.19		08.53	10.06
	15.36	17.11	18.33		21.02	22.32	23.43	23.14	21.42	19.57		18.15		15.40	14.49
17	09.46	08.20	06.47		06.01	04.25	03.22	04.02	05.32	06.59		08.22		08.56	10.07
	15.39	17.14	18.36		21.05	22.35	23.44	23.12	21.38	19.53		18.12		15.37	14.48
18	09.44	08.16	06.43		05.57	04.22	03.21	04.05	05.35	07.02		08.25		08.59	10.08
	15.41	17.17	18.39		21.08	22.37	23.45	23.09	21.35	19.50		18.08		15.35	14.48
19	09.42	08.13	06.40		05.54	04.19	03.21	04.08	05.38	07.04		08.28		09.02	10.09
	15.44	17.20	18.42		21.11	22.40	23.46	23.07	21.32	19.46		18.05		15.32	14.48
20	09.39	08.10	06.36		05.51	04.16	03.21	04.11	05.41	07.07		08.31		09.05	10.10
	15.47	17.23	18.45		21.14	22.43	23.46	23.04	21.28	19.43		18.02		15.30	14.48
21	09.37	08.07	06.33		05.47	04.13	03.21	04.13	05.44	07.10		08.34		09.08	10.11
	15.50	17.26	18.48		21.17	22.46	23.46	23.01	21.25	19.39		17.58		15.27	14.49
22	09.35	08.03	06.30		05.44	04.10	03.21	04.16	05.47	07.13		08.37		09.11	10.11
	15.53	17.29	18.50		21.19	22.49	23.47	22.59	21.22	19.36		17.55		15.25	14.49
23	09.32	08.00	06.26		05.41	04.08	03.21	04.19	05.49	07.15		08.40		09.14	10.12
	15.56	17.32	18.53		21.22	22.52	23.47	22.56	21.18	19.33		17.52		15.22	14.50
24	09.30	07.57	06.23		05.37	04.05	03.22	04.22	05.52	07.18		08.43		09.16	10.12
	15.59	17.35	18.56		21.25	22.55	23.47	22.53	21.15	19.29		17.49		15.20	14.50
25	09.27	07.54	06.19		05.34	04.02	03.22	04.25	05.55	07.21		07.46		09.19	10.12
	16.02	17.38	18.59		21.28	22.58	23.46	22.50	21.12	19.26		16.46		15.18	14.51
26	09.24	07.50	06.16		05.31	04.00	03.23	04.28	05.58	07.24		07.49		09.22	10.13
	16.05	17.41	19.02		21.31	23.00	23.46	22.47	21.08	19.22		16.42		15.15	14.52
27	09.22	07.47	06.12		05.27	03.57	03.24	04.30	06.01	07.26		07.52		09.25	10.12
	16.08	17.44	19.05		21.34	23.03	23.45	22.44	21.05	19.19		16.39		15.13	14.53
28	09.19	07.44	06.09		05.24	03.55	03.25	04.33	06.04	07.29		07.55		09.28	10.12
	16.12	17.47	19.07		21.37	23.06	23.45	22.41	21.01	19.15		16.36		15.11	14.54
29	09.16		07.06		05.21	03.52	03.26	04.36	06.06	07.32		07.58		09.30	10.12
	16.15		20.10		21.40	23.08	23.44	22.39	20.58	19.12		16.33		15.09	14.56
30	09.14		07.02		05.18	03.50	03.27	04.39	06.09	07.35	08.52-09.00/8	08.01		09.33	10.12
	16.18		20.13		21.43	23.11	23.43	22.36	20.55	19.09		16.30		15.07	14.57
31	09.11		06.59			03.47		04.42	06.12			08.04			10.11
	16.21		20.16			23.14		22.33	20.51			16.27			14.58
Potential sun hours	182	242	363		447	559	605	594	502	392		308		206	151
Sum of minutes with flicker	0	0	216		0	0	0	0	0	8		210		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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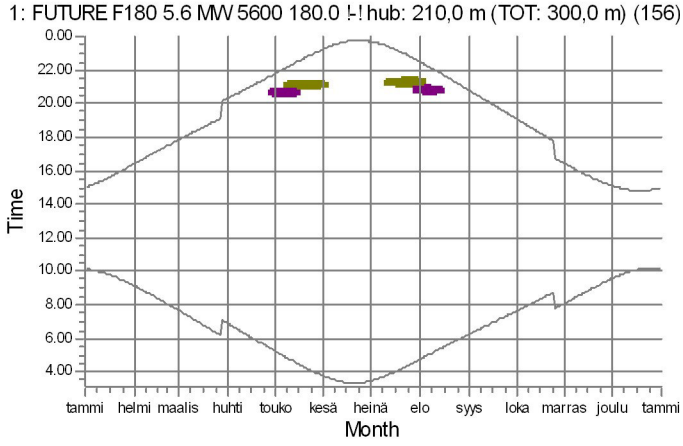
Calculated:
27.8.2021 14.58/3.3.294

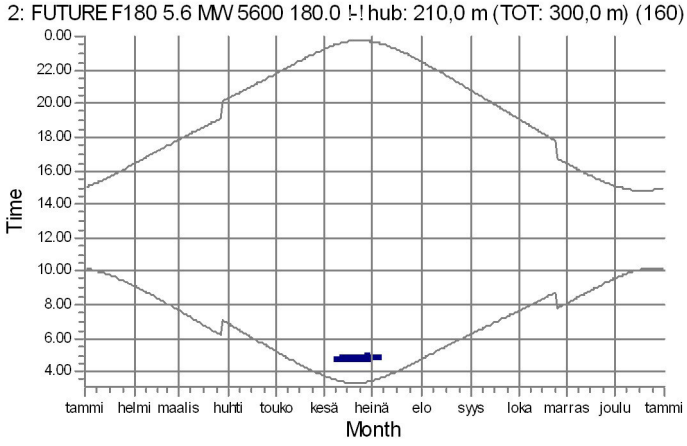
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case

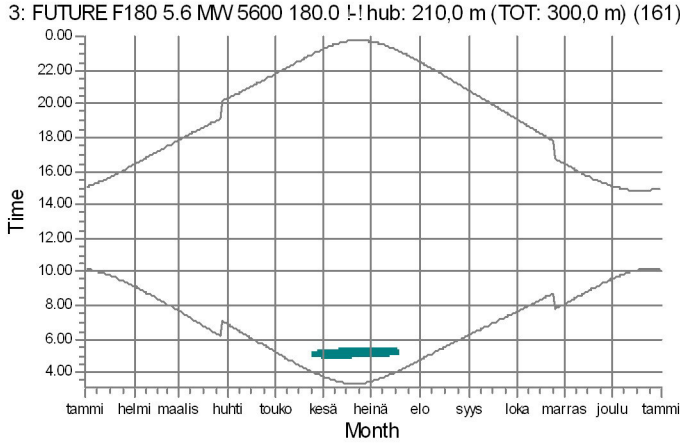
1: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (156)



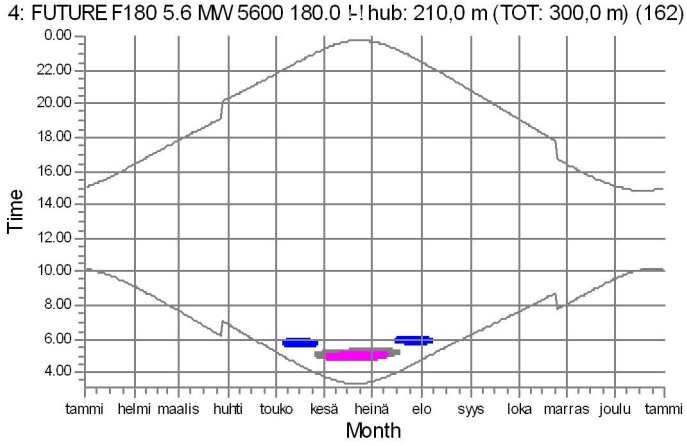
2: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (160)



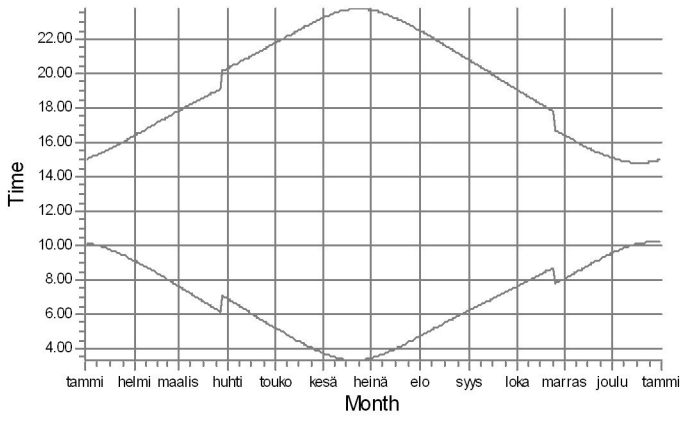
3: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (161)



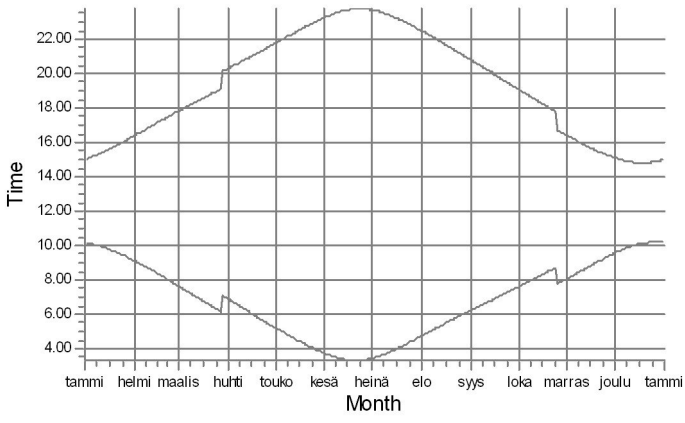
4: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (162)



5: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (155)



6: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (158)



Shadow receptors

RH01: RH01
RH02: RH02
RH03: RH03
RH04: RH04
RH05: RH05
RH08: RH08
RH09: RH09

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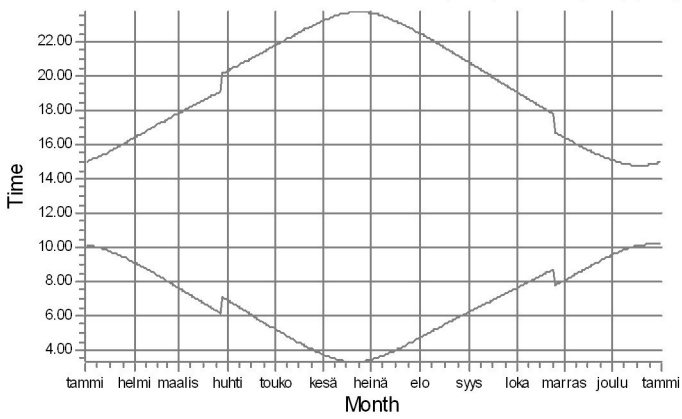
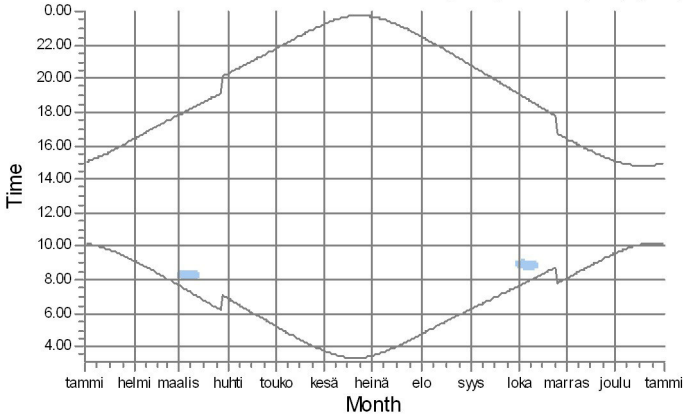
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case

7: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (159)



8: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (157)



Shadow receptors

RH13: RH13

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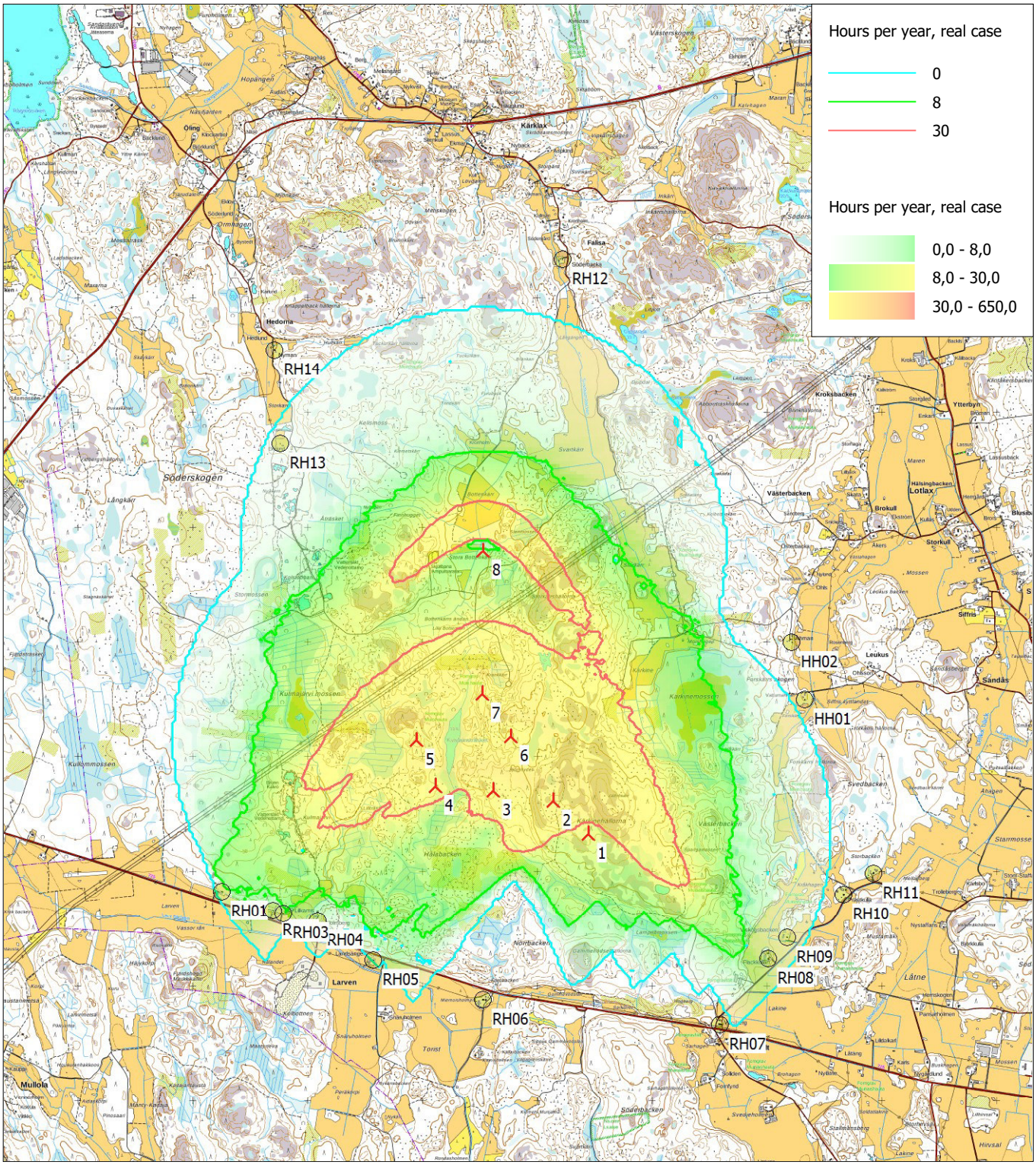
SHADOW - Map

Calculation: MP Proposal, 8xF180 @210m, Real case



Map: Söde_Background map , Print scale 1:50 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 254 335 North: 7 013 130

New WTG Shadow receptor

Flicker map level: DEM 2m

Bilaga 2

Modelleringens utgångsdata och resultat,

worst case Söderskogen

Project:
Söderskogen

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SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Worst case

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) [SEINAJOKI]

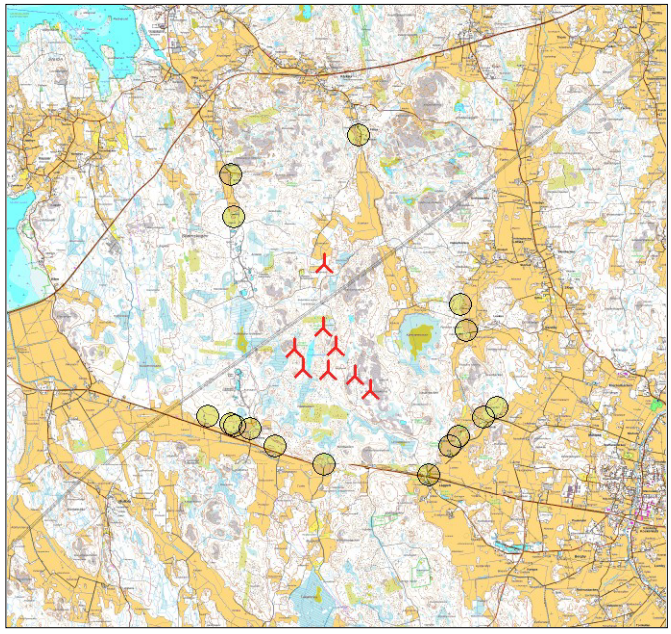
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

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: DEM 2m
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 1:150 000
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	255445	7011327	46,5	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
2	255137	7011612	50,4	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
3	254614	7011705	38,8	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
4	254111	7011739	25,6	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
5	253945	7012144	33,9	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
6	254771	7012174	40,0	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
7	254521	7012552	35,1	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
8	254528	7013790	19,3	FUTURE F180 5.6 MW 5600 180....Yes		FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1

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]
HH01	HH01	257331	7012499	17,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
HH02	HH02	257219	7012995	17,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH01	RH01	252257	7010823	13,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH02	RH02	252700	7010660	15,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH03	RH03	252789	7010635	15,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH04	RH04	253090	7010568	15,6	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH05	RH05	253574	7010222	14,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH06	RH06	254528	7009881	18,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH07	RH07	256594	7009667	21,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH08	RH08	257015	7010236	19,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH09	RH09	257177	7010423	17,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH10	RH10	257669	7010798	18,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH11	RH11	257929	7010986	18,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH12	RH12	255219	7016333	14,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH13	RH13	252762	7014727	25,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH14	RH14	252714	7015547	21,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0

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27.8.2021 16.22/3.3.294

SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Worst case

Calculation Results

Shadow receptor

No.	Name	Shadow, worst case: Shadow hours per year [h/year]	Shadow, worst case: Shadow days per year [days/year]	Shadow, worst case: Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
HH01	HH01	0:00	0	0:00	0:00
HH02	HH02	0:00	0	0:00	0:00
RH01	RH01	12:05	45	0:21	3:34
RH02	RH02	18:00	52	0:25	5:17
RH03	RH03	11:06	38	0:22	3:14
RH04	RH04	17:49	53	0:24	5:14
RH05	RH05	5:27	28	0:15	1:36
RH06	RH06	0:00	0	0:00	0:00
RH07	RH07	0:00	0	0:00	0:00
RH08	RH08	15:43	53	0:23	4:12
RH09	RH09	11:01	38	0:22	2:45
RH10	RH10	0:00	0	0:00	0:00
RH11	RH11	0:00	0	0:00	0:00
RH12	RH12	0:00	0	0:00	0:00
RH13	RH13	7:14	26	0:21	1:14
RH14	RH14	0:00	0	0:00	0:00

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)	26:44	6:58
2	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)	5:27	1:36
3	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)	17:49	5:14
4	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)	34:16	10:06
5	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)	0:00	0:00
6	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)	0:00	0:00
7	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)	0:00	0:00
8	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)	7:14	1:14

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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** HH01 - HH01

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.35
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.03
3	10.08	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.04	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.36	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.11	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.51
12	09.56	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.48
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.07
	15.38	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.10	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.13	03.21	04.13	05.43	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.27	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.57	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.55
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
27.8.2021 16.22/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case**Shadow receptor:** HH02 - HH02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.35
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.03
3	10.08	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.04	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.36	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.04	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.07	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.11	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.13	18.31	15.54	14.51
12	09.56	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	10.00
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.48
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.07
	15.38	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.10	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.13	03.21	04.13	05.43	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.49
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.24	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.17	14.51
26	09.24	07.50	06.16	05.31	03.59	03.23	04.27	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.52	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.25	04.33	06.03	07.29	07.55	09.27	10.12
	16.11	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.55
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.29	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case**Shadow receptor:** RH01 - RH01

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May		June	July		August		September	October	November	December
1	10.10	09.08	07.41	06.56	05.15		03.46	03.29		04.45	05.46 (4)	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46		23.16	23.42		22.29	20 06.06 (4)	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11		03.44	03.31		04.48	05.47 (4)	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49		23.18	23.40		22.26	19 06.06 (4)	20.45	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08		03.42	03.32		04.51	05.47 (4)	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52		23.21	23.39		22.23	18 06.05 (4)	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05		03.40	03.34		04.54	05.49 (4)	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55		23.23	23.38		22.20	15 06.04 (4)	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02		03.38	03.36		04.57	05.49 (4)	06.26	07.49	08.19	09.45
	15.09	16.37	18.02	20.30	21.58		23.25	23.36		22.17	14 06.03 (4)	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	05.44 (4)	03.36	03.37		05.00	05.51 (4)	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	6 05.50 (4)	23.27	23.35		22.14	10 06.01 (4)	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	05.41 (4)	03.34	03.39		05.03	05.54 (4)	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	11 05.52 (4)	23.29	23.33		22.11	3 05.57 (4)	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	05.39 (4)	03.32	03.41		05.06		06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	14 05.53 (4)	23.31	23.31		22.08		20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	05.38 (4)	03.31	03.44		05.09		06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	17 05.55 (4)	23.33	23.29		22.04		20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	05.37 (4)	03.29	03.46		05.12		06.40	08.03	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	18 05.55 (4)	23.35	23.27		22.01		20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	05.36 (4)	03.28	03.48		05.15		06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	19 05.55 (4)	23.36	23.25		21.58		20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	05.36 (4)	03.27	03.50		05.18		06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	20 05.56 (4)	23.38	23.23		21.55		20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	05.36 (4)	03.26	03.53		05.21		06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	20 05.56 (4)	23.39	23.21		21.51		20.07	18.25	15.48	14.51
14	09.52	08.29	06.57	06.11	04.34	05.36 (4)	03.25	03.55		05.24		06.51	08.14	08.47	10.03
	15.31	17.05	18.28	20.56	22.25	21 05.57 (4)	23.41	23.19		21.48		20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	05.35 (4)	03.24	03.58		05.27		06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	21 05.56 (4)	23.42	23.16		21.45		20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.05	04.28	05.36 (4)	03.23	04.00	05.54 (4)	05.30		06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	21 05.57 (4)	23.43	23.14	2 05.56 (4)	21.42		19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	05.35 (4)	03.23	04.03	05.51 (4)	05.32		06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	21 05.56 (4)	23.44	23.11	8 05.59 (4)	21.38		19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	05.36 (4)	03.22	04.06	05.51 (4)	05.35		07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	20 05.56 (4)	23.45	23.09	11 06.02 (4)	21.35		19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	05.36 (4)	03.22	04.08	05.50 (4)	05.38		07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	20 05.56 (4)	23.45	23.06	13 06.03 (4)	21.32		19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	05.36 (4)	03.22	04.11	05.49 (4)	05.41		07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	19 05.55 (4)	23.46	23.04	15 06.04 (4)	21.28		19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	05.37 (4)	03.22	04.14	05.48 (4)	05.44		07.10	08.34	09.08	10.11
	15.51	17.26	18.48	21.17	22.46	18 05.55 (4)	23.46	23.01	16 06.04 (4)	21.25		19.40	17.59	15.27	14.49
22	09.34	08.04	06.30	05.44	04.11	05.37 (4)	03.22	04.17	05.47 (4)	05.47		07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	18 05.55 (4)	23.46	22.58	18 06.05 (4)	21.22		19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	05.38 (4)	03.22	04.19	05.47 (4)	05.50		07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	16 05.54 (4)	23.46	22.56	19 06.06 (4)	21.18		19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	05.39 (4)	03.22	04.22	05.47 (4)	05.53		07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	14 05.53 (4)	23.46	22.53	19 06.06 (4)	21.15		19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	05.40 (4)	03.23	04.25	05.46 (4)	05.55		07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	12 05.52 (4)	23.46	22.50	20 06.06 (4)	21.12		19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	05.42 (4)	03.24	04.28	05.47 (4)	05.58		07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	9 05.51 (4)	23.46	22.47	20 06.07 (4)	21.08		19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	05.43 (4)	03.24	04.31	05.46 (4)	06.01		07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	6 05.49 (4)	23.45	22.44	21 06.07 (4)	21.05		19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55		03.25	04.34	05.46 (4)	06.04		07.29	07.55	09.28	10.12
	16.12	17.47	19.08	21.37	23.06		23.44	22.41	21 06.07 (4)	21.01		19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53		03.26	04.37	05.46 (4)	06.07		07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08		23.44	22.38	21 06.07 (4)	20.58		19.12	16.33	15.10	14.56
30	09.14		07.02	05.18	03.50		03.28	04.40	05.46 (4)	06.10		07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11		23.43	22.35	21 06.07 (4)	20.55		19.09	16.30	15.08	14.57
31	09.11		06.59		03.48			04.43	05.47 (4)	06.12			08.04		10.11
	16.21		20.16		23.13			22.32	20 06.07 (4)	20.51			16.27		14.59
Potential sun hours	182	242	363	447	559		605	594		502		392	308	206	151
Total, worst case						361			265		99				
Sun reduction						0,49			0,46		0,42				
Oper. time red.						0,98			0,98		0,98				
Wind dir. red.						0,65			0,65		0,65				
Total reduction						0,31			0,29		0,27				
Total, real						111			78		26				

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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH02 - RH02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46	04.56 (4)	03.29	04.59 (4)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16 18	05.14 (4)	23.42 24	05.23 (4)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	04.55 (4)	03.30	05.00 (4)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18 20	05.15 (4)	23.40 24	05.24 (4)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.42	04.55 (4)	03.32	05.00 (4)	04.51	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52	23.21 21	05.16 (4)	23.39 23	05.23 (4)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.40	04.56 (4)	03.34	05.00 (4)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23 20	05.16 (4)	23.38 23	05.23 (4)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.55 (4)	03.36	05.00 (4)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25 21	05.16 (4)	23.36 23	05.23 (4)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.55 (4)	03.37	05.01 (4)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27 22	05.17 (4)	23.35 22	05.23 (4)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.55 (4)	03.39	05.01 (4)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29 22	05.17 (4)	23.33 22	05.23 (4)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.55 (4)	03.41	05.02 (4)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31 23	05.18 (4)	23.31 21	05.23 (4)	22.08	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.55 (4)	03.44	05.02 (4)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33 23	05.18 (4)	23.29 20	05.22 (4)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.55 (4)	03.46	05.03 (4)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35 23	05.18 (4)	23.27 19	05.22 (4)	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	04.55 (4)	03.48	05.04 (4)	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36 24	05.19 (4)	23.25 18	05.22 (4)	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.55 (4)	03.50	05.05 (4)	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38 24	05.19 (4)	23.23 17	05.22 (4)	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.55 (4)	03.53	05.05 (4)	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39 24	05.19 (4)	23.21 16	05.21 (4)	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.55 (4)	03.55	05.06 (4)	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41 25	05.20 (4)	23.19 14	05.20 (4)	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.55 (4)	03.58	05.07 (4)	05.27	06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42 25	05.20 (4)	23.16 12	05.19 (4)	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.55 (4)	04.00	05.09 (4)	05.30	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43 25	05.20 (4)	23.14 9	05.18 (4)	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.56 (4)	04.03	05.11 (4)	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44 25	05.21 (4)	23.11 4	05.15 (4)	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.56 (4)	04.06		05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44 25	05.21 (4)	23.09		21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.56 (4)	04.08		05.38	07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45 25	05.21 (4)	23.06		21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	03.22	04.57 (4)	04.11		05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46 24	05.21 (4)	23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	03.22	04.57 (4)	04.14		05.44	07.10	08.34	09.08	10.10
	15.51	17.26	18.48	21.16	22.46	23.46 24	05.21 (4)	23.01		21.25	19.39	17.59	15.27	14.49
22	09.34	08.04	06.30	05.44	04.11	03.22	04.57 (4)	04.17		05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46 24	05.21 (4)	22.58		21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.57 (4)	04.19		05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46 25	05.22 (4)	22.56		21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.57 (4)	04.22		05.53	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46 25	05.22 (4)	22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.57 (4)	04.25		05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46 25	05.22 (4)	22.50		21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.58 (4)	04.28		05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45 24	05.22 (4)	22.47		21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58 05.01 (4)	03.24	04.58 (4)	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 7 05.08 (4)	23.45 25	05.23 (4)	22.44		21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55 04.59 (4)	03.25	04.59 (4)	04.34		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06 11 05.10 (4)	23.44 24	05.23 (4)	22.41		21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53 04.58 (4)	03.26	04.58 (4)	04.37		06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08 14 05.12 (4)	23.44 24	05.22 (4)	22.38		20.58	19.12	16.33	15.10	14.56
30	09.14		07.02	05.18	03.50 04.57 (4)	03.28	04.58 (4)	04.40		06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11 16 05.13 (4)	23.43 25	05.23 (4)	22.35		20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48 04.56 (4)			04.43		06.12		08.04		10.11
	16.21		20.16		23.13 17 05.13 (4)			22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case					65	704		311						
Sun reduction					0,49	0,45		0,46						
Oper. time red.					0,98	0,98		0,98						
Wind dir. red.					0,66	0,66		0,66						
Total reduction					0,31	0,29		0,30						
Total, real					20	205		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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH03 - RH03

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46		03.29		04.52 (4)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.42	19	05.11 (4)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44		03.30		04.53 (4)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18		23.40	18	05.11 (4)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.42		04.52 (4)	03.32	04.53 (4)	04.51	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52	23.21	8	05.00 (4)	23.39	18	05.11 (4)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39		04.51 (4)	03.34		04.54 (4)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23	11	05.02 (4)	23.38	17	05.11 (4)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38		04.50 (4)	03.36		04.54 (4)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25	12	05.02 (4)	23.36	16	05.10 (4)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36		04.49 (4)	03.37		04.55 (4)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	14	05.03 (4)	23.35	15	05.10 (4)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34		04.49 (4)	03.39		04.56 (4)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	15	05.04 (4)	23.33	13	05.09 (4)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32		04.48 (4)	03.41		04.57 (4)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	17	05.05 (4)	23.31	12	05.09 (4)	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31		04.48 (4)	03.44		04.58 (4)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33	17	05.05 (4)	23.29	9	05.07 (4)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29		04.48 (4)	03.46		05.01 (4)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35	18	05.06 (4)	23.27	5	05.06 (4)	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28		04.48 (4)	03.48			05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	19	05.07 (4)	23.25			21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27		04.48 (4)	03.50			05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	19	05.07 (4)	23.23			21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26		04.48 (4)	03.53			05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	19	05.07 (4)	23.21			21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25		04.48 (4)	03.55			05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41	20	05.08 (4)	23.19			21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24		04.47 (4)	03.58			05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	21	05.08 (4)	23.16			21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23		04.48 (4)	04.00			05.30	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43	21	05.09 (4)	23.14			21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23		04.48 (4)	04.03			05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	21	05.09 (4)	23.11			21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22		04.48 (4)	04.06			05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	22	05.10 (4)	23.09			21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22		04.49 (4)	04.08			05.38	07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	21	05.10 (4)	23.06			21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	03.22		04.49 (4)	04.11			05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46	21	05.10 (4)	23.04			21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	03.22		04.49 (4)	04.14			05.44	07.10	08.34	09.08	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	21	05.10 (4)	23.01			21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22		04.49 (4)	04.17			05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46	21	05.10 (4)	22.58			21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22		04.50 (4)	04.19			05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46	21	05.11 (4)	22.56			21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22		04.49 (4)	04.22			05.53	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46	22	05.11 (4)	22.53			21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23		04.49 (4)	04.25			05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	21	05.10 (4)	22.50			21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24		04.50 (4)	04.28			05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	21	05.11 (4)	22.47			21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	03.24		04.51 (4)	04.31			06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	20	05.11 (4)	22.44			21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25		04.51 (4)	04.34			06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06	23.44	21	05.12 (4)	22.41			21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26		04.51 (4)	04.37			06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	20	05.11 (4)	22.38			20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28		04.51 (4)	04.40			06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	20	05.11 (4)	22.35			20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48				04.43			06.12		08.04		10.11
	16.21		20.16		23.13				22.32			20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151	
Total, worst case							524		142						
Sun reduction							0,45		0,46						
Oper. time red.							0,98		0,98						
Wind dir. red.							0,66		0,66						
Total reduction							0,29		0,30						
Total, real							152		42						

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:
27.8.2021 16.22/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH04 - RH04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.55	05.15	03.46	04.59 (3)	03.29	05.02 (3)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16 18	05.17 (3)	23.42 23	05.25 (3)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	04.58 (3)	03.30	05.03 (3)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18 19	05.17 (3)	23.40 23	05.26 (3)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	04.58 (3)	03.32	05.03 (3)	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.25	21.52	23.21 20	05.18 (3)	23.39 23	05.26 (3)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	04.58 (3)	03.34	05.03 (3)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23 21	05.19 (3)	23.38 23	05.26 (3)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.58 (3)	03.35	05.03 (3)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25 21	05.19 (3)	23.36 22	05.25 (3)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.58 (3)	03.37	05.04 (3)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27 21	05.19 (3)	23.35 22	05.26 (3)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.58 (3)	03.39	05.04 (3)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29 22	05.20 (3)	23.33 21	05.25 (3)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.58 (3)	03.41	05.05 (3)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31 22	05.20 (3)	23.31 21	05.26 (3)	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.58 (3)	03.44	05.05 (3)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33 22	05.20 (3)	23.29 20	05.25 (3)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.58 (3)	03.46	05.06 (3)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35 22	05.20 (3)	23.27 19	05.25 (3)	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	04.59 (3)	03.48	05.06 (3)	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36 23	05.22 (3)	23.25 19	05.25 (3)	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.58 (3)	03.50	05.07 (3)	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38 23	05.21 (3)	23.23 18	05.25 (3)	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.58 (3)	03.53	05.07 (3)	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39 23	05.21 (3)	23.21 17	05.24 (3)	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.59 (3)	03.55	05.08 (3)	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41 23	05.22 (3)	23.19 15	05.23 (3)	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.58 (3)	03.58	05.09 (3)	05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42 24	05.22 (3)	23.16 14	05.23 (3)	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.59 (3)	04.00	05.10 (3)	05.29	06.56	08.20	08.52	10.06
	15.36	17.11	18.34	21.02	22.31	23.43 23	05.22 (3)	23.14 12	05.22 (3)	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.59 (3)	04.03	05.12 (3)	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44 24	05.23 (3)	23.11 8	05.20 (3)	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	05.00 (3)	04.06		05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44 23	05.23 (3)	23.09		21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	05.00 (3)	04.08		05.38	07.04	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45 23	05.23 (3)	23.06		21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22	05.00 (3)	04.11		05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46 23	05.23 (3)	23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22	05.00 (3)	04.14		05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46 24	05.24 (3)	23.01		21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	05.00 (3)	04.17		05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46 24	05.24 (3)	22.58		21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	05.00 (3)	04.19		05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46 23	05.23 (3)	22.56		21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	05.01 (3)	04.22		05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46 23	05.24 (3)	22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	05.00 (3)	04.25		05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46 24	05.24 (3)	22.50		21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00 05.04 (3)	03.24	05.01 (3)	04.28		05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00 6 05.10 (3)	23.45 23	05.24 (3)	22.47		21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58 05.02 (3)	03.24	05.02 (3)	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 10 05.12 (3)	23.45 23	05.25 (3)	22.44		21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55 05.01 (3)	03.25	05.02 (3)	04.34		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06 12 05.13 (3)	23.44 23	05.25 (3)	22.41		21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53 05.01 (3)	03.26	05.01 (3)	04.37		06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08 14 05.15 (3)	23.43 24	05.25 (3)	22.38		20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50 05.00 (3)	03.28	05.02 (3)	04.40		06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11 16 05.16 (3)	23.43 23	05.25 (3)	22.35		20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48 04.59 (3)			04.43		06.12		08.04		10.11
	16.21		20.16		23.13 17 05.16 (3)			22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case					75	674	320					
Sun reduction					0,49	0,45	0,46					
Oper. time red.					0,98	0,98	0,98					
Wind dir. red.					0,66	0,66	0,66					
Total reduction					0,31	0,29	0,30					
Total, real					23	196	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)

Project:
Söderskogen

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Calculated:
27.8.2021 16.22/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH05 - RH05

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.15	03.46		03.29		04.48 (2)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.41	10	04.58 (2)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44		03.30		04.48 (2)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18		23.40	10	04.58 (2)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41		03.32		04.50 (2)	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.24	21.52	23.20		23.39	8	04.58 (2)	22.23	20.41	18.58	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39		03.34		04.51 (2)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23		23.38	6	04.57 (2)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38		03.35		04.53 (2)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25		23.36	2	04.55 (2)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36		03.37			05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27		23.35			22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.20	06.35	04.55	03.34		03.39			05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29		23.33			22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32		03.41			05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	5	04.51 (2)	23.31		22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31		04.45 (2)	03.44		05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	7	04.52 (2)	23.29		22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29		04.44 (2)	03.46		05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.44	22.13	23.35	9	04.53 (2)	23.27		22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28		04.43 (2)	03.48		05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	11	04.54 (2)	23.25		21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27		04.44 (2)	03.50		05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	11	04.55 (2)	23.23		21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26		04.43 (2)	03.53		05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	12	04.55 (2)	23.21		21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25		04.44 (2)	03.55		05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41	12	04.56 (2)	23.19		21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24		04.43 (2)	03.58		05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	13	04.56 (2)	23.16		21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23		04.43 (2)	04.00		05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.34	21.02	22.31	23.43	14	04.57 (2)	23.14		21.41	19.57	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.23		04.43 (2)	04.03		05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	15	04.58 (2)	23.11		21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22		04.44 (2)	04.06		05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	14	04.58 (2)	23.09		21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22		04.44 (2)	04.08		05.38	07.04	08.28	09.01	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	14	04.58 (2)	23.06		21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22		04.44 (2)	04.11		05.41	07.07	08.31	09.04	10.10
	15.48	17.23	18.45	21.13	22.43	23.45	15	04.59 (2)	23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22		04.44 (2)	04.14		05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	15	04.59 (2)	23.01		21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22		04.44 (2)	04.17		05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46	15	04.59 (2)	22.58		21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22		04.44 (2)	04.19		05.50	07.15	08.40	09.13	10.11
	15.57	17.32	18.53	21.22	22.52	23.46	15	04.59 (2)	22.55		21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22		04.45 (2)	04.22		05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.54	23.46	14	04.59 (2)	22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23		04.45 (2)	04.25		05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	14	04.59 (2)	22.50		21.11	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24		04.45 (2)	04.28		05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	14	04.59 (2)	22.47		21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	03.24		04.46 (2)	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	14	05.00 (2)	22.44		21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25		04.47 (2)	04.34		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	13	05.00 (2)	22.41		21.01	19.15	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26		04.46 (2)	04.37		06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	13	04.59 (2)	22.38		20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28		04.47 (2)	04.40		06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.42	12	04.59 (2)	22.35		20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48			04.42			06.12		08.04		10.11
	16.21		20.16		23.13			22.32			20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151	
Total, worst case							291		36						
Sun reduction							0,45		0,46						
Oper. time red.							0,98		0,98						
Wind dir. red.							0,66		0,66						
Total reduction							0,29		0,30						
Total, real							86		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:
27.8.2021 16.22/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH06 - RH06

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.15	03.46	03.29	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.41	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.18	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.34	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	03.35	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.36	03.37	05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.34	22.14	20.31	18.48	16.08	14.58
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	03.43	05.09	06.37	07.59	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.26	03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	03.55	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.58	05.27	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.23	04.03	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.43	23.11	21.38	19.53	18.12	15.38	14.49
18	09.43	08.16	06.43	05.58	04.22	03.22	04.06	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	23.09	21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.08	05.38	07.04	08.28	09.01	10.09
	15.45	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22	04.11	05.41	07.07	08.31	09.04	10.09
	15.48	17.23	18.45	21.13	22.43	23.45	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22	04.14	05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	04.17	05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.50	07.15	08.40	09.13	10.11
	15.57	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.25	05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.28	05.58	07.23	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.28	03.58	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26	04.37	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28	04.40	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.42	22.35	20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH07 - RH07

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.46	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46	23.15	23.41	22.29	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.09	09.38
	15.03	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.34	04.54	06.23	07.45	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.22	23.37	22.20	20.37	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.36	03.37	05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.34	22.13	20.31	18.48	16.08	14.58
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.14	06.28	04.49	03.31	03.43	05.09	06.37	07.59	08.31	09.54
	15.18	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40	03.27	03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.20	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	03.55	05.23	06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.58	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.41	23.16	21.44	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.42	23.13	21.41	19.56	18.15	15.40	14.49
17	09.45	08.19	06.46	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.49
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.07
	15.42	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.08	05.38	07.04	08.28	09.01	10.08
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13	03.21	04.14	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.45	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.11	03.22	04.16	05.47	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.11
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.51
25	09.26	07.53	06.19	05.34	04.02	03.23	04.25	05.55	07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.45	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.48	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.31	06.01	07.26	07.51	09.24	10.12
	16.09	17.44	19.04	21.34	23.02	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.55
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.39	06.09	07.34	08.00	09.32	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.48		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH08 - RH08

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	21.01 (1)	03.29	04.45	21.07 (1)	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46	23.15 11	21.12 (1)	23.41	22.29 18	21.25 (1)	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	21.03 (1)	03.30	04.48	21.08 (1)	06.18	07.40	08.09	09.38
	15.03	16.27	17.53	20.21	21.49	23.18 8	21.11 (1)	23.40	22.26 16	21.24 (1)	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	21.06 (1)	03.32	04.51	21.10 (1)	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20 4	21.10 (1)	23.39	22.23 13	21.23 (1)	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39		03.33	04.54	21.11 (1)	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23		23.37	22.20 10	21.21 (1)	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.01	03.37		03.35	04.57		06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25		23.36	22.17		20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35		03.37	05.00		06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27		23.34	22.13		20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.34		03.39	05.03		06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29		23.33	22.10		20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 21.03 (1)	03.32		03.41	05.06		06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.38	22.07 6 21.09 (1)	23.31		23.31	22.07		20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49 21.00 (1)	03.30		03.43	05.09		06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 11 21.11 (1)	23.33		23.29	22.04		20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46 20.59 (1)	03.29		03.45 21.12 (1)	05.12		06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 15 21.14 (1)	23.34		23.27 6 21.18 (1)	22.01		20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43 20.57 (1)	03.28		03.48 21.11 (1)	05.15		06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16 17 21.14 (1)	23.36		23.25 9 21.20 (1)	21.58		20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40 20.56 (1)	03.26		03.50 21.09 (1)	05.18		06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19 19 21.15 (1)	23.38		23.23 12 21.21 (1)	21.54		20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 20.56 (1)	03.25		03.52 21.08 (1)	05.20		06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 20 21.16 (1)	23.39		23.21 14 21.22 (1)	21.51		20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33 20.55 (1)	03.24		03.55 21.08 (1)	05.23		06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25 21 21.16 (1)	23.40		23.18 15 21.23 (1)	21.48		20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 20.55 (1)	03.24		03.57 21.07 (1)	05.26		06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28 22 21.17 (1)	23.41		23.16 17 21.24 (1)	21.45		20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28 20.54 (1)	03.23		04.00 21.07 (1)	05.29		06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 23 21.17 (1)	23.42		23.14 18 21.25 (1)	21.41		19.56	18.15	15.40	14.49
17	09.45	08.19	06.46	06.01	04.25 20.54 (1)	03.22		04.03 21.06 (1)	05.32		06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34 23 21.17 (1)	23.43		23.11 19 21.25 (1)	21.38		19.53	18.11	15.37	14.49
18	09.43	08.16	06.43	05.57	04.22 20.55 (1)	03.22		04.05 21.06 (1)	05.35		07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37 23 21.18 (1)	23.44		23.09 20 21.26 (1)	21.35		19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 20.54 (1)	03.21		04.08 21.05 (1)	05.38		07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40 23 21.17 (1)	23.45		23.06 21 21.26 (1)	21.31		19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16 20.54 (1)	03.21		04.11 21.05 (1)	05.41		07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43 23 21.17 (1)	23.45		23.03 21 21.26 (1)	21.28		19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13 20.55 (1)	03.21		04.13 21.05 (1)	05.44		07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46 22 21.17 (1)	23.46		23.01 22 21.27 (1)	21.25		19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10 20.55 (1)	03.21		04.16 21.05 (1)	05.46		07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49 22 21.17 (1)	23.46		22.58 22 21.27 (1)	21.21		19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 20.56 (1)	03.22		04.19 21.05 (1)	05.49		07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51 21 21.17 (1)	23.46		22.55 22 21.27 (1)	21.18		19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05 20.56 (1)	03.22		04.22 21.04 (1)	05.52		07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54 21 21.17 (1)	23.46		22.52 23 21.27 (1)	21.15		19.29	17.49	15.20	14.51
25	09.27	07.53	06.19	05.34	04.02 20.56 (1)	03.23		04.25 21.05 (1)	05.55		07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57 21 21.17 (1)	23.45		22.50 23 21.28 (1)	21.11		19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 20.57 (1)	03.23		04.28 21.05 (1)	05.58		07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00 19 21.16 (1)	23.45		22.47 22 21.27 (1)	21.08		19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57 20.57 (1)	03.24		04.31 21.05 (1)	06.01		07.26	07.51	09.24	10.12
	16.09	17.44	19.04	21.34	23.03 19 21.16 (1)	23.45		22.44 23 21.28 (1)	21.04		19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55 20.58 (1)	03.25		04.33 21.05 (1)	06.04		07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05 17 21.15 (1)	23.44		22.41 22 21.27 (1)	21.01		19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52 20.59 (1)	03.26		04.36 21.05 (1)	06.06		07.32	07.57	09.30	10.11
	16.15		20.10	21.40	23.08 15 21.14 (1)	23.43		22.38 22 21.27 (1)	20.58		19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 21.00 (1)	03.27		04.39 21.06 (1)	06.09		07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10 14 21.14 (1)	23.42		22.35 21 21.27 (1)	20.54		19.08	16.30	15.07	14.57
31	09.10		06.59		03.48 21.01 (1)			04.42 21.06 (1)	06.12			08.03		10.10
	16.21		20.16		23.13 12 21.13 (1)			22.32 20 21.26 (1)	20.51			16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case					449	23	414	57				
Sun reduction					0,49	0,45	0,46	0,42				
Oper. time red.					0,98	0,98	0,98	0,98				
Wind dir. red.					0,58	0,58	0,58	0,58				
Total reduction					0,28	0,26	0,26	0,24				
Total, real					124	6	109	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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH09 - RH09

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	20.31 (1)	03.45	03.29	04.45	20.40 (1)	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46 18	20.49 (1)	23.15	23.41	22.29 18	20.58 (1)	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	20.30 (1)	03.43	03.30	04.48	20.39 (1)	06.18	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49 19	20.49 (1)	23.18	23.40	22.26 20	20.59 (1)	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	20.29 (1)	03.41	03.32	04.51	20.39 (1)	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52 21	20.50 (1)	23.20	23.39	22.23 20	20.59 (1)	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	20.28 (1)	03.39	03.33	04.54	20.38 (1)	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55 22	20.50 (1)	23.23	23.37	22.20 21	20.59 (1)	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	20.28 (1)	03.37	03.35	04.57	20.38 (1)	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58 22	20.50 (1)	23.25	23.36	22.17 22	21.00 (1)	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	20.28 (1)	03.35	03.37	05.00	20.37 (1)	06.29	07.51	08.22	09.47
	15.10	16.40	18.05	20.33	22.01 22	20.50 (1)	23.27	23.34	22.13 22	20.59 (1)	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	20.28 (1)	03.34	03.39	05.03	20.38 (1)	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04 22	20.50 (1)	23.29	23.33	22.10 22	21.00 (1)	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	20.28 (1)	03.32	03.41	05.06	20.37 (1)	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07 22	20.50 (1)	23.31	23.31	22.07 22	20.59 (1)	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	20.28 (1)	03.30	03.43	05.09	20.38 (1)	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 21	20.49 (1)	23.33	23.29	22.04 21	20.59 (1)	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	20.29 (1)	03.29	03.45	05.12	20.38 (1)	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 20	20.49 (1)	23.34	23.27	22.01 21	20.59 (1)	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	20.29 (1)	03.28	03.48	05.15	20.38 (1)	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16 19	20.48 (1)	23.36	23.25	21.58 20	20.58 (1)	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40	20.29 (1)	03.26	03.50	05.17	20.39 (1)	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19 18	20.47 (1)	23.38	23.23	21.54 18	20.57 (1)	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	20.31 (1)	03.25	03.52	05.20	20.40 (1)	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 16	20.47 (1)	23.39	23.21	21.51 15	20.55 (1)	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	20.32 (1)	03.24	03.55	05.23	20.41 (1)	06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25 13	20.45 (1)	23.40	23.18	21.48 13	20.54 (1)	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.07	04.30	20.34 (1)	03.23	03.57	05.26	20.44 (1)	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28 10	20.44 (1)	23.41	23.16	21.44 7	20.51 (1)	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28	20.36 (1)	03.23	04.00	05.29		06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 5	20.41 (1)	23.42	23.14	21.41		19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.25		03.22	04.03	05.32		06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34		23.43	23.11	21.38		19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22		03.22	04.05	05.35		07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37		23.44	23.09	21.35		19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19		03.21	04.08	05.38		07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40		23.45	23.06	21.31		19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16		03.21	04.11	05.41		07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43		23.45	23.03	21.28		19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13		03.21	04.13	05.44		07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46		23.46	23.01	21.25		19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10		03.21	04.16	05.46		07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49		23.46	22.58	21.21		19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08		03.22	04.19	05.49		07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51		23.46	22.55	21.18		19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05		03.22	04.22	05.52		07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54		23.46	22.52	21.15		19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02		03.23	04.25	05.55		07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57		23.46	22.50	21.11		19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00		03.23	04.28	05.58		07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00		23.45	22.47	21.08		19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57		03.24	04.30	06.01		07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03		23.45	22.44	21.04		19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24 20.35 (1)	03.55		03.25	04.33 20.45 (1)	06.03		07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37 9 20.44 (1)	23.05		23.44	22.41 8 20.53 (1)	21.01		19.15	16.36	15.11	14.54
29	09.16		07.05	05.21 20.33 (1)	03.52		03.26	04.36 20.43 (1)	06.06		07.32	07.57	09.30	10.11
	16.15		20.10	21.40 13 20.46 (1)	23.08		23.43	22.38 12 20.55 (1)	20.58		19.12	16.33	15.09	14.56
30	09.13		07.02	05.18 20.31 (1)	03.50		03.27	04.39 20.42 (1)	06.09		07.34	08.00	09.33	10.11
	16.18		20.13	21.43 16 20.47 (1)	23.10		23.42	22.35 15 20.57 (1)	20.54		19.08	16.30	15.07	14.57
31	09.10		06.59		03.48			04.42 20.41 (1)	06.12			08.03		10.10
	16.21		20.16		23.13			22.32 16 20.57 (1)	20.51			16.26		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case				38	290		51	282				
Sun reduction				0,44	0,49		0,46	0,42				
Oper. time red.				0,98	0,98		0,98	0,98				
Wind dir. red.				0,56	0,56		0,56	0,56				
Total reduction				0,24	0,27		0,26	0,23				
Total, real				9	78		13	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:
27.8.2021 16.22/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case**Shadow receptor:** RH10 - RH10

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.18	21.46	23.15	23.41	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.12	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.34	22.13	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.56	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.06	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.50	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.41	23.16	21.44	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.27	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.24	03.22	04.03	05.32	06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.42	18.01	15.29	14.48
21	09.36	08.06	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.22	05.37	04.05	03.22	04.22	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.43	06.09	05.24	03.55	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.31	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.48		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.26		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH11 - RH11

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.18	21.46	23.15	23.41	22.29	20.47	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.12	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.23	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.34	22.13	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.48	05.14	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.06	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.50	08.13	08.46	10.02
	15.30	17.05	18.27	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.44	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.06
	15.38	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.42	18.01	15.29	14.48
21	09.36	08.06	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.21	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.22	05.37	04.05	03.22	04.22	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.20	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.27	05.58	07.23	07.48	09.22	10.12
	16.05	17.41	19.01	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.43	06.09	05.24	03.55	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.31	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.47		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
27.8.2021 16.22/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH12 - RH12

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.11	09.08	07.41	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.36
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.30	20.48	19.05	16.23	15.05
2	10.10	09.05	07.37	06.52	05.11	03.43	03.29	04.48	06.18	07.40	08.10	09.38
	15.02	16.27	17.53	20.22	21.49	23.19	23.41	22.27	20.44	19.02	16.20	15.03
3	10.09	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.40	22.23	20.41	18.58	16.17	15.02
4	10.08	08.59	07.31	06.45	05.04	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.24	23.38	22.20	20.38	18.55	16.14	15.00
5	10.07	08.57	07.27	06.42	05.01	03.37	03.34	04.57	06.26	07.48	08.19	09.46
	15.08	16.36	18.02	20.30	21.59	23.26	23.37	22.17	20.34	18.52	16.11	14.58
6	10.06	08.54	07.24	06.38	04.58	03.35	03.36	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.05	20.33	22.02	23.28	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.51	07.20	06.35	04.55	03.33	03.38	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.08	20.36	22.05	23.30	23.34	22.11	20.27	18.45	16.05	14.56
8	10.03	08.48	07.17	06.31	04.52	03.31	03.40	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.08	23.32	23.32	22.08	20.24	18.41	16.02	14.54
9	10.01	08.45	07.14	06.28	04.49	03.30	03.43	05.08	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.11	23.34	23.30	22.05	20.21	18.38	15.59	14.53
10	10.00	08.42	07.10	06.24	04.45	03.28	03.45	05.11	06.40	08.02	08.34	09.56
	15.19	16.52	18.16	20.45	22.14	23.36	23.28	22.01	20.17	18.35	15.56	14.52
11	09.58	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.38	09.58
	15.22	16.55	18.19	20.47	22.17	23.37	23.26	21.58	20.14	18.31	15.54	14.51
12	09.56	08.35	07.04	06.18	04.39	03.26	03.49	05.17	06.45	08.08	08.41	10.00
	15.25	16.58	18.22	20.50	22.20	23.39	23.24	21.55	20.10	18.28	15.51	14.50
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.44	10.02
	15.27	17.01	18.25	20.53	22.23	23.40	23.21	21.52	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.54	05.23	06.51	08.14	08.47	10.03
	15.30	17.05	18.28	20.56	22.26	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.17	08.50	10.05
	15.33	17.08	18.31	20.59	22.29	23.43	23.17	21.45	20.00	18.18	15.42	14.49
16	09.48	08.23	06.50	06.04	04.27	03.22	03.59	05.29	06.56	08.20	08.53	10.06
	15.35	17.11	18.33	21.02	22.32	23.44	23.14	21.42	19.56	18.15	15.40	14.48
17	09.46	08.20	06.47	06.01	04.24	03.21	04.02	05.32	06.59	08.22	08.56	10.07
	15.38	17.14	18.36	21.05	22.35	23.45	23.12	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.02	08.25	08.59	10.08
	15.41	17.17	18.39	21.08	22.38	23.45	23.09	21.35	19.50	18.08	15.34	14.48
19	09.42	08.13	06.40	05.54	04.18	03.21	04.07	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.41	23.46	23.07	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.20	04.10	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.44	23.46	23.04	21.28	19.43	18.02	15.29	14.48
21	09.37	08.07	06.33	05.47	04.13	03.20	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.17	22.46	23.47	23.02	21.25	19.39	17.58	15.27	14.48
22	09.35	08.04	06.30	05.44	04.10	03.21	04.16	05.46	07.13	08.37	09.11	10.12
	15.53	17.29	18.50	21.20	22.49	23.47	22.59	21.22	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.14	10.12
	15.56	17.32	18.53	21.22	22.52	23.47	22.56	21.18	19.32	17.52	15.22	14.49
24	09.30	07.57	06.23	05.37	04.05	03.21	04.21	05.52	07.18	08.43	09.17	10.12
	15.59	17.35	18.56	21.25	22.55	23.47	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.24	05.55	07.21	07.46	09.19	10.13
	16.02	17.38	18.59	21.28	22.58	23.47	22.50	21.12	19.26	16.45	15.17	14.51
26	09.25	07.50	06.16	05.31	03.59	03.22	04.27	05.58	07.23	07.49	09.22	10.13
	16.05	17.41	19.02	21.31	23.01	23.46	22.48	21.08	19.22	16.42	15.15	14.52
27	09.22	07.47	06.12	05.27	03.57	03.23	04.30	06.01	07.26	07.52	09.25	10.13
	16.08	17.44	19.05	21.34	23.03	23.46	22.45	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.24	04.33	06.03	07.29	07.55	09.28	10.13
	16.11	17.47	19.07	21.37	23.06	23.45	22.42	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.25	04.36	06.06	07.32	07.58	09.31	10.12
	16.14		20.10	21.40	23.09	23.44	22.39	20.58	19.12	16.33	15.09	14.55
30	09.14		07.02	05.17	03.49	03.27	04.39	06.09	07.34	08.01	09.33	10.12
	16.18		20.13	21.43	23.11	23.43	22.36	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.14		22.33	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	606	595	502	392	308	206	151
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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH13 - RH13

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.11	09.08	07.41		08.16 (8)	06.55	05.14	03.45	03.28	04.45	06.15		07.37		08.49 (8)	08.07	09.36
	15.01	16.24	17.50	6	08.22 (8)	20.19	21.46	23.16	23.42	22.30	20.48		19.05	13	09.02 (8)	16.24	15.05
2	10.10	09.05	07.37		08.12 (8)	06.52	05.11	03.43	03.30	04.48	06.18		07.40		08.47 (8)	08.10	09.38
	15.02	16.27	17.53	13	08.25 (8)	20.22	21.49	23.19	23.41	22.27	20.45		19.02	17	09.04 (8)	16.20	15.04
3	10.09	09.02	07.34		08.11 (8)	06.49	05.08	03.41	03.31	04.51	06.21		07.43		08.46 (8)	08.13	09.41
	15.04	16.30	17.56	16	08.27 (8)	20.25	21.53	23.21	23.40	22.24	20.41		18.59	18	09.04 (8)	16.17	15.02
4	10.08	09.00	07.31		08.09 (8)	06.45	05.05	03.39	03.33	04.54	06.23		07.46		08.45 (8)	08.16	09.43
	15.06	16.34	17.59	18	08.27 (8)	20.27	21.56	23.23	23.38	22.20	20.38		18.55	20	09.05 (8)	16.14	15.00
5	10.07	08.57	07.27		08.09 (8)	06.42	05.02	03.37	03.35	04.57	06.26		07.49		08.44 (8)	08.19	09.46
	15.08	16.37	18.02	19	08.28 (8)	20.30	21.59	23.26	23.37	22.17	20.34		18.52	20	09.04 (8)	16.11	14.59
6	10.05	08.54	07.24		08.08 (8)	06.38	04.58	03.35	03.37	05.00	06.29		07.51		08.43 (8)	08.22	09.48
	15.10	16.40	18.05	20	08.28 (8)	20.33	22.02	23.28	23.35	22.14	20.31		18.48	21	09.04 (8)	16.08	14.57
7	10.04	08.51	07.21		08.08 (8)	06.35	04.55	03.33	03.39	05.03	06.32		07.54		08.43 (8)	08.25	09.50
	15.13	16.43	18.08	20	08.28 (8)	20.36	22.05	23.30	23.34	22.11	20.28		18.45	21	09.04 (8)	16.05	14.56
8	10.03	08.48	07.17		08.07 (8)	06.32	04.52	03.32	03.41	05.06	06.34		07.57		08.43 (8)	08.28	09.52
	15.15	16.46	18.11	21	08.28 (8)	20.39	22.08	23.32	23.32	22.08	20.24		18.42	20	09.03 (8)	16.02	14.55
9	10.01	08.45	07.14		08.08 (8)	06.28	04.49	03.30	03.43	05.09	06.37		08.00		08.44 (8)	08.31	09.54
	15.17	16.49	18.14	20	08.28 (8)	20.42	22.11	23.34	23.30	22.05	20.21		18.38	18	09.02 (8)	16.00	14.54
10	10.00	08.42	07.11		08.07 (8)	06.25	04.46	03.29	03.45	05.12	06.40		08.03		08.44 (8)	08.35	09.56
	15.20	16.52	18.16	19	08.26 (8)	20.45	22.14	23.35	23.28	22.01	20.17		18.35	17	09.01 (8)	15.57	14.53
11	09.58	08.39	07.07		08.08 (8)	06.21	04.43	03.27	03.47	05.15	06.43		08.05		08.45 (8)	08.38	09.58
	15.22	16.56	18.19	18	08.26 (8)	20.48	22.17	23.37	23.26	21.58	20.14		18.32	15	09.00 (8)	15.54	14.52
12	09.56	08.35	07.04		08.09 (8)	06.18	04.40	03.26	03.50	05.18	06.45		08.08		08.47 (8)	08.41	10.00
	15.25	16.59	18.22	15	08.24 (8)	20.50	22.20	23.39	23.24	21.55	20.10		18.28	10	08.57 (8)	15.51	14.51
13	09.54	08.32	07.00		08.11 (8)	06.15	04.37	03.25	03.52	05.21	06.48		08.11			08.44	10.02
	15.28	17.02	18.25	11	08.22 (8)	20.53	22.23	23.40	23.21	21.52	20.07		18.25			15.48	14.50
14	09.52	08.29	06.57			06.11	04.34	03.24	03.55	05.23	06.51		08.14			08.47	10.03
	15.30	17.05	18.28			20.56	22.26	23.41	23.19	21.48	20.04		18.22			15.45	14.49
15	09.50	08.26	06.54			06.08	04.31	03.23	03.57	05.26	06.54		08.17			08.50	10.05
	15.33	17.08	18.31			20.59	22.29	23.43	23.17	21.45	20.00		18.18			15.43	14.49
16	09.48	08.23	06.50			06.04	04.28	03.22	04.00	05.29	06.56		08.20			08.53	10.06
	15.36	17.11	18.34			21.02	22.32	23.44	23.14	21.42	19.57		18.15			15.40	14.49
17	09.46	08.20	06.47			06.01	04.25	03.22	04.02	05.32	06.59		08.23			08.56	10.07
	15.39	17.14	18.36			21.05	22.35	23.44	23.12	21.38	19.53		18.12			15.37	14.48
18	09.44	08.17	06.43			05.58	04.22	03.21	04.05	05.35	07.02		08.25			08.59	10.08
	15.41	17.17	18.39			21.08	22.38	23.45	23.09	21.35	19.50		18.08			15.35	14.48
19	09.42	08.13	06.40			05.54	04.19	03.21	04.08	05.38	07.05		08.28			09.02	10.09
	15.44	17.20	18.42			21.11	22.41	23.46	23.07	21.32	19.46		18.05			15.32	14.48
20	09.39	08.10	06.37			05.51	04.16	03.21	04.11	05.41	07.07		08.31			09.05	10.10
	15.47	17.23	18.45			21.14	22.44	23.46	23.04	21.29	19.43		18.02			15.30	14.48
21	09.37	08.07	06.33			05.48	04.13	03.21	04.13	05.44	07.10		08.34			09.08	10.11
	15.50	17.26	18.48			21.17	22.46	23.47	23.02	21.25	19.40		17.59			15.27	14.49
22	09.35	08.04	06.30			05.44	04.10	03.21	04.16	05.47	07.13		08.37			09.11	10.12
	15.53	17.29	18.51			21.20	22.49	23.47	22.59	21.22	19.36		17.55			15.25	14.49
23	09.32	08.00	06.26			05.41	04.08	03.21	04.19	05.50	07.15		08.40			09.14	10.12
	15.56	17.32	18.53			21.23	22.52	23.47	22.56	21.18	19.33		17.52			15.22	14.50
24	09.30	07.57	06.23			05.37	04.05	03.22	04.22	05.52	07.18		08.43			09.17	10.12
	15.59	17.35	18.56			21.26	22.55	23.47	22.53	21.15	19.29		17.49			15.20	14.50
25	09.27	07.54	06.19			05.34	04.02	03.22	04.25	05.55	07.21		07.46			09.20	10.13
	16.02	17.38	18.59			21.29	22.58	23.47	22.50	21.12	19.26		16.46			15.18	14.51
26	09.25	07.51	06.16			05.31	04.00	03.23	04.28	05.58	07.24		07.49			09.22	10.13
	16.05	17.41	19.02			21.31	23.01	23.46	22.48	21.08	19.22		16.42			15.16	14.52
27	09.22	07.47	06.13			05.28	03.57	03.24	04.30	06.01	07.26		07.52			09.25	10.13
	16.09	17.44	19.05			21.34	23.03	23.46	22.45	21.05	19.19		16.39			15.13	14.53
28	09.19	07.44	06.09			05.24	03.55	03.25	04.33	06.04	07.29		07.55			09.28	10.13
	16.12	17.47	19.08			21.37	23.06	23.45	22.42	21.02	19.16		16.36			15.11	14.54
29	09.17		07.06			05.21	03.52	03.26	04.36	06.07	07.32		07.58			09.31	10.12
	16.15		20.10			21.40	23.09	23.44	22.39	20.58	19.12		16.33			15.09	14.56
30	09.14		07.02			05.18	03.50	03.27	04.39	06.09	07.35	08.52 (8)	08.01			09.33	10.12
	16.18		20.13			21.43	23.11	23.43	22.36	20.55	19.09	8 09.00 (8)	16.30			15.07	14.57
31	09.11		06.59				03.47		04.42	06.12			08.04				10.11
	16.21		20.16				23.14		22.33	20.51			16.27				14.59
Potential sun hours	182	242	363		447	559	605	594	502	392		308		206	151
Total, worst case				216							8		210		
Sun reduction				0,36							0,36		0,25		
Oper. time red.				0,98							0,98		0,98		
Wind dir. red.				0,56							0,56		0,56		
Total reduction				0,20							0,20		0,14		
Total, real				43							2		30		

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:
27.8.2021 16.22/3.3.294

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case **Shadow receptor:** RH14 - RH14

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.11	09.08	07.41	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.47	23.16	23.42	22.30	20.48	19.05	16.24	15.05
2	10.10	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.39
	15.02	16.27	17.53	20.22	21.50	23.19	23.41	22.27	20.45	19.02	16.20	15.04
3	10.09	09.03	07.34	06.49	05.08	03.41	03.31	04.51	06.21	07.43	08.13	09.41
	15.04	16.30	17.56	20.25	21.53	23.21	23.40	22.24	20.41	18.59	16.17	15.02
4	10.08	09.00	07.31	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.28	21.56	23.24	23.39	22.20	20.38	18.55	16.14	15.00
5	10.07	08.57	07.27	06.42	05.01	03.37	03.35	04.57	06.26	07.49	08.19	09.46
	15.08	16.37	18.02	20.30	21.59	23.26	23.37	22.17	20.34	18.52	16.11	14.59
6	10.06	08.54	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.05	20.33	22.02	23.28	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.51	07.21	06.35	04.55	03.33	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.05	23.30	23.34	22.11	20.28	18.45	16.05	14.56
8	10.03	08.48	07.17	06.32	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.53
	15.15	16.46	18.11	20.39	22.08	23.32	23.32	22.08	20.24	18.42	16.02	14.55
9	10.01	08.45	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.32	09.55
	15.17	16.49	18.14	20.42	22.11	23.34	23.30	22.05	20.21	18.38	16.00	14.53
10	10.00	08.42	07.11	06.25	04.46	03.29	03.45	05.12	06.40	08.03	08.35	09.57
	15.20	16.52	18.16	20.45	22.14	23.36	23.28	22.01	20.17	18.35	15.57	14.52
11	09.58	08.39	07.07	06.21	04.43	03.27	03.47	05.15	06.43	08.05	08.38	09.58
	15.22	16.55	18.19	20.48	22.17	23.37	23.26	21.58	20.14	18.32	15.54	14.51
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.41	10.00
	15.25	16.59	18.22	20.50	22.20	23.39	23.24	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.36	03.25	03.52	05.21	06.48	08.11	08.44	10.02
	15.27	17.02	18.25	20.53	22.23	23.40	23.22	21.52	20.07	18.25	15.48	14.50
14	09.53	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.47	10.03
	15.30	17.05	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.45	14.49
15	09.51	08.26	06.54	06.08	04.30	03.23	03.57	05.26	06.54	08.17	08.50	10.05
	15.33	17.08	18.31	20.59	22.29	23.43	23.17	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.32	23.44	23.15	21.42	19.57	18.15	15.40	14.48
17	09.46	08.20	06.47	06.01	04.25	03.22	04.02	05.32	06.59	08.23	08.56	10.07
	15.39	17.14	18.36	21.05	22.35	23.45	23.12	21.39	19.53	18.12	15.37	14.48
18	09.44	08.17	06.43	05.58	04.22	03.21	04.05	05.35	07.02	08.25	08.59	10.09
	15.41	17.17	18.39	21.08	22.38	23.45	23.10	21.35	19.50	18.08	15.35	14.48
19	09.42	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.05	08.28	09.02	10.10
	15.44	17.20	18.42	21.11	22.41	23.46	23.07	21.32	19.46	18.05	15.32	14.48
20	09.40	08.10	06.37	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.44	23.46	23.04	21.29	19.43	18.02	15.30	14.48
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.17	22.47	23.47	23.02	21.25	19.40	17.59	15.27	14.49
22	09.35	08.04	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.11	10.12
	15.53	17.29	18.51	21.20	22.49	23.47	22.59	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.21	04.19	05.49	07.15	08.40	09.14	10.12
	15.56	17.32	18.53	21.23	22.52	23.47	22.56	21.19	19.33	17.52	15.22	14.50
24	09.30	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.17	10.13
	15.59	17.35	18.56	21.26	22.55	23.47	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.20	10.13
	16.02	17.38	18.59	21.29	22.58	23.47	22.50	21.12	19.26	16.46	15.18	14.51
26	09.25	07.51	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.13
	16.05	17.41	19.02	21.32	23.01	23.46	22.48	21.08	19.22	16.42	15.15	14.52
27	09.22	07.47	06.13	05.28	03.57	03.24	04.30	06.01	07.26	07.52	09.25	10.13
	16.09	17.44	19.05	21.35	23.03	23.46	22.45	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.28	10.13
	16.12	17.47	19.08	21.38	23.06	23.45	22.42	21.02	19.16	16.36	15.11	14.54
29	09.17		07.06	05.21	03.52	03.26	04.36	06.07	07.32	07.58	09.31	10.12
	16.15		20.10	21.41	23.09	23.44	22.39	20.58	19.12	16.33	15.09	14.55
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.12
	16.18		20.13	21.44	23.11	23.43	22.36	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.14		22.33	20.51		16.27		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
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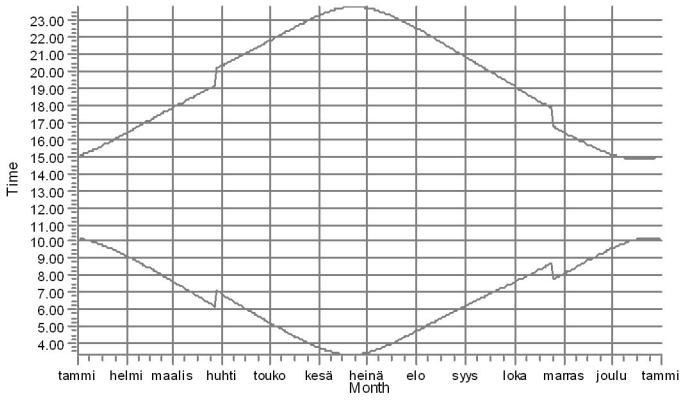
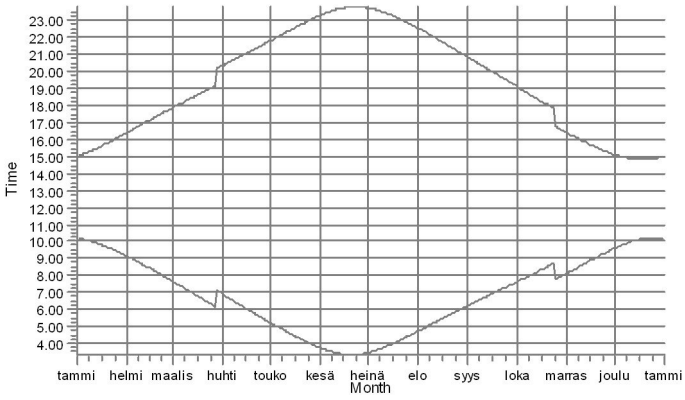
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case

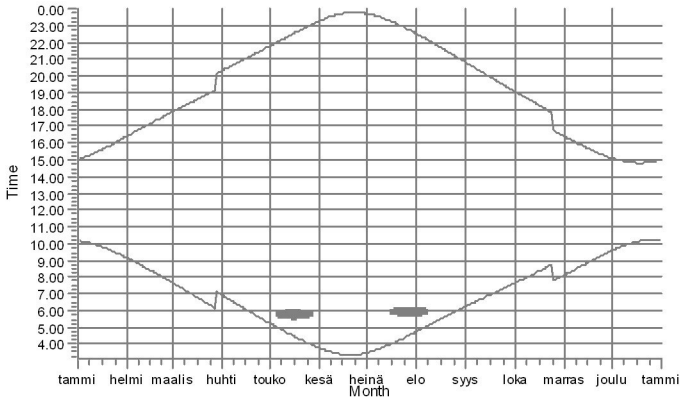
HH01: HH01



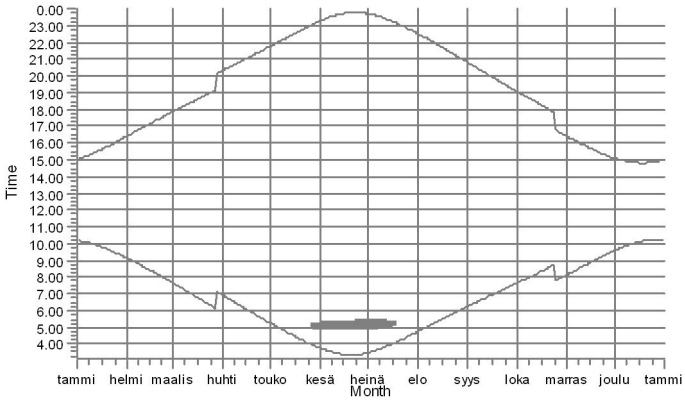
HH02: HH02



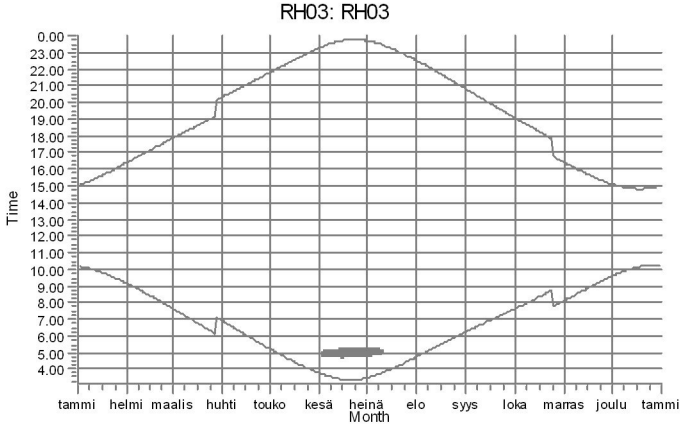
RH01: RH01



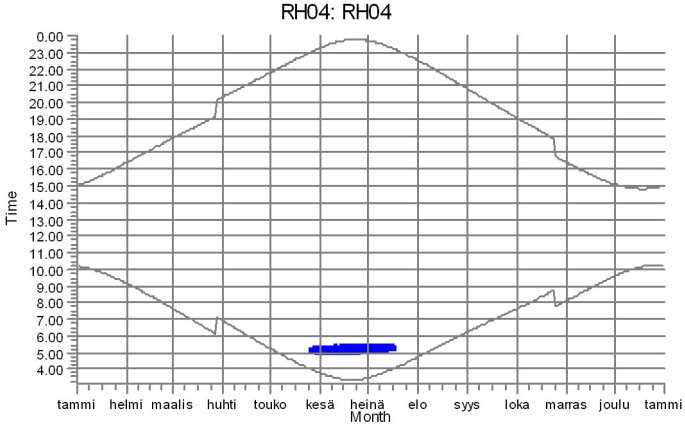
RH02: RH02



RH03: RH03



RH04: RH04



WTGs

3: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)

4: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

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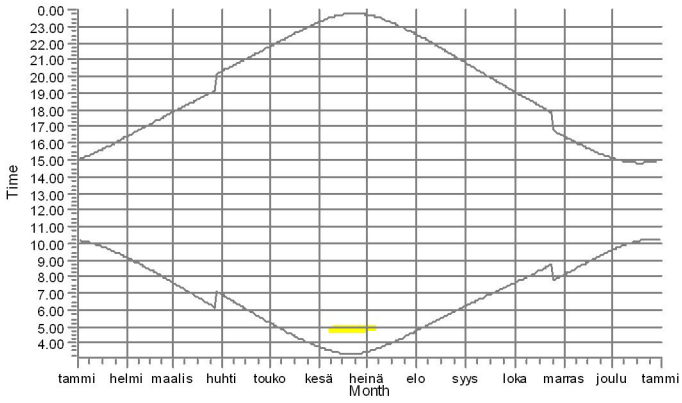
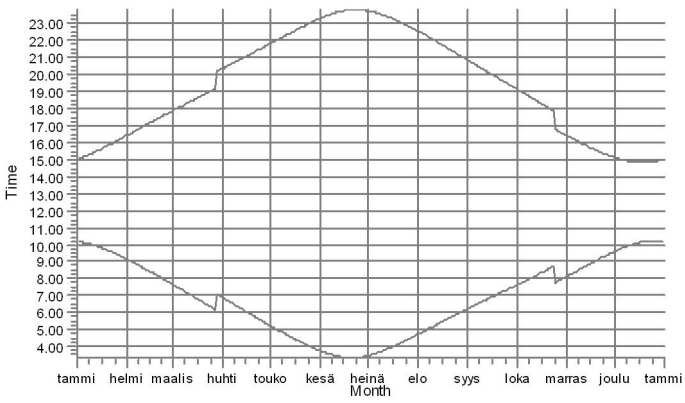
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case

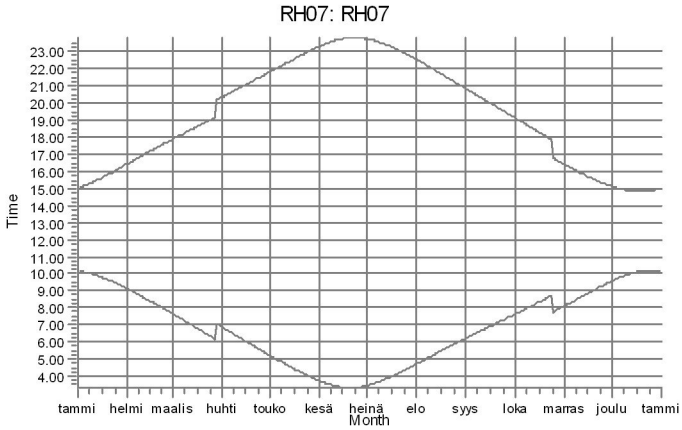
RH05: RH05



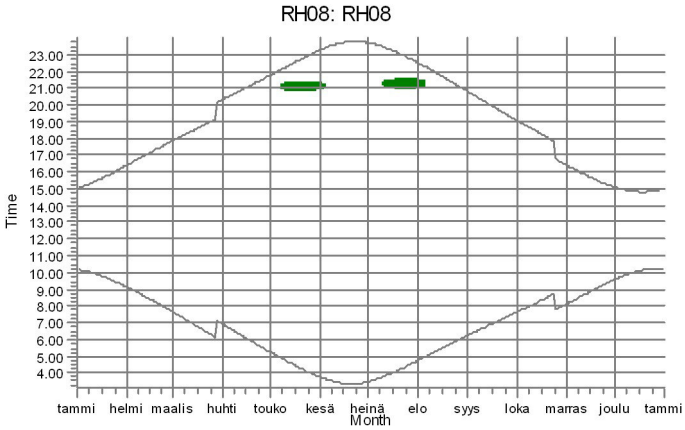
RH06: RH06



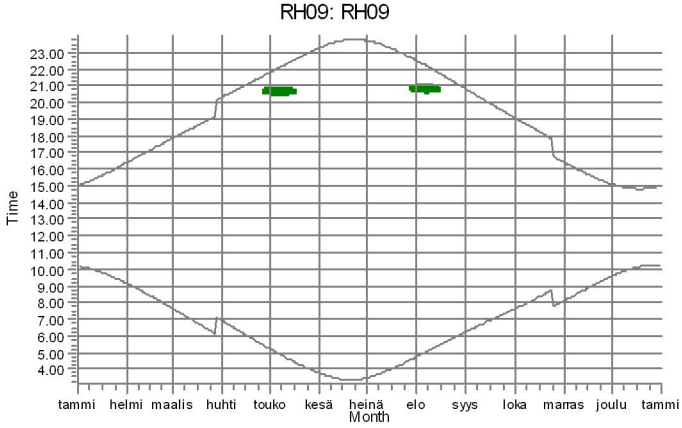
RH07: RH07



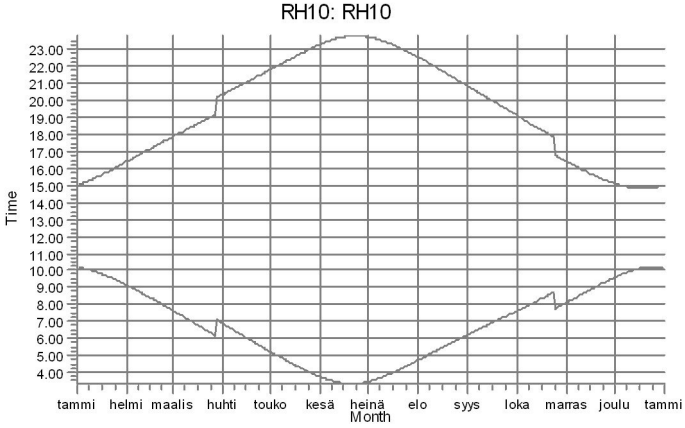
RH08: RH08



RH09: RH09



RH10: RH10



WTGs

1: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)

2: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

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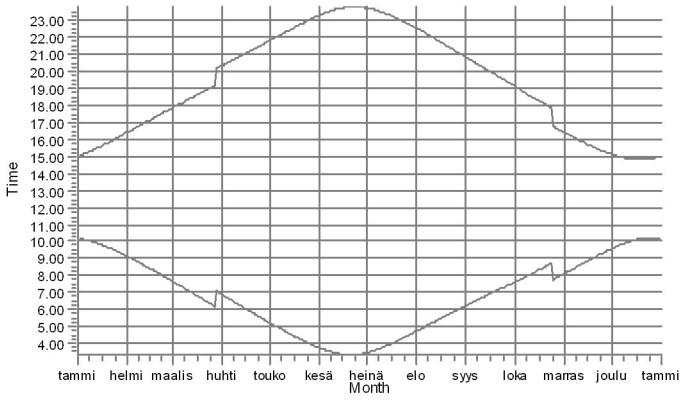
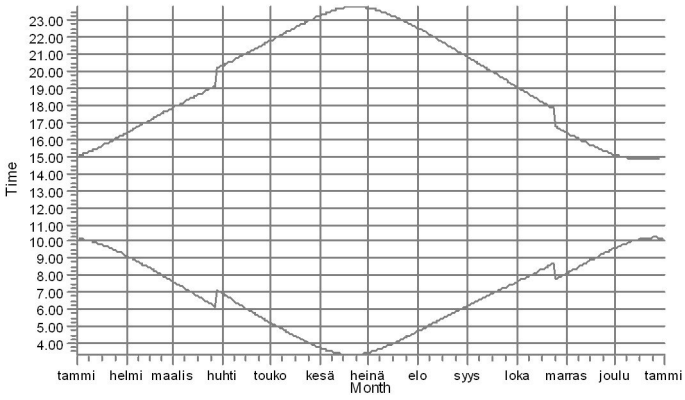
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case

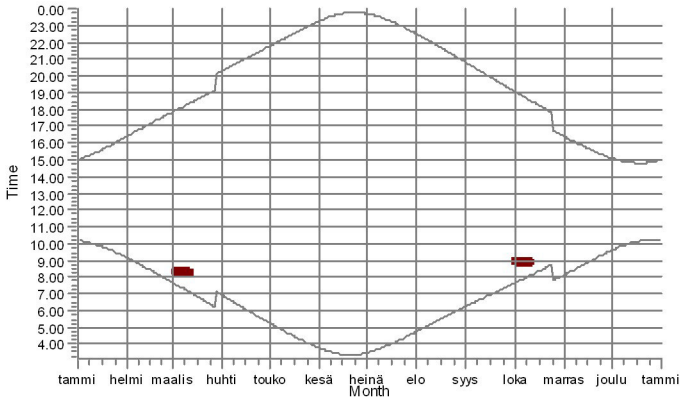
RH11: RH11



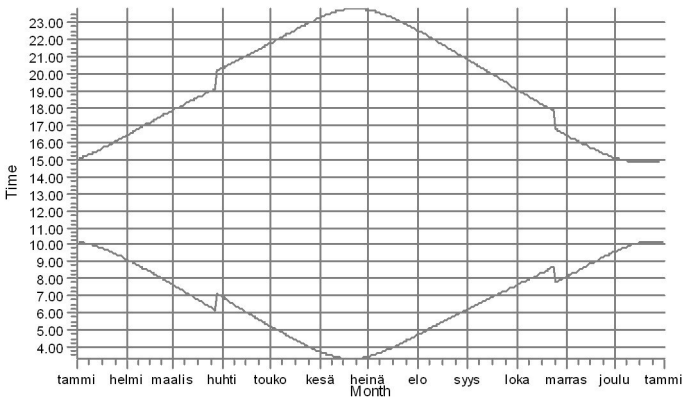
RH12: RH12



RH13: RH13



RH14: RH14



WTGs

8: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)

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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case**WTG:** 1 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14 20.31-20.49/18	03.45 21.01-21.12/11	03.29	04.45 20.40-20.58/18	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.41	22.29 21.07-21.25/18	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11 20.30-20.49/19	03.43 21.03-21.11/8	03.30	04.48 20.39-20.59/20	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26 21.08-21.24/16	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08 20.29-20.50/21	03.41 21.06-21.10/4	03.32	04.51 20.39-20.59/20	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23 21.10-21.23/13	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05 20.28-20.50/22	03.39	03.33	04.54 20.38-20.59/21	06.23	07.45	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20 21.11-21.21/10	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02 20.28-20.50/22	03.37	03.35	04.57 20.38-21.00/22	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58 20.28-20.50/22	03.35	03.37	05.00 20.37-20.59/22	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55 20.28-20.50/22	03.34	03.39	05.03 20.38-21.00/22	06.31	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 20.28-20.50/22	03.32	03.41	05.06 20.37-20.59/22	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07 21.03-21.09/6	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49 20.28-20.49/21	03.30	03.43	05.09 20.38-20.59/21	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 21.00-21.11/11	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46 20.29-20.49/20	03.29	03.45 21.12-21.18/6	05.12 20.38-20.59/21	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 20.59-21.14/15	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43 20.29-20.48/19	03.28	03.48 21.11-21.20/9	05.15 20.38-20.58/20	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16 20.57-21.14/17	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.03	06.18	04.40 20.29-20.47/18	03.26	03.50 21.09-21.21/12	05.18 20.39-20.57/18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19 20.56-21.15/19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 20.31-20.47/16	03.25	03.52 21.08-21.22/14	05.21 20.40-20.55/15	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 20.56-21.16/20	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34 20.32-20.45/13	03.24	03.55 21.08-21.23/15	05.23 20.41-20.54/13	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25 20.55-21.16/21	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 20.34-20.44/10	03.24	03.57 21.07-21.24/17	05.26 20.44-20.51/7	06.53	08.16	08.49	10.04
	15.33	17.08	18.31	20.59	22.28 20.55-21.17/22	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28 20.36-20.41/5	03.23	04.00 21.07-21.25/18	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 20.54-21.17/23	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25 20.54-21.17/23	03.22	04.03 21.06-21.25/19	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.49
18	09.44	08.16	06.43	05.57	04.22 20.55-21.18/23	03.22	04.05 21.06-21.26/20	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 20.54-21.17/23	03.21	04.08 21.05-21.26/21	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16 20.54-21.17/23	03.21	04.11 21.05-21.26/21	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13 20.55-21.17/22	03.21	04.13 21.05-21.27/22	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10 20.55-21.17/22	03.21	04.16 21.05-21.27/22	05.47	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 20.56-21.17/21	03.22	04.19 21.05-21.27/22	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05 20.56-21.17/21	03.22	04.22 21.04-21.27/23	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02 20.56-21.17/21	03.23	04.25 21.05-21.28/23	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 20.57-21.16/19	03.23	04.28 21.05-21.27/22	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57 20.57-21.16/19	03.24	04.31 21.05-21.28/23	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24 20.35-20.44/9	03.55 20.58-21.15/17	03.25	04.33 20.45-20.53/8	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41 21.05-21.27/22	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21 20.33-20.46/13	03.52 20.59-21.14/15	03.26	04.36 20.43-20.55/12	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	22.38 21.05-21.27/22	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18 20.31-20.47/16	03.50 21.00-21.14/14	03.27	04.39 20.42-20.57/15	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35 21.06-21.27/21	20.54	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 21.01-21.13/12		04.42 20.41-20.57/16	06.12		08.04		10.11
	16.21		20.16		23.13		22.32 21.06-21.26/20	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	38	739	23	465	339	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:
27.8.2021 16.22/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case **WTG:** 2 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45		03.29	04.48-04.58/10	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.42		22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43		03.30	04.48-04.58/10	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18		23.40		22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41		03.32	04.50-04.58/8	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21		23.39		22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39		03.33	04.51-04.57/6	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23		23.38		22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37		03.35	04.53-04.55/2	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25		23.36		22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35		03.37		05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27		23.35		22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34		03.39		05.03	06.31	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29		23.33		22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	04.46-04.51/5	03.41		05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31		23.31		22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	04.45-04.52/7	03.43		05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33		23.29		22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.44-04.53/9	03.45		05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35		23.27		22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	04.43-04.54/11	03.48		05.15	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36		23.25		21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	04.44-04.55/11	03.50		05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38		23.23		21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	04.43-04.55/12	03.52		05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39		23.21		21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	04.44-04.56/12	03.55		05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41		23.19		21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	04.43-04.56/13	03.57		05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42		23.16		21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.43-04.57/14	04.00		05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43		23.14		21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22	04.43-04.58/15	04.03		05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44		23.11		21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.44-04.58/14	04.05		05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44		23.09		21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.44-04.58/14	04.08		05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45		23.06		21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.44-04.59/15	04.11		05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46		23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.44-04.59/15	04.13		05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46		23.01		21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.44-04.59/15	04.16		05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46		22.58		21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.44-04.59/15	04.19		05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46		22.56		21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.45-04.59/14	04.22		05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46		22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23	04.45-04.59/14	04.25		05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46		22.50		21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.45-04.59/14	04.28		05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45		22.47		21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.27	03.57	03.24	04.46-05.00/14	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45		22.44		21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.47-05.00/13	04.33		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44		22.41		21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.46-04.59/13	04.36		06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44		22.38		20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.47-04.59/12	04.39		06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43		22.35		20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48			04.42		06.12		08.04		10.11
	16.21		20.16		23.13			22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	0	291		36		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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case **WTG:** 3 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45 04.59-05.17/18	03.29 05.02-05.25/23	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43 04.58-05.17/19	03.30 05.03-05.26/23	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41 04.58-05.18/20	03.32 05.03-05.26/23	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39 04.58-05.19/21	03.33 05.03-05.26/23	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37 04.58-05.19/21	03.35 05.03-05.25/22	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35 04.58-05.19/21	03.37 05.04-05.26/22	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34 04.58-05.20/22	03.39 05.04-05.25/21	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32 04.58-05.20/22	03.41 05.05-05.26/21	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30 04.58-05.20/22	03.43 05.05-05.25/20	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29 04.58-05.20/22	03.45 05.06-05.25/19	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28 04.59-05.22/23	03.48 05.06-05.25/19	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26 04.58-05.21/23	03.50 05.07-05.25/18	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25 04.58-05.21/23	03.52 05.07-05.24/17	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24 04.59-05.22/23	03.55 05.08-05.23/15	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24 04.58-05.22/24	03.57 05.09-05.23/14	05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23 04.59-05.22/23	04.00 05.10-05.22/12	05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22 04.59-05.23/24	04.03 05.12-05.20/8	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22 05.00-05.23/23	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21 05.00-05.23/23	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21 05.00-05.23/23	04.11	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21 05.00-05.24/24	04.14	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21 05.00-05.24/24	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22 05.00-05.23/23	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22 05.01-05.24/23	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23 05.00-05.24/24	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 05.04-05.10/6	03.23 05.01-05.24/23	04.28	05.58	07.23	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57 05.02-05.12/10	03.24 05.02-05.25/23	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55 05.01-05.13/12	03.25 05.02-05.25/23	04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52 05.01-05.15/14	03.26 05.01-05.25/24	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 05.00-05.16/16	03.27 05.02-05.25/23	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 04.59-05.16/17		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	75	674	320	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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27.8.2021 16.22/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case **WTG:** 4 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.46 04.56-05.14/18	03.29 04.52-05.23/31	04.45 05.46-06.06/20	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43 04.55-05.15/20	03.30 04.53-05.24/31	04.48 05.47-06.06/19	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41 04.52-05.16/24	03.32 04.53-05.23/30	04.51 05.47-06.05/18	06.21	07.43	08.13	09.41
	15.04	16.31	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39 04.51-05.16/25	03.33 04.54-05.23/29	04.54 05.49-06.04/15	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.37 04.50-05.16/26	03.35 04.54-05.23/29	04.57 05.49-06.03/14	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58 05.44-05.50/6	03.35 04.49-05.17/28	03.37 04.55-05.23/28	05.00 05.51-06.01/10	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.58
7	10.04	08.50	07.20	06.35	04.55 05.41-05.52/11	03.34 04.49-05.17/28	03.39 04.56-05.23/27	05.03 05.54-05.57/3	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 05.39-05.53/14	03.32 04.48-05.18/30	03.41 04.57-05.23/26	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49 05.38-05.55/17	03.31 04.48-05.18/30	03.43 04.58-05.22/24	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46 05.37-05.55/18	03.29 04.48-05.18/30	03.45 05.01-05.22/21	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43 05.36-05.55/19	03.28 04.48-05.19/31	03.48 05.04-05.22/18	05.15	06.43	08.05	08.37	09.58
	15.22	16.56	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40 05.36-05.56/20	03.26 04.48-05.19/31	03.50 05.05-05.22/17	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 05.36-05.56/20	03.25 04.48-05.19/31	03.53 05.05-05.21/16	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34 05.36-05.57/21	03.24 04.48-05.20/32	03.55 05.06-05.20/14	05.24	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.22	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 05.35-05.56/21	03.24 04.47-05.20/33	03.58 05.07-05.19/12	05.26	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28 05.36-05.57/21	03.23 04.48-05.20/32	04.00 05.09-05.18/9	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14 05.54-05.56/2	21.42	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25 05.35-05.56/21	03.22 04.48-05.21/33	04.03 05.11-05.15/4	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11 05.51-05.59/8	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22 05.36-05.56/20	03.22 04.48-05.21/33	04.05 05.51-06.02/11	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 05.36-05.56/20	03.21 04.49-05.21/32	04.08 05.50-06.03/13	05.38	07.04	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16 05.36-05.55/19	03.21 04.49-05.21/32	04.11 05.49-06.04/15	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13 05.37-05.55/18	03.21 04.49-05.21/32	04.14 05.48-06.04/16	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11 05.37-05.55/18	03.21 04.49-05.21/32	04.16 05.47-06.05/18	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 05.38-05.54/16	03.22 04.50-05.22/32	04.19 05.47-06.06/19	05.50	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.33	17.52	15.22	14.50
24	09.29	07.57	06.23	05.38	04.05 05.39-05.53/14	03.22 04.49-05.22/33	04.22 05.47-06.06/19	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02 05.40-05.52/12	03.23 04.49-05.22/33	04.25 05.46-06.06/20	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 05.42-05.51/9	03.23 04.50-05.22/32	04.28 05.47-06.07/20	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57 05.01-05.08/7	03.24 04.51-05.23/32	04.31 05.46-06.07/21	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 05.43-05.49/6	23.45	22.44	21.05	19.19	16.39	15.14	14.53
28	09.19	07.44	06.09	05.24	03.55 04.59-05.10/11	03.25 04.51-05.23/32	04.34 05.46-06.07/21	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.55
29	09.16		07.06	05.21	03.52 04.58-05.12/14	03.26 04.51-05.22/31	04.36 05.46-06.07/21	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 04.57-05.13/16	03.27 04.51-05.23/32	04.39 05.46-06.07/21	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 04.56-05.13/17		04.42 05.47-06.07/20	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	426	900	631	99	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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case**WTG:** 5 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.21	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.08	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.56	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.40	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.24	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.22	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.57	05.26	06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43	23.14	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.12	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.21	04.14	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.51	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.50	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.33	17.52	15.22	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.13	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.14	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.55	09.28	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
27.8.2021 16.22/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case **WTG:** 6 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	03.57	05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.12	15.37	14.48
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case**WTG:** 7 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.02	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.08	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.40	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	03.57	05.26	06.53	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.42	19.56	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.12	21.38	19.53	18.12	15.37	14.48
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.28	10.12
	16.12	17.47	19.07	21.37	23.06	23.45	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
27.8.2021 16.22/3.3.294

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case **WTG:** 8 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
753	723	338	253	460	781	838	1300	1347	793	537	467	8589

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.10	09.08	07.40	08.16-08.22/6	06.55	05.14	03.45	03.28	04.45	06.15		07.37	08.49-09.02/13	08.07	09.36
	15.01	16.24	17.50		20.19	21.46	23.16	23.42	22.29	20.48		19.05		16.23	15.05
2	10.10	09.05	07.37	08.12-08.25/13	06.52	05.11	03.43	03.30	04.48	06.18		07.40	08.47-09.04/17	08.10	09.38
	15.02	16.27	17.53		20.22	21.49	23.19	23.41	22.26	20.44		19.02		16.20	15.04
3	10.09	09.02	07.34	08.11-08.27/16	06.49	05.08	03.41	03.31	04.51	06.20		07.43	08.46-09.04/18	08.13	09.41
	15.04	16.30	17.56		20.24	21.52	23.21	23.40	22.23	20.41		18.58		16.17	15.02
4	10.08	08.59	07.31	08.09-08.27/18	06.45	05.05	03.39	03.33	04.54	06.23		07.46	08.45-09.05/20	08.16	09.43
	15.06	16.34	17.59		20.27	21.55	23.23	23.38	22.20	20.38		18.55		16.14	15.00
5	10.06	08.56	07.27	08.09-08.28/19	06.42	05.01	03.37	03.35	04.57	06.26		07.48	08.44-09.04/20	08.19	09.46
	15.08	16.37	18.02		20.30	21.58	23.25	23.37	22.17	20.34		18.52		16.11	14.59
6	10.05	08.53	07.24	08.08-08.28/20	06.38	04.58	03.35	03.37	05.00	06.29		07.51	08.43-09.04/21	08.22	09.48
	15.10	16.40	18.05		20.33	22.01	23.28	23.35	22.14	20.31		18.48		16.08	14.57
7	10.04	08.51	07.20	08.08-08.28/20	06.35	04.55	03.33	03.39	05.03	06.32		07.54	08.43-09.04/21	08.25	09.50
	15.13	16.43	18.08		20.36	22.04	23.30	23.33	22.11	20.27		18.45		16.05	14.56
8	10.03	08.47	07.17	08.07-08.28/21	06.31	04.52	03.32	03.41	05.06	06.34		07.57	08.43-09.03/20	08.28	09.52
	15.15	16.46	18.10		20.39	22.07	23.32	23.31	22.08	20.24		18.42		16.02	14.55
9	10.01	08.44	07.14	08.08-08.28/20	06.28	04.49	03.30	03.43	05.09	06.37		08.00	08.44-09.02/18	08.31	09.54
	15.17	16.49	18.13		20.42	22.10	23.33	23.30	22.04	20.21		18.38		15.59	14.54
10	09.59	08.41	07.10	08.07-08.26/19	06.25	04.46	03.29	03.45	05.12	06.40		08.02	08.44-09.01/17	08.34	09.56
	15.20	16.52	18.16		20.45	22.14	23.35	23.28	22.01	20.17		18.35		15.57	14.52
11	09.58	08.38	07.07	08.08-08.26/18	06.21	04.43	03.27	03.47	05.15	06.43		08.05	08.45-09.00/15	08.37	09.58
	15.22	16.55	18.19		20.47	22.17	23.37	23.26	21.58	20.14		18.31		15.54	14.52
12	09.56	08.35	07.04	08.09-08.24/15	06.18	04.40	03.26	03.50	05.18	06.45		08.08	08.47-08.57/10	08.40	10.00
	15.25	16.59	18.22		20.50	22.20	23.38	23.23	21.55	20.10		18.28		15.51	14.51
13	09.54	08.32	07.00	08.11-08.22/11	06.14	04.36	03.25	03.52	05.20	06.48		08.11		08.44	10.01
	15.27	17.02	18.25		20.53	22.23	23.40	23.21	21.51	20.07		18.25		15.48	14.50
14	09.52	08.29	06.57		06.11	04.33	03.24	03.55	05.23	06.51		08.14		08.47	10.03
	15.30	17.05	18.28		20.56	22.26	23.41	23.19	21.48	20.03		18.21		15.45	14.49
15	09.50	08.26	06.53		06.08	04.30	03.23	03.57	05.26	06.53		08.17		08.50	10.05
	15.33	17.08	18.31		20.59	22.29	23.42	23.17	21.45	20.00		18.18		15.43	14.49
16	09.48	08.23	06.50		06.04	04.27	03.22	04.00	05.29	06.56		08.19		08.53	10.06
	15.36	17.11	18.33		21.02	22.32	23.43	23.14	21.42	19.57		18.15		15.40	14.49
17	09.46	08.20	06.47		06.01	04.25	03.22	04.02	05.32	06.59		08.22		08.56	10.07
	15.39	17.14	18.36		21.05	22.35	23.44	23.12	21.38	19.53		18.12		15.37	14.48
18	09.44	08.16	06.43		05.57	04.22	03.21	04.05	05.35	07.02		08.25		08.59	10.08
	15.41	17.17	18.39		21.08	22.37	23.45	23.09	21.35	19.50		18.08		15.35	14.48
19	09.42	08.13	06.40		05.54	04.19	03.21	04.08	05.38	07.04		08.28		09.02	10.09
	15.44	17.20	18.42		21.11	22.40	23.46	23.07	21.32	19.46		18.05		15.32	14.48
20	09.39	08.10	06.36		05.51	04.16	03.21	04.11	05.41	07.07		08.31		09.05	10.10
	15.47	17.23	18.45		21.14	22.43	23.46	23.04	21.28	19.43		18.02		15.30	14.48
21	09.37	08.07	06.33		05.47	04.13	03.21	04.13	05.44	07.10		08.34		09.08	10.11
	15.50	17.26	18.48		21.17	22.46	23.46	23.01	21.25	19.39		17.58		15.27	14.49
22	09.35	08.03	06.30		05.44	04.10	03.21	04.16	05.47	07.13		08.37		09.11	10.11
	15.53	17.29	18.50		21.19	22.49	23.47	22.59	21.22	19.36		17.55		15.25	14.49
23	09.32	08.00	06.26		05.41	04.08	03.21	04.19	05.49	07.15		08.40		09.14	10.12
	15.56	17.32	18.53		21.22	22.52	23.47	22.56	21.18	19.33		17.52		15.22	14.50
24	09.30	07.57	06.23		05.37	04.05	03.22	04.22	05.52	07.18		08.43		09.16	10.12
	15.59	17.35	18.56		21.25	22.55	23.47	22.53	21.15	19.29		17.49		15.20	14.50
25	09.27	07.54	06.19		05.34	04.02	03.22	04.25	05.55	07.21		07.46		09.19	10.12
	16.02	17.38	18.59		21.28	22.58	23.46	22.50	21.12	19.26		16.46		15.18	14.51
26	09.24	07.50	06.16		05.31	04.00	03.23	04.28	05.58	07.24		07.49		09.22	10.13
	16.05	17.41	19.02		21.31	23.00	23.46	22.47	21.08	19.22		16.42		15.15	14.52
27	09.22	07.47	06.12		05.27	03.57	03.24	04.30	06.01	07.26		07.52		09.25	10.12
	16.08	17.44	19.05		21.34	23.03	23.45	22.44	21.05	19.19		16.39		15.13	14.53
28	09.19	07.44	06.09		05.24	03.55	03.25	04.33	06.04	07.29		07.55		09.28	10.12
	16.12	17.47	19.07		21.37	23.06	23.45	22.41	21.01	19.15		16.36		15.11	14.54
29	09.16		07.06		05.21	03.52	03.26	04.36	06.06	07.32		07.58		09.30	10.12
	16.15		20.10		21.40	23.08	23.44	22.39	20.58	19.12		16.33		15.09	14.56
30	09.14		07.02		05.18	03.50	03.27	04.39	06.09	07.35	08.52-09.00/8	08.01		09.33	10.12
	16.18		20.13		21.43	23.11	23.43	22.36	20.55	19.09		16.30		15.07	14.57
31	09.11		06.59			03.47		04.42	06.12			08.04			10.11
	16.21		20.16			23.14		22.33	20.51			16.27			14.58
Potential sun hours	182	242	363		447	559	605	594	502	392		308		206	151
Sum of minutes with flicker	0	0	216		0	0	0	0	0	8		210		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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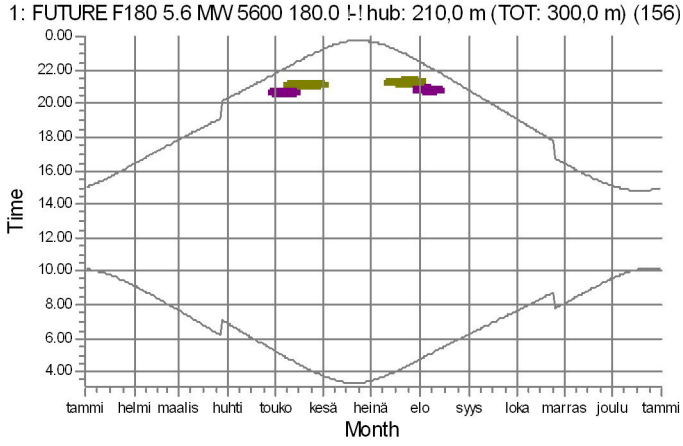
Calculated:
27.8.2021 16.22/3.3.294

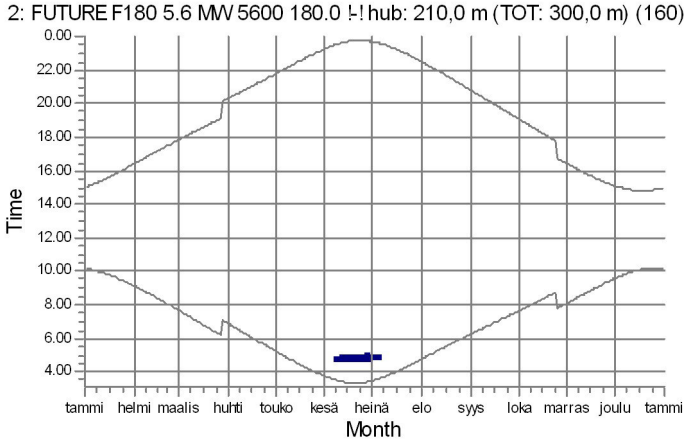
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case

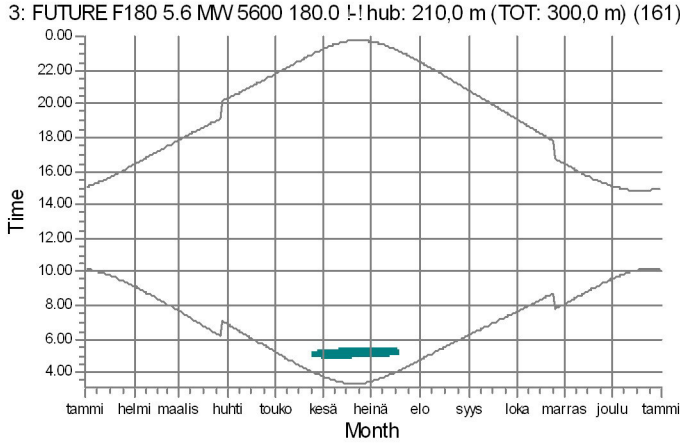
1: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (156)



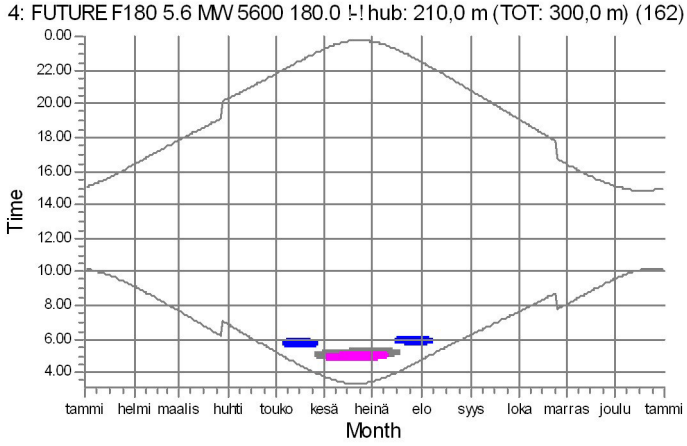
2: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (160)



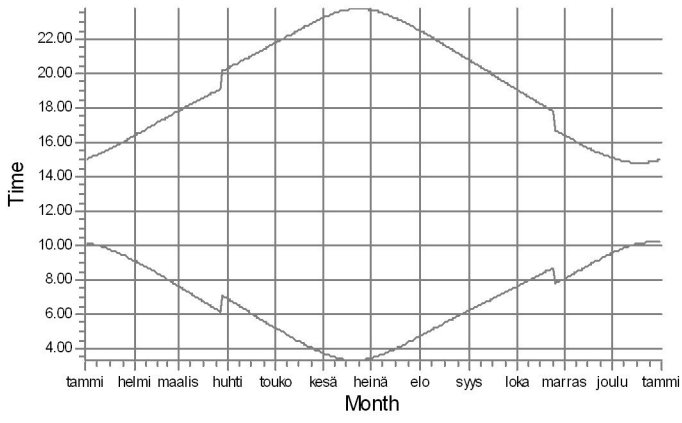
3: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (161)



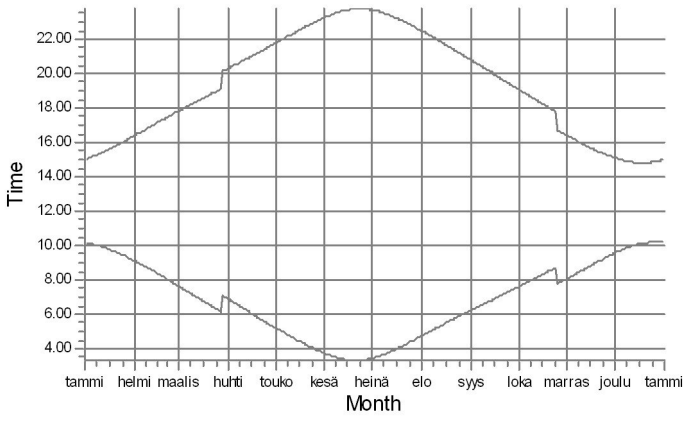
4: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (162)



5: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (155)



6: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (158)



Shadow receptors

RH01: RH01
RH02: RH02
RH03: RH03
RH04: RH04
RH05: RH05
RH08: RH08
RH09: RH09

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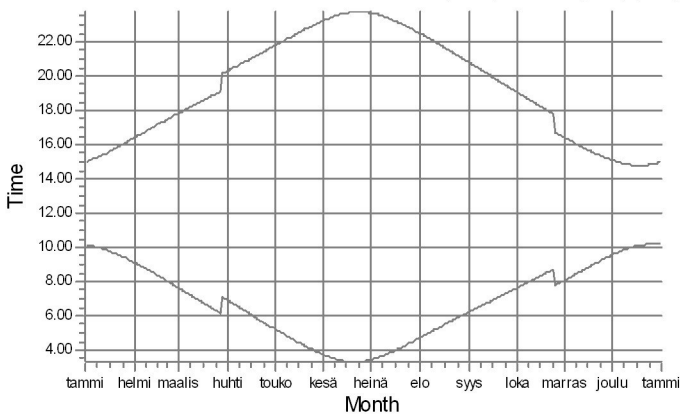
Anders Stenberg / a.stenberg@wpd.fi
Calculated:
27.8.2021 16.22/3.3.294

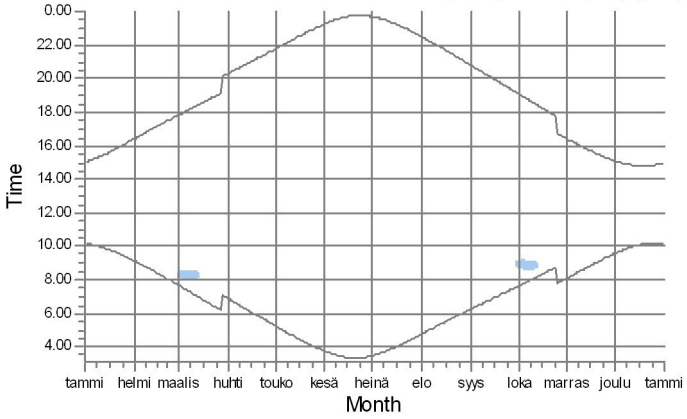
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case

7: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (159)



8: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (157)



Shadow receptors

RH13: RH13

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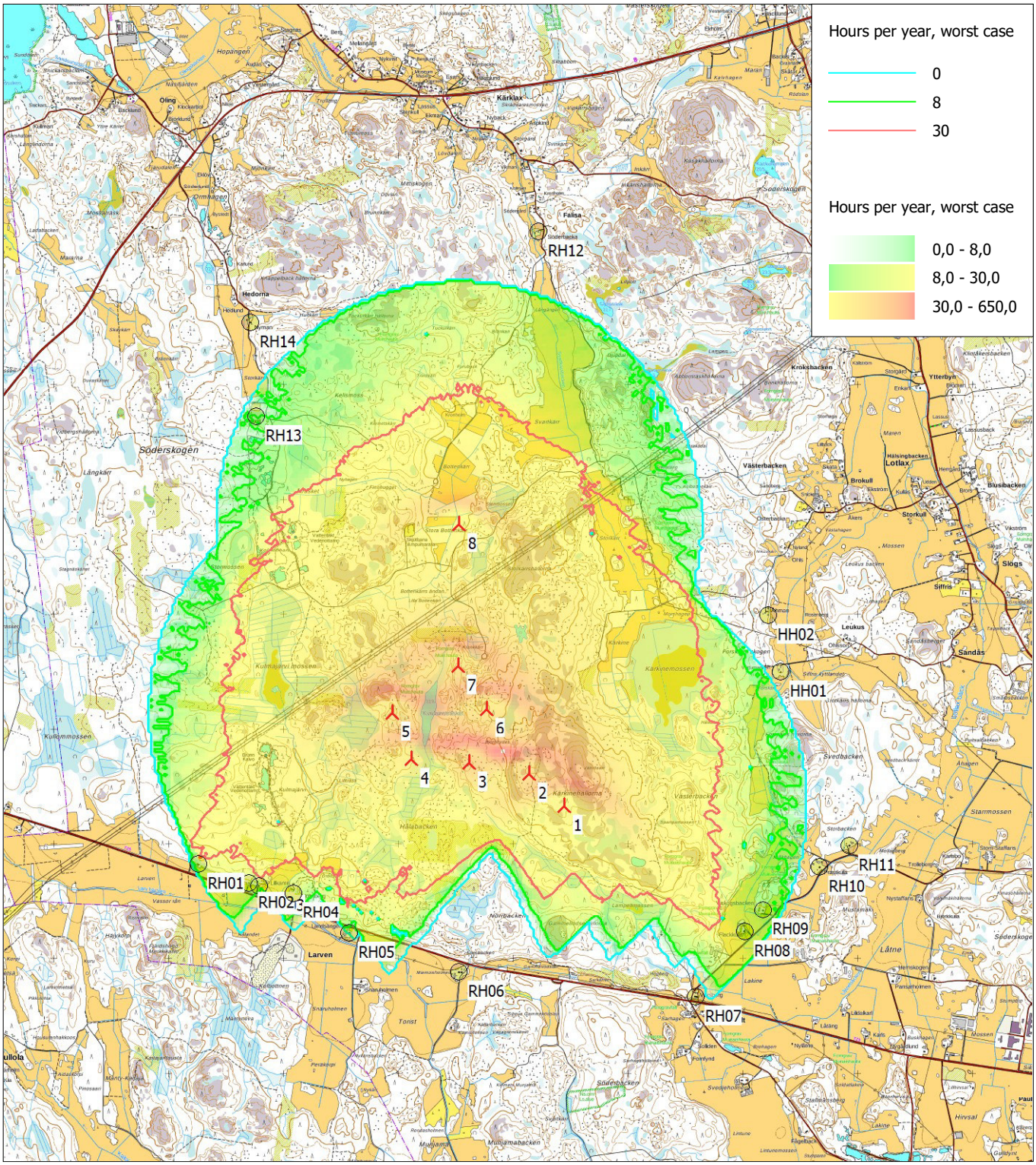
Calculated:
27.8.2021 16.22/3.3.294

SHADOW - Map

Calculation: MP Proposal, 8xF180 @210m, Worst case



Map: Söde_Background map , Print scale 1:50 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 254 545 North: 7 012 890

New WTG Shadow receptor

Flicker map level: DEM 2m

Bilaga 3

Modelleringens utgångsdata och resultat,

real case kumulativa konsekvenser

Project:
Söderskogen

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Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

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) [SEINAJOKI]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational hours are calculated from WTGs in calculation and wind distribution:
Finnish Wind Atlas (gp=30279, lat=63.153, lon=22.140)

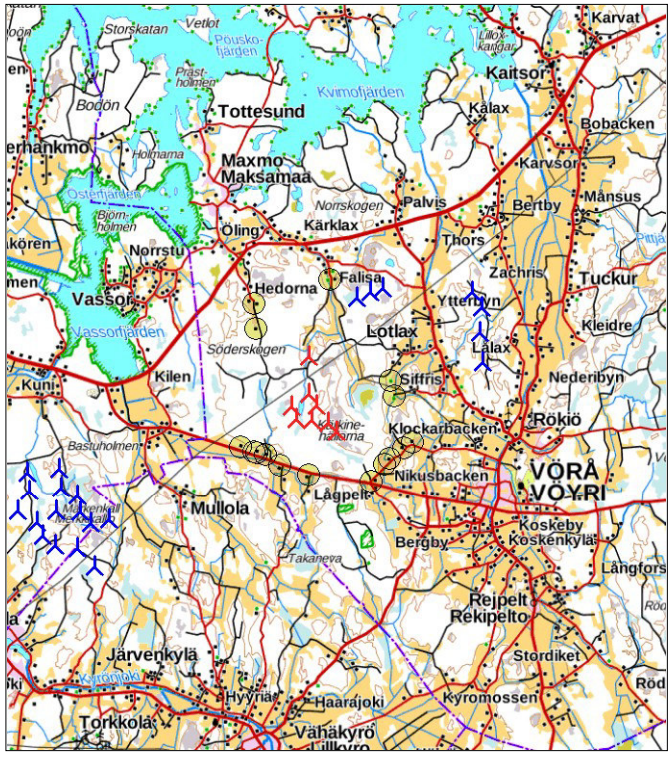
Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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: DEM 10m
Obstacles not 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	Valid	WTG type Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	255445	7011327	46,5	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
2	255137	7011612	50,4	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
3	254614	7011705	38,8	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
4	254111	7011739	25,8	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
5	253945	7012144	33,9	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
6	254771	7012174	40,0	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
7	254521	7012552	35,0	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
8	254528	7013790	19,2	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
Lotlax 1	256101	7015730	27,0	Prokon P3000 3030 116...	No	Prokon	P3000-3030	3030	116,7	122,0	1836	0,0
Lotlax 2	256560	7015928	33,2	Prokon P3000 3030 116...	No	Prokon	P3000-3030	3030	116,7	122,0	1836	0,0
Lotlax 3	256964	7016058	30,0	Prokon P3000 3030 116...	No	Prokon	P3000-3030	3030	116,7	122,0	1836	0,0
Lålax 1	260278	7013601	21,1	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Lålax 2	260174	7014579	28,5	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Lålax 3	260216	7015429	20,8	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Lålax 4	259924	7015937	27,7	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Märkenkall 01	247894	7008402	21,5	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 02	247294	7008259	25,0	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 03	246855	7007441	24,7	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 04	247445	7006854	25,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 05	246950	7008670	26,1	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 06	246864	7009208	21,0	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 07	246326	7009461	17,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 08	246247	7010081	20,5	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 09	246160	7008681	29,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 10	246126	7007532	23,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 11	245712	7007870	13,7	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 12	245517	7008318	15,8	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 13	245281	7009344	17,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 14	245200	7009948	18,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 15	244881	7008680	14,1	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0

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18.8.2021 15.08/3.3.247

SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

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]
HH01	HH01	257331	7012499	17,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
HH02	HH02	257219	7012995	17,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH01	RH01	252257	7010823	13,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH02	RH02	252700	7010660	15,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH03	RH03	252789	7010635	14,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH04	RH04	253090	7010568	15,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH05	RH05	253574	7010222	14,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH06	RH06	254528	7009881	18,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH07	RH07	256594	7009667	21,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH08	RH08	257015	7010236	19,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH09	RH09	257177	7010423	17,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH10	RH10	257669	7010798	18,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH11	RH11	257929	7010986	18,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH12	RH12	255219	7016333	14,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH13	RH13	252762	7014727	25,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH14	RH14	252714	7015547	21,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

		Shadow, worst case			**Shadow, expected values**
No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
HH01	HH01	0:00	0	0:00	0:00
HH02	HH02	0:00	0	0:00	0:00
RH01	RH01	12:05	45	0:21	3:34
RH02	RH02	17:54	52	0:25	5:15
RH03	RH03	10:55	38	0:22	3:11
RH04	RH04	17:49	53	0:24	5:14
RH05	RH05	5:27	28	0:15	1:36
RH06	RH06	0:00	0	0:00	0:00
RH07	RH07	0:00	0	0:00	0:00
RH08	RH08	15:43	53	0:23	4:12
RH09	RH09	11:01	38	0:22	2:45
RH10	RH10	0:00	0	0:00	0:00
RH11	RH11	0:00	0	0:00	0:00
RH12	RH12	20:37	67	0:28	3:47
RH13	RH13	7:13	26	0:21	1:13
RH14	RH14	0:00	0	0:00	0:00

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)	26:44	6:58
2	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)	5:27	1:36
3	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)	17:49	5:14
4	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)	34:07	10:02
5	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)	0:00	0:00
6	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)	0:00	0:00
7	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)	0:00	0:00
8	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)	7:13	1:13
Lotlax 1	Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (335)	10:56	1:52
Lotlax 2	Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)	6:07	1:11
Lotlax 3	Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)	3:34	0:43
Lålax 1	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (338)	0:00	0:00
Lålax 2	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (339)	0:00	0:00
Lålax 3	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (340)	0:00	0:00
Lålax 4	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (341)	0:00	0:00
Märkenkall 01	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (320)	0:00	0:00
Märkenkall 02	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (327)	0:00	0:00
Märkenkall 03	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (328)	0:00	0:00
Märkenkall 04	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (329)	0:00	0:00

To be continued on next page...

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SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
Märkenkall 05	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (330)	0:00	0:00
Märkenkall 06	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (331)	0:00	0:00
Märkenkall 07	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (332)	0:00	0:00
Märkenkall 08	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (333)	0:00	0:00
Märkenkall 09	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (334)	0:00	0:00
Märkenkall 10	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (321)	0:00	0:00
Märkenkall 11	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (322)	0:00	0:00
Märkenkall 12	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (323)	0:00	0:00
Märkenkall 13	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (324)	0:00	0:00
Märkenkall 14	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (325)	0:00	0:00
Märkenkall 15	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (326)	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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** HH01 - HH01

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.35
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.03
3	10.08	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.04	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.36	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.11	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.51
12	09.56	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.48
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.07
	15.38	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.10	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.13	03.21	04.13	05.43	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.27	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.57	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.55
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** HH02 - HH02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.35
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.03
3	10.08	09.02	07.34	06.48	05.08	03.41	03.31	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.04	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.36	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.04	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.50
	15.12	16.43	18.07	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.11	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.13	18.31	15.54	14.51
12	09.56	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	10.00
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.48
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.07
	15.38	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.10	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.13	03.21	04.13	05.43	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26	05.41	04.07	03.21	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.49
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.24	05.55	07.21	08.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.17	14.51
26	09.24	07.50	06.16	05.31	03.59	03.23	04.27	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.52	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.54	03.25	04.33	06.03	07.29	07.55	09.27	10.12
	16.11	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.55
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.29	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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)

Project:
Söderskogen

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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH01 - RH01

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May		June	July		August		September	October	November	December
1	10.10	09.08	07.41	06.56	05.15		03.46	03.29		04.45		05.46 (4)	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46		23.16	23.42		22.29	20	06.06 (4)	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11		03.44	03.31		04.48		05.47 (4)	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49		23.18	23.40		22.26	19	06.06 (4)	20.45	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08		03.42	03.32		04.51		05.47 (4)	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52		23.21	23.39		22.23	18	06.05 (4)	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05		03.40	03.34		04.54		05.49 (4)	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55		23.23	23.38		22.20	15	06.04 (4)	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02		03.38	03.36		04.57		05.49 (4)	06.26	07.49	08.19	09.45
	15.09	16.37	18.02	20.30	21.58		23.25	23.36		22.17	14	06.03 (4)	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	05.44 (4)	03.36	03.37		05.00		05.51 (4)	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	6 05.50 (4)	23.27	23.35		22.14	10	06.01 (4)	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	05.41 (4)	03.34	03.39		05.03		05.55 (4)	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	11 05.52 (4)	23.29	23.33		22.11	2	05.57 (4)	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	05.39 (4)	03.32	03.41		05.06			06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	14 05.53 (4)	23.31	23.31		22.08			20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	05.38 (4)	03.31	03.44		05.09			06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	17 05.55 (4)	23.33	23.29		22.04			20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	05.37 (4)	03.29	03.46		05.12			06.40	08.03	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	18 05.55 (4)	23.35	23.27		22.01			20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	05.36 (4)	03.28	03.48		05.15			06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	19 05.55 (4)	23.36	23.25		21.58			20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	05.36 (4)	03.27	03.50		05.18			06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	20 05.56 (4)	23.38	23.23		21.55			20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	05.36 (4)	03.26	03.53		05.21			06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	20 05.56 (4)	23.39	23.21		21.51			20.07	18.25	15.48	14.51
14	09.52	08.29	06.57	06.11	04.34	05.36 (4)	03.25	03.55		05.24			06.51	08.14	08.47	10.03
	15.31	17.05	18.28	20.56	22.25	21 05.57 (4)	23.41	23.19		21.48			20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	05.35 (4)	03.24	03.58		05.27			06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	21 05.56 (4)	23.42	23.16		21.45			20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.05	04.28	05.36 (4)	03.23	04.00	05.54 (4)	05.30			06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	21 05.57 (4)	23.43	23.14	3 05.57 (4)	21.42			19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	05.35 (4)	03.23	04.03	05.51 (4)	05.32			06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	21 05.56 (4)	23.44	23.11	8 05.59 (4)	21.38			19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	05.36 (4)	03.22	04.06	05.51 (4)	05.35			07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	20 05.56 (4)	23.45	23.09	11 06.02 (4)	21.35			19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	05.36 (4)	03.22	04.08	05.50 (4)	05.38			07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	20 05.56 (4)	23.45	23.06	13 06.03 (4)	21.32			19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	05.36 (4)	03.22	04.11	05.49 (4)	05.41			07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	19 05.55 (4)	23.46	23.04	15 06.04 (4)	21.28			19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	05.37 (4)	03.22	04.14	05.48 (4)	05.44			07.10	08.34	09.08	10.11
	15.51	17.26	18.48	21.17	22.46	18 05.55 (4)	23.46	23.01	16 06.04 (4)	21.25			19.40	17.59	15.27	14.49
22	09.34	08.04	06.30	05.44	04.11	05.37 (4)	03.22	04.17	05.47 (4)	05.47			07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	18 05.55 (4)	23.46	22.58	18 06.05 (4)	21.22			19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	05.38 (4)	03.22	04.19	05.47 (4)	05.50			07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	16 05.54 (4)	23.46	22.56	19 06.06 (4)	21.18			19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	05.39 (4)	03.22	04.22	05.47 (4)	05.53			07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	14 05.53 (4)	23.46	22.53	19 06.06 (4)	21.15			19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	05.40 (4)	03.23	04.25	05.46 (4)	05.55			07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	12 05.52 (4)	23.46	22.50	20 06.06 (4)	21.12			19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	05.42 (4)	03.24	04.28	05.47 (4)	05.58			07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	9 05.51 (4)	23.46	22.47	20 06.07 (4)	21.08			19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	05.43 (4)	03.24	04.31	05.46 (4)	06.01			07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	6 05.49 (4)	23.45	22.44	21 06.07 (4)	21.05			19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55		03.25	04.34	05.46 (4)	06.04			07.29	07.55	09.28	10.12
	16.12	17.47	19.08	21.37	23.06		23.44	22.41	21 06.07 (4)	21.01			19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53		03.26	04.37	05.46 (4)	06.07			07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08		23.44	22.38	21 06.07 (4)	20.58			19.12	16.33	15.10	14.56
30	09.14		07.02	05.18	03.50		03.28	04.40	05.46 (4)	06.10			07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11		23.43	22.35	21 06.07 (4)	20.55			19.09	16.30	15.08	14.57
31	09.11		06.59		03.48			04.43	05.47 (4)	06.12				08.04		10.11
	16.21		20.16		23.13			22.32	20 06.07 (4)	20.51				16.27		14.59
Potential sun hours	182	242	363	447	559		605	594		502			392	308	206	151
Total, worst case						361			266		98					
Sun reduction						0,49			0,46		0,42					
Oper. time red.						0,98			0,98		0,98					
Wind dir. red.						0,65			0,65		0,65					
Total reduction						0,31			0,29		0,27					
Total, real						111			78		26					

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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH02 - RH02

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46	04.56 (4)	03.29	04.59 (4)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16 18	05.14 (4)	03.42	05.23 (4)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	04.55 (4)	03.30	05.00 (4)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18 19	05.14 (4)	03.40 24	05.24 (4)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.42	04.55 (4)	03.32	05.00 (4)	04.51	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52	23.21 21	05.16 (4)	03.39 23	05.23 (4)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.40	04.56 (4)	03.34	05.00 (4)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23 20	05.16 (4)	03.38 23	05.23 (4)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.55 (4)	03.36	05.00 (4)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25 21	05.16 (4)	03.36 23	05.23 (4)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.55 (4)	03.37	05.01 (4)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27 22	05.17 (4)	03.35 22	05.23 (4)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.55 (4)	03.39	05.01 (4)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29 22	05.17 (4)	03.33 22	05.23 (4)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.55 (4)	03.41	05.02 (4)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31 23	05.18 (4)	03.31 21	05.23 (4)	22.08	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.55 (4)	03.44	05.02 (4)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33 23	05.18 (4)	03.29 20	05.22 (4)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.55 (4)	03.46	05.03 (4)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35 23	05.18 (4)	03.27 19	05.22 (4)	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	04.55 (4)	03.48	05.04 (4)	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36 24	05.19 (4)	03.25 18	05.22 (4)	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.55 (4)	03.50	05.05 (4)	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38 24	05.19 (4)	03.23 17	05.22 (4)	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.55 (4)	03.53	05.05 (4)	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39 24	05.19 (4)	03.21 16	05.21 (4)	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.56 (4)	03.55	05.06 (4)	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41 24	05.20 (4)	03.19 14	05.20 (4)	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.55 (4)	03.58	05.07 (4)	05.27	06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42 25	05.20 (4)	03.16 12	05.19 (4)	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.56 (4)	04.00	05.09 (4)	05.30	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43 24	05.20 (4)	03.14 9	05.18 (4)	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.56 (4)	04.03	05.12 (4)	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44 25	05.21 (4)	03.11 3	05.15 (4)	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.56 (4)	04.06		05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44 25	05.21 (4)	03.09		21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.56 (4)	04.08		05.38	07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45 25	05.21 (4)	03.06		21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	03.22	04.57 (4)	04.11		05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46 24	05.21 (4)	03.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	03.22	04.57 (4)	04.14		05.44	07.10	08.34	09.08	10.10
	15.51	17.26	18.48	21.16	22.46	23.46 24	05.21 (4)	03.01		21.25	19.39	17.59	15.27	14.49
22	09.34	08.04	06.30	05.44	04.11	03.22	04.57 (4)	04.17		05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46 24	05.21 (4)	22.58		21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.58 (4)	04.19		05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46 24	05.22 (4)	22.56		21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.57 (4)	04.22		05.53	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46 25	05.22 (4)	22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.57 (4)	04.25		05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46 25	05.22 (4)	22.50		21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.58 (4)	04.28		05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45 24	05.22 (4)	22.47		21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	05.01 (4) 03.24	04.58 (4)	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 7	05.08 (4) 23.45	05.23 (4)	22.44		21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	04.59 (4) 03.25	04.59 (4)	04.34		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06 11	05.10 (4) 23.44	05.23 (4)	22.41		21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	04.58 (4) 03.26	04.58 (4)	04.37		06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08 14	05.12 (4) 23.44	05.22 (4)	22.38		20.58	19.12	16.33	15.10	14.56
30	09.14		07.02	05.18	03.50	04.57 (4) 03.28	04.58 (4)	04.40		06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11 15	05.12 (4) 23.43	25 05.23 (4)	22.35		20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48	04.56 (4)		04.43		06.12		08.04		10.11
	16.21		20.16		23.13 17	05.13 (4)		22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case					64	700		310						
Sun reduction					0,49	0,45		0,46						
Oper. time red.					0,98	0,98		0,98						
Wind dir. red.					0,66	0,66		0,66						
Total reduction					0,31	0,29		0,30						
Total, real					20	203		92						

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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH03 - RH03

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46		03.29		04.52 (4)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.42	19	05.11 (4)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44		03.30		04.53 (4)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18		23.40	18	05.11 (4)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.42	04.53 (4)	03.32		04.53 (4)	04.51	06.21	07.43	08.13	09.41
	15.05	16.31	17.56	20.25	21.52	23.21	6 04.59 (4)	23.39	18	05.11 (4)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	04.51 (4)	03.34		04.54 (4)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23	10 05.01 (4)	23.38	16	05.10 (4)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.50 (4)	03.36		04.54 (4)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25	12 05.02 (4)	23.36	16	05.10 (4)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.49 (4)	03.37		04.56 (4)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	14 05.03 (4)	23.35	14	05.10 (4)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.49 (4)	03.39		04.56 (4)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	15 05.04 (4)	23.33	13	05.09 (4)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.49 (4)	03.41		04.58 (4)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	16 05.05 (4)	23.31	11	05.09 (4)	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.48 (4)	03.44		04.58 (4)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33	17 05.05 (4)	23.29	9	05.07 (4)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.48 (4)	03.46		05.01 (4)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35	18 05.06 (4)	23.27	4	05.05 (4)	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	04.48 (4)	03.48			05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	19 05.07 (4)	23.25			21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.48 (4)	03.50			05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	19 05.07 (4)	23.23			21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.48 (4)	03.53			05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	19 05.07 (4)	23.21			21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.48 (4)	03.55			05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41	20 05.08 (4)	23.19			21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.48 (4)	03.58			05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	20 05.08 (4)	23.16			21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.48 (4)	04.00			05.30	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43	21 05.09 (4)	23.14			21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.48 (4)	04.03			05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	21 05.09 (4)	23.11			21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.48 (4)	04.06			05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	22 05.10 (4)	23.09			21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.49 (4)	04.08			05.38	07.05	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	21 05.10 (4)	23.06			21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.37	05.51	04.16	03.22	04.49 (4)	04.11			05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46	21 05.10 (4)	23.04			21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.14	03.22	04.49 (4)	04.14			05.44	07.10	08.34	09.08	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	21 05.10 (4)	23.01			21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	04.49 (4)	04.17			05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46	21 05.10 (4)	22.58			21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.50 (4)	04.19			05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46	21 05.11 (4)	22.56			21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.50 (4)	04.22			05.53	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46	21 05.11 (4)	22.53			21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.49 (4)	04.25			05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	21 05.10 (4)	22.50			21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.50 (4)	04.28			05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	21 05.11 (4)	22.47			21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	03.24	04.51 (4)	04.31			06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	20 05.11 (4)	22.44			21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25	04.51 (4)	04.34			06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06	23.44	20 05.11 (4)	22.41			21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26	04.51 (4)	04.37			06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	20 05.11 (4)	22.38			20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28	04.51 (4)	04.40			06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	20 05.11 (4)	22.35			20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48			04.43			06.12		08.04		10.11
	16.21		20.16		23.13			22.32			20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151	
Total, worst case							517		138						
Sun reduction							0,45		0,46						
Oper. time red.							0,98		0,98						
Wind dir. red.							0,66		0,66						
Total reduction							0,29		0,30						
Total, real							150		41						

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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH04 - RH04

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.55	05.15	03.46	04.59 (3)	03.29	05.02 (3)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	18 05.17 (3)	23.42	23 05.25 (3)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	04.58 (3)	03.30	05.03 (3)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18	19 05.17 (3)	23.40	23 05.26 (3)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	04.58 (3)	03.32	05.03 (3)	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.25	21.52	23.21	20 05.18 (3)	23.39	23 05.26 (3)	22.23	20.41	18.59	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	04.58 (3)	03.34	05.03 (3)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23	21 05.19 (3)	23.38	23 05.26 (3)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	04.58 (3)	03.35	05.03 (3)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25	21 05.19 (3)	23.36	22 05.25 (3)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36	04.58 (3)	03.37	05.04 (3)	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	21 05.19 (3)	23.35	22 05.26 (3)	22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.21	06.35	04.55	03.34	04.58 (3)	03.39	05.04 (3)	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	22 05.20 (3)	23.33	21 05.25 (3)	22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32	04.58 (3)	03.41	05.05 (3)	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	22 05.20 (3)	23.31	21 05.26 (3)	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	04.58 (3)	03.44	05.05 (3)	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.14	20.42	22.10	23.33	22 05.20 (3)	23.29	20 05.25 (3)	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.58 (3)	03.46	05.06 (3)	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.45	22.13	23.35	22 05.20 (3)	23.27	19 05.25 (3)	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	04.59 (3)	03.48	05.06 (3)	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	23 05.22 (3)	23.25	19 05.25 (3)	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	04.58 (3)	03.50	05.07 (3)	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23 05.21 (3)	23.23	18 05.25 (3)	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26	04.58 (3)	03.53	05.07 (3)	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23 05.21 (3)	23.21	17 05.24 (3)	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	04.59 (3)	03.55	05.08 (3)	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41	23 05.22 (3)	23.19	15 05.23 (3)	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.54	06.08	04.31	03.24	04.58 (3)	03.58	05.09 (3)	05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	24 05.22 (3)	23.16	14 05.23 (3)	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.59 (3)	04.00	05.10 (3)	05.29	06.56	08.20	08.52	10.06
	15.36	17.11	18.34	21.02	22.31	23.43	23 05.22 (3)	23.14	12 05.22 (3)	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.23	04.59 (3)	04.03	05.12 (3)	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	24 05.23 (3)	23.11	8 05.20 (3)	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	05.00 (3)	04.06		05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	23 05.23 (3)	23.09		21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	05.00 (3)	04.08		05.38	07.04	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	23 05.23 (3)	23.06		21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22	05.00 (3)	04.11		05.41	07.07	08.31	09.05	10.10
	15.48	17.23	18.45	21.14	22.43	23.46	23 05.23 (3)	23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22	05.00 (3)	04.14		05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	24 05.24 (3)	23.01		21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	05.00 (3)	04.17		05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46	24 05.24 (3)	22.58		21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	05.00 (3)	04.19		05.50	07.15	08.40	09.13	10.12
	15.57	17.32	18.53	21.22	22.52	23.46	23 05.23 (3)	22.56		21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	05.01 (3)	04.22		05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.55	23.46	23 05.24 (3)	22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	05.00 (3)	04.25		05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	24 05.24 (3)	22.50		21.12	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	05.04 (3)	03.24	05.01 (3)	04.28		05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	6 05.10 (3)	23.45	23 05.24 (3)	22.47		21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	05.02 (3)	03.24	05.02 (3)	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	10 05.12 (3)	23.45	23 05.25 (3)	22.44		21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	05.01 (3)	03.25	05.02 (3)	04.34		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.08	21.37	23.06	12 05.13 (3)	23.44	23 05.25 (3)	22.41		21.01	19.16	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	05.01 (3)	03.26	05.01 (3)	04.37		06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	14 05.15 (3)	23.43	24 05.25 (3)	22.38		20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	05.00 (3)	03.28	05.02 (3)	04.40		06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	16 05.16 (3)	23.43	23 05.25 (3)	22.35		20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48	04.59 (3)			04.43		06.12		08.04		10.11
	16.21		20.16		23.13	17 05.16 (3)			22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case					75	674	320					
Sun reduction					0,49	0,45	0,46					
Oper. time red.					0,98	0,98	0,98					
Wind dir. red.					0,66	0,66	0,66					
Total reduction					0,31	0,29	0,30					
Total, real					23	196	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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH05 - RH05

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.15	03.46		03.29		04.48 (2)	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.41	10	04.58 (2)	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44		03.30		04.48 (2)	04.48	06.18	07.40	08.10	09.38
	15.03	16.28	17.53	20.22	21.49	23.18		23.40	10	04.58 (2)	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41		03.32		04.50 (2)	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.24	21.52	23.20		23.39	8	04.58 (2)	22.23	20.41	18.58	16.18	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39		03.34		04.51 (2)	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23		23.38	6	04.57 (2)	22.20	20.38	18.55	16.15	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38		03.35		04.53 (2)	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25		23.36	2	04.55 (2)	22.17	20.34	18.52	16.12	14.59
6	10.05	08.53	07.24	06.38	04.59	03.36		03.37			05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27		23.35			22.14	20.31	18.48	16.09	14.58
7	10.04	08.50	07.20	06.35	04.55	03.34		03.39			05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29		23.33			22.11	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.32	04.52	03.32		03.41			05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	5	04.51 (2)		23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31		04.45 (2)		03.44	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	7	04.52 (2)		23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29		04.44 (2)		03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.53	18.16	20.44	22.13	23.35	9	04.53 (2)		23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28		04.43 (2)		03.48	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	11	04.54 (2)		23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27		04.44 (2)		03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	11	04.55 (2)		23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.37	03.26		04.43 (2)		03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	12	04.55 (2)		23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25		04.44 (2)		03.55	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.41	12	04.56 (2)		23.19	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24		04.43 (2)		03.58	05.27	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	13	04.56 (2)		23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23		04.43 (2)		04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.34	21.02	22.31	23.43	14	04.57 (2)		23.14	21.41	19.57	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.23		04.43 (2)		04.03	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	15	04.58 (2)		23.11	21.38	19.53	18.12	15.38	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22		04.44 (2)		04.06	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	14	04.58 (2)		23.09	21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22		04.44 (2)		04.08	05.38	07.04	08.28	09.01	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	14	04.58 (2)		23.06	21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22		04.44 (2)		04.11	05.41	07.07	08.31	09.04	10.10
	15.48	17.23	18.45	21.13	22.43	23.45	15	04.59 (2)		23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22		04.44 (2)		04.14	05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	15	04.59 (2)		23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22		04.44 (2)		04.17	05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.51	21.19	22.49	23.46	15	04.59 (2)		22.58	21.22	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22		04.44 (2)		04.19	05.50	07.15	08.40	09.13	10.11
	15.57	17.32	18.53	21.22	22.52	23.46	15	04.59 (2)		22.55	21.18	19.33	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22		04.45 (2)		04.22	05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.54	23.46	14	04.59 (2)		22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23		04.45 (2)		04.25	05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	14	04.59 (2)		22.50	21.11	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24		04.45 (2)		04.28	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	14	04.59 (2)		22.47	21.08	19.22	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	03.24		04.46 (2)		04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	14	05.00 (2)		22.44	21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25		04.47 (2)		04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	13	05.00 (2)		22.41	21.01	19.15	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26		04.46 (2)		04.37	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	13	04.59 (2)		22.38	20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28		04.47 (2)		04.40	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.42	12	04.59 (2)		22.35	20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48					04.42	06.12		08.04		10.11
	16.21		20.16		23.13					22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594			502	392	308	206	151
Total, worst case							291		36						
Sun reduction							0,45		0,46						
Oper. time red.							0,98		0,98						
Wind dir. red.							0,66		0,66						
Total reduction							0,29		0,30						
Total, real							86		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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH06 - RH06

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.15	03.46	03.29	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.41	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.44	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.21	07.43	08.13	09.40
	15.05	16.31	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.18	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.34	04.54	06.23	07.46	08.16	09.43
	15.07	16.34	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.38	03.35	04.57	06.26	07.48	08.19	09.45
	15.09	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.36	03.37	05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.34	22.14	20.31	18.48	16.08	14.58
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.06	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.31	03.43	05.09	06.37	07.59	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.23	16.56	18.19	20.47	22.16	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.27	03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.26	03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	03.55	05.24	06.51	08.14	08.46	10.03
	15.31	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.22	15.46	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.58	05.27	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.23	04.03	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.43	23.11	21.38	19.53	18.12	15.38	14.49
18	09.43	08.16	06.43	05.58	04.22	03.22	04.06	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	23.09	21.35	19.50	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.08	05.38	07.04	08.28	09.01	10.09
	15.45	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.22	04.11	05.41	07.07	08.31	09.04	10.09
	15.48	17.23	18.45	21.13	22.43	23.45	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.22	04.14	05.44	07.10	08.34	09.07	10.10
	15.51	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11	03.22	04.17	05.47	07.13	08.37	09.10	10.11
	15.54	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.50
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.50	07.15	08.40	09.13	10.11
	15.57	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.23	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	16.00	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.03	03.23	04.25	05.55	07.21	07.46	09.19	10.12
	16.03	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.52
26	09.24	07.50	06.16	05.31	04.00	03.24	04.28	05.58	07.23	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.28	03.58	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.14	14.54
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.12	14.55
29	09.16		07.06	05.21	03.53	03.26	04.37	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.10	14.56
30	09.13		07.02	05.18	03.50	03.28	04.40	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.42	22.35	20.55	19.09	16.30	15.08	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH07 - RH07

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.46	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46	23.15	23.41	22.29	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.09	09.38
	15.03	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.34	04.54	06.23	07.45	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.22	23.37	22.20	20.37	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.36	03.37	05.00	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.34	22.13	20.31	18.48	16.08	14.58
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.14	06.28	04.49	03.31	03.43	05.09	06.37	07.59	08.31	09.54
	15.18	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.46	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40	03.27	03.50	05.18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.53	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.20	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.25	03.55	05.23	06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.58	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.41	23.16	21.44	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31	23.42	23.13	21.41	19.56	18.15	15.40	14.49
17	09.45	08.19	06.46	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.49
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.07
	15.42	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.49
19	09.41	08.13	06.40	05.54	04.19	03.22	04.08	05.38	07.04	08.28	09.01	10.08
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13	03.21	04.14	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.45	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.11	03.22	04.16	05.47	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.11
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.51
25	09.26	07.53	06.19	05.34	04.02	03.23	04.25	05.55	07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.45	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.48	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.31	06.01	07.26	07.51	09.24	10.12
	16.09	17.44	19.04	21.34	23.02	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.55
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.32	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.39	06.09	07.34	08.00	09.32	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.48		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH08 - RH08

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	21.01 (1)	03.29	04.45	21.07 (1)	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46	23.15 11	21.12 (1)	23.41	22.29 18	21.25 (1)	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	21.03 (1)	03.30	04.48	21.08 (1)	06.18	07.40	08.09	09.38
	15.03	16.27	17.53	20.21	21.49	23.18 8	21.11 (1)	23.40	22.26 16	21.24 (1)	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	21.06 (1)	03.32	04.51	21.10 (1)	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20 4	21.10 (1)	23.39	22.23 13	21.23 (1)	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39		03.33	04.54	21.11 (1)	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23		23.37	22.20 10	21.21 (1)	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.01	03.37		03.35	04.57		06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25		23.36	22.17		20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35		03.37	05.00		06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27		23.34	22.13		20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.34		03.39	05.03		06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29		23.33	22.10		20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	21.03 (1) 03.32		03.41	05.06		06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.38	22.07 6	21.09 (1) 23.31		23.31	22.07		20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	21.00 (1) 03.30		03.43	05.09		06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 11	21.11 (1) 23.33		23.29	22.04		20.20	18.38	16.59	14.54
10	09.59	08.41	07.10	06.24	04.46	20.59 (1) 03.29		03.45	21.12 (1) 05.12		06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 15	21.14 (1) 23.34		23.27 6	21.18 (1) 22.01		20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	20.57 (1) 03.28		03.48	21.11 (1) 05.15		06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16 17	21.14 (1) 23.36		23.25 9	21.20 (1) 21.58		20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40	20.56 (1) 03.26		03.50	21.09 (1) 05.18		06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19 19	21.15 (1) 23.38		23.23 12	21.21 (1) 21.54		20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	20.56 (1) 03.25		03.52	21.08 (1) 05.20		06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 20	21.16 (1) 23.39		23.21 14	21.22 (1) 21.51		20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	20.55 (1) 03.24		03.55	21.08 (1) 05.23		06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25 21	21.16 (1) 23.40		23.18 15	21.23 (1) 21.48		20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	20.55 (1) 03.24		03.57	21.07 (1) 05.26		06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28 22	21.17 (1) 23.41		23.16 17	21.24 (1) 21.45		20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28	20.54 (1) 03.23		04.00	21.07 (1) 05.29		06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 23	21.17 (1) 23.42		23.14 18	21.25 (1) 21.41		19.56	18.15	15.40	14.49
17	09.45	08.19	06.46	06.01	04.25	20.54 (1) 03.22		04.03	21.06 (1) 05.32		06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34 23	21.17 (1) 23.43		23.11 19	21.25 (1) 21.38		19.53	18.11	15.37	14.49
18	09.43	08.16	06.43	05.57	04.22	20.55 (1) 03.22		04.05	21.06 (1) 05.35		07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37 23	21.18 (1) 23.44		23.09 20	21.26 (1) 21.35		19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	20.54 (1) 03.21		04.08	21.05 (1) 05.38		07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40 23	21.17 (1) 23.45		23.06 21	21.26 (1) 21.31		19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	20.54 (1) 03.21		04.11	21.05 (1) 05.41		07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43 23	21.17 (1) 23.45		23.03 21	21.26 (1) 21.28		19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13	20.55 (1) 03.21		04.13	21.05 (1) 05.44		07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46 22	21.17 (1) 23.46		23.01 22	21.27 (1) 21.25		19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	20.55 (1) 03.21		04.16	21.05 (1) 05.46		07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49 22	21.17 (1) 23.46		22.58 22	21.27 (1) 21.21		19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	20.56 (1) 03.22		04.19	21.05 (1) 05.49		07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51 21	21.17 (1) 23.46		22.55 22	21.27 (1) 21.18		19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	20.56 (1) 03.22		04.22	21.04 (1) 05.52		07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54 21	21.17 (1) 23.46		22.52 23	21.27 (1) 21.15		19.29	17.49	15.20	14.51
25	09.27	07.53	06.19	05.34	04.02	20.56 (1) 03.23		04.25	21.05 (1) 05.55		07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57 21	21.17 (1) 23.45		22.50 23	21.28 (1) 21.11		19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	20.57 (1) 03.23		04.28	21.05 (1) 05.58		07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00 19	21.16 (1) 23.45		22.47 22	21.27 (1) 21.08		19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57	20.57 (1) 03.24		04.31	21.05 (1) 06.01		07.26	07.51	09.24	10.12
	16.09	17.44	19.04	21.34	23.03 19	21.16 (1) 23.45		22.44 23	21.28 (1) 21.04		19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	20.58 (1) 03.25		04.33	21.05 (1) 06.04		07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05 17	21.15 (1) 23.44		22.41 22	21.27 (1) 21.01		19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	20.59 (1) 03.26		04.36	21.05 (1) 06.06		07.32	07.57	09.30	10.11
	16.15		20.10	21.40	23.08 15	21.14 (1) 23.43		22.38 22	21.27 (1) 20.58		19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	21.00 (1) 03.27		04.39	21.06 (1) 06.09		07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10 14	21.14 (1) 23.42		22.35 21	21.27 (1) 20.54		19.08	16.30	15.07	14.57
31	09.10		06.59		03.48	21.01 (1)		04.42	21.06 (1) 06.12			08.03		10.10
	16.21		20.16		23.13 12	21.13 (1)		22.32 20	21.26 (1) 20.51			16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case					449	23	414	57				
Sun reduction					0,49	0,45	0,46	0,42				
Oper. time red.					0,98	0,98	0,98	0,98				
Wind dir. red.					0,58	0,58	0,58	0,58				
Total reduction					0,28	0,26	0,26	0,24				
Total, real					124	6	109	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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH09 - RH09

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	20.31 (1)	03.45	03.29	04.45	20.40 (1)	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.19	21.46 18	20.49 (1)	23.15	23.41	22.29 18	20.58 (1)	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	20.30 (1)	03.43	03.30	04.48	20.39 (1)	06.18	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49 19	20.49 (1)	23.18	23.40	22.26 20	20.59 (1)	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	20.29 (1)	03.41	03.32	04.51	20.39 (1)	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52 21	20.50 (1)	23.20	23.39	22.23 20	20.59 (1)	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	20.28 (1)	03.39	03.33	04.54	20.38 (1)	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55 22	20.50 (1)	23.23	23.37	22.20 21	20.59 (1)	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	20.28 (1)	03.37	03.35	04.57	20.38 (1)	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58 22	20.50 (1)	23.25	23.36	22.17 22	21.00 (1)	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	20.28 (1)	03.35	03.37	05.00	20.37 (1)	06.29	07.51	08.22	09.47
	15.10	16.40	18.05	20.33	22.01 22	20.50 (1)	23.27	23.34	22.13 22	20.59 (1)	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	20.28 (1)	03.34	03.39	05.03	20.38 (1)	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04 22	20.50 (1)	23.29	23.33	22.10 22	21.00 (1)	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	20.28 (1)	03.32	03.41	05.06	20.37 (1)	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07 22	20.50 (1)	23.31	23.31	22.07 22	20.59 (1)	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	20.28 (1)	03.30	03.43	05.09	20.38 (1)	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 21	20.49 (1)	23.33	23.29	22.04 21	20.59 (1)	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	20.29 (1)	03.29	03.45	05.12	20.38 (1)	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 20	20.49 (1)	23.34	23.27	22.01 21	20.59 (1)	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	20.29 (1)	03.28	03.48	05.15	20.38 (1)	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16 19	20.48 (1)	23.36	23.25	21.58 20	20.58 (1)	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.40	20.29 (1)	03.26	03.50	05.17	20.39 (1)	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19 18	20.47 (1)	23.38	23.23	21.54 18	20.57 (1)	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	20.31 (1)	03.25	03.52	05.20	20.40 (1)	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 16	20.47 (1)	23.39	23.21	21.51 15	20.55 (1)	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	20.32 (1)	03.24	03.55	05.23	20.41 (1)	06.51	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25 13	20.45 (1)	23.40	23.18	21.48 13	20.54 (1)	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.07	04.30	20.34 (1)	03.23	03.57	05.26	20.44 (1)	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28 10	20.44 (1)	23.41	23.16	21.44 7	20.51 (1)	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.28	20.36 (1)	03.23	04.00	05.29		06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 5	20.41 (1)	23.42	23.14	21.41		19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.25		03.22	04.03	05.32		06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34		23.43	23.11	21.38		19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22		03.22	04.05	05.35		07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37		23.44	23.09	21.35		19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19		03.21	04.08	05.38		07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40		23.45	23.06	21.31		19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16		03.21	04.11	05.41		07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43		23.45	23.03	21.28		19.43	18.02	15.30	14.49
21	09.36	08.06	06.33	05.47	04.13		03.21	04.13	05.44		07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46		23.46	23.01	21.25		19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10		03.21	04.16	05.46		07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49		23.46	22.58	21.21		19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08		03.22	04.19	05.49		07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51		23.46	22.55	21.18		19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05		03.22	04.22	05.52		07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54		23.46	22.52	21.15		19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02		03.23	04.25	05.55		07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57		23.46	22.50	21.11		19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00		03.23	04.28	05.58		07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00		23.45	22.47	21.08		19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57		03.24	04.30	06.01		07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03		23.45	22.44	21.04		19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	20.35 (1) 03.55		03.25	04.33	20.45 (1) 06.03		07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37 9	20.44 (1) 23.05		23.44	22.41 8	20.53 (1) 21.01		19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	20.33 (1) 03.52		03.26	04.36	20.43 (1) 06.06		07.32	07.57	09.30	10.11
	16.15		20.10	21.40 13	20.46 (1) 23.08		23.43	22.38 12	20.55 (1) 20.58		19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	20.31 (1) 03.50		03.27	04.39	20.42 (1) 06.09		07.34	08.00	09.33	10.11
	16.18		20.13	21.43 16	20.47 (1) 23.10		23.42	22.35 15	20.57 (1) 20.54		19.08	16.30	15.07	14.57
31	09.10		06.59		03.48			04.42	20.41 (1) 06.12			08.03		10.10
	16.21		20.16		23.13			22.32 16	20.57 (1) 20.51			16.26		14.59
Potential sun hours	182	242	363	447	559	605	594	502		392	308	206	151
Total, worst case				38	290		51	282					
Sun reduction				0,44	0,49		0,46	0,42					
Oper. time red.				0,98	0,98		0,98	0,98					
Wind dir. red.				0,56	0,56		0,56	0,56					
Total reduction				0,24	0,27		0,26	0,23					
Total, real				9	78		13	65					

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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH10 - RH10

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.18	21.46	23.15	23.41	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.12	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.34	22.13	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.56	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.06	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.50	08.13	08.46	10.02
	15.30	17.05	18.28	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.41	23.16	21.44	20.00	18.18	15.43	14.49
16	09.48	08.22	06.50	06.04	04.27	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.24	03.22	04.03	05.32	06.59	08.22	08.55	10.06
	15.39	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.42	18.01	15.29	14.48
21	09.36	08.06	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.22	05.37	04.05	03.22	04.22	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.48	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.43	06.09	05.24	03.55	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.31	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.48		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.26		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH11 - RH11

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.06	09.35
	15.01	16.24	17.50	20.18	21.46	23.15	23.41	22.29	20.47	19.05	16.23	15.05
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41	03.32	04.51	06.20	07.43	08.12	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.37	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.59
6	10.05	08.53	07.23	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.47
	15.10	16.40	18.04	20.33	22.01	23.27	23.34	22.13	20.30	18.48	16.08	14.57
7	10.03	08.50	07.20	06.35	04.55	03.33	03.39	05.03	06.31	07.54	08.25	09.49
	15.13	16.43	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.56	08.28	09.52
	15.15	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.00	08.44	07.13	06.28	04.49	03.30	03.43	05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.54
10	09.59	08.41	07.10	06.24	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.34	23.27	22.01	20.17	18.35	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.48	05.14	06.42	08.05	08.37	09.57
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.54	14.52
12	09.55	08.35	07.03	06.18	04.39	03.26	03.50	05.17	06.45	08.08	08.40	09.59
	15.25	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.25	20.53	22.22	23.39	23.21	21.51	20.06	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.50	08.13	08.46	10.02
	15.30	17.05	18.27	20.56	22.25	23.40	23.18	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.33	17.08	18.30	20.59	22.28	23.42	23.16	21.44	20.00	18.18	15.42	14.49
16	09.48	08.22	06.50	06.04	04.27	03.23	04.00	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.46	06.01	04.24	03.22	04.02	05.32	06.59	08.22	08.55	10.06
	15.38	17.14	18.36	21.04	22.34	23.43	23.11	21.38	19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.22	03.22	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.44	23.09	21.35	19.49	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.04	10.09
	15.47	17.23	18.45	21.13	22.43	23.45	23.03	21.28	19.42	18.01	15.29	14.48
21	09.36	08.06	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.21	04.19	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.51	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.22	05.37	04.05	03.22	04.22	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.52	21.15	19.29	17.49	15.20	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.25	05.55	07.20	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.27	05.58	07.23	07.48	09.22	10.12
	16.05	17.41	19.01	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.24	04.30	06.01	07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.19	16.39	15.13	14.53
28	09.19	07.43	06.09	05.24	03.55	03.25	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05	05.21	03.52	03.26	04.36	06.06	07.31	07.57	09.30	10.11
	16.15		20.10	21.40	23.08	23.43	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.17	03.50	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.18		20.13	21.43	23.10	23.42	22.35	20.54	19.08	16.30	15.07	14.57
31	09.10		06.59		03.47		04.42	06.12		08.03		10.10
	16.21		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH12 - RH12

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February			March			April	May	June
1	10.11	09.08			07.41		08.32 (Lotlax 1)	06.55	05.14	03.45
	15.00	16.24			17.50	24	08.56 (Lotlax 1)	20.19	21.46	23.16
2	10.10	09.05			07.37		08.32 (Lotlax 1)	06.52	05.11	03.43
	15.02	16.27			17.53	25	08.57 (Lotlax 1)	20.22	21.49	23.19
3	10.09	09.02			07.34		08.31 (Lotlax 1)	06.48	05.08	03.41
	15.04	16.30			17.56	25	08.56 (Lotlax 1)	20.24	21.52	23.21
4	10.08	08.59			07.31		08.31 (Lotlax 1)	06.45	05.04	03.39
	15.06	16.33			17.59	26	08.57 (Lotlax 1)	20.27	21.55	23.24
5	10.07	08.57			07.27		08.31 (Lotlax 1)	06.42	05.01	03.37
	15.08	16.36			18.02	25	08.56 (Lotlax 1)	20.30	21.59	23.26
6	10.06	08.54			07.24		08.31 (Lotlax 1)	06.38	04.58	03.35
	15.10	16.40			18.05	25	08.56 (Lotlax 1)	20.33	22.02	23.28
7	10.04	08.51			07.20		08.31 (Lotlax 1)	06.35	04.55	03.33
	15.12	16.43			18.08	23	08.54 (Lotlax 1)	20.36	22.05	23.30
8	10.03	08.48			07.17		08.32 (Lotlax 1)	06.31	04.52	03.31
	15.15	16.46			18.10	22	08.54 (Lotlax 1)	20.39	22.08	23.32
9	10.01	08.45			07.14		08.33 (Lotlax 1)	06.28	04.49	03.30
	15.17	16.49			18.13	19	08.52 (Lotlax 1)	20.42	22.11	23.34
10	10.00	08.42			07.10		08.34 (Lotlax 1)	06.24	04.45	03.28
	15.19	16.52			18.16	16	08.50 (Lotlax 1)	20.45	22.14	23.36
11	09.58	08.38			07.07		08.36 (Lotlax 1)	06.21	04.42	03.27
	15.22	16.55			18.19	11	08.47 (Lotlax 1)	20.47	22.17	23.37
12	09.56	08.35			07.04			06.18	04.39	03.26
	15.25	16.58			18.22			20.50	22.20	23.39
13	09.54	08.32			07.00			06.14	04.36	03.25
	15.27	17.01			18.25			20.53	22.23	23.40
14	09.52	08.29			06.57		07.31 (Lotlax 2)	06.11	04.33	03.24
	15.30	17.05			18.28	10	07.41 (Lotlax 2)	20.56	22.26	23.41
15	09.50	08.26			06.53		07.29 (Lotlax 2)	06.07	04.30	03.23
	15.33	17.08			18.31	14	07.43 (Lotlax 2)	20.59	22.29	23.43
16	09.48	08.23			06.50		07.27 (Lotlax 2)	06.04	04.27	03.22
	15.35	17.11			18.33	16	07.43 (Lotlax 2)	21.02	22.32	23.44
17	09.46	08.20			06.47		07.26 (Lotlax 2)	06.01	04.24	03.21
	15.38	17.14			18.36	18	07.44 (Lotlax 2)	21.05	22.35	23.45
18	09.44	08.16			06.43		07.25 (Lotlax 2)	05.57	04.21	03.21
	15.41	17.17			18.39	19	07.44 (Lotlax 2)	21.08	22.38	23.45
19	09.42	08.13			06.40		07.25 (Lotlax 2)	05.54	04.18	03.21
	15.44	17.20			18.42	19	07.44 (Lotlax 2)	21.11	22.41	23.46
20	09.39	08.10			06.36		07.24 (Lotlax 2)	05.51	04.16	03.20
	15.47	17.23			18.45	19	07.43 (Lotlax 2)	21.14	22.44	23.46
21	09.37	08.07			06.33		07.04 (Lotlax 3)	05.47	04.13	03.20
	15.50	17.26			18.48	21	07.43 (Lotlax 2)	21.17	22.46	23.47
22	09.35	08.04			06.30		07.00 (Lotlax 3)	05.44	04.10	03.21
	15.53	17.29			18.50	25	07.41 (Lotlax 2)	21.20	22.49	23.47
23	09.32	08.00			06.26		06.57 (Lotlax 3)	05.41	04.07	03.21
	15.56	17.32			18.53	28	07.41 (Lotlax 2)	21.22	22.52	23.47
24	09.30	07.57		08.41 (Lotlax 1)	06.23		06.55 (Lotlax 3)	05.37	04.05	03.21
	15.59	17.35	8	08.49 (Lotlax 1)	18.56	26	07.38 (Lotlax 2)	21.25	22.55	23.47
25	09.27	07.54		08.38 (Lotlax 1)	06.19		06.54 (Lotlax 3)	05.34	04.02	03.22
	16.02	17.38	15	08.53 (Lotlax 1)	18.59	22	07.35 (Lotlax 2)	21.28	22.58	23.47
26	09.25	07.50		08.36 (Lotlax 1)	06.16		06.55 (Lotlax 3)	05.31	03.59	03.22
	16.05	17.41	18	08.54 (Lotlax 1)	19.02	15	07.10 (Lotlax 3)	21.31	23.01	23.46
27	09.22	07.47		08.35 (Lotlax 1)	06.12		06.54 (Lotlax 3)	05.27	03.57	03.23
	16.08	17.44	21	08.56 (Lotlax 1)	19.05	14	07.08 (Lotlax 3)	21.34	23.03	23.46
28	09.19	07.44		08.33 (Lotlax 1)	06.09		06.55 (Lotlax 3)	05.24	03.54	03.24
	16.11	17.47	23	08.56 (Lotlax 1)	19.07	13	07.08 (Lotlax 3)	21.37	23.06	23.45
29	09.16				07.06		07.56 (Lotlax 3)	05.21	03.52	03.25
	16.14				20.10	9	08.05 (Lotlax 3)	21.40	23.09	23.44
30	09.14				07.02		08.00 (Lotlax 3)	05.17	03.49	03.27
	16.18				20.13	1	08.01 (Lotlax 3)	21.43	23.11	23.43
31	09.11				06.59				03.47	
	16.21				20.16				23.14	
Potential sun hours	182	242			363			447	559	606
Total, worst case			85			530				
Sun reduction			0,33			0,36				
Oper. time red.			0,98			0,98				
Wind dir. red.			0,58			0,57				
Total reduction			0,19			0,20				
Total, real			16			107				

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:
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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH12 - RH12

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	July		August		September			October			November	December
1	03.28		04.45		06.15			07.37			08.07	09.36
	23.42		22.30		20.48			19.05			16.23	15.05
2	03.29		04.48		06.18			07.40		09.17 (Lotlax 1)	08.10	09.38
	23.41		22.27		20.44			19.02	8	09.25 (Lotlax 1)	16.20	15.03
3	03.31		04.51		06.20			07.43		09.13 (Lotlax 1)	08.13	09.41
	23.40		22.23		20.41			18.58	14	09.27 (Lotlax 1)	16.17	15.02
4	03.33		04.54		06.23			07.46		09.11 (Lotlax 1)	08.16	09.43
	23.38		22.20		20.38			18.55	18	09.29 (Lotlax 1)	16.14	15.00
5	03.34		04.57		06.26			07.48		09.09 (Lotlax 1)	08.19	09.46
	23.37		22.17		20.34			18.52	21	09.30 (Lotlax 1)	16.11	14.58
6	03.36		05.00		06.29			07.51		09.08 (Lotlax 1)	08.22	09.48
	23.35		22.14		20.31			18.48	23	09.31 (Lotlax 1)	16.08	14.57
7	03.38		05.03		06.31			07.54		09.07 (Lotlax 1)	08.25	09.50
	23.34		22.11		20.27			18.45	24	09.31 (Lotlax 1)	16.05	14.56
8	03.40		05.06		06.34			07.57		09.07 (Lotlax 1)	08.28	09.52
	23.32		22.08		20.24			18.41	24	09.31 (Lotlax 1)	16.02	14.54
9	03.43		05.08		06.37			08.00		09.06 (Lotlax 1)	08.31	09.54
	23.30		22.05		20.21			18.38	25	09.31 (Lotlax 1)	15.59	14.53
10	03.45		05.11		06.40			08.02		09.06 (Lotlax 1)	08.34	09.56
	23.28		22.01		20.17			18.35	25	09.31 (Lotlax 1)	15.56	14.52
11	03.47		05.14		06.42			08.05		09.06 (Lotlax 1)	08.38	09.58
	23.26		21.58		20.14			18.31	25	09.31 (Lotlax 1)	15.54	14.51
12	03.49		05.17		06.45			08.08		09.06 (Lotlax 1)	08.41	10.00
	23.24		21.55		20.10			18.28	24	09.30 (Lotlax 1)	15.51	14.50
13	03.52		05.20		06.48			08.11		09.06 (Lotlax 1)	08.44	10.02
	23.21		21.52		20.07			18.25	23	09.29 (Lotlax 1)	15.48	14.50
14	03.54		05.23		06.51		07.47 (Lotlax 3)	08.14		09.06 (Lotlax 1)	08.47	10.03
	23.19		21.48		20.03	8	07.55 (Lotlax 3)	18.21	22	09.28 (Lotlax 1)	15.45	14.49
15	03.57		05.26		06.53		07.45 (Lotlax 3)	08.17		09.07 (Lotlax 1)	08.50	10.05
	23.17		21.45		20.00	12	07.57 (Lotlax 3)	18.18	20	09.27 (Lotlax 1)	15.42	14.49
16	03.59		05.29		06.56		07.44 (Lotlax 3)	08.20		09.08 (Lotlax 1)	08.53	10.06
	23.14		21.42		19.56	14	07.58 (Lotlax 3)	18.15	17	09.25 (Lotlax 1)	15.40	14.48
17	04.02		05.32		06.59		07.42 (Lotlax 3)	08.22		09.10 (Lotlax 1)	08.56	10.07
	23.12		21.38		19.53	15	07.57 (Lotlax 3)	18.11	13	09.23 (Lotlax 1)	15.37	14.48
18	04.05		05.35		07.02		07.42 (Lotlax 3)	08.25		09.15 (Lotlax 1)	08.59	10.08
	23.09		21.35		19.50	17	08.21 (Lotlax 2)	18.08	4	09.19 (Lotlax 1)	15.34	14.48
19	04.07		05.38		07.04		07.42 (Lotlax 3)	08.28			09.02	10.09
	23.07		21.32		19.46	25	08.25 (Lotlax 2)	18.05			15.32	14.48
20	04.10		05.41		07.07		07.42 (Lotlax 3)	08.31			09.05	10.10
	23.04		21.28		19.43	28	08.26 (Lotlax 2)	18.02			15.29	14.48
21	04.13		05.44		07.10		07.45 (Lotlax 3)	08.34			09.08	10.11
	23.02		21.25		19.39	26	08.27 (Lotlax 2)	17.58			15.27	14.48
22	04.16		05.46		07.13		07.48 (Lotlax 3)	08.37			09.11	10.12
	22.59		21.22		19.36	23	08.28 (Lotlax 2)	17.55			15.24	14.49
23	04.19		05.49		07.15		08.08 (Lotlax 2)	08.40			09.14	10.12
	22.56		21.18		19.32	19	08.27 (Lotlax 2)	17.52			15.22	14.49
24	04.21		05.52		07.18		08.08 (Lotlax 2)	08.43			09.17	10.12
	22.53		21.15		19.29	19	08.27 (Lotlax 2)	17.49			15.20	14.50
25	04.24		05.55		07.21		08.08 (Lotlax 2)	07.46			09.19	10.13
	22.50		21.12		19.26	19	08.27 (Lotlax 2)	16.45			15.17	14.51
26	04.27		05.58		07.23		08.08 (Lotlax 2)	07.49			09.22	10.13
	22.48		21.08		19.22	18	08.26 (Lotlax 2)	16.42			15.15	14.52
27	04.30		06.01		07.26		08.09 (Lotlax 2)	07.52			09.25	10.13
	22.45		21.05		19.19	17	08.26 (Lotlax 2)	16.39			15.13	14.53
28	04.33		06.03		07.29		08.09 (Lotlax 2)	07.55			09.28	10.13
	22.42		21.01		19.15	14	08.23 (Lotlax 2)	16.36			15.11	14.54
29	04.36		06.06		07.32		08.10 (Lotlax 2)	07.58			09.31	10.12
	22.39		20.58		19.12	12	08.22 (Lotlax 2)	16.33			15.09	14.55
30	04.39		06.09		07.34		08.13 (Lotlax 2)	08.01			09.33	10.12
	22.36		20.55		19.09	6	08.19 (Lotlax 2)	16.30			15.07	14.57
31	04.42		06.12					08.04				10.11
	22.33		20.51					16.26				14.58
Potential sun hours	595		502		392			308			206	151
Total, worst case					292			330				
Sun reduction					0,36			0,25				
Oper. time red.					0,98			0,98				
Wind dir. red.					0,56			0,58				
Total reduction					0,20			0,14				
Total, real					57			48				

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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH13 - RH13

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.11	09.08	07.41		08.16 (8)	06.55	05.14	03.45	03.28	04.45	06.15	07.37		08.49 (8)	08.07	09.36
	15.01	16.24	17.50	6	08.22 (8)	20.19	21.46	23.16	23.42	22.30	20.48	19.05	13	09.02 (8)	16.24	15.05
2	10.10	09.05	07.37		08.13 (8)	06.52	05.11	03.43	03.30	04.48	06.18	07.40		08.47 (8)	08.10	09.38
	15.02	16.27	17.53	12	08.25 (8)	20.22	21.49	23.19	23.41	22.27	20.45	19.02	17	09.04 (8)	16.20	15.04
3	10.09	09.02	07.34		08.11 (8)	06.49	05.08	03.41	03.31	04.51	06.21	07.43		08.46 (8)	08.13	09.41
	15.04	16.30	17.56	16	08.27 (8)	20.25	21.53	23.21	23.40	22.24	20.41	18.59	18	09.04 (8)	16.17	15.02
4	10.08	09.00	07.31		08.09 (8)	06.45	05.05	03.39	03.33	04.54	06.23	07.46		08.45 (8)	08.16	09.43
	15.06	16.34	17.59	18	08.27 (8)	20.27	21.56	23.23	23.38	22.20	20.38	18.55	20	09.05 (8)	16.14	15.00
5	10.07	08.57	07.27		08.09 (8)	06.42	05.02	03.37	03.35	04.57	06.26	07.49		08.44 (8)	08.19	09.46
	15.08	16.37	18.02	19	08.28 (8)	20.30	21.59	23.26	23.37	22.17	20.34	18.52	20	09.04 (8)	16.11	14.59
6	10.05	08.54	07.24		08.08 (8)	06.38	04.58	03.35	03.37	05.00	06.29	07.51		08.43 (8)	08.22	09.48
	15.10	16.40	18.05	20	08.28 (8)	20.33	22.02	23.28	23.35	22.14	20.31	18.48	21	09.04 (8)	16.08	14.57
7	10.04	08.51	07.21		08.08 (8)	06.35	04.55	03.33	03.39	05.03	06.32	07.54		08.43 (8)	08.25	09.50
	15.13	16.43	18.08	20	08.28 (8)	20.36	22.05	23.30	23.34	22.11	20.28	18.45	21	09.04 (8)	16.05	14.56
8	10.03	08.48	07.17		08.07 (8)	06.32	04.52	03.32	03.41	05.06	06.34	07.57		08.43 (8)	08.28	09.52
	15.15	16.46	18.11	21	08.28 (8)	20.39	22.08	23.32	23.32	22.08	20.24	18.42	20	09.03 (8)	16.02	14.55
9	10.01	08.45	07.14		08.08 (8)	06.28	04.49	03.30	03.43	05.09	06.37	08.00		08.44 (8)	08.31	09.54
	15.17	16.49	18.14	20	08.28 (8)	20.42	22.11	23.34	23.30	22.05	20.21	18.38	18	09.02 (8)	16.00	14.54
10	10.00	08.42	07.11		08.07 (8)	06.25	04.46	03.29	03.45	05.12	06.40	08.03		08.44 (8)	08.35	09.56
	15.20	16.52	18.16	19	08.26 (8)	20.45	22.14	23.35	23.28	22.01	20.17	18.35	17	09.01 (8)	15.57	14.53
11	09.58	08.39	07.07		08.08 (8)	06.21	04.43	03.27	03.47	05.15	06.43	08.05		08.45 (8)	08.38	09.58
	15.22	16.56	18.19	18	08.26 (8)	20.48	22.17	23.37	23.26	21.58	20.14	18.32	15	09.00 (8)	15.54	14.52
12	09.56	08.35	07.04		08.09 (8)	06.18	04.40	03.26	03.50	05.18	06.45	08.08		08.47 (8)	08.41	10.00
	15.25	16.59	18.22	15	08.24 (8)	20.50	22.20	23.39	23.24	21.55	20.10	18.28	10	08.57 (8)	15.51	14.51
13	09.54	08.32	07.00		08.11 (8)	06.15	04.37	03.25	03.52	05.21	06.48	08.11			08.44	10.02
	15.28	17.02	18.25	11	08.22 (8)	20.53	22.23	23.40	23.21	21.52	20.07	18.25			15.48	14.50
14	09.52	08.29	06.57			06.11	04.34	03.24	03.55	05.23	06.51	08.14			08.47	10.03
	15.30	17.05	18.28			20.56	22.26	23.41	23.19	21.48	20.04	18.22			15.45	14.49
15	09.50	08.26	06.54			06.08	04.31	03.23	03.57	05.26	06.54	08.17			08.50	10.05
	15.33	17.08	18.31			20.59	22.29	23.43	23.17	21.45	20.00	18.18			15.43	14.49
16	09.48	08.23	06.50			06.04	04.28	03.22	04.00	05.29	06.56	08.20			08.53	10.06
	15.36	17.11	18.34			21.02	22.32	23.44	23.14	21.42	19.57	18.15			15.40	14.49
17	09.46	08.20	06.47			06.01	04.25	03.22	04.02	05.32	06.59	08.23			08.56	10.07
	15.39	17.14	18.36			21.05	22.35	23.44	23.12	21.38	19.53	18.12			15.37	14.48
18	09.44	08.17	06.43			05.58	04.22	03.21	04.05	05.35	07.02	08.25			08.59	10.08
	15.41	17.17	18.39			21.08	22.38	23.45	23.09	21.35	19.50	18.08			15.35	14.48
19	09.42	08.13	06.40			05.54	04.19	03.21	04.08	05.38	07.05	08.28			09.02	10.09
	15.44	17.20	18.42			21.11	22.41	23.46	23.07	21.32	19.46	18.05			15.32	14.48
20	09.39	08.10	06.37			05.51	04.16	03.21	04.11	05.41	07.07	08.31			09.05	10.10
	15.47	17.23	18.45			21.14	22.44	23.46	23.04	21.29	19.43	18.02			15.30	14.48
21	09.37	08.07	06.33			05.48	04.13	03.21	04.13	05.44	07.10	08.34			09.08	10.11
	15.50	17.26	18.48			21.17	22.46	23.47	23.02	21.25	19.40	17.59			15.27	14.49
22	09.35	08.04	06.30			05.44	04.10	03.21	04.16	05.47	07.13	08.37			09.11	10.12
	15.53	17.29	18.51			21.20	22.49	23.47	22.59	21.22	19.36	17.55			15.25	14.49
23	09.32	08.00	06.26			05.41	04.08	03.21	04.19	05.50	07.15	08.40			09.14	10.12
	15.56	17.32	18.53			21.23	22.52	23.47	22.56	21.18	19.33	17.52			15.22	14.50
24	09.30	07.57	06.23			05.37	04.05	03.22	04.22	05.52	07.18	08.43			09.17	10.12
	15.59	17.35	18.56			21.26	22.55	23.47	22.53	21.15	19.29	17.49			15.20	14.50
25	09.27	07.54	06.19			05.34	04.02	03.22	04.25	05.55	07.21	07.46			09.20	10.13
	16.02	17.38	18.59			21.29	22.58	23.47	22.50	21.12	19.26	16.46			15.18	14.51
26	09.25	07.51	06.16			05.31	04.00	03.23	04.28	05.58	07.24	07.49			09.22	10.13
	16.05	17.41	19.02			21.31	23.01	23.46	22.48	21.08	19.22	16.42			15.16	14.52
27	09.22	07.47	06.13			05.28	03.57	03.24	04.30	06.01	07.26	07.52			09.25	10.13
	16.09	17.44	19.05			21.34	23.03	23.46	22.45	21.05	19.19	16.39			15.13	14.53
28	09.19	07.44	06.09			05.24	03.55	03.25	04.33	06.04	07.29	07.55			09.28	10.13
	16.12	17.47	19.08			21.37	23.06	23.45	22.42	21.02	19.16	16.36			15.11	14.54
29	09.17		07.06			05.21	03.52	03.26	04.36	06.07	07.32	07.58			09.31	10.12
	16.15		20.10			21.40	23.09	23.44	22.39	20.58	19.12	16.33			15.09	14.56
30	09.14		07.02			05.18	03.50	03.27	04.39	06.09	07.35	08.01			09.33	10.12
	16.18		20.13			21.43	23.11	23.43	22.36	20.55	19.09	16.30			15.07	14.57
31	09.11		06.59				03.47		04.42	06.12		08.04				10.11
	16.21		20.16				23.14		22.33	20.51		16.27				14.59
Potential sun hours	182	242	363		447	559	605	594	502	392		308		206	151	
Total, worst case				215							8		210			
Sun reduction				0,36							0,36		0,25			
Oper. time red.				0,98							0,98		0,98			
Wind dir. red.				0,56							0,56		0,56			
Total reduction				0,20							0,20		0,14			
Total, real				43							2		29			

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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**Shadow receptor:** RH14 - RH14

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.11	09.08	07.41	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.47	23.16	23.42	22.30	20.48	19.05	16.24	15.05
2	10.10	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.39
	15.02	16.27	17.53	20.22	21.50	23.19	23.41	22.27	20.45	19.02	16.20	15.04
3	10.09	09.03	07.34	06.49	05.08	03.41	03.31	04.51	06.21	07.43	08.13	09.41
	15.04	16.30	17.56	20.25	21.53	23.21	23.40	22.24	20.41	18.59	16.17	15.02
4	10.08	09.00	07.31	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.28	21.56	23.24	23.39	22.20	20.38	18.55	16.14	15.00
5	10.07	08.57	07.27	06.42	05.01	03.37	03.35	04.57	06.26	07.49	08.19	09.46
	15.08	16.37	18.02	20.30	21.59	23.26	23.37	22.17	20.34	18.52	16.11	14.59
6	10.06	08.54	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.10	16.40	18.05	20.33	22.02	23.28	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.51	07.21	06.35	04.55	03.33	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.05	23.30	23.34	22.11	20.28	18.45	16.05	14.56
8	10.03	08.48	07.17	06.32	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.53
	15.15	16.46	18.11	20.39	22.08	23.32	23.32	22.08	20.24	18.42	16.02	14.55
9	10.01	08.45	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.32	09.55
	15.17	16.49	18.14	20.42	22.11	23.34	23.30	22.05	20.21	18.38	16.00	14.53
10	10.00	08.42	07.11	06.25	04.46	03.29	03.45	05.12	06.40	08.03	08.35	09.57
	15.20	16.52	18.16	20.45	22.14	23.36	23.28	22.01	20.17	18.35	15.57	14.52
11	09.58	08.39	07.07	06.21	04.43	03.27	03.47	05.15	06.43	08.05	08.38	09.58
	15.22	16.55	18.19	20.48	22.17	23.37	23.26	21.58	20.14	18.32	15.54	14.51
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.41	10.00
	15.25	16.59	18.22	20.50	22.20	23.39	23.24	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.15	04.36	03.25	03.52	05.21	06.48	08.11	08.44	10.02
	15.27	17.02	18.25	20.53	22.23	23.40	23.22	21.52	20.07	18.25	15.48	14.50
14	09.53	08.29	06.57	06.11	04.33	03.24	03.55	05.23	06.51	08.14	08.47	10.03
	15.30	17.05	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.45	14.49
15	09.51	08.26	06.54	06.08	04.30	03.23	03.57	05.26	06.54	08.17	08.50	10.05
	15.33	17.08	18.31	20.59	22.29	23.43	23.17	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.27	03.22	04.00	05.29	06.56	08.20	08.53	10.06
	15.36	17.11	18.34	21.02	22.32	23.44	23.15	21.42	19.57	18.15	15.40	14.48
17	09.46	08.20	06.47	06.01	04.25	03.22	04.02	05.32	06.59	08.23	08.56	10.07
	15.39	17.14	18.36	21.05	22.35	23.45	23.12	21.39	19.53	18.12	15.37	14.48
18	09.44	08.17	06.43	05.58	04.22	03.21	04.05	05.35	07.02	08.25	08.59	10.09
	15.41	17.17	18.39	21.08	22.38	23.45	23.10	21.35	19.50	18.08	15.35	14.48
19	09.42	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.05	08.28	09.02	10.10
	15.44	17.20	18.42	21.11	22.41	23.46	23.07	21.32	19.46	18.05	15.32	14.48
20	09.40	08.10	06.37	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.44	23.46	23.04	21.29	19.43	18.02	15.30	14.48
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.17	22.47	23.47	23.02	21.25	19.40	17.59	15.27	14.49
22	09.35	08.04	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.11	10.12
	15.53	17.29	18.51	21.20	22.49	23.47	22.59	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.21	04.19	05.49	07.15	08.40	09.14	10.12
	15.56	17.32	18.53	21.23	22.52	23.47	22.56	21.19	19.33	17.52	15.22	14.50
24	09.30	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.17	10.13
	15.59	17.35	18.56	21.26	22.55	23.47	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.20	10.13
	16.02	17.38	18.59	21.29	22.58	23.47	22.50	21.12	19.26	16.46	15.18	14.51
26	09.25	07.51	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.13
	16.05	17.41	19.02	21.32	23.01	23.46	22.48	21.08	19.22	16.42	15.15	14.52
27	09.22	07.47	06.13	05.28	03.57	03.24	04.30	06.01	07.26	07.52	09.25	10.13
	16.09	17.44	19.05	21.35	23.03	23.46	22.45	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.28	10.13
	16.12	17.47	19.08	21.38	23.06	23.45	22.42	21.02	19.16	16.36	15.11	14.54
29	09.17		07.06	05.21	03.52	03.26	04.36	06.07	07.32	07.58	09.31	10.12
	16.15		20.10	21.41	23.09	23.44	22.39	20.58	19.12	16.33	15.09	14.55
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.12
	16.18		20.13	21.44	23.11	23.43	22.36	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.14		22.33	20.51		16.27		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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)

Licensed user:
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Stephanitorsbollwerk 3 (Haus LUV)
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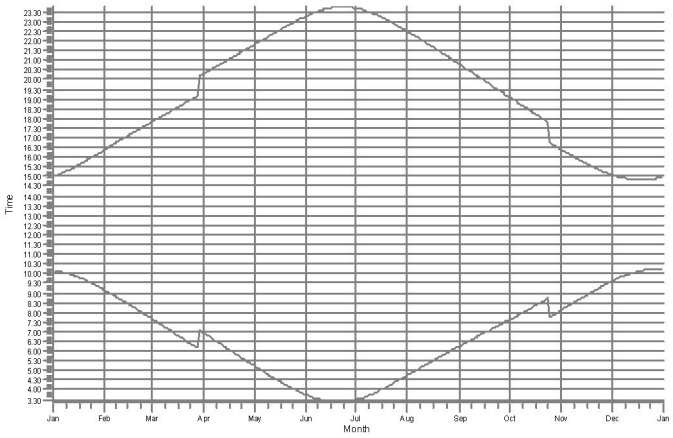
+49 7142 77810
Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

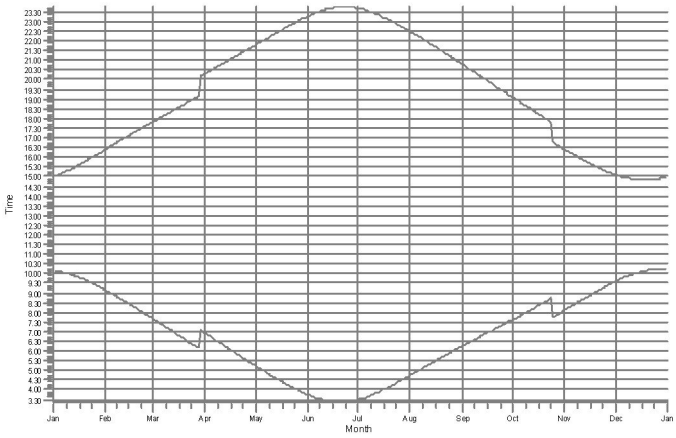
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

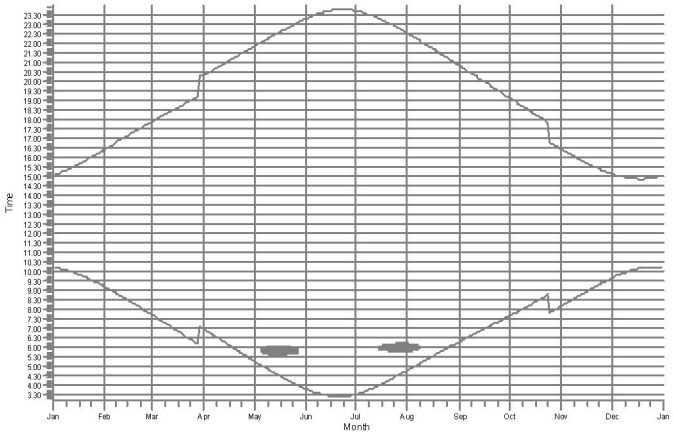
HH01: HH01



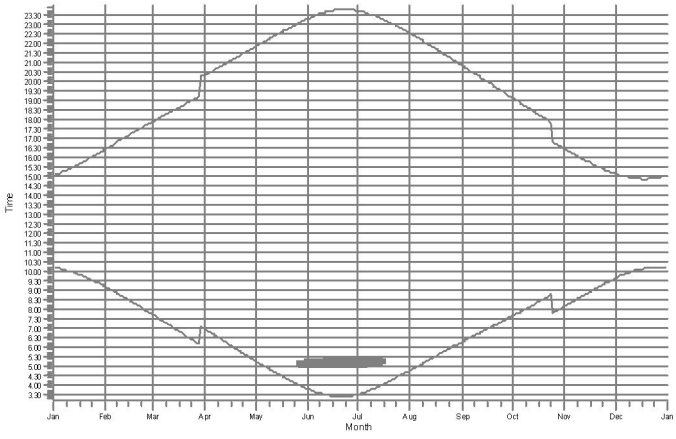
HH02: HH02



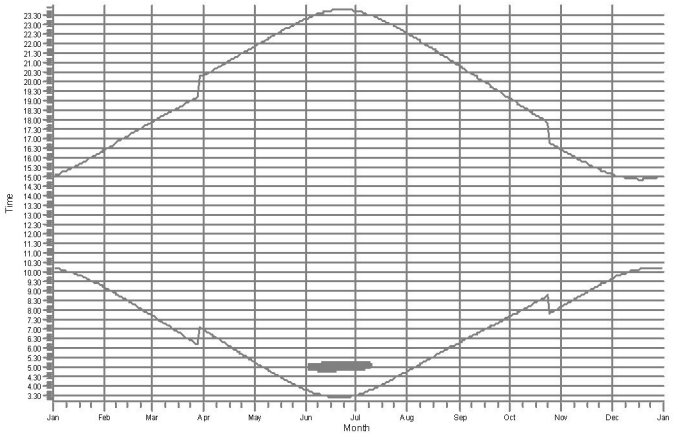
RH01: RH01



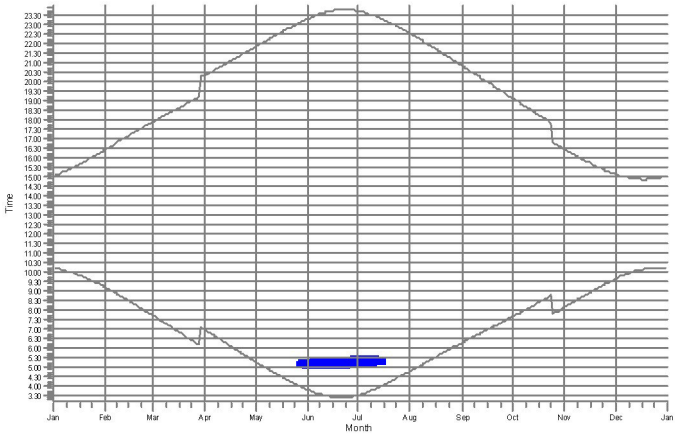
RH02: RH02



RH03: RH03



RH04: RH04



WTGs

3: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)

4: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

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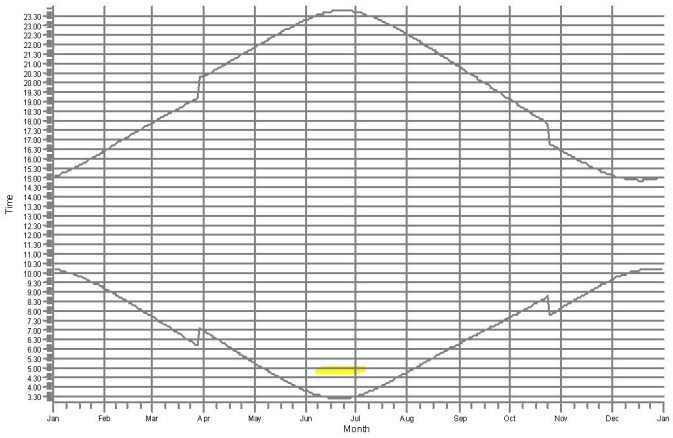
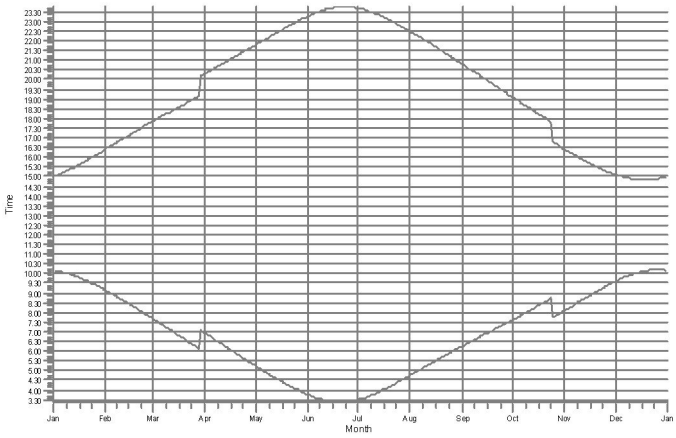
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

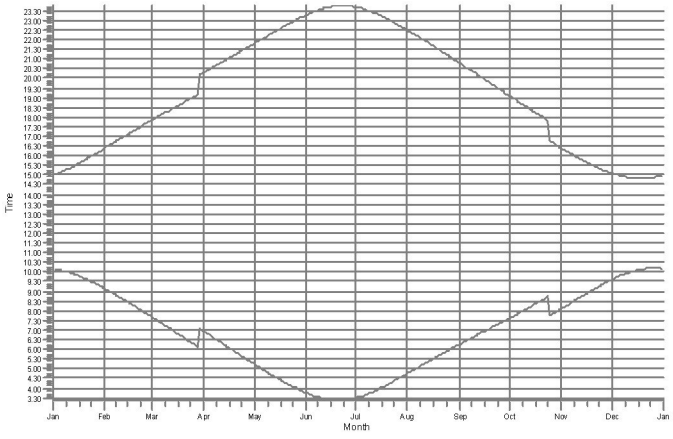
RH05: RH05



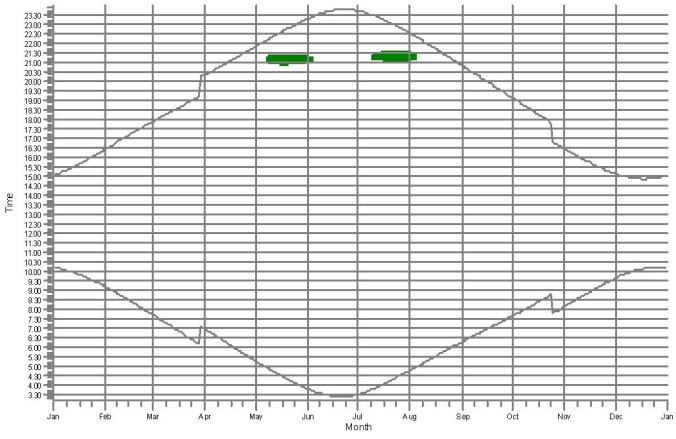
RH06: RH06



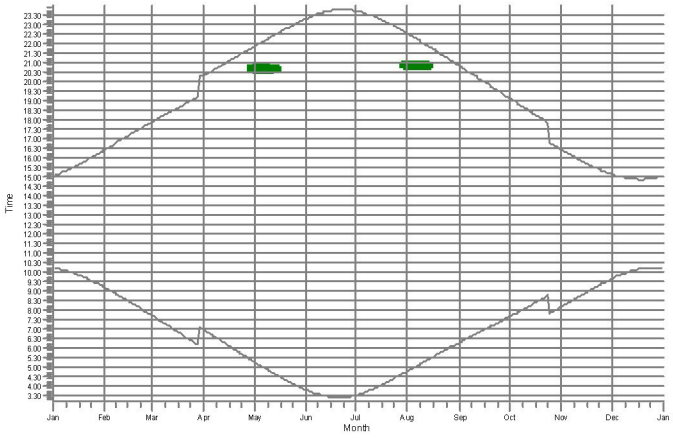
RH07: RH07



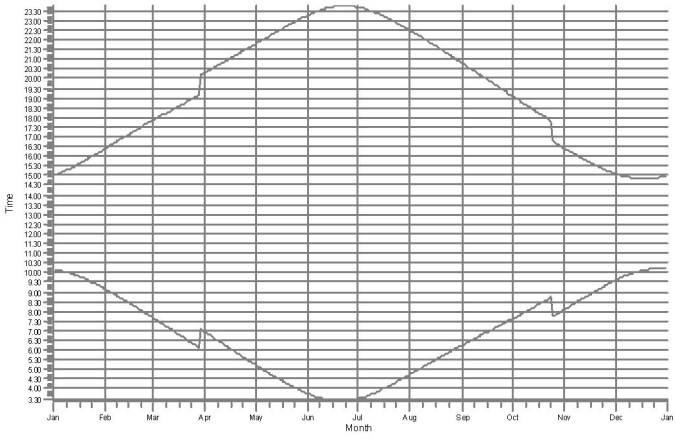
RH08: RH08



RH09: RH09



RH10: RH10



WTGs

1: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)

2: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

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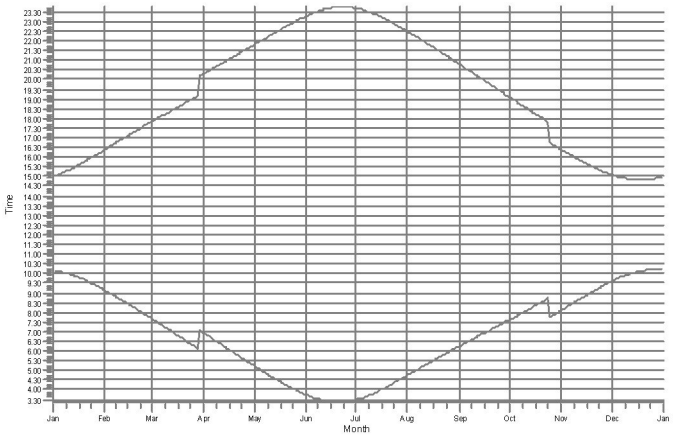
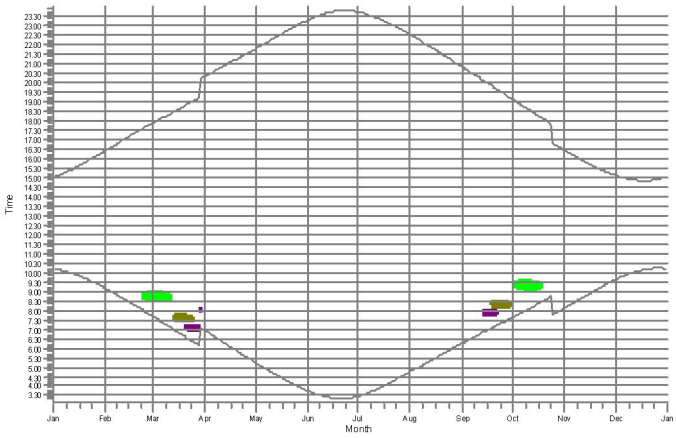
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

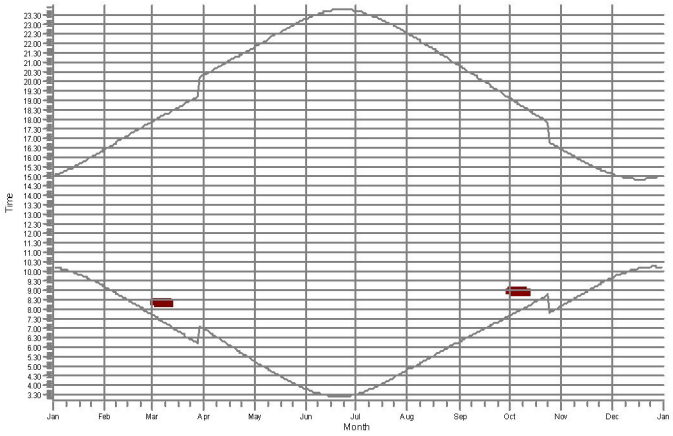
RH11: RH11



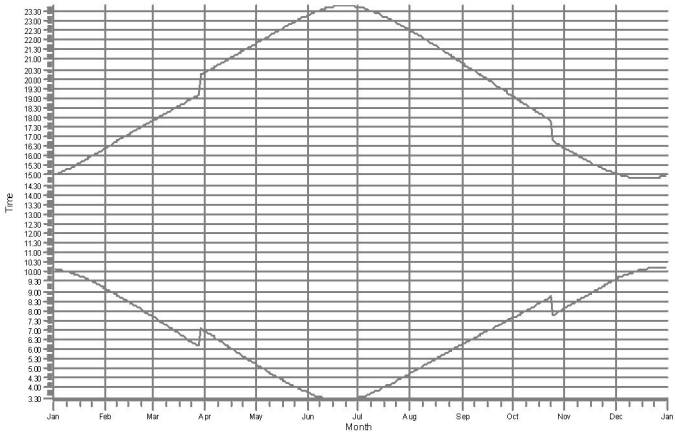
RH12: RH12



RH13: RH13



RH14: RH14



WTGs

8: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)
Lotlax 1: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (335)
Lotlax 2: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)
Lotlax 3: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)

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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 1 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14 20.31-20.49/18	03.45 21.01-21.12/11	03.29	04.45 20.40-20.58/18	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.41	22.29 21.07-21.25/18	20.48	19.05	16.23	15.06
2	10.09	09.05	07.37	06.52	05.11 20.30-20.49/19	03.43 21.03-21.11/8	03.30	04.48 20.39-20.59/20	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26 21.08-21.24/16	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08 20.29-20.50/21	03.41 21.06-21.10/4	03.32	04.51 20.39-20.59/20	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.20	23.39	22.23 21.10-21.23/13	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05 20.28-20.50/22	03.39	03.33	04.54 20.38-20.59/21	06.23	07.45	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20 21.11-21.21/10	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02 20.28-20.50/22	03.37	03.35	04.57 20.38-21.00/22	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58 20.28-20.50/22	03.35	03.37	05.00 20.37-20.59/22	06.29	07.51	08.22	09.47
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55 20.28-20.50/22	03.34	03.39	05.03 20.38-21.00/22	06.31	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 20.28-20.50/22	03.32	03.41	05.06 20.37-20.59/22	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07 21.03-21.09/6	23.31	23.31	22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49 20.28-20.49/21	03.30	03.43	05.09 20.38-20.59/21	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10 21.00-21.11/11	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46 20.29-20.49/20	03.29	03.45 21.12-21.18/6	05.12 20.38-20.59/21	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13 20.59-21.14/15	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43 20.29-20.48/19	03.28	03.48 21.11-21.20/9	05.15 20.38-20.58/20	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16 20.57-21.14/17	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.03	06.18	04.40 20.29-20.47/18	03.26	03.50 21.09-21.21/12	05.18 20.39-20.57/18	06.45	08.08	08.40	09.59
	15.25	16.59	18.22	20.50	22.19 20.56-21.15/19	23.38	23.23	21.54	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 20.31-20.47/16	03.25	03.52 21.08-21.22/14	05.21 20.40-20.55/15	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22 20.56-21.16/20	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34 20.32-20.45/13	03.24	03.55 21.08-21.23/15	05.23 20.41-20.54/13	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25 20.55-21.16/21	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 20.34-20.44/10	03.24	03.57 21.07-21.24/17	05.26 20.44-20.51/7	06.53	08.16	08.49	10.04
	15.33	17.08	18.31	20.59	22.28 20.55-21.17/22	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28 20.36-20.41/5	03.23	04.00 21.07-21.25/18	05.29	06.56	08.19	08.52	10.05
	15.36	17.11	18.33	21.02	22.31 20.54-21.17/23	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25 20.54-21.17/23	03.22	04.03 21.06-21.25/19	05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.49
18	09.44	08.16	06.43	05.57	04.22 20.55-21.18/23	03.22	04.05 21.06-21.26/20	05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 20.54-21.17/23	03.21	04.08 21.05-21.26/21	05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16 20.54-21.17/23	03.21	04.11 21.05-21.26/21	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13 20.55-21.17/22	03.21	04.13 21.05-21.27/22	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.29	05.44	04.10 20.55-21.17/22	03.21	04.16 21.05-21.27/22	05.47	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 20.56-21.17/21	03.22	04.19 21.05-21.27/22	05.49	07.15	08.40	09.13	10.11
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05 20.56-21.17/21	03.22	04.22 21.04-21.27/23	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02 20.56-21.17/21	03.23	04.25 21.05-21.28/23	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 20.57-21.16/19	03.23	04.28 21.05-21.27/22	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.16	14.52
27	09.21	07.47	06.12	05.27	03.57 20.57-21.16/19	03.24	04.31 21.05-21.28/23	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24 20.35-20.44/9	03.55 20.58-21.15/17	03.25	04.33 20.45-20.53/8	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.05	23.44	22.41 21.05-21.27/22	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21 20.33-20.46/13	03.52 20.59-21.14/15	03.26	04.36 20.43-20.55/12	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.43	22.38 21.05-21.27/22	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18 20.31-20.47/16	03.50 21.00-21.14/14	03.27	04.39 20.42-20.57/15	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35 21.06-21.27/21	20.54	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 21.01-21.13/12		04.42 20.41-20.57/16	06.12		08.04		10.11
	16.21		20.16		23.13		22.32 21.06-21.26/20	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	38	739	23	465	339	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: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 2 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45		03.29	04.48-04.58/10	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16		23.42		22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43		03.30	04.48-04.58/10	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18		23.40		22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.48	05.08	03.41		03.32	04.50-04.58/8	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21		23.39		22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39		03.33	04.51-04.57/6	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23		23.38		22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37		03.35	04.53-04.55/2	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25		23.36		22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35		03.37		05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27		23.35		22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34		03.39		05.03	06.31	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29		23.33		22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	04.46-04.51/5	03.41		05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31		23.31		22.07	20.24	18.41	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	04.45-04.52/7	03.43		05.09	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33		23.29		22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	04.44-04.53/9	03.45		05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35		23.27		22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28	04.43-04.54/11	03.48		05.15	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36		23.25		21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	04.44-04.55/11	03.50		05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38		23.23		21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	04.43-04.55/12	03.52		05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39		23.21		21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	04.44-04.56/12	03.55		05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41		23.19		21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	04.43-04.56/13	03.57		05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42		23.16		21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.43-04.57/14	04.00		05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43		23.14		21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22	04.43-04.58/15	04.03		05.32	06.59	08.22	08.55	10.07
	15.39	17.14	18.36	21.05	22.34	23.44		23.11		21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.44-04.58/14	04.05		05.35	07.02	08.25	08.58	10.08
	15.42	17.17	18.39	21.08	22.37	23.44		23.09		21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.44-04.58/14	04.08		05.38	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45		23.06		21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.44-04.59/15	04.11		05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46		23.04		21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.44-04.59/15	04.13		05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46		23.01		21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.44-04.59/15	04.16		05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46		22.58		21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.44-04.59/15	04.19		05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46		22.56		21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.45-04.59/14	04.22		05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46		22.53		21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23	04.45-04.59/14	04.25		05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46		22.50		21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.45-04.59/14	04.28		05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.45		22.47		21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.27	03.57	03.24	04.46-05.00/14	04.31		06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45		22.44		21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.47-05.00/13	04.33		06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44		22.41		21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.46-04.59/13	04.36		06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44		22.38		20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.47-04.59/12	04.39		06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43		22.35		20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48			04.42		06.12		08.04		10.11
	16.21		20.16		23.13			22.32		20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	0	291		36		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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 3 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45 04.59-05.17/18	03.29 05.02-05.25/23	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43 04.58-05.17/19	03.30 05.03-05.26/23	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41 04.58-05.18/20	03.32 05.03-05.26/23	04.51	06.20	07.43	08.13	09.40
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39 04.58-05.19/21	03.33 05.03-05.26/23	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37 04.58-05.19/21	03.35 05.03-05.25/22	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35 04.58-05.19/21	03.37 05.04-05.26/22	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34 04.58-05.20/22	03.39 05.04-05.25/21	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32 04.58-05.20/22	03.41 05.05-05.26/21	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30 04.58-05.20/22	03.43 05.05-05.25/20	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29 04.58-05.20/22	03.45 05.06-05.25/19	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.57	08.38	07.07	06.21	04.43	03.28 04.59-05.22/23	03.48 05.06-05.25/19	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26 04.58-05.21/23	03.50 05.07-05.25/18	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25 04.58-05.21/23	03.52 05.07-05.24/17	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24 04.59-05.22/23	03.55 05.08-05.23/15	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24 04.58-05.22/24	03.57 05.09-05.23/14	05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23 04.59-05.22/23	04.00 05.10-05.22/12	05.29	06.56	08.19	08.52	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22 04.59-05.23/24	04.03 05.12-05.20/8	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22 05.00-05.23/23	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21 05.00-05.23/23	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21 05.00-05.23/23	04.11	05.41	07.07	08.31	09.04	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21 05.00-05.24/24	04.14	05.44	07.10	08.34	09.07	10.10
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21 05.00-05.24/24	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22 05.00-05.23/23	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22 05.01-05.24/23	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23 05.00-05.24/24	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 05.04-05.10/6	03.23 05.01-05.24/23	04.28	05.58	07.23	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57 05.02-05.12/10	03.24 05.02-05.25/23	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55 05.01-05.13/12	03.25 05.02-05.25/23	04.34	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52 05.01-05.15/14	03.26 05.01-05.25/24	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 05.00-05.16/16	03.27 05.02-05.25/23	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 04.59-05.16/17		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	75	674	320	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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 4 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.46 04.56-05.14/18	03.29 04.52-05.23/31	04.45 05.46-06.06/20	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43 04.55-05.14/19	03.30 04.53-05.24/31	04.48 05.47-06.06/19	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.40	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41 04.53-05.16/23	03.32 04.53-05.23/30	04.51 05.47-06.05/18	06.21	07.43	08.13	09.41
	15.04	16.31	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39 04.51-05.16/25	03.33 04.54-05.23/29	04.54 05.49-06.04/15	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.01
5	10.06	08.56	07.27	06.42	05.02	03.37 04.50-05.16/26	03.35 04.54-05.23/29	04.57 05.49-06.03/14	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58 05.44-05.50/6	03.35 04.49-05.17/28	03.37 04.56-05.23/27	05.00 05.51-06.01/10	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.58
7	10.04	08.50	07.20	06.35	04.55 05.41-05.52/11	03.34 04.49-05.17/28	03.39 04.56-05.23/27	05.03 05.55-05.57/2	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52 05.39-05.53/14	03.32 04.49-05.18/29	03.41 04.58-05.23/25	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49 05.38-05.55/17	03.31 04.48-05.18/30	03.43 04.58-05.22/24	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46 05.37-05.55/18	03.29 04.48-05.18/30	03.45 05.01-05.22/21	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43 05.36-05.55/19	03.28 04.48-05.19/31	03.48 05.04-05.22/18	05.15	06.43	08.05	08.37	09.58
	15.22	16.56	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40 05.36-05.56/20	03.26 04.48-05.19/31	03.50 05.05-05.22/17	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37 05.36-05.56/20	03.25 04.48-05.19/31	03.53 05.05-05.21/16	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34 05.36-05.57/21	03.24 04.48-05.20/32	03.55 05.06-05.20/14	05.24	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.22	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31 05.35-05.56/21	03.24 04.48-05.20/32	03.58 05.07-05.19/12	05.26	06.54	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28 05.36-05.57/21	03.23 04.48-05.20/32	04.00 05.09-05.18/9	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14 05.54-05.57/3	21.42	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25 05.35-05.56/21	03.22 04.48-05.21/33	04.03 05.12-05.15/3	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11 05.51-05.59/8	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22 05.36-05.56/20	03.22 04.48-05.21/33	04.05 05.51-06.02/11	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19 05.36-05.56/20	03.21 04.49-05.21/32	04.08 05.50-06.03/13	05.38	07.04	08.28	09.02	10.09
	15.45	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.49
20	09.39	08.10	06.36	05.51	04.16 05.36-05.55/19	03.21 04.49-05.21/32	04.11 05.49-06.04/15	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13 05.37-05.55/18	03.21 04.49-05.21/32	04.14 05.48-06.04/16	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.11 05.37-05.55/18	03.21 04.49-05.21/32	04.16 05.47-06.05/18	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08 05.38-05.54/16	03.22 04.50-05.22/32	04.19 05.47-06.06/19	05.50	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.33	17.52	15.22	14.50
24	09.29	07.57	06.23	05.38	04.05 05.39-05.53/14	03.22 04.50-05.22/32	04.22 05.47-06.06/19	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02 05.40-05.52/12	03.23 04.49-05.22/33	04.25 05.46-06.06/20	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00 05.42-05.51/9	03.23 04.50-05.22/32	04.28 05.47-06.07/20	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57 05.01-05.08/7	03.24 04.51-05.23/32	04.31 05.46-06.07/21	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03 05.43-05.49/6	23.45	22.44	21.05	19.19	16.39	15.14	14.53
28	09.19	07.44	06.09	05.24	03.55 04.59-05.10/11	03.25 04.51-05.23/32	04.34 05.46-06.07/21	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.55
29	09.16		07.06	05.21	03.52 04.58-05.12/14	03.26 04.51-05.22/31	04.36 05.46-06.07/21	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50 04.57-05.12/15	03.27 04.51-05.23/32	04.39 05.46-06.07/21	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48 04.56-05.13/17		04.42 05.47-06.07/20	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	425	895	629	98	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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 5 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.21	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.21	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.31	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.11	20.39	22.07	23.31	23.31	22.08	20.24	18.42	16.03	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.18	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.21	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.56	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.32	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.40	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.24	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.22	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.24	03.57	05.26	06.54	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.34	21.02	22.31	23.43	23.14	21.42	19.57	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.12	21.38	19.53	18.12	15.37	14.49
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.48	04.13	03.21	04.14	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.59	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.51	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.50	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.33	17.52	15.22	14.50
24	09.29	07.57	06.23	05.38	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.51
25	09.27	07.54	06.19	05.34	04.02	03.23	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.12
	16.06	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.13	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.14	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.34	06.04	07.29	07.55	09.28	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.07	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 6 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.35
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.03	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.07	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.39	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	03.57	05.26	06.53	08.17	08.49	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.15	15.40	14.49
17	09.46	08.19	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.11	21.38	19.53	18.12	15.37	14.48
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.07	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.23	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.27	10.12
	16.12	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.13		07.02	05.18	03.50	03.27	04.39	06.09	07.34	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 7 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.29	04.45	06.15	07.37	08.07	09.36
	15.01	16.24	17.50	20.19	21.46	23.16	23.42	22.29	20.48	19.05	16.24	15.06
2	10.09	09.05	07.37	06.52	05.11	03.43	03.30	04.48	06.18	07.40	08.10	09.38
	15.02	16.27	17.53	20.22	21.49	23.18	23.41	22.26	20.44	19.02	16.20	15.04
3	10.08	09.02	07.34	06.49	05.08	03.41	03.32	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.02
4	10.07	08.59	07.30	06.45	05.05	03.39	03.33	04.54	06.23	07.46	08.16	09.43
	15.06	16.34	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.06	08.56	07.27	06.42	05.02	03.37	03.35	04.57	06.26	07.48	08.19	09.45
	15.08	16.37	18.02	20.30	21.58	23.25	23.36	22.17	20.34	18.52	16.11	14.59
6	10.05	08.53	07.24	06.38	04.58	03.35	03.37	05.00	06.29	07.51	08.22	09.48
	15.11	16.40	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.34	03.39	05.03	06.32	07.54	08.25	09.50
	15.13	16.43	18.08	20.36	22.04	23.29	23.33	22.11	20.27	18.45	16.05	14.56
8	10.02	08.47	07.17	06.31	04.52	03.32	03.41	05.06	06.34	07.57	08.28	09.52
	15.15	16.46	18.10	20.39	22.07	23.31	23.31	22.08	20.24	18.42	16.02	14.55
9	10.01	08.44	07.14	06.28	04.49	03.30	03.43	05.09	06.37	08.00	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.33	23.29	22.04	20.20	18.38	16.00	14.54
10	09.59	08.41	07.10	06.25	04.46	03.29	03.45	05.12	06.40	08.02	08.34	09.56
	15.20	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.35	15.57	14.53
11	09.58	08.38	07.07	06.21	04.43	03.28	03.48	05.15	06.43	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.14	18.31	15.54	14.52
12	09.56	08.35	07.04	06.18	04.40	03.26	03.50	05.18	06.45	08.08	08.40	10.00
	15.25	16.59	18.22	20.50	22.19	23.38	23.23	21.55	20.10	18.28	15.51	14.51
13	09.54	08.32	07.00	06.14	04.37	03.25	03.52	05.21	06.48	08.11	08.43	10.01
	15.28	17.02	18.25	20.53	22.22	23.40	23.21	21.51	20.07	18.25	15.48	14.50
14	09.52	08.29	06.57	06.11	04.34	03.24	03.55	05.23	06.51	08.14	08.46	10.03
	15.30	17.05	18.28	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.50
15	09.50	08.26	06.53	06.08	04.31	03.23	03.57	05.26	06.53	08.17	08.50	10.04
	15.33	17.08	18.31	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.43	14.49
16	09.48	08.23	06.50	06.04	04.28	03.23	04.00	05.29	06.56	08.19	08.53	10.06
	15.36	17.11	18.33	21.02	22.31	23.43	23.14	21.42	19.56	18.15	15.40	14.49
17	09.46	08.20	06.47	06.01	04.25	03.22	04.03	05.32	06.59	08.22	08.56	10.07
	15.39	17.14	18.36	21.05	22.34	23.44	23.12	21.38	19.53	18.12	15.37	14.48
18	09.44	08.16	06.43	05.58	04.22	03.22	04.05	05.35	07.02	08.25	08.59	10.08
	15.42	17.17	18.39	21.08	22.37	23.45	23.09	21.35	19.50	18.08	15.35	14.48
19	09.41	08.13	06.40	05.54	04.19	03.21	04.08	05.38	07.04	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.45	23.06	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.51	04.16	03.21	04.11	05.41	07.07	08.31	09.05	10.10
	15.47	17.23	18.45	21.14	22.43	23.46	23.04	21.28	19.43	18.02	15.30	14.49
21	09.37	08.07	06.33	05.47	04.13	03.21	04.13	05.44	07.10	08.34	09.08	10.11
	15.50	17.26	18.48	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.49
22	09.34	08.03	06.30	05.44	04.10	03.21	04.16	05.47	07.13	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.22	19.36	17.55	15.25	14.49
23	09.32	08.00	06.26	05.41	04.08	03.22	04.19	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.56	21.18	19.32	17.52	15.22	14.50
24	09.29	07.57	06.23	05.37	04.05	03.22	04.22	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.49	15.20	14.50
25	09.27	07.54	06.19	05.34	04.02	03.22	04.25	05.55	07.21	07.46	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.18	14.51
26	09.24	07.50	06.16	05.31	04.00	03.23	04.28	05.58	07.24	07.49	09.22	10.12
	16.05	17.41	19.02	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.16	14.52
27	09.22	07.47	06.12	05.28	03.57	03.24	04.31	06.01	07.26	07.52	09.25	10.12
	16.09	17.44	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09	05.24	03.55	03.25	04.33	06.04	07.29	07.55	09.28	10.12
	16.12	17.47	19.07	21.37	23.06	23.45	22.41	21.01	19.15	16.36	15.11	14.54
29	09.16		07.06	05.21	03.52	03.26	04.36	06.06	07.32	07.58	09.30	10.12
	16.15		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.33	15.09	14.56
30	09.14		07.02	05.18	03.50	03.27	04.39	06.09	07.35	08.01	09.33	10.11
	16.18		20.13	21.43	23.11	23.43	22.35	20.55	19.09	16.30	15.07	14.57
31	09.11		06.59		03.48		04.42	06.12		08.04		10.11
	16.21		20.16		23.13		22.32	20.51		16.27		14.59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types) **WTG:** 8 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March		April	May	June	July	August	September		October		November	December
1	10.10	09.08	07.40	08.16-08.22/6	06.55	05.14	03.45	03.28	04.45	06.15		07.37	08.49-09.02/13	08.07	09.36
	15.01	16.24	17.50		20.19	21.46	23.16	23.42	22.29	20.48		19.05		16.23	15.05
2	10.10	09.05	07.37	08.13-08.25/12	06.52	05.11	03.43	03.30	04.48	06.18		07.40	08.47-09.04/17	08.10	09.38
	15.02	16.27	17.53		20.22	21.49	23.19	23.41	22.26	20.44		19.02		16.20	15.04
3	10.09	09.02	07.34	08.11-08.27/16	06.49	05.08	03.41	03.31	04.51	06.20		07.43	08.46-09.04/18	08.13	09.41
	15.04	16.30	17.56		20.24	21.52	23.21	23.40	22.23	20.41		18.58		16.17	15.02
4	10.08	08.59	07.31	08.09-08.27/18	06.45	05.05	03.39	03.33	04.54	06.23		07.46	08.45-09.05/20	08.16	09.43
	15.06	16.34	17.59		20.27	21.55	23.23	23.38	22.20	20.38		18.55		16.14	15.00
5	10.06	08.56	07.27	08.09-08.28/19	06.42	05.01	03.37	03.35	04.57	06.26		07.48	08.44-09.04/20	08.19	09.46
	15.08	16.37	18.02		20.30	21.58	23.25	23.37	22.17	20.34		18.52		16.11	14.59
6	10.05	08.53	07.24	08.08-08.28/20	06.38	04.58	03.35	03.37	05.00	06.29		07.51	08.43-09.04/21	08.22	09.48
	15.10	16.40	18.05		20.33	22.01	23.28	23.35	22.14	20.31		18.48		16.08	14.57
7	10.04	08.51	07.20	08.08-08.28/20	06.35	04.55	03.33	03.39	05.03	06.32		07.54	08.43-09.04/21	08.25	09.50
	15.13	16.43	18.08		20.36	22.04	23.30	23.33	22.11	20.27		18.45		16.05	14.56
8	10.03	08.47	07.17	08.07-08.28/21	06.31	04.52	03.32	03.41	05.06	06.34		07.57	08.43-09.03/20	08.28	09.52
	15.15	16.46	18.10		20.39	22.07	23.32	23.31	22.08	20.24		18.42		16.02	14.55
9	10.01	08.44	07.14	08.08-08.28/20	06.28	04.49	03.30	03.43	05.09	06.37		08.00	08.44-09.02/18	08.31	09.54
	15.17	16.49	18.13		20.42	22.10	23.33	23.30	22.04	20.21		18.38		15.59	14.54
10	09.59	08.41	07.10	08.07-08.26/19	06.25	04.46	03.29	03.45	05.12	06.40		08.02	08.44-09.01/17	08.34	09.56
	15.20	16.52	18.16		20.45	22.14	23.35	23.28	22.01	20.17		18.35		15.57	14.52
11	09.58	08.38	07.07	08.08-08.26/18	06.21	04.43	03.27	03.47	05.15	06.43		08.05	08.45-09.00/15	08.37	09.58
	15.22	16.55	18.19		20.47	22.17	23.37	23.26	21.58	20.14		18.31		15.54	14.52
12	09.56	08.35	07.04	08.09-08.24/15	06.18	04.40	03.26	03.50	05.18	06.45		08.08	08.47-08.57/10	08.40	10.00
	15.25	16.59	18.22		20.50	22.20	23.38	23.23	21.55	20.10		18.28		15.51	14.51
13	09.54	08.32	07.00	08.11-08.22/11	06.14	04.36	03.25	03.52	05.20	06.48		08.11		08.44	10.01
	15.27	17.02	18.25		20.53	22.23	23.40	23.21	21.51	20.07		18.25		15.48	14.50
14	09.52	08.29	06.57		06.11	04.33	03.24	03.55	05.23	06.51		08.14		08.47	10.03
	15.30	17.05	18.28		20.56	22.26	23.41	23.19	21.48	20.03		18.21		15.45	14.49
15	09.50	08.26	06.53		06.08	04.30	03.23	03.57	05.26	06.53		08.17		08.50	10.05
	15.33	17.08	18.31		20.59	22.29	23.42	23.17	21.45	20.00		18.18		15.43	14.49
16	09.48	08.23	06.50		06.04	04.27	03.22	04.00	05.29	06.56		08.19		08.53	10.06
	15.36	17.11	18.33		21.02	22.32	23.43	23.14	21.42	19.57		18.15		15.40	14.49
17	09.46	08.20	06.47		06.01	04.25	03.22	04.02	05.32	06.59		08.22		08.56	10.07
	15.39	17.14	18.36		21.05	22.35	23.44	23.12	21.38	19.53		18.12		15.37	14.48
18	09.44	08.16	06.43		05.57	04.22	03.21	04.05	05.35	07.02		08.25		08.59	10.08
	15.41	17.17	18.39		21.08	22.37	23.45	23.09	21.35	19.50		18.08		15.35	14.48
19	09.42	08.13	06.40		05.54	04.19	03.21	04.08	05.38	07.04		08.28		09.02	10.09
	15.44	17.20	18.42		21.11	22.40	23.46	23.07	21.32	19.46		18.05		15.32	14.48
20	09.39	08.10	06.36		05.51	04.16	03.21	04.11	05.41	07.07		08.31		09.05	10.10
	15.47	17.23	18.45		21.14	22.43	23.46	23.04	21.28	19.43		18.02		15.30	14.48
21	09.37	08.07	06.33		05.47	04.13	03.21	04.13	05.44	07.10		08.34		09.08	10.11
	15.50	17.26	18.48		21.17	22.46	23.46	23.01	21.25	19.39		17.58		15.27	14.49
22	09.35	08.03	06.30		05.44	04.10	03.21	04.16	05.47	07.13		08.37		09.11	10.11
	15.53	17.29	18.50		21.19	22.49	23.47	22.59	21.22	19.36		17.55		15.25	14.49
23	09.32	08.00	06.26		05.41	04.08	03.21	04.19	05.49	07.15		08.40		09.14	10.12
	15.56	17.32	18.53		21.22	22.52	23.47	22.56	21.18	19.33		17.52		15.22	14.50
24	09.30	07.57	06.23		05.37	04.05	03.22	04.22	05.52	07.18		08.43		09.16	10.12
	15.59	17.35	18.56		21.25	22.55	23.47	22.53	21.15	19.29		17.49		15.20	14.50
25	09.27	07.54	06.19		05.34	04.02	03.22	04.25	05.55	07.21		07.46		09.19	10.12
	16.02	17.38	18.59		21.28	22.58	23.46	22.50	21.12	19.26		16.46		15.18	14.51
26	09.24	07.50	06.16		05.31	04.00	03.23	04.28	05.58	07.24		07.49		09.22	10.13
	16.05	17.41	19.02		21.31	23.00	23.46	22.47	21.08	19.22		16.42		15.15	14.52
27	09.22	07.47	06.12		05.27	03.57	03.24	04.30	06.01	07.26		07.52		09.25	10.12
	16.08	17.44	19.05		21.34	23.03	23.45	22.44	21.05	19.19		16.39		15.13	14.53
28	09.19	07.44	06.09		05.24	03.55	03.25	04.33	06.04	07.29		07.55		09.28	10.12
	16.12	17.47	19.07		21.37	23.06	23.45	22.41	21.01	19.15		16.36		15.11	14.54
29	09.16		07.06		05.21	03.52	03.26	04.36	06.06	07.32		07.58		09.30	10.12
	16.15		20.10		21.40	23.08	23.44	22.39	20.58	19.12		16.33		15.09	14.56
30	09.14		07.02		05.18	03.50	03.27	04.39	06.09	07.35	08.52-09.00/8	08.01		09.33	10.12
	16.18		20.13		21.43	23.11	23.43	22.36	20.55	19.09		16.30		15.07	14.57
31	09.11		06.59			03.47		04.42	06.12			08.04			10.11
	16.21		20.16			23.14		22.33	20.51			16.27			14.58
Potential sun hours	182	242	363		447	559	605	594	502	392		308		206	151
Sum of minutes with flicker	0	0	215		0	0	0	0	0	8		210		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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Lotlax 1 - Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (335)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February		March		April	May	June	July	August	September	October		November	December
1	10.10	09.08		07.40	08.32-08.56/24	06.55	05.14	03.45	03.28	04.45	06.15	07.37		08.07	09.36
	15.00	16.24		17.50		20.19	21.46	23.16	23.42	22.30	20.48	19.05		16.23	15.05
2	10.10	09.05		07.37	08.32-08.57/25	06.52	05.11	03.43	03.29	04.48	06.17	07.40	09.17-09.25/8	08.10	09.38
	15.02	16.27		17.53		20.22	21.49	23.19	23.41	22.26	20.44	19.02		16.20	15.03
3	10.09	09.02		07.34	08.31-08.56/25	06.48	05.08	03.41	03.31	04.51	06.20	07.43	09.13-09.27/14	08.13	09.41
	15.04	16.30		17.56		20.24	21.52	23.21	23.40	22.23	20.41	18.58		16.17	15.02
4	10.08	08.59		07.30	08.31-08.57/26	06.45	05.04	03.39	03.33	04.54	06.23	07.46	09.11-09.29/18	08.16	09.43
	15.06	16.33		17.59		20.27	21.55	23.23	23.38	22.20	20.38	18.55		16.14	15.00
5	10.07	08.56		07.27	08.31-08.56/25	06.42	05.01	03.37	03.34	04.57	06.26	07.48	09.09-09.30/21	08.19	09.46
	15.08	16.36		18.02		20.30	21.58	23.26	23.37	22.17	20.34	18.51		16.11	14.58
6	10.05	08.53		07.24	08.31-08.56/25	06.38	04.58	03.35	03.36	05.00	06.29	07.51	09.08-09.31/23	08.22	09.48
	15.10	16.40		18.05		20.33	22.01	23.28	23.35	22.14	20.31	18.48		16.08	14.57
7	10.04	08.51		07.20	08.31-08.54/23	06.35	04.55	03.33	03.38	05.03	06.31	07.54	09.07-09.31/24	08.25	09.50
	15.12	16.43		18.07		20.36	22.04	23.30	23.33	22.11	20.27	18.45		16.05	14.56
8	10.03	08.47		07.17	08.32-08.54/22	06.31	04.52	03.31	03.40	05.06	06.34	07.57	09.07-09.31/24	08.28	09.52
	15.15	16.46		18.10		20.39	22.07	23.32	23.32	22.08	20.24	18.41		16.02	14.54
9	10.01	08.44		07.14	08.33-08.52/19	06.28	04.49	03.30	03.43	05.08	06.37	08.00	09.06-09.31/25	08.31	09.54
	15.17	16.49		18.13		20.42	22.11	23.34	23.30	22.04	20.20	18.38		15.59	14.53
10	10.00	08.41		07.10	08.34-08.50/16	06.24	04.45	03.28	03.45	05.11	06.40	08.02	09.06-09.31/25	08.34	09.56
	15.19	16.52		18.16		20.44	22.14	23.35	23.28	22.01	20.17	18.35		15.56	14.52
11	09.58	08.38		07.07	08.36-08.47/11	06.21	04.42	03.27	03.47	05.14	06.42	08.05	09.06-09.31/25	08.37	09.58
	15.22	16.55		18.19		20.47	22.17	23.37	23.26	21.58	20.14	18.31		15.53	14.51
12	09.56	08.35		07.04		06.18	04.39	03.26	03.49	05.17	06.45	08.08	09.06-09.30/24	08.40	10.00
	15.25	16.58		18.22		20.50	22.20	23.39	23.24	21.55	20.10	18.28		15.51	14.50
13	09.54	08.32		07.00		06.14	04.36	03.25	03.52	05.20	06.48	08.11	09.06-09.29/23	08.44	10.02
	15.27	17.01		18.25		20.53	22.23	23.40	23.21	21.51	20.07	18.25		15.48	14.50
14	09.52	08.29		06.57		06.11	04.33	03.24	03.54	05.23	06.51	08.14	09.06-09.28/22	08.47	10.03
	15.30	17.05		18.28		20.56	22.26	23.41	23.19	21.48	20.03	18.21		15.45	14.49
15	09.50	08.26		06.53		06.07	04.30	03.23	03.57	05.26	06.53	08.17	09.07-09.27/20	08.50	10.05
	15.33	17.08		18.30		20.59	22.29	23.42	23.17	21.45	20.00	18.18		15.42	14.49
16	09.48	08.23		06.50		06.04	04.27	03.22	03.59	05.29	06.56	08.19	09.08-09.25/17	08.53	10.06
	15.35	17.11		18.33		21.02	22.32	23.44	23.14	21.42	19.56	18.15		15.40	14.48
17	09.46	08.20		06.47		06.01	04.24	03.21	04.02	05.32	06.59	08.22	09.10-09.23/13	08.56	10.07
	15.38	17.14		18.36		21.05	22.35	23.44	23.12	21.38	19.53	18.11		15.37	14.48
18	09.44	08.16		06.43		05.57	04.21	03.21	04.05	05.35	07.02	08.25	09.15-09.19/4	08.59	10.08
	15.41	17.17		18.39		21.08	22.38	23.45	23.09	21.35	19.50	18.08		15.34	14.48
19	09.42	08.13		06.40		05.54	04.18	03.21	04.07	05.38	07.04	08.28		09.02	10.09
	15.44	17.20		18.42		21.11	22.41	23.46	23.07	21.32	19.46	18.05		15.32	14.48
20	09.39	08.10		06.36		05.51	04.16	03.20	04.10	05.41	07.07	08.31		09.05	10.10
	15.47	17.23		18.45		21.14	22.43	23.46	23.04	21.28	19.43	18.01		15.29	14.48
21	09.37	08.07		06.33		05.47	04.13	03.20	04.13	05.43	07.10	08.34		09.08	10.11
	15.50	17.26		18.48		21.16	22.46	23.47	23.01	21.25	19.39	17.58		15.27	14.48
22	09.35	08.03		06.29		05.44	04.10	03.21	04.16	05.46	07.12	08.37		09.11	10.12
	15.53	17.29		18.50		21.19	22.49	23.47	22.59	21.22	19.36	17.55		15.24	14.49
23	09.32	08.00		06.26		05.41	04.07	03.21	04.19	05.49	07.15	08.40		09.14	10.12
	15.56	17.32		18.53		21.22	22.52	23.47	22.56	21.18	19.32	17.52		15.22	14.49
24	09.30	07.57	08.41-08.49/8	06.23		05.37	04.05	03.21	04.21	05.52	07.18	08.43		09.16	10.12
	15.59	17.35		18.56		21.25	22.55	23.47	22.53	21.15	19.29	17.49		15.20	14.50
25	09.27	07.54	08.38-08.53/15	06.19		05.34	04.02	03.22	04.24	05.55	07.21	07.46		09.19	10.13
	16.02	17.38		18.59		21.28	22.58	23.47	22.50	21.12	19.26	16.45		15.17	14.51
26	09.24	07.50	08.36-08.54/18	06.16		05.31	03.59	03.22	04.27	05.58	07.23	07.49		09.22	10.13
	16.05	17.41		19.02		21.31	23.01	23.46	22.47	21.08	19.22	16.42		15.15	14.52
27	09.22	07.47	08.35-08.56/21	06.12		05.27	03.57	03.23	04.30	06.01	07.26	07.52		09.25	10.13
	16.08	17.44		19.05		21.34	23.03	23.46	22.44	21.05	19.19	16.39		15.13	14.53
28	09.19	07.44	08.33-08.56/23	06.09		05.24	03.54	03.24	04.33	06.03	07.29	07.55		09.28	10.12
	16.11	17.47		19.07		21.37	23.06	23.45	22.42	21.01	19.15	16.36		15.11	14.54
29	09.16			07.05		05.21	03.52	03.25	04.36	06.06	07.32	07.58		09.30	10.12
	16.14			20.10		21.40	23.09	23.44	22.39	20.58	19.12	16.33		15.09	14.55
30	09.14			07.02		05.17	03.49	03.27	04.39	06.09	07.34	08.01		09.33	10.12
	16.18			20.13		21.43	23.11	23.43	22.36	20.55	19.08	16.29		15.07	14.57
31	09.11			06.59			03.47		04.42	06.12		08.04			10.11
	16.21			20.16			23.14		22.33	20.51		16.26			14.58
Potential sun hours	182	242		363		447	559	605	594	502	392	308		206	151
Sum of minutes with flicker	0	85		241		0	0	0	0	0	0	330		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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Lotlax 2 - Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March		April	May	June	July	August	September		October	November	December
1	10.10	09.08	07.40		06.55	05.14	03.45	03.28	04.45	06.15		07.37	08.07	09.36
	15.00	16.24	17.50		20.19	21.46	23.16	23.42	22.30	20.48		19.05	16.23	15.05
2	10.10	09.05	07.37		06.52	05.11	03.43	03.29	04.48	06.17		07.40	08.10	09.38
	15.02	16.27	17.53		20.22	21.49	23.19	23.41	22.26	20.44		19.02	16.20	15.03
3	10.09	09.02	07.34		06.48	05.08	03.40	03.31	04.51	06.20		07.43	08.13	09.41
	15.04	16.30	17.56		20.24	21.52	23.21	23.40	22.23	20.41		18.58	16.17	15.01
4	10.08	08.59	07.30		06.45	05.04	03.38	03.33	04.54	06.23		07.45	08.16	09.43
	15.06	16.33	17.59		20.27	21.55	23.23	23.38	22.20	20.38		18.55	16.14	15.00
5	10.07	08.56	07.27		06.41	05.01	03.37	03.34	04.57	06.26		07.48	08.19	09.46
	15.08	16.36	18.02		20.30	21.58	23.26	23.37	22.17	20.34		18.51	16.11	14.58
6	10.05	08.53	07.24		06.38	04.58	03.35	03.36	05.00	06.29		07.51	08.22	09.48
	15.10	16.40	18.04		20.33	22.01	23.28	23.35	22.14	20.31		18.48	16.08	14.57
7	10.04	08.50	07.20		06.35	04.55	03.33	03.38	05.02	06.31		07.54	08.25	09.50
	15.12	16.43	18.07		20.36	22.04	23.30	23.33	22.11	20.27		18.45	16.05	14.56
8	10.03	08.47	07.17		06.31	04.52	03.31	03.40	05.05	06.34		07.57	08.28	09.52
	15.15	16.46	18.10		20.39	22.07	23.32	23.32	22.08	20.24		18.41	16.02	14.54
9	10.01	08.44	07.14		06.28	04.48	03.30	03.42	05.08	06.37		07.59	08.31	09.54
	15.17	16.49	18.13		20.42	22.11	23.34	23.30	22.04	20.20		18.38	15.59	14.53
10	10.00	08.41	07.10		06.24	04.45	03.28	03.45	05.11	06.40		08.02	08.34	09.56
	15.19	16.52	18.16		20.44	22.14	23.35	23.28	22.01	20.17		18.35	15.56	14.52
11	09.58	08.38	07.07		06.21	04.42	03.27	03.47	05.14	06.42		08.05	08.37	09.58
	15.22	16.55	18.19		20.47	22.17	23.37	23.26	21.58	20.14		18.31	15.53	14.51
12	09.56	08.35	07.03		06.18	04.39	03.26	03.49	05.17	06.45		08.08	08.40	10.00
	15.24	16.58	18.22		20.50	22.20	23.39	23.24	21.55	20.10		18.28	15.51	14.50
13	09.54	08.32	07.00		06.14	04.36	03.25	03.52	05.20	06.48		08.11	08.44	10.02
	15.27	17.01	18.25		20.53	22.23	23.40	23.21	21.51	20.07		18.25	15.48	14.50
14	09.52	08.29	06.57	07.31-07.41/10	06.11	04.33	03.24	03.54	05.23	06.51		08.14	08.47	10.03
	15.30	17.04	18.28		20.56	22.26	23.41	23.19	21.48	20.03		18.21	15.45	14.49
15	09.50	08.26	06.53	07.29-07.43/14	06.07	04.30	03.23	03.57	05.26	06.53		08.17	08.50	10.05
	15.33	17.08	18.30		20.59	22.29	23.42	23.17	21.45	20.00		18.18	15.42	14.48
16	09.48	08.23	06.50	07.27-07.43/16	06.04	04.27	03.22	03.59	05.29	06.56		08.19	08.53	10.06
	15.35	17.11	18.33		21.02	22.32	23.44	23.14	21.42	19.56		18.15	15.40	14.48
17	09.46	08.20	06.46	07.26-07.44/18	06.01	04.24	03.21	04.02	05.32	06.59		08.22	08.56	10.07
	15.38	17.14	18.36		21.05	22.35	23.44	23.12	21.38	19.53		18.11	15.37	14.48
18	09.44	08.16	06.43	07.25-07.44/19	05.57	04.21	03.21	04.05	05.35	07.01	08.19-08.21/2	08.25	08.59	10.08
	15.41	17.17	18.39		21.08	22.38	23.45	23.09	21.35	19.50		18.08	15.34	14.48
19	09.42	08.13	06.40	07.25-07.44/19	05.54	04.18	03.21	04.07	05.38	07.04	08.15-08.25/10	08.28	09.02	10.09
	15.44	17.20	18.42		21.11	22.40	23.46	23.07	21.32	19.46		18.05	15.32	14.48
20	09.39	08.10	06.36	07.24-07.43/19	05.51	04.15	03.20	04.10	05.41	07.07	08.12-08.26/14	08.31	09.05	10.10
	15.47	17.23	18.45		21.14	22.43	23.46	23.04	21.28	19.43		18.01	15.29	14.48
21	09.37	08.07	06.33	07.25-07.43/18	05.47	04.13	03.20	04.13	05.43	07.10	08.11-08.27/16	08.34	09.08	10.11
	15.50	17.26	18.48		21.16	22.46	23.47	23.01	21.25	19.39		17.58	15.27	14.48
22	09.35	08.03	06.29	07.24-07.41/17	05.44	04.10	03.20	04.16	05.46	07.12	08.10-08.28/18	08.37	09.11	10.12
	15.53	17.29	18.50		21.19	22.49	23.47	22.59	21.22	19.36		17.55	15.24	14.49
23	09.32	08.00	06.26	07.26-07.41/15	05.40	04.07	03.21	04.19	05.49	07.15	08.08-08.27/19	08.40	09.14	10.12
	15.56	17.32	18.53		21.22	22.52	23.47	22.56	21.18	19.32		17.52	15.22	14.49
24	09.30	07.57	06.23	07.26-07.38/12	05.37	04.04	03.21	04.21	05.52	07.18	08.08-08.27/19	08.43	09.16	10.12
	15.59	17.35	18.56		21.25	22.55	23.47	22.53	21.15	19.29		17.48	15.20	14.50
25	09.27	07.54	06.19	07.29-07.35/6	05.34	04.02	03.22	04.24	05.55	07.21	08.08-08.27/19	07.46	09.19	10.13
	16.02	17.38	18.59		21.28	22.58	23.47	22.50	21.12	19.26		16.45	15.17	14.51
26	09.24	07.50	06.16		05.30	03.59	03.22	04.27	05.58	07.23	08.08-08.26/18	07.49	09.22	10.13
	16.05	17.41	19.02		21.31	23.01	23.46	22.47	21.08	19.22		16.42	15.15	14.52
27	09.22	07.47	06.12		05.27	03.57	03.23	04.30	06.01	07.26	08.09-08.26/17	07.52	09.25	10.13
	16.08	17.44	19.05		21.34	23.03	23.46	22.44	21.05	19.19		16.39	15.13	14.53
28	09.19	07.44	06.09		05.24	03.54	03.24	04.33	06.03	07.29	08.09-08.23/14	07.55	09.28	10.12
	16.11	17.47	19.07		21.37	23.06	23.45	22.42	21.01	19.15		16.36	15.11	14.54
29	09.16		07.05		05.21	03.52	03.25	04.36	06.06	07.32	08.10-08.22/12	07.58	09.30	10.12
	16.14		20.10		21.40	23.09	23.44	22.39	20.58	19.12		16.33	15.09	14.55
30	09.14		07.02		05.17	03.49	03.26	04.39	06.09	07.34	08.13-08.19/6	08.01	09.33	10.12
	16.18		20.13		21.43	23.11	23.43	22.36	20.55	19.08		16.29	15.07	14.57
31	09.11		06.59			03.47		04.42	06.12			08.04		10.11
	16.21		20.16			23.14		22.33	20.51			16.26		14.58
Potential sun hours	182	242	363		447	559	606	594	502	392		308	206	151
Sum of minutes with flicker	0	0	183		0	0	0	0	0	184		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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Lotlax 3 - Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.15	07.37	08.07	09.36
	15.00	16.24	17.50	20.19	21.46	23.16	23.42	22.30	20.48	19.05	16.23	15.05
2	10.10	09.05	07.37	06.52	05.11	03.43	03.29	04.48	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.22	21.49	23.19	23.41	22.26	20.44	19.02	16.20	15.03
3	10.09	09.02	07.34	06.48	05.08	03.40	03.31	04.51	06.20	07.43	08.13	09.41
	15.04	16.30	17.56	20.24	21.52	23.21	23.40	22.23	20.41	18.58	16.17	15.01
4	10.08	08.59	07.30	06.45	05.04	03.38	03.33	04.54	06.23	07.45	08.16	09.43
	15.06	16.33	17.59	20.27	21.55	23.23	23.38	22.20	20.38	18.55	16.14	15.00
5	10.07	08.56	07.27	06.41	05.01	03.36	03.34	04.57	06.26	07.48	08.19	09.46
	15.08	16.36	18.02	20.30	21.58	23.26	23.37	22.17	20.34	18.51	16.11	14.58
6	10.05	08.53	07.24	06.38	04.58	03.35	03.36	04.59	06.29	07.51	08.22	09.48
	15.10	16.39	18.04	20.33	22.01	23.28	23.35	22.14	20.31	18.48	16.08	14.57
7	10.04	08.50	07.20	06.35	04.55	03.33	03.38	05.02	06.31	07.54	08.25	09.50
	15.12	16.43	18.07	20.36	22.04	23.30	23.33	22.11	20.27	18.45	16.05	14.55
8	10.03	08.47	07.17	06.31	04.52	03.31	03.40	05.05	06.34	07.57	08.28	09.52
	15.14	16.46	18.10	20.39	22.07	23.32	23.32	22.08	20.24	18.41	16.02	14.54
9	10.01	08.44	07.14	06.28	04.48	03.30	03.42	05.08	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.42	22.10	23.34	23.30	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.45	03.28	03.45	05.11	06.40	08.02	08.34	09.56
	15.19	16.52	18.16	20.44	22.14	23.35	23.28	22.01	20.17	18.35	15.56	14.52
11	09.58	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.17	23.37	23.26	21.58	20.14	18.31	15.53	14.51
12	09.56	08.35	07.03	06.18	04.39	03.26	03.49	05.17	06.45	08.08	08.40	10.00
	15.24	16.58	18.22	20.50	22.20	23.39	23.24	21.55	20.10	18.28	15.51	14.50
13	09.54	08.32	07.00	06.14	04.36	03.24	03.52	05.20	06.48	08.11	08.43	10.02
	15.27	17.01	18.25	20.53	22.23	23.40	23.21	21.51	20.07	18.25	15.48	14.49
14	09.52	08.29	06.57	06.11	04.33	03.23	03.54	05.23	06.51 07.47-07.55/8	08.14	08.47	10.03
	15.30	17.04	18.28	20.56	22.26	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53 07.45-07.57/12	08.16	08.50	10.05
	15.32	17.08	18.30	20.59	22.29	23.42	23.17	21.45	20.00	18.18	15.42	14.48
16	09.48	08.23	06.50	06.04	04.27	03.22	03.59	05.29	06.56 07.44-07.58/14	08.19	08.53	10.06
	15.35	17.11	18.33	21.02	22.32	23.44	23.14	21.42	19.56	18.15	15.40	14.48
17	09.46	08.19	06.46	06.01	04.24	03.21	04.02	05.32	06.59 07.42-07.57/15	08.22	08.56	10.07
	15.38	17.14	18.36	21.05	22.35	23.44	23.12	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01 07.42-07.57/15	08.25	08.59	10.08
	15.41	17.17	18.39	21.08	22.38	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.42	08.13	06.40	05.54	04.18	03.21	04.07	05.38	07.04 07.42-07.57/15	08.28	09.02	10.09
	15.44	17.20	18.42	21.11	22.40	23.46	23.07	21.32	19.46	18.05	15.32	14.48
20	09.39	08.10	06.36	05.50	04.15	03.20	04.10	05.40	07.07 07.42-07.56/14	08.31	09.05	10.10
	15.47	17.23	18.45	21.13	22.43	23.46	23.04	21.28	19.43	18.01	15.29	14.48
21	09.37	08.07	06.33 07.04-07.07/3	05.47	04.13	03.20	04.13	05.43	07.10 07.45-07.55/10	08.34	09.08	10.11
	15.50	17.26	18.47	21.16	22.46	23.47	23.01	21.25	19.39	17.58	15.27	14.48
22	09.35	08.03	06.29 07.00-07.08/8	05.44	04.10	03.20	04.16	05.46	07.12 07.48-07.53/5	08.37	09.11	10.11
	15.53	17.29	18.50	21.19	22.49	23.47	22.59	21.22	19.36	17.55	15.24	14.49
23	09.32	08.00	06.26 06.57-07.10/13	05.40	04.07	03.21	04.18	05.49	07.15	08.40	09.14	10.12
	15.56	17.32	18.53	21.22	22.52	23.47	22.56	21.18	19.32	17.52	15.22	14.49
24	09.30	07.57	06.23 06.55-07.09/14	05.37	04.04	03.21	04.21	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.47	22.53	21.15	19.29	17.48	15.20	14.50
25	09.27	07.54	06.19 06.54-07.10/16	05.34	04.02	03.22	04.24	05.55	07.21	07.46	09.19	10.13
	16.02	17.38	18.59	21.28	22.58	23.47	22.50	21.11	19.25	16.45	15.17	14.51
26	09.24	07.50	06.16 06.55-07.10/15	05.30	03.59	03.22	04.27	05.58	07.23	07.49	09.22	10.13
	16.05	17.41	19.02	21.31	23.01	23.46	22.47	21.08	19.22	16.42	15.15	14.52
27	09.22	07.47	06.12 06.54-07.08/14	05.27	03.57	03.23	04.30	06.01	07.26	07.52	09.25	10.13
	16.08	17.44	19.04	21.34	23.03	23.46	22.44	21.05	19.19	16.39	15.13	14.53
28	09.19	07.44	06.09 06.55-07.08/13	05.24	03.54	03.24	04.33	06.03	07.29	07.55	09.28	10.12
	16.11	17.47	19.07	21.37	23.06	23.45	22.42	21.01	19.15	16.36	15.11	14.54
29	09.16		07.05 07.56-08.05/9	05.21	03.52	03.25	04.36	06.06	07.32	07.58	09.30	10.12
	16.14		20.10	21.40	23.09	23.44	22.39	20.58	19.12	16.33	15.09	14.55
30	09.14		07.02 08.00-08.01/1	05.17	03.49	03.26	04.39	06.09	07.34	08.01	09.33	10.12
	16.17		20.13	21.43	23.11	23.43	22.36	20.55	19.08	16.29	15.07	14.56
31	09.11		06.59		03.47		04.42	06.12		08.04		10.11
	16.21		20.16		23.14		22.33	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Sum of minutes with flicker	0	0	106	0	0	0	0	0	108	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:
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SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Lålax 1 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (338)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.14	07.37	08.06	09.35
	15.00	16.24	17.50	20.18	21.46	23.16	23.42	22.29	20.47	19.05	16.23	15.05
2	10.09	09.05	07.37	06.51	05.11	03.43	03.29	04.48	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.40	22.26	20.44	19.01	16.20	15.03
3	10.08	09.02	07.33	06.48	05.07	03.40	03.31	04.51	06.20	07.42	08.12	09.40
	15.04	16.30	17.55	20.24	21.52	23.20	23.39	22.23	20.41	18.58	16.17	15.01
4	10.07	08.59	07.30	06.45	05.04	03.38	03.33	04.53	06.23	07.45	08.16	09.43
	15.06	16.33	17.58	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.36	03.34	04.56	06.26	07.48	08.19	09.45
	15.08	16.36	18.01	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.58
6	10.05	08.53	07.23	06.38	04.58	03.35	03.36	04.59	06.28	07.51	08.22	09.47
	15.10	16.39	18.04	20.33	22.01	23.27	23.35	22.14	20.30	18.48	16.08	14.57
7	10.04	08.50	07.20	06.34	04.55	03.33	03.38	05.02	06.31	07.54	08.25	09.50
	15.12	16.42	18.07	20.35	22.04	23.29	23.33	22.10	20.27	18.44	16.05	14.55
8	10.02	08.47	07.17	06.31	04.51	03.31	03.40	05.05	06.34	07.56	08.28	09.52
	15.14	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.23	18.41	16.02	14.54
9	10.01	08.44	07.13	06.28	04.48	03.30	03.42	05.08	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.45	03.28	03.45	05.11	06.39	08.02	08.34	09.56
	15.19	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.34	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.36	23.25	21.58	20.13	18.31	15.53	14.51
12	09.56	08.35	07.03	06.17	04.39	03.26	03.49	05.17	06.45	08.08	08.40	09.59
	15.24	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.50	14.50
13	09.54	08.32	07.00	06.14	04.36	03.25	03.52	05.20	06.48	08.10	08.43	10.01
	15.27	17.01	18.24	20.53	22.22	23.39	23.21	21.51	20.06	18.24	15.48	14.49
14	09.52	08.29	06.56	06.11	04.33	03.24	03.54	05.23	06.50	08.13	08.46	10.03
	15.30	17.04	18.27	20.56	22.25	23.41	23.18	21.48	20.03	18.21	15.45	14.49
15	09.50	08.25	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.32	17.07	18.30	20.59	22.28	23.42	23.16	21.44	19.59	18.18	15.42	14.48
16	09.48	08.22	06.50	06.04	04.27	03.22	03.59	05.29	06.56	08.19	08.52	10.05
	15.35	17.10	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.14	15.39	14.48
17	09.46	08.19	06.46	06.00	04.24	03.21	04.02	05.32	06.58	08.22	08.55	10.07
	15.38	17.13	18.36	21.04	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.43	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.39	05.54	04.18	03.21	04.07	05.37	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.04	15.32	14.48
20	09.39	08.10	06.36	05.50	04.15	03.20	04.10	05.40	07.07	08.31	09.04	10.10
	15.47	17.23	18.44	21.13	22.43	23.46	23.04	21.28	19.42	18.01	15.29	14.48
21	09.36	08.06	06.33	05.47	04.13	03.20	04.13	05.43	07.09	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.48
22	09.34	08.03	06.29	05.44	04.10	03.21	04.16	05.46	07.12	08.36	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.35	17.55	15.24	14.49
23	09.32	08.00	06.26	05.40	04.07	03.21	04.18	05.49	07.15	08.39	09.13	10.11
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.51	15.22	14.49
24	09.29	07.57	06.22	05.37	04.04	03.21	04.21	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.54	23.46	22.53	21.14	19.29	17.48	15.19	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.24	05.55	07.20	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.17	14.51
26	09.24	07.50	06.15	05.30	03.59	03.22	04.27	05.57	07.23	07.48	09.22	10.12
	16.05	17.41	19.01	21.31	23.00	23.45	22.47	21.08	19.22	16.42	15.15	14.52
27	09.21	07.47	06.12	05.27	03.57	03.23	04.30	06.00	07.26	07.51	09.24	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.18	16.39	15.13	14.53
28	09.19	07.43	06.09	05.24	03.54	03.24	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.05	23.44	22.41	21.01	19.15	16.35	15.11	14.54
29	09.16		07.05	05.20	03.52	03.25	04.36	06.06	07.31	07.57	09.30	10.12
	16.14		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.32	15.09	14.55
30	09.13		07.02	05.17	03.49	03.27	04.39	06.09	07.34	08.00	09.33	10.11
	16.17		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.29	15.07	14.56
31	09.10		06.58		03.47		04.42	06.12		08.03		10.11
	16.20		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Lålax 2 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (339)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.45	06.14	07.37	08.06	09.35
	15.00	16.24	17.50	20.18	21.46	23.16	23.42	22.29	20.47	19.05	16.23	15.05
2	10.09	09.05	07.37	06.51	05.11	03.42	03.29	04.47	06.17	07.40	08.09	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.41	22.26	20.44	19.01	16.20	15.03
3	10.08	09.02	07.33	06.48	05.07	03.40	03.31	04.50	06.20	07.42	08.13	09.40
	15.04	16.30	17.55	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.01
4	10.07	08.59	07.30	06.45	05.04	03.38	03.32	04.53	06.23	07.45	08.16	09.43
	15.06	16.33	17.58	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.36	03.34	04.56	06.26	07.48	08.19	09.45
	15.08	16.36	18.01	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.58
6	10.05	08.53	07.23	06.38	04.58	03.35	03.36	04.59	06.28	07.51	08.22	09.48
	15.10	16.39	18.04	20.33	22.01	23.27	23.35	22.14	20.30	18.48	16.08	14.57
7	10.04	08.50	07.20	06.34	04.55	03.33	03.38	05.02	06.31	07.54	08.25	09.50
	15.12	16.42	18.07	20.35	22.04	23.29	23.33	22.10	20.27	18.44	16.05	14.55
8	10.02	08.47	07.17	06.31	04.51	03.31	03.40	05.05	06.34	07.56	08.28	09.52
	15.14	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.54
9	10.01	08.44	07.13	06.28	04.48	03.30	03.42	05.08	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.45	03.28	03.45	05.11	06.39	08.02	08.34	09.56
	15.19	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.34	15.56	14.52
11	09.57	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.13	18.31	15.53	14.51
12	09.56	08.35	07.03	06.17	04.39	03.26	03.49	05.17	06.45	08.08	08.40	10.00
	15.24	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.50	14.50
13	09.54	08.32	07.00	06.14	04.36	03.24	03.52	05.20	06.48	08.10	08.43	10.01
	15.27	17.01	18.24	20.53	22.22	23.40	23.21	21.51	20.06	18.24	15.48	14.49
14	09.52	08.29	06.56	06.11	04.33	03.23	03.54	05.23	06.50	08.13	08.46	10.03
	15.30	17.04	18.27	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.23	03.57	05.26	06.53	08.16	08.49	10.04
	15.32	17.07	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.48
16	09.48	08.22	06.50	06.04	04.27	03.22	03.59	05.29	06.56	08.19	08.52	10.06
	15.35	17.10	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.14	15.39	14.48
17	09.46	08.19	06.46	06.00	04.24	03.21	04.02	05.32	06.58	08.22	08.55	10.07
	15.38	17.13	18.36	21.04	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.05	05.35	07.01	08.25	08.58	10.08
	15.41	17.17	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.39	05.54	04.18	03.20	04.07	05.37	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.04	15.32	14.48
20	09.39	08.10	06.36	05.50	04.15	03.20	04.10	05.40	07.07	08.31	09.04	10.10
	15.47	17.23	18.44	21.13	22.43	23.46	23.04	21.28	19.42	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.12	03.20	04.13	05.43	07.09	08.34	09.07	10.10
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.27	14.48
22	09.34	08.03	06.29	05.44	04.10	03.20	04.16	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.35	17.55	15.24	14.48
23	09.32	08.00	06.26	05.40	04.07	03.21	04.18	05.49	07.15	08.39	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.46	22.55	21.18	19.32	17.51	15.22	14.49
24	09.29	07.57	06.22	05.37	04.04	03.21	04.21	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.48	15.19	14.50
25	09.27	07.53	06.19	05.34	04.02	03.22	04.24	05.55	07.20	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.17	14.50
26	09.24	07.50	06.15	05.30	03.59	03.22	04.27	05.57	07.23	07.48	09.22	10.12
	16.05	17.41	19.01	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.15	14.51
27	09.21	07.47	06.12	05.27	03.56	03.23	04.30	06.00	07.26	07.51	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.18	16.39	15.13	14.52
28	09.19	07.43	06.09	05.24	03.54	03.24	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.06	23.44	22.41	21.01	19.15	16.35	15.11	14.54
29	09.16		07.05	05.20	03.52	03.25	04.36	06.06	07.31	07.57	09.30	10.12
	16.14		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.32	15.09	14.55
30	09.13		07.02	05.17	03.49	03.26	04.39	06.09	07.34	08.00	09.33	10.11
	16.17		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.29	15.07	14.56
31	09.10		06.58		03.47		04.42	06.12		08.03		10.11
	16.20		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Lålax 3 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (340)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.45	03.28	04.44	06.14	07.37	08.06	09.35
	15.00	16.24	17.50	20.18	21.46	23.16	23.42	22.29	20.47	19.05	16.23	15.05
2	10.09	09.05	07.37	06.51	05.11	03.42	03.29	04.47	06.17	07.40	08.10	09.38
	15.02	16.27	17.52	20.21	21.49	23.18	23.41	22.26	20.44	19.01	16.20	15.03
3	10.08	09.02	07.33	06.48	05.07	03.40	03.31	04.50	06.20	07.42	08.13	09.41
	15.04	16.30	17.55	20.24	21.52	23.21	23.39	22.23	20.41	18.58	16.17	15.01
4	10.07	08.59	07.30	06.45	05.04	03.38	03.32	04.53	06.23	07.45	08.16	09.43
	15.05	16.33	17.58	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.36	03.34	04.56	06.25	07.48	08.19	09.45
	15.08	16.36	18.01	20.30	21.58	23.25	23.36	22.17	20.34	18.51	16.11	14.58
6	10.05	08.53	07.23	06.38	04.58	03.34	03.36	04.59	06.28	07.51	08.22	09.48
	15.10	16.39	18.04	20.33	22.01	23.27	23.35	22.14	20.30	18.48	16.08	14.57
7	10.04	08.50	07.20	06.34	04.55	03.33	03.38	05.02	06.31	07.54	08.25	09.50
	15.12	16.42	18.07	20.36	22.04	23.29	23.33	22.10	20.27	18.44	16.05	14.55
8	10.02	08.47	07.17	06.31	04.51	03.31	03.40	05.05	06.34	07.56	08.28	09.52
	15.14	16.46	18.10	20.38	22.07	23.31	23.31	22.07	20.24	18.41	16.02	14.54
9	10.01	08.44	07.13	06.28	04.48	03.29	03.42	05.08	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.29	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.45	03.28	03.44	05.11	06.39	08.02	08.34	09.56
	15.19	16.52	18.16	20.44	22.13	23.35	23.27	22.01	20.17	18.34	15.56	14.52
11	09.58	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.13	18.31	15.53	14.51
12	09.56	08.35	07.03	06.17	04.39	03.25	03.49	05.17	06.45	08.08	08.40	10.00
	15.24	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.50	14.50
13	09.54	08.32	07.00	06.14	04.36	03.24	03.52	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.24	20.53	22.22	23.40	23.21	21.51	20.06	18.24	15.48	14.49
14	09.52	08.29	06.56	06.11	04.33	03.23	03.54	05.23	06.50	08.13	08.46	10.03
	15.30	17.04	18.27	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.22	03.57	05.26	06.53	08.16	08.49	10.04
	15.32	17.07	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.48
16	09.48	08.22	06.50	06.04	04.27	03.22	03.59	05.29	06.56	08.19	08.52	10.06
	15.35	17.10	18.33	21.01	22.31	23.43	23.14	21.41	19.56	18.14	15.39	14.48
17	09.46	08.19	06.46	06.00	04.24	03.21	04.02	05.32	06.58	08.22	08.55	10.07
	15.38	17.13	18.36	21.04	22.34	23.44	23.11	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.04	05.34	07.01	08.25	08.58	10.08
	15.41	17.16	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.48
19	09.41	08.13	06.39	05.54	04.18	03.20	04.07	05.37	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.45	23.06	21.31	19.46	18.04	15.31	14.48
20	09.39	08.10	06.36	05.50	04.15	03.20	04.10	05.40	07.07	08.31	09.04	10.10
	15.47	17.23	18.44	21.13	22.43	23.46	23.04	21.28	19.42	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.12	03.20	04.13	05.43	07.09	08.34	09.07	10.11
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.26	14.48
22	09.34	08.03	06.29	05.44	04.10	03.20	04.15	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.46	22.58	21.21	19.35	17.55	15.24	14.48
23	09.32	08.00	06.26	05.40	04.07	03.20	04.18	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.47	22.56	21.18	19.32	17.51	15.22	14.49
24	09.29	07.57	06.22	05.37	04.04	03.21	04.21	05.52	07.18	08.42	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.46	22.53	21.15	19.29	17.48	15.19	14.50
25	09.27	07.53	06.19	05.34	04.02	03.21	04.24	05.55	07.20	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.57	23.46	22.50	21.11	19.25	16.45	15.17	14.50
26	09.24	07.50	06.15	05.30	03.59	03.22	04.27	05.57	07.23	07.48	09.22	10.12
	16.05	17.41	19.01	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.15	14.51
27	09.21	07.47	06.12	05.27	03.56	03.23	04.30	06.00	07.26	07.51	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.04	19.18	16.39	15.13	14.52
28	09.19	07.43	06.09	05.24	03.54	03.24	04.33	06.03	07.29	07.54	09.27	10.12
	16.11	17.47	19.07	21.37	23.06	23.45	22.41	21.01	19.15	16.35	15.11	14.54
29	09.16		07.05	05.20	03.51	03.25	04.36	06.06	07.31	07.57	09.30	10.12
	16.14		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.32	15.09	14.55
30	09.13		07.02	05.17	03.49	03.26	04.39	06.09	07.34	08.00	09.33	10.11
	16.17		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.29	15.07	14.56
31	09.11		06.58		03.47		04.42	06.12		08.03		10.11
	16.20		20.16		23.13		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Lålax 4 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (341)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.40	06.55	05.14	03.44	03.28	04.44	06.14	07.37	08.07	09.36
	15.00	16.24	17.50	20.18	21.46	23.16	23.42	22.29	20.48	19.05	16.23	15.05
2	10.09	09.05	07.37	06.51	05.11	03.42	03.29	04.47	06.17	07.40	08.10	09.38
	15.02	16.27	17.53	20.21	21.49	23.18	23.41	22.26	20.44	19.01	16.20	15.03
3	10.09	09.02	07.33	06.48	05.07	03.40	03.31	04.50	06.20	07.42	08.13	09.41
	15.03	16.30	17.55	20.24	21.52	23.21	23.40	22.23	20.41	18.58	16.17	15.01
4	10.07	08.59	07.30	06.45	05.04	03.38	03.32	04.53	06.23	07.45	08.16	09.43
	15.05	16.33	17.58	20.27	21.55	23.23	23.38	22.20	20.37	18.55	16.14	15.00
5	10.06	08.56	07.27	06.41	05.01	03.36	03.34	04.56	06.25	07.48	08.19	09.45
	15.08	16.36	18.01	20.30	21.58	23.25	23.37	22.17	20.34	18.51	16.11	14.58
6	10.05	08.53	07.23	06.38	04.58	03.34	03.36	04.59	06.28	07.51	08.22	09.48
	15.10	16.39	18.04	20.33	22.01	23.28	23.35	22.14	20.30	18.48	16.08	14.57
7	10.04	08.50	07.20	06.34	04.54	03.33	03.38	05.02	06.31	07.54	08.25	09.50
	15.12	16.42	18.07	20.36	22.04	23.30	23.33	22.11	20.27	18.44	16.05	14.55
8	10.02	08.47	07.17	06.31	04.51	03.31	03.40	05.05	06.34	07.56	08.28	09.52
	15.14	16.46	18.10	20.38	22.07	23.32	23.31	22.07	20.24	18.41	16.02	14.54
9	10.01	08.44	07.13	06.28	04.48	03.29	03.42	05.08	06.37	07.59	08.31	09.54
	15.17	16.49	18.13	20.41	22.10	23.33	23.30	22.04	20.20	18.38	15.59	14.53
10	09.59	08.41	07.10	06.24	04.45	03.28	03.44	05.11	06.39	08.02	08.34	09.56
	15.19	16.52	18.16	20.44	22.13	23.35	23.28	22.01	20.17	18.34	15.56	14.52
11	09.58	08.38	07.07	06.21	04.42	03.27	03.47	05.14	06.42	08.05	08.37	09.58
	15.22	16.55	18.19	20.47	22.16	23.37	23.25	21.58	20.13	18.31	15.53	14.51
12	09.56	08.35	07.03	06.17	04.39	03.25	03.49	05.17	06.45	08.08	08.40	10.00
	15.24	16.58	18.22	20.50	22.19	23.38	23.23	21.54	20.10	18.28	15.50	14.50
13	09.54	08.32	07.00	06.14	04.36	03.24	03.51	05.20	06.48	08.11	08.43	10.01
	15.27	17.01	18.24	20.53	22.22	23.40	23.21	21.51	20.06	18.24	15.47	14.49
14	09.52	08.29	06.56	06.11	04.33	03.23	03.54	05.23	06.50	08.13	08.46	10.03
	15.30	17.04	18.27	20.56	22.25	23.41	23.19	21.48	20.03	18.21	15.45	14.49
15	09.50	08.26	06.53	06.07	04.30	03.22	03.57	05.26	06.53	08.16	08.49	10.04
	15.32	17.07	18.30	20.59	22.28	23.42	23.16	21.45	20.00	18.18	15.42	14.48
16	09.48	08.22	06.50	06.04	04.27	03.22	03.59	05.29	06.56	08.19	08.52	10.06
	15.35	17.10	18.33	21.02	22.31	23.43	23.14	21.41	19.56	18.14	15.39	14.48
17	09.46	08.19	06.46	06.00	04.24	03.21	04.02	05.32	06.58	08.22	08.55	10.07
	15.38	17.13	18.36	21.04	22.34	23.44	23.12	21.38	19.53	18.11	15.37	14.48
18	09.44	08.16	06.43	05.57	04.21	03.21	04.04	05.34	07.01	08.25	08.58	10.08
	15.41	17.16	18.39	21.07	22.37	23.45	23.09	21.35	19.49	18.08	15.34	14.47
19	09.41	08.13	06.39	05.54	04.18	03.20	04.07	05.37	07.04	08.28	09.01	10.09
	15.44	17.20	18.42	21.10	22.40	23.46	23.06	21.31	19.46	18.04	15.31	14.47
20	09.39	08.10	06.36	05.50	04.15	03.20	04.10	05.40	07.07	08.31	09.04	10.10
	15.47	17.23	18.44	21.13	22.43	23.46	23.04	21.28	19.42	18.01	15.29	14.48
21	09.37	08.06	06.33	05.47	04.12	03.20	04.13	05.43	07.09	08.34	09.07	10.11
	15.50	17.26	18.47	21.16	22.46	23.46	23.01	21.25	19.39	17.58	15.26	14.48
22	09.34	08.03	06.29	05.44	04.10	03.20	04.15	05.46	07.12	08.37	09.10	10.11
	15.53	17.29	18.50	21.19	22.49	23.47	22.58	21.21	19.36	17.55	15.24	14.48
23	09.32	08.00	06.26	05.40	04.07	03.20	04.18	05.49	07.15	08.40	09.13	10.12
	15.56	17.32	18.53	21.22	22.52	23.47	22.56	21.18	19.32	17.51	15.22	14.49
24	09.29	07.57	06.22	05.37	04.04	03.21	04.21	05.52	07.18	08.43	09.16	10.12
	15.59	17.35	18.56	21.25	22.55	23.47	22.53	21.15	19.29	17.48	15.19	14.50
25	09.27	07.53	06.19	05.34	04.02	03.21	04.24	05.55	07.20	07.45	09.19	10.12
	16.02	17.38	18.59	21.28	22.58	23.46	22.50	21.11	19.25	16.45	15.17	14.50
26	09.24	07.50	06.15	05.30	03.59	03.22	04.27	05.57	07.23	07.48	09.22	10.12
	16.05	17.41	19.01	21.31	23.00	23.46	22.47	21.08	19.22	16.42	15.15	14.51
27	09.22	07.47	06.12	05.27	03.56	03.23	04.30	06.00	07.26	07.51	09.25	10.12
	16.08	17.44	19.04	21.34	23.03	23.45	22.44	21.05	19.18	16.39	15.13	14.52
28	09.19	07.43	06.09	05.24	03.54	03.24	04.33	06.03	07.29	07.54	09.28	10.12
	16.11	17.47	19.07	21.37	23.06	23.45	22.41	21.01	19.15	16.35	15.11	14.54
29	09.16		07.05	05.20	03.51	03.25	04.36	06.06	07.31	07.57	09.30	10.12
	16.14		20.10	21.40	23.08	23.44	22.38	20.58	19.12	16.32	15.09	14.55
30	09.13		07.02	05.17	03.49	03.26	04.39	06.09	07.34	08.00	09.33	10.12
	16.17		20.13	21.43	23.11	23.43	22.35	20.54	19.08	16.29	15.07	14.56
31	09.11		06.58		03.47		04.41	06.12		08.03		10.11
	16.20		20.16		23.14		22.32	20.51		16.26		14.58
Potential sun hours	182	242	363	447	559	606	595	502	392	308	206	151
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 01 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (320)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.46	23.16	23.42	22.29	20.48	19.06	16.24	15.06
2	10.09	09.05	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.40	08.10	09.38
	15.04	16.28	17.54	20.22	21.49	23.18	23.40	22.26	20.45	19.02	16.21	15.05
3	10.08	09.02	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.05	16.31	17.57	20.25	21.52	23.21	23.39	22.23	20.41	18.59	16.18	15.03
4	10.07	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	17.59	20.28	21.55	23.23	23.38	22.20	20.38	18.56	16.15	15.01
5	10.06	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.45
	15.09	16.37	18.02	20.31	21.58	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.36	03.38	05.01	06.29	07.52	08.22	09.48
	15.12	16.41	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.49	16.09	14.58
7	10.04	08.51	07.21	06.35	04.56	03.35	03.40	05.04	06.32	07.54	08.25	09.50
	15.14	16.44	18.08	20.36	22.04	23.29	23.33	22.11	20.28	18.45	16.06	14.57
8	10.02	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.31	09.54
	15.18	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.00	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.46	05.13	06.40	08.03	08.34	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.17	18.35	15.57	14.54
11	09.58	08.39	07.07	06.22	04.44	03.29	03.49	05.15	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.36	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.35	07.04	06.18	04.40	03.28	03.51	05.18	06.46	08.08	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.32	07.01	06.15	04.37	03.26	03.54	05.21	06.49	08.11	08.44	10.01
	15.29	17.02	18.25	20.53	22.23	23.39	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.34	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.05	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.31	03.25	03.58	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.50	06.05	04.28	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.15	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	06.59	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.34	23.44	23.11	21.38	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.42	17.18	18.40	21.08	22.37	23.44	23.09	21.35	19.50	18.09	15.36	14.49
19	09.42	08.13	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.28	09.02	10.09
	15.45	17.21	18.42	21.11	22.40	23.45	23.06	21.32	19.47	18.06	15.33	14.49
20	09.39	08.10	06.37	05.51	04.17	03.22	04.12	05.42	07.08	08.31	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.33	05.48	04.14	03.22	04.14	05.44	07.10	08.34	09.08	10.10
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.11	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.58	21.22	19.36	17.56	15.26	14.50
23	09.32	08.01	06.27	05.41	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.16	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.49	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	18.59	21.29	22.57	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.24	07.51	06.16	05.32	04.01	03.24	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.32	23.00	23.45	22.47	21.08	19.23	16.43	15.16	14.53
27	09.22	07.47	06.13	05.28	03.58	03.25	04.31	06.01	07.27	07.52	09.25	10.12
	16.09	17.45	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.29	07.55	09.28	10.12
	16.12	17.48	19.08	21.37	23.06	23.44	22.41	21.02	19.16	16.37	15.12	14.55
29	09.16		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.40	23.08	23.43	22.39	20.58	19.13	16.34	15.10	14.57
30	09.14		07.03	05.18	03.51	03.28	04.40	06.10	07.35	08.01	09.33	10.11
	16.19		20.14	21.43	23.11	23.43	22.36	20.55	19.09	16.30	15.08	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.16		23.13		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 02 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (327)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.46	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.49	23.18	23.40	22.26	20.45	19.02	16.21	15.05
3	10.08	09.02	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.05	16.31	17.57	20.25	21.52	23.21	23.39	22.23	20.41	18.59	16.18	15.03
4	10.07	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	17.59	20.28	21.55	23.23	23.38	22.20	20.38	18.56	16.15	15.01
5	10.06	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.45
	15.09	16.38	18.02	20.31	21.58	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.29	07.52	08.22	09.48
	15.12	16.41	18.05	20.33	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.58
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.54	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.02	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.31	09.54
	15.18	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.00	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.40	08.03	08.34	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.35	15.57	14.54
11	09.58	08.39	07.07	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.36	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.18	06.46	08.08	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.32	07.01	06.15	04.37	03.27	03.54	05.21	06.49	08.11	08.44	10.01
	15.29	17.02	18.25	20.54	22.23	23.39	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.34	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.31	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.34	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.42	17.18	18.40	21.08	22.37	23.44	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.13	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.40	23.45	23.06	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.31	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.44	07.10	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.11	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.58	21.22	19.36	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.16	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.49	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	18.59	21.29	22.57	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.24	07.51	06.16	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.32	23.00	23.45	22.47	21.09	19.23	16.43	15.17	14.53
27	09.22	07.47	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.12
	16.09	17.45	19.05	21.35	23.03	23.45	22.44	21.05	19.19	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.37	23.06	23.44	22.41	21.02	19.16	16.37	15.12	14.56
29	09.16		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.40	23.08	23.43	22.39	20.58	19.13	16.34	15.10	14.57
30	09.14		07.03	05.18	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.11
	16.19		20.14	21.43	23.11	23.43	22.36	20.55	19.09	16.30	15.08	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.16		23.13		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 03 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (328)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.46	23.16	23.41	22.29	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.45	03.32	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.49	23.18	23.40	22.26	20.45	19.02	16.21	15.05
3	10.08	09.02	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.06	16.31	17.57	20.25	21.52	23.21	23.39	22.23	20.41	18.59	16.18	15.03
4	10.07	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.08	16.34	18.00	20.28	21.55	23.23	23.38	22.20	20.38	18.56	16.15	15.02
5	10.06	08.57	07.28	06.42	05.02	03.39	03.37	04.58	06.27	07.49	08.19	09.45
	15.10	16.38	18.02	20.31	21.58	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.29	07.52	08.22	09.48
	15.12	16.41	18.05	20.33	22.01	23.27	23.35	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.54	08.25	09.50
	15.14	16.44	18.08	20.36	22.04	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.02	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.45	05.10	06.38	08.00	08.31	09.54
	15.19	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.00	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.40	08.03	08.34	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.35	15.58	14.54
11	09.58	08.39	07.07	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.24	16.56	18.20	20.48	22.17	23.36	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.08	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.32	07.01	06.15	04.38	03.27	03.54	05.21	06.49	08.11	08.44	10.01
	15.29	17.03	18.26	20.54	22.23	23.39	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.35	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.26	23.40	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.31	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.24	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.34	23.44	23.11	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.37	23.44	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.13	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.40	23.45	23.06	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.31	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.45	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.10	08.34	09.08	10.10
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.12	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.58	21.22	19.36	17.56	15.26	14.51
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.13	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.16	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.04	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	18.59	21.29	22.57	23.46	22.50	21.12	19.26	16.46	15.19	14.53
26	09.24	07.51	06.17	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.32	23.00	23.45	22.47	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.26	04.32	06.02	07.27	07.52	09.25	10.12
	16.10	17.45	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.40	15.15	14.55
28	09.19	07.44	06.10	05.25	03.56	03.26	04.35	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.37	23.06	23.44	22.41	21.02	19.16	16.37	15.12	14.56
29	09.16		07.06	05.22	03.54	03.28	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.40	23.08	23.43	22.38	20.58	19.13	16.34	15.10	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.11
	16.19		20.14	21.43	23.11	23.42	22.36	20.55	19.09	16.31	15.09	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.16		23.13		22.33	20.52		16.27		15.00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	206	152
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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+49 7142 77810
Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 04 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (329)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.35
	15.02	16.25	17.51	20.19	21.46	23.16	23.41	22.29	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.45	03.32	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.49	23.18	23.40	22.26	20.45	19.02	16.21	15.05
3	10.08	09.02	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.40
	15.06	16.31	17.57	20.25	21.52	23.20	23.39	22.23	20.41	18.59	16.18	15.03
4	10.07	08.59	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.08	16.34	17.59	20.28	21.55	23.23	23.37	22.20	20.38	18.56	16.15	15.02
5	10.06	08.57	07.28	06.42	05.02	03.39	03.37	04.58	06.27	07.49	08.19	09.45
	15.10	16.38	18.02	20.31	21.58	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.29	07.52	08.22	09.48
	15.12	16.41	18.05	20.33	22.01	23.27	23.34	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.54	08.25	09.50
	15.14	16.44	18.08	20.36	22.04	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.02	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.07	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.45	05.10	06.38	08.00	08.31	09.54
	15.19	16.50	18.14	20.42	22.10	23.33	23.29	22.04	20.21	18.39	16.00	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.40	08.03	08.34	09.56
	15.21	16.53	18.17	20.45	22.13	23.35	23.27	22.01	20.17	18.35	15.58	14.54
11	09.57	08.39	07.07	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.37	09.58
	15.24	16.56	18.20	20.48	22.16	23.36	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.35	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.08	08.40	09.59
	15.26	16.59	18.23	20.51	22.19	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.32	07.01	06.15	04.38	03.27	03.54	05.21	06.49	08.11	08.44	10.01
	15.29	17.02	18.25	20.53	22.22	23.39	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.35	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.25	23.40	23.18	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.28	23.41	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.05
	15.37	17.12	18.34	21.02	22.31	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.24	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.34	23.43	23.11	21.38	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.07	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.37	23.44	23.09	21.35	19.50	18.09	15.36	14.50
19	09.41	08.13	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.28	09.02	10.09
	15.45	17.21	18.43	21.11	22.40	23.45	23.06	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.31	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.45	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.10	08.34	09.08	10.10
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.34	08.04	06.30	05.45	04.12	03.23	04.17	05.47	07.13	08.37	09.10	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.58	21.22	19.36	17.56	15.26	14.51
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.13	10.11
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.29	07.57	06.23	05.38	04.06	03.24	04.23	05.53	07.19	08.43	09.16	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.04	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	18.59	21.28	22.57	23.46	22.50	21.12	19.26	16.46	15.19	14.53
26	09.24	07.51	06.16	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.31	23.00	23.45	22.47	21.08	19.23	16.43	15.17	14.53
27	09.22	07.47	06.13	05.28	03.58	03.26	04.32	06.02	07.27	07.52	09.25	10.12
	16.10	17.45	19.05	21.34	23.03	23.45	22.44	21.05	19.19	16.40	15.15	14.55
28	09.19	07.44	06.10	05.25	03.56	03.26	04.35	06.04	07.30	07.55	09.27	10.12
	16.13	17.48	19.08	21.37	23.05	23.44	22.41	21.02	19.16	16.37	15.12	14.56
29	09.16		07.06	05.22	03.54	03.28	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.40	23.08	23.43	22.38	20.58	19.13	16.34	15.10	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.11
	16.19		20.14	21.43	23.11	23.42	22.35	20.55	19.09	16.31	15.09	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.16		23.13		22.32	20.52		16.27		15.00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	207	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 05 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (330)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.40	22.27	20.45	19.02	16.21	15.05
3	10.09	09.02	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.05	16.31	17.57	20.25	21.53	23.21	23.39	22.23	20.41	18.59	16.18	15.03
4	10.07	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	18.00	20.28	21.56	23.23	23.38	22.20	20.38	18.56	16.15	15.01
5	10.06	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.45
	15.09	16.38	18.02	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.29	07.52	08.22	09.48
	15.12	16.41	18.05	20.33	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.58
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.54	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.02	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.31	09.54
	15.18	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.00	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.40	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.35	15.57	14.54
11	09.58	08.39	07.07	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.36	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.18	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.32	07.01	06.15	04.37	03.27	03.54	05.21	06.49	08.11	08.44	10.01
	15.29	17.02	18.26	20.54	22.23	23.39	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.34	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.31	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.42	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.40	23.45	23.07	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.22	04.12	05.42	07.08	08.31	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.22	04.15	05.45	07.10	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.11	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.36	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.16	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.49	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	18.59	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.25	07.51	06.16	05.32	04.01	03.24	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.32	23.00	23.45	22.47	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.12
	16.09	17.45	19.05	21.35	23.03	23.45	22.44	21.05	19.19	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.44	22.42	21.02	19.16	16.37	15.12	14.56
29	09.17		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.41	23.08	23.44	22.39	20.58	19.13	16.34	15.10	14.57
30	09.14		07.03	05.18	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.11
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.08	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.16		23.13		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 06 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (331)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.41	22.27	20.45	19.02	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.05	16.31	17.57	20.25	21.53	23.21	23.39	22.24	20.41	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.34	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	18.00	20.28	21.56	23.23	23.38	22.20	20.38	18.56	16.15	15.01
5	10.06	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.46
	15.09	16.38	18.02	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.36	03.38	05.01	06.29	07.52	08.22	09.48
	15.12	16.41	18.05	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.58
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.54	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.32	09.54
	15.18	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.00	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.46	05.13	06.40	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.35	15.57	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.37	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.40	03.28	03.51	05.18	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.37	03.26	03.53	05.21	06.49	08.11	08.44	10.01
	15.29	17.02	18.26	20.54	22.23	23.39	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.34	03.25	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.31	03.25	03.58	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.28	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.42	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.49
19	09.42	08.14	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.40	23.45	23.07	21.32	19.47	18.06	15.33	14.49
20	09.39	08.10	06.37	05.52	04.17	03.22	04.12	05.42	07.08	08.31	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.22	04.14	05.44	07.10	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.11	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.36	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.49	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.25	07.51	06.16	05.32	04.01	03.24	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.32	23.00	23.46	22.47	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.31	06.02	07.27	07.52	09.25	10.12
	16.09	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.19	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.44	22.42	21.02	19.16	16.37	15.12	14.55
29	09.17		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.41	23.08	23.44	22.39	20.58	19.13	16.34	15.10	14.57
30	09.14		07.03	05.18	03.51	03.28	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.30	15.08	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.16		23.14		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	152
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 07 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (332)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.10	09.05	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.41	22.27	20.45	19.02	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.05	16.31	17.57	20.25	21.53	23.21	23.39	22.24	20.42	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.34	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	18.00	20.28	21.56	23.23	23.38	22.20	20.38	18.56	16.15	15.01
5	10.07	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.46
	15.09	16.38	18.02	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.36	03.38	05.01	06.29	07.52	08.22	09.48
	15.12	16.41	18.05	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.58
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.29	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.32	09.54
	15.18	16.50	18.14	20.42	22.11	23.33	23.30	22.05	20.21	18.39	16.00	14.55
10	10.00	08.42	07.11	06.25	04.47	03.30	03.46	05.13	06.40	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.28	22.01	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.37	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.18	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.37	03.26	03.54	05.21	06.49	08.11	08.44	10.02
	15.29	17.02	18.26	20.54	22.23	23.40	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.34	03.25	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.57	22.26	23.41	23.19	21.49	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.31	03.25	03.58	05.27	06.54	08.17	08.50	10.05
	15.34	17.09	18.31	20.59	22.29	23.42	23.17	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.42	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.49
19	09.42	08.14	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.41	23.45	23.07	21.32	19.47	18.06	15.33	14.49
20	09.39	08.10	06.37	05.52	04.17	03.22	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.22	04.14	05.45	07.10	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.11	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.25	07.51	06.17	05.32	04.01	03.24	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.32	23.00	23.46	22.47	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.12
	16.09	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.19	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.45	22.42	21.02	19.16	16.37	15.12	14.55
29	09.17		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.31	10.12
	16.16		20.11	21.41	23.08	23.44	22.39	20.59	19.13	16.34	15.10	14.57
30	09.14		07.03	05.19	03.51	03.28	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.08	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.14		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 08 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (333)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.46	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.06
2	10.10	09.06	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.03	16.28	17.54	20.22	21.50	23.19	23.41	22.27	20.45	19.02	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.05	16.31	17.57	20.25	21.53	23.21	23.39	22.24	20.42	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.34	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	18.00	20.28	21.56	23.23	23.38	22.21	20.38	18.56	16.15	15.01
5	10.07	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.46
	15.09	16.38	18.02	20.31	21.59	23.25	23.37	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.36	03.38	05.01	06.29	07.52	08.22	09.48
	15.11	16.41	18.05	20.34	22.02	23.28	23.35	22.14	20.31	18.49	16.09	14.58
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.26	09.50
	15.14	16.44	18.08	20.36	22.05	23.30	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.29	09.52
	15.16	16.47	18.11	20.39	22.08	23.32	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.31	03.44	05.10	06.38	08.00	08.32	09.54
	15.18	16.50	18.14	20.42	22.11	23.33	23.30	22.05	20.21	18.39	16.00	14.55
10	10.00	08.42	07.11	06.25	04.47	03.30	03.46	05.13	06.40	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.28	22.02	20.18	18.36	15.57	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.37	23.26	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.40	03.27	03.51	05.18	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.37	03.26	03.53	05.21	06.49	08.11	08.44	10.02
	15.29	17.02	18.26	20.54	22.23	23.40	23.21	21.52	20.07	18.25	15.49	14.51
14	09.52	08.29	06.57	06.12	04.34	03.25	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.57	22.26	23.41	23.19	21.49	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.31	03.25	03.58	05.27	06.54	08.17	08.50	10.05
	15.34	17.09	18.31	20.59	22.29	23.42	23.17	21.45	20.01	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.28	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.49
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.42	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.49
19	09.42	08.14	06.40	05.55	04.20	03.22	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.41	23.45	23.07	21.32	19.47	18.06	15.33	14.49
20	09.40	08.10	06.37	05.52	04.17	03.22	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.45	21.14	22.44	23.46	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.22	04.14	05.45	07.10	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.11	03.22	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.51
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.20	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.25	07.51	06.17	05.32	04.01	03.24	04.29	05.59	07.24	07.49	09.22	10.13
	16.06	17.42	19.02	21.32	23.01	23.46	22.48	21.09	19.23	16.43	15.16	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.31	06.02	07.27	07.52	09.25	10.13
	16.09	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.19	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.45	22.42	21.02	19.16	16.37	15.12	14.55
29	09.17		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.31	10.12
	16.16		20.11	21.41	23.09	23.44	22.39	20.59	19.13	16.34	15.10	14.57
30	09.14		07.03	05.18	03.51	03.28	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.08	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.14		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	151
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 09 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (334)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.41	22.27	20.45	19.02	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.06	16.31	17.57	20.25	21.53	23.21	23.39	22.24	20.42	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	18.00	20.28	21.56	23.23	23.38	22.20	20.38	18.56	16.15	15.02
5	10.06	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.46
	15.10	16.38	18.02	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.30	07.52	08.22	09.48
	15.12	16.41	18.05	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.32	09.54
	15.19	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.00	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.41	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.37	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.38	03.27	03.54	05.21	06.49	08.11	08.44	10.01
	15.29	17.03	18.26	20.54	22.23	23.39	23.21	21.52	20.07	18.26	15.49	14.51
14	09.52	08.29	06.57	06.12	04.35	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.40	23.45	23.07	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.02	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.10	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.12	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.25	07.51	06.17	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.06	17.42	19.02	21.32	23.00	23.46	22.47	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.12
	16.10	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.19	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.44	22.42	21.02	19.16	16.37	15.12	14.56
29	09.17		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.41	23.08	23.44	22.39	20.58	19.13	16.34	15.10	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.08	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.14		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 10 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (321)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.41	22.30	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.45	03.32	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.40	22.26	20.45	19.02	16.21	15.05
3	10.08	09.02	07.34	06.49	05.09	03.43	03.33	04.52	06.21	07.43	08.13	09.41
	15.06	16.31	17.57	20.25	21.53	23.21	23.39	22.23	20.41	18.59	16.18	15.03
4	10.07	09.00	07.31	06.46	05.06	03.41	03.35	04.55	06.24	07.46	08.16	09.43
	15.08	16.35	18.00	20.28	21.56	23.23	23.38	22.20	20.38	18.56	16.15	15.02
5	10.06	08.57	07.28	06.42	05.03	03.39	03.37	04.58	06.27	07.49	08.19	09.45
	15.10	16.38	18.03	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.30	07.52	08.22	09.48
	15.12	16.41	18.05	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.02	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.45	05.10	06.38	08.00	08.31	09.54
	15.19	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.01	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.41	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.24	16.56	18.20	20.48	22.17	23.36	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.32	07.01	06.15	04.38	03.27	03.54	05.22	06.49	08.11	08.44	10.01
	15.29	17.03	18.26	20.54	22.23	23.39	23.21	21.52	20.07	18.26	15.49	14.51
14	09.52	08.29	06.57	06.12	04.35	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.00	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.24	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.11	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.07	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.37	23.44	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.46	17.21	18.43	21.11	22.40	23.45	23.06	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.31	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.45	23.04	21.29	19.43	18.03	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.10	08.34	09.08	10.10
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.12	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.58	21.22	19.37	17.56	15.26	14.51
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.24	04.23	05.53	07.19	08.43	09.16	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.04	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	19.00	21.29	22.57	23.46	22.50	21.12	19.26	16.46	15.19	14.53
26	09.24	07.51	06.17	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.07	17.42	19.02	21.32	23.00	23.45	22.47	21.09	19.23	16.43	15.17	14.54
27	09.22	07.48	06.13	05.28	03.58	03.26	04.32	06.02	07.27	07.52	09.25	10.12
	16.10	17.45	19.05	21.35	23.03	23.45	22.44	21.05	19.19	16.40	15.15	14.55
28	09.19	07.44	06.10	05.25	03.56	03.27	04.35	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.44	22.41	21.02	19.16	16.37	15.13	14.56
29	09.16		07.06	05.22	03.54	03.28	04.38	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.41	23.08	23.43	22.39	20.58	19.13	16.34	15.11	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.11
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.09	14.58
31	09.11		06.59		03.49		04.43	06.13		08.04		10.11
	16.22		20.16		23.13		22.33	20.52		16.28		15.00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	206	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 11 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (322)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.45	03.32	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.40	22.27	20.45	19.03	16.21	15.05
3	10.08	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.06	16.31	17.57	20.25	21.53	23.21	23.39	22.23	20.42	18.59	16.18	15.03
4	10.07	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.08	16.35	18.00	20.28	21.56	23.23	23.38	22.20	20.38	18.56	16.15	15.02
5	10.06	08.57	07.28	06.42	05.03	03.39	03.37	04.58	06.27	07.49	08.19	09.45
	15.10	16.38	18.03	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.30	07.52	08.22	09.48
	15.12	16.41	18.05	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.02	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.28	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.45	05.10	06.38	08.00	08.32	09.54
	15.19	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.01	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.41	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.24	16.56	18.20	20.48	22.17	23.36	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.38	03.27	03.54	05.22	06.49	08.11	08.44	10.01
	15.29	17.03	18.26	20.54	22.23	23.39	23.21	21.52	20.07	18.26	15.49	14.51
14	09.52	08.29	06.57	06.12	04.35	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.56	22.26	23.41	23.19	21.48	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.09	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.01	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.24	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.07	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.38	23.44	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.46	17.21	18.43	21.11	22.40	23.45	23.07	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.03	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.11	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.12	03.23	04.17	05.48	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.51
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.24	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.04	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.53
26	09.25	07.51	06.17	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.07	17.42	19.02	21.32	23.00	23.45	22.47	21.09	19.23	16.43	15.17	14.54
27	09.22	07.48	06.13	05.28	03.58	03.26	04.32	06.02	07.27	07.52	09.25	10.12
	16.10	17.45	19.05	21.35	23.03	23.45	22.44	21.05	19.20	16.40	15.15	14.55
28	09.19	07.44	06.10	05.25	03.56	03.26	04.35	06.05	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.44	22.42	21.02	19.16	16.37	15.13	14.56
29	09.17		07.06	05.22	03.54	03.28	04.38	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.41	23.08	23.43	22.39	20.58	19.13	16.34	15.11	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.11
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.09	14.58
31	09.11		07.00		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.13		22.33	20.52		16.28		15.00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	206	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 12 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (323)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.09	09.05	07.38	06.53	05.12	03.45	03.32	04.49	06.19	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.40	22.27	20.45	19.03	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.06	16.31	17.57	20.25	21.53	23.21	23.39	22.24	20.42	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.08	16.35	18.00	20.28	21.56	23.23	23.38	22.20	20.38	18.56	16.15	15.02
5	10.06	08.57	07.28	06.42	05.03	03.39	03.37	04.58	06.27	07.49	08.19	09.46
	15.10	16.38	18.03	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.30	07.52	08.22	09.48
	15.12	16.41	18.05	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.25	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.29	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.24	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.45	05.10	06.38	08.00	08.32	09.54
	15.19	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.01	14.55
10	09.59	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.41	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.27	22.01	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.24	16.56	18.20	20.48	22.17	23.37	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.38	03.27	03.54	05.22	06.49	08.11	08.44	10.01
	15.29	17.03	18.26	20.54	22.23	23.39	23.21	21.52	20.07	18.26	15.49	14.51
14	09.52	08.29	06.57	06.12	04.35	03.26	03.56	05.24	06.51	08.14	08.47	10.03
	15.31	17.06	18.28	20.57	22.26	23.41	23.19	21.49	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.09	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.04
	15.34	17.09	18.31	20.59	22.29	23.42	23.16	21.45	20.01	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.24	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.07	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.40	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.46	17.21	18.43	21.11	22.40	23.45	23.07	21.32	19.47	18.06	15.33	14.50
20	09.39	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.45	21.14	22.43	23.46	23.04	21.29	19.43	18.03	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.11	08.34	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.12	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.51
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.57	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.04	03.24	04.26	05.56	07.21	07.46	09.19	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.53
26	09.25	07.51	06.17	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.07	17.42	19.02	21.32	23.00	23.46	22.47	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.12
	16.10	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.20	16.40	15.15	14.55
28	09.19	07.44	06.10	05.25	03.56	03.26	04.35	06.05	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.44	22.42	21.02	19.16	16.37	15.12	14.56
29	09.17		07.06	05.22	03.54	03.28	04.37	06.07	07.32	07.58	09.30	10.12
	16.16		20.11	21.41	23.08	23.44	22.39	20.59	19.13	16.34	15.10	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.09	14.58
31	09.11		07.00		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.13		22.33	20.52		16.28		15.00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 13 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (324)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.10	09.06	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.19	23.41	22.27	20.45	19.03	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.06	16.31	17.57	20.25	21.53	23.21	23.39	22.24	20.42	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.07	16.35	18.00	20.28	21.56	23.23	23.38	22.21	20.38	18.56	16.15	15.02
5	10.07	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.46
	15.10	16.38	18.03	20.31	21.59	23.25	23.37	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.30	07.52	08.22	09.48
	15.12	16.41	18.05	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.26	09.50
	15.14	16.44	18.08	20.36	22.05	23.30	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.29	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.25	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.32	09.54
	15.19	16.50	18.14	20.42	22.11	23.33	23.30	22.05	20.21	18.39	16.00	14.55
10	10.00	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.41	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.28	22.02	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.24	16.56	18.20	20.48	22.17	23.37	23.26	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.38	03.27	03.54	05.21	06.49	08.12	08.44	10.02
	15.29	17.03	18.26	20.54	22.23	23.40	23.21	21.52	20.07	18.26	15.49	14.51
14	09.52	08.30	06.57	06.12	04.35	03.26	03.56	05.24	06.52	08.14	08.47	10.03
	15.31	17.06	18.28	20.57	22.26	23.41	23.19	21.49	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.05
	15.34	17.09	18.31	20.59	22.29	23.42	23.17	21.45	20.01	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.41	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.41	23.45	23.07	21.32	19.47	18.06	15.33	14.50
20	09.40	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.46	21.14	22.44	23.46	23.04	21.29	19.43	18.03	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.11	08.35	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.12	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.58	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.20	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.25	07.51	06.17	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.13
	16.06	17.42	19.02	21.32	23.01	23.46	22.48	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.13
	16.10	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.20	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.35	06.05	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.45	22.42	21.02	19.16	16.37	15.12	14.56
29	09.17		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.31	10.12
	16.16		20.11	21.41	23.09	23.44	22.39	20.59	19.13	16.34	15.10	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.08	14.58
31	09.11		07.00		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.14		22.33	20.52		16.28		15.00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	152
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 14 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (325)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.10	09.06	07.38	06.53	05.12	03.44	03.31	04.49	06.18	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.19	23.41	22.27	20.45	19.03	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.43	08.13	09.41
	15.05	16.31	17.57	20.25	21.53	23.21	23.40	22.24	20.42	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.07	16.34	18.00	20.28	21.56	23.23	23.38	22.21	20.38	18.56	16.15	15.01
5	10.07	08.57	07.28	06.42	05.02	03.38	03.36	04.58	06.27	07.49	08.19	09.46
	15.09	16.38	18.03	20.31	21.59	23.25	23.37	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.30	07.52	08.23	09.48
	15.12	16.41	18.05	20.34	22.02	23.28	23.35	22.14	20.31	18.49	16.09	14.58
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.26	09.50
	15.14	16.44	18.08	20.37	22.05	23.30	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.29	09.52
	15.16	16.47	18.11	20.39	22.08	23.32	23.32	22.08	20.25	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.44	05.10	06.38	08.00	08.32	09.54
	15.18	16.50	18.14	20.42	22.11	23.33	23.30	22.05	20.21	18.39	16.00	14.55
10	10.00	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.41	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.28	22.02	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.23	16.56	18.20	20.48	22.17	23.37	23.26	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.09	08.41	10.00
	15.26	16.59	18.23	20.51	22.20	23.38	23.24	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.38	03.26	03.54	05.21	06.49	08.12	08.44	10.02
	15.29	17.03	18.26	20.54	22.23	23.40	23.21	21.52	20.07	18.26	15.49	14.51
14	09.52	08.30	06.58	06.12	04.35	03.26	03.56	05.24	06.52	08.14	08.47	10.03
	15.31	17.06	18.28	20.57	22.26	23.41	23.19	21.49	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.08	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.05
	15.34	17.09	18.31	21.00	22.29	23.42	23.17	21.45	20.01	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.23	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.06	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.41	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.45	17.21	18.43	21.11	22.41	23.45	23.07	21.32	19.47	18.06	15.33	14.50
20	09.40	08.11	06.37	05.52	04.17	03.22	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.46	21.14	22.44	23.46	23.04	21.29	19.43	18.03	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.22	04.15	05.45	07.11	08.35	09.08	10.11
	15.51	17.27	18.48	21.17	22.47	23.46	23.02	21.26	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.11	03.23	04.17	05.47	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.50
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.47	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.58	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.03	03.24	04.26	05.56	07.21	07.46	09.20	10.13
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.52
26	09.25	07.51	06.17	05.32	04.01	03.24	04.29	05.59	07.24	07.49	09.22	10.13
	16.06	17.42	19.02	21.32	23.01	23.46	22.48	21.09	19.23	16.43	15.17	14.53
27	09.22	07.48	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.13
	16.10	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.20	16.40	15.14	14.54
28	09.19	07.44	06.10	05.25	03.56	03.26	04.34	06.04	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.45	22.42	21.02	19.16	16.37	15.12	14.56
29	09.17		07.06	05.22	03.53	03.27	04.37	06.07	07.32	07.58	09.31	10.12
	16.16		20.11	21.41	23.09	23.44	22.39	20.59	19.13	16.34	15.10	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.08	14.58
31	09.11		07.00		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.14		22.33	20.52		16.27		15.00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	151
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:
18.8.2021 15.08/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)**WTG:** Märkenkall 15 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (326)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,00	2,82	4,23	6,60	8,77	9,10	8,87	6,81	4,67	2,52	1,17	0,58

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
752	722	337	253	459	779	837	1297	1345	791	536	466	8575

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.10	09.08	07.41	06.56	05.15	03.47	03.30	04.46	06.16	07.38	08.07	09.36
	15.02	16.25	17.51	20.19	21.47	23.16	23.42	22.30	20.48	19.06	16.24	15.07
2	10.10	09.06	07.38	06.53	05.12	03.45	03.32	04.49	06.19	07.41	08.10	09.38
	15.04	16.28	17.54	20.22	21.50	23.18	23.41	22.27	20.45	19.03	16.21	15.05
3	10.09	09.03	07.34	06.49	05.09	03.42	03.33	04.52	06.21	07.44	08.13	09.41
	15.06	16.31	17.57	20.25	21.53	23.21	23.39	22.24	20.42	18.59	16.18	15.03
4	10.08	09.00	07.31	06.46	05.06	03.40	03.35	04.55	06.24	07.46	08.16	09.43
	15.08	16.35	18.00	20.28	21.56	23.23	23.38	22.21	20.38	18.56	16.15	15.02
5	10.07	08.57	07.28	06.43	05.03	03.39	03.37	04.58	06.27	07.49	08.19	09.46
	15.10	16.38	18.03	20.31	21.59	23.25	23.36	22.17	20.35	18.52	16.12	15.00
6	10.05	08.54	07.24	06.39	04.59	03.37	03.38	05.01	06.30	07.52	08.22	09.48
	15.12	16.41	18.06	20.34	22.02	23.27	23.35	22.14	20.31	18.49	16.09	14.59
7	10.04	08.51	07.21	06.36	04.56	03.35	03.40	05.04	06.32	07.55	08.26	09.50
	15.14	16.44	18.08	20.36	22.05	23.29	23.33	22.11	20.28	18.46	16.06	14.57
8	10.03	08.48	07.18	06.32	04.53	03.33	03.42	05.07	06.35	07.57	08.29	09.52
	15.16	16.47	18.11	20.39	22.08	23.31	23.31	22.08	20.25	18.42	16.03	14.56
9	10.01	08.45	07.14	06.29	04.50	03.32	03.45	05.10	06.38	08.00	08.32	09.54
	15.19	16.50	18.14	20.42	22.11	23.33	23.29	22.05	20.21	18.39	16.01	14.55
10	10.00	08.42	07.11	06.25	04.47	03.30	03.47	05.13	06.41	08.03	08.35	09.56
	15.21	16.53	18.17	20.45	22.14	23.35	23.28	22.02	20.18	18.36	15.58	14.54
11	09.58	08.39	07.08	06.22	04.44	03.29	03.49	05.16	06.43	08.06	08.38	09.58
	15.24	16.56	18.20	20.48	22.17	23.37	23.25	21.58	20.14	18.32	15.55	14.53
12	09.56	08.36	07.04	06.19	04.41	03.28	03.51	05.19	06.46	08.09	08.41	10.00
	15.26	17.00	18.23	20.51	22.20	23.38	23.23	21.55	20.11	18.29	15.52	14.52
13	09.54	08.33	07.01	06.15	04.38	03.27	03.54	05.22	06.49	08.12	08.44	10.02
	15.29	17.03	18.26	20.54	22.23	23.40	23.21	21.52	20.07	18.26	15.49	14.51
14	09.52	08.30	06.58	06.12	04.35	03.26	03.56	05.24	06.52	08.14	08.47	10.03
	15.31	17.06	18.29	20.57	22.26	23.41	23.19	21.49	20.04	18.22	15.46	14.51
15	09.50	08.26	06.54	06.09	04.32	03.25	03.59	05.27	06.54	08.17	08.50	10.05
	15.34	17.09	18.31	20.59	22.29	23.42	23.17	21.45	20.01	18.19	15.44	14.50
16	09.48	08.23	06.51	06.05	04.29	03.24	04.01	05.30	06.57	08.20	08.53	10.06
	15.37	17.12	18.34	21.02	22.32	23.43	23.14	21.42	19.57	18.16	15.41	14.50
17	09.46	08.20	06.47	06.02	04.26	03.24	04.04	05.33	07.00	08.23	08.56	10.07
	15.40	17.15	18.37	21.05	22.35	23.44	23.12	21.39	19.54	18.12	15.38	14.50
18	09.44	08.17	06.44	05.58	04.23	03.23	04.07	05.36	07.02	08.26	08.59	10.08
	15.43	17.18	18.40	21.08	22.38	23.45	23.09	21.35	19.50	18.09	15.36	14.50
19	09.42	08.14	06.41	05.55	04.20	03.23	04.09	05.39	07.05	08.29	09.02	10.09
	15.46	17.21	18.43	21.11	22.41	23.45	23.07	21.32	19.47	18.06	15.33	14.50
20	09.40	08.10	06.37	05.52	04.17	03.23	04.12	05.42	07.08	08.32	09.05	10.10
	15.48	17.24	18.46	21.14	22.43	23.46	23.04	21.29	19.43	18.03	15.31	14.50
21	09.37	08.07	06.34	05.48	04.14	03.23	04.15	05.45	07.11	08.35	09.08	10.11
	15.51	17.27	18.48	21.17	22.46	23.46	23.01	21.25	19.40	17.59	15.28	14.50
22	09.35	08.04	06.30	05.45	04.12	03.23	04.17	05.48	07.13	08.37	09.11	10.11
	15.54	17.30	18.51	21.20	22.49	23.46	22.59	21.22	19.37	17.56	15.26	14.51
23	09.32	08.01	06.27	05.42	04.09	03.23	04.20	05.50	07.16	08.40	09.14	10.12
	15.57	17.33	18.54	21.23	22.52	23.46	22.56	21.19	19.33	17.53	15.23	14.51
24	09.30	07.58	06.23	05.38	04.06	03.23	04.23	05.53	07.19	08.43	09.17	10.12
	16.00	17.36	18.57	21.26	22.55	23.46	22.53	21.15	19.30	17.50	15.21	14.52
25	09.27	07.54	06.20	05.35	04.04	03.24	04.26	05.56	07.22	07.46	09.19	10.12
	16.03	17.39	19.00	21.29	22.58	23.46	22.50	21.12	19.26	16.46	15.19	14.53
26	09.25	07.51	06.17	05.32	04.01	03.25	04.29	05.59	07.24	07.49	09.22	10.12
	16.07	17.42	19.02	21.32	23.00	23.46	22.47	21.09	19.23	16.43	15.17	14.54
27	09.22	07.48	06.13	05.28	03.58	03.25	04.32	06.02	07.27	07.52	09.25	10.12
	16.10	17.45	19.05	21.35	23.03	23.45	22.45	21.05	19.20	16.40	15.15	14.55
28	09.19	07.44	06.10	05.25	03.56	03.26	04.35	06.05	07.30	07.55	09.28	10.12
	16.13	17.48	19.08	21.38	23.06	23.44	22.42	21.02	19.16	16.37	15.13	14.56
29	09.17		07.06	05.22	03.54	03.28	04.38	06.07	07.32	07.58	09.31	10.12
	16.16		20.11	21.41	23.08	23.44	22.39	20.59	19.13	16.34	15.11	14.57
30	09.14		07.03	05.19	03.51	03.29	04.40	06.10	07.35	08.01	09.33	10.12
	16.19		20.14	21.44	23.11	23.43	22.36	20.55	19.09	16.31	15.09	14.58
31	09.11		07.00		03.49		04.43	06.13		08.04		10.11
	16.22		20.17		23.14		22.33	20.52		16.28		15.00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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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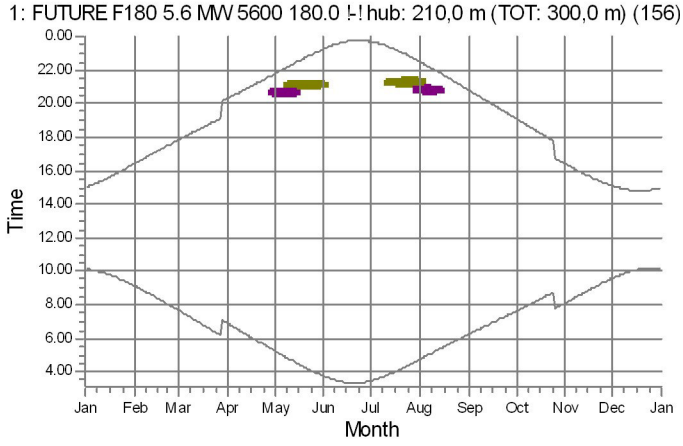
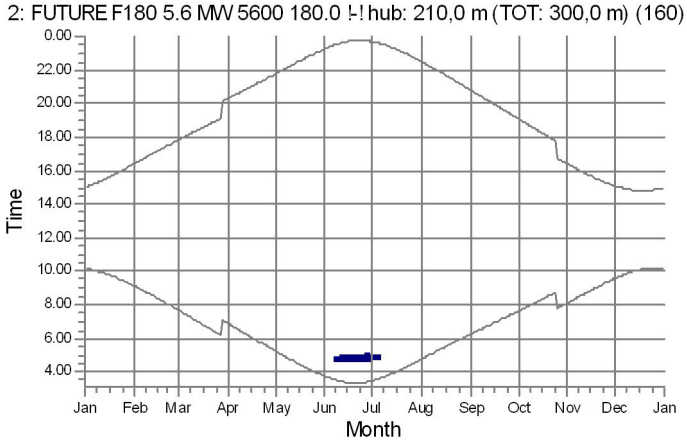
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

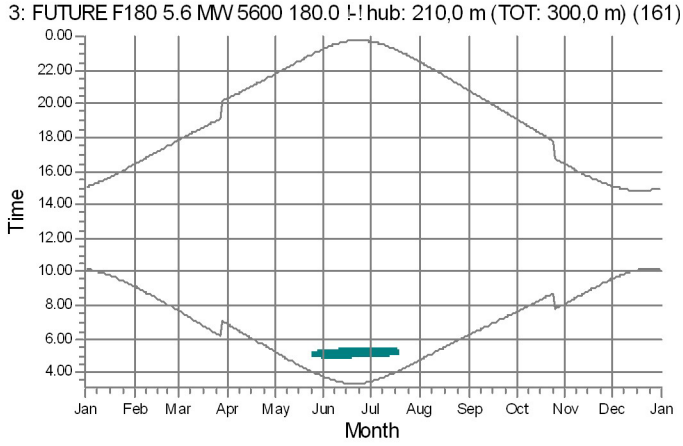
1: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (156)



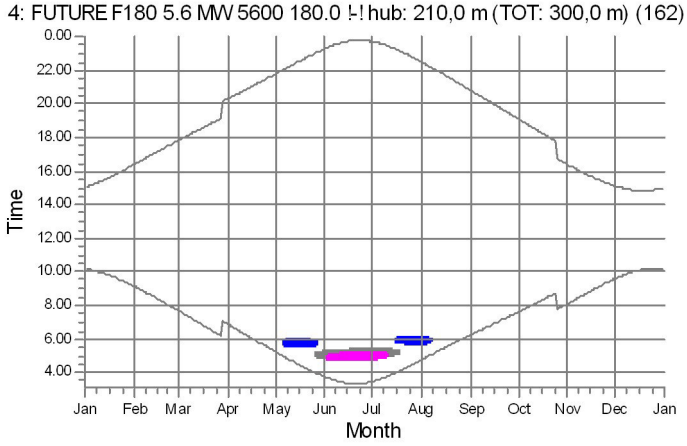
2: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (160)



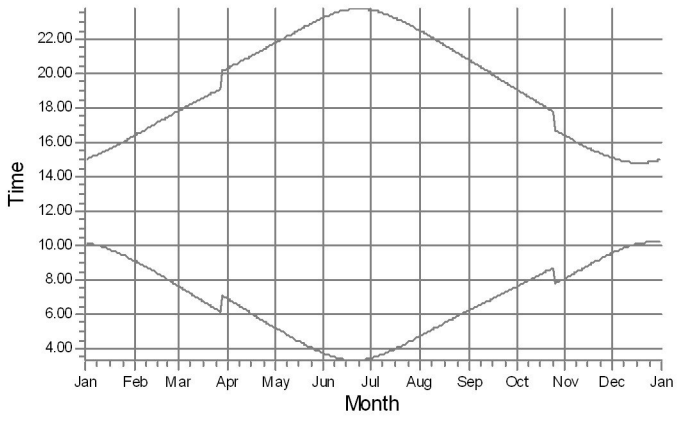
3: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (161)



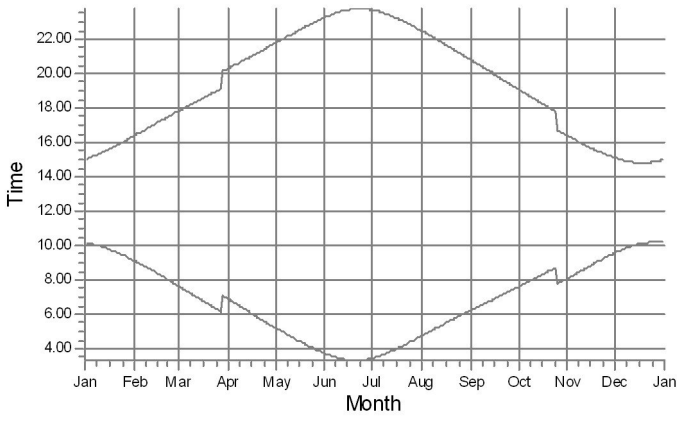
4: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (162)



5: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (155)



6: FUTURE F180 5.6 MW 5600 180.0 ┣! hub: 210,0 m (TOT: 300,0 m) (158)



Shadow receptors

RH01: RH01
RH02: RH02
RH03: RH03
RH04: RH04
RH05: RH05
RH08: RH08
RH09: RH09

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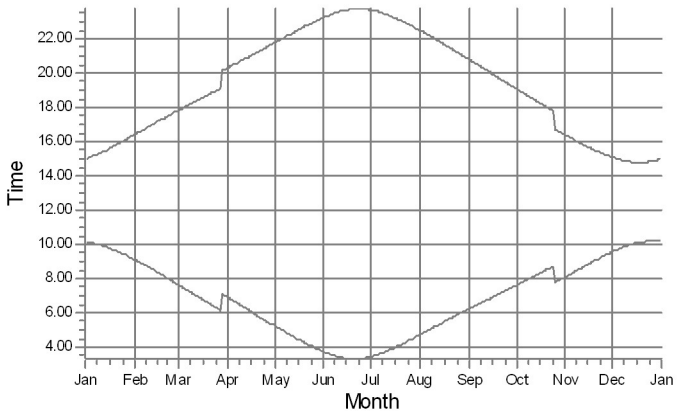
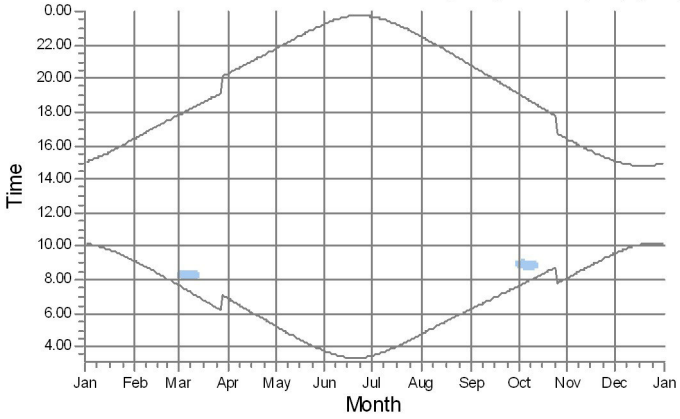
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

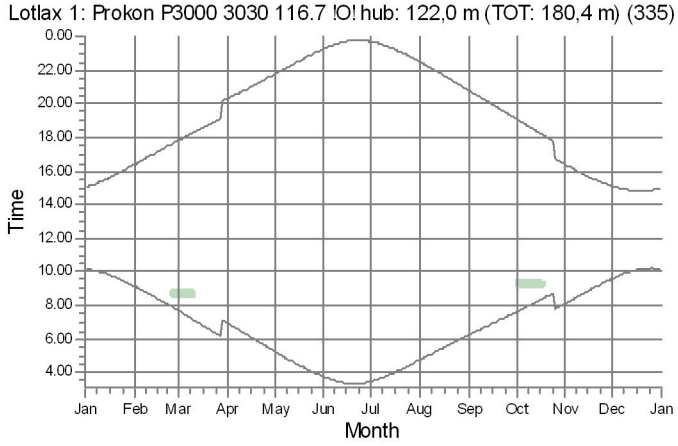
7: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)



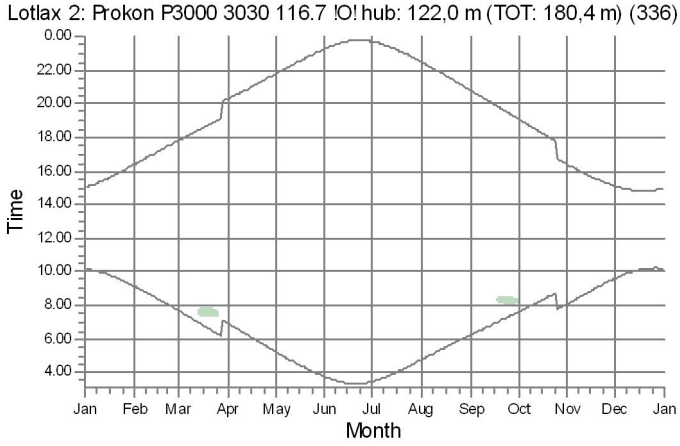
8: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)



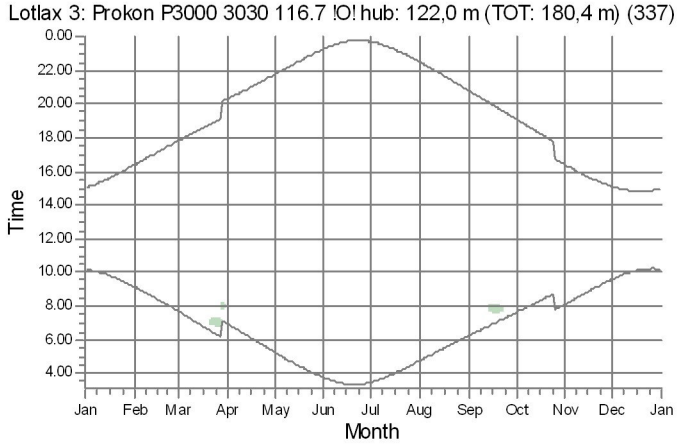
Lotlax 1: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (335)



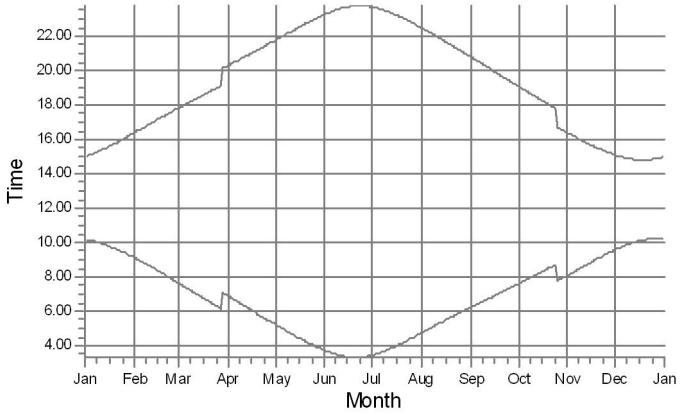
Lotlax 2: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)



Lotlax 3: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)



Lålax 1: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



Shadow receptors

RH12: RH12 RH13: RH13

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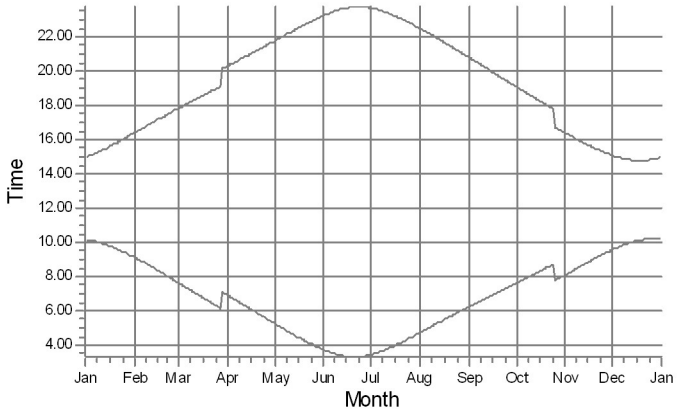
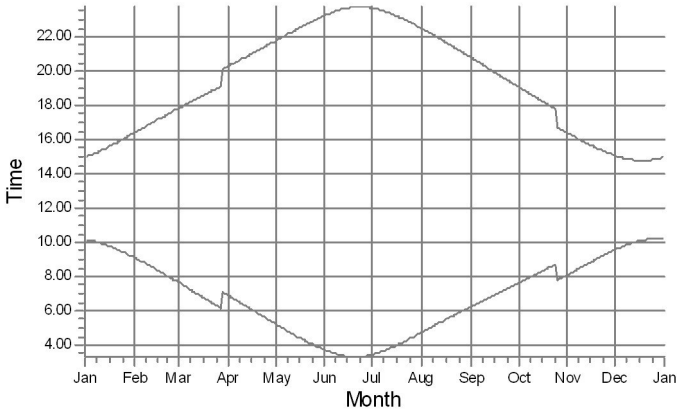
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

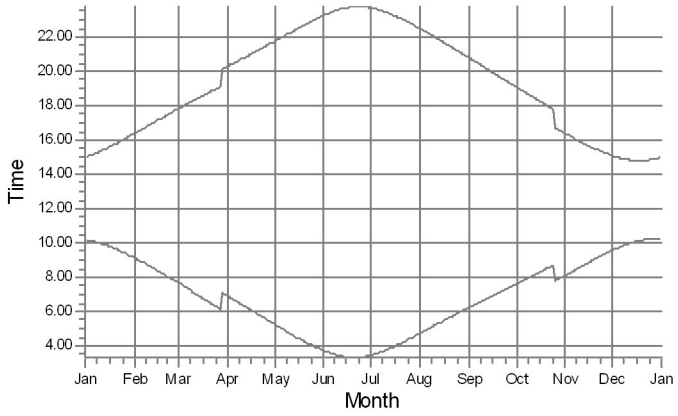
Lålax 2: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



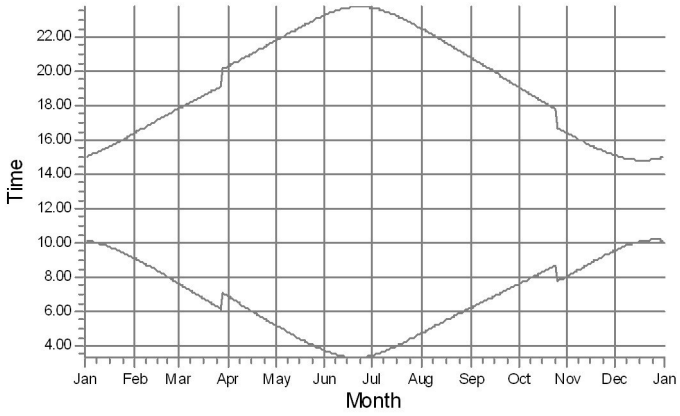
Lålax 3: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



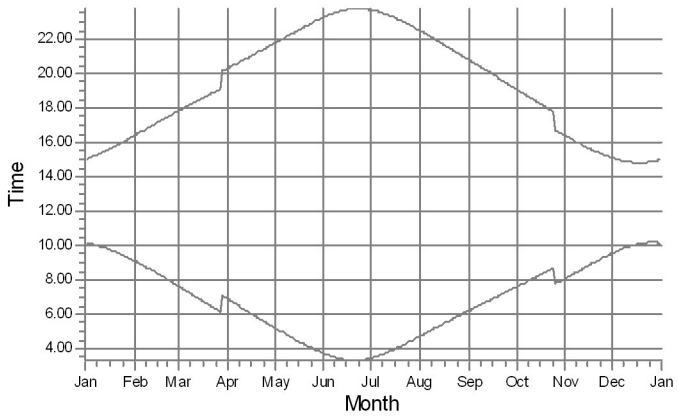
Lålax 4: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



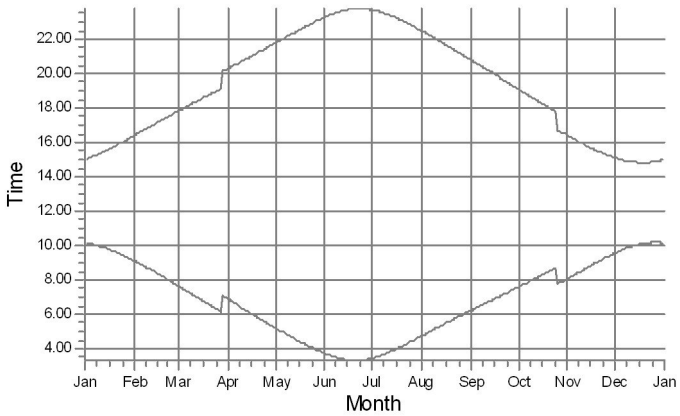
Märkenkall 01: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 02: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 03: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Shadow receptors

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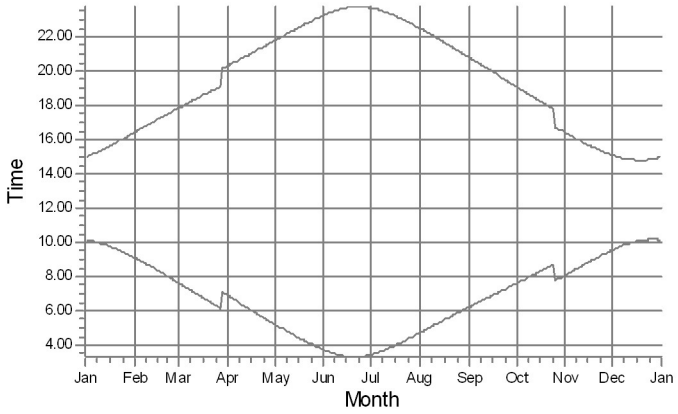
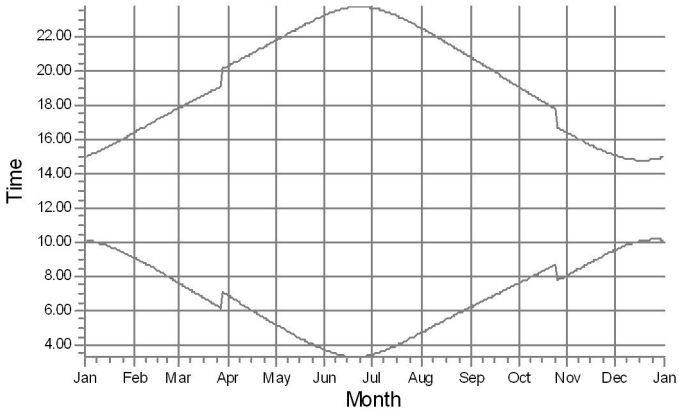
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

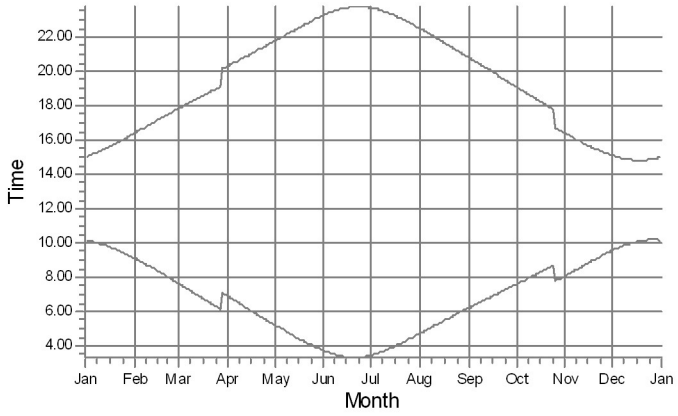
Märkenkall 04: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



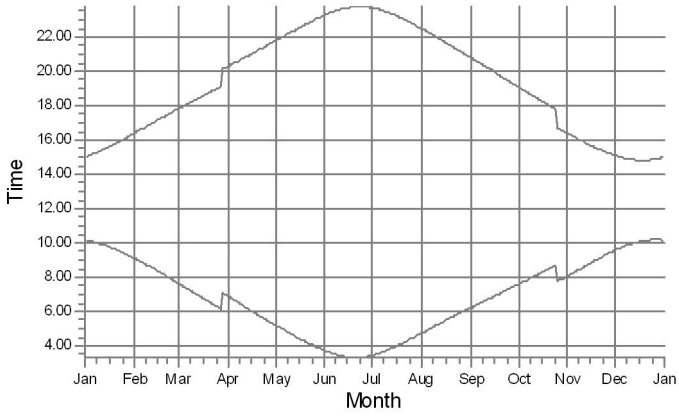
Märkenkall 05: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



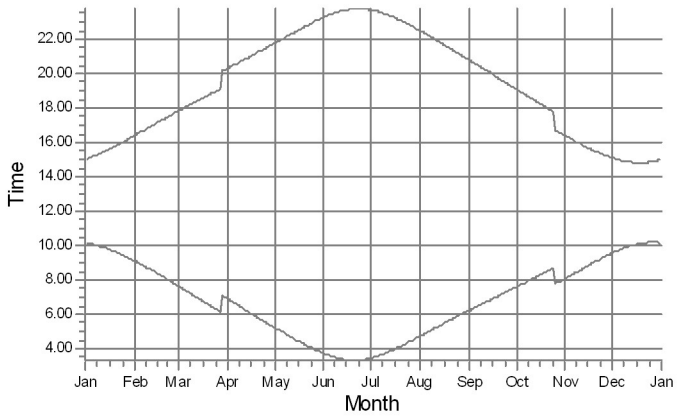
Märkenkall 06: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



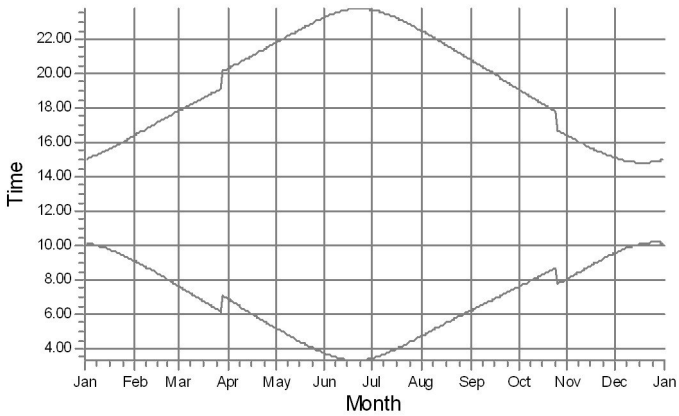
Märkenkall 07: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 08: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 09: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Shadow receptors

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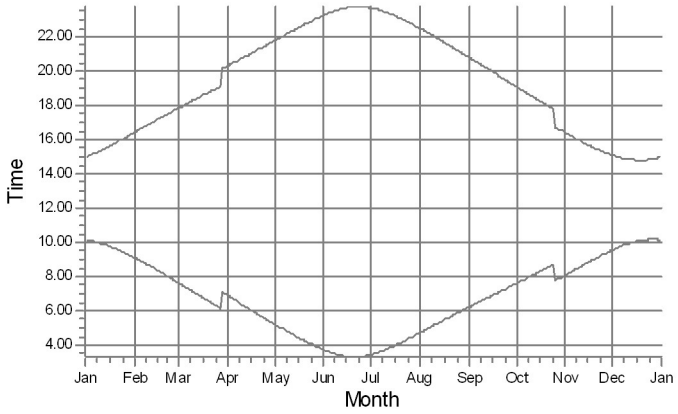
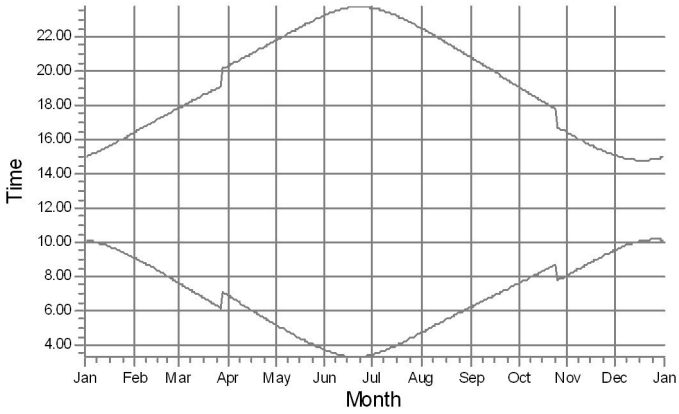
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)

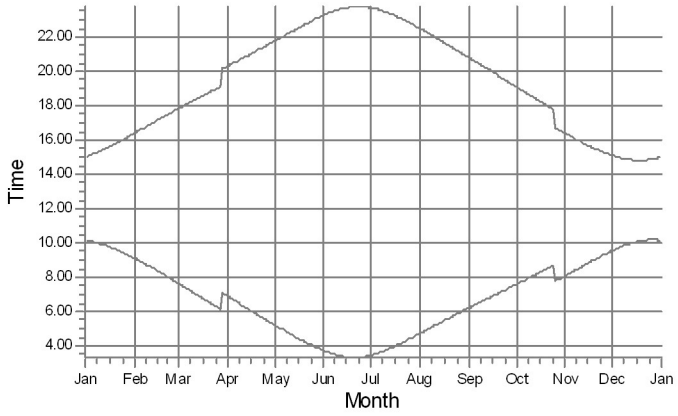
Märkenkall 10: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



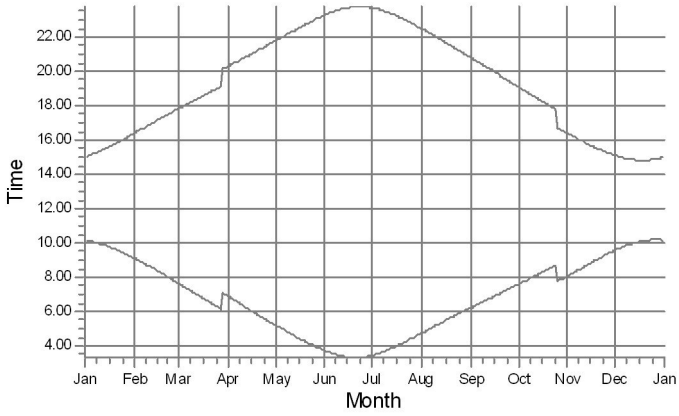
Märkenkall 11: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



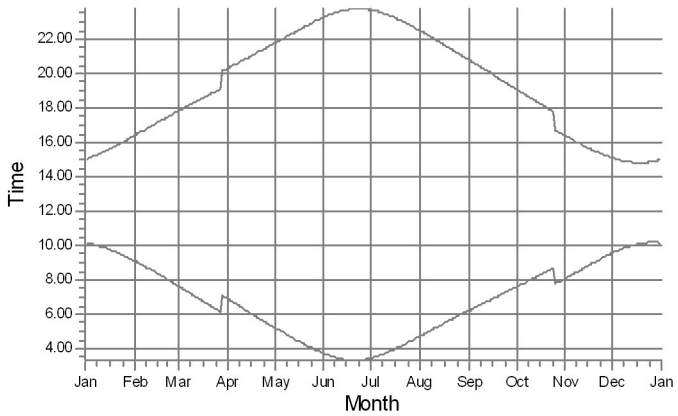
Märkenkall 12: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



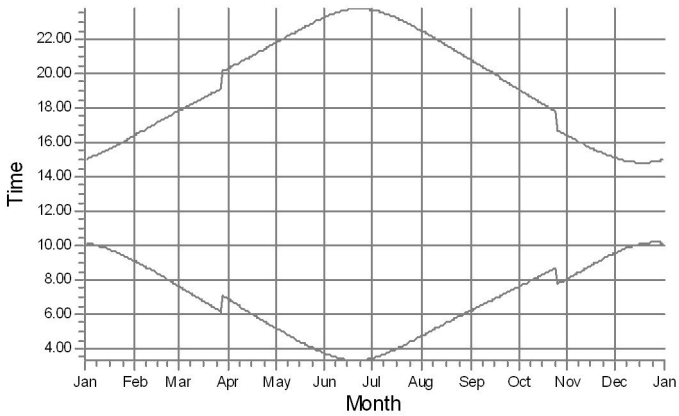
Märkenkall 13: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 14: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 15: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Shadow receptors

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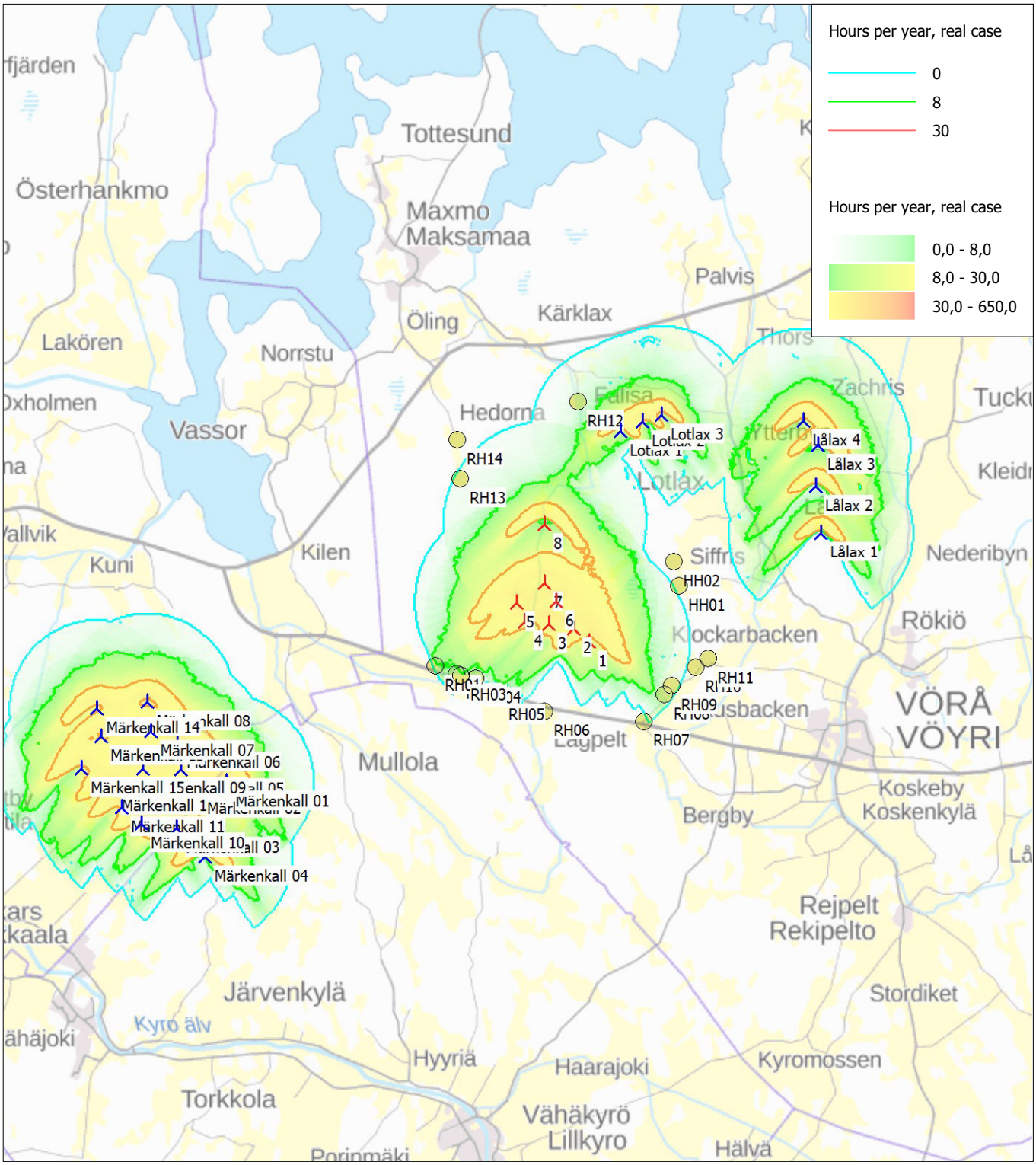
Calculated:
18.8.2021 15.08/3.3.247

SHADOW - Map

Calculation: MP Proposal, 8xF180 @210m, Real case - cumulative impact (permitted WTG types)



Map: Söde_Background map_160k , Print scale 1:120 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 252 810 North: 7 011 600

New WTG Shadow receptor

Flicker map level: DEM 10m

Bilaga 4

Modelleringens utgångsdata och resultat,

worst case kumulativa konsekvenser

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SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

Assumptions for shadow calculations

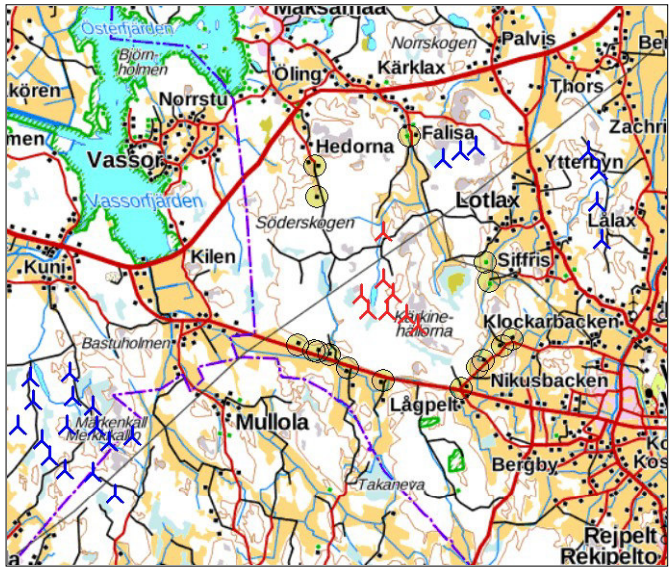
Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

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

The calculated times are "worst case" given by the following assumptions:
- The sun is shining all the day, from sunrise to sunset
- The rotor plane is always perpendicular to the line from the WTG to the sun
- The WTG is always operating

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: DEM 10m
Obstacles not 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	255445	7011327	46,5	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
2	255137	7011612	50,4	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
3	254614	7011705	38,8	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
4	254111	7011739	25,8	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
5	253945	7012144	33,9	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
6	254771	7012174	40,0	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
7	254521	7012552	35,0	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
8	254528	7013790	19,2	FUTURE F180 5.6 MW ...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	2102	12,1
Lotlax 1	256101	7015730	27,0	Prokon P3000 3030 116...	No	Prokon	P3000-3030	3030	116,7	122,0	1836	0,0
Lotlax 2	256560	7015928	33,2	Prokon P3000 3030 116...	No	Prokon	P3000-3030	3030	116,7	122,0	1836	0,0
Lotlax 3	256964	7016058	30,0	Prokon P3000 3030 116...	No	Prokon	P3000-3030	3030	116,7	122,0	1836	0,0
Lålax 1	260278	7013601	21,1	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Lålax 2	260174	7014579	28,5	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Lålax 3	260216	7015429	20,8	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Lålax 4	259924	7015937	27,7	VESTAS V150-4.2 4200...	Yes	VESTAS	V150-4.2-4200	4200	150,0	140,0	1903	10,4
Märkenkall 01	247894	7008402	21,5	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 02	247294	7008259	25,0	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 03	246855	7007441	24,7	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 04	247445	7006854	25,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 05	246950	7008670	26,1	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 06	246864	7009208	21,0	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 07	246326	7009461	17,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 08	246247	7010081	20,5	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 09	246160	7008681	29,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 10	246126	7007532	23,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 11	245712	7007870	13,7	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 12	245517	7008318	15,8	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 13	245281	7009344	17,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 14	245200	7009948	18,9	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0
Märkenkall 15	244881	7008680	14,1	GE WIND ENERGY 5.5-...	Yes	GE WIND ENERGY	5.5-158 Thrust 665-5500	5500	158,0	161,0	1816	0,0

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]
HH01	HH01	257331	7012499	17,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
HH02	HH02	257219	7012995	17,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH01	RH01	252257	7010823	13,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH02	RH02	252700	7010660	15,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0

To be continued on next page...

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SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

...continued from previous page

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]
RH03	RH03	252789	7010635	14,7	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH04	RH04	253090	7010568	15,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH05	RH05	253574	7010222	14,2	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH06	RH06	254528	7009881	18,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH07	RH07	256594	7009667	21,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH08	RH08	257015	7010236	19,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH09	RH09	257177	7010423	17,1	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH10	RH10	257669	7010798	18,8	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH11	RH11	257929	7010986	18,5	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH12	RH12	255219	7016333	14,3	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH13	RH13	252762	7014727	25,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
RH14	RH14	252714	7015547	21,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0

Calculation Results

Shadow receptor

		Shadow, worst case		
No.	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
HH01	HH01	0:00	0	0:00
HH02	HH02	0:00	0	0:00
RH01	RH01	12:05	45	0:21
RH02	RH02	17:54	52	0:25
RH03	RH03	10:55	38	0:22
RH04	RH04	17:49	53	0:24
RH05	RH05	5:27	28	0:15
RH06	RH06	0:00	0	0:00
RH07	RH07	0:00	0	0:00
RH08	RH08	15:43	53	0:23
RH09	RH09	11:01	38	0:22
RH10	RH10	0:00	0	0:00
RH11	RH11	0:00	0	0:00
RH12	RH12	20:37	67	0:28
RH13	RH13	7:13	26	0:21
RH14	RH14	0:00	0	0:00

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

No.	Name	Worst case [h/year]
1	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)	26:44
2	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)	5:27
3	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)	17:49
4	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)	34:07
5	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)	0:00
6	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)	0:00
7	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)	0:00
8	FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)	7:13
Lotlax 1	Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (335)	10:56
Lotlax 2	Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)	6:07
Lotlax 3	Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)	3:34
Lålax 1	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (338)	0:00
Lålax 2	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (339)	0:00
Lålax 3	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (340)	0:00
Lålax 4	VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (341)	0:00
Märkenkall 01	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (320)	0:00
Märkenkall 02	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (327)	0:00
Märkenkall 03	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (328)	0:00
Märkenkall 04	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (329)	0:00
Märkenkall 05	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (330)	0:00
Märkenkall 06	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (331)	0:00
Märkenkall 07	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (332)	0:00
Märkenkall 08	GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (333)	0:00

To be continued on next page...

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SHADOW - Main Result

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

...continued from previous page

No.	Name	Worst case [h/year]
	Märkenkall 09 GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (334)	0:00
	Märkenkall 10 GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (321)	0:00
	Märkenkall 11 GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (322)	0:00
	Märkenkall 12 GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (323)	0:00
	Märkenkall 13 GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (324)	0:00
	Märkenkall 14 GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (325)	0:00
	Märkenkall 15 GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (326)	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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SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** HH01 - HH01

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:28	04:45	06:15	07:37	08:07	09:35
	15:00	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:23	15:05
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:17	07:40	08:10	09:38
	15:02	16:27	17:53	20:21	21:49	23:18	23:40	22:26	20:44	19:02	16:20	15:03
3	10:08	09:02	07:34	06:48	05:08	03:41	03:31	04:51	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:04	03:39	03:33	04:54	06:23	07:45	08:16	09:43
	15:06	16:33	17:59	20:27	21:55	23:23	23:38	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:36	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:47
	15:10	16:40	18:04	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55	03:33	03:39	05:03	06:31	07:54	08:25	09:50
	15:12	16:43	18:07	20:36	22:04	23:29	23:33	22:10	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:55
9	10:01	08:44	07:13	06:28	04:49	03:30	03:43	05:09	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	15:59	14:53
10	09:59	08:41	07:10	06:24	04:46	03:29	03:45	05:11	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:56	14:52
11	09:57	08:38	07:07	06:21	04:42	03:27	03:47	05:14	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:36	23:25	21:58	20:13	18:31	15:54	14:51
12	09:56	08:35	07:03	06:18	04:39	03:26	03:50	05:17	06:45	08:08	08:40	09:59
	15:25	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:36	03:25	03:52	05:20	06:48	08:11	08:43	10:01
	15:27	17:01	18:25	20:53	22:22	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:33	03:24	03:55	05:23	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:49
15	09:50	08:26	06:53	06:07	04:30	03:23	03:57	05:26	06:53	08:16	08:49	10:04
	15:33	17:08	18:30	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:42	14:49
16	09:48	08:22	06:50	06:04	04:27	03:22	04:00	05:29	06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:02	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:48
17	09:46	08:19	06:46	06:01	04:24	03:22	04:02	05:32	06:59	08:22	08:55	10:07
	15:38	17:14	18:36	21:05	22:34	23:44	23:11	21:38	19:53	18:11	15:37	14:48
18	09:44	08:16	06:43	05:57	04:21	03:21	04:05	05:35	07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07	22:37	23:45	23:09	21:35	19:49	18:08	15:34	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:10	05:41	07:07	08:31	09:04	10:10
	15:47	17:23	18:45	21:13	22:43	23:46	23:04	21:28	19:43	18:01	15:29	14:48
21	09:37	08:06	06:33	05:47	04:13	03:21	04:13	05:43	07:10	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44	04:10	03:21	04:16	05:46	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:36	17:55	15:24	14:49
23	09:32	08:00	06:26	05:41	04:07	03:21	04:19	05:49	07:15	08:40	09:13	10:11
	15:56	17:32	18:53	21:22	22:52	23:46	22:55	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:54	23:46	22:53	21:15	19:29	17:49	15:20	14:50
25	09:27	07:53	06:19	05:34	04:02	03:22	04:25	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:25	16:45	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:27	05:58	07:23	07:49	09:22	10:12
	16:05	17:41	19:02	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:15	14:52
27	09:21	07:47	06:12	05:27	03:57	03:24	04:30	06:01	07:26	07:51	09:25	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:54	03:25	04:33	06:03	07:29	07:54	09:27	10:12
	16:11	17:47	19:07	21:37	23:05	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:05	05:21	03:52	03:26	04:36	06:06	07:32	07:57	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:33	15:09	14:55
30	09:13		07:02	05:17	03:50	03:27	04:39	06:09	07:34	08:00	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35	20:54	19:08	16:30	15:07	14:57
31	09:11		06:59		03:47		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:26		14:58
Potential sun hours Total, worst case	182	242	363	447	559	605	594	502	392	308	206	151

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** HH02 - HH02

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:28	04:45	06:15	07:37	08:07	09:35
	15:00	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:23	15:05
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:17	07:40	08:10	09:38
	15:02	16:27	17:53	20:21	21:49	23:18	23:40	22:26	20:44	19:02	16:20	15:03
3	10:08	09:02	07:34	06:48	05:08	03:41	03:31	04:51	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:04	03:39	03:33	04:54	06:23	07:45	08:16	09:43
	15:06	16:33	17:59	20:27	21:55	23:23	23:38	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:36	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:48
	15:10	16:40	18:04	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55	03:33	03:39	05:03	06:31	07:54	08:25	09:50
	15:12	16:43	18:07	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:55
9	10:01	08:44	07:14	06:28	04:49	03:30	03:43	05:09	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	15:59	14:53
10	09:59	08:41	07:10	06:24	04:46	03:29	03:45	05:11	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:56	14:52
11	09:57	08:38	07:07	06:21	04:42	03:27	03:47	05:14	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:37	23:25	21:58	20:13	18:31	15:54	14:51
12	09:56	08:35	07:03	06:18	04:39	03:26	03:50	05:17	06:45	08:08	08:40	10:00
	15:25	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:36	03:25	03:52	05:20	06:48	08:11	08:43	10:01
	15:27	17:01	18:25	20:53	22:22	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:33	03:24	03:55	05:23	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:49
15	09:50	08:26	06:53	06:07	04:30	03:23	03:57	05:26	06:53	08:16	08:49	10:04
	15:33	17:08	18:30	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:42	14:49
16	09:48	08:22	06:50	06:04	04:27	03:22	04:00	05:29	06:56	08:19	08:52	10:06
	15:36	17:11	18:33	21:02	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:48
17	09:46	08:19	06:46	06:01	04:24	03:22	04:02	05:32	06:59	08:22	08:55	10:07
	15:38	17:14	18:36	21:05	22:34	23:44	23:11	21:38	19:53	18:11	15:37	14:48
18	09:44	08:16	06:43	05:57	04:21	03:21	04:05	05:35	07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07	22:37	23:45	23:09	21:35	19:49	18:08	15:34	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:10	05:41	07:07	08:31	09:04	10:10
	15:47	17:23	18:45	21:13	22:43	23:46	23:04	21:28	19:43	18:01	15:29	14:48
21	09:37	08:06	06:33	05:47	04:13	03:21	04:13	05:43	07:10	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44	04:10	03:21	04:16	05:46	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:36	17:55	15:24	14:49
23	09:32	08:00	06:26	05:41	04:07	03:21	04:19	05:49	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:46	22:56	21:18	19:32	17:52	15:22	14:49
24	09:29	07:57	06:23	05:37	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:49	15:20	14:50
25	09:27	07:53	06:19	05:34	04:02	03:22	04:24	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:25	16:45	15:17	14:51
26	09:24	07:50	06:16	05:31	03:59	03:23	04:27	05:58	07:23	07:49	09:22	10:12
	16:05	17:41	19:02	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:15	14:52
27	09:21	07:47	06:12	05:27	03:57	03:24	04:30	06:01	07:26	07:52	09:25	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:54	03:25	04:33	06:03	07:29	07:55	09:27	10:12
	16:11	17:47	19:07	21:37	23:06	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:05	05:21	03:52	03:26	04:36	06:06	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:33	15:09	14:55
30	09:13		07:02	05:17	03:50	03:27	04:39	06:09	07:34	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35	20:54	19:08	16:29	15:07	14:57
31	09:11		06:59		03:47		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:26		14:58
Potential sun hours Total, worst case	182	242	363	447	559	605	594	502	392	308	206	151

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH01 - RH01

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May		June	July		August		September	October	November	December
1	10:10	09:08	07:41	06:56	05:15		03:46	03:29		04:45		05:46 (4)	06:15	07:37	08:07	09:36
	15:01	16:24	17:50	20:19	21:46		23:16	23:42		22:29	20	06:06 (4)	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11		03:44	03:31		04:48		05:47 (4)	06:18	07:40	08:10	09:38
	15:03	16:28	17:53	20:22	21:49		23:18	23:40		22:26	19	06:06 (4)	20:45	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08		03:42	03:32		04:51		05:47 (4)	06:21	07:43	08:13	09:41
	15:05	16:31	17:56	20:25	21:52		23:21	23:39		22:23	18	06:05 (4)	20:41	18:59	16:18	15:02
4	10:07	08:59	07:31	06:45	05:05		03:40	03:34		04:54		05:49 (4)	06:23	07:46	08:16	09:43
	15:07	16:34	17:59	20:27	21:55		23:23	23:38		22:20	15	06:04 (4)	20:38	18:55	16:15	15:01
5	10:06	08:56	07:27	06:42	05:02		03:38	03:36		04:57		05:49 (4)	06:26	07:49	08:19	09:45
	15:09	16:37	18:02	20:30	21:58		23:25	23:36		22:17	14	06:03 (4)	20:34	18:52	16:12	14:59
6	10:05	08:53	07:24	06:38	04:59	05:44 (4)	03:36	03:37		05:00		05:51 (4)	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	6 05:50 (4)	23:27	23:35		22:14	10	06:01 (4)	20:31	18:48	16:09	14:58
7	10:04	08:50	07:21	06:35	04:55	05:41 (4)	03:34	03:39		05:03		05:55 (4)	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	11 05:52 (4)	23:29	23:33		22:11	2	05:57 (4)	20:27	18:45	16:06	14:56
8	10:02	08:47	07:17	06:32	04:52	05:39 (4)	03:32	03:41		05:06			06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07	14 05:53 (4)	23:31	23:31		22:08			20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49	05:38 (4)	03:31	03:44		05:09			06:37	08:00	08:31	09:54
	15:18	16:49	18:14	20:42	22:10	17 05:55 (4)	23:33	23:29		22:04			20:21	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	05:37 (4)	03:29	03:46		05:12			06:40	08:03	08:34	09:56
	15:20	16:53	18:16	20:45	22:13	18 05:55 (4)	23:35	23:27		22:01			20:17	18:35	15:57	14:53
11	09:58	08:38	07:07	06:21	04:43	05:36 (4)	03:28	03:48		05:15			06:43	08:05	08:37	09:58
	15:23	16:56	18:19	20:47	22:16	19 05:55 (4)	23:36	23:25		21:58			20:14	18:32	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	05:36 (4)	03:27	03:50		05:18			06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	20 05:56 (4)	23:38	23:23		21:55			20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:15	04:37	05:36 (4)	03:26	03:53		05:21			06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	20 05:56 (4)	23:39	23:21		21:51			20:07	18:25	15:48	14:51
14	09:52	08:29	06:57	06:11	04:34	05:36 (4)	03:25	03:55		05:24			06:51	08:14	08:47	10:03
	15:31	17:05	18:28	20:56	22:25	21 05:57 (4)	23:41	23:19		21:48			20:03	18:22	15:46	14:50
15	09:50	08:26	06:54	06:08	04:31	05:35 (4)	03:24	03:58		05:27			06:54	08:17	08:50	10:04
	15:33	17:08	18:31	20:59	22:28	21 05:56 (4)	23:42	23:16		21:45			20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:05	04:28	05:36 (4)	03:23	04:00	05:54 (4)	05:30			06:56	08:20	08:53	10:06
	15:36	17:11	18:34	21:02	22:31	21 05:57 (4)	23:43	23:14	3 05:57 (4)	21:42			19:57	18:15	15:40	14:49
17	09:46	08:20	06:47	06:01	04:25	05:35 (4)	03:23	04:03	05:51 (4)	05:32			06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34	21 05:56 (4)	23:44	23:11	8 05:59 (4)	21:38			19:53	18:12	15:38	14:49
18	09:44	08:16	06:43	05:58	04:22	05:36 (4)	03:22	04:06	05:51 (4)	05:35			07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37	20 05:56 (4)	23:45	23:09	11 06:02 (4)	21:35			19:50	18:08	15:35	14:49
19	09:41	08:13	06:40	05:54	04:19	05:36 (4)	03:22	04:08	05:50 (4)	05:38			07:05	08:28	09:02	10:09
	15:45	17:20	18:42	21:11	22:40	20 05:56 (4)	23:45	23:06	13 06:03 (4)	21:32			19:46	18:05	15:32	14:49
20	09:39	08:10	06:37	05:51	04:16	05:36 (4)	03:22	04:11	05:49 (4)	05:41			07:07	08:31	09:05	10:10
	15:48	17:23	18:45	21:14	22:43	19 05:55 (4)	23:46	23:04	15 06:04 (4)	21:28			19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:14	05:37 (4)	03:22	04:14	05:48 (4)	05:44			07:10	08:34	09:08	10:11
	15:51	17:26	18:48	21:17	22:46	18 05:55 (4)	23:46	23:01	16 06:04 (4)	21:25			19:40	17:59	15:27	14:49
22	09:34	08:04	06:30	05:44	04:11	05:37 (4)	03:22	04:17	05:47 (4)	05:47			07:13	08:37	09:10	10:11
	15:54	17:29	18:51	21:19	22:49	18 05:55 (4)	23:46	22:58	18 06:05 (4)	21:22			19:36	17:55	15:25	14:50
23	09:32	08:00	06:26	05:41	04:08	05:38 (4)	03:22	04:19	05:47 (4)	05:50			07:15	08:40	09:13	10:12
	15:57	17:32	18:53	21:22	22:52	16 05:54 (4)	23:46	22:56	19 06:06 (4)	21:18			19:33	17:52	15:23	14:50
24	09:29	07:57	06:23	05:38	04:05	05:39 (4)	03:22	04:22	05:47 (4)	05:53			07:18	08:43	09:16	10:12
	16:00	17:35	18:56	21:25	22:55	14 05:53 (4)	23:46	22:53	19 06:06 (4)	21:15			19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:03	05:40 (4)	03:23	04:25	05:46 (4)	05:55			07:21	07:46	09:19	10:12
	16:03	17:38	18:59	21:28	22:57	12 05:52 (4)	23:46	22:50	20 06:06 (4)	21:12			19:26	16:46	15:18	14:52
26	09:24	07:50	06:16	05:31	04:00	05:42 (4)	03:24	04:28	05:47 (4)	05:58			07:24	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	9 05:51 (4)	23:46	22:47	20 06:07 (4)	21:08			19:22	16:43	15:16	14:53
27	09:22	07:47	06:13	05:28	03:58	05:43 (4)	03:24	04:31	05:46 (4)	06:01			07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	6 05:49 (4)	23:45	22:44	21 06:07 (4)	21:05			19:19	16:39	15:14	14:54
28	09:19	07:44	06:09	05:24	03:55		03:25	04:34	05:46 (4)	06:04			07:29	07:55	09:28	10:12
	16:12	17:47	19:08	21:37	23:06		23:44	22:41	21 06:07 (4)	21:01			19:16	16:36	15:12	14:55
29	09:16		07:06	05:21	03:53		03:26	04:37	05:46 (4)	06:07			07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08		23:44	22:38	21 06:07 (4)	20:58			19:12	16:33	15:10	14:56
30	09:14		07:02	05:18	03:50		03:28	04:40	05:46 (4)	06:10			07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11		23:43	22:35	21 06:07 (4)	20:55			19:09	16:30	15:08	14:57
31	09:11		06:59		03:48			04:43	05:47 (4)	06:12				08:04		10:11
	16:21		20:16		23:13			22:32	20 06:07 (4)	20:51				16:27		14:59
Potential sun hours	182	242	363	447	559		605	594		502			392	308	206	151
Total, worst case						361			266		98					

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH02 - RH02

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May		June		July		August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15		03:46		04:56 (4)	03:29	04:59 (4)	04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46		23:16	18	05:14 (4)	03:42	05:23 (4)	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11		03:44		04:55 (4)	03:30	05:00 (4)	04:48	06:18	07:40	08:10	09:38
	15:03	16:28	17:53	20:22	21:49		23:18	19	05:14 (4)	03:40	05:24 (4)	22:26	20:44	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08		03:42		04:55 (4)	03:32	05:00 (4)	04:51	06:21	07:43	08:13	09:41
	15:05	16:31	17:56	20:25	21:52		23:21	21	05:16 (4)	03:39	05:23 (4)	22:23	20:41	18:59	16:18	15:02
4	10:07	08:59	07:31	06:45	05:05		03:40		04:56 (4)	03:34	05:00 (4)	04:54	06:23	07:46	08:16	09:43
	15:07	16:34	17:59	20:27	21:55		23:23	20	05:16 (4)	03:38	05:23 (4)	22:20	20:38	18:55	16:15	15:01
5	10:06	08:56	07:27	06:42	05:02		03:38		04:55 (4)	03:36	05:00 (4)	04:57	06:26	07:48	08:19	09:45
	15:09	16:37	18:02	20:30	21:58		23:25	21	05:16 (4)	03:36	05:23 (4)	22:17	20:34	18:52	16:12	14:59
6	10:05	08:53	07:24	06:38	04:59		03:36		04:55 (4)	03:37	05:01 (4)	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01		23:27	22	05:17 (4)	03:35	05:23 (4)	22:14	20:31	18:48	16:09	14:58
7	10:04	08:50	07:21	06:35	04:55		03:34		04:55 (4)	03:39	05:01 (4)	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04		23:29	22	05:17 (4)	03:33	05:23 (4)	22:11	20:27	18:45	16:06	14:56
8	10:02	08:47	07:17	06:32	04:52		03:32		04:55 (4)	03:41	05:02 (4)	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07		23:31	23	05:18 (4)	03:31	05:23 (4)	22:08	20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49		03:31		04:55 (4)	03:44	05:02 (4)	05:09	06:37	08:00	08:31	09:54
	15:18	16:49	18:14	20:42	22:10		23:33	23	05:18 (4)	03:29	05:22 (4)	22:04	20:21	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46		03:29		04:55 (4)	03:46	05:03 (4)	05:12	06:40	08:02	08:34	09:56
	15:20	16:53	18:16	20:45	22:13		23:35	23	05:18 (4)	03:27	05:22 (4)	22:01	20:17	18:35	15:57	14:53
11	09:58	08:38	07:07	06:21	04:43		03:28		04:55 (4)	03:48	05:04 (4)	05:15	06:43	08:05	08:37	09:58
	15:23	16:56	18:19	20:47	22:16		23:36	24	05:19 (4)	03:25	05:22 (4)	21:58	20:14	18:32	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40		03:27		04:55 (4)	03:50	05:05 (4)	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19		23:38	24	05:19 (4)	03:23	05:22 (4)	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:15	04:37		03:26		04:55 (4)	03:53	05:05 (4)	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22		23:39	24	05:19 (4)	03:21	05:21 (4)	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34		03:25		04:56 (4)	03:55	05:06 (4)	05:24	06:51	08:14	08:46	10:03
	15:31	17:05	18:28	20:56	22:25		23:41	24	05:20 (4)	03:19	05:20 (4)	21:48	20:03	18:22	15:46	14:50
15	09:50	08:26	06:54	06:08	04:31		03:24		04:55 (4)	03:58	05:07 (4)	05:27	06:54	08:17	08:50	10:04
	15:33	17:08	18:31	20:59	22:28		23:42	25	05:20 (4)	03:16	05:19 (4)	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28		03:23		04:56 (4)	04:00	05:09 (4)	05:30	06:56	08:20	08:53	10:06
	15:36	17:11	18:34	21:02	22:31		23:43	24	05:20 (4)	03:14	05:18 (4)	21:42	19:57	18:15	15:40	14:49
17	09:46	08:20	06:47	06:01	04:25		03:23		04:56 (4)	04:03	05:12 (4)	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34		23:44	25	05:21 (4)	03:11	05:15 (4)	21:38	19:53	18:12	15:38	14:49
18	09:44	08:16	06:43	05:58	04:22		03:22		04:56 (4)	04:06		05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37		23:44	25	05:21 (4)	03:09		21:35	19:50	18:08	15:35	14:49
19	09:41	08:13	06:40	05:54	04:19		03:22		04:56 (4)	04:08		05:38	07:05	08:28	09:02	10:09
	15:45	17:20	18:42	21:11	22:40		23:45	25	05:21 (4)	03:06		21:32	19:46	18:05	15:32	14:49
20	09:39	08:10	06:37	05:51	04:16		03:22		04:57 (4)	04:11		05:41	07:07	08:31	09:05	10:10
	15:48	17:23	18:45	21:14	22:43		23:46	24	05:21 (4)	03:04		21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:14		03:22		04:57 (4)	04:14		05:44	07:10	08:34	09:08	10:10
	15:51	17:26	18:48	21:16	22:46		23:46	24	05:21 (4)	03:01		21:25	19:39	17:59	15:27	14:49
22	09:34	08:04	06:30	05:44	04:11		03:22		04:57 (4)	04:17		05:47	07:13	08:37	09:10	10:11
	15:54	17:29	18:51	21:19	22:49		23:46	24	05:21 (4)	02:58		21:22	19:36	17:55	15:25	14:50
23	09:32	08:00	06:26	05:41	04:08		03:22		04:58 (4)	04:19		05:50	07:15	08:40	09:13	10:12
	15:57	17:32	18:53	21:22	22:52		23:46	24	05:22 (4)	02:56		21:18	19:33	17:52	15:23	14:50
24	09:29	07:57	06:23	05:38	04:05		03:22		04:57 (4)	04:22		05:53	07:18	08:43	09:16	10:12
	16:00	17:35	18:56	21:25	22:55		23:46	25	05:22 (4)	02:53		21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:03		03:23		04:57 (4)	04:25		05:55	07:21	07:46	09:19	10:12
	16:03	17:38	18:59	21:28	22:57		23:46	25	05:22 (4)	02:50		21:12	19:26	16:46	15:18	14:52
26	09:24	07:50	06:16	05:31	04:00		03:24		04:58 (4)	04:28		05:58	07:24	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00		23:45	24	05:22 (4)	02:47		21:08	19:22	16:43	15:16	14:53
27	09:22	07:47	06:13	05:28	03:58		05:01 (4)	03:24	04:58 (4)	04:31		06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	7	05:08 (4)	23:45	25	05:23 (4)	22:44		21:05	19:19	16:39	15:14	14:54
28	09:19	07:44	06:09	05:24	03:55		04:59 (4)	03:25	04:59 (4)	04:34		06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:08	21:37	23:06	11	05:10 (4)	23:44	24	05:23 (4)	22:41		21:01	19:16	16:36	15:12	14:55
29	09:16		07:06	05:21	03:53		04:58 (4)	03:26	04:58 (4)	04:37		06:07	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	14	05:12 (4)	23:44	24	05:22 (4)	22:38		20:58	19:12	16:33	15:10	14:56
30	09:14		07:02	05:18	03:50		04:57 (4)	03:28	04:58 (4)	04:40		06:09	07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	15	05:12 (4)	23:43	25	05:23 (4)	22:35		20:55	19:09	16:30	15:08	14:57
31	09:11		06:59		03:48		04:56 (4)				04:43		06:12		08:04		10:11
	16:21		20:16		23:13	17	05:13 (4)				22:32		20:51		16:27		14:59
Potential sun hours	182	242	363	447	559			605			594		502	392	308	206	151
Total, worst case						64			700			310					

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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+49 7142 77810
Anders Stenberg / a.stenberg@wpd.fi
Calculated:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH03 - RH03

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June		July		August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:46		03:29		04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16		23:42	19	05:11 (4)	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:44		03:30		04:53 (4)	04:48	06:18	07:40	08:10	09:38
	15:03	16:28	17:53	20:22	21:49	23:18		23:40	18	05:11 (4)	22:26	20:44	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08	03:42	04:53 (4)	03:32		04:53 (4)	04:51	06:21	07:43	08:13	09:41
	15:05	16:31	17:56	20:25	21:52	23:21	6 04:59 (4)	23:39	18	05:11 (4)	22:23	20:41	18:59	16:18	15:02
4	10:07	08:59	07:31	06:45	05:05	03:39	04:51 (4)	03:34		04:54 (4)	04:54	06:23	07:46	08:16	09:43
	15:07	16:34	17:59	20:27	21:55	23:23	10 05:01 (4)	23:38	16	05:10 (4)	22:20	20:38	18:55	16:15	15:01
5	10:06	08:56	07:27	06:42	05:02	03:38	04:50 (4)	03:36		04:54 (4)	04:57	06:26	07:48	08:19	09:45
	15:09	16:37	18:02	20:30	21:58	23:25	12 05:02 (4)	23:36	16	05:10 (4)	22:17	20:34	18:52	16:12	14:59
6	10:05	08:53	07:24	06:38	04:59	03:36	04:49 (4)	03:37		04:56 (4)	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	23:27	14 05:03 (4)	23:35	14	05:10 (4)	22:14	20:31	18:48	16:09	14:58
7	10:04	08:50	07:21	06:35	04:55	03:34	04:49 (4)	03:39		04:56 (4)	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	15 05:04 (4)	23:33	13	05:09 (4)	22:11	20:27	18:45	16:06	14:56
8	10:02	08:47	07:17	06:32	04:52	03:32	04:49 (4)	03:41		04:58 (4)	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07	23:31	16 05:05 (4)	23:31	11	05:09 (4)	22:07	20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49	03:31	04:48 (4)	03:44		04:58 (4)	05:09	06:37	08:00	08:31	09:54
	15:18	16:49	18:14	20:42	22:10	23:33	17 05:05 (4)	23:29	9	05:07 (4)	22:04	20:21	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29	04:48 (4)	03:46		05:01 (4)	05:12	06:40	08:02	08:34	09:56
	15:20	16:53	18:16	20:45	22:13	23:35	18 05:06 (4)	23:27	4	05:05 (4)	22:01	20:17	18:35	15:57	14:53
11	09:58	08:38	07:07	06:21	04:43	03:28	04:48 (4)	03:48			05:15	06:43	08:05	08:37	09:58
	15:23	16:56	18:19	20:47	22:16	23:36	19 05:07 (4)	23:25			21:58	20:14	18:32	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	03:27	04:48 (4)	03:50			05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	23:38	19 05:07 (4)	23:23			21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:15	04:37	03:26	04:48 (4)	03:53			05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	19 05:07 (4)	23:21			21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:25	04:48 (4)	03:55			05:24	06:51	08:14	08:46	10:03
	15:31	17:05	18:28	20:56	22:25	23:41	20 05:08 (4)	23:19			21:48	20:03	18:22	15:46	14:50
15	09:50	08:26	06:54	06:08	04:31	03:24	04:48 (4)	03:58			05:27	06:54	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	20 05:08 (4)	23:16			21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23	04:48 (4)	04:00			05:30	06:56	08:20	08:53	10:06
	15:36	17:11	18:34	21:02	22:31	23:43	21 05:09 (4)	23:14			21:42	19:57	18:15	15:40	14:49
17	09:46	08:20	06:47	06:01	04:25	03:23	04:48 (4)	04:03			05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	21 05:09 (4)	23:11			21:38	19:53	18:12	15:38	14:49
18	09:44	08:16	06:43	05:58	04:22	03:22	04:48 (4)	04:06			05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37	23:44	22 05:10 (4)	23:09			21:35	19:50	18:08	15:35	14:49
19	09:41	08:13	06:40	05:54	04:19	03:22	04:49 (4)	04:08			05:38	07:05	08:28	09:02	10:09
	15:45	17:20	18:42	21:11	22:40	23:45	21 05:10 (4)	23:06			21:32	19:46	18:05	15:32	14:49
20	09:39	08:10	06:37	05:51	04:16	03:22	04:49 (4)	04:11			05:41	07:07	08:31	09:05	10:10
	15:48	17:23	18:45	21:14	22:43	23:46	21 05:10 (4)	23:04			21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:14	03:22	04:49 (4)	04:14			05:44	07:10	08:34	09:08	10:10
	15:51	17:26	18:48	21:16	22:46	23:46	21 05:10 (4)	23:01			21:25	19:39	17:59	15:27	14:49
22	09:34	08:03	06:30	05:44	04:11	03:22	04:49 (4)	04:17			05:47	07:13	08:37	09:10	10:11
	15:54	17:29	18:51	21:19	22:49	23:46	21 05:10 (4)	22:58			21:22	19:36	17:55	15:25	14:50
23	09:32	08:00	06:26	05:41	04:08	03:22	04:50 (4)	04:19			05:50	07:15	08:40	09:13	10:12
	15:57	17:32	18:53	21:22	22:52	23:46	21 05:11 (4)	22:56			21:18	19:33	17:52	15:23	14:50
24	09:29	07:57	06:23	05:38	04:05	03:22	04:50 (4)	04:22			05:53	07:18	08:43	09:16	10:12
	16:00	17:35	18:56	21:25	22:55	23:46	21 05:11 (4)	22:53			21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:03	03:23	04:49 (4)	04:25			05:55	07:21	07:46	09:19	10:12
	16:03	17:38	18:59	21:28	22:57	23:46	21 05:10 (4)	22:50			21:12	19:26	16:46	15:18	14:52
26	09:24	07:50	06:16	05:31	04:00	03:24	04:50 (4)	04:28			05:58	07:24	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	23:45	21 05:11 (4)	22:47			21:08	19:22	16:43	15:16	14:53
27	09:22	07:47	06:13	05:28	03:58	03:24	04:51 (4)	04:31			06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	20 05:11 (4)	22:44			21:05	19:19	16:39	15:14	14:54
28	09:19	07:44	06:09	05:24	03:55	03:25	04:51 (4)	04:34			06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:08	21:37	23:06	23:44	20 05:11 (4)	22:41			21:01	19:16	16:36	15:12	14:55
29	09:16		07:06	05:21	03:53	03:26	04:51 (4)	04:37			06:07	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	20 05:11 (4)	22:38			20:58	19:12	16:33	15:10	14:56
30	09:13		07:02	05:18	03:50	03:28	04:51 (4)	04:40			06:09	07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	20 05:11 (4)	22:35			20:55	19:09	16:30	15:08	14:57
31	09:11		06:59		03:48			04:43			06:12		08:04		10:11
	16:21		20:16		23:13			22:32			20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151	
Total, worst case							517		138						

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH04 - RH04

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May		June		July		August	September	October	November	December
1	10:10	09:08	07:41	06:55	05:15		03:46		04:59 (3)	03:29	05:02 (3)	04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46		23:16	18	05:17 (3)	23:42	23	05:25 (3)	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11		03:44		04:58 (3)	03:30	05:03 (3)	04:48	06:18	07:40	08:10	09:38
	15:03	16:28	17:53	20:22	21:49		23:18	19	05:17 (3)	23:40	23	05:26 (3)	22:26	20:44	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08		03:41		04:58 (3)	03:32	05:03 (3)	04:51	06:21	07:43	08:13	09:40
	15:05	16:31	17:56	20:25	21:52		23:21	20	05:18 (3)	23:39	23	05:26 (3)	22:23	20:41	18:59	16:18	15:02
4	10:07	08:59	07:31	06:45	05:05		03:39		04:58 (3)	03:34	05:03 (3)	04:54	06:23	07:46	08:16	09:43
	15:07	16:34	17:59	20:27	21:55		23:23	21	05:19 (3)	23:38	23	05:26 (3)	22:20	20:38	18:55	16:15	15:01
5	10:06	08:56	07:27	06:42	05:02		03:38		04:58 (3)	03:35	05:03 (3)	04:57	06:26	07:48	08:19	09:45
	15:09	16:37	18:02	20:30	21:58		23:25	21	05:19 (3)	23:36	22	05:25 (3)	22:17	20:34	18:52	16:12	14:59
6	10:05	08:53	07:24	06:38	04:59		03:36		04:58 (3)	03:37	05:04 (3)	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01		23:27	21	05:19 (3)	23:35	22	05:26 (3)	22:14	20:31	18:48	16:09	14:58
7	10:04	08:50	07:21	06:35	04:55		03:34		04:58 (3)	03:39	05:04 (3)	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04		23:29	22	05:20 (3)	23:33	21	05:25 (3)	22:11	20:27	18:45	16:06	14:56
8	10:02	08:47	07:17	06:32	04:52		03:32		04:58 (3)	03:41	05:05 (3)	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07		23:31	22	05:20 (3)	23:31	21	05:26 (3)	22:07	20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49		03:31		04:58 (3)	03:44	05:05 (3)	05:09	06:37	08:00	08:31	09:54
	15:18	16:49	18:14	20:42	22:10		23:33	22	05:20 (3)	23:29	20	05:25 (3)	22:04	20:21	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46		03:29		04:58 (3)	03:46	05:06 (3)	05:12	06:40	08:02	08:34	09:56
	15:20	16:53	18:16	20:45	22:13		23:35	22	05:20 (3)	23:27	19	05:25 (3)	22:01	20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21	04:43		03:28		04:59 (3)	03:48	05:06 (3)	05:15	06:43	08:05	08:37	09:58
	15:23	16:56	18:19	20:47	22:16		23:36	23	05:22 (3)	23:25	19	05:25 (3)	21:58	20:14	18:32	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40		03:27		04:58 (3)	03:50	05:07 (3)	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19		23:38	23	05:21 (3)	23:23	18	05:25 (3)	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:15	04:37		03:26		04:58 (3)	03:53	05:07 (3)	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22		23:39	23	05:21 (3)	23:21	17	05:24 (3)	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34		03:25		04:59 (3)	03:55	05:08 (3)	05:24	06:51	08:14	08:46	10:03
	15:31	17:05	18:28	20:56	22:25		23:41	23	05:22 (3)	23:19	15	05:23 (3)	21:48	20:03	18:22	15:46	14:50
15	09:50	08:26	06:54	06:08	04:31		03:24		04:58 (3)	03:58	05:09 (3)	05:27	06:54	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28		23:42	24	05:22 (3)	23:16	14	05:23 (3)	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28		03:23		04:59 (3)	04:00	05:10 (3)	05:29	06:56	08:20	08:52	10:06
	15:36	17:11	18:34	21:02	22:31		23:43	23	05:22 (3)	23:14	12	05:22 (3)	21:42	19:57	18:15	15:40	14:49
17	09:46	08:20	06:47	06:01	04:25		03:23		04:59 (3)	04:03	05:12 (3)	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34		23:44	24	05:23 (3)	23:11	8	05:20 (3)	21:38	19:53	18:12	15:38	14:49
18	09:44	08:16	06:43	05:58	04:22		03:22		05:00 (3)	04:06			05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37		23:44	23	05:23 (3)	23:09			21:35	19:50	18:08	15:35	14:49
19	09:41	08:13	06:40	05:54	04:19		03:22		05:00 (3)	04:08			05:38	07:04	08:28	09:02	10:09
	15:45	17:20	18:42	21:11	22:40		23:45	23	05:23 (3)	23:06			21:32	19:46	18:05	15:32	14:49
20	09:39	08:10	06:36	05:51	04:16		03:22		05:00 (3)	04:11			05:41	07:07	08:31	09:05	10:10
	15:48	17:23	18:45	21:14	22:43		23:46	23	05:23 (3)	23:04			21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:13		03:22		05:00 (3)	04:14			05:44	07:10	08:34	09:07	10:10
	15:51	17:26	18:48	21:16	22:46		23:46	24	05:24 (3)	23:01			21:25	19:39	17:59	15:27	14:49
22	09:34	08:03	06:30	05:44	04:11		03:22		05:00 (3)	04:17			05:47	07:13	08:37	09:10	10:11
	15:54	17:29	18:51	21:19	22:49		23:46	24	05:24 (3)	22:58			21:22	19:36	17:55	15:25	14:50
23	09:32	08:00	06:26	05:41	04:08		03:22		05:00 (3)	04:19			05:50	07:15	08:40	09:13	10:12
	15:57	17:32	18:53	21:22	22:52		23:46	23	05:23 (3)	22:56			21:18	19:33	17:52	15:23	14:50
24	09:29	07:57	06:23	05:38	04:05		03:22		05:01 (3)	04:22			05:52	07:18	08:43	09:16	10:12
	16:00	17:35	18:56	21:25	22:55		23:46	23	05:24 (3)	22:53			21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:03		03:23		05:00 (3)	04:25			05:55	07:21	07:46	09:19	10:12
	16:03	17:38	18:59	21:28	22:57		23:46	24	05:24 (3)	22:50			21:12	19:26	16:46	15:18	14:52
26	09:24	07:50	06:16	05:31	04:00	05:04 (3)	03:24		05:01 (3)	04:28			05:58	07:24	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	6 05:10 (3)	23:45	23	05:24 (3)	22:47			21:08	19:22	16:43	15:16	14:53
27	09:22	07:47	06:13	05:28	03:58	05:02 (3)	03:24		05:02 (3)	04:31			06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	10 05:12 (3)	23:45	23	05:25 (3)	22:44			21:05	19:19	16:39	15:14	14:54
28	09:19	07:44	06:09	05:24	03:55	05:01 (3)	03:25		05:02 (3)	04:34			06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:08	21:37	23:06	12 05:13 (3)	23:44	23	05:25 (3)	22:41			21:01	19:16	16:36	15:12	14:55
29	09:16		07:06	05:21	03:53	05:01 (3)	03:26		05:01 (3)	04:37			06:07	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	14 05:15 (3)	23:43	24	05:25 (3)	22:38			20:58	19:12	16:33	15:10	14:56
30	09:13		07:02	05:18	03:50	05:00 (3)	03:28		05:02 (3)	04:40			06:09	07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	16 05:16 (3)	23:43	23	05:25 (3)	22:35			20:55	19:09	16:30	15:08	14:57
31	09:11		06:59		03:48	04:59 (3)				04:43			06:12		08:04		10:11
	16:21		20:16		23:13	17 05:16 (3)				22:32			20:51		16:27		14:59
Potential sun hours	182	242	363	447	559		605		594		502	392	308	206	151
Total, worst case						75		674		320					

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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH05 - RH05

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June		July		August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:15	03:46		03:29	04:48 (2)	04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16		23:41	10 04:58 (2)	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:44		03:30	04:48 (2)	04:48	06:18	07:40	08:10	09:38
	15:03	16:28	17:53	20:22	21:49	23:18		23:40	10 04:58 (2)	22:26	20:44	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08	03:41		03:32	04:50 (2)	04:51	06:21	07:43	08:13	09:40
	15:05	16:31	17:56	20:24	21:52	23:20		23:39	8 04:58 (2)	22:23	20:41	18:58	16:18	15:02
4	10:07	08:59	07:31	06:45	05:05	03:39		03:34	04:51 (2)	04:54	06:23	07:46	08:16	09:43
	15:07	16:34	17:59	20:27	21:55	23:23		23:38	6 04:57 (2)	22:20	20:38	18:55	16:15	15:01
5	10:06	08:56	07:27	06:42	05:02	03:38		03:35	04:53 (2)	04:57	06:26	07:48	08:19	09:45
	15:09	16:37	18:02	20:30	21:58	23:25		23:36	2 04:55 (2)	22:17	20:34	18:52	16:12	14:59
6	10:05	08:53	07:24	06:38	04:59	03:36		03:37		05:00	06:29	07:51	08:22	09:47
	15:11	16:40	18:05	20:33	22:01	23:27		23:35		22:14	20:31	18:48	16:09	14:58
7	10:04	08:50	07:20	06:35	04:55	03:34		03:39		05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29		23:33		22:11	20:27	18:45	16:06	14:56
8	10:02	08:47	07:17	06:32	04:52	03:32	04:46 (2)	03:41		05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07	23:31	5 04:51 (2)	23:31		22:07	20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49	03:31	04:45 (2)	03:44		05:09	06:37	08:00	08:31	09:54
	15:18	16:49	18:13	20:42	22:10	23:33	7 04:52 (2)	23:29		22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29	04:44 (2)	03:46		05:12	06:40	08:02	08:34	09:56
	15:20	16:53	18:16	20:44	22:13	23:35	9 04:53 (2)	23:27		22:01	20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21	04:43	03:28	04:43 (2)	03:48		05:15	06:43	08:05	08:37	09:58
	15:23	16:56	18:19	20:47	22:16	23:36	11 04:54 (2)	23:25		21:58	20:14	18:32	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	03:27	04:44 (2)	03:50		05:18	06:45	08:08	08:40	09:59
	15:25	16:59	18:22	20:50	22:19	23:38	11 04:55 (2)	23:23		21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:15	04:37	03:26	04:43 (2)	03:53		05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	12 04:55 (2)	23:21		21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:25	04:44 (2)	03:55		05:24	06:51	08:14	08:46	10:03
	15:31	17:05	18:28	20:56	22:25	23:41	12 04:56 (2)	23:19		21:48	20:03	18:22	15:46	14:50
15	09:50	08:26	06:53	06:08	04:31	03:24	04:43 (2)	03:58		05:27	06:54	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	13 04:56 (2)	23:16		21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23	04:43 (2)	04:00		05:29	06:56	08:19	08:52	10:05
	15:36	17:11	18:34	21:02	22:31	23:43	14 04:57 (2)	23:14		21:41	19:57	18:15	15:40	14:49
17	09:46	08:19	06:47	06:01	04:25	03:23	04:43 (2)	04:03		05:32	06:59	08:22	08:55	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	15 04:58 (2)	23:11		21:38	19:53	18:12	15:38	14:49
18	09:44	08:16	06:43	05:58	04:22	03:22	04:44 (2)	04:06		05:35	07:02	08:25	08:58	10:08
	15:42	17:17	18:39	21:08	22:37	23:44	14 04:58 (2)	23:09		21:35	19:50	18:08	15:35	14:49
19	09:41	08:13	06:40	05:54	04:19	03:22	04:44 (2)	04:08		05:38	07:04	08:28	09:01	10:09
	15:45	17:20	18:42	21:11	22:40	23:45	14 04:58 (2)	23:06		21:32	19:46	18:05	15:32	14:49
20	09:39	08:10	06:36	05:51	04:16	03:22	04:44 (2)	04:11		05:41	07:07	08:31	09:04	10:10
	15:48	17:23	18:45	21:13	22:43	23:45	15 04:59 (2)	23:04		21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:13	03:22	04:44 (2)	04:14		05:44	07:10	08:34	09:07	10:10
	15:51	17:26	18:48	21:16	22:46	23:46	15 04:59 (2)	23:01		21:25	19:39	17:59	15:27	14:49
22	09:34	08:03	06:30	05:44	04:11	03:22	04:44 (2)	04:17		05:47	07:13	08:37	09:10	10:11
	15:54	17:29	18:51	21:19	22:49	23:46	15 04:59 (2)	22:58		21:22	19:36	17:55	15:25	14:50
23	09:32	08:00	06:26	05:41	04:08	03:22	04:44 (2)	04:19		05:50	07:15	08:40	09:13	10:11
	15:57	17:32	18:53	21:22	22:52	23:46	15 04:59 (2)	22:55		21:18	19:33	17:52	15:23	14:50
24	09:29	07:57	06:23	05:38	04:05	03:22	04:45 (2)	04:22		05:52	07:18	08:43	09:16	10:12
	16:00	17:35	18:56	21:25	22:54	23:46	14 04:59 (2)	22:53		21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:03	03:23	04:45 (2)	04:25		05:55	07:21	07:46	09:19	10:12
	16:03	17:38	18:59	21:28	22:57	23:46	14 04:59 (2)	22:50		21:11	19:26	16:46	15:18	14:52
26	09:24	07:50	06:16	05:31	04:00	03:24	04:45 (2)	04:28		05:58	07:24	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	23:45	14 04:59 (2)	22:47		21:08	19:22	16:43	15:16	14:53
27	09:22	07:47	06:13	05:28	03:58	03:24	04:46 (2)	04:31		06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	14 05:00 (2)	22:44		21:05	19:19	16:39	15:14	14:54
28	09:19	07:44	06:09	05:24	03:55	03:25	04:47 (2)	04:34		06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:07	21:37	23:05	23:44	13 05:00 (2)	22:41		21:01	19:15	16:36	15:12	14:55
29	09:16		07:06	05:21	03:53	03:26	04:46 (2)	04:37		06:07	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:43	13 04:59 (2)	22:38		20:58	19:12	16:33	15:10	14:56
30	09:13		07:02	05:18	03:50	03:28	04:47 (2)	04:40		06:09	07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:42	12 04:59 (2)	22:35		20:55	19:09	16:30	15:08	14:57
31	09:11		06:59		03:48			04:42		06:12		08:04		10:11
	16:21		20:16		23:13			22:32		20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case							291		36					

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH06 - RH06

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:15	03:46	03:29	04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16	23:41	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:44	03:30	04:48	06:18	07:40	08:10	09:38
	15:03	16:27	17:53	20:22	21:49	23:18	23:40	22:26	20:44	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08	03:41	03:32	04:51	06:21	07:43	08:13	09:40
	15:05	16:31	17:56	20:24	21:52	23:20	23:39	22:23	20:41	18:58	16:18	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39	03:34	04:54	06:23	07:46	08:16	09:43
	15:07	16:34	17:59	20:27	21:55	23:23	23:37	22:20	20:37	18:55	16:14	15:01
5	10:06	08:56	07:27	06:42	05:02	03:38	03:35	04:57	06:26	07:48	08:19	09:45
	15:09	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:36	03:37	05:00	06:29	07:51	08:22	09:47
	15:11	16:40	18:05	20:33	22:01	23:27	23:34	22:14	20:31	18:48	16:08	14:58
7	10:03	08:50	07:20	06:35	04:55	03:34	03:39	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:10	20:27	18:45	16:06	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07	23:31	23:31	22:07	20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49	03:31	03:43	05:09	06:37	07:59	08:31	09:54
	15:18	16:49	18:13	20:42	22:10	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29	03:46	05:12	06:40	08:02	08:34	09:56
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11	09:57	08:38	07:07	06:21	04:43	03:28	03:48	05:15	06:43	08:05	08:37	09:58
	15:23	16:56	18:19	20:47	22:16	23:36	23:25	21:58	20:14	18:31	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	03:27	03:50	05:18	06:45	08:08	08:40	09:59
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	03:26	03:53	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:25	03:55	05:24	06:51	08:14	08:46	10:03
	15:31	17:05	18:28	20:56	22:25	23:40	23:18	21:48	20:03	18:22	15:46	14:50
15	09:50	08:26	06:53	06:08	04:31	03:24	03:58	05:27	06:53	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23	04:00	05:29	06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:02	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:49
17	09:46	08:19	06:47	06:01	04:25	03:23	04:03	05:32	06:59	08:22	08:55	10:07
	15:39	17:14	18:36	21:05	22:34	23:43	23:11	21:38	19:53	18:12	15:38	14:49
18	09:43	08:16	06:43	05:58	04:22	03:22	04:06	05:35	07:02	08:25	08:58	10:08
	15:42	17:17	18:39	21:08	22:37	23:44	23:09	21:35	19:50	18:08	15:35	14:49
19	09:41	08:13	06:40	05:54	04:19	03:22	04:08	05:38	07:04	08:28	09:01	10:09
	15:45	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:05	15:32	14:49
20	09:39	08:10	06:36	05:51	04:16	03:22	04:11	05:41	07:07	08:31	09:04	10:09
	15:48	17:23	18:45	21:13	22:43	23:45	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:13	03:22	04:14	05:44	07:10	08:34	09:07	10:10
	15:51	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:59	15:27	14:49
22	09:34	08:03	06:30	05:44	04:11	03:22	04:17	05:47	07:13	08:37	09:10	10:11
	15:54	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:36	17:55	15:25	14:50
23	09:32	08:00	06:26	05:41	04:08	03:22	04:19	05:50	07:15	08:40	09:13	10:11
	15:57	17:32	18:53	21:22	22:52	23:46	22:55	21:18	19:32	17:52	15:23	14:50
24	09:29	07:57	06:23	05:38	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:12
	16:00	17:35	18:56	21:25	22:54	23:46	22:53	21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:03	03:23	04:25	05:55	07:21	07:46	09:19	10:12
	16:03	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:26	16:46	15:18	14:52
26	09:24	07:50	06:16	05:31	04:00	03:24	04:28	05:58	07:23	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:16	14:52
27	09:21	07:47	06:12	05:28	03:58	03:24	04:31	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:14	14:54
28	09:19	07:44	06:09	05:24	03:55	03:25	04:34	06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:07	21:37	23:05	23:44	22:41	21:01	19:15	16:36	15:12	14:55
29	09:16		07:06	05:21	03:53	03:26	04:37	06:07	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:43	22:38	20:58	19:12	16:33	15:10	14:56
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	16:18		20:13	21:43	23:11	23:42	22:35	20:55	19:09	16:30	15:08	14:57
31	09:11		06:59		03:48		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours Total, worst case	182	242	363	447	559	605	594	502	392	308	206	151

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH07 - RH07

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:46	03:29	04:45	06:15	07:37	08:06	09:35
	15:01	16:24	17:50	20:19	21:46	23:15	23:41	22:29	20:48	19:05	16:23	15:06
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:18	07:40	08:09	09:38
	15:03	16:27	17:53	20:21	21:49	23:18	23:40	22:26	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:48	05:08	03:41	03:32	04:51	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24	21:52	23:20	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39	03:34	04:54	06:23	07:45	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:22	23:37	22:20	20:37	18:55	16:14	15:01
5	10:06	08:56	07:27	06:42	05:02	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:36	03:37	05:00	06:29	07:51	08:22	09:47
	15:11	16:40	18:05	20:33	22:01	23:27	23:34	22:13	20:31	18:48	16:08	14:58
7	10:03	08:50	07:20	06:35	04:55	03:34	03:39	05:03	06:31	07:54	08:25	09:49
	15:13	16:43	18:07	20:36	22:04	23:29	23:33	22:10	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:38	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:55
9	10:00	08:44	07:14	06:28	04:49	03:31	03:43	05:09	06:37	07:59	08:31	09:54
	15:18	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29	03:46	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:34	23:27	22:01	20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21	04:43	03:28	03:48	05:15	06:42	08:05	08:37	09:57
	15:22	16:55	18:19	20:47	22:16	23:36	23:25	21:58	20:13	18:31	15:54	14:52
12	09:55	08:35	07:03	06:18	04:40	03:27	03:50	05:18	06:45	08:08	08:40	09:59
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	03:25	03:53	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	23:20	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:25	03:55	05:23	06:51	08:13	08:46	10:02
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15	09:50	08:26	06:53	06:08	04:31	03:24	03:58	05:26	06:53	08:16	08:49	10:04
	15:33	17:08	18:30	20:59	22:28	23:41	23:16	21:44	20:00	18:18	15:43	14:49
16	09:48	08:22	06:50	06:04	04:28	03:23	04:00	05:29	06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:02	22:31	23:42	23:13	21:41	19:56	18:15	15:40	14:49
17	09:45	08:19	06:46	06:01	04:25	03:22	04:03	05:32	06:59	08:22	08:55	10:06
	15:39	17:14	18:36	21:04	22:34	23:43	23:11	21:38	19:53	18:11	15:37	14:49
18	09:43	08:16	06:43	05:57	04:22	03:22	04:05	05:35	07:01	08:25	08:58	10:07
	15:42	17:17	18:39	21:07	22:37	23:44	23:09	21:35	19:49	18:08	15:35	14:49
19	09:41	08:13	06:40	05:54	04:19	03:22	04:08	05:38	07:04	08:28	09:01	10:08
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:05	15:32	14:49
20	09:39	08:10	06:36	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:04	10:09
	15:47	17:23	18:45	21:13	22:43	23:45	23:03	21:28	19:43	18:02	15:30	14:49
21	09:36	08:06	06:33	05:47	04:13	03:21	04:14	05:44	07:10	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	23:45	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44	04:11	03:22	04:16	05:47	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:22	04:19	05:49	07:15	08:40	09:13	10:11
	15:56	17:32	18:53	21:22	22:51	23:46	22:55	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:11
	15:59	17:35	18:56	21:25	22:54	23:46	22:52	21:15	19:29	17:49	15:20	14:51
25	09:26	07:53	06:19	05:34	04:02	03:23	04:25	05:55	07:21	07:45	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:45	22:50	21:11	19:25	16:45	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:28	05:58	07:23	07:48	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:16	14:52
27	09:21	07:47	06:12	05:27	03:57	03:24	04:31	06:01	07:26	07:51	09:24	10:12
	16:09	17:44	19:04	21:34	23:02	23:45	22:44	21:04	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:55	03:25	04:34	06:04	07:29	07:54	09:27	10:12
	16:12	17:47	19:07	21:37	23:05	23:44	22:41	21:01	19:15	16:36	15:11	14:55
29	09:16		07:05	05:21	03:52	03:26	04:36	06:06	07:32	07:57	09:30	10:11
	16:15		20:10	21:40	23:08	23:43	22:38	20:58	19:12	16:33	15:09	14:56
30	09:13		07:02	05:18	03:50	03:27	04:39	06:09	07:34	08:00	09:32	10:11
	16:18		20:13	21:43	23:10	23:42	22:35	20:54	19:08	16:30	15:07	14:57
31	09:10		06:59		03:48		04:42	06:12		08:03		10:10
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours Total, worst case	182	242	363	447	559	605	594	502	392	308	206	151

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH08 - RH08

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May		June		July		August		September	October	November	December
1	10:10	09:08	07:40	06:55	05:14		03:45	21:01 (1)	03:29		04:45	21:07 (1)	06:15	07:37	08:06	09:35
	15:01	16:24	17:50	20:19	21:46		23:15	11 21:12 (1)	23:41		22:29	18 21:25 (1)	20:48	19:05	16:23	15:06
2	10:09	09:05	07:37	06:52	05:11		03:43	21:03 (1)	03:30		04:48	21:08 (1)	06:18	07:40	08:09	09:38
	15:03	16:27	17:53	20:21	21:49		23:18	8 21:11 (1)	23:40		22:26	16 21:24 (1)	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:48	05:08		03:41	21:06 (1)	03:32		04:51	21:10 (1)	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24	21:52		23:20	4 21:10 (1)	23:39		22:23	13 21:23 (1)	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05		03:39		03:33		04:54	21:11 (1)	06:23	07:45	08:16	09:43
	15:06	16:33	17:59	20:27	21:55		23:23		23:37		22:20	10 21:21 (1)	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:42	05:01		03:37		03:35		04:57		06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58		23:25		23:36		22:17		20:34	18:51	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58		03:35		03:37		05:00		06:29	07:51	08:22	09:47
	15:11	16:40	18:05	20:33	22:01		23:27		23:34		22:13		20:30	18:48	16:08	14:57
7	10:03	08:50	07:20	06:35	04:55		03:34		03:39		05:03		06:31	07:54	08:25	09:49
	15:13	16:43	18:07	20:36	22:04		23:29		23:33		22:10		20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	21:03 (1)	03:32		03:41		05:06		06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:38	22:07	6 21:09 (1)	23:31		23:31		22:07		20:24	18:41	16:02	14:55
9	10:00	08:44	07:13	06:28	04:49	21:00 (1)	03:30		03:43		05:09		06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	11 21:11 (1)	23:33		23:29		22:04		20:20	18:38	15:59	14:54
10	09:59	08:41	07:10	06:24	04:46	20:59 (1)	03:29		03:45	21:12 (1)	05:12		06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	15 21:14 (1)	23:34		23:27	6 21:18 (1)	22:01		20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21	04:43	20:57 (1)	03:28		03:48	21:11 (1)	05:15		06:42	08:05	08:37	09:57
	15:22	16:55	18:19	20:47	22:16	17 21:14 (1)	23:36		23:25	9 21:20 (1)	21:58		20:13	18:31	15:54	14:52
12	09:55	08:35	07:03	06:18	04:40	20:56 (1)	03:26		03:50	21:09 (1)	05:18		06:45	08:08	08:40	09:59
	15:25	16:58	18:22	20:50	22:19	19 21:15 (1)	23:38		23:23	12 21:21 (1)	21:54		20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	20:56 (1)	03:25		03:52	21:08 (1)	05:20		06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	20 21:16 (1)	23:39		23:21	14 21:22 (1)	21:51		20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:33	20:55 (1)	03:24		03:55	21:08 (1)	05:23		06:51	08:13	08:46	10:02
	15:30	17:05	18:28	20:56	22:25	21 21:16 (1)	23:40		23:18	15 21:23 (1)	21:48		20:03	18:21	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31	20:55 (1)	03:24		03:57	21:07 (1)	05:26		06:53	08:16	08:49	10:04
	15:33	17:08	18:30	20:59	22:28	22 21:17 (1)	23:41		23:16	17 21:24 (1)	21:45		20:00	18:18	15:43	14:49
16	09:48	08:22	06:50	06:04	04:28	20:54 (1)	03:23		04:00	21:07 (1)	05:29		06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:02	22:31	23 21:17 (1)	23:42		23:14	18 21:25 (1)	21:41		19:56	18:15	15:40	14:49
17	09:45	08:19	06:46	06:01	04:25	20:54 (1)	03:22		04:03	21:06 (1)	05:32		06:59	08:22	08:55	10:06
	15:39	17:14	18:36	21:04	22:34	23 21:17 (1)	23:43		23:11	19 21:25 (1)	21:38		19:53	18:11	15:37	14:49
18	09:43	08:16	06:43	05:57	04:22	20:55 (1)	03:22		04:05	21:06 (1)	05:35		07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07	22:37	23 21:18 (1)	23:44		23:09	20 21:26 (1)	21:35		19:49	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	20:54 (1)	03:21		04:08	21:05 (1)	05:38		07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23 21:17 (1)	23:45		23:06	21 21:26 (1)	21:31		19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	20:54 (1)	03:21		04:11	21:05 (1)	05:41		07:07	08:31	09:04	10:09
	15:47	17:23	18:45	21:13	22:43	23 21:17 (1)	23:45		23:03	21 21:26 (1)	21:28		19:43	18:02	15:30	14:49
21	09:36	08:06	06:33	05:47	04:13	20:55 (1)	03:21		04:13	21:05 (1)	05:44		07:10	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	22 21:17 (1)	23:46		23:01	22 21:27 (1)	21:25		19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44	04:10	20:55 (1)	03:21		04:16	21:05 (1)	05:46		07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	22 21:17 (1)	23:46		22:58	22 21:27 (1)	21:21		19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	20:56 (1)	03:22		04:19	21:05 (1)	05:49		07:15	08:40	09:13	10:11
	15:56	17:32	18:53	21:22	22:51	21 21:17 (1)	23:46		22:55	22 21:27 (1)	21:18		19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37	04:05	20:56 (1)	03:22		04:22	21:04 (1)	05:52		07:18	08:42	09:16	10:12
	15:59	17:35	18:56	21:25	22:54	21 21:17 (1)	23:46		22:52	23 21:27 (1)	21:15		19:29	17:49	15:20	14:51
25	09:27	07:53	06:19	05:34	04:02	20:56 (1)	03:23		04:25	21:05 (1)	05:55		07:21	07:45	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	21 21:17 (1)	23:45		22:50	23 21:28 (1)	21:11		19:25	16:45	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	20:57 (1)	03:23		04:28	21:05 (1)	05:58		07:23	07:48	09:22	10:12
	16:05	17:41	19:02	21:31	23:00	19 21:16 (1)	23:45		22:47	22 21:27 (1)	21:08		19:22	16:42	15:16	14:52
27	09:21	07:47	06:12	05:27	03:57	20:57 (1)	03:24		04:31	21:05 (1)	06:01		07:26	07:51	09:24	10:12
	16:09	17:44	19:04	21:34	23:03	19 21:16 (1)	23:45		22:44	23 21:28 (1)	21:04		19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:55	20:58 (1)	03:25		04:33	21:05 (1)	06:04		07:29	07:54	09:27	10:12
	16:12	17:47	19:07	21:37	23:05	17 21:15 (1)	23:44		22:41	22 21:27 (1)	21:01		19:15	16:36	15:11	14:54
29	09:16		07:05	05:21	03:52	20:59 (1)	03:26		04:36	21:05 (1)	06:06		07:32	07:57	09:30	10:11
	16:15		20:10	21:40	23:08	15 21:14 (1)	23:43		22:38	22 21:27 (1)	20:58		19:12	16:33	15:09	14:56
30	09:13		07:02	05:18	03:50	21:00 (1)	03:27		04:39	21:06 (1)	06:09		07:34	08:00	09:33	10:11
	16:18		20:13	21:43	23:10	14 21:14 (1)	23:42		22:35	21 21:27 (1)	20:54		19:08	16:30	15:07	14:57
31	09:10		06:59		03:48	21:01 (1)			04:42	21:06 (1)	06:12			08:03		10:10
	16:21		20:16		23:13	12 21:13 (1)			22:32	20 21:26 (1)	20:51			16:27		14:59
Potential sun hours	182	242	363	447	559		605		594		502		392	308	206	151
Total, worst case						449		23		414		57				

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH09 - RH09

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April		May		June	July		August		September	October	November	December
1	10:10	09:08	07:40	06:55		05:14		20:31 (1)	03:45	03:29			20:40 (1)	06:15	07:37	08:06	09:35
	15:01	16:24	17:50	20:19		21:46	18	20:49 (1)	23:15	23:41	22:29	18	20:58 (1)	20:48	19:05	16:23	15:05
2	10:09	09:05	07:37	06:52		05:11		20:30 (1)	03:43	03:30	04:48		20:39 (1)	06:18	07:40	08:09	09:38
	15:02	16:27	17:53	20:21		21:49	19	20:49 (1)	23:18	23:40	22:26	20	20:59 (1)	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:48		05:08		20:29 (1)	03:41	03:32	04:51		20:39 (1)	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24		21:52	21	20:50 (1)	23:20	23:39	22:23	20	20:59 (1)	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45		05:05		20:28 (1)	03:39	03:33	04:54		20:38 (1)	06:23	07:45	08:16	09:43
	15:06	16:33	17:59	20:27		21:55	22	20:50 (1)	23:23	23:37	22:20	21	20:59 (1)	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41		05:01		20:28 (1)	03:37	03:35	04:57		20:38 (1)	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30		21:58	22	20:50 (1)	23:25	23:36	22:17	22	21:00 (1)	20:34	18:51	16:11	14:59
6	10:05	08:53	07:24	06:38		04:58		20:28 (1)	03:35	03:37	05:00		20:37 (1)	06:29	07:51	08:22	09:47
	15:10	16:40	18:05	20:33		22:01	22	20:50 (1)	23:27	23:34	22:13	22	20:59 (1)	20:30	18:48	16:08	14:57
7	10:03	08:50	07:20	06:35		04:55		20:28 (1)	03:34	03:39	05:03		20:38 (1)	06:31	07:54	08:25	09:49
	15:13	16:43	18:07	20:36		22:04	22	20:50 (1)	23:29	23:33	22:10	22	21:00 (1)	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31		04:52		20:28 (1)	03:32	03:41	05:06		20:37 (1)	06:34	07:56	08:28	09:52
	15:15	16:46	18:10	20:38		22:07	22	20:50 (1)	23:31	23:31	22:07	22	20:59 (1)	20:24	18:41	16:02	14:55
9	10:00	08:44	07:13	06:28		04:49		20:28 (1)	03:30	03:43	05:09		20:38 (1)	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41		22:10	21	20:49 (1)	23:33	23:29	22:04	21	20:59 (1)	20:20	18:38	15:59	14:54
10	09:59	08:41	07:10	06:24		04:46		20:29 (1)	03:29	03:45	05:12		20:38 (1)	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44		22:13	20	20:49 (1)	23:34	23:27	22:01	21	20:59 (1)	20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21		04:43		20:29 (1)	03:28	03:48	05:15		20:38 (1)	06:42	08:05	08:37	09:57
	15:22	16:55	18:19	20:47		22:16	19	20:48 (1)	23:36	23:25	21:58	20	20:58 (1)	20:13	18:31	15:54	14:52
12	09:55	08:35	07:03	06:18		04:40		20:29 (1)	03:26	03:50	05:17		20:39 (1)	06:45	08:08	08:40	09:59
	15:25	16:58	18:22	20:50		22:19	18	20:47 (1)	23:38	23:23	21:54	18	20:57 (1)	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14		04:36		20:31 (1)	03:25	03:52	05:20		20:40 (1)	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53		22:22	16	20:47 (1)	23:39	23:21	21:51	15	20:55 (1)	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11		04:33		20:32 (1)	03:24	03:55	05:23		20:41 (1)	06:51	08:13	08:46	10:02
	15:30	17:05	18:28	20:56		22:25	13	20:45 (1)	23:40	23:18	21:48	13	20:54 (1)	20:03	18:21	15:45	14:50
15	09:50	08:26	06:53	06:07		04:30		20:34 (1)	03:23	03:57	05:26		20:44 (1)	06:53	08:16	08:49	10:04
	15:33	17:08	18:30	20:59		22:28	10	20:44 (1)	23:41	23:16	21:44	7	20:51 (1)	20:00	18:18	15:43	14:49
16	09:48	08:22	06:50	06:04		04:28		20:36 (1)	03:23	04:00	05:29			06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:02		22:31	5	20:41 (1)	23:42	23:14	21:41			19:56	18:15	15:40	14:49
17	09:46	08:19	06:46	06:01		04:25			03:22	04:03	05:32			06:59	08:22	08:55	10:06
	15:39	17:14	18:36	21:04		22:34			23:43	23:11	21:38			19:53	18:11	15:37	14:48
18	09:43	08:16	06:43	05:57		04:22			03:22	04:05	05:35			07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07		22:37			23:44	23:09	21:35			19:49	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54		04:19			03:21	04:08	05:38			07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10		22:40			23:45	23:06	21:31			19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51		04:16			03:21	04:11	05:41			07:07	08:31	09:04	10:09
	15:47	17:23	18:45	21:13		22:43			23:45	23:03	21:28			19:43	18:02	15:30	14:49
21	09:36	08:06	06:33	05:47		04:13			03:21	04:13	05:44			07:10	08:34	09:07	10:10
	15:50	17:26	18:47	21:16		22:46			23:46	23:01	21:25			19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44		04:10			03:21	04:16	05:46			07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19		22:49			23:46	22:58	21:21			19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41		04:08			03:22	04:19	05:49			07:15	08:40	09:13	10:11
	15:56	17:32	18:53	21:22		22:51			23:46	22:55	21:18			19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37		04:05			03:22	04:22	05:52			07:18	08:42	09:16	10:12
	15:59	17:35	18:56	21:25		22:54			23:46	22:52	21:15			19:29	17:49	15:20	14:50
25	09:27	07:53	06:19	05:34		04:02			03:23	04:25	05:55			07:21	07:45	09:19	10:12
	16:02	17:38	18:59	21:28		22:57			23:46	22:50	21:11			19:25	16:45	15:18	14:51
26	09:24	07:50	06:16	05:31		04:00			03:23	04:28	05:58			07:23	07:48	09:22	10:12
	16:05	17:41	19:02	21:31		23:00			23:45	22:47	21:08			19:22	16:42	15:16	14:52
27	09:21	07:47	06:12	05:27		03:57			03:24	04:30	06:01			07:26	07:51	09:24	10:12
	16:08	17:44	19:04	21:34		23:03			23:45	22:44	21:04			19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	20:35 (1)	03:55			03:25	04:33	20:45 (1)	06:03		07:29	07:54	09:27	10:12
	16:12	17:47	19:07	21:37	9 20:44 (1)	23:05			23:44	22:41	8 20:53 (1)	21:01		19:15	16:36	15:11	14:54
29	09:16		07:05	05:21	20:33 (1)	03:52			03:26	04:36	20:43 (1)	06:06		07:32	07:57	09:30	10:11
	16:15		20:10	21:40	13 20:46 (1)	23:08			23:43	22:38	12 20:55 (1)	20:58		19:12	16:33	15:09	14:56
30	09:13		07:02	05:18	20:31 (1)	03:50			03:27	04:39	20:42 (1)	06:09		07:34	08:00	09:33	10:11
	16:18		20:13	21:43	16 20:47 (1)	23:10			23:42	22:35	15 20:57 (1)	20:54		19:08	16:30	15:07	14:57
31	09:10		06:59			03:48				04:42	20:41 (1)	06:12			08:03		10:10
	16:21		20:16			23:13				22:32	16 20:57 (1)	20:51			16:26		14:59
Potential sun hours	182	242	363	447		559		605	594		502		392	308	206	151	
Total, worst case					38		290			51		282					

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH10 - RH10

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:29	04:45	06:15	07:37	08:06	09:35
	15:01	16:24	17:50	20:18	21:46	23:15	23:41	22:29	20:48	19:05	16:23	15:05
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:17	07:40	08:09	09:38
	15:02	16:27	17:53	20:21	21:49	23:18	23:40	22:26	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:48	05:08	03:41	03:32	04:51	06:20	07:43	08:12	09:40
	15:04	16:30	17:56	20:24	21:52	23:20	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39	03:33	04:54	06:23	07:45	08:16	09:43
	15:06	16:33	17:59	20:27	21:55	23:23	23:37	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:47
	15:10	16:40	18:04	20:33	22:01	23:27	23:34	22:13	20:30	18:48	16:08	14:57
7	10:03	08:50	07:20	06:35	04:55	03:34	03:39	05:03	06:31	07:54	08:25	09:49
	15:13	16:43	18:07	20:36	22:04	23:29	23:33	22:10	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:56	08:28	09:52
	15:15	16:46	18:10	20:38	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:55
9	10:00	08:44	07:13	06:28	04:49	03:30	03:43	05:09	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	15:59	14:54
10	09:59	08:41	07:10	06:24	04:46	03:29	03:45	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:34	23:27	22:01	20:17	18:35	15:56	14:53
11	09:57	08:38	07:07	06:21	04:43	03:28	03:48	05:15	06:42	08:05	08:37	09:57
	15:22	16:55	18:19	20:47	22:16	23:36	23:25	21:58	20:13	18:31	15:54	14:52
12	09:55	08:35	07:03	06:18	04:39	03:26	03:50	05:17	06:45	08:08	08:40	09:59
	15:25	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:36	03:25	03:52	05:20	06:48	08:11	08:43	10:01
	15:27	17:01	18:25	20:53	22:22	23:39	23:21	21:51	20:06	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:33	03:24	03:55	05:23	06:50	08:13	08:46	10:02
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15	09:50	08:26	06:53	06:07	04:30	03:23	03:57	05:26	06:53	08:16	08:49	10:04
	15:33	17:08	18:30	20:59	22:28	23:41	23:16	21:44	20:00	18:18	15:43	14:49
16	09:48	08:22	06:50	06:04	04:27	03:23	04:00	05:29	06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:01	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:49
17	09:46	08:19	06:46	06:01	04:24	03:22	04:03	05:32	06:59	08:22	08:55	10:06
	15:39	17:14	18:36	21:04	22:34	23:43	23:11	21:38	19:53	18:11	15:37	14:48
18	09:43	08:16	06:43	05:57	04:22	03:22	04:05	05:35	07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07	22:37	23:44	23:09	21:35	19:49	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:04	10:09
	15:47	17:23	18:45	21:13	22:43	23:45	23:03	21:28	19:42	18:01	15:29	14:48
21	09:36	08:06	06:33	05:47	04:13	03:21	04:13	05:44	07:10	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44	04:10	03:21	04:16	05:46	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:22	04:19	05:49	07:15	08:40	09:13	10:11
	15:56	17:32	18:53	21:22	22:51	23:46	22:55	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:22	05:37	04:05	03:22	04:22	05:52	07:18	08:42	09:16	10:12
	15:59	17:35	18:56	21:25	22:54	23:46	22:52	21:15	19:29	17:49	15:20	14:50
25	09:27	07:53	06:19	05:34	04:02	03:22	04:25	05:55	07:21	07:45	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:25	16:45	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:28	05:58	07:23	07:48	09:22	10:12
	16:05	17:41	19:02	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:15	14:52
27	09:21	07:47	06:12	05:27	03:57	03:24	04:30	06:01	07:26	07:51	09:24	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:04	19:19	16:39	15:13	14:53
28	09:19	07:43	06:09	05:24	03:55	03:25	04:33	06:03	07:29	07:54	09:27	10:12
	16:12	17:47	19:07	21:37	23:05	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:05	05:21	03:52	03:26	04:36	06:06	07:31	07:57	09:30	10:11
	16:15		20:10	21:40	23:08	23:43	22:38	20:58	19:12	16:33	15:09	14:56
30	09:13		07:02	05:17	03:50	03:27	04:39	06:09	07:34	08:00	09:33	10:11
	16:18		20:13	21:43	23:10	23:42	22:35	20:54	19:08	16:30	15:07	14:57
31	09:10		06:59		03:48		04:42	06:12		08:03		10:10
	16:21		20:16		23:13		22:32	20:51		16:26		14:59
Potential sun hours Total, worst case	182	242	363	447	559	605	594	502	392	308	206	151

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH11 - RH11

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:29	04:45	06:15	07:37	08:06	09:35
	15:01	16:24	17:50	20:18	21:46	23:15	23:41	22:29	20:47	19:05	16:23	15:05
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:17	07:40	08:09	09:38
	15:02	16:27	17:53	20:21	21:49	23:18	23:40	22:26	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:48	05:08	03:41	03:32	04:51	06:20	07:43	08:12	09:40
	15:04	16:30	17:56	20:24	21:52	23:20	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39	03:33	04:54	06:23	07:45	08:16	09:43
	15:06	16:33	17:59	20:27	21:55	23:23	23:37	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:59
6	10:05	08:53	07:23	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:47
	15:10	16:40	18:04	20:33	22:01	23:27	23:34	22:13	20:30	18:48	16:08	14:57
7	10:03	08:50	07:20	06:35	04:55	03:33	03:39	05:03	06:31	07:54	08:25	09:49
	15:13	16:43	18:07	20:36	22:04	23:29	23:33	22:10	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:56	08:28	09:52
	15:15	16:46	18:10	20:38	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:55
9	10:00	08:44	07:13	06:28	04:49	03:30	03:43	05:09	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	15:59	14:54
10	09:59	08:41	07:10	06:24	04:46	03:29	03:45	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:34	23:27	22:01	20:17	18:35	15:56	14:52
11	09:57	08:38	07:07	06:21	04:42	03:27	03:48	05:14	06:42	08:05	08:37	09:57
	15:22	16:55	18:19	20:47	22:16	23:36	23:25	21:58	20:13	18:31	15:54	14:52
12	09:55	08:35	07:03	06:18	04:39	03:26	03:50	05:17	06:45	08:08	08:40	09:59
	15:25	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:36	03:25	03:52	05:20	06:48	08:11	08:43	10:01
	15:27	17:01	18:25	20:53	22:22	23:39	23:21	21:51	20:06	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:33	03:24	03:55	05:23	06:50	08:13	08:46	10:02
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15	09:50	08:26	06:53	06:07	04:30	03:23	03:57	05:26	06:53	08:16	08:49	10:04
	15:33	17:08	18:30	20:59	22:28	23:42	23:16	21:44	20:00	18:18	15:42	14:49
16	09:48	08:22	06:50	06:04	04:27	03:23	04:00	05:29	06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:01	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:49
17	09:46	08:19	06:46	06:01	04:24	03:22	04:02	05:32	06:59	08:22	08:55	10:06
	15:38	17:14	18:36	21:04	22:34	23:43	23:11	21:38	19:53	18:11	15:37	14:48
18	09:43	08:16	06:43	05:57	04:22	03:22	04:05	05:35	07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07	22:37	23:44	23:09	21:35	19:49	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:04	10:09
	15:47	17:23	18:45	21:13	22:43	23:45	23:03	21:28	19:42	18:01	15:29	14:48
21	09:36	08:06	06:33	05:47	04:13	03:21	04:13	05:44	07:10	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44	04:10	03:21	04:16	05:46	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:21	04:19	05:49	07:15	08:40	09:13	10:11
	15:56	17:32	18:53	21:22	22:51	23:46	22:55	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:22	05:37	04:05	03:22	04:22	05:52	07:18	08:42	09:16	10:12
	15:59	17:35	18:56	21:25	22:54	23:46	22:52	21:15	19:29	17:49	15:20	14:50
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	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:25	16:45	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:27	05:58	07:23	07:48	09:22	10:12
	16:05	17:41	19:01	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:15	14:52
27	09:21	07:47	06:12	05:27	03:57	03:24	04:30	06:01	07:26	07:51	09:24	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:04	19:19	16:39	15:13	14:53
28	09:19	07:43	06:09	05:24	03:55	03:25	04:33	06:03	07:29	07:54	09:27	10:12
	16:11	17:47	19:07	21:37	23:05	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:05	05:21	03:52	03:26	04:36	06:06	07:31	07:57	09:30	10:11
	16:15		20:10	21:40	23:08	23:43	22:38	20:58	19:12	16:33	15:09	14:56
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	16:18		20:13	21:43	23:10	23:42	22:35	20:54	19:08	16:30	15:07	14:57
31	09:10		06:59		03:47		04:42	06:12		08:03		10:10
	16:21		20:16		23:13		22:32	20:51		16:26		14:58
Potential sun hours Total, worst case	182	242	363	447	559	605	594	502	392	308	206	151

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH12 - RH12

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February			March			April	May	June
1	10:11	09:08			07:41		08:32 (Lotlax 1)	06:55	05:14	03:45
	15:00	16:24			17:50	24	08:56 (Lotlax 1)	20:19	21:46	23:16
2	10:10	09:05			07:37		08:32 (Lotlax 1)	06:52	05:11	03:43
	15:02	16:27			17:53	25	08:57 (Lotlax 1)	20:22	21:49	23:19
3	10:09	09:02			07:34		08:31 (Lotlax 1)	06:48	05:08	03:41
	15:04	16:30			17:56	25	08:56 (Lotlax 1)	20:24	21:52	23:21
4	10:08	08:59			07:31		08:31 (Lotlax 1)	06:45	05:04	03:39
	15:06	16:33			17:59	26	08:57 (Lotlax 1)	20:27	21:55	23:24
5	10:07	08:57			07:27		08:31 (Lotlax 1)	06:42	05:01	03:37
	15:08	16:36			18:02	25	08:56 (Lotlax 1)	20:30	21:59	23:26
6	10:06	08:54			07:24		08:31 (Lotlax 1)	06:38	04:58	03:35
	15:10	16:40			18:05	25	08:56 (Lotlax 1)	20:33	22:02	23:28
7	10:04	08:51			07:20		08:31 (Lotlax 1)	06:35	04:55	03:33
	15:12	16:43			18:08	23	08:54 (Lotlax 1)	20:36	22:05	23:30
8	10:03	08:48			07:17		08:32 (Lotlax 1)	06:31	04:52	03:31
	15:15	16:46			18:10	22	08:54 (Lotlax 1)	20:39	22:08	23:32
9	10:01	08:45			07:14		08:33 (Lotlax 1)	06:28	04:49	03:30
	15:17	16:49			18:13	19	08:52 (Lotlax 1)	20:42	22:11	23:34
10	10:00	08:42			07:10		08:34 (Lotlax 1)	06:24	04:45	03:28
	15:19	16:52			18:16	16	08:50 (Lotlax 1)	20:45	22:14	23:36
11	09:58	08:38			07:07		08:36 (Lotlax 1)	06:21	04:42	03:27
	15:22	16:55			18:19	11	08:47 (Lotlax 1)	20:47	22:17	23:37
12	09:56	08:35			07:04			06:18	04:39	03:26
	15:25	16:58			18:22			20:50	22:20	23:39
13	09:54	08:32			07:00			06:14	04:36	03:25
	15:27	17:01			18:25			20:53	22:23	23:40
14	09:52	08:29			06:57		07:31 (Lotlax 2)	06:11	04:33	03:24
	15:30	17:05			18:28	10	07:41 (Lotlax 2)	20:56	22:26	23:41
15	09:50	08:26			06:53		07:29 (Lotlax 2)	06:07	04:30	03:23
	15:33	17:08			18:31	14	07:43 (Lotlax 2)	20:59	22:29	23:43
16	09:48	08:23			06:50		07:27 (Lotlax 2)	06:04	04:27	03:22
	15:35	17:11			18:33	16	07:43 (Lotlax 2)	21:02	22:32	23:44
17	09:46	08:20			06:47		07:26 (Lotlax 2)	06:01	04:24	03:21
	15:38	17:14			18:36	18	07:44 (Lotlax 2)	21:05	22:35	23:45
18	09:44	08:16			06:43		07:25 (Lotlax 2)	05:57	04:21	03:21
	15:41	17:17			18:39	19	07:44 (Lotlax 2)	21:08	22:38	23:45
19	09:42	08:13			06:40		07:25 (Lotlax 2)	05:54	04:18	03:21
	15:44	17:20			18:42	19	07:44 (Lotlax 2)	21:11	22:41	23:46
20	09:39	08:10			06:36		07:24 (Lotlax 2)	05:51	04:16	03:20
	15:47	17:23			18:45	19	07:43 (Lotlax 2)	21:14	22:44	23:46
21	09:37	08:07			06:33		07:04 (Lotlax 3)	05:47	04:13	03:20
	15:50	17:26			18:48	21	07:43 (Lotlax 2)	21:17	22:46	23:47
22	09:35	08:04			06:30		07:00 (Lotlax 3)	05:44	04:10	03:21
	15:53	17:29			18:50	25	07:41 (Lotlax 2)	21:20	22:49	23:47
23	09:32	08:00			06:26		06:57 (Lotlax 3)	05:41	04:07	03:21
	15:56	17:32			18:53	28	07:41 (Lotlax 2)	21:22	22:52	23:47
24	09:30	07:57		08:41 (Lotlax 1)	06:23		06:55 (Lotlax 3)	05:37	04:05	03:21
	15:59	17:35	8	08:49 (Lotlax 1)	18:56	26	07:38 (Lotlax 2)	21:25	22:55	23:47
25	09:27	07:54		08:38 (Lotlax 1)	06:19		06:54 (Lotlax 3)	05:34	04:02	03:22
	16:02	17:38	15	08:53 (Lotlax 1)	18:59	22	07:35 (Lotlax 2)	21:28	22:58	23:47
26	09:25	07:50		08:36 (Lotlax 1)	06:16		06:55 (Lotlax 3)	05:31	03:59	03:22
	16:05	17:41	18	08:54 (Lotlax 1)	19:02	15	07:10 (Lotlax 3)	21:31	23:01	23:46
27	09:22	07:47		08:35 (Lotlax 1)	06:12		06:54 (Lotlax 3)	05:27	03:57	03:23
	16:08	17:44	21	08:56 (Lotlax 1)	19:05	14	07:08 (Lotlax 3)	21:34	23:03	23:46
28	09:19	07:44		08:33 (Lotlax 1)	06:09		06:55 (Lotlax 3)	05:24	03:54	03:24
	16:11	17:47	23	08:56 (Lotlax 1)	19:07	13	07:08 (Lotlax 3)	21:37	23:06	23:45
29	09:16				07:06		07:56 (Lotlax 3)	05:21	03:52	03:25
	16:14				20:10	9	08:05 (Lotlax 3)	21:40	23:09	23:44
30	09:14				07:02		08:00 (Lotlax 3)	05:17	03:49	03:27
	16:18				20:13	1	08:01 (Lotlax 3)	21:43	23:11	23:43
31	09:11				06:59				03:47	
	16:21				20:16				23:14	
Potential sun hours	182	242			363			447	559	606
Total, worst case			85			530				

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH12 - RH12

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	July	August	September			October			November	December
1	03:28	04:45	06:15			07:37			08:07	09:36
	23:42	22:30	20:48			19:05			16:23	15:05
2	03:29	04:48	06:18			07:40		09:17 (Lotlax 1)	08:10	09:38
	23:41	22:27	20:44			19:02	8	09:25 (Lotlax 1)	16:20	15:03
3	03:31	04:51	06:20			07:43		09:13 (Lotlax 1)	08:13	09:41
	23:40	22:23	20:41			18:58	14	09:27 (Lotlax 1)	16:17	15:02
4	03:33	04:54	06:23			07:46		09:11 (Lotlax 1)	08:16	09:43
	23:38	22:20	20:38			18:55	18	09:29 (Lotlax 1)	16:14	15:00
5	03:34	04:57	06:26			07:48		09:09 (Lotlax 1)	08:19	09:46
	23:37	22:17	20:34			18:52	21	09:30 (Lotlax 1)	16:11	14:58
6	03:36	05:00	06:29			07:51		09:08 (Lotlax 1)	08:22	09:48
	23:35	22:14	20:31			18:48	23	09:31 (Lotlax 1)	16:08	14:57
7	03:38	05:03	06:31			07:54		09:07 (Lotlax 1)	08:25	09:50
	23:34	22:11	20:27			18:45	24	09:31 (Lotlax 1)	16:05	14:56
8	03:40	05:06	06:34			07:57		09:07 (Lotlax 1)	08:28	09:52
	23:32	22:08	20:24			18:41	24	09:31 (Lotlax 1)	16:02	14:54
9	03:43	05:08	06:37			08:00		09:06 (Lotlax 1)	08:31	09:54
	23:30	22:05	20:21			18:38	25	09:31 (Lotlax 1)	15:59	14:53
10	03:45	05:11	06:40			08:02		09:06 (Lotlax 1)	08:34	09:56
	23:28	22:01	20:17			18:35	25	09:31 (Lotlax 1)	15:56	14:52
11	03:47	05:14	06:42			08:05		09:06 (Lotlax 1)	08:38	09:58
	23:26	21:58	20:14			18:31	25	09:31 (Lotlax 1)	15:54	14:51
12	03:49	05:17	06:45			08:08		09:06 (Lotlax 1)	08:41	10:00
	23:24	21:55	20:10			18:28	24	09:30 (Lotlax 1)	15:51	14:50
13	03:52	05:20	06:48			08:11		09:06 (Lotlax 1)	08:44	10:02
	23:21	21:52	20:07			18:25	23	09:29 (Lotlax 1)	15:48	14:50
14	03:54	05:23	06:51		07:47 (Lotlax 3)	08:14		09:06 (Lotlax 1)	08:47	10:03
	23:19	21:48	20:03	8	07:55 (Lotlax 3)	18:21	22	09:28 (Lotlax 1)	15:45	14:49
15	03:57	05:26	06:53		07:45 (Lotlax 3)	08:17		09:07 (Lotlax 1)	08:50	10:05
	23:17	21:45	20:00	12	07:57 (Lotlax 3)	18:18	20	09:27 (Lotlax 1)	15:42	14:49
16	03:59	05:29	06:56		07:44 (Lotlax 3)	08:20		09:08 (Lotlax 1)	08:53	10:06
	23:14	21:42	19:56	14	07:58 (Lotlax 3)	18:15	17	09:25 (Lotlax 1)	15:40	14:48
17	04:02	05:32	06:59		07:42 (Lotlax 3)	08:22		09:10 (Lotlax 1)	08:56	10:07
	23:12	21:38	19:53	15	07:57 (Lotlax 3)	18:11	13	09:23 (Lotlax 1)	15:37	14:48
18	04:05	05:35	07:02		07:42 (Lotlax 3)	08:25		09:15 (Lotlax 1)	08:59	10:08
	23:09	21:35	19:50	17	08:21 (Lotlax 2)	18:08	4	09:19 (Lotlax 1)	15:34	14:48
19	04:07	05:38	07:04		07:42 (Lotlax 3)	08:28			09:02	10:09
	23:07	21:32	19:46	25	08:25 (Lotlax 2)	18:05			15:32	14:48
20	04:10	05:41	07:07		07:42 (Lotlax 3)	08:31			09:05	10:10
	23:04	21:28	19:43	28	08:26 (Lotlax 2)	18:02			15:29	14:48
21	04:13	05:44	07:10		07:45 (Lotlax 3)	08:34			09:08	10:11
	23:02	21:25	19:39	26	08:27 (Lotlax 2)	17:58			15:27	14:48
22	04:16	05:46	07:13		07:48 (Lotlax 3)	08:37			09:11	10:12
	22:59	21:22	19:36	23	08:28 (Lotlax 2)	17:55			15:24	14:49
23	04:19	05:49	07:15		08:08 (Lotlax 2)	08:40			09:14	10:12
	22:56	21:18	19:32	19	08:27 (Lotlax 2)	17:52			15:22	14:49
24	04:21	05:52	07:18		08:08 (Lotlax 2)	08:43			09:17	10:12
	22:53	21:15	19:29	19	08:27 (Lotlax 2)	17:49			15:20	14:50
25	04:24	05:55	07:21		08:08 (Lotlax 2)	07:46			09:19	10:13
	22:50	21:12	19:26	19	08:27 (Lotlax 2)	16:45			15:17	14:51
26	04:27	05:58	07:23		08:08 (Lotlax 2)	07:49			09:22	10:13
	22:48	21:08	19:22	18	08:26 (Lotlax 2)	16:42			15:15	14:52
27	04:30	06:01	07:26		08:09 (Lotlax 2)	07:52			09:25	10:13
	22:45	21:05	19:19	17	08:26 (Lotlax 2)	16:39			15:13	14:53
28	04:33	06:03	07:29		08:09 (Lotlax 2)	07:55			09:28	10:13
	22:42	21:01	19:15	14	08:23 (Lotlax 2)	16:36			15:11	14:54
29	04:36	06:06	07:32		08:10 (Lotlax 2)	07:58			09:31	10:12
	22:39	20:58	19:12	12	08:22 (Lotlax 2)	16:33			15:09	14:55
30	04:39	06:09	07:34		08:13 (Lotlax 2)	08:01			09:33	10:12
	22:36	20:55	19:09	6	08:19 (Lotlax 2)	16:30			15:07	14:57
31	04:42	06:12				08:04				10:11
	22:33	20:51				16:26				14:58
Potential sun hours	595	502	392			308			206	151
Total, worst case				292			330			

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH13 - RH13

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March		April	May	June	July	August	September		October		November	December
1	10:11	09:08	07:41		08:16 (8)	06:55	05:14	03:45	03:28	04:45	06:15		07:37		08:49 (8)	08:07	09:36
	15:01	16:24	17:50	6	08:22 (8)	20:19	21:46	23:16	23:42	22:30	20:48		19:05	13	09:02 (8)	16:24	15:05
2	10:10	09:05	07:37		08:13 (8)	06:52	05:11	03:43	03:30	04:48	06:18		07:40		08:47 (8)	08:10	09:38
	15:02	16:27	17:53	12	08:25 (8)	20:22	21:49	23:19	23:41	22:27	20:45		19:02	17	09:04 (8)	16:20	15:04
3	10:09	09:02	07:34		08:11 (8)	06:49	05:08	03:41	03:31	04:51	06:21		07:43		08:46 (8)	08:13	09:41
	15:04	16:30	17:56	16	08:27 (8)	20:25	21:53	23:21	23:40	22:24	20:41		18:59	18	09:04 (8)	16:17	15:02
4	10:08	09:00	07:31		08:09 (8)	06:45	05:05	03:39	03:33	04:54	06:23		07:46		08:45 (8)	08:16	09:43
	15:06	16:34	17:59	18	08:27 (8)	20:27	21:56	23:23	23:38	22:20	20:38		18:55	20	09:05 (8)	16:14	15:00
5	10:07	08:57	07:27		08:09 (8)	06:42	05:02	03:37	03:35	04:57	06:26		07:49		08:44 (8)	08:19	09:46
	15:08	16:37	18:02	19	08:28 (8)	20:30	21:59	23:26	23:37	22:17	20:34		18:52	20	09:04 (8)	16:11	14:59
6	10:05	08:54	07:24		08:08 (8)	06:38	04:58	03:35	03:37	05:00	06:29		07:51		08:43 (8)	08:22	09:48
	15:10	16:40	18:05	20	08:28 (8)	20:33	22:02	23:28	23:35	22:14	20:31		18:48	21	09:04 (8)	16:08	14:57
7	10:04	08:51	07:21		08:08 (8)	06:35	04:55	03:33	03:39	05:03	06:32		07:54		08:43 (8)	08:25	09:50
	15:13	16:43	18:08	20	08:28 (8)	20:36	22:05	23:30	23:34	22:11	20:28		18:45	21	09:04 (8)	16:05	14:56
8	10:03	08:48	07:17		08:07 (8)	06:32	04:52	03:32	03:41	05:06	06:34		07:57		08:43 (8)	08:28	09:52
	15:15	16:46	18:11	21	08:28 (8)	20:39	22:08	23:32	23:32	22:08	20:24		18:42	20	09:03 (8)	16:02	14:55
9	10:01	08:45	07:14		08:08 (8)	06:28	04:49	03:30	03:43	05:09	06:37		08:00		08:44 (8)	08:31	09:54
	15:17	16:49	18:14	20	08:28 (8)	20:42	22:11	23:34	23:30	22:05	20:21		18:38	18	09:02 (8)	16:00	14:54
10	10:00	08:42	07:11		08:07 (8)	06:25	04:46	03:29	03:45	05:12	06:40		08:03		08:44 (8)	08:35	09:56
	15:20	16:52	18:16	19	08:26 (8)	20:45	22:14	23:35	23:28	22:01	20:17		18:35	17	09:01 (8)	15:57	14:53
11	09:58	08:39	07:07		08:08 (8)	06:21	04:43	03:27	03:47	05:15	06:43		08:05		08:45 (8)	08:38	09:58
	15:22	16:56	18:19	18	08:26 (8)	20:48	22:17	23:37	23:26	21:58	20:14		18:32	15	09:00 (8)	15:54	14:52
12	09:56	08:35	07:04		08:09 (8)	06:18	04:40	03:26	03:50	05:18	06:45		08:08		08:47 (8)	08:41	10:00
	15:25	16:59	18:22	15	08:24 (8)	20:50	22:20	23:39	23:24	21:55	20:10		18:28	10	08:57 (8)	15:51	14:51
13	09:54	08:32	07:00		08:11 (8)	06:15	04:37	03:25	03:52	05:21	06:48		08:11			08:44	10:02
	15:28	17:02	18:25	11	08:22 (8)	20:53	22:23	23:40	23:21	21:52	20:07		18:25			15:48	14:50
14	09:52	08:29	06:57			06:11	04:34	03:24	03:55	05:23	06:51		08:14			08:47	10:03
	15:30	17:05	18:28			20:56	22:26	23:41	23:19	21:48	20:04		18:22			15:45	14:49
15	09:50	08:26	06:54			06:08	04:31	03:23	03:57	05:26	06:54		08:17			08:50	10:05
	15:33	17:08	18:31			20:59	22:29	23:43	23:17	21:45	20:00		18:18			15:43	14:49
16	09:48	08:23	06:50			06:04	04:28	03:22	04:00	05:29	06:56		08:20			08:53	10:06
	15:36	17:11	18:34			21:02	22:32	23:44	23:14	21:42	19:57		18:15			15:40	14:49
17	09:46	08:20	06:47			06:01	04:25	03:22	04:02	05:32	06:59		08:23			08:56	10:07
	15:39	17:14	18:36			21:05	22:35	23:44	23:12	21:38	19:53		18:12			15:37	14:48
18	09:44	08:17	06:43			05:58	04:22	03:21	04:05	05:35	07:02		08:25			08:59	10:08
	15:41	17:17	18:39			21:08	22:38	23:45	23:09	21:35	19:50		18:08			15:35	14:48
19	09:42	08:13	06:40			05:54	04:19	03:21	04:08	05:38	07:05		08:28			09:02	10:09
	15:44	17:20	18:42			21:11	22:41	23:46	23:07	21:32	19:46		18:05			15:32	14:48
20	09:39	08:10	06:37			05:51	04:16	03:21	04:11	05:41	07:07		08:31			09:05	10:10
	15:47	17:23	18:45			21:14	22:44	23:46	23:04	21:29	19:43		18:02			15:30	14:48
21	09:37	08:07	06:33			05:48	04:13	03:21	04:13	05:44	07:10		08:34			09:08	10:11
	15:50	17:26	18:48			21:17	22:46	23:47	23:02	21:25	19:40		17:59			15:27	14:49
22	09:35	08:04	06:30			05:44	04:10	03:21	04:16	05:47	07:13		08:37			09:11	10:12
	15:53	17:29	18:51			21:20	22:49	23:47	22:59	21:22	19:36		17:55			15:25	14:49
23	09:32	08:00	06:26			05:41	04:08	03:21	04:19	05:50	07:15		08:40			09:14	10:12
	15:56	17:32	18:53			21:23	22:52	23:47	22:56	21:18	19:33		17:52			15:22	14:50
24	09:30	07:57	06:23			05:37	04:05	03:22	04:22	05:52	07:18		08:43			09:17	10:12
	15:59	17:35	18:56			21:26	22:55	23:47	22:53	21:15	19:29		17:49			15:20	14:50
25	09:27	07:54	06:19			05:34	04:02	03:22	04:25	05:55	07:21		07:46			09:20	10:13
	16:02	17:38	18:59			21:29	22:58	23:47	22:50	21:12	19:26		16:46			15:18	14:51
26	09:25	07:51	06:16			05:31	04:00	03:23	04:28	05:58	07:24		07:49			09:22	10:13
	16:05	17:41	19:02			21:31	23:01	23:46	22:48	21:08	19:22		16:42			15:16	14:52
27	09:22	07:47	06:13			05:28	03:57	03:24	04:30	06:01	07:26		07:52			09:25	10:13
	16:09	17:44	19:05			21:34	23:03	23:46	22:45	21:05	19:19		16:39			15:13	14:53
28	09:19	07:44	06:09			05:24	03:55	03:25	04:33	06:04	07:29		07:55			09:28	10:13
	16:12	17:47	19:08			21:37	23:06	23:45	22:42	21:02	19:16		16:36			15:11	14:54
29	09:17		07:06			05:21	03:52	03:26	04:36	06:07	07:32		07:58			09:31	10:12
	16:15		20:10			21:40	23:09	23:44	22:39	20:58	19:12		16:33			15:09	14:56
30	09:14		07:02			05:18	03:50	03:27	04:39	06:09	07:35	08:52 (8)	08:01			09:33	10:12
	16:18		20:13			21:43	23:11	23:43	22:36	20:55	19:09	8 09:00 (8)	16:30			15:07	14:57
31	09:11		06:59				03:47		04:42	06:12			08:04				10:11
	16:21		20:16				23:14		22:33	20:51			16:27				14:59
Potential sun hours	182	242	363		447	559	605	594	502	392			308			206	151
Total, worst case				215							8			210			

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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**Shadow receptor:** RH14 - RH14

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:11	09:08	07:41	06:55	05:14	03:45	03:28	04:45	06:15	07:37	08:07	09:36
	15:01	16:24	17:50	20:19	21:47	23:16	23:42	22:30	20:48	19:05	16:24	15:05
2	10:10	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:18	07:40	08:10	09:39
	15:02	16:27	17:53	20:22	21:50	23:19	23:41	22:27	20:45	19:02	16:20	15:04
3	10:09	09:03	07:34	06:49	05:08	03:41	03:31	04:51	06:21	07:43	08:13	09:41
	15:04	16:30	17:56	20:25	21:53	23:21	23:40	22:24	20:41	18:59	16:17	15:02
4	10:08	09:00	07:31	06:45	05:05	03:39	03:33	04:54	06:23	07:46	08:16	09:43
	15:06	16:34	17:59	20:28	21:56	23:24	23:39	22:20	20:38	18:55	16:14	15:00
5	10:07	08:57	07:27	06:42	05:01	03:37	03:35	04:57	06:26	07:49	08:19	09:46
	15:08	16:37	18:02	20:30	21:59	23:26	23:37	22:17	20:34	18:52	16:11	14:59
6	10:06	08:54	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:48
	15:10	16:40	18:05	20:33	22:02	23:28	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:51	07:21	06:35	04:55	03:33	03:39	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:05	23:30	23:34	22:11	20:28	18:45	16:05	14:56
8	10:03	08:48	07:17	06:32	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:53
	15:15	16:46	18:11	20:39	22:08	23:32	23:32	22:08	20:24	18:42	16:02	14:55
9	10:01	08:45	07:14	06:28	04:49	03:30	03:43	05:09	06:37	08:00	08:32	09:55
	15:17	16:49	18:14	20:42	22:11	23:34	23:30	22:05	20:21	18:38	16:00	14:53
10	10:00	08:42	07:11	06:25	04:46	03:29	03:45	05:12	06:40	08:03	08:35	09:57
	15:20	16:52	18:16	20:45	22:14	23:36	23:28	22:01	20:17	18:35	15:57	14:52
11	09:58	08:39	07:07	06:21	04:43	03:27	03:47	05:15	06:43	08:05	08:38	09:58
	15:22	16:55	18:19	20:48	22:17	23:37	23:26	21:58	20:14	18:32	15:54	14:51
12	09:56	08:35	07:04	06:18	04:40	03:26	03:50	05:18	06:45	08:08	08:41	10:00
	15:25	16:59	18:22	20:50	22:20	23:39	23:24	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:15	04:36	03:25	03:52	05:21	06:48	08:11	08:44	10:02
	15:27	17:02	18:25	20:53	22:23	23:40	23:22	21:52	20:07	18:25	15:48	14:50
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15	09:51	08:26	06:54	06:08	04:30	03:23	03:57	05:26	06:54	08:17	08:50	10:05
	15:33	17:08	18:31	20:59	22:29	23:43	23:17	21:45	20:00	18:18	15:43	14:49
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	15:36	17:11	18:34	21:02	22:32	23:44	23:15	21:42	19:57	18:15	15:40	14:48
17	09:46	08:20	06:47	06:01	04:25	03:22	04:02	05:32	06:59	08:23	08:56	10:07
	15:39	17:14	18:36	21:05	22:35	23:45	23:12	21:39	19:53	18:12	15:37	14:48
18	09:44	08:17	06:43	05:58	04:22	03:21	04:05	05:35	07:02	08:25	08:59	10:09
	15:41	17:17	18:39	21:08	22:38	23:45	23:10	21:35	19:50	18:08	15:35	14:48
19	09:42	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:05	08:28	09:02	10:10
	15:44	17:20	18:42	21:11	22:41	23:46	23:07	21:32	19:46	18:05	15:32	14:48
20	09:40	08:10	06:37	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:05	10:10
	15:47	17:23	18:45	21:14	22:44	23:46	23:04	21:29	19:43	18:02	15:30	14:48
21	09:37	08:07	06:33	05:47	04:13	03:21	04:13	05:44	07:10	08:34	09:08	10:11
	15:50	17:26	18:48	21:17	22:47	23:47	23:02	21:25	19:40	17:59	15:27	14:49
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	15:53	17:29	18:51	21:20	22:49	23:47	22:59	21:22	19:36	17:55	15:25	14:49
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	16:02	17:38	18:59	21:29	22:58	23:47	22:50	21:12	19:26	16:46	15:18	14:51
26	09:25	07:51	06:16	05:31	04:00	03:23	04:28	05:58	07:24	07:49	09:22	10:13
	16:05	17:41	19:02	21:32	23:01	23:46	22:48	21:08	19:22	16:42	15:15	14:52
27	09:22	07:47	06:13	05:28	03:57	03:24	04:30	06:01	07:26	07:52	09:25	10:13
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28	09:19	07:44	06:09	05:24	03:55	03:25	04:33	06:04	07:29	07:55	09:28	10:13
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29	09:17		07:06	05:21	03:52	03:26	04:36	06:07	07:32	07:58	09:31	10:12
	16:15		20:10	21:41	23:09	23:44	22:39	20:58	19:12	16:33	15:09	14:55
30	09:14		07:02	05:18	03:50	03:27	04:39	06:09	07:35	08:01	09:33	10:12
	16:18		20:13	21:44	23:11	23:43	22:36	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:47		04:42	06:12		08:04		10:11
	16:21		20:16		23:14		22:33	20:51		16:27		14:58
Potential sun hours Total, worst case	182	242	363	447	559	605	594	502	392	308	206	151

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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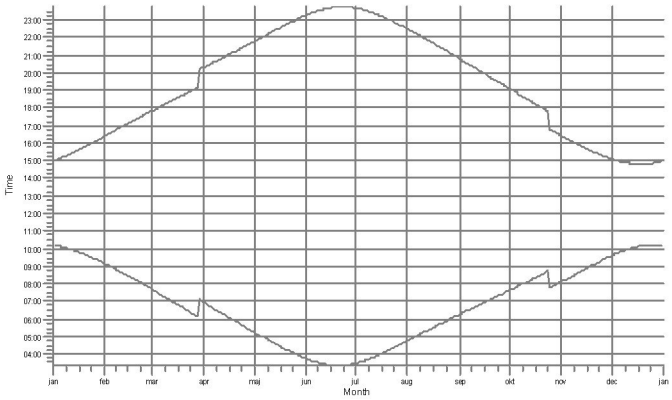
Calculated:
20.8.2021 14:34/3.3.247

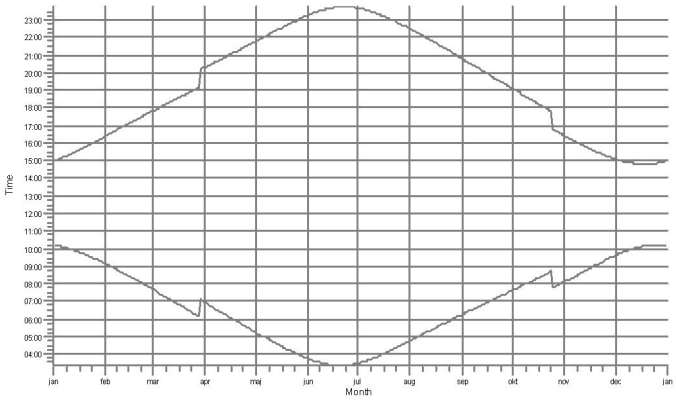
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

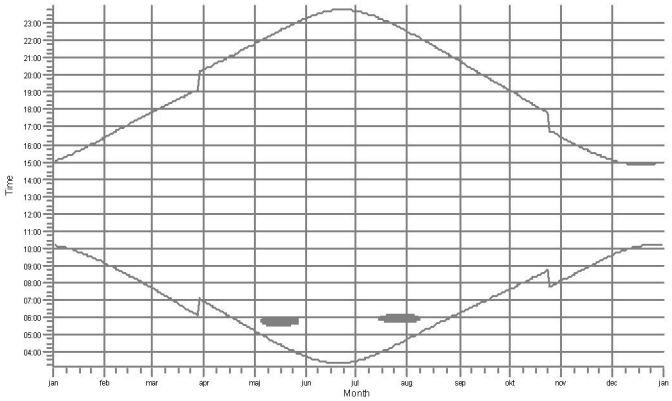
HH01: HH01



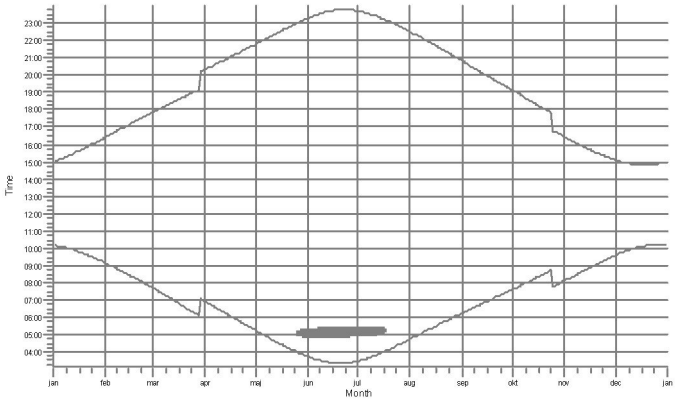
HH02: HH02



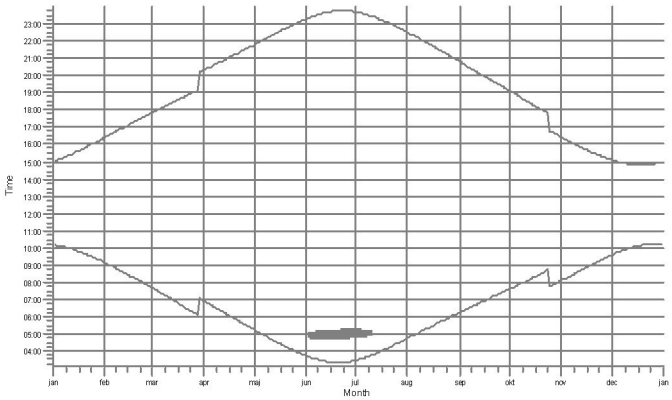
RH01: RH01



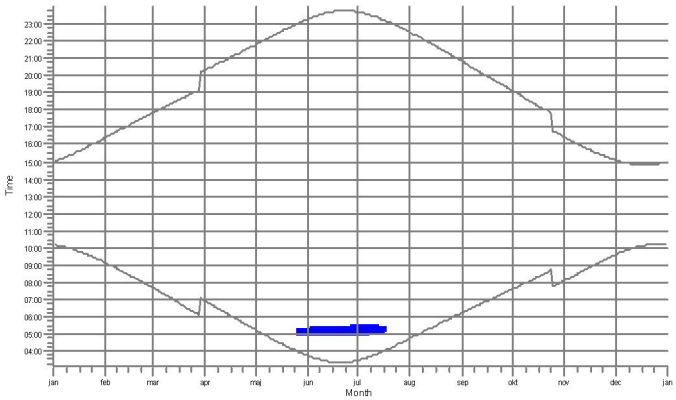
RH02: RH02



RH03: RH03



RH04: RH04



WTGs

3: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: [redacted]) 4: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

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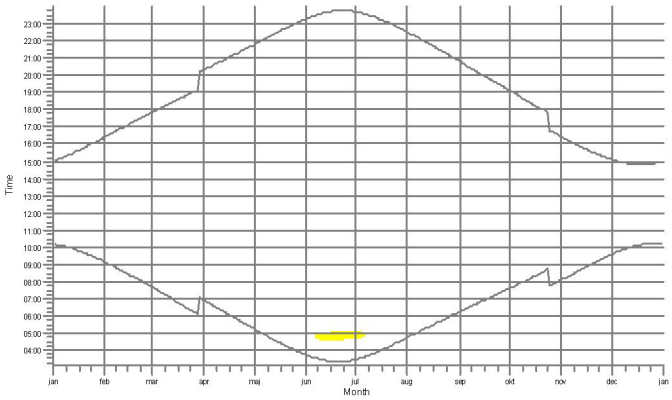
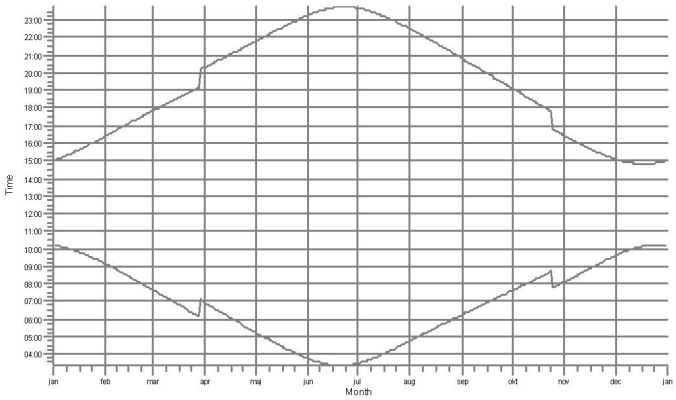
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

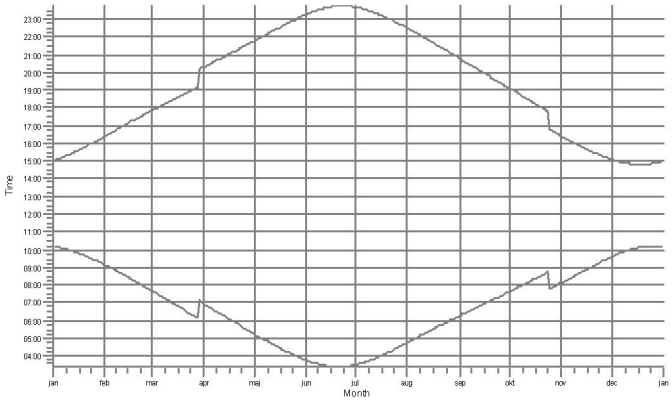
RH05: RH05



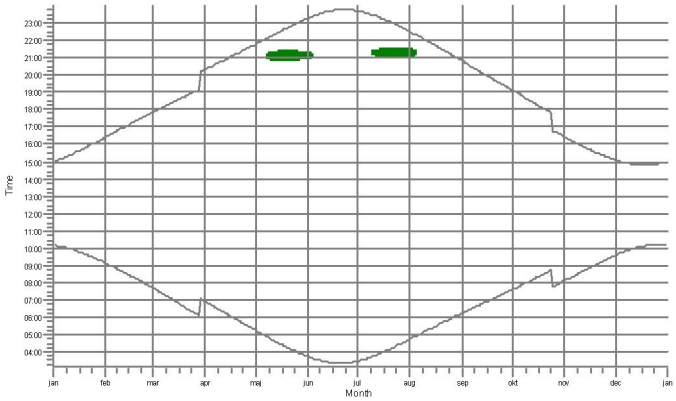
RH06: RH06



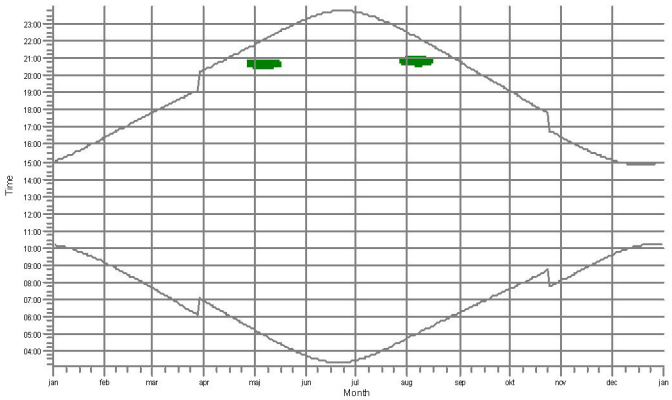
RH07: RH07



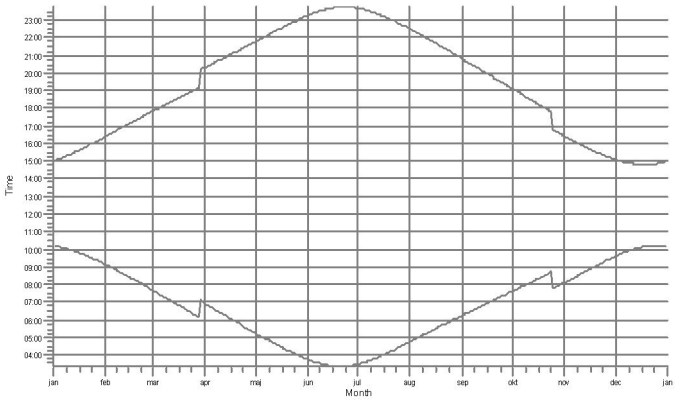
RH08: RH08



RH09: RH09



RH10: RH10



WTGs

1: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 3 5) 2: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

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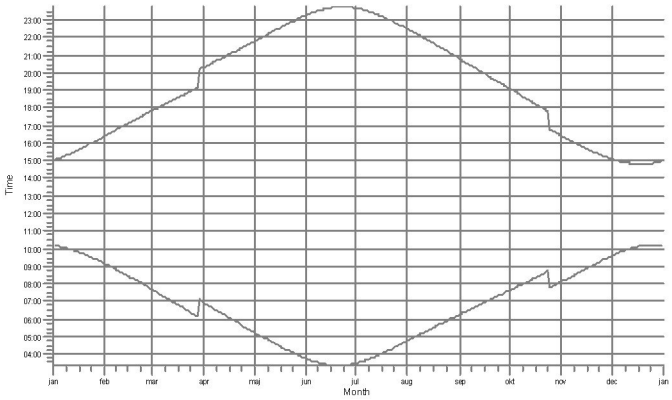
Calculated:
20.8.2021 14:34/3.3.247

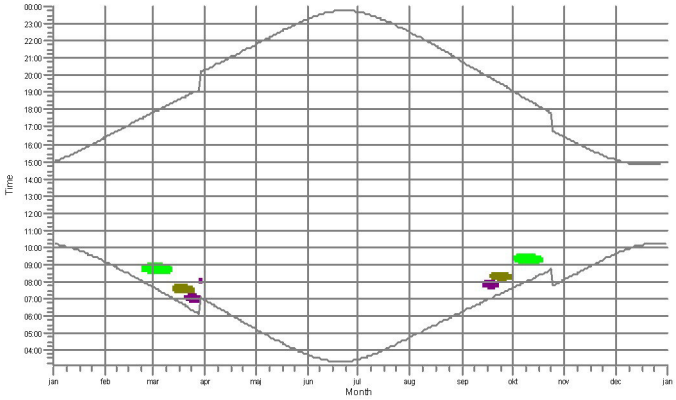
SHADOW - Calendar, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

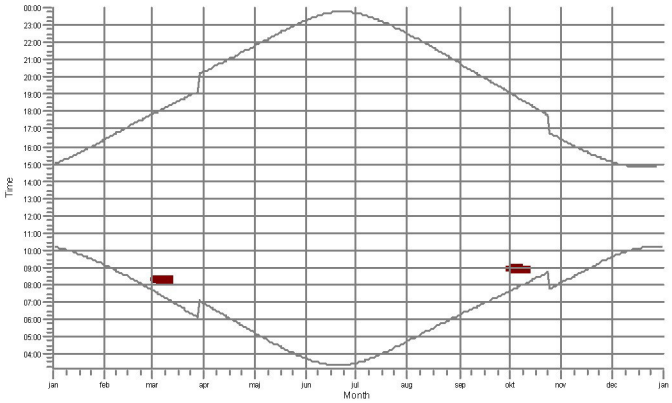
RH11: RH11



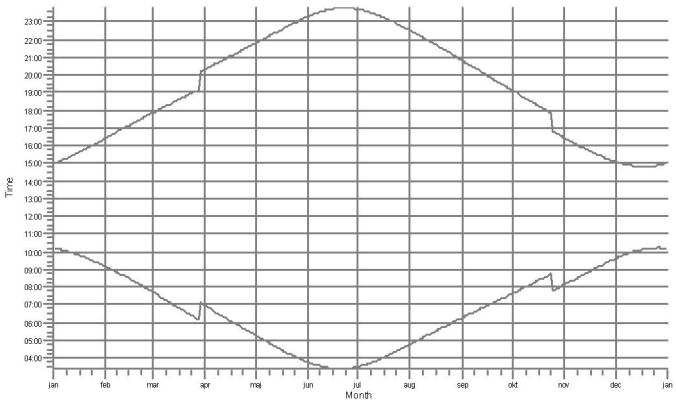
RH12: RH12



RH13: RH13



RH14: RH14



WTGs

8: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 1 7) Lotlax 2: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)
Lotlax 1: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 1) Lotlax 3: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)

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Calculated:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 1 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (156)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14 20:31-20:49/18	03:45 21:01-21:12/11	03:29	04:45 20:40-20:58/18	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16	23:41	22:29 21:07-21:25/18	20:48	19:05	16:23	15:06
2	10:09	09:05	07:37	06:52	05:11 20:30-20:49/19	03:43 21:03-21:11/8	03:30	04:48 20:39-20:59/20	06:18	07:40	08:10	09:38
	15:03	16:27	17:53	20:22	21:49	23:18	23:40	22:26 21:08-21:24/16	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:48	05:08 20:29-20:50/21	03:41 21:06-21:10/4	03:32	04:51 20:39-20:59/20	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24	21:52	23:20	23:39	22:23 21:10-21:23/13	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05 20:28-20:50/22	03:39	03:33	04:54 20:38-20:59/21	06:23	07:45	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20 21:11-21:21/10	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:42	05:02 20:28-20:50/22	03:37	03:35	04:57 20:38-21:00/22	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58 20:28-20:50/22	03:35	03:37	05:00 20:37-20:59/22	06:29	07:51	08:22	09:47
	15:11	16:40	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55 20:28-20:50/22	03:34	03:39	05:03 20:38-21:00/22	06:31	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52 20:28-20:50/22	03:32	03:41	05:06 20:37-20:59/22	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:39	22:07 21:03-21:09/6	23:31	23:31	22:07	20:24	18:41	16:02	14:55
9	10:01	08:44	07:14	06:28	04:49 20:28-20:49/21	03:30	03:43	05:09 20:38-20:59/21	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10 21:00-21:11/11	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46 20:29-20:49/20	03:29	03:45 21:12-21:18/6	05:12 20:38-20:59/21	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13 20:59-21:14/15	23:35	23:27	22:01	20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21	04:43 20:29-20:48/19	03:28	03:48 21:11-21:20/9	05:15 20:38-20:58/20	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16 20:57-21:14/17	23:36	23:25	21:58	20:14	18:31	15:54	14:52
12	09:56	08:35	07:03	06:18	04:40 20:29-20:47/18	03:26	03:50 21:09-21:21/12	05:18 20:39-20:57/18	06:45	08:08	08:40	09:59
	15:25	16:59	18:22	20:50	22:19 20:56-21:15/19	23:38	23:23	21:54	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37 20:31-20:47/16	03:25	03:52 21:08-21:22/14	05:21 20:40-20:55/15	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22 20:56-21:16/20	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34 20:32-20:45/13	03:24	03:55 21:08-21:23/15	05:23 20:41-20:54/13	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25 20:55-21:16/21	23:41	23:19	21:48	20:03	18:21	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31 20:34-20:44/10	03:24	03:57 21:07-21:24/17	05:26 20:44-20:51/7	06:53	08:16	08:49	10:04
	15:33	17:08	18:31	20:59	22:28 20:55-21:17/22	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28 20:36-20:41/5	03:23	04:00 21:07-21:25/18	05:29	06:56	08:19	08:52	10:05
	15:36	17:11	18:33	21:02	22:31 20:54-21:17/23	23:43	23:14	21:41	19:56	18:15	15:40	14:49
17	09:46	08:19	06:47	06:01	04:25 20:54-21:17/23	03:22	04:03 21:06-21:25/19	05:32	06:59	08:22	08:55	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	23:11	21:38	19:53	18:11	15:37	14:49
18	09:44	08:16	06:43	05:57	04:22 20:55-21:18/23	03:22	04:05 21:06-21:26/20	05:35	07:02	08:25	08:58	10:08
	15:42	17:17	18:39	21:08	22:37	23:44	23:09	21:35	19:50	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19 20:54-21:17/23	03:21	04:08 21:05-21:26/21	05:38	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16 20:54-21:17/23	03:21	04:11 21:05-21:26/21	05:41	07:07	08:31	09:04	10:10
	15:47	17:23	18:45	21:13	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:47	04:13 20:55-21:17/22	03:21	04:13 21:05-21:27/22	05:44	07:10	08:34	09:07	10:10
	15:50	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:29	05:44	04:10 20:55-21:17/22	03:21	04:16 21:05-21:27/22	05:47	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08 20:56-21:17/21	03:22	04:19 21:05-21:27/22	05:49	07:15	08:40	09:13	10:11
	15:56	17:32	18:53	21:22	22:52	23:46	22:55	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37	04:05 20:56-21:17/21	03:22	04:22 21:04-21:27/23	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:54	23:46	22:53	21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:02 20:56-21:17/21	03:23	04:25 21:05-21:28/23	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00 20:57-21:16/19	03:23	04:28 21:05-21:27/22	05:58	07:23	07:49	09:22	10:12
	16:05	17:41	19:02	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:16	14:52
27	09:21	07:47	06:12	05:27	03:57 20:57-21:16/19	03:24	04:31 21:05-21:28/23	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24 20:35-20:44/9	03:55 20:58-21:15/17	03:25	04:33 20:45-20:53/8	06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:07	21:37	23:05	23:44	22:41 21:05-21:27/22	21:01	19:15	16:36	15:11	14:54
29	09:16		07:06	05:21 20:33-20:46/13	03:52 20:59-21:14/15	03:26	04:36 20:43-20:55/12	06:06	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:43	22:38 21:05-21:27/22	20:58	19:12	16:33	15:09	14:56
30	09:13		07:02	05:18 20:31-20:47/16	03:50 21:00-21:14/14	03:27	04:39 20:42-20:57/15	06:09	07:34	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35 21:06-21:27/21	20:54	19:09	16:30	15:07	14:57
31	09:11		06:59		03:48 21:01-21:13/12		04:42 20:41-20:57/16	06:12		08:04		10:11
	16:21		20:16		23:13		22:32 21:06-21:26/20	20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	38	739	23	465	339	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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 2 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (160)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:29 04:48-04:58/10	04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30 04:48-04:58/10	04:48	06:18	07:40	08:10	09:38
	15:03	16:27	17:53	20:22	21:49	23:18	23:40	22:26	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:48	05:08	03:41	03:32 04:50-04:58/8	04:51	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39	03:33 04:51-04:57/6	04:54	06:23	07:46	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:00
5	10:06	08:56	07:27	06:42	05:02	03:37	03:35 04:53-04:55/2	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55	03:34	03:39	05:03	06:31	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32 04:46-04:51/5	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:55
9	10:01	08:44	07:14	06:28	04:49	03:30 04:45-04:52/7	03:43	05:09	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:42	22:10	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29 04:44-04:53/9	03:45	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21	04:43	03:28 04:43-04:54/11	03:48	05:15	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:36	23:25	21:58	20:14	18:31	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	03:26 04:44-04:55/11	03:50	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	03:25 04:43-04:55/12	03:52	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:24 04:44-04:56/12	03:55	05:23	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31	03:23 04:43-04:56/13	03:57	05:26	06:53	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23 04:43-04:57/14	04:00	05:29	06:56	08:19	08:52	10:06
	15:36	17:11	18:33	21:02	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:49
17	09:46	08:19	06:47	06:01	04:25	03:22 04:43-04:58/15	04:03	05:32	06:59	08:22	08:55	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	23:11	21:38	19:53	18:12	15:37	14:49
18	09:44	08:16	06:43	05:58	04:22	03:22 04:44-04:58/14	04:05	05:35	07:02	08:25	08:58	10:08
	15:42	17:17	18:39	21:08	22:37	23:44	23:09	21:35	19:50	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21 04:44-04:58/14	04:08	05:38	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:32	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21 04:44-04:59/15	04:11	05:41	07:07	08:31	09:04	10:10
	15:47	17:23	18:45	21:13	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:47	04:13	03:21 04:44-04:59/15	04:13	05:44	07:10	08:34	09:07	10:10
	15:50	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:30	05:44	04:10	03:21 04:44-04:59/15	04:16	05:47	07:13	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:22	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:22 04:44-04:59/15	04:19	05:49	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:46	22:56	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37	04:05	03:22 04:45-04:59/14	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:02	03:23 04:45-04:59/14	04:25	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23 04:45-04:59/14	04:28	05:58	07:23	07:49	09:22	10:12
	16:05	17:41	19:02	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:16	14:52
27	09:22	07:47	06:12	05:27	03:57	03:24 04:46-05:00/14	04:31	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:55	03:25 04:47-05:00/13	04:33	06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:07	21:37	23:06	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:06	05:21	03:52	03:26 04:46-04:59/13	04:36	06:06	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:33	15:09	14:56
30	09:13		07:02	05:18	03:50	03:27 04:47-04:59/12	04:39	06:09	07:34	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:48		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	0	291	36	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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 3 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (161)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45 04:59-05:17/18	03:29 05:02-05:25/23	04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:43 04:58-05:17/19	03:30 05:03-05:26/23	04:48	06:18	07:40	08:10	09:38
	15:03	16:27	17:53	20:22	21:49	23:18	23:40	22:26	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:49	05:08	03:41 04:58-05:18/20	03:32 05:03-05:26/23	04:51	06:20	07:43	08:13	09:40
	15:04	16:30	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39 04:58-05:19/21	03:33 05:03-05:26/23	04:54	06:23	07:46	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:00
5	10:06	08:56	07:27	06:42	05:02	03:37 04:58-05:19/21	03:35 05:03-05:25/22	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35 04:58-05:19/21	03:37 05:04-05:26/22	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55	03:34 04:58-05:20/22	03:39 05:04-05:25/21	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32 04:58-05:20/22	03:41 05:05-05:26/21	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:31	23:31	22:07	20:24	18:42	16:02	14:55
9	10:01	08:44	07:14	06:28	04:49	03:30 04:58-05:20/22	03:43 05:05-05:25/20	05:09	06:37	08:00	08:31	09:54
	15:17	16:49	18:13	20:42	22:10	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29 04:58-05:20/22	03:45 05:06-05:25/19	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:57	14:53
11	09:57	08:38	07:07	06:21	04:43	03:28 04:59-05:22/23	03:48 05:06-05:25/19	05:15	06:43	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:36	23:25	21:58	20:14	18:31	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	03:26 04:58-05:21/23	03:50 05:07-05:25/18	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	03:25 04:58-05:21/23	03:52 05:07-05:24/17	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:24 04:59-05:22/23	03:55 05:08-05:23/15	05:23	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31	03:24 04:58-05:22/24	03:57 05:09-05:23/14	05:26	06:53	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23 04:59-05:22/23	04:00 05:10-05:22/12	05:29	06:56	08:19	08:52	10:06
	15:36	17:11	18:33	21:02	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:49
17	09:46	08:19	06:47	06:01	04:25	03:22 04:59-05:23/24	04:03 05:12-05:20/8	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	23:11	21:38	19:53	18:12	15:37	14:49
18	09:44	08:16	06:43	05:58	04:22	03:22 05:00-05:23/23	04:05	05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37	23:45	23:09	21:35	19:50	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21 05:00-05:23/23	04:08	05:38	07:04	08:28	09:02	10:09
	15:44	17:20	18:42	21:11	22:40	23:45	23:06	21:32	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21 05:00-05:23/23	04:11	05:41	07:07	08:31	09:04	10:10
	15:47	17:23	18:45	21:13	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:47	04:13	03:21 05:00-05:24/24	04:14	05:44	07:10	08:34	09:07	10:10
	15:50	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:30	05:44	04:10	03:21 05:00-05:24/24	04:16	05:47	07:13	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:22	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:22 05:00-05:23/23	04:19	05:49	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:46	22:56	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37	04:05	03:22 05:01-05:24/23	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:02	03:23 05:00-05:24/24	04:25	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00 05:04-05:10/6	03:23 05:01-05:24/23	04:28	05:58	07:23	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:16	14:52
27	09:22	07:47	06:12	05:28	03:57 05:02-05:12/10	03:24 05:02-05:25/23	04:31	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:55 05:01-05:13/12	03:25 05:02-05:25/23	04:34	06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:07	21:37	23:06	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:06	05:21	03:52 05:01-05:15/14	03:26 05:01-05:25/24	04:36	06:06	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:33	15:09	14:56
30	09:13		07:02	05:18	03:50 05:00-05:16/16	03:27 05:02-05:25/23	04:39	06:09	07:34	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:48 04:59-05:16/17		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	75	674	320	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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 4 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (162)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:46 04:56-05:14/18	03:29 04:52-05:23/31	04:45 05:46-06:06/20	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:43 04:55-05:14/19	03:30 04:53-05:24/31	04:48 05:47-06:06/19	06:18	07:40	08:10	09:38
	15:03	16:27	17:53	20:22	21:49	23:18	23:40	22:26	20:44	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08	03:41 04:53-05:16/23	03:32 04:53-05:23/30	04:51 05:47-06:05/18	06:21	07:43	08:13	09:41
	15:04	16:31	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39 04:51-05:16/25	03:33 04:54-05:23/29	04:54 05:49-06:04/15	06:23	07:46	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:01
5	10:06	08:56	07:27	06:42	05:02	03:37 04:50-05:16/26	03:35 04:54-05:23/29	04:57 05:49-06:03/14	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58 05:44-05:50/6	03:35 04:49-05:17/28	03:37 04:56-05:23/27	05:00 05:51-06:01/10	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:58
7	10:04	08:50	07:20	06:35	04:55 05:41-05:52/11	03:34 04:49-05:17/28	03:39 04:56-05:23/27	05:03 05:55-05:57/2	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52 05:39-05:53/14	03:32 04:49-05:18/29	03:41 04:58-05:23/25	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07	23:31	23:31	22:07	20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49 05:38-05:55/17	03:31 04:48-05:18/30	03:43 04:58-05:22/24	05:09	06:37	08:00	08:31	09:54
	15:18	16:49	18:13	20:42	22:10	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46 05:37-05:55/18	03:29 04:48-05:18/30	03:45 05:01-05:22/21	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:57	14:53
11	09:58	08:38	07:07	06:21	04:43 05:36-05:55/19	03:28 04:48-05:19/31	03:48 05:04-05:22/18	05:15	06:43	08:05	08:37	09:58
	15:22	16:56	18:19	20:47	22:16	23:37	23:25	21:58	20:14	18:32	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40 05:36-05:56/20	03:26 04:48-05:19/31	03:50 05:05-05:22/17	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37 05:36-05:56/20	03:25 04:48-05:19/31	03:53 05:05-05:21/16	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34 05:36-05:57/21	03:24 04:48-05:20/32	03:55 05:06-05:20/14	05:24	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:22	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31 05:35-05:56/21	03:24 04:48-05:20/32	03:58 05:07-05:19/12	05:26	06:54	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28 05:36-05:57/21	03:23 04:48-05:20/32	04:00 05:09-05:18/9	05:29	06:56	08:19	08:53	10:06
	15:36	17:11	18:33	21:02	22:31	23:43	23:14 05:54-05:57/3	21:42	19:56	18:15	15:40	14:49
17	09:46	08:19	06:47	06:01	04:25 05:35-05:56/21	03:22 04:48-05:21/33	04:03 05:12-05:15/3	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	23:11 05:51-05:59/8	21:38	19:53	18:12	15:37	14:49
18	09:44	08:16	06:43	05:58	04:22 05:36-05:56/20	03:22 04:48-05:21/33	04:05 05:51-06:02/11	05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37	23:45	23:09	21:35	19:50	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19 05:36-05:56/20	03:21 04:49-05:21/32	04:08 05:50-06:03/13	05:38	07:04	08:28	09:02	10:09
	15:45	17:20	18:42	21:11	22:40	23:45	23:06	21:32	19:46	18:05	15:32	14:49
20	09:39	08:10	06:36	05:51	04:16 05:36-05:55/19	03:21 04:49-05:21/32	04:11 05:49-06:04/15	05:41	07:07	08:31	09:05	10:10
	15:47	17:23	18:45	21:13	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:13 05:37-05:55/18	03:21 04:49-05:21/32	04:14 05:48-06:04/16	05:44	07:10	08:34	09:08	10:11
	15:50	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:59	15:27	14:49
22	09:34	08:03	06:30	05:44	04:11 05:37-05:55/18	03:21 04:49-05:21/32	04:16 05:47-06:05/18	05:47	07:13	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:22	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08 05:38-05:54/16	03:22 04:50-05:22/32	04:19 05:47-06:06/19	05:50	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:46	22:56	21:18	19:33	17:52	15:22	14:50
24	09:29	07:57	06:23	05:38	04:05 05:39-05:53/14	03:22 04:50-05:22/32	04:22 05:47-06:06/19	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:02 05:40-05:52/12	03:23 04:49-05:22/33	04:25 05:46-06:06/20	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:12	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00 05:42-05:51/9	03:23 04:50-05:22/32	04:28 05:47-06:07/20	05:58	07:24	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:16	14:52
27	09:22	07:47	06:12	05:28	03:57 05:01-05:08/7	03:24 04:51-05:23/32	04:31 05:46-06:07/21	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03 05:43-05:49/6	23:45	22:44	21:05	19:19	16:39	15:14	14:53
28	09:19	07:44	06:09	05:24	03:55 04:59-05:10/11	03:25 04:51-05:23/32	04:34 05:46-06:07/21	06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:07	21:37	23:06	23:44	22:41	21:01	19:15	16:36	15:11	14:55
29	09:16		07:06	05:21	03:52 04:58-05:12/14	03:26 04:51-05:22/31	04:36 05:46-06:07/21	06:07	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:33	15:09	14:56
30	09:13		07:02	05:18	03:50 04:57-05:12/15	03:27 04:51-05:23/32	04:39 05:46-06:07/21	06:09	07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:48 04:56-05:13/17		04:42 05:47-06:07/20	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	0	0	425	895	629	98	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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 5 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (155)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:29	04:45	06:15	07:37	08:07	09:36
	15:01	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:18	07:40	08:10	09:38
	15:03	16:27	17:53	20:22	21:49	23:18	23:41	22:26	20:44	19:02	16:21	15:04
3	10:08	09:02	07:34	06:49	05:08	03:41	03:32	04:51	06:21	07:43	08:13	09:41
	15:04	16:30	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:31	06:45	05:05	03:39	03:33	04:54	06:23	07:46	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:00
5	10:06	08:56	07:27	06:42	05:02	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55	03:34	03:39	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:11	20:39	22:07	23:31	23:31	22:08	20:24	18:42	16:03	14:55
9	10:01	08:44	07:14	06:28	04:49	03:30	03:43	05:09	06:37	08:00	08:31	09:54
	15:18	16:49	18:13	20:42	22:10	23:33	23:29	22:04	20:21	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29	03:45	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:57	14:53
11	09:58	08:38	07:07	06:21	04:43	03:28	03:48	05:15	06:43	08:05	08:37	09:58
	15:22	16:56	18:19	20:47	22:16	23:37	23:25	21:58	20:14	18:32	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	03:26	03:50	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	03:25	03:52	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:40	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:24	03:55	05:24	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:22	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31	03:24	03:57	05:26	06:54	08:17	08:50	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23	04:00	05:29	06:56	08:19	08:53	10:06
	15:36	17:11	18:34	21:02	22:31	23:43	23:14	21:42	19:57	18:15	15:40	14:49
17	09:46	08:20	06:47	06:01	04:25	03:22	04:03	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	23:12	21:38	19:53	18:12	15:37	14:49
18	09:44	08:16	06:43	05:58	04:22	03:22	04:05	05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37	23:45	23:09	21:35	19:50	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:02	10:09
	15:44	17:20	18:42	21:11	22:40	23:45	23:06	21:32	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:05	10:10
	15:47	17:23	18:45	21:14	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:48	04:13	03:21	04:14	05:44	07:10	08:34	09:08	10:11
	15:50	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:59	15:27	14:49
22	09:34	08:03	06:30	05:44	04:10	03:21	04:16	05:47	07:13	08:37	09:10	10:11
	15:53	17:29	18:51	21:19	22:49	23:46	22:58	21:22	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:22	04:19	05:50	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:46	22:56	21:18	19:33	17:52	15:22	14:50
24	09:29	07:57	06:23	05:38	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:49	15:20	14:51
25	09:27	07:54	06:19	05:34	04:02	03:23	04:25	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:12	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:28	05:58	07:24	07:49	09:22	10:12
	16:06	17:41	19:02	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:16	14:52
27	09:22	07:47	06:13	05:28	03:57	03:24	04:31	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:14	14:53
28	09:19	07:44	06:09	05:24	03:55	03:25	04:34	06:04	07:29	07:55	09:28	10:12
	16:12	17:47	19:07	21:37	23:06	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:06	05:21	03:52	03:26	04:36	06:07	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:33	15:09	14:56
30	09:14		07:02	05:18	03:50	03:27	04:39	06:09	07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:48		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 6 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (158)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:29	04:45	06:15	07:37	08:07	09:35
	15:01	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:18	07:40	08:10	09:38
	15:03	16:27	17:53	20:22	21:49	23:18	23:41	22:26	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:49	05:08	03:41	03:32	04:51	06:20	07:43	08:13	09:41
	15:04	16:30	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39	03:33	04:54	06:23	07:46	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:00
5	10:06	08:56	07:27	06:42	05:02	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55	03:34	03:39	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:31	23:31	22:07	20:24	18:42	16:02	14:55
9	10:01	08:44	07:14	06:28	04:49	03:30	03:43	05:09	06:37	08:00	08:31	09:54
	15:17	16:49	18:13	20:42	22:10	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29	03:45	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:57	14:53
11	09:58	08:38	07:07	06:21	04:43	03:28	03:48	05:15	06:43	08:05	08:37	09:58
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12	09:56	08:35	07:04	06:18	04:40	03:26	03:50	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	03:25	03:52	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:39	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:24	03:55	05:23	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31	03:23	03:57	05:26	06:53	08:17	08:49	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23	04:00	05:29	06:56	08:19	08:53	10:06
	15:36	17:11	18:33	21:02	22:31	23:43	23:14	21:41	19:56	18:15	15:40	14:49
17	09:46	08:19	06:47	06:01	04:25	03:22	04:03	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	23:11	21:38	19:53	18:12	15:37	14:48
18	09:44	08:16	06:43	05:58	04:22	03:22	04:05	05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37	23:45	23:09	21:35	19:50	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:02	10:09
	15:44	17:20	18:42	21:11	22:40	23:45	23:06	21:32	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:05	10:10
	15:47	17:23	18:45	21:13	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:47	04:13	03:21	04:13	05:44	07:10	08:34	09:07	10:11
	15:50	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:30	05:44	04:10	03:21	04:16	05:47	07:13	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:22	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:22	04:19	05:49	07:15	08:40	09:13	10:12
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24	09:29	07:57	06:23	05:37	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:49	15:20	14:50
25	09:27	07:54	06:19	05:34	04:02	03:22	04:25	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:28	05:58	07:23	07:49	09:22	10:12
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27	09:22	07:47	06:12	05:28	03:57	03:24	04:31	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:55	03:25	04:33	06:04	07:29	07:55	09:27	10:12
	16:12	17:47	19:07	21:37	23:06	23:44	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:06	05:21	03:52	03:26	04:36	06:06	07:32	07:58	09:30	10:12
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	16:18		20:13	21:43	23:11	23:43	22:35	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:48		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 7 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:29	04:45	06:15	07:37	08:07	09:36
	15:01	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:24	15:06
2	10:09	09:05	07:37	06:52	05:11	03:43	03:30	04:48	06:18	07:40	08:10	09:38
	15:02	16:27	17:53	20:22	21:49	23:18	23:41	22:26	20:44	19:02	16:20	15:04
3	10:08	09:02	07:34	06:49	05:08	03:41	03:32	04:51	06:20	07:43	08:13	09:41
	15:04	16:30	17:56	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:02
4	10:07	08:59	07:30	06:45	05:05	03:39	03:33	04:54	06:23	07:46	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:00
5	10:06	08:56	07:27	06:42	05:02	03:37	03:35	04:57	06:26	07:48	08:19	09:45
	15:08	16:37	18:02	20:30	21:58	23:25	23:36	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24	06:38	04:58	03:35	03:37	05:00	06:29	07:51	08:22	09:48
	15:11	16:40	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:50	07:20	06:35	04:55	03:34	03:39	05:03	06:32	07:54	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:29	23:33	22:11	20:27	18:45	16:05	14:56
8	10:02	08:47	07:17	06:31	04:52	03:32	03:41	05:06	06:34	07:57	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:31	23:31	22:08	20:24	18:42	16:02	14:55
9	10:01	08:44	07:14	06:28	04:49	03:30	03:43	05:09	06:37	08:00	08:31	09:54
	15:17	16:49	18:13	20:42	22:10	23:33	23:29	22:04	20:20	18:38	16:00	14:54
10	09:59	08:41	07:10	06:25	04:46	03:29	03:45	05:12	06:40	08:02	08:34	09:56
	15:20	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:35	15:57	14:53
11	09:58	08:38	07:07	06:21	04:43	03:28	03:48	05:15	06:43	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:37	23:25	21:58	20:14	18:31	15:54	14:52
12	09:56	08:35	07:04	06:18	04:40	03:26	03:50	05:18	06:45	08:08	08:40	10:00
	15:25	16:59	18:22	20:50	22:19	23:38	23:23	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00	06:14	04:37	03:25	03:52	05:21	06:48	08:11	08:43	10:01
	15:28	17:02	18:25	20:53	22:22	23:40	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:34	03:24	03:55	05:23	06:51	08:14	08:46	10:03
	15:30	17:05	18:28	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:50
15	09:50	08:26	06:53	06:08	04:31	03:23	03:57	05:26	06:53	08:17	08:50	10:04
	15:33	17:08	18:31	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:28	03:23	04:00	05:29	06:56	08:19	08:53	10:06
	15:36	17:11	18:33	21:02	22:31	23:43	23:14	21:42	19:56	18:15	15:40	14:49
17	09:46	08:20	06:47	06:01	04:25	03:22	04:03	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:34	23:44	23:12	21:38	19:53	18:12	15:37	14:48
18	09:44	08:16	06:43	05:58	04:22	03:22	04:05	05:35	07:02	08:25	08:59	10:08
	15:42	17:17	18:39	21:08	22:37	23:45	23:09	21:35	19:50	18:08	15:35	14:48
19	09:41	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:02	10:09
	15:44	17:20	18:42	21:11	22:40	23:45	23:06	21:32	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:05	10:10
	15:47	17:23	18:45	21:14	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:49
21	09:37	08:07	06:33	05:47	04:13	03:21	04:13	05:44	07:10	08:34	09:08	10:11
	15:50	17:26	18:48	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:34	08:03	06:30	05:44	04:10	03:21	04:16	05:47	07:13	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:22	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:22	04:19	05:49	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:46	22:56	21:18	19:32	17:52	15:22	14:50
24	09:29	07:57	06:23	05:37	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:49	15:20	14:50
25	09:27	07:54	06:19	05:34	04:02	03:22	04:25	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:12	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:28	05:58	07:24	07:49	09:22	10:12
	16:05	17:41	19:02	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:16	14:52
27	09:22	07:47	06:12	05:28	03:57	03:24	04:31	06:01	07:26	07:52	09:25	10:12
	16:09	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:55	03:25	04:33	06:04	07:29	07:55	09:28	10:12
	16:12	17:47	19:07	21:37	23:06	23:45	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:06	05:21	03:52	03:26	04:36	06:06	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:33	15:09	14:56
30	09:14		07:02	05:18	03:50	03:27	04:39	06:09	07:35	08:01	09:33	10:11
	16:18		20:13	21:43	23:11	23:43	22:35	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:48		04:42	06:12		08:04		10:11
	16:21		20:16		23:13		22:32	20:51		16:27		14:59
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** 8 - FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40 08:16-08:22/6	06:55	05:14	03:45	03:28	04:45	06:15	07:37 08:49-09:02/13	08:07	09:36
	15:01	16:24	17:50	20:19	21:46	23:16	23:42	22:29	20:48	19:05	16:23	15:05
2	10:10	09:05	07:37 08:13-08:25/12	06:52	05:11	03:43	03:30	04:48	06:18	07:40 08:47-09:04/17	08:10	09:38
	15:02	16:27	17:53	20:22	21:49	23:19	23:41	22:26	20:44	19:02	16:20	15:04
3	10:09	09:02	07:34 08:11-08:27/16	06:49	05:08	03:41	03:31	04:51	06:20	07:43 08:46-09:04/18	08:13	09:41
	15:04	16:30	17:56	20:24	21:52	23:21	23:40	22:23	20:41	18:58	16:17	15:02
4	10:08	08:59	07:31 08:09-08:27/18	06:45	05:05	03:39	03:33	04:54	06:23	07:46 08:45-09:05/20	08:16	09:43
	15:06	16:34	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:00
5	10:06	08:56	07:27 08:09-08:28/19	06:42	05:01	03:37	03:35	04:57	06:26	07:48 08:44-09:04/20	08:19	09:46
	15:08	16:37	18:02	20:30	21:58	23:25	23:37	22:17	20:34	18:52	16:11	14:59
6	10:05	08:53	07:24 08:08-08:28/20	06:38	04:58	03:35	03:37	05:00	06:29	07:51 08:43-09:04/21	08:22	09:48
	15:10	16:40	18:05	20:33	22:01	23:28	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:51	07:20 08:08-08:28/20	06:35	04:55	03:33	03:39	05:03	06:32	07:54 08:43-09:04/21	08:25	09:50
	15:13	16:43	18:08	20:36	22:04	23:30	23:33	22:11	20:27	18:45	16:05	14:56
8	10:03	08:47	07:17 08:07-08:28/21	06:31	04:52	03:32	03:41	05:06	06:34	07:57 08:43-09:03/20	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:32	23:31	22:08	20:24	18:42	16:02	14:55
9	10:01	08:44	07:14 08:08-08:28/20	06:28	04:49	03:30	03:43	05:09	06:37	08:00 08:44-09:02/18	08:31	09:54
	15:17	16:49	18:13	20:42	22:10	23:33	23:30	22:04	20:21	18:38	15:59	14:54
10	09:59	08:41	07:10 08:07-08:26/19	06:25	04:46	03:29	03:45	05:12	06:40	08:02 08:44-09:01/17	08:34	09:56
	15:20	16:52	18:16	20:45	22:14	23:35	23:28	22:01	20:17	18:35	15:57	14:52
11	09:58	08:38	07:07 08:08-08:26/18	06:21	04:43	03:27	03:47	05:15	06:43	08:05 08:45-09:00/15	08:37	09:58
	15:22	16:55	18:19	20:47	22:17	23:37	23:26	21:58	20:14	18:31	15:54	14:52
12	09:56	08:35	07:04 08:09-08:24/15	06:18	04:40	03:26	03:50	05:18	06:45	08:08 08:47-08:57/10	08:40	10:00
	15:25	16:59	18:22	20:50	22:20	23:38	23:23	21:55	20:10	18:28	15:51	14:51
13	09:54	08:32	07:00 08:11-08:22/11	06:14	04:36	03:25	03:52	05:20	06:48	08:11	08:44	10:01
	15:27	17:02	18:25	20:53	22:23	23:40	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:33	03:24	03:55	05:23	06:51	08:14	08:47	10:03
	15:30	17:05	18:28	20:56	22:26	23:41	23:19	21:48	20:03	18:21	15:45	14:49
15	09:50	08:26	06:53	06:08	04:30	03:23	03:57	05:26	06:53	08:17	08:50	10:05
	15:33	17:08	18:31	20:59	22:29	23:42	23:17	21:45	20:00	18:18	15:43	14:49
16	09:48	08:23	06:50	06:04	04:27	03:22	04:00	05:29	06:56	08:19	08:53	10:06
	15:36	17:11	18:33	21:02	22:32	23:43	23:14	21:42	19:57	18:15	15:40	14:49
17	09:46	08:20	06:47	06:01	04:25	03:22	04:02	05:32	06:59	08:22	08:56	10:07
	15:39	17:14	18:36	21:05	22:35	23:44	23:12	21:38	19:53	18:12	15:37	14:48
18	09:44	08:16	06:43	05:57	04:22	03:21	04:05	05:35	07:02	08:25	08:59	10:08
	15:41	17:17	18:39	21:08	22:37	23:45	23:09	21:35	19:50	18:08	15:35	14:48
19	09:42	08:13	06:40	05:54	04:19	03:21	04:08	05:38	07:04	08:28	09:02	10:09
	15:44	17:20	18:42	21:11	22:40	23:46	23:07	21:32	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:21	04:11	05:41	07:07	08:31	09:05	10:10
	15:47	17:23	18:45	21:14	22:43	23:46	23:04	21:28	19:43	18:02	15:30	14:48
21	09:37	08:07	06:33	05:47	04:13	03:21	04:13	05:44	07:10	08:34	09:08	10:11
	15:50	17:26	18:48	21:17	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:49
22	09:35	08:03	06:30	05:44	04:10	03:21	04:16	05:47	07:13	08:37	09:11	10:11
	15:53	17:29	18:50	21:19	22:49	23:47	22:59	21:22	19:36	17:55	15:25	14:49
23	09:32	08:00	06:26	05:41	04:08	03:21	04:19	05:49	07:15	08:40	09:14	10:12
	15:56	17:32	18:53	21:22	22:52	23:47	22:56	21:18	19:33	17:52	15:22	14:50
24	09:30	07:57	06:23	05:37	04:05	03:22	04:22	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:47	22:53	21:15	19:29	17:49	15:20	14:50
25	09:27	07:54	06:19	05:34	04:02	03:22	04:25	05:55	07:21	07:46	09:19	10:12
	16:02	17:38	18:59	21:28	22:58	23:46	22:50	21:12	19:26	16:46	15:18	14:51
26	09:24	07:50	06:16	05:31	04:00	03:23	04:28	05:58	07:24	07:49	09:22	10:13
	16:05	17:41	19:02	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:15	14:52
27	09:22	07:47	06:12	05:27	03:57	03:24	04:30	06:01	07:26	07:52	09:25	10:12
	16:08	17:44	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44	06:09	05:24	03:55	03:25	04:33	06:04	07:29	07:55	09:28	10:12
	16:12	17:47	19:07	21:37	23:06	23:45	22:41	21:01	19:15	16:36	15:11	14:54
29	09:16		07:06	05:21	03:52	03:26	04:36	06:06	07:32	07:58	09:30	10:12
	16:15		20:10	21:40	23:08	23:44	22:39	20:58	19:12	16:33	15:09	14:56
30	09:14		07:02	05:18	03:50	03:27	04:39	06:09	07:35 08:52-09:00/8	08:01	09:33	10:12
	16:18		20:13	21:43	23:11	23:43	22:36	20:55	19:09	16:30	15:07	14:57
31	09:11		06:59		03:47		04:42	06:12		08:04		10:11
	16:21		20:16		23:14		22:33	20:51		16:27		14:58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	0	215	0	0	0	0	0	8	210	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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Lotlax 1 - Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (335)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40 08:32-08:56/24	06:55	05:14	03:45	03:28	04:45	06:15	07:37	08:07	09:36
	15:00	16:24	17:50	20:19	21:46	23:16	23:42	22:30	20:48	19:05	16:23	15:05
2	10:10	09:05	07:37 08:32-08:57/25	06:52	05:11	03:43	03:29	04:48	06:17	07:40 09:17-09:25/8	08:10	09:38
	15:02	16:27	17:53	20:22	21:49	23:19	23:41	22:26	20:44	19:02	16:20	15:03
3	10:09	09:02	07:34 08:31-08:56/25	06:48	05:08	03:41	03:31	04:51	06:20	07:43 09:13-09:27/14	08:13	09:41
	15:04	16:30	17:56	20:24	21:52	23:21	23:40	22:23	20:41	18:58	16:17	15:02
4	10:08	08:59	07:30 08:31-08:57/26	06:45	05:04	03:39	03:33	04:54	06:23	07:46 09:11-09:29/18	08:16	09:43
	15:06	16:33	17:59	20:27	21:55	23:23	23:38	22:20	20:38	18:55	16:14	15:00
5	10:07	08:56	07:27 08:31-08:56/25	06:42	05:01	03:37	03:34	04:57	06:26	07:48 09:09-09:30/21	08:19	09:46
	15:08	16:36	18:02	20:30	21:58	23:26	23:37	22:17	20:34	18:51	16:11	14:58
6	10:05	08:53	07:24 08:31-08:56/25	06:38	04:58	03:35	03:36	05:00	06:29	07:51 09:08-09:31/23	08:22	09:48
	15:10	16:40	18:05	20:33	22:01	23:28	23:35	22:14	20:31	18:48	16:08	14:57
7	10:04	08:51	07:20 08:31-08:54/23	06:35	04:55	03:33	03:38	05:03	06:31	07:54 09:07-09:31/24	08:25	09:50
	15:12	16:43	18:07	20:36	22:04	23:30	23:33	22:11	20:27	18:45	16:05	14:56
8	10:03	08:47	07:17 08:32-08:54/22	06:31	04:52	03:31	03:40	05:06	06:34	07:57 09:07-09:31/24	08:28	09:52
	15:15	16:46	18:10	20:39	22:07	23:32	23:32	22:08	20:24	18:41	16:02	14:54
9	10:01	08:44	07:14 08:33-08:52/19	06:28	04:49	03:30	03:43	05:08	06:37	08:00 09:06-09:31/25	08:31	09:54
	15:17	16:49	18:13	20:42	22:11	23:34	23:30	22:04	20:20	18:38	15:59	14:53
10	10:00	08:41	07:10 08:34-08:50/16	06:24	04:45	03:28	03:45	05:11	06:40	08:02 09:06-09:31/25	08:34	09:56
	15:19	16:52	18:16	20:44	22:14	23:35	23:28	22:01	20:17	18:35	15:56	14:52
11	09:58	08:38	07:07 08:36-08:47/11	06:21	04:42	03:27	03:47	05:14	06:42	08:05 09:06-09:31/25	08:37	09:58
	15:22	16:55	18:19	20:47	22:17	23:37	23:26	21:58	20:14	18:31	15:53	14:51
12	09:56	08:35	07:04	06:18	04:39	03:26	03:49	05:17	06:45	08:08 09:06-09:30/24	08:40	10:00
	15:25	16:58	18:22	20:50	22:20	23:39	23:24	21:55	20:10	18:28	15:51	14:50
13	09:54	08:32	07:00	06:14	04:36	03:25	03:52	05:20	06:48	08:11 09:06-09:29/23	08:44	10:02
	15:27	17:01	18:25	20:53	22:23	23:40	23:21	21:51	20:07	18:25	15:48	14:50
14	09:52	08:29	06:57	06:11	04:33	03:24	03:54	05:23	06:51	08:14 09:06-09:28/22	08:47	10:03
	15:30	17:05	18:28	20:56	22:26	23:41	23:19	21:48	20:03	18:21	15:45	14:49
15	09:50	08:26	06:53	06:07	04:30	03:23	03:57	05:26	06:53	08:17 09:07-09:27/20	08:50	10:05
	15:33	17:08	18:30	20:59	22:29	23:42	23:17	21:45	20:00	18:18	15:42	14:49
16	09:48	08:23	06:50	06:04	04:27	03:22	03:59	05:29	06:56	08:19 09:08-09:25/17	08:53	10:06
	15:35	17:11	18:33	21:02	22:32	23:44	23:14	21:42	19:56	18:15	15:40	14:48
17	09:46	08:20	06:47	06:01	04:24	03:21	04:02	05:32	06:59	08:22 09:10-09:23/13	08:56	10:07
	15:38	17:14	18:36	21:05	22:35	23:44	23:12	21:38	19:53	18:11	15:37	14:48
18	09:44	08:16	06:43	05:57	04:21	03:21	04:05	05:35	07:02	08:25 09:15-09:19/4	08:59	10:08
	15:41	17:17	18:39	21:08	22:38	23:45	23:09	21:35	19:50	18:08	15:34	14:48
19	09:42	08:13	06:40	05:54	04:18	03:21	04:07	05:38	07:04	08:28	09:02	10:09
	15:44	17:20	18:42	21:11	22:41	23:46	23:07	21:32	19:46	18:05	15:32	14:48
20	09:39	08:10	06:36	05:51	04:16	03:20	04:10	05:41	07:07	08:31	09:05	10:10
	15:47	17:23	18:45	21:14	22:43	23:46	23:04	21:28	19:43	18:01	15:29	14:48
21	09:37	08:07	06:33	05:47	04:13	03:20	04:13	05:43	07:10	08:34	09:08	10:11
	15:50	17:26	18:48	21:16	22:46	23:47	23:01	21:25	19:39	17:58	15:27	14:48
22	09:35	08:03	06:29	05:44	04:10	03:21	04:16	05:46	07:12	08:37	09:11	10:12
	15:53	17:29	18:50	21:19	22:49	23:47	22:59	21:22	19:36	17:55	15:24	14:49
23	09:32	08:00	06:26	05:41	04:07	03:21	04:19	05:49	07:15	08:40	09:14	10:12
	15:56	17:32	18:53	21:22	22:52	23:47	22:56	21:18	19:32	17:52	15:22	14:49
24	09:30	07:57 08:41-08:49/8	06:23	05:37	04:05	03:21	04:21	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:47	22:53	21:15	19:29	17:49	15:20	14:50
25	09:27	07:54 08:38-08:53/15	06:19	05:34	04:02	03:22	04:24	05:55	07:21	07:46	09:19	10:13
	16:02	17:38	18:59	21:28	22:58	23:47	22:50	21:12	19:26	16:45	15:17	14:51
26	09:24	07:50 08:36-08:54/18	06:16	05:31	03:59	03:22	04:27	05:58	07:23	07:49	09:22	10:13
	16:05	17:41	19:02	21:31	23:01	23:46	22:47	21:08	19:22	16:42	15:15	14:52
27	09:22	07:47 08:35-08:56/21	06:12	05:27	03:57	03:23	04:30	06:01	07:26	07:52	09:25	10:13
	16:08	17:44	19:05	21:34	23:03	23:46	22:44	21:05	19:19	16:39	15:13	14:53
28	09:19	07:44 08:33-08:56/23	06:09	05:24	03:54	03:24	04:33	06:03	07:29	07:55	09:28	10:12
	16:11	17:47	19:07	21:37	23:06	23:45	22:42	21:01	19:15	16:36	15:11	14:54
29	09:16		07:05	05:21	03:52	03:25	04:36	06:06	07:32	07:58	09:30	10:12
	16:14		20:10	21:40	23:09	23:44	22:39	20:58	19:12	16:33	15:09	14:55
30	09:14		07:02	05:17	03:49	03:27	04:39	06:09	07:34	08:01	09:33	10:12
	16:18		20:13	21:43	23:11	23:43	22:36	20:55	19:08	16:29	15:07	14:57
31	09:11		06:59		03:47		04:42	06:12		08:04		10:11
	16:21		20:16		23:14		22:33	20:51		16:26		14:58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Sum of minutes with flicker	0	85	241	0	0	0	0	0	0	330	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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Lotlax 2 - Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March		April	May	June	July	August	September		October	November	December
1	10:10	09:08	07:40		06:55	05:14	03:45	03:28	04:45	06:15		07:37	08:07	09:36
	15:00	16:24	17:50		20:19	21:46	23:16	23:42	22:30	20:48		19:05	16:23	15:05
2	10:10	09:05	07:37		06:52	05:11	03:43	03:29	04:48	06:17		07:40	08:10	09:38
	15:02	16:27	17:53		20:22	21:49	23:19	23:41	22:26	20:44		19:02	16:20	15:03
3	10:09	09:02	07:34		06:48	05:08	03:40	03:31	04:51	06:20		07:43	08:13	09:41
	15:04	16:30	17:56		20:24	21:52	23:21	23:40	22:23	20:41		18:58	16:17	15:01
4	10:08	08:59	07:30		06:45	05:04	03:38	03:33	04:54	06:23		07:45	08:16	09:43
	15:06	16:33	17:59		20:27	21:55	23:23	23:38	22:20	20:38		18:55	16:14	15:00
5	10:07	08:56	07:27		06:41	05:01	03:37	03:34	04:57	06:26		07:48	08:19	09:46
	15:08	16:36	18:02		20:30	21:58	23:26	23:37	22:17	20:34		18:51	16:11	14:58
6	10:05	08:53	07:24		06:38	04:58	03:35	03:36	05:00	06:29		07:51	08:22	09:48
	15:10	16:40	18:04		20:33	22:01	23:28	23:35	22:14	20:31		18:48	16:08	14:57
7	10:04	08:50	07:20		06:35	04:55	03:33	03:38	05:02	06:31		07:54	08:25	09:50
	15:12	16:43	18:07		20:36	22:04	23:30	23:33	22:11	20:27		18:45	16:05	14:56
8	10:03	08:47	07:17		06:31	04:52	03:31	03:40	05:05	06:34		07:57	08:28	09:52
	15:15	16:46	18:10		20:39	22:07	23:32	23:32	22:08	20:24		18:41	16:02	14:54
9	10:01	08:44	07:14		06:28	04:48	03:30	03:42	05:08	06:37		07:59	08:31	09:54
	15:17	16:49	18:13		20:42	22:11	23:34	23:30	22:04	20:20		18:38	15:59	14:53
10	10:00	08:41	07:10		06:24	04:45	03:28	03:45	05:11	06:40		08:02	08:34	09:56
	15:19	16:52	18:16		20:44	22:14	23:35	23:28	22:01	20:17		18:35	15:56	14:52
11	09:58	08:38	07:07		06:21	04:42	03:27	03:47	05:14	06:42		08:05	08:37	09:58
	15:22	16:55	18:19		20:47	22:17	23:37	23:26	21:58	20:14		18:31	15:53	14:51
12	09:56	08:35	07:03		06:18	04:39	03:26	03:49	05:17	06:45		08:08	08:40	10:00
	15:24	16:58	18:22		20:50	22:20	23:39	23:24	21:55	20:10		18:28	15:51	14:50
13	09:54	08:32	07:00		06:14	04:36	03:25	03:52	05:20	06:48		08:11	08:44	10:02
	15:27	17:01	18:25		20:53	22:23	23:40	23:21	21:51	20:07		18:25	15:48	14:50
14	09:52	08:29	06:57	07:31-07:41/10	06:11	04:33	03:24	03:54	05:23	06:51		08:14	08:47	10:03
	15:30	17:04	18:28		20:56	22:26	23:41	23:19	21:48	20:03		18:21	15:45	14:49
15	09:50	08:26	06:53	07:29-07:43/14	06:07	04:30	03:23	03:57	05:26	06:53		08:17	08:50	10:05
	15:33	17:08	18:30		20:59	22:29	23:42	23:17	21:45	20:00		18:18	15:42	14:48
16	09:48	08:23	06:50	07:27-07:43/16	06:04	04:27	03:22	03:59	05:29	06:56		08:19	08:53	10:06
	15:35	17:11	18:33		21:02	22:32	23:44	23:14	21:42	19:56		18:15	15:40	14:48
17	09:46	08:20	06:46	07:26-07:44/18	06:01	04:24	03:21	04:02	05:32	06:59		08:22	08:56	10:07
	15:38	17:14	18:36		21:05	22:35	23:44	23:12	21:38	19:53		18:11	15:37	14:48
18	09:44	08:16	06:43	07:25-07:44/19	05:57	04:21	03:21	04:05	05:35	07:01	08:19-08:21/2	08:25	08:59	10:08
	15:41	17:17	18:39		21:08	22:38	23:45	23:09	21:35	19:50		18:08	15:34	14:48
19	09:42	08:13	06:40	07:25-07:44/19	05:54	04:18	03:21	04:07	05:38	07:04	08:15-08:25/10	08:28	09:02	10:09
	15:44	17:20	18:42		21:11	22:40	23:46	23:07	21:32	19:46		18:05	15:32	14:48
20	09:39	08:10	06:36	07:24-07:43/19	05:51	04:15	03:20	04:10	05:41	07:07	08:12-08:26/14	08:31	09:05	10:10
	15:47	17:23	18:45		21:14	22:43	23:46	23:04	21:28	19:43		18:01	15:29	14:48
21	09:37	08:07	06:33	07:25-07:43/18	05:47	04:13	03:20	04:13	05:43	07:10	08:11-08:27/16	08:34	09:08	10:11
	15:50	17:26	18:48		21:16	22:46	23:47	23:01	21:25	19:39		17:58	15:27	14:48
22	09:35	08:03	06:29	07:24-07:41/17	05:44	04:10	03:20	04:16	05:46	07:12	08:10-08:28/18	08:37	09:11	10:12
	15:53	17:29	18:50		21:19	22:49	23:47	22:59	21:22	19:36		17:55	15:24	14:49
23	09:32	08:00	06:26	07:26-07:41/15	05:40	04:07	03:21	04:19	05:49	07:15	08:08-08:27/19	08:40	09:14	10:12
	15:56	17:32	18:53		21:22	22:52	23:47	22:56	21:18	19:32		17:52	15:22	14:49
24	09:30	07:57	06:23	07:26-07:38/12	05:37	04:04	03:21	04:21	05:52	07:18	08:08-08:27/19	08:43	09:16	10:12
	15:59	17:35	18:56		21:25	22:55	23:47	22:53	21:15	19:29		17:48	15:20	14:50
25	09:27	07:54	06:19	07:29-07:35/6	05:34	04:02	03:22	04:24	05:55	07:21	08:08-08:27/19	07:46	09:19	10:13
	16:02	17:38	18:59		21:28	22:58	23:47	22:50	21:12	19:26		16:45	15:17	14:51
26	09:24	07:50	06:16		05:30	03:59	03:22	04:27	05:58	07:23	08:08-08:26/18	07:49	09:22	10:13
	16:05	17:41	19:02		21:31	23:01	23:46	22:47	21:08	19:22		16:42	15:15	14:52
27	09:22	07:47	06:12		05:27	03:57	03:23	04:30	06:01	07:26	08:09-08:26/17	07:52	09:25	10:13
	16:08	17:44	19:05		21:34	23:03	23:46	22:44	21:05	19:19		16:39	15:13	14:53
28	09:19	07:44	06:09		05:24	03:54	03:24	04:33	06:03	07:29	08:09-08:23/14	07:55	09:28	10:12
	16:11	17:47	19:07		21:37	23:06	23:45	22:42	21:01	19:15		16:36	15:11	14:54
29	09:16		07:05		05:21	03:52	03:25	04:36	06:06	07:32	08:10-08:22/12	07:58	09:30	10:12
	16:14		20:10		21:40	23:09	23:44	22:39	20:58	19:12		16:33	15:09	14:55
30	09:14		07:02		05:17	03:49	03:26	04:39	06:09	07:34	08:13-08:19/6	08:01	09:33	10:12
	16:18		20:13		21:43	23:11	23:43	22:36	20:55	19:08		16:29	15:07	14:57
31	09:11		06:59			03:47		04:42	06:12			08:04		10:11
	16:21		20:16			23:14		22:33	20:51			16:26		14:58
Potential sun hours	182	242	363		447	559	606	594	502	392		308	206	151
Sum of minutes with flicker	0	0	183		0	0	0	0	0	184		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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Lotlax 3 - Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March		April	May	June	July	August	September		October	November	December
1	10:10	09:08	07:40		06:55	05:14	03:45	03:28	04:45	06:15		07:37	08:07	09:36
	15:00	16:24	17:50		20:19	21:46	23:16	23:42	22:30	20:48		19:05	16:23	15:05
2	10:10	09:05	07:37		06:52	05:11	03:43	03:29	04:48	06:17		07:40	08:10	09:38
	15:02	16:27	17:53		20:22	21:49	23:19	23:41	22:26	20:44		19:02	16:20	15:03
3	10:09	09:02	07:34		06:48	05:08	03:40	03:31	04:51	06:20		07:43	08:13	09:41
	15:04	16:30	17:56		20:24	21:52	23:21	23:40	22:23	20:41		18:58	16:17	15:01
4	10:08	08:59	07:30		06:45	05:04	03:38	03:33	04:54	06:23		07:45	08:16	09:43
	15:06	16:33	17:59		20:27	21:55	23:23	23:38	22:20	20:38		18:55	16:14	15:00
5	10:07	08:56	07:27		06:41	05:01	03:36	03:34	04:57	06:26		07:48	08:19	09:46
	15:08	16:36	18:02		20:30	21:58	23:26	23:37	22:17	20:34		18:51	16:11	14:58
6	10:05	08:53	07:24		06:38	04:58	03:35	03:36	04:59	06:29		07:51	08:22	09:48
	15:10	16:39	18:04		20:33	22:01	23:28	23:35	22:14	20:31		18:48	16:08	14:57
7	10:04	08:50	07:20		06:35	04:55	03:33	03:38	05:02	06:31		07:54	08:25	09:50
	15:12	16:43	18:07		20:36	22:04	23:30	23:33	22:11	20:27		18:45	16:05	14:55
8	10:03	08:47	07:17		06:31	04:52	03:31	03:40	05:05	06:34		07:57	08:28	09:52
	15:14	16:46	18:10		20:39	22:07	23:32	23:32	22:08	20:24		18:41	16:02	14:54
9	10:01	08:44	07:14		06:28	04:48	03:30	03:42	05:08	06:37		07:59	08:31	09:54
	15:17	16:49	18:13		20:42	22:10	23:34	23:30	22:04	20:20		18:38	15:59	14:53
10	09:59	08:41	07:10		06:24	04:45	03:28	03:45	05:11	06:40		08:02	08:34	09:56
	15:19	16:52	18:16		20:44	22:14	23:35	23:28	22:01	20:17		18:35	15:56	14:52
11	09:58	08:38	07:07		06:21	04:42	03:27	03:47	05:14	06:42		08:05	08:37	09:58
	15:22	16:55	18:19		20:47	22:17	23:37	23:26	21:58	20:14		18:31	15:53	14:51
12	09:56	08:35	07:03		06:18	04:39	03:26	03:49	05:17	06:45		08:08	08:40	10:00
	15:24	16:58	18:22		20:50	22:20	23:39	23:24	21:55	20:10		18:28	15:51	14:50
13	09:54	08:32	07:00		06:14	04:36	03:24	03:52	05:20	06:48		08:11	08:43	10:02
	15:27	17:01	18:25		20:53	22:23	23:40	23:21	21:51	20:07		18:25	15:48	14:49
14	09:52	08:29	06:57		06:11	04:33	03:23	03:54	05:23	06:51	07:47-07:55/8	08:14	08:47	10:03
	15:30	17:04	18:28		20:56	22:26	23:41	23:19	21:48	20:03		18:21	15:45	14:49
15	09:50	08:26	06:53		06:07	04:30	03:23	03:57	05:26	06:53	07:45-07:57/12	08:16	08:50	10:05
	15:32	17:08	18:30		20:59	22:29	23:42	23:17	21:45	20:00		18:18	15:42	14:48
16	09:48	08:23	06:50		06:04	04:27	03:22	03:59	05:29	06:56	07:44-07:58/14	08:19	08:53	10:06
	15:35	17:11	18:33		21:02	22:32	23:44	23:14	21:42	19:56		18:15	15:40	14:48
17	09:46	08:19	06:46		06:01	04:24	03:21	04:02	05:32	06:59	07:42-07:57/15	08:22	08:56	10:07
	15:38	17:14	18:36		21:05	22:35	23:44	23:12	21:38	19:53		18:11	15:37	14:48
18	09:44	08:16	06:43		05:57	04:21	03:21	04:05	05:35	07:01	07:42-07:57/15	08:25	08:59	10:08
	15:41	17:17	18:39		21:08	22:38	23:45	23:09	21:35	19:49		18:08	15:34	14:48
19	09:42	08:13	06:40		05:54	04:18	03:21	04:07	05:38	07:04	07:42-07:57/15	08:28	09:02	10:09
	15:44	17:20	18:42		21:11	22:40	23:46	23:07	21:32	19:46		18:05	15:32	14:48
20	09:39	08:10	06:36		05:50	04:15	03:20	04:10	05:40	07:07	07:42-07:56/14	08:31	09:05	10:10
	15:47	17:23	18:45		21:13	22:43	23:46	23:04	21:28	19:43		18:01	15:29	14:48
21	09:37	08:07	06:33	07:04-07:07/3	05:47	04:13	03:20	04:13	05:43	07:10	07:45-07:55/10	08:34	09:08	10:11
	15:50	17:26	18:47		21:16	22:46	23:47	23:01	21:25	19:39		17:58	15:27	14:48
22	09:35	08:03	06:29	07:00-07:08/8	05:44	04:10	03:20	04:16	05:46	07:12	07:48-07:53/5	08:37	09:11	10:11
	15:53	17:29	18:50		21:19	22:49	23:47	22:59	21:22	19:36		17:55	15:24	14:49
23	09:32	08:00	06:26	06:57-07:10/13	05:40	04:07	03:21	04:18	05:49	07:15		08:40	09:14	10:12
	15:56	17:32	18:53		21:22	22:52	23:47	22:56	21:18	19:32		17:52	15:22	14:49
24	09:30	07:57	06:23	06:55-07:09/14	05:37	04:04	03:21	04:21	05:52	07:18		08:43	09:16	10:12
	15:59	17:35	18:56		21:25	22:55	23:47	22:53	21:15	19:29		17:48	15:20	14:50
25	09:27	07:54	06:19	06:54-07:10/16	05:34	04:02	03:22	04:24	05:55	07:21		07:46	09:19	10:13
	16:02	17:38	18:59		21:28	22:58	23:47	22:50	21:11	19:25		16:45	15:17	14:51
26	09:24	07:50	06:16	06:55-07:10/15	05:30	03:59	03:22	04:27	05:58	07:23		07:49	09:22	10:13
	16:05	17:41	19:02		21:31	23:01	23:46	22:47	21:08	19:22		16:42	15:15	14:52
27	09:22	07:47	06:12	06:54-07:08/14	05:27	03:57	03:23	04:30	06:01	07:26		07:52	09:25	10:13
	16:08	17:44	19:04		21:34	23:03	23:46	22:44	21:05	19:19		16:39	15:13	14:53
28	09:19	07:44	06:09	06:55-07:08/13	05:24	03:54	03:24	04:33	06:03	07:29		07:55	09:28	10:12
	16:11	17:47	19:07		21:37	23:06	23:45	22:42	21:01	19:15		16:36	15:11	14:54
29	09:16		07:05	07:56-08:05/9	05:21	03:52	03:25	04:36	06:06	07:32		07:58	09:30	10:12
	16:14		20:10		21:40	23:09	23:44	22:39	20:58	19:12		16:33	15:09	14:55
30	09:14		07:02	08:00-08:01/1	05:17	03:49	03:26	04:39	06:09	07:34		08:01	09:33	10:12
	16:17		20:13		21:43	23:11	23:43	22:36	20:55	19:08		16:29	15:07	14:56
31	09:11		06:59			03:47		04:42	06:12			08:04		10:11
	16:21		20:16			23:14		22:33	20:51			16:26		14:58
Potential sun hours	182	242	363		447	559	606	594	502	392		308	206	151
Sum of minutes with flicker	0	0	106		0	0	0	0	0	108		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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** Lålax 1 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (338)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:28	04:45	06:14	07:37	08:06	09:35
	15:00	16:24	17:50	20:18	21:46	23:16	23:42	22:29	20:47	19:05	16:23	15:05
2	10:09	09:05	07:37	06:51	05:11	03:43	03:29	04:48	06:17	07:40	08:09	09:38
	15:02	16:27	17:53	20:21	21:49	23:18	23:40	22:26	20:44	19:01	16:20	15:03
3	10:08	09:02	07:33	06:48	05:07	03:40	03:31	04:51	06:20	07:42	08:12	09:40
	15:04	16:30	17:55	20:24	21:52	23:20	23:39	22:23	20:41	18:58	16:17	15:01
4	10:07	08:59	07:30	06:45	05:04	03:38	03:33	04:53	06:23	07:45	08:16	09:43
	15:06	16:33	17:58	20:27	21:55	23:23	23:38	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:36	03:34	04:56	06:26	07:48	08:19	09:45
	15:08	16:36	18:01	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:58
6	10:05	08:53	07:23	06:38	04:58	03:35	03:36	04:59	06:28	07:51	08:22	09:47
	15:10	16:39	18:04	20:33	22:01	23:27	23:35	22:14	20:30	18:48	16:08	14:57
7	10:04	08:50	07:20	06:34	04:55	03:33	03:38	05:02	06:31	07:54	08:25	09:50
	15:12	16:42	18:07	20:35	22:04	23:29	23:33	22:10	20:27	18:44	16:05	14:55
8	10:02	08:47	07:17	06:31	04:51	03:31	03:40	05:05	06:34	07:56	08:28	09:52
	15:14	16:46	18:10	20:38	22:07	23:31	23:31	22:07	20:23	18:41	16:02	14:54
9	10:01	08:44	07:13	06:28	04:48	03:30	03:42	05:08	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	15:59	14:53
10	09:59	08:41	07:10	06:24	04:45	03:28	03:45	05:11	06:39	08:02	08:34	09:56
	15:19	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:34	15:56	14:52
11	09:57	08:38	07:07	06:21	04:42	03:27	03:47	05:14	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:36	23:25	21:58	20:13	18:31	15:53	14:51
12	09:56	08:35	07:03	06:17	04:39	03:26	03:49	05:17	06:45	08:08	08:40	09:59
	15:24	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:50	14:50
13	09:54	08:32	07:00	06:14	04:36	03:25	03:52	05:20	06:48	08:10	08:43	10:01
	15:27	17:01	18:24	20:53	22:22	23:39	23:21	21:51	20:06	18:24	15:48	14:49
14	09:52	08:29	06:56	06:11	04:33	03:24	03:54	05:23	06:50	08:13	08:46	10:03
	15:30	17:04	18:27	20:56	22:25	23:41	23:18	21:48	20:03	18:21	15:45	14:49
15	09:50	08:25	06:53	06:07	04:30	03:23	03:57	05:26	06:53	08:16	08:49	10:04
	15:32	17:07	18:30	20:59	22:28	23:42	23:16	21:44	19:59	18:18	15:42	14:48
16	09:48	08:22	06:50	06:04	04:27	03:22	03:59	05:29	06:56	08:19	08:52	10:05
	15:35	17:10	18:33	21:01	22:31	23:43	23:14	21:41	19:56	18:14	15:39	14:48
17	09:46	08:19	06:46	06:00	04:24	03:21	04:02	05:32	06:58	08:22	08:55	10:07
	15:38	17:13	18:36	21:04	22:34	23:44	23:11	21:38	19:53	18:11	15:37	14:48
18	09:43	08:16	06:43	05:57	04:21	03:21	04:05	05:35	07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07	22:37	23:45	23:09	21:35	19:49	18:08	15:34	14:48
19	09:41	08:13	06:39	05:54	04:18	03:21	04:07	05:37	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:04	15:32	14:48
20	09:39	08:10	06:36	05:50	04:15	03:20	04:10	05:40	07:07	08:31	09:04	10:10
	15:47	17:23	18:44	21:13	22:43	23:46	23:04	21:28	19:42	18:01	15:29	14:48
21	09:36	08:06	06:33	05:47	04:13	03:20	04:13	05:43	07:09	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:48
22	09:34	08:03	06:29	05:44	04:10	03:21	04:16	05:46	07:12	08:36	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:35	17:55	15:24	14:49
23	09:32	08:00	06:26	05:40	04:07	03:21	04:18	05:49	07:15	08:39	09:13	10:11
	15:56	17:32	18:53	21:22	22:52	23:46	22:55	21:18	19:32	17:51	15:22	14:49
24	09:29	07:57	06:22	05:37	04:04	03:21	04:21	05:52	07:18	08:42	09:16	10:12
	15:59	17:35	18:56	21:25	22:54	23:46	22:53	21:14	19:29	17:48	15:19	14:50
25	09:27	07:53	06:19	05:34	04:02	03:22	04:24	05:55	07:20	07:45	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:25	16:45	15:17	14:51
26	09:24	07:50	06:15	05:30	03:59	03:22	04:27	05:57	07:23	07:48	09:22	10:12
	16:05	17:41	19:01	21:31	23:00	23:45	22:47	21:08	19:22	16:42	15:15	14:52
27	09:21	07:47	06:12	05:27	03:57	03:23	04:30	06:00	07:26	07:51	09:24	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:04	19:18	16:39	15:13	14:53
28	09:19	07:43	06:09	05:24	03:54	03:24	04:33	06:03	07:29	07:54	09:27	10:12
	16:11	17:47	19:07	21:37	23:05	23:44	22:41	21:01	19:15	16:35	15:11	14:54
29	09:16		07:05	05:20	03:52	03:25	04:36	06:06	07:31	07:57	09:30	10:12
	16:14		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:32	15:09	14:55
30	09:13		07:02	05:17	03:49	03:27	04:39	06:09	07:34	08:00	09:33	10:11
	16:17		20:13	21:43	23:11	23:43	22:35	20:54	19:08	16:29	15:07	14:56
31	09:10		06:58		03:47		04:42	06:12		08:03		10:11
	16:20		20:16		23:13		22:32	20:51		16:26		14:58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** Lålax 2 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (339)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:28	04:45	06:14	07:37	08:06	09:35
	15:00	16:24	17:50	20:18	21:46	23:16	23:42	22:29	20:47	19:05	16:23	15:05
2	10:09	09:05	07:37	06:51	05:11	03:42	03:29	04:47	06:17	07:40	08:09	09:38
	15:02	16:27	17:53	20:21	21:49	23:18	23:41	22:26	20:44	19:01	16:20	15:03
3	10:08	09:02	07:33	06:48	05:07	03:40	03:31	04:50	06:20	07:42	08:13	09:40
	15:04	16:30	17:55	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:01
4	10:07	08:59	07:30	06:45	05:04	03:38	03:32	04:53	06:23	07:45	08:16	09:43
	15:06	16:33	17:58	20:27	21:55	23:23	23:38	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:36	03:34	04:56	06:26	07:48	08:19	09:45
	15:08	16:36	18:01	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:58
6	10:05	08:53	07:23	06:38	04:58	03:35	03:36	04:59	06:28	07:51	08:22	09:48
	15:10	16:39	18:04	20:33	22:01	23:27	23:35	22:14	20:30	18:48	16:08	14:57
7	10:04	08:50	07:20	06:34	04:55	03:33	03:38	05:02	06:31	07:54	08:25	09:50
	15:12	16:42	18:07	20:35	22:04	23:29	23:33	22:10	20:27	18:44	16:05	14:55
8	10:02	08:47	07:17	06:31	04:51	03:31	03:40	05:05	06:34	07:56	08:28	09:52
	15:14	16:46	18:10	20:38	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:54
9	10:01	08:44	07:13	06:28	04:48	03:30	03:42	05:08	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	15:59	14:53
10	09:59	08:41	07:10	06:24	04:45	03:28	03:45	05:11	06:39	08:02	08:34	09:56
	15:19	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:34	15:56	14:52
11	09:57	08:38	07:07	06:21	04:42	03:27	03:47	05:14	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:37	23:25	21:58	20:13	18:31	15:53	14:51
12	09:56	08:35	07:03	06:17	04:39	03:26	03:49	05:17	06:45	08:08	08:40	10:00
	15:24	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:50	14:50
13	09:54	08:32	07:00	06:14	04:36	03:24	03:52	05:20	06:48	08:10	08:43	10:01
	15:27	17:01	18:24	20:53	22:22	23:40	23:21	21:51	20:06	18:24	15:48	14:49
14	09:52	08:29	06:56	06:11	04:33	03:23	03:54	05:23	06:50	08:13	08:46	10:03
	15:30	17:04	18:27	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:49
15	09:50	08:26	06:53	06:07	04:30	03:23	03:57	05:26	06:53	08:16	08:49	10:04
	15:32	17:07	18:30	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:42	14:48
16	09:48	08:22	06:50	06:04	04:27	03:22	03:59	05:29	06:56	08:19	08:52	10:06
	15:35	17:10	18:33	21:01	22:31	23:43	23:14	21:41	19:56	18:14	15:39	14:48
17	09:46	08:19	06:46	06:00	04:24	03:21	04:02	05:32	06:58	08:22	08:55	10:07
	15:38	17:13	18:36	21:04	22:34	23:44	23:11	21:38	19:53	18:11	15:37	14:48
18	09:44	08:16	06:43	05:57	04:21	03:21	04:05	05:35	07:01	08:25	08:58	10:08
	15:41	17:17	18:39	21:07	22:37	23:45	23:09	21:35	19:49	18:08	15:34	14:48
19	09:41	08:13	06:39	05:54	04:18	03:20	04:07	05:37	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:04	15:32	14:48
20	09:39	08:10	06:36	05:50	04:15	03:20	04:10	05:40	07:07	08:31	09:04	10:10
	15:47	17:23	18:44	21:13	22:43	23:46	23:04	21:28	19:42	18:01	15:29	14:48
21	09:37	08:06	06:33	05:47	04:12	03:20	04:13	05:43	07:09	08:34	09:07	10:10
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:27	14:48
22	09:34	08:03	06:29	05:44	04:10	03:20	04:16	05:46	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:35	17:55	15:24	14:48
23	09:32	08:00	06:26	05:40	04:07	03:21	04:18	05:49	07:15	08:39	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:46	22:55	21:18	19:32	17:51	15:22	14:49
24	09:29	07:57	06:22	05:37	04:04	03:21	04:21	05:52	07:18	08:42	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:48	15:19	14:50
25	09:27	07:53	06:19	05:34	04:02	03:22	04:24	05:55	07:20	07:45	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:25	16:45	15:17	14:50
26	09:24	07:50	06:15	05:30	03:59	03:22	04:27	05:57	07:23	07:48	09:22	10:12
	16:05	17:41	19:01	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:15	14:51
27	09:21	07:47	06:12	05:27	03:56	03:23	04:30	06:00	07:26	07:51	09:25	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:04	19:18	16:39	15:13	14:52
28	09:19	07:43	06:09	05:24	03:54	03:24	04:33	06:03	07:29	07:54	09:27	10:12
	16:11	17:47	19:07	21:37	23:06	23:44	22:41	21:01	19:15	16:35	15:11	14:54
29	09:16		07:05	05:20	03:52	03:25	04:36	06:06	07:31	07:57	09:30	10:12
	16:14		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:32	15:09	14:55
30	09:13		07:02	05:17	03:49	03:26	04:39	06:09	07:34	08:00	09:33	10:11
	16:17		20:13	21:43	23:11	23:43	22:35	20:54	19:08	16:29	15:07	14:56
31	09:10		06:58		03:47		04:42	06:12		08:03		10:11
	16:20		20:16		23:13		22:32	20:51		16:26		14:58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** Lålax 3 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (340)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:45	03:28	04:44	06:14	07:37	08:06	09:35
	15:00	16:24	17:50	20:18	21:46	23:16	23:42	22:29	20:47	19:05	16:23	15:05
2	10:09	09:05	07:37	06:51	05:11	03:42	03:29	04:47	06:17	07:40	08:10	09:38
	15:02	16:27	17:52	20:21	21:49	23:18	23:41	22:26	20:44	19:01	16:20	15:03
3	10:08	09:02	07:33	06:48	05:07	03:40	03:31	04:50	06:20	07:42	08:13	09:41
	15:04	16:30	17:55	20:24	21:52	23:21	23:39	22:23	20:41	18:58	16:17	15:01
4	10:07	08:59	07:30	06:45	05:04	03:38	03:32	04:53	06:23	07:45	08:16	09:43
	15:05	16:33	17:58	20:27	21:55	23:23	23:38	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:36	03:34	04:56	06:25	07:48	08:19	09:45
	15:08	16:36	18:01	20:30	21:58	23:25	23:36	22:17	20:34	18:51	16:11	14:58
6	10:05	08:53	07:23	06:38	04:58	03:34	03:36	04:59	06:28	07:51	08:22	09:48
	15:10	16:39	18:04	20:33	22:01	23:27	23:35	22:14	20:30	18:48	16:08	14:57
7	10:04	08:50	07:20	06:34	04:55	03:33	03:38	05:02	06:31	07:54	08:25	09:50
	15:12	16:42	18:07	20:36	22:04	23:29	23:33	22:10	20:27	18:44	16:05	14:55
8	10:02	08:47	07:17	06:31	04:51	03:31	03:40	05:05	06:34	07:56	08:28	09:52
	15:14	16:46	18:10	20:38	22:07	23:31	23:31	22:07	20:24	18:41	16:02	14:54
9	10:01	08:44	07:13	06:28	04:48	03:29	03:42	05:08	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:29	22:04	20:20	18:38	15:59	14:53
10	09:59	08:41	07:10	06:24	04:45	03:28	03:44	05:11	06:39	08:02	08:34	09:56
	15:19	16:52	18:16	20:44	22:13	23:35	23:27	22:01	20:17	18:34	15:56	14:52
11	09:58	08:38	07:07	06:21	04:42	03:27	03:47	05:14	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:37	23:25	21:58	20:13	18:31	15:53	14:51
12	09:56	08:35	07:03	06:17	04:39	03:25	03:49	05:17	06:45	08:08	08:40	10:00
	15:24	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:50	14:50
13	09:54	08:32	07:00	06:14	04:36	03:24	03:52	05:20	06:48	08:11	08:43	10:01
	15:27	17:01	18:24	20:53	22:22	23:40	23:21	21:51	20:06	18:24	15:48	14:49
14	09:52	08:29	06:56	06:11	04:33	03:23	03:54	05:23	06:50	08:13	08:46	10:03
	15:30	17:04	18:27	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:49
15	09:50	08:26	06:53	06:07	04:30	03:22	03:57	05:26	06:53	08:16	08:49	10:04
	15:32	17:07	18:30	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:42	14:48
16	09:48	08:22	06:50	06:04	04:27	03:22	03:59	05:29	06:56	08:19	08:52	10:06
	15:35	17:10	18:33	21:01	22:31	23:43	23:14	21:41	19:56	18:14	15:39	14:48
17	09:46	08:19	06:46	06:00	04:24	03:21	04:02	05:32	06:58	08:22	08:55	10:07
	15:38	17:13	18:36	21:04	22:34	23:44	23:11	21:38	19:53	18:11	15:37	14:48
18	09:44	08:16	06:43	05:57	04:21	03:21	04:04	05:34	07:01	08:25	08:58	10:08
	15:41	17:16	18:39	21:07	22:37	23:45	23:09	21:35	19:49	18:08	15:34	14:48
19	09:41	08:13	06:39	05:54	04:18	03:20	04:07	05:37	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:45	23:06	21:31	19:46	18:04	15:31	14:48
20	09:39	08:10	06:36	05:50	04:15	03:20	04:10	05:40	07:07	08:31	09:04	10:10
	15:47	17:23	18:44	21:13	22:43	23:46	23:04	21:28	19:42	18:01	15:29	14:48
21	09:37	08:06	06:33	05:47	04:12	03:20	04:13	05:43	07:09	08:34	09:07	10:11
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:26	14:48
22	09:34	08:03	06:29	05:44	04:10	03:20	04:15	05:46	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:46	22:58	21:21	19:35	17:55	15:24	14:48
23	09:32	08:00	06:26	05:40	04:07	03:20	04:18	05:49	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:47	22:56	21:18	19:32	17:51	15:22	14:49
24	09:29	07:57	06:22	05:37	04:04	03:21	04:21	05:52	07:18	08:42	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:46	22:53	21:15	19:29	17:48	15:19	14:50
25	09:27	07:53	06:19	05:34	04:02	03:21	04:24	05:55	07:20	07:45	09:19	10:12
	16:02	17:38	18:59	21:28	22:57	23:46	22:50	21:11	19:25	16:45	15:17	14:50
26	09:24	07:50	06:15	05:30	03:59	03:22	04:27	05:57	07:23	07:48	09:22	10:12
	16:05	17:41	19:01	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:15	14:51
27	09:21	07:47	06:12	05:27	03:56	03:23	04:30	06:00	07:26	07:51	09:25	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:04	19:18	16:39	15:13	14:52
28	09:19	07:43	06:09	05:24	03:54	03:24	04:33	06:03	07:29	07:54	09:27	10:12
	16:11	17:47	19:07	21:37	23:06	23:45	22:41	21:01	19:15	16:35	15:11	14:54
29	09:16		07:05	05:20	03:51	03:25	04:36	06:06	07:31	07:57	09:30	10:12
	16:14		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:32	15:09	14:55
30	09:13		07:02	05:17	03:49	03:26	04:39	06:09	07:34	08:00	09:33	10:11
	16:17		20:13	21:43	23:11	23:43	22:35	20:54	19:08	16:29	15:07	14:56
31	09:11		06:58		03:47		04:42	06:12		08:03		10:11
	16:20		20:16		23:13		22:32	20:51		16:26		14:58
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)**WTG:** Lålax 4 - VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (341)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:40	06:55	05:14	03:44	03:28	04:44	06:14	07:37	08:07	09:36
	15:00	16:24	17:50	20:18	21:46	23:16	23:42	22:29	20:48	19:05	16:23	15:05
2	10:09	09:05	07:37	06:51	05:11	03:42	03:29	04:47	06:17	07:40	08:10	09:38
	15:02	16:27	17:53	20:21	21:49	23:18	23:41	22:26	20:44	19:01	16:20	15:03
3	10:09	09:02	07:33	06:48	05:07	03:40	03:31	04:50	06:20	07:42	08:13	09:41
	15:03	16:30	17:55	20:24	21:52	23:21	23:40	22:23	20:41	18:58	16:17	15:01
4	10:07	08:59	07:30	06:45	05:04	03:38	03:32	04:53	06:23	07:45	08:16	09:43
	15:05	16:33	17:58	20:27	21:55	23:23	23:38	22:20	20:37	18:55	16:14	15:00
5	10:06	08:56	07:27	06:41	05:01	03:36	03:34	04:56	06:25	07:48	08:19	09:45
	15:08	16:36	18:01	20:30	21:58	23:25	23:37	22:17	20:34	18:51	16:11	14:58
6	10:05	08:53	07:23	06:38	04:58	03:34	03:36	04:59	06:28	07:51	08:22	09:48
	15:10	16:39	18:04	20:33	22:01	23:28	23:35	22:14	20:30	18:48	16:08	14:57
7	10:04	08:50	07:20	06:34	04:54	03:33	03:38	05:02	06:31	07:54	08:25	09:50
	15:12	16:42	18:07	20:36	22:04	23:30	23:33	22:11	20:27	18:44	16:05	14:55
8	10:02	08:47	07:17	06:31	04:51	03:31	03:40	05:05	06:34	07:56	08:28	09:52
	15:14	16:46	18:10	20:38	22:07	23:32	23:31	22:07	20:24	18:41	16:02	14:54
9	10:01	08:44	07:13	06:28	04:48	03:29	03:42	05:08	06:37	07:59	08:31	09:54
	15:17	16:49	18:13	20:41	22:10	23:33	23:30	22:04	20:20	18:38	15:59	14:53
10	09:59	08:41	07:10	06:24	04:45	03:28	03:44	05:11	06:39	08:02	08:34	09:56
	15:19	16:52	18:16	20:44	22:13	23:35	23:28	22:01	20:17	18:34	15:56	14:52
11	09:58	08:38	07:07	06:21	04:42	03:27	03:47	05:14	06:42	08:05	08:37	09:58
	15:22	16:55	18:19	20:47	22:16	23:37	23:25	21:58	20:13	18:31	15:53	14:51
12	09:56	08:35	07:03	06:17	04:39	03:25	03:49	05:17	06:45	08:08	08:40	10:00
	15:24	16:58	18:22	20:50	22:19	23:38	23:23	21:54	20:10	18:28	15:50	14:50
13	09:54	08:32	07:00	06:14	04:36	03:24	03:51	05:20	06:48	08:11	08:43	10:01
	15:27	17:01	18:24	20:53	22:22	23:40	23:21	21:51	20:06	18:24	15:47	14:49
14	09:52	08:29	06:56	06:11	04:33	03:23	03:54	05:23	06:50	08:13	08:46	10:03
	15:30	17:04	18:27	20:56	22:25	23:41	23:19	21:48	20:03	18:21	15:45	14:49
15	09:50	08:26	06:53	06:07	04:30	03:22	03:57	05:26	06:53	08:16	08:49	10:04
	15:32	17:07	18:30	20:59	22:28	23:42	23:16	21:45	20:00	18:18	15:42	14:48
16	09:48	08:22	06:50	06:04	04:27	03:22	03:59	05:29	06:56	08:19	08:52	10:06
	15:35	17:10	18:33	21:02	22:31	23:43	23:14	21:41	19:56	18:14	15:39	14:48
17	09:46	08:19	06:46	06:00	04:24	03:21	04:02	05:32	06:58	08:22	08:55	10:07
	15:38	17:13	18:36	21:04	22:34	23:44	23:12	21:38	19:53	18:11	15:37	14:48
18	09:44	08:16	06:43	05:57	04:21	03:21	04:04	05:34	07:01	08:25	08:58	10:08
	15:41	17:16	18:39	21:07	22:37	23:45	23:09	21:35	19:49	18:08	15:34	14:47
19	09:41	08:13	06:39	05:54	04:18	03:20	04:07	05:37	07:04	08:28	09:01	10:09
	15:44	17:20	18:42	21:10	22:40	23:46	23:06	21:31	19:46	18:04	15:31	14:47
20	09:39	08:10	06:36	05:50	04:15	03:20	04:10	05:40	07:07	08:31	09:04	10:10
	15:47	17:23	18:44	21:13	22:43	23:46	23:04	21:28	19:42	18:01	15:29	14:48
21	09:37	08:06	06:33	05:47	04:12	03:20	04:13	05:43	07:09	08:34	09:07	10:11
	15:50	17:26	18:47	21:16	22:46	23:46	23:01	21:25	19:39	17:58	15:26	14:48
22	09:34	08:03	06:29	05:44	04:10	03:20	04:15	05:46	07:12	08:37	09:10	10:11
	15:53	17:29	18:50	21:19	22:49	23:47	22:58	21:21	19:36	17:55	15:24	14:48
23	09:32	08:00	06:26	05:40	04:07	03:20	04:18	05:49	07:15	08:40	09:13	10:12
	15:56	17:32	18:53	21:22	22:52	23:47	22:56	21:18	19:32	17:51	15:22	14:49
24	09:29	07:57	06:22	05:37	04:04	03:21	04:21	05:52	07:18	08:43	09:16	10:12
	15:59	17:35	18:56	21:25	22:55	23:47	22:53	21:15	19:29	17:48	15:19	14:50
25	09:27	07:53	06:19	05:34	04:02	03:21	04:24	05:55	07:20	07:45	09:19	10:12
	16:02	17:38	18:59	21:28	22:58	23:46	22:50	21:11	19:25	16:45	15:17	14:50
26	09:24	07:50	06:15	05:30	03:59	03:22	04:27	05:57	07:23	07:48	09:22	10:12
	16:05	17:41	19:01	21:31	23:00	23:46	22:47	21:08	19:22	16:42	15:15	14:51
27	09:22	07:47	06:12	05:27	03:56	03:23	04:30	06:00	07:26	07:51	09:25	10:12
	16:08	17:44	19:04	21:34	23:03	23:45	22:44	21:05	19:18	16:39	15:13	14:52
28	09:19	07:43	06:09	05:24	03:54	03:24	04:33	06:03	07:29	07:54	09:28	10:12
	16:11	17:47	19:07	21:37	23:06	23:45	22:41	21:01	19:15	16:35	15:11	14:54
29	09:16		07:05	05:20	03:51	03:25	04:36	06:06	07:31	07:57	09:30	10:12
	16:14		20:10	21:40	23:08	23:44	22:38	20:58	19:12	16:32	15:09	14:55
30	09:13		07:02	05:17	03:49	03:26	04:39	06:09	07:34	08:00	09:33	10:12
	16:17		20:13	21:43	23:11	23:43	22:35	20:54	19:08	16:29	15:07	14:56
31	09:11		06:58		03:47		04:41	06:12		08:03		10:11
	16:20		20:16		23:14		22:32	20:51		16:26		14:58
Potential sun hours	182	242	363	447	559	606	595	502	392	308	206	151
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 01 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (320)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:46	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:46	23:16	23:42	22:29	20:48	19:06	16:24	15:06
2	10:09	09:05	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:40	08:10	09:38
	15:04	16:28	17:54	20:22	21:49	23:18	23:40	22:26	20:45	19:02	16:21	15:05
3	10:08	09:02	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:05	16:31	17:57	20:25	21:52	23:21	23:39	22:23	20:41	18:59	16:18	15:03
4	10:07	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:07	16:34	17:59	20:28	21:55	23:23	23:38	22:20	20:38	18:56	16:15	15:01
5	10:06	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:45
	15:09	16:37	18:02	20:31	21:58	23:25	23:36	22:17	20:35	18:52	16:12	15:00
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	15:12	16:41	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:49	16:09	14:58
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	15:14	16:44	18:08	20:36	22:04	23:29	23:33	22:11	20:28	18:45	16:06	14:57
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	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:50	06:05	04:28	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:15	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:23	04:04	05:33	06:59	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:34	23:44	23:11	21:38	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:42	17:18	18:40	21:08	22:37	23:44	23:09	21:35	19:50	18:09	15:36	14:49
19	09:42	08:13	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:28	09:02	10:09
	15:45	17:21	18:42	21:11	22:40	23:45	23:06	21:32	19:47	18:06	15:33	14:49
20	09:39	08:10	06:37	05:51	04:17	03:22	04:12	05:42	07:08	08:31	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:46	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:33	05:48	04:14	03:22	04:14	05:44	07:10	08:34	09:08	10:10
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:11	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:58	21:22	19:36	17:56	15:26	14:50
23	09:32	08:01	06:27	05:41	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:16	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:49	15:21	14:52
25	09:27	07:54	06:20	05:35	04:03	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	18:59	21:29	22:57	23:46	22:50	21:12	19:26	16:46	15:19	14:52
26	09:24	07:51	06:16	05:32	04:01	03:24	04:29	05:59	07:24	07:49	09:22	10:12
	16:06	17:42	19:02	21:32	23:00	23:45	22:47	21:08	19:23	16:43	15:16	14:53
27	09:22	07:47	06:13	05:28	03:58	03:25	04:31	06:01	07:27	07:52	09:25	10:12
	16:09	17:45	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:40	15:14	14:54
28	09:19	07:44	06:10	05:25	03:56	03:26	04:34	06:04	07:29	07:55	09:28	10:12
	16:12	17:48	19:08	21:37	23:06	23:44	22:41	21:02	19:16	16:37	15:12	14:55
29	09:16		07:06	05:22	03:53	03:27	04:37	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:40	23:08	23:43	22:39	20:58	19:13	16:34	15:10	14:57
30	09:14		07:03	05:18	03:51	03:28	04:40	06:10	07:35	08:01	09:33	10:11
	16:19		20:14	21:43	23:11	23:43	22:36	20:55	19:09	16:30	15:08	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:16		23:13		22:33	20:52		16:27		15:00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 02 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (327)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:46	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:09	09:05	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:49	23:18	23:40	22:26	20:45	19:02	16:21	15:05
3	10:08	09:02	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:05	16:31	17:57	20:25	21:52	23:21	23:39	22:23	20:41	18:59	16:18	15:03
4	10:07	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:07	16:34	17:59	20:28	21:55	23:23	23:38	22:20	20:38	18:56	16:15	15:01
5	10:06	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:45
	15:09	16:38	18:02	20:31	21:58	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:29	07:52	08:22	09:48
	15:12	16:41	18:05	20:33	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:58
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:54	08:25	09:50
	15:14	16:44	18:08	20:36	22:05	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:02	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:28	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:44	05:10	06:38	08:00	08:31	09:54
	15:18	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:00	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:40	08:03	08:34	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:27	22:01	20:18	18:35	15:57	14:54
11	09:58	08:39	07:07	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:23	16:56	18:20	20:48	22:17	23:36	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:18	06:46	08:08	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:32	07:01	06:15	04:37	03:27	03:54	05:21	06:49	08:11	08:44	10:01
	15:29	17:02	18:25	20:54	22:23	23:39	23:21	21:52	20:07	18:25	15:49	14:51
14	09:52	08:29	06:57	06:12	04:34	03:26	03:56	05:24	06:51	08:14	08:47	10:03
	15:31	17:06	18:28	20:56	22:26	23:41	23:19	21:48	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:31	03:25	03:59	05:27	06:54	08:17	08:50	10:04
	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:23	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:34	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:42	17:18	18:40	21:08	22:37	23:44	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:13	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:40	23:45	23:06	21:32	19:47	18:06	15:33	14:50
20	09:39	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:31	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:46	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:23	04:15	05:44	07:10	08:34	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:11	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:58	21:22	19:36	17:56	15:26	14:50
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:16	10:12
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	16:09	17:45	19:05	21:35	23:03	23:45	22:44	21:05	19:19	16:40	15:14	14:54
28	09:19	07:44	06:10	05:25	03:56	03:26	04:34	06:04	07:30	07:55	09:28	10:12
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29	09:16		07:06	05:22	03:53	03:27	04:37	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:40	23:08	23:43	22:39	20:58	19:13	16:34	15:10	14:57
30	09:14		07:03	05:18	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:11
	16:19		20:14	21:43	23:11	23:43	22:36	20:55	19:09	16:30	15:08	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:16		23:13		22:33	20:52		16:27		15:00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 03 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (328)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:46	23:16	23:41	22:29	20:48	19:06	16:24	15:07
2	10:09	09:05	07:38	06:53	05:12	03:45	03:32	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:49	23:18	23:40	22:26	20:45	19:02	16:21	15:05
3	10:08	09:02	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:06	16:31	17:57	20:25	21:52	23:21	23:39	22:23	20:41	18:59	16:18	15:03
4	10:07	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:08	16:34	18:00	20:28	21:55	23:23	23:38	22:20	20:38	18:56	16:15	15:02
5	10:06	08:57	07:28	06:42	05:02	03:39	03:37	04:58	06:27	07:49	08:19	09:45
	15:10	16:38	18:02	20:31	21:58	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:29	07:52	08:22	09:48
	15:12	16:41	18:05	20:33	22:01	23:27	23:35	22:14	20:31	18:49	16:09	14:59
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:54	08:25	09:50
	15:14	16:44	18:08	20:36	22:04	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:02	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:28	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:45	05:10	06:38	08:00	08:31	09:54
	15:19	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:00	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:40	08:03	08:34	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:27	22:01	20:18	18:35	15:58	14:54
11	09:58	08:39	07:07	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:24	16:56	18:20	20:48	22:17	23:36	23:25	21:58	20:14	18:32	15:55	14:53
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	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:32	07:01	06:15	04:38	03:27	03:54	05:21	06:49	08:11	08:44	10:01
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14	09:52	08:29	06:57	06:12	04:35	03:26	03:56	05:24	06:51	08:14	08:47	10:03
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	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
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	15:40	17:15	18:37	21:05	22:34	23:44	23:11	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:37	23:44	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:13	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:40	23:45	23:06	21:32	19:47	18:06	15:33	14:50
20	09:39	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:31	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:45	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:23	04:15	05:45	07:10	08:34	09:08	10:10
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:12	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:58	21:22	19:36	17:56	15:26	14:51
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:13	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:16	10:12
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	16:03	17:39	18:59	21:29	22:57	23:46	22:50	21:12	19:26	16:46	15:19	14:53
26	09:24	07:51	06:17	05:32	04:01	03:25	04:29	05:59	07:24	07:49	09:22	10:12
	16:06	17:42	19:02	21:32	23:00	23:45	22:47	21:09	19:23	16:43	15:17	14:53
27	09:22	07:48	06:13	05:28	03:58	03:26	04:32	06:02	07:27	07:52	09:25	10:12
	16:10	17:45	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:40	15:15	14:55
28	09:19	07:44	06:10	05:25	03:56	03:26	04:35	06:04	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:37	23:06	23:44	22:41	21:02	19:16	16:37	15:12	14:56
29	09:16		07:06	05:22	03:54	03:28	04:37	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:40	23:08	23:43	22:38	20:58	19:13	16:34	15:10	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:11
	16:19		20:14	21:43	23:11	23:42	22:36	20:55	19:09	16:31	15:09	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:16		23:13		22:33	20:52		16:27		15:00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 04 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (329)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:35
	15:02	16:25	17:51	20:19	21:46	23:16	23:41	22:29	20:48	19:06	16:24	15:07
2	10:09	09:05	07:38	06:53	05:12	03:45	03:32	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:49	23:18	23:40	22:26	20:45	19:02	16:21	15:05
3	10:08	09:02	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:40
	15:06	16:31	17:57	20:25	21:52	23:20	23:39	22:23	20:41	18:59	16:18	15:03
4	10:07	08:59	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:08	16:34	17:59	20:28	21:55	23:23	23:37	22:20	20:38	18:56	16:15	15:02
5	10:06	08:57	07:28	06:42	05:02	03:39	03:37	04:58	06:27	07:49	08:19	09:45
	15:10	16:38	18:02	20:31	21:58	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:29	07:52	08:22	09:48
	15:12	16:41	18:05	20:33	22:01	23:27	23:34	22:14	20:31	18:49	16:09	14:59
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:54	08:25	09:50
	15:14	16:44	18:08	20:36	22:04	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:02	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:28	09:52
	15:16	16:47	18:11	20:39	22:07	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:45	05:10	06:38	08:00	08:31	09:54
	15:19	16:50	18:14	20:42	22:10	23:33	23:29	22:04	20:21	18:39	16:00	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:40	08:03	08:34	09:56
	15:21	16:53	18:17	20:45	22:13	23:35	23:27	22:01	20:17	18:35	15:58	14:54
11	09:57	08:39	07:07	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:37	09:58
	15:24	16:56	18:20	20:48	22:16	23:36	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:35	07:04	06:19	04:41	03:28	03:51	05:19	06:46	08:08	08:40	09:59
	15:26	16:59	18:23	20:51	22:19	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:32	07:01	06:15	04:38	03:27	03:54	05:21	06:49	08:11	08:44	10:01
	15:29	17:02	18:25	20:53	22:22	23:39	23:21	21:52	20:07	18:25	15:49	14:51
14	09:52	08:29	06:57	06:12	04:35	03:26	03:56	05:24	06:51	08:14	08:47	10:03
	15:31	17:06	18:28	20:56	22:25	23:40	23:18	21:48	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:04
	15:34	17:09	18:31	20:59	22:28	23:41	23:16	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:05
	15:37	17:12	18:34	21:02	22:31	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:24	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:34	23:43	23:11	21:38	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:07	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:37	23:44	23:09	21:35	19:50	18:09	15:36	14:50
19	09:41	08:13	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:28	09:02	10:09
	15:45	17:21	18:43	21:11	22:40	23:45	23:06	21:32	19:47	18:06	15:33	14:50
20	09:39	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:31	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:45	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:23	04:15	05:45	07:10	08:34	09:08	10:10
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:34	08:04	06:30	05:45	04:12	03:23	04:17	05:47	07:13	08:37	09:10	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:58	21:22	19:36	17:56	15:26	14:51
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:13	10:11
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:29	07:57	06:23	05:38	04:06	03:24	04:23	05:53	07:19	08:43	09:16	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:50	15:21	14:52
25	09:27	07:54	06:20	05:35	04:04	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	18:59	21:28	22:57	23:46	22:50	21:12	19:26	16:46	15:19	14:53
26	09:24	07:51	06:16	05:32	04:01	03:25	04:29	05:59	07:24	07:49	09:22	10:12
	16:06	17:42	19:02	21:31	23:00	23:45	22:47	21:08	19:23	16:43	15:17	14:53
27	09:22	07:47	06:13	05:28	03:58	03:26	04:32	06:02	07:27	07:52	09:25	10:12
	16:10	17:45	19:05	21:34	23:03	23:45	22:44	21:05	19:19	16:40	15:15	14:55
28	09:19	07:44	06:10	05:25	03:56	03:26	04:35	06:04	07:30	07:55	09:27	10:12
	16:13	17:48	19:08	21:37	23:05	23:44	22:41	21:02	19:16	16:37	15:12	14:56
29	09:16		07:06	05:22	03:54	03:28	04:37	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:40	23:08	23:43	22:38	20:58	19:13	16:34	15:10	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:11
	16:19		20:14	21:43	23:11	23:42	22:35	20:55	19:09	16:31	15:09	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:16		23:13		22:32	20:52		16:27		15:00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	207	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 05 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (330)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:09	09:05	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:18	23:40	22:27	20:45	19:02	16:21	15:05
3	10:09	09:02	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:05	16:31	17:57	20:25	21:53	23:21	23:39	22:23	20:41	18:59	16:18	15:03
4	10:07	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:07	16:34	18:00	20:28	21:56	23:23	23:38	22:20	20:38	18:56	16:15	15:01
5	10:06	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:45
	15:09	16:38	18:02	20:31	21:59	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:29	07:52	08:22	09:48
	15:12	16:41	18:05	20:33	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:58
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:54	08:25	09:50
	15:14	16:44	18:08	20:36	22:05	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:02	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:28	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:44	05:10	06:38	08:00	08:31	09:54
	15:18	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:00	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:40	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:27	22:01	20:18	18:35	15:57	14:54
11	09:58	08:39	07:07	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:23	16:56	18:20	20:48	22:17	23:36	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:18	06:46	08:09	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:32	07:01	06:15	04:37	03:27	03:54	05:21	06:49	08:11	08:44	10:01
	15:29	17:02	18:26	20:54	22:23	23:39	23:21	21:52	20:07	18:25	15:49	14:51
14	09:52	08:29	06:57	06:12	04:34	03:26	03:56	05:24	06:51	08:14	08:47	10:03
	15:31	17:06	18:28	20:56	22:26	23:41	23:19	21:48	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:31	03:25	03:59	05:27	06:54	08:17	08:50	10:04
	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:23	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:42	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:14	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:40	23:45	23:07	21:32	19:47	18:06	15:33	14:50
20	09:39	08:10	06:37	05:52	04:17	03:22	04:12	05:42	07:08	08:31	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:46	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:22	04:15	05:45	07:10	08:34	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:11	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:36	17:56	15:26	14:50
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:16	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:49	15:21	14:52
25	09:27	07:54	06:20	05:35	04:03	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	18:59	21:29	22:58	23:46	22:50	21:12	19:26	16:46	15:19	14:52
26	09:25	07:51	06:16	05:32	04:01	03:24	04:29	05:59	07:24	07:49	09:22	10:12
	16:06	17:42	19:02	21:32	23:00	23:45	22:47	21:09	19:23	16:43	15:17	14:53
27	09:22	07:48	06:13	05:28	03:58	03:25	04:32	06:02	07:27	07:52	09:25	10:12
	16:09	17:45	19:05	21:35	23:03	23:45	22:44	21:05	19:19	16:40	15:14	14:54
28	09:19	07:44	06:10	05:25	03:56	03:26	04:34	06:04	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:38	23:06	23:44	22:42	21:02	19:16	16:37	15:12	14:56
29	09:17		07:06	05:22	03:53	03:27	04:37	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:41	23:08	23:44	22:39	20:58	19:13	16:34	15:10	14:57
30	09:14		07:03	05:18	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:11
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:08	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:16		23:13		22:33	20:52		16:27		15:00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 06 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (331)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:46	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:09	09:05	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:18	23:41	22:27	20:45	19:02	16:21	15:05
3	10:09	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:05	16:31	17:57	20:25	21:53	23:21	23:39	22:24	20:41	18:59	16:18	15:03
4	10:08	09:00	07:31	06:46	05:06	03:40	03:34	04:55	06:24	07:46	08:16	09:43
	15:07	16:34	18:00	20:28	21:56	23:23	23:38	22:20	20:38	18:56	16:15	15:01
5	10:06	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:46
	15:09	16:38	18:02	20:31	21:59	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:36	03:38	05:01	06:29	07:52	08:22	09:48
	15:12	16:41	18:05	20:34	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:58
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:54	08:25	09:50
	15:14	16:44	18:08	20:36	22:05	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:03	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:28	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:44	05:10	06:38	08:00	08:32	09:54
	15:18	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:00	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:46	05:13	06:40	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:27	22:01	20:18	18:35	15:57	14:54
11	09:58	08:39	07:08	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:23	16:56	18:20	20:48	22:17	23:37	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:40	03:28	03:51	05:18	06:46	08:09	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:33	07:01	06:15	04:37	03:26	03:53	05:21	06:49	08:11	08:44	10:01
	15:29	17:02	18:26	20:54	22:23	23:39	23:21	21:52	20:07	18:25	15:49	14:51
14	09:52	08:29	06:57	06:12	04:34	03:25	03:56	05:24	06:51	08:14	08:47	10:03
	15:31	17:06	18:28	20:56	22:26	23:41	23:19	21:48	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:31	03:25	03:58	05:27	06:54	08:17	08:50	10:04
	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:28	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:23	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:42	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:49
19	09:42	08:14	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:40	23:45	23:07	21:32	19:47	18:06	15:33	14:49
20	09:39	08:10	06:37	05:52	04:17	03:22	04:12	05:42	07:08	08:31	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:46	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:22	04:14	05:44	07:10	08:34	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:11	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:36	17:56	15:26	14:50
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:17	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:49	15:21	14:52
25	09:27	07:54	06:20	05:35	04:03	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	19:00	21:29	22:58	23:46	22:50	21:12	19:26	16:46	15:19	14:52
26	09:25	07:51	06:16	05:32	04:01	03:24	04:29	05:59	07:24	07:49	09:22	10:12
	16:06	17:42	19:02	21:32	23:00	23:46	22:47	21:09	19:23	16:43	15:17	14:53
27	09:22	07:48	06:13	05:28	03:58	03:25	04:31	06:02	07:27	07:52	09:25	10:12
	16:09	17:45	19:05	21:35	23:03	23:45	22:45	21:05	19:19	16:40	15:14	14:54
28	09:19	07:44	06:10	05:25	03:56	03:26	04:34	06:04	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:38	23:06	23:44	22:42	21:02	19:16	16:37	15:12	14:55
29	09:17		07:06	05:22	03:53	03:27	04:37	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:41	23:08	23:44	22:39	20:58	19:13	16:34	15:10	14:57
30	09:14		07:03	05:18	03:51	03:28	04:40	06:10	07:35	08:01	09:33	10:12
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:30	15:08	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:16		23:14		22:33	20:52		16:27		15:00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	152
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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Anders Stenberg / a.stenberg@wpd.fi
Calculated:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 07 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (332)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:46	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:10	09:05	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:18	23:41	22:27	20:45	19:02	16:21	15:05
3	10:09	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:05	16:31	17:57	20:25	21:53	23:21	23:39	22:24	20:42	18:59	16:18	15:03
4	10:08	09:00	07:31	06:46	05:06	03:40	03:34	04:55	06:24	07:46	08:16	09:43
	15:07	16:34	18:00	20:28	21:56	23:23	23:38	22:20	20:38	18:56	16:15	15:01
5	10:07	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:46
	15:09	16:38	18:02	20:31	21:59	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:36	03:38	05:01	06:29	07:52	08:22	09:48
	15:12	16:41	18:05	20:34	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:58
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:55	08:25	09:50
	15:14	16:44	18:08	20:36	22:05	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:03	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:29	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:44	05:10	06:38	08:00	08:32	09:54
	15:18	16:50	18:14	20:42	22:11	23:33	23:30	22:05	20:21	18:39	16:00	14:55
10	10:00	08:42	07:11	06:25	04:47	03:30	03:46	05:13	06:40	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:28	22:01	20:18	18:36	15:58	14:54
11	09:58	08:39	07:08	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:23	16:56	18:20	20:48	22:17	23:37	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:18	06:46	08:09	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:33	07:01	06:15	04:37	03:26	03:54	05:21	06:49	08:11	08:44	10:02
	15:29	17:02	18:26	20:54	22:23	23:40	23:21	21:52	20:07	18:25	15:49	14:51
14	09:52	08:29	06:57	06:12	04:34	03:25	03:56	05:24	06:51	08:14	08:47	10:03
	15:31	17:06	18:28	20:57	22:26	23:41	23:19	21:49	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:31	03:25	03:58	05:27	06:54	08:17	08:50	10:05
	15:34	17:09	18:31	20:59	22:29	23:42	23:17	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:23	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:42	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:49
19	09:42	08:14	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:41	23:45	23:07	21:32	19:47	18:06	15:33	14:49
20	09:39	08:10	06:37	05:52	04:17	03:22	04:12	05:42	07:08	08:32	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:46	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:22	04:14	05:45	07:10	08:34	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:11	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:37	17:56	15:26	14:50
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:17	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:50	15:21	14:52
25	09:27	07:54	06:20	05:35	04:03	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	19:00	21:29	22:58	23:46	22:50	21:12	19:26	16:46	15:19	14:52
26	09:25	07:51	06:17	05:32	04:01	03:24	04:29	05:59	07:24	07:49	09:22	10:12
	16:06	17:42	19:02	21:32	23:00	23:46	22:47	21:09	19:23	16:43	15:17	14:53
27	09:22	07:48	06:13	05:28	03:58	03:25	04:32	06:02	07:27	07:52	09:25	10:12
	16:09	17:45	19:05	21:35	23:03	23:45	22:45	21:05	19:19	16:40	15:14	14:54
28	09:19	07:44	06:10	05:25	03:56	03:26	04:34	06:04	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:38	23:06	23:45	22:42	21:02	19:16	16:37	15:12	14:55
29	09:17		07:06	05:22	03:53	03:27	04:37	06:07	07:32	07:58	09:31	10:12
	16:16		20:11	21:41	23:08	23:44	22:39	20:59	19:13	16:34	15:10	14:57
30	09:14		07:03	05:19	03:51	03:28	04:40	06:10	07:35	08:01	09:33	10:12
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:08	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:17		23:14		22:33	20:52		16:27		15:00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 08 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (333)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:46	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:06
2	10:10	09:06	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:41	08:10	09:38
	15:03	16:28	17:54	20:22	21:50	23:19	23:41	22:27	20:45	19:02	16:21	15:05
3	10:09	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:05	16:31	17:57	20:25	21:53	23:21	23:39	22:24	20:42	18:59	16:18	15:03
4	10:08	09:00	07:31	06:46	05:06	03:40	03:34	04:55	06:24	07:46	08:16	09:43
	15:07	16:34	18:00	20:28	21:56	23:23	23:38	22:21	20:38	18:56	16:15	15:01
5	10:07	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:46
	15:09	16:38	18:02	20:31	21:59	23:25	23:37	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:36	03:38	05:01	06:29	07:52	08:22	09:48
	15:11	16:41	18:05	20:34	22:02	23:28	23:35	22:14	20:31	18:49	16:09	14:58
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:55	08:26	09:50
	15:14	16:44	18:08	20:36	22:05	23:30	23:33	22:11	20:28	18:46	16:06	14:57
8	10:03	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:29	09:52
	15:16	16:47	18:11	20:39	22:08	23:32	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:31	03:44	05:10	06:38	08:00	08:32	09:54
	15:18	16:50	18:14	20:42	22:11	23:33	23:30	22:05	20:21	18:39	16:00	14:55
10	10:00	08:42	07:11	06:25	04:47	03:30	03:46	05:13	06:40	08:03	08:35	09:56
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	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:33	07:01	06:15	04:37	03:26	03:53	05:21	06:49	08:11	08:44	10:02
	15:29	17:02	18:26	20:54	22:23	23:40	23:21	21:52	20:07	18:25	15:49	14:51
14	09:52	08:29	06:57	06:12	04:34	03:25	03:56	05:24	06:51	08:14	08:47	10:03
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18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
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19	09:42	08:14	06:40	05:55	04:20	03:22	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:41	23:45	23:07	21:32	19:47	18:06	15:33	14:49
20	09:40	08:10	06:37	05:52	04:17	03:22	04:12	05:42	07:08	08:32	09:05	10:10
	15:48	17:24	18:45	21:14	22:44	23:46	23:04	21:29	19:43	18:02	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:22	04:14	05:45	07:10	08:34	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
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	16:22		20:17		23:14		22:33	20:52		16:27		15:00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	151
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: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 09 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (334)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
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13	09:54	08:33	07:01	06:15	04:38	03:27	03:54	05:21	06:49	08:11	08:44	10:01
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	15:31	17:06	18:28	20:56	22:26	23:41	23:19	21:48	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:04
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	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:50
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Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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

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20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

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Assumptions for shadow calculations

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The rotor plane is always perpendicular to the line from the WTG to the sun
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	15:04	16:28	17:54	20:22	21:50	23:18	23:40	22:26	20:45	19:02	16:21	15:05
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	15:08	16:35	18:00	20:28	21:56	23:23	23:38	22:20	20:38	18:56	16:15	15:02
5	10:06	08:57	07:28	06:42	05:03	03:39	03:37	04:58	06:27	07:49	08:19	09:45
	15:10	16:38	18:03	20:31	21:59	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:30	07:52	08:22	09:48
	15:12	16:41	18:05	20:34	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:59
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8	10:02	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:28	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:45	05:10	06:38	08:00	08:31	09:54
	15:19	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:01	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:41	08:03	08:35	09:56
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14	09:52	08:29	06:57	06:12	04:35	03:26	03:56	05:24	06:51	08:14	08:47	10:03
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15	09:50	08:26	06:54	06:08	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:04
	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:00	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
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17	09:46	08:20	06:47	06:02	04:26	03:24	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:11	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:07	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:37	23:44	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:14	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
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20	09:39	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:31	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:45	23:04	21:29	19:43	18:03	15:31	14:50
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	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:12	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:58	21:22	19:37	17:56	15:26	14:51
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:24	04:23	05:53	07:19	08:43	09:16	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:50	15:21	14:52
25	09:27	07:54	06:20	05:35	04:04	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	19:00	21:29	22:57	23:46	22:50	21:12	19:26	16:46	15:19	14:53
26	09:24	07:51	06:17	05:32	04:01	03:25	04:29	05:59	07:24	07:49	09:22	10:12
	16:07	17:42	19:02	21:32	23:00	23:45	22:47	21:09	19:23	16:43	15:17	14:54
27	09:22	07:48	06:13	05:28	03:58	03:26	04:32	06:02	07:27	07:52	09:25	10:12
	16:10	17:45	19:05	21:35	23:03	23:45	22:44	21:05	19:19	16:40	15:15	14:55
28	09:19	07:44	06:10	05:25	03:56	03:27	04:35	06:04	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:38	23:06	23:44	22:41	21:02	19:16	16:37	15:13	14:56
29	09:16		07:06	05:22	03:54	03:28	04:38	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:41	23:08	23:43	22:39	20:58	19:13	16:34	15:11	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:11
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:09	14:58
31	09:11		06:59		03:49		04:43	06:13		08:04		10:11
	16:22		20:16		23:13		22:33	20:52		16:28		15:00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 11 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (322)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:09	09:05	07:38	06:53	05:12	03:45	03:32	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:18	23:40	22:27	20:45	19:03	16:21	15:05
3	10:08	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:06	16:31	17:57	20:25	21:53	23:21	23:39	22:23	20:42	18:59	16:18	15:03
4	10:07	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:08	16:35	18:00	20:28	21:56	23:23	23:38	22:20	20:38	18:56	16:15	15:02
5	10:06	08:57	07:28	06:42	05:03	03:39	03:37	04:58	06:27	07:49	08:19	09:45
	15:10	16:38	18:03	20:31	21:59	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:30	07:52	08:22	09:48
	15:12	16:41	18:05	20:34	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:59
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:55	08:25	09:50
	15:14	16:44	18:08	20:36	22:05	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:02	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:28	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:45	05:10	06:38	08:00	08:32	09:54
	15:19	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:01	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:41	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:27	22:01	20:18	18:36	15:58	14:54
11	09:58	08:39	07:08	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:24	16:56	18:20	20:48	22:17	23:36	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:19	06:46	08:09	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:33	07:01	06:15	04:38	03:27	03:54	05:22	06:49	08:11	08:44	10:01
	15:29	17:03	18:26	20:54	22:23	23:39	23:21	21:52	20:07	18:26	15:49	14:51
14	09:52	08:29	06:57	06:12	04:35	03:26	03:56	05:24	06:51	08:14	08:47	10:03
	15:31	17:06	18:28	20:56	22:26	23:41	23:19	21:48	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:09	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:04
	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:01	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:24	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:07	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:38	23:44	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:14	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:46	17:21	18:43	21:11	22:40	23:45	23:07	21:32	19:47	18:06	15:33	14:50
20	09:39	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:32	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:46	23:04	21:29	19:43	18:03	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:23	04:15	05:45	07:11	08:34	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:12	03:23	04:17	05:48	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:37	17:56	15:26	14:51
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:24	04:23	05:53	07:19	08:43	09:17	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:50	15:21	14:52
25	09:27	07:54	06:20	05:35	04:04	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	19:00	21:29	22:58	23:46	22:50	21:12	19:26	16:46	15:19	14:53
26	09:25	07:51	06:17	05:32	04:01	03:25	04:29	05:59	07:24	07:49	09:22	10:12
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	16:10	17:45	19:05	21:35	23:03	23:45	22:44	21:05	19:20	16:40	15:15	14:55
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	16:13	17:48	19:08	21:38	23:06	23:44	22:42	21:02	19:16	16:37	15:13	14:56
29	09:17		07:06	05:22	03:54	03:28	04:38	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:41	23:08	23:43	22:39	20:58	19:13	16:34	15:11	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:11
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:09	14:58
31	09:11		07:00		03:49		04:43	06:13		08:04		10:11
	16:22		20:17		23:13		22:33	20:52		16:28		15:00
Potential sun hours	183	243	363	447	559	604	593	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 12 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (323)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:09	09:05	07:38	06:53	05:12	03:45	03:32	04:49	06:19	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:18	23:40	22:27	20:45	19:03	16:21	15:05
3	10:09	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:06	16:31	17:57	20:25	21:53	23:21	23:39	22:24	20:42	18:59	16:18	15:03
4	10:08	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:08	16:35	18:00	20:28	21:56	23:23	23:38	22:20	20:38	18:56	16:15	15:02
5	10:06	08:57	07:28	06:42	05:03	03:39	03:37	04:58	06:27	07:49	08:19	09:46
	15:10	16:38	18:03	20:31	21:59	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:30	07:52	08:22	09:48
	15:12	16:41	18:05	20:34	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:59
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:55	08:25	09:50
	15:14	16:44	18:08	20:36	22:05	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:03	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:29	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:24	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:45	05:10	06:38	08:00	08:32	09:54
	15:19	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:01	14:55
10	09:59	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:41	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:27	22:01	20:18	18:36	15:58	14:54
11	09:58	08:39	07:08	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:24	16:56	18:20	20:48	22:17	23:37	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:19	06:46	08:09	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:33	07:01	06:15	04:38	03:27	03:54	05:22	06:49	08:11	08:44	10:01
	15:29	17:03	18:26	20:54	22:23	23:39	23:21	21:52	20:07	18:26	15:49	14:51
14	09:52	08:29	06:57	06:12	04:35	03:26	03:56	05:24	06:51	08:14	08:47	10:03
	15:31	17:06	18:28	20:57	22:26	23:41	23:19	21:49	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:09	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:04
	15:34	17:09	18:31	20:59	22:29	23:42	23:16	21:45	20:01	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:24	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:07	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:14	06:40	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:46	17:21	18:43	21:11	22:40	23:45	23:07	21:32	19:47	18:06	15:33	14:50
20	09:39	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:32	09:05	10:10
	15:48	17:24	18:45	21:14	22:43	23:46	23:04	21:29	19:43	18:03	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:23	04:15	05:45	07:11	08:34	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:12	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:37	17:56	15:26	14:51
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:57	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:17	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:50	15:21	14:52
25	09:27	07:54	06:20	05:35	04:04	03:24	04:26	05:56	07:21	07:46	09:19	10:12
	16:03	17:39	19:00	21:29	22:58	23:46	22:50	21:12	19:26	16:46	15:19	14:53
26	09:25	07:51	06:17	05:32	04:01	03:25	04:29	05:59	07:24	07:49	09:22	10:12
	16:07	17:42	19:02	21:32	23:00	23:46	22:47	21:09	19:23	16:43	15:17	14:53
27	09:22	07:48	06:13	05:28	03:58	03:25	04:32	06:02	07:27	07:52	09:25	10:12
	16:10	17:45	19:05	21:35	23:03	23:45	22:45	21:05	19:20	16:40	15:15	14:55
28	09:19	07:44	06:10	05:25	03:56	03:26	04:35	06:05	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:38	23:06	23:44	22:42	21:02	19:16	16:37	15:12	14:56
29	09:17		07:06	05:22	03:54	03:28	04:37	06:07	07:32	07:58	09:30	10:12
	16:16		20:11	21:41	23:08	23:44	22:39	20:59	19:13	16:34	15:10	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:12
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:09	14:58
31	09:11		07:00		03:49		04:43	06:13		08:04		10:11
	16:22		20:17		23:13		22:33	20:52		16:28		15:00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 13 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (324)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:10	09:06	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:19	23:41	22:27	20:45	19:03	16:21	15:05
3	10:09	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:06	16:31	17:57	20:25	21:53	23:21	23:39	22:24	20:42	18:59	16:18	15:03
4	10:08	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:07	16:35	18:00	20:28	21:56	23:23	23:38	22:21	20:38	18:56	16:15	15:02
5	10:07	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:46
	15:10	16:38	18:03	20:31	21:59	23:25	23:37	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:30	07:52	08:22	09:48
	15:12	16:41	18:05	20:34	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:59
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:55	08:26	09:50
	15:14	16:44	18:08	20:36	22:05	23:30	23:33	22:11	20:28	18:46	16:06	14:57
8	10:03	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:29	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:25	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:44	05:10	06:38	08:00	08:32	09:54
	15:19	16:50	18:14	20:42	22:11	23:33	23:30	22:05	20:21	18:39	16:00	14:55
10	10:00	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:41	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:28	22:02	20:18	18:36	15:58	14:54
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	15:24	16:56	18:20	20:48	22:17	23:37	23:26	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:19	06:46	08:09	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:33	07:01	06:15	04:38	03:27	03:54	05:21	06:49	08:12	08:44	10:02
	15:29	17:03	18:26	20:54	22:23	23:40	23:21	21:52	20:07	18:26	15:49	14:51
14	09:52	08:30	06:57	06:12	04:35	03:26	03:56	05:24	06:52	08:14	08:47	10:03
	15:31	17:06	18:28	20:57	22:26	23:41	23:19	21:49	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:05
	15:34	17:09	18:31	20:59	22:29	23:42	23:17	21:45	20:01	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:23	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:14	06:41	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:41	23:45	23:07	21:32	19:47	18:06	15:33	14:50
20	09:40	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:32	09:05	10:10
	15:48	17:24	18:46	21:14	22:44	23:46	23:04	21:29	19:43	18:03	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:23	04:15	05:45	07:11	08:35	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:12	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:37	17:56	15:26	14:50
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:58	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:17	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:50	15:21	14:52
25	09:27	07:54	06:20	05:35	04:03	03:24	04:26	05:56	07:21	07:46	09:20	10:12
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26	09:25	07:51	06:17	05:32	04:01	03:25	04:29	05:59	07:24	07:49	09:22	10:13
	16:06	17:42	19:02	21:32	23:01	23:46	22:48	21:09	19:23	16:43	15:17	14:53
27	09:22	07:48	06:13	05:28	03:58	03:25	04:32	06:02	07:27	07:52	09:25	10:13
	16:10	17:45	19:05	21:35	23:03	23:45	22:45	21:05	19:20	16:40	15:14	14:54
28	09:19	07:44	06:10	05:25	03:56	03:26	04:35	06:05	07:30	07:55	09:28	10:12
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29	09:17		07:06	05:22	03:53	03:27	04:37	06:07	07:32	07:58	09:31	10:12
	16:16		20:11	21:41	23:09	23:44	22:39	20:59	19:13	16:34	15:10	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:12
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:08	14:58
31	09:11		07:00		03:49		04:43	06:13		08:04		10:11
	16:22		20:17		23:14		22:33	20:52		16:28		15:00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	152
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:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 14 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (325)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:10	09:06	07:38	06:53	05:12	03:44	03:31	04:49	06:18	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:19	23:41	22:27	20:45	19:03	16:21	15:05
3	10:09	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:43	08:13	09:41
	15:05	16:31	17:57	20:25	21:53	23:21	23:40	22:24	20:42	18:59	16:18	15:03
4	10:08	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:07	16:34	18:00	20:28	21:56	23:23	23:38	22:21	20:38	18:56	16:15	15:01
5	10:07	08:57	07:28	06:42	05:02	03:38	03:36	04:58	06:27	07:49	08:19	09:46
	15:09	16:38	18:03	20:31	21:59	23:25	23:37	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:30	07:52	08:23	09:48
	15:12	16:41	18:05	20:34	22:02	23:28	23:35	22:14	20:31	18:49	16:09	14:58
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:55	08:26	09:50
	15:14	16:44	18:08	20:37	22:05	23:30	23:33	22:11	20:28	18:46	16:06	14:57
8	10:03	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:29	09:52
	15:16	16:47	18:11	20:39	22:08	23:32	23:32	22:08	20:25	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:44	05:10	06:38	08:00	08:32	09:54
	15:18	16:50	18:14	20:42	22:11	23:33	23:30	22:05	20:21	18:39	16:00	14:55
10	10:00	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:41	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:28	22:02	20:18	18:36	15:58	14:54
11	09:58	08:39	07:08	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:23	16:56	18:20	20:48	22:17	23:37	23:26	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:19	06:46	08:09	08:41	10:00
	15:26	16:59	18:23	20:51	22:20	23:38	23:24	21:55	20:11	18:29	15:52	14:52
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	15:29	17:03	18:26	20:54	22:23	23:40	23:21	21:52	20:07	18:26	15:49	14:51
14	09:52	08:30	06:58	06:12	04:35	03:26	03:56	05:24	06:52	08:14	08:47	10:03
	15:31	17:06	18:28	20:57	22:26	23:41	23:19	21:49	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:08	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:05
	15:34	17:09	18:31	21:00	22:29	23:42	23:17	21:45	20:01	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:23	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:06	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:14	06:41	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:45	17:21	18:43	21:11	22:41	23:45	23:07	21:32	19:47	18:06	15:33	14:50
20	09:40	08:11	06:37	05:52	04:17	03:22	04:12	05:42	07:08	08:32	09:05	10:10
	15:48	17:24	18:46	21:14	22:44	23:46	23:04	21:29	19:43	18:03	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:22	04:15	05:45	07:11	08:35	09:08	10:11
	15:51	17:27	18:48	21:17	22:47	23:46	23:02	21:26	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:11	03:23	04:17	05:47	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:37	17:56	15:26	14:50
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:47	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:58	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:17	10:12
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26	09:25	07:51	06:17	05:32	04:01	03:24	04:29	05:59	07:24	07:49	09:22	10:13
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27	09:22	07:48	06:13	05:28	03:58	03:25	04:32	06:02	07:27	07:52	09:25	10:13
	16:10	17:45	19:05	21:35	23:03	23:45	22:45	21:05	19:20	16:40	15:14	14:54
28	09:19	07:44	06:10	05:25	03:56	03:26	04:34	06:04	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:38	23:06	23:45	22:42	21:02	19:16	16:37	15:12	14:56
29	09:17		07:06	05:22	03:53	03:27	04:37	06:07	07:32	07:58	09:31	10:12
	16:16		20:11	21:41	23:09	23:44	22:39	20:59	19:13	16:34	15:10	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:12
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:08	14:58
31	09:11		07:00		03:49		04:43	06:13		08:04		10:11
	16:22		20:17		23:14		22:33	20:52		16:27		15:00
Potential sun hours	182	242	363	447	559	604	594	502	392	308	206	151
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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20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types) **WTG:** Märkenkall 15 - GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub: 161,0 m (TOT: 240,0 m) (326)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:
The sun is shining all the day, from sunrise to sunset
The rotor plane is always perpendicular to the line from the WTG to the sun
The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	10:10	09:08	07:41	06:56	05:15	03:47	03:30	04:46	06:16	07:38	08:07	09:36
	15:02	16:25	17:51	20:19	21:47	23:16	23:42	22:30	20:48	19:06	16:24	15:07
2	10:10	09:06	07:38	06:53	05:12	03:45	03:32	04:49	06:19	07:41	08:10	09:38
	15:04	16:28	17:54	20:22	21:50	23:18	23:41	22:27	20:45	19:03	16:21	15:05
3	10:09	09:03	07:34	06:49	05:09	03:42	03:33	04:52	06:21	07:44	08:13	09:41
	15:06	16:31	17:57	20:25	21:53	23:21	23:39	22:24	20:42	18:59	16:18	15:03
4	10:08	09:00	07:31	06:46	05:06	03:40	03:35	04:55	06:24	07:46	08:16	09:43
	15:08	16:35	18:00	20:28	21:56	23:23	23:38	22:21	20:38	18:56	16:15	15:02
5	10:07	08:57	07:28	06:43	05:03	03:39	03:37	04:58	06:27	07:49	08:19	09:46
	15:10	16:38	18:03	20:31	21:59	23:25	23:36	22:17	20:35	18:52	16:12	15:00
6	10:05	08:54	07:24	06:39	04:59	03:37	03:38	05:01	06:30	07:52	08:22	09:48
	15:12	16:41	18:06	20:34	22:02	23:27	23:35	22:14	20:31	18:49	16:09	14:59
7	10:04	08:51	07:21	06:36	04:56	03:35	03:40	05:04	06:32	07:55	08:26	09:50
	15:14	16:44	18:08	20:36	22:05	23:29	23:33	22:11	20:28	18:46	16:06	14:57
8	10:03	08:48	07:18	06:32	04:53	03:33	03:42	05:07	06:35	07:57	08:29	09:52
	15:16	16:47	18:11	20:39	22:08	23:31	23:31	22:08	20:25	18:42	16:03	14:56
9	10:01	08:45	07:14	06:29	04:50	03:32	03:45	05:10	06:38	08:00	08:32	09:54
	15:19	16:50	18:14	20:42	22:11	23:33	23:29	22:05	20:21	18:39	16:01	14:55
10	10:00	08:42	07:11	06:25	04:47	03:30	03:47	05:13	06:41	08:03	08:35	09:56
	15:21	16:53	18:17	20:45	22:14	23:35	23:28	22:02	20:18	18:36	15:58	14:54
11	09:58	08:39	07:08	06:22	04:44	03:29	03:49	05:16	06:43	08:06	08:38	09:58
	15:24	16:56	18:20	20:48	22:17	23:37	23:25	21:58	20:14	18:32	15:55	14:53
12	09:56	08:36	07:04	06:19	04:41	03:28	03:51	05:19	06:46	08:09	08:41	10:00
	15:26	17:00	18:23	20:51	22:20	23:38	23:23	21:55	20:11	18:29	15:52	14:52
13	09:54	08:33	07:01	06:15	04:38	03:27	03:54	05:22	06:49	08:12	08:44	10:02
	15:29	17:03	18:26	20:54	22:23	23:40	23:21	21:52	20:07	18:26	15:49	14:51
14	09:52	08:30	06:58	06:12	04:35	03:26	03:56	05:24	06:52	08:14	08:47	10:03
	15:31	17:06	18:29	20:57	22:26	23:41	23:19	21:49	20:04	18:22	15:46	14:51
15	09:50	08:26	06:54	06:09	04:32	03:25	03:59	05:27	06:54	08:17	08:50	10:05
	15:34	17:09	18:31	20:59	22:29	23:42	23:17	21:45	20:01	18:19	15:44	14:50
16	09:48	08:23	06:51	06:05	04:29	03:24	04:01	05:30	06:57	08:20	08:53	10:06
	15:37	17:12	18:34	21:02	22:32	23:43	23:14	21:42	19:57	18:16	15:41	14:50
17	09:46	08:20	06:47	06:02	04:26	03:24	04:04	05:33	07:00	08:23	08:56	10:07
	15:40	17:15	18:37	21:05	22:35	23:44	23:12	21:39	19:54	18:12	15:38	14:50
18	09:44	08:17	06:44	05:58	04:23	03:23	04:07	05:36	07:02	08:26	08:59	10:08
	15:43	17:18	18:40	21:08	22:38	23:45	23:09	21:35	19:50	18:09	15:36	14:50
19	09:42	08:14	06:41	05:55	04:20	03:23	04:09	05:39	07:05	08:29	09:02	10:09
	15:46	17:21	18:43	21:11	22:41	23:45	23:07	21:32	19:47	18:06	15:33	14:50
20	09:40	08:10	06:37	05:52	04:17	03:23	04:12	05:42	07:08	08:32	09:05	10:10
	15:48	17:24	18:46	21:14	22:43	23:46	23:04	21:29	19:43	18:03	15:31	14:50
21	09:37	08:07	06:34	05:48	04:14	03:23	04:15	05:45	07:11	08:35	09:08	10:11
	15:51	17:27	18:48	21:17	22:46	23:46	23:01	21:25	19:40	17:59	15:28	14:50
22	09:35	08:04	06:30	05:45	04:12	03:23	04:17	05:48	07:13	08:37	09:11	10:11
	15:54	17:30	18:51	21:20	22:49	23:46	22:59	21:22	19:37	17:56	15:26	14:51
23	09:32	08:01	06:27	05:42	04:09	03:23	04:20	05:50	07:16	08:40	09:14	10:12
	15:57	17:33	18:54	21:23	22:52	23:46	22:56	21:19	19:33	17:53	15:23	14:51
24	09:30	07:58	06:23	05:38	04:06	03:23	04:23	05:53	07:19	08:43	09:17	10:12
	16:00	17:36	18:57	21:26	22:55	23:46	22:53	21:15	19:30	17:50	15:21	14:52
25	09:27	07:54	06:20	05:35	04:04	03:24	04:26	05:56	07:22	07:46	09:19	10:12
	16:03	17:39	19:00	21:29	22:58	23:46	22:50	21:12	19:26	16:46	15:19	14:53
26	09:25	07:51	06:17	05:32	04:01	03:25	04:29	05:59	07:24	07:49	09:22	10:12
	16:07	17:42	19:02	21:32	23:00	23:46	22:47	21:09	19:23	16:43	15:17	14:54
27	09:22	07:48	06:13	05:28	03:58	03:25	04:32	06:02	07:27	07:52	09:25	10:12
	16:10	17:45	19:05	21:35	23:03	23:45	22:45	21:05	19:20	16:40	15:15	14:55
28	09:19	07:44	06:10	05:25	03:56	03:26	04:35	06:05	07:30	07:55	09:28	10:12
	16:13	17:48	19:08	21:38	23:06	23:44	22:42	21:02	19:16	16:37	15:13	14:56
29	09:17		07:06	05:22	03:54	03:28	04:38	06:07	07:32	07:58	09:31	10:12
	16:16		20:11	21:41	23:08	23:44	22:39	20:59	19:13	16:34	15:11	14:57
30	09:14		07:03	05:19	03:51	03:29	04:40	06:10	07:35	08:01	09:33	10:12
	16:19		20:14	21:44	23:11	23:43	22:36	20:55	19:09	16:31	15:09	14:58
31	09:11		07:00		03:49		04:43	06:13		08:04		10:11
	16:22		20:17		23:14		22:33	20:52		16:28		15:00
Potential sun hours	182	242	363	447	559	604	593	502	392	308	206	152
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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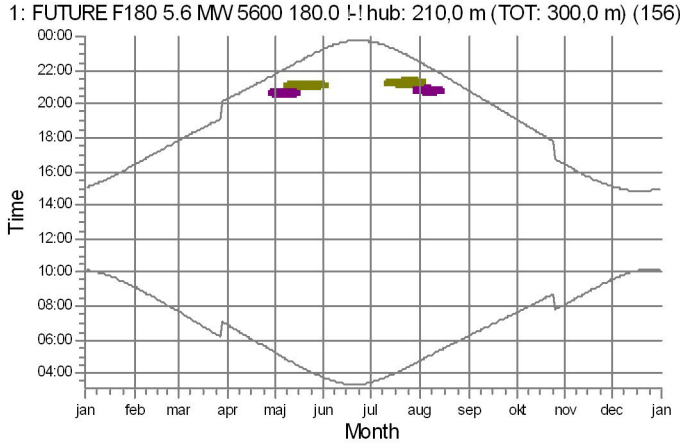
Calculated:
20.8.2021 14:34/3.3.247

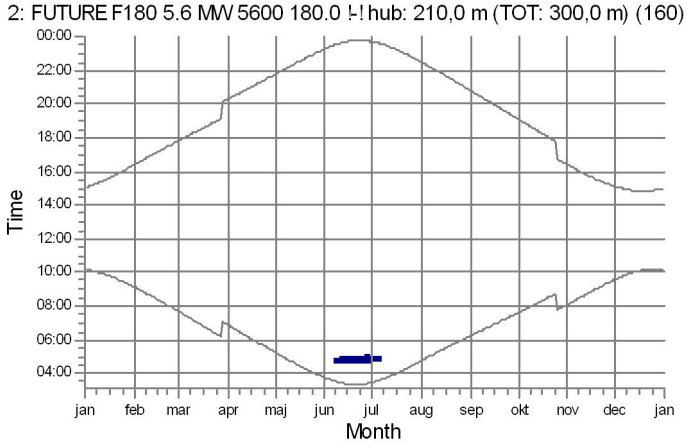
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

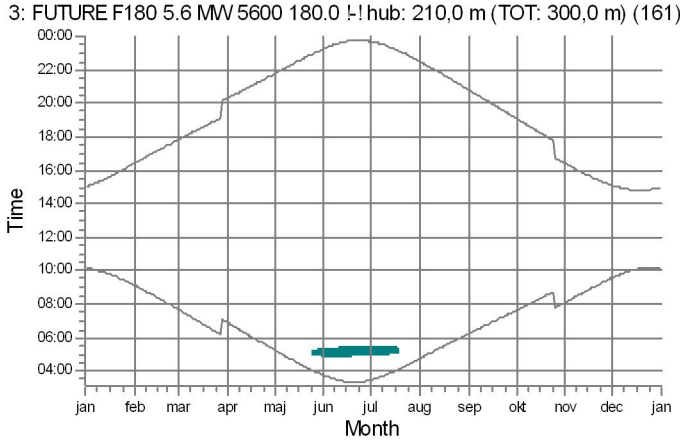
1: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (156)



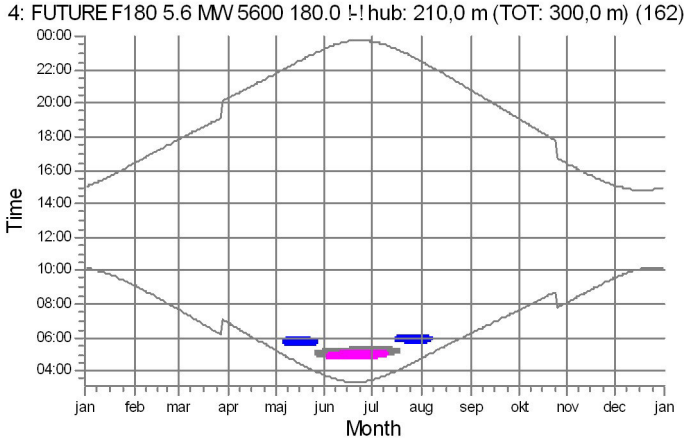
2: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (160)



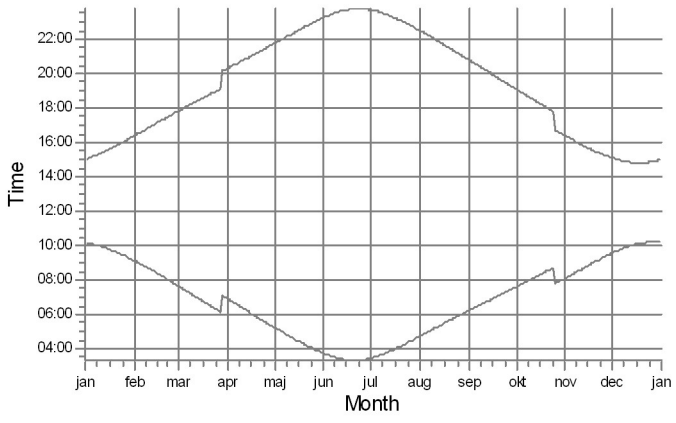
3: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (161)



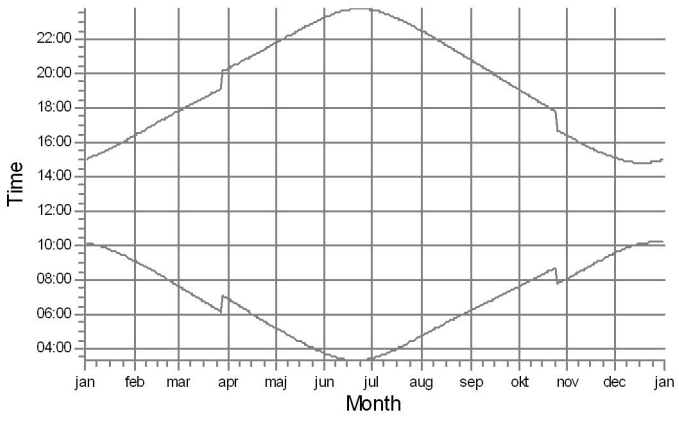
4: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (162)



5: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (155)



6: FUTURE F180 5.6 MW 5600 180.0 ⊦! hub: 210,0 m (TOT: 300,0 m) (158)



Shadow receptors

RH01: RH01
RH02: RH02
RH03: RH03
RH04: RH04
RH05: RH05
RH08: RH08
RH09: RH09

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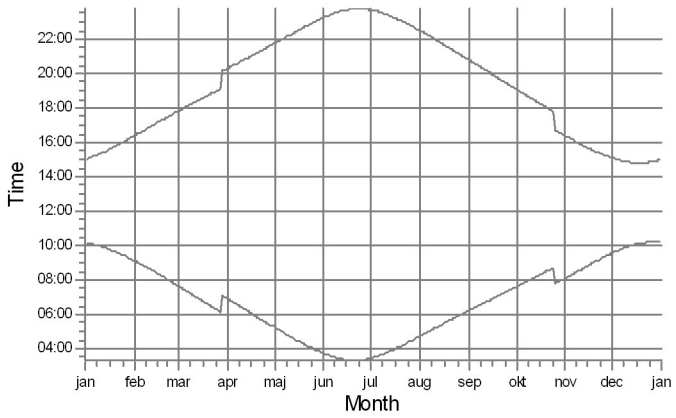
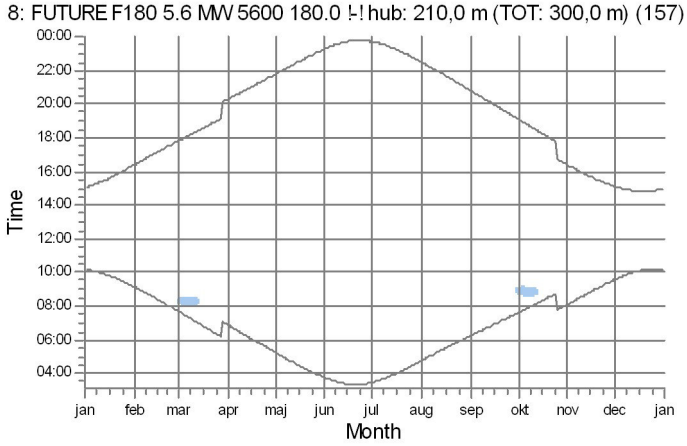
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

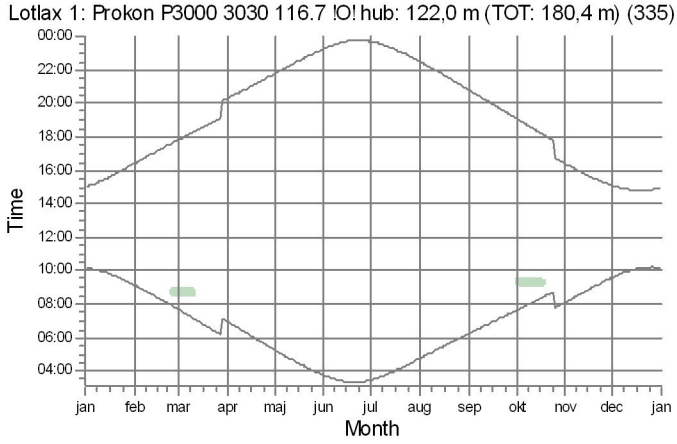
7: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (159)



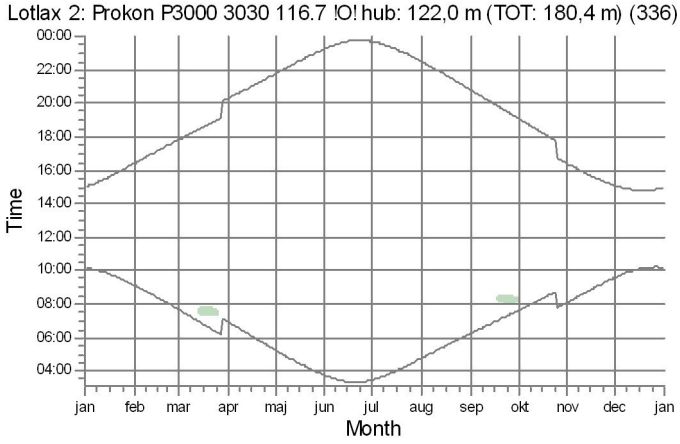
8: FUTURE F180 5.6 MW 5600 180.0 !-! hub: 210,0 m (TOT: 300,0 m) (157)



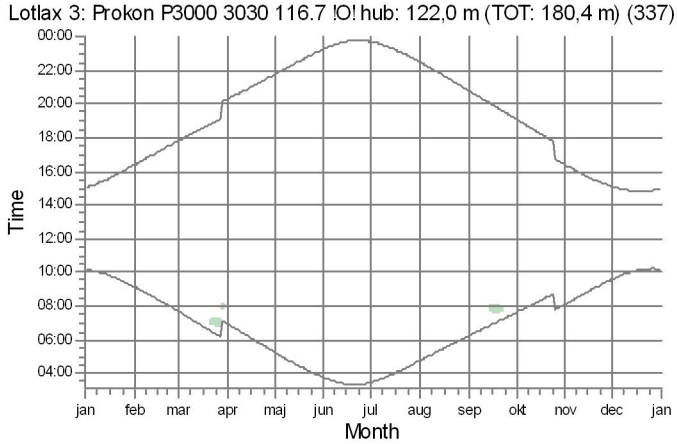
Lotlax 1: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (335)



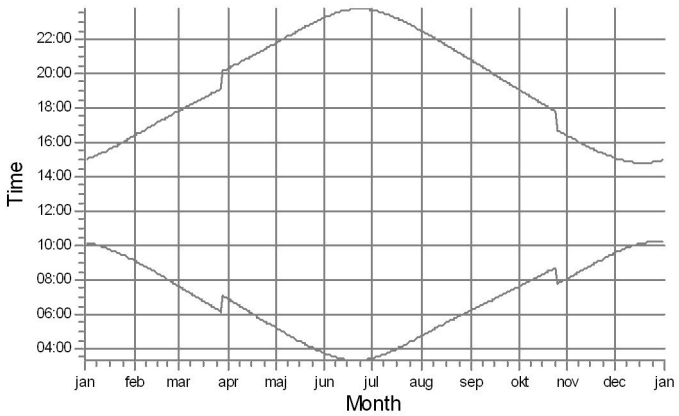
Lotlax 2: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (336)



Lotlax 3: Prokon P3000 3030 116.7 !O! hub: 122,0 m (TOT: 180,4 m) (337)



Lålax 1: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



Shadow receptors

RH12: RH12

RH13: RH13

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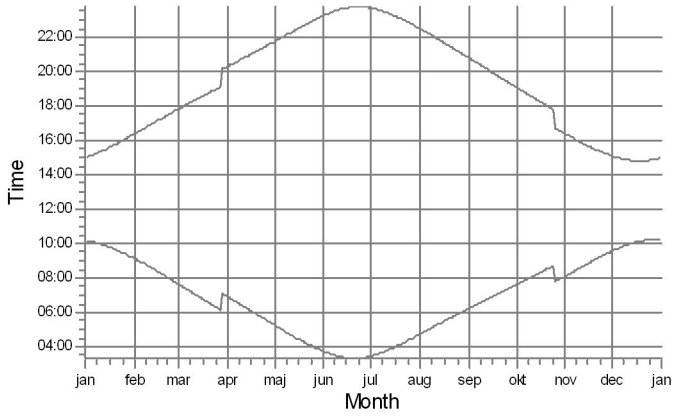
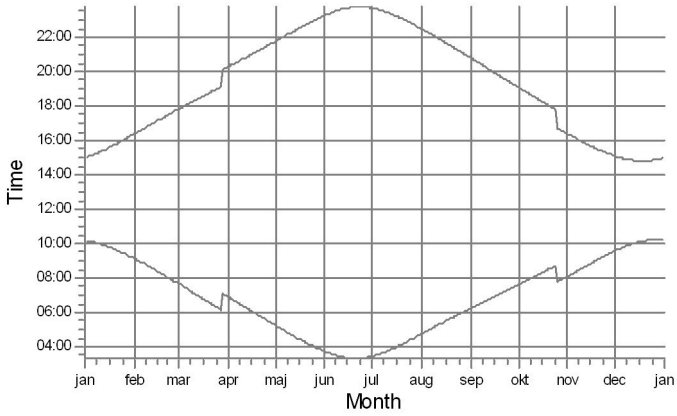
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

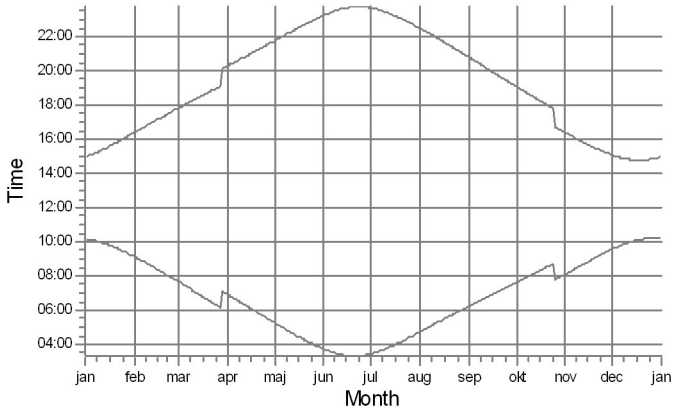
Lålax 2: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



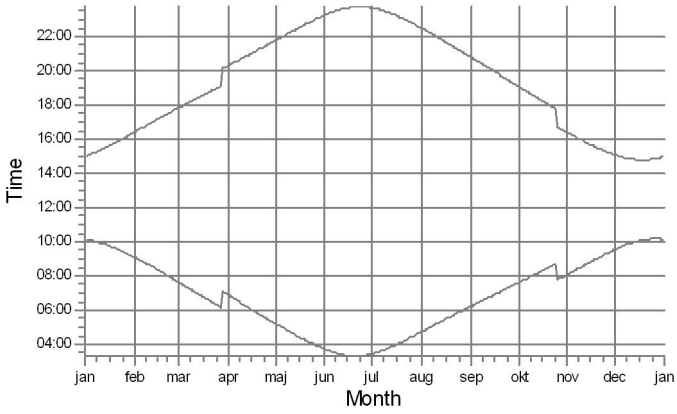
Lålax 3: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



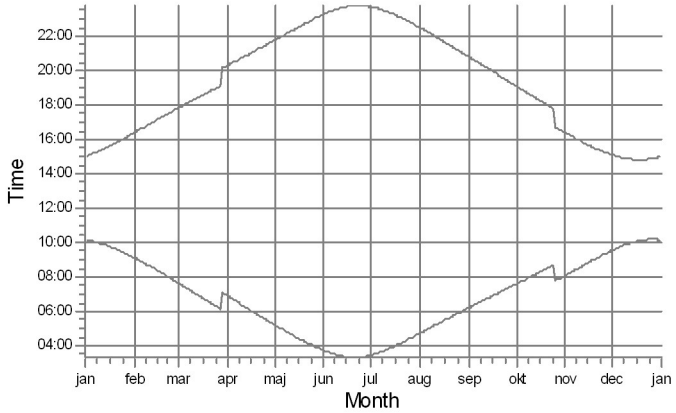
Lålax 4: VESTAS V150-4.2 4200 150.0 !O! hub: 140,0 m (TOT: 215,0 m) (3



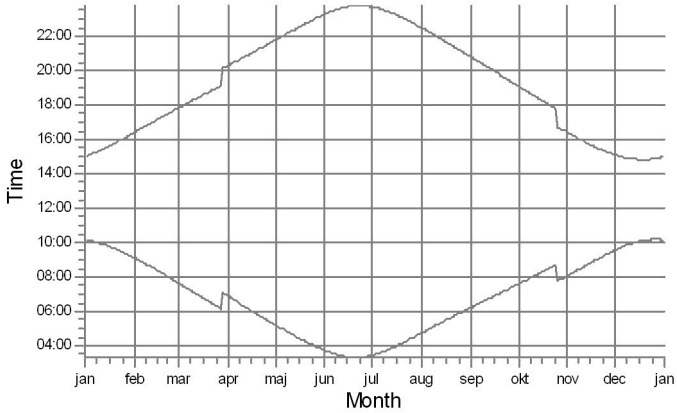
Märkenkall 01: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 02: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 03: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Shadow receptors

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Calculated:
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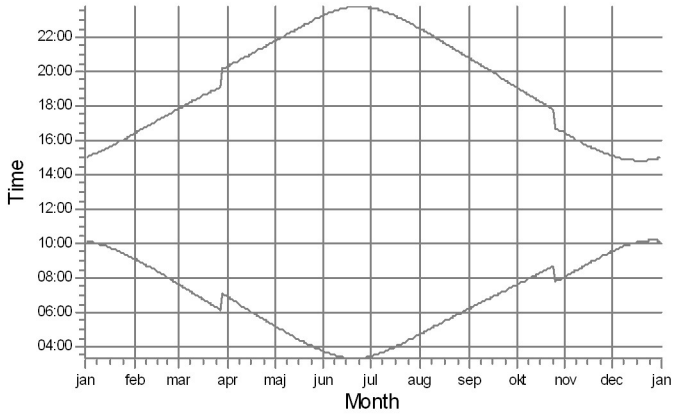
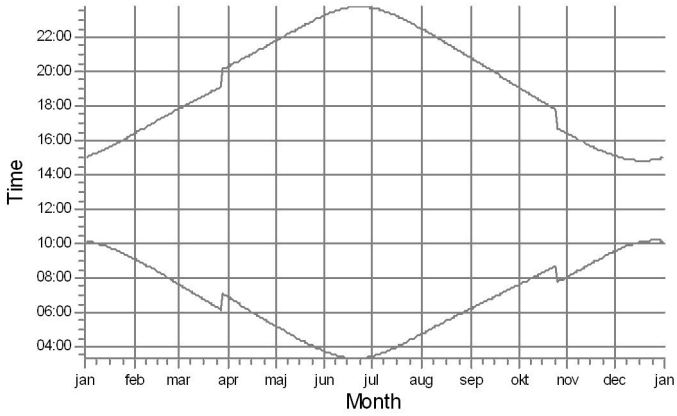
SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

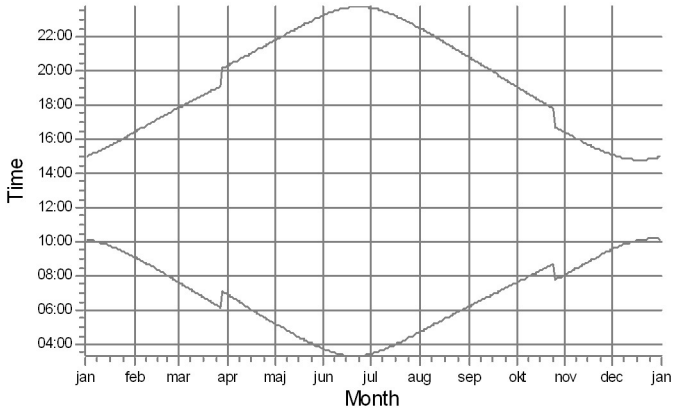
Märkenkall 04: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 05: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 06: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



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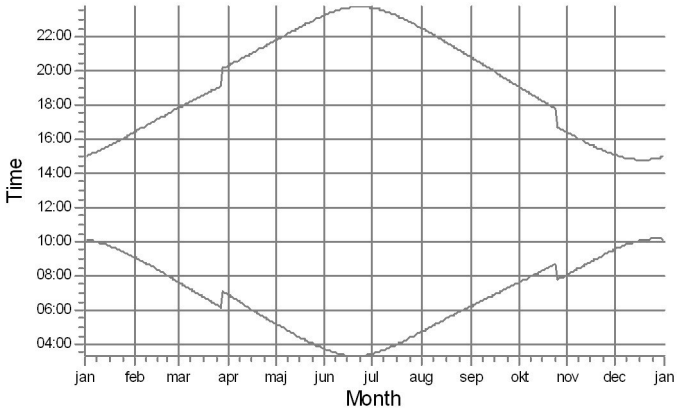

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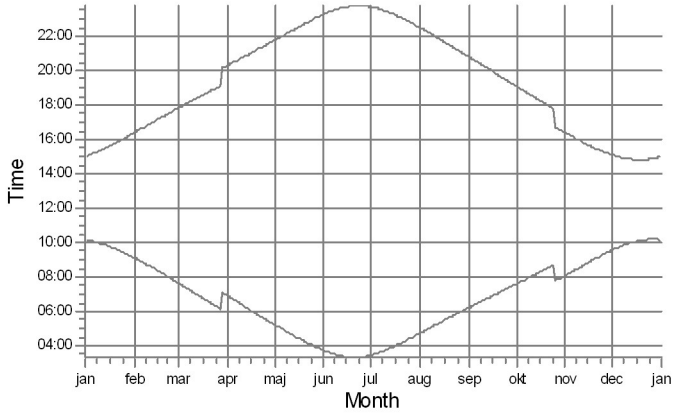
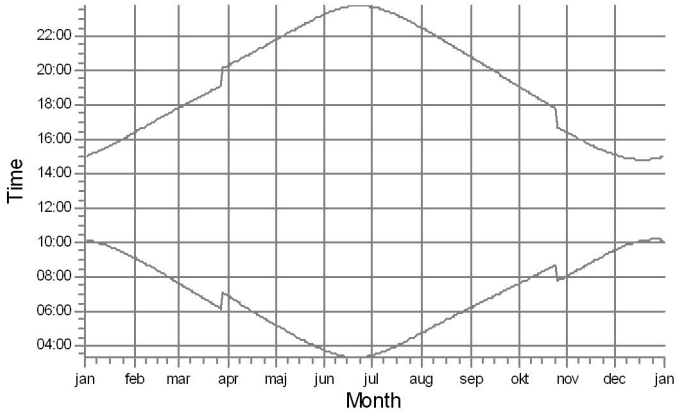


Märkenkall 09: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Shadow receptors

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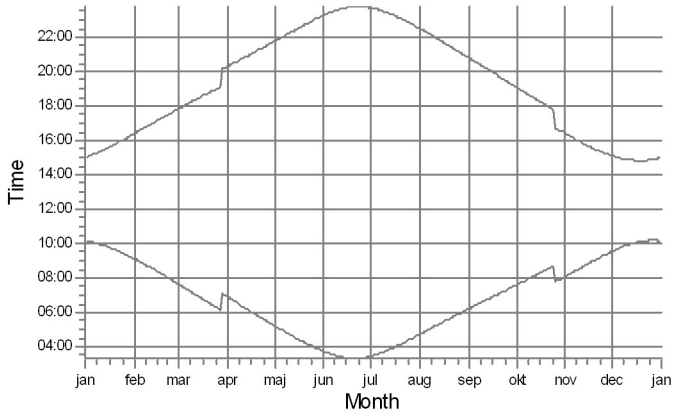
Anders Stenberg / a.stenberg@wpd.fi
Calculated:
20.8.2021 14:34/3.3.247

SHADOW - Calendar per WTG, graphical

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)

Märkenkall 10: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



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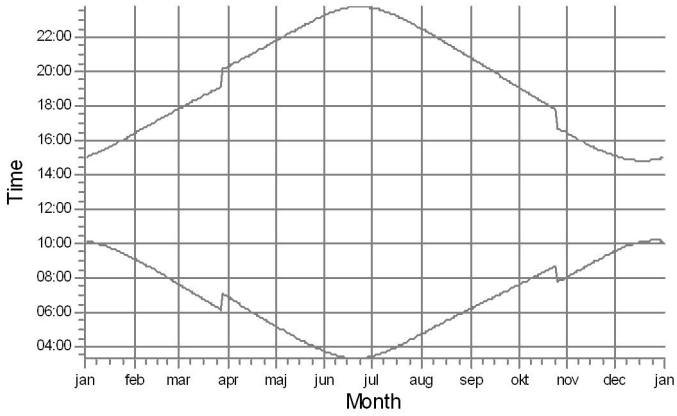
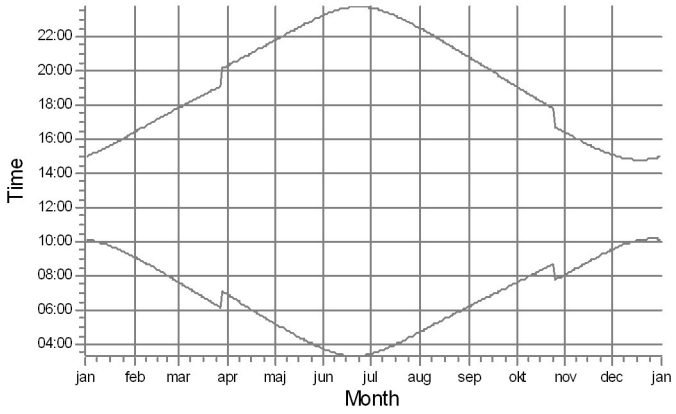


Märkenkall 12: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



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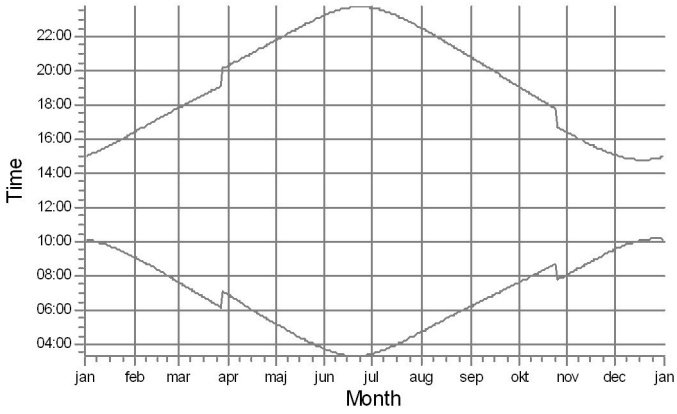
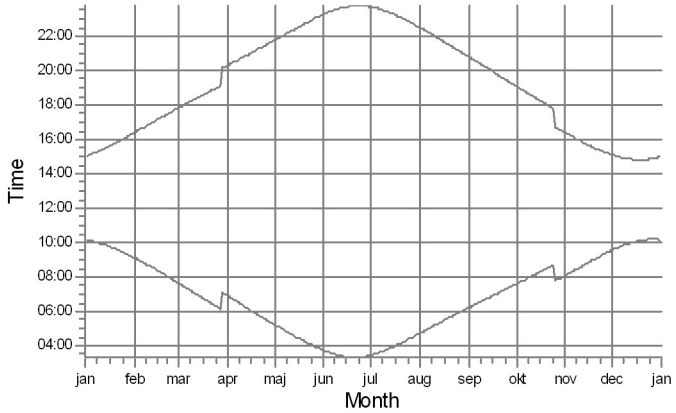
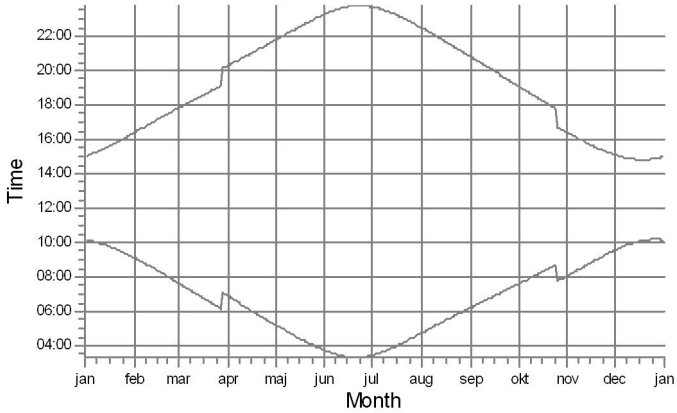


Märkenkall 14: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Märkenkall 15: GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O! hub:



Shadow receptors

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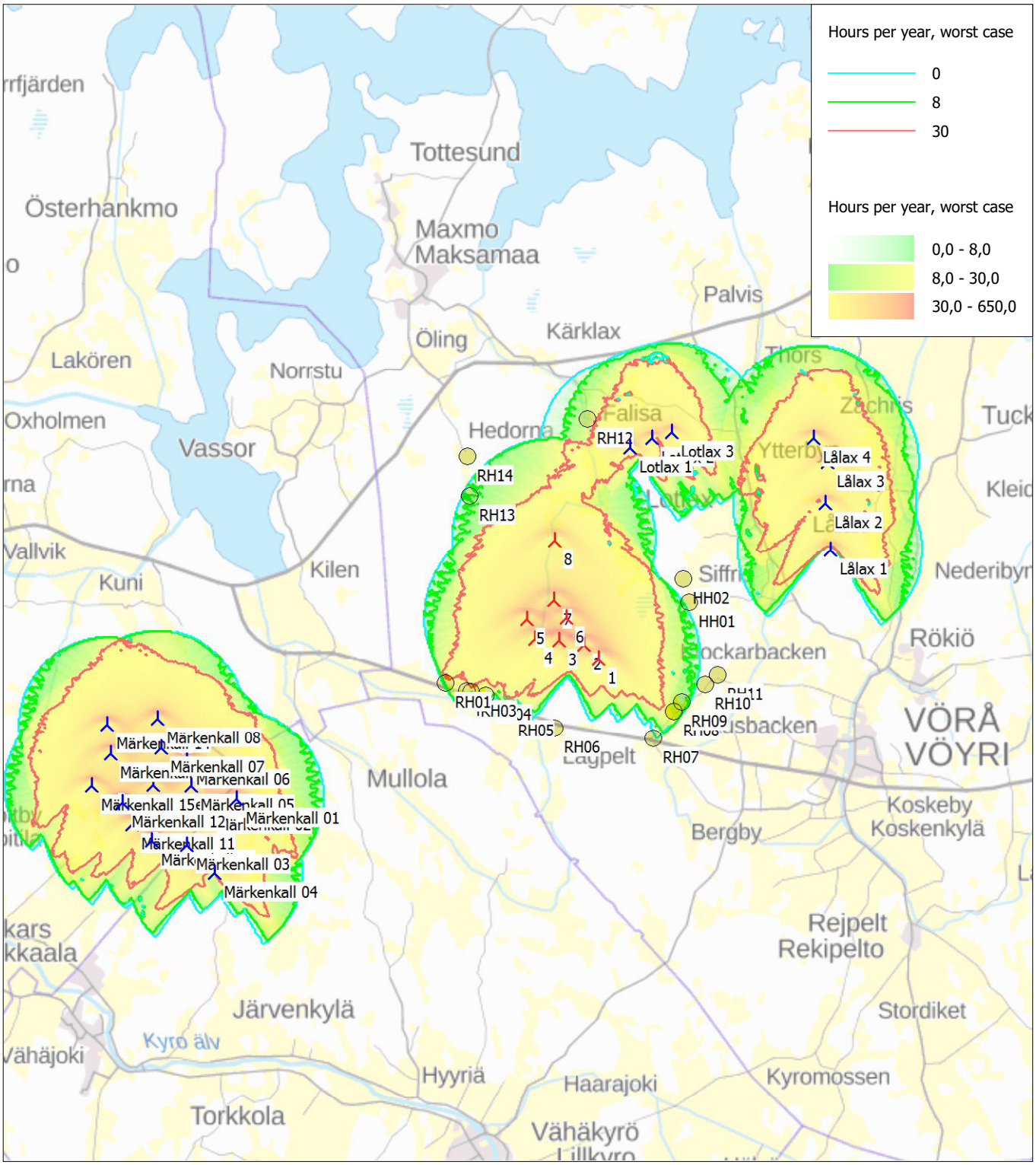
Anders Stenberg / a.stenberg@wpd.fi
Calculated:
20.8.2021 14:34/3.3.247

SHADOW - Map

Calculation: MP Proposal, 8xF180 @210m, Worst case - cumulative impact (permitted WTG types)



Map: Söde_Background map_160k , Print scale 1:120 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 252 600 North: 7 011 960

New WTG Shadow receptor

Flicker map level: DEM 10m