PROGETTO PER LA REALIZZAZIONE DI UN IMPIANTO PER LA PRODUZIONE DI ENERGIA MEDIANTE LO SFRUTTAMENTO DEL VENTO NEI TERRITORI COMUNALI DI CUPELLO, FURCI, MONTEODORISIO, SCERNI, GISSI E ATESSA(CH) LOC. COLLECHIESI POTENZA NOMINALE 40,5 MW

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ES.6 Analisi dell'evoluzione dell'ombra indotta dagli aereogeneratori - Shadow flickering

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INDICE

1. INTRODUZIONE 2
2. STUDIO DELL'EVOLUZIONE DELL'OMBRA GIORNALIERA GENERATA DAGLI AEROGENERATORI . 3
3. INDIVIDUAZIONE DEI RECETTORI ED IPOTESI DI CALCOLO 4
4. I RISULTATI DEL CALCOLO DELL'EVOLUZIONE DELL'OMBRA 8
5. CONCLUSIONI E RACCOMANDAZIONI 9
6. ELENCO ALLEGATI 9

INDICE FIGURE

Figura 1: Planimetria dell'impianto 2
Figura 2: Evoluzione annuale tipo dell'ombra di una pala 4
Figura 3 -Indicazione dei recettori su igm 6

INDICE TABELLE

TAB. 1 – COORDINATE AEROGENERATORI **2**
TAB. 2 – COORDINATE RECETTORI **5**
TAB. 3 –DISTANZE DELLE TURBINE DAI RECETTORI PIÙ PROSSIMI **7**

1. INTRODUZIONE

Il presente elaborato ha lo scopo di valutare in maniera tecnica l'eventuale impatto generato dall'evoluzione dell'ombra derivante dalla futura installazione di un impianto di produzione di energia da fonte eolica in territorio extra urbano del comune di Cupello, Scerni, Furci, Monteodorisio, Gissi e Atessa (CH). Il progetto è composto da n°9 aerogeneratori del tipo IEC 3B - 150, con potenza unitaria pari a 4.5 MW, altezza al mozzo pari a 150 e diametro rotorico pari a 163.

In particolare, la posizione degli aerogeneratori è la seguente:

WTG	COORDINATE WGS 84 33N	
	EST	NORD
Ate1	462835.70	4658580.99
Gis1	463327.61	4658676.82
Sce1	465766.39	4657860.63
Sce2	465667.15	4658632.52
Sce3	464534.61	4657867.46
Mod1	468686.29	4657639.83
Cup1	470118.74	4656808.37
Cup2	472019.40	4655484.00
Fur1	466333.77	4654002.16

Tab. 1 – Coordinate aerogeneratori

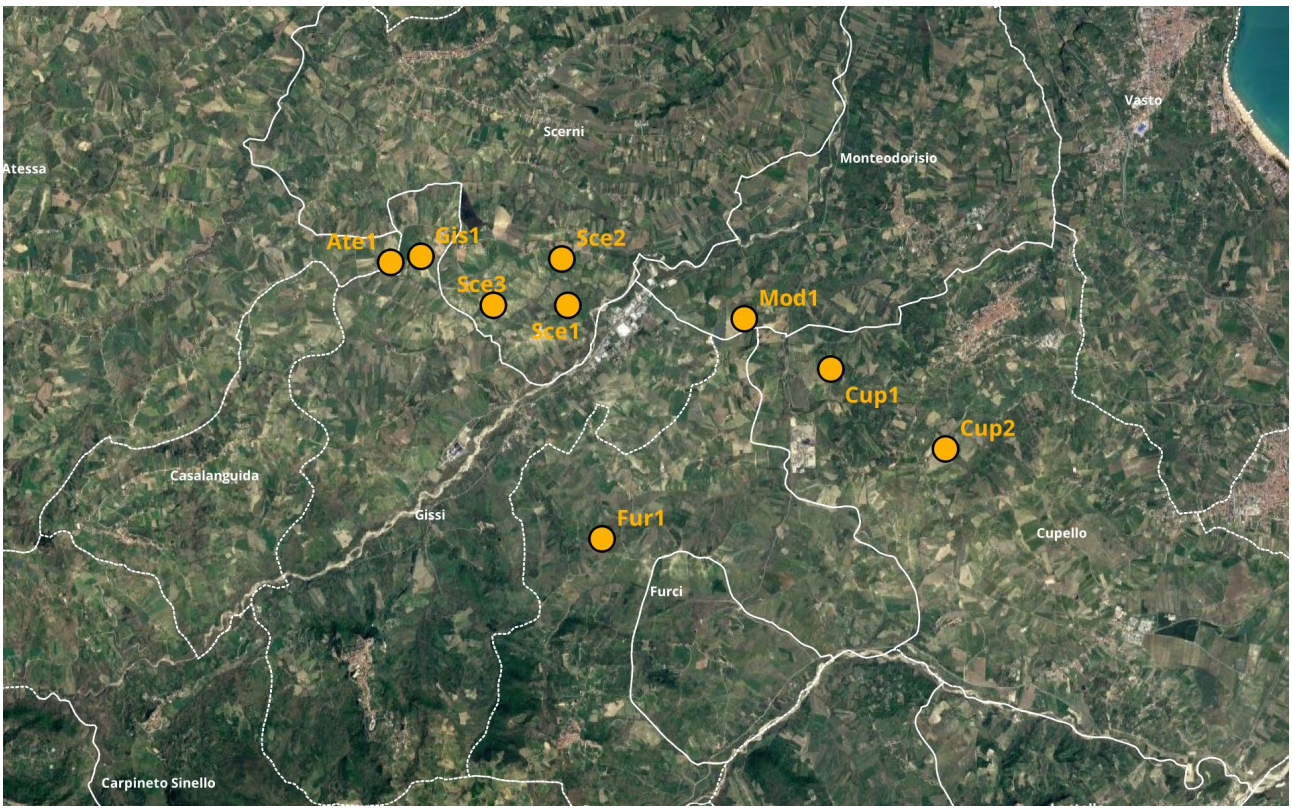

Figura 1: Planimetria dell'impianto

Lo Shadow-Flickering è l'espressione comunemente impiegata in ambito specialistico per descrivere l'effetto stroboscopico delle ombre proiettate dalle pale rotanti degli aerogeneratori eolici quando sussistono le condizioni meteorologiche opportune; infatti la possibilità e la durata di tali effetti dipendono da una serie di condizioni ambientali, tra cui: la posizione del sole, l'ora del giorno, il giorno dell'anno, le condizioni atmosferiche ambientali e la posizione della turbina eolica rispetto ad un recettore sensibile. La valutazione

tecnica è eseguita con l'ausilio di un software di simulazione specifico per la progettazione degli impianti eolici WIND PRO®, costituito da un insieme di moduli di elaborazione orientati alla simulazione di una serie di aspetti che caratterizzano le diverse fasi progettuali. Il modulo SHADOW è quello specifico per la valutazione dell'evoluzione dell'ombra e del flickering. In tale report è riportata:

- *La descrizione del caso studio con le posizioni delle turbine e loro caratteristiche tecniche*
- *Una breve descrizione tecnica del fenomeno di shadow flickering*
- *La descrizione dei recettori soggetti al fenomeno per i quali è stata richiesta questa analisi*
- *Sintesi della metodologia di analisi seguita per lo studio*
- *Sintesi dei risultati ottenuti, con allegati grafici ed analitici di dettaglio che descrivono il fenomeno su ognuno dei recettori e da parte di ognuna delle turbine per tutto l'anno solare.*

2. STUDIO DELL'EVOLUZIONE DELL'OMBRA GIORNALIERA GENERATA DAGLI AEROGENERATORI

Le turbine eoliche, come altre strutture fortemente sviluppate in altezza, proiettano un'ombra sulle aree adiacenti in presenza della luce solare diretta. Per chi vive in tali zone prossime all'insediamento eolico può essere molto fastidioso il cosiddetto fenomeno del "flicker" che consiste in un effetto di lampeggiamento che si verifica quando le pale del rotore in movimento "tagliano" la luce solare in maniera intermittente. Una progettazione attenta a questa problematica permette di evitare questo spiacevole fenomeno semplicemente prevedendo il luogo di incidenza dell'ombra e disponendo le turbine in maniera tale che l'ombra sulle zone sensibili non superi un certo numero di ore all'anno. Il grafico in Figura 2 riporta l'evoluzione annuale dell'ombra di una turbina considerando il caso peggiore di pale sempre in rotazione intorno al mozzo, e orientate sempre ortogonalmente al sole durante la sua evoluzione giornaliera.

Come è evidente dal grafico e dalla legenda le ore annue di ombra sono sempre minori con l'aumentare della distanza dal pilone secondo una particolare geometria dettata dalla posizione geografica; da osservare che l'ombra arriva a proiettarsi anche sino ad una distanza di 1 km, anche se solo per pochi minuti all'anno.

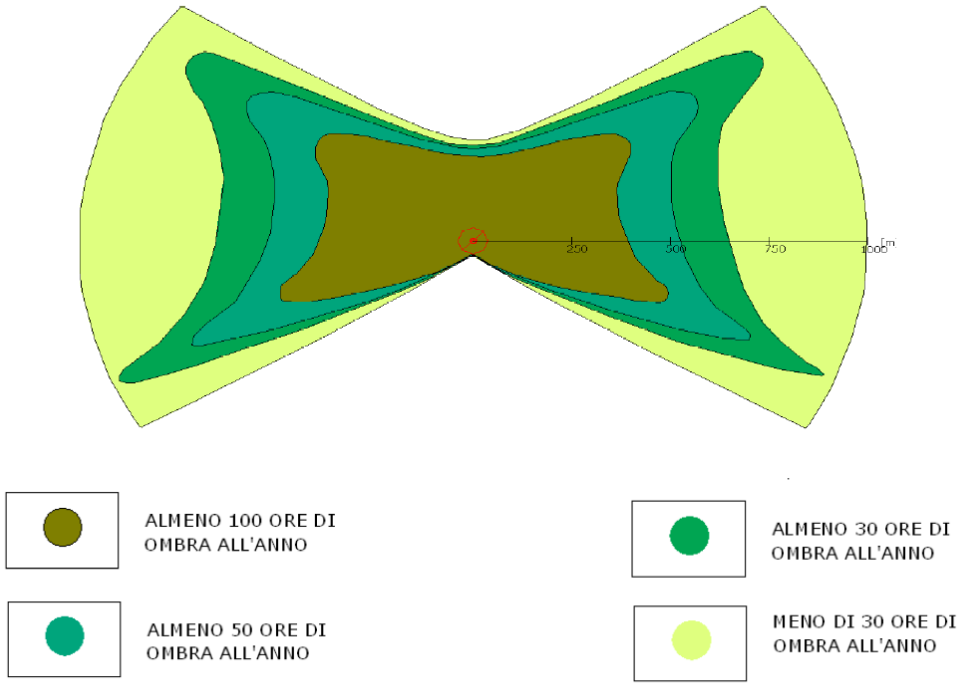

Figura 2: Evoluzione annuale tipo dell'ombra di una pala

Considerati i pochi precedenti esistenti (Germania) e le ipotesi così penalizzanti con cui è stato calcolato tale grafico si è ritenuto opportuno effettuare una sovrapposizione sull'impianto della parte più interna del grafico ovvero dell'area **che supera le 100 ore all'anno di ombra dei punti di installazione, intendendo questo come limite da non superarsi.**

In Italia, così come nella maggior parte dei paesi Europei ed extraeuropei non esiste una normativa specifica relativa al disturbo generato dal fenomeno di Shadow – Flickering. Esistono delle regolamentazioni locali ma quasi mai comprendono limiti numerici specifici, quanto piuttosto delle raccomandazioni tese a sottolineare che il fenomeno non sia “unreasonable” o “significant”.

3. INDIVIDUAZIONE DEI RECETTORI ED IPOTESI DI CALCOLO

3.1 Individuazione dei ricettori

Il progetto in esame nei comuni di Cupello, Scerni, Furci, Monteodorisio, Gissi e Atessa (CH) prevede l’istallazione di 9 aerogeneratori.

L’analisi di shadow-flickering di cui al presente studio è scaturita da una attività di censimento nell’area del parco eolico in progetto così come descritto nell’elaborato ES.8.1 Individuazione recettori.

Da tale studio ne è derivato che i recettori da considerare effettivamente sensibili sono esterni all’intorno di 500 m (distanza pari a 2,5 volte l’altezza complessiva) dall’asse di ciascun aerogeneratore. Ad ogni modo si è ritenuto opportuno procedere con l’analisi.

L’analisi è stata elaborata per specifici 36 recettori che circondano l’impianto per i quali è stata stabilita l’abitabilità.

Codifica WindPro	Denominazione manufatto	Coordinate geografiche UTM WGS84 33N		Z [m]
		Est	Nord	
A	1	462374	4658898	284.8
B	2	462475	4658946	282.7
C	3	462489	4658998	280.6
D	4	462578	4659017	278.0
E	5	462750	4659023	277.0
F	7	462812	4659090	273.0
G	8	462830	4659067	272.6
H	13	463002	4659173	261.8
I	14	463182	4659206	266.2
J	15	463737	4659076	272.3
K	16	463696	4659070	280.8
L	18	463797	4659037	263.0
M	19	463788	4659006	261.5
N	20	463799	4658992	258.2
O	21	463861	4659015	251.1
P	22	463904	4658850	276.9
Q	24	462605	4658097	266.9
R	25	462920	4657987	253.6
S	26	462491	4658094	271.7
T	27	462250	4658508	275.5
U	30	464064	4658206	271.3
V	35	465818	4659093	200.8
W	36	465784	4659097	201.9
X	40	465941	4659085	193.8
Y	41	466003	4659055	194.2
Z	46	465100	4658787	236.7
AA	47	465057	4658794	238.4
AB	48	465010	4658798	240.4
AC	49	465027	4658755	240.2
AD	51	465890	4654006	276.2
AE	58	471588	4655204	356.9
AF	59	471632	4655217	352.6
AG	60	471665	4655148	339.8
AH	67	470052	4657271	209.9
AI	69	468283	4657819	241.5
AJ	71	468695	4657030	225.8
AK	72	468841	4658116	203.6

Tab. 2 – Coordinate recettori

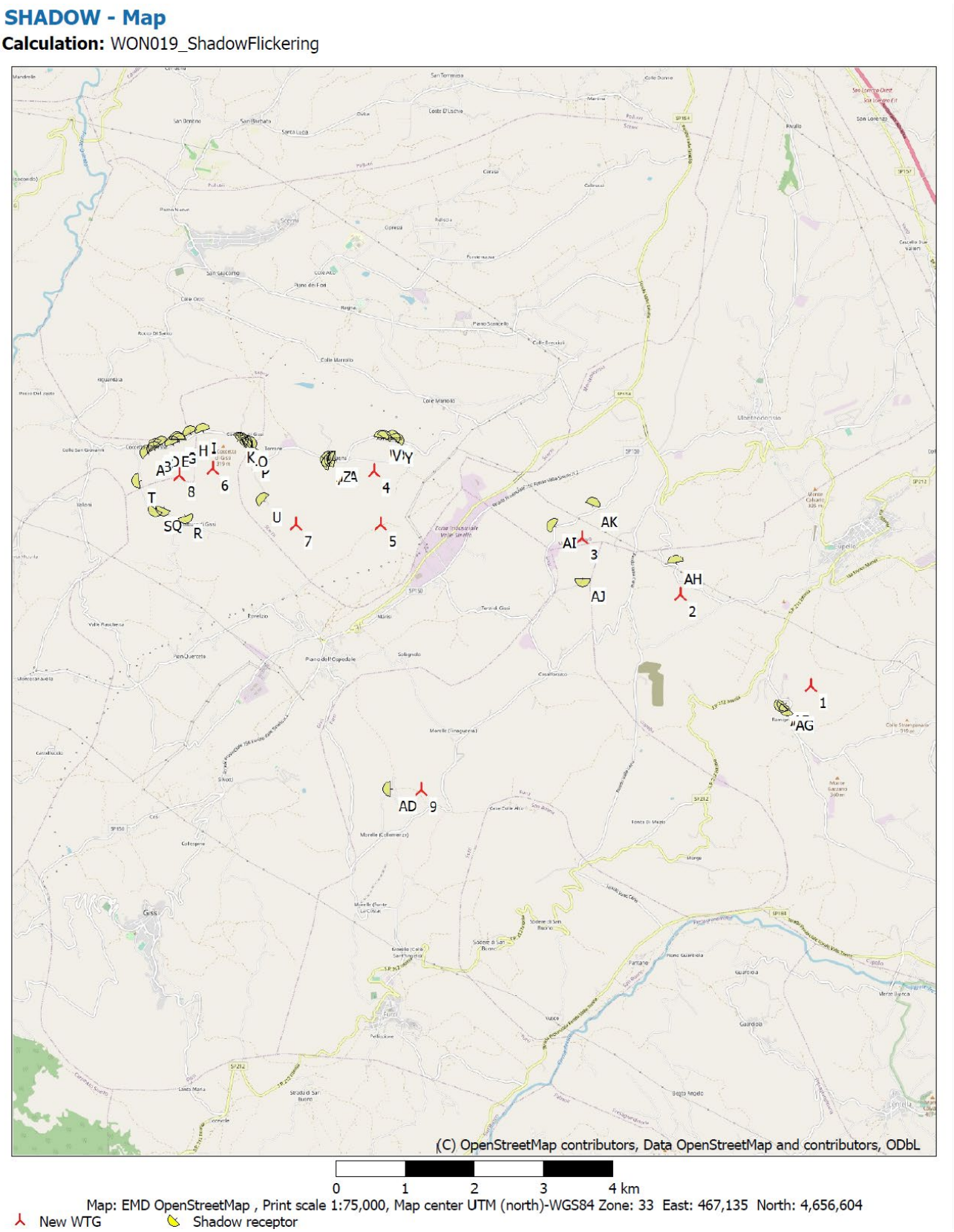

Figura 3 -Indicazione dei recettori

Nella tabella a seguire sono riportate le distanze minime intercorrenti tra recettori in oggetto e l'aerogeneratore più prossimo.

Codifica WindPro	Denominazione manufatto	Distanza WTG più vicina [m]	WTG più vicina	Codifica WindPro
A	1	560	Ate1	8
B	2	513	Ate1	8
C	3	542	Ate1	8
D	4	506	Ate1	8
E	5	450	Ate1	8
F	7	509	Ate1	8
G	8	486	Ate1	8
H	13	593	Gis1	6
I	14	549	Gis1	6
J	15	571	Gis1	6
K	16	526	Gis1	6
L	18	591	Gis1	6
M	19	566	Gis1	6
N	20	567	Gis1	6
O	21	631	Gis1	6
P	22	602	Gis1	6
Q	24	535	Ate1	8
R	25	599	Ate1	8
S	26	597	Ate1	8
T	27	590	Ate1	8
U	30	579	Sce3	7
V	35	485	Sce2	4
W	36	479	Sce2	4
X	40	525	Sce2	4
Y	41	539	Sce2	4
Z	46	588	Sce2	4
AA	47	630	Sce2	4
AB	48	678	Sce2	4
AC	49	651	Sce2	4
AD	51	444	Fur1	9
AE	58	530	Cup2	1
AF	59	470	Cup2	1
AG	60	488	Cup2	1
AH	67	467	Cup1	2
AI	69	441	Mod1	3
AJ	71	610	Mod1	3
AK	72	500	Mod1	3

Tab. 3 –Distanze delle turbine dai recettori più prossimi

In relazione a ciò, si fa presente che già in fase di scelta delle aree sulle quali ubicare l'impianto si è cercato di allontanarsi il più possibile dall'area urbana e dalle abitazioni ed edifici ritenuti sensibili.

Tale fascia è stata definita in fase di progetto al fine di garantire il rispetto dei limiti in merito non solo all'ombreggiamento ma anche agli impatti acustici, elettromagnetici e in termini di calcolo della gittata.

Lo studio, i cui risultati in dettaglio sono riportati di seguito, è stato condotto con uno specifico software

(WindPRO).

Nello studio ci si è posti nella condizione più sfavorevole possibile, in quanto si è considerato che:

- il sole risplende per tutta la giornata dall'alba al tramonto (cioè si è sempre in assenza di copertura nuvolosa);
- il piano di rotazione delle pale è sempre perpendicolare alla linea che passa per il sole e per l'aerogeneratore (l'aerogeneratore "insegue" il sole);
- l'aerogeneratore è sempre operativo.

Allo stesso tempo, si è trascurata la presenza degli alberi e di altri ostacoli che bordano le strade "intercettando" l'ombra degli aerogeneratori riducendo il fastidio del flickering.

Ciò significa che i risultati ai quali si perverrà sono ampiamente cautelativi.

3.2 Base dati e parametri di calcolo

In base alla metodologia descritta nei paragrafi precedenti, sono stati utilizzati i seguenti dati di input per impostare il modello di simulazione per la valutazione del fenomeno di Shadow-Flickering degli aerogeneratori di progetto:

a) **Il DTM o Modello del terreno digitale** per caratterizzare l'orografica è stato estrapolato dal grid disponibile in download dal SIT della Regione Puglia, georeferenziato, sovrapposto, confrontato e adeguato con le curve di livello presenti sulla cartografia ufficiale CTR 1:5.000 con uno step di 5 m. Il modello digitale ottenuto copre un'area sufficiente ad inglobare l'area del parco eolico di progetto e trova una buon riscontro con l'andamento orografico verificato in sito.

b) **Posizioni geografiche di recettori con dettaglio dimensionale delle aree più esposte.** Sono i ricettori individuati dallo studio acustico e classificati secondo la loro abitabilità e destinazione d'uso. Per tutti i ricettori si è ritenuto opportuno usare l'ipotesi di cautela della modalità "green house mode". Questa scelta è stata operata poiché in talune circostanze anche lo spazio antistante le strutture può essere considerato o adibito a luogo di riposo e relax. La scelta di una singola finestra o di una facciata in alcune condizioni potrebbe risultare riduttiva allo scopo di una vera valutazione d'impatto.

c) Posizioni geografiche delle turbine eoliche e loro caratteristiche dimensionali

Gli aerogeneratori di progetto con le loro caratteristiche dimensionali e tecnologiche

d) Nessun ostacolo naturale o artificiale è stato modellato.

4. I RISULTATI DEL CALCOLO DELL'EVOLUZIONE DELL'OMBRA

Nella procedura "Worst case" il fenomeno di shadow/flickering viene calcolato non tenendo conto delle condizioni di soleggiamento del sito e del vento, dati che allo stato dell'arte per il sito in questione non sono disponibili. Invece se avessimo di dati di cui sopra potremmo calcolare il fenomeno di shadow/flickering con la metodologia ("real case"), che secondo altri casi simili comporterebbe la riduzione del fenomeno ad 1/3 dei valori, il quale seppur più realistico, è comunque sovrastimato poiché non tiene conto della presenza di nubi e di vegetazione ad alto fusto. Dalle simulazioni effettuate, si evince che gli aerogeneratori di progetto generano maggiormente il fenomeno di shadow/flickering sul recettore "k" individuato nell'analisi che, nelle ipotesi di "Worst case", subisce il fenomeno per un periodo che si avvicina o supera di poco le 100 ore/anno, per tutti gli

altri rimanenti recettori considerati invece, l'effetto calcolato è più modesto e/o comunque meno rilevante fino a divenire irrilevante e in alcuni casi nullo.

Con le considerazioni di cui sopra, ovvero prevedendo la riduzione ad 1/3 si avranno valori sicuramente più ridotti per i ricettori con k= 33 ore/anno e comunque sono abitati meno di 4 ore giorno e quindi la probabilità di accadimento si riduce quasi al nulla.

È stato elaborato un calendario dell'ombra riportato in appendice (rif. Appendice Calendar), che riporta in maniera grafica giorno per giorno, per tutto l'anno, la durata giornaliera del fenomeno, l'orario di inizio e di fine del fenomeno, nelle condizioni di caso reale. Dalla lettura del "Calendar" si legge che il fenomeno dell'ombreggiamento, si esplica sui recettori con intensità maggiore nel periodo compreso tra Gennaio, Marzo, Aprile, Settembre, Novembre e Dicembre nelle prime ore della giornata, oppure al primo pomeriggio. Nella figura che segue è riportato a titolo di esempio il grafico "calendar" di un recettore: le macchie individuano i momenti di shadow, la posizione nel grafico individua tempo e durata del fenomeno, il colore della macchia individua la turbina che causa il fenomeno.

L'allegato 2 riporta il dettaglio analitico di quanto espresso dal grafico precedente con gli specifici orari di inizio e di fine del fenomeno. A seguire è altresì riportata la sintesi grafica annuale (come mostra l'immagine precedente) dell'apporto di ombreggiamento a carico di ogni recettore ed il/gli aerogeneratore/i responsabile/i del fenomeno.

È stata inoltre elaborata una mappa (report Map, Allegato 3) in cui vengono riportate, con diverse gradazioni di colore, le zone soggette ad una determinata durata del fenomeno dell'ombreggiamento oltre all'estensione areale nella quale il fenomeno risulta significativo.

Il fenomeno dell'ombreggiamento interessa marginalmente tratti di strade comunali e/o private per un numero di ore all'anno del tutto irrilevanti e cioè pari ad un massimo di 30 ore/anno, ma solo in alcuni tratti. Preme tuttavia evidenziare che nelle simulazioni non si è tenuto conto della possibile presenza di vegetazione capace di offrire un effetto "barriera" ai recettori e/o alle strade limitrofe. Inoltre, la percezione dell'impianto dalla strada risulterebbe essere "in movimento" e quindi legata alla breve permanenza delle automobili in transito, per cui il fastidio indotto sarebbe temporalmente limitato. A questo si aggiunge che le simulazioni sono state effettuate assumendo le "condizioni peggiori", sovrastimando pertanto l'effetto di flickering.

5. CONCLUSIONI E RACCOMANDAZIONI

In conclusione, si può affermare che i risultati ottenuti dell'elaborazione evidenziano, pur considerando le condizioni più sfavorevoli, che le turbine di progetto generano effetti di shadow flickering **i cui impatti risultano essere nulli per molte strutture, e piuttosto modesti (o non particolarmente problematici) per altre.**

In ogni caso è comunque da rimarcare l'effetto di sovrastima dovuto al grado di cautela utilizzato per la simulazione che non tiene in conto di tutte le possibili fonti di attenuazione dell'effetto cui ogni recettore è (o può essere) soggetto quali presenza di alberi, ostacoli, siepi e quant'altro possa attenuare il fenomeno dell'evoluzione giornaliera dell'ombra.

6. ELENCO ALLEGATI

1. Main result: quadro sintetico dei risultati di calcolo;
2. Calendar: analisi giornaliera dell'effetto "flickering" ricevuto da ogni recettore;

3. Calendar, graphical: grafico dell'analisi giornaliera dell'effetto "flickering" ricevuto da ogni recettore;
4. Calendar per WTG: analisi giornaliera dell'effetto "flickering" indotto da ogni aerogeneratore sui recettori;
5. Calendar per WTG, graphical: grafico dell'analisi giornaliera dell'effetto "flickering indotto da ogni aerogeneratore sui recettori;
6. Map: mappa dei recettori.

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15/02/2024 21:59/3.6.377

SHADOW - Main Result

Calculation: WON019_ShadowFlickering

Assumptions for shadow calculations

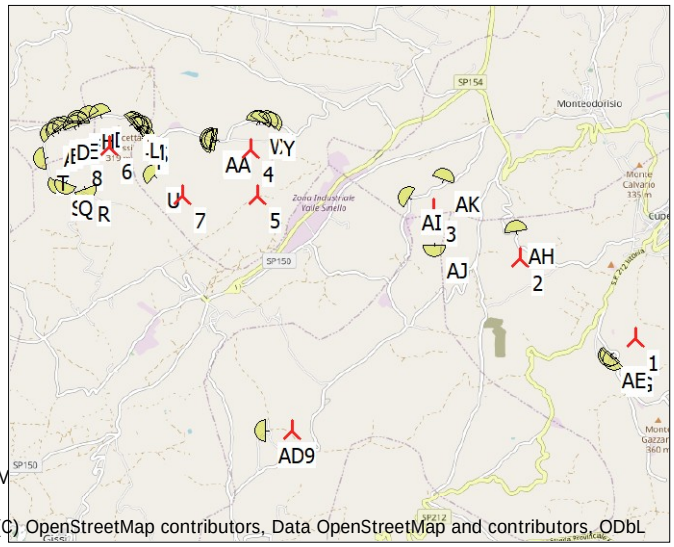
Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

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: Elevation Grid Data Object: WON019_V3_definitivo_EM
Receptor grid resolution: 1.0 m

All coordinates are in
UTM (north)-WGS84 Zone: 33



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:125,000

New WTG Shadow receptor

WTGs

	Easting	Northing	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	472,019	4,655,484	289.2	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
2	470,119	4,656,808	235.1	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
3	468,686	4,657,640	219.4	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
4	465,667	4,658,633	203.6	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
5	465,766	4,657,861	187.8	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
6	463,328	4,658,677	268.7	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
7	464,535	4,657,867	222.2	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
8	462,836	4,658,581	238.1	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-
9	466,334	4,654,002	300.2	VESTAS V163-4.5_h150 4500 ...	Yes	VESTAS	V163-4.5_h150-4,500	4,500	163.0	150.0	2,500	-

Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Degrees from south cw	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]	[°]		[m]
A	462,374	4,658,898	284.8	1.0	1.0	1.0	-50.0	90.0	Fixed direction	2.0
B	462,475	4,658,946	282.7	1.0	1.0	1.0	-30.0	90.0	Fixed direction	2.0
C	462,489	4,658,998	280.6	1.0	1.0	1.0	-40.0	90.0	Fixed direction	2.0
D	462,578	4,659,017	278.0	1.0	1.0	1.0	-30.0	90.0	Fixed direction	2.0
E	462,750	4,659,023	277.0	1.0	1.0	1.0	-20.0	90.0	Fixed direction	2.0
F	462,812	4,659,090	273.0	1.0	1.0	1.0	0.0	90.0	Fixed direction	2.0
G	462,830	4,659,067	272.6	1.0	1.0	1.0	0.0	90.0	Fixed direction	2.0
H	463,002	4,659,173	261.8	1.0	1.0	1.0	-30.0	90.0	Fixed direction	2.0
I	463,182	4,659,206	266.2	1.0	1.0	1.0	-20.0	90.0	Fixed direction	2.0
J	463,737	4,659,076	272.3	1.0	1.0	1.0	50.0	90.0	Fixed direction	2.0
K	463,696	4,659,070	280.8	1.0	1.0	1.0	50.0	90.0	Fixed direction	2.0
L	463,797	4,659,037	263.0	1.0	1.0	1.0	50.0	90.0	Fixed direction	2.0
M	463,788	4,659,006	261.5	1.0	1.0	1.0	60.0	90.0	Fixed direction	2.0
N	463,799	4,658,992	258.2	1.0	1.0	1.0	60.0	90.0	Fixed direction	2.0
O	463,861	4,659,015	251.1	1.0	1.0	1.0	50.0	90.0	Fixed direction	2.0
P	463,904	4,658,850	276.9	1.0	1.0	1.0	60.0	90.0	Fixed direction	2.0
Q	462,605	4,658,097	266.9	1.0	1.0	1.0	-160.0	90.0	Fixed direction	2.0
R	462,920	4,657,987	253.6	1.0	1.0	1.0	160.0	90.0	Fixed direction	2.0
S	462,491	4,658,094	271.7	1.0	1.0	1.0	-150.0	90.0	Fixed direction	2.0
T	462,250	4,658,508	275.5	1.0	1.0	1.0	-100.0	90.0	Fixed direction	2.0
U	464,064	4,658,206	271.3	1.0	1.0	1.0	-50.0	90.0	Fixed direction	2.0
V	465,818	4,659,093	200.8	1.0	1.0	1.0	30.0	90.0	Fixed direction	2.0
W	465,784	4,659,097	201.9	1.0	1.0	1.0	10.0	90.0	Fixed direction	2.0

To be continued on next page...

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SHADOW - Main Result

Calculation: WON019_ShadowFlickering

...continued from previous page

No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Degrees from south cw	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]	[°]		[m]
X	465,941	4,659,085	193.8	1.0	1.0	1.0	40.0	90.0	Fixed direction	2.0
Y	466,003	4,659,055	194.2	1.0	1.0	1.0	40.0	90.0	Fixed direction	2.0
Z	465,100	4,658,787	236.7	1.0	1.0	1.0	-80.0	90.0	Fixed direction	2.0
AA	465,057	4,658,794	238.4	1.0	1.0	1.0	-70.0	90.0	Fixed direction	2.0
AB	465,010	4,658,798	240.4	1.0	1.0	1.0	-80.0	90.0	Fixed direction	2.0
AC	465,027	4,658,755	240.2	1.0	1.0	1.0	-80.0	90.0	Fixed direction	2.0
AD	465,890	4,654,006	276.2	1.0	1.0	1.0	-90.0	90.0	Fixed direction	2.0
AE	471,588	4,655,204	356.9	1.0	1.0	1.0	-140.0	90.0	Fixed direction	2.0
AF	471,632	4,655,217	352.6	1.0	1.0	1.0	-140.0	90.0	Fixed direction	2.0
AG	471,665	4,655,148	339.8	1.0	1.0	1.0	-140.0	90.0	Fixed direction	2.0
AH	470,052	4,657,271	209.9	1.0	1.0	1.0	-10.0	90.0	Fixed direction	2.0
AI	468,283	4,657,819	241.5	1.0	1.0	1.0	-60.0	90.0	Fixed direction	2.0
AJ	468,695	4,657,030	225.8	1.0	1.0	1.0	180.0	90.0	Fixed direction	2.0
AK	468,841	4,658,116	203.6	1.0	1.0	1.0	20.0	90.0	Fixed direction	2.0

Calculation Results

Shadow receptor

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A	143:43	181	1:14
B	149:35	160	1:18
C	114:56	138	1:13
D	89:43	140	1:03
E	66:17	118	0:56
F	101:11	120	1:02
G	105:36	126	1:02
H	67:21	76	1:05
I	6:13	20	0:23
J	141:32	116	1:38
K	146:32	112	1:41
L	120:30	128	1:39
M	113:55	108	1:42
N	106:04	99	1:42
O	87:25	88	1:33
P	70:45	78	1:14
Q	3:11	21	0:13
R	0:00	0	0:00
S	2:23	19	0:11
T	83:25	115	1:04
U	120:33	174	1:08
V	56:00	62	1:08
W	49:53	73	1:04
X	95:14	86	1:31
Y	123:05	104	1:33
Z	66:05	81	1:03
AA	57:55	77	0:59
AB	49:42	71	0:55
AC	53:35	73	0:57
AD	145:27	166	1:19
AE	20:18	50	0:33
AF	10:25	32	0:25
AG	0:00	0	0:00
AH	75:08	72	1:17
AI	120:47	139	1:22
AJ	0:00	0	0:00
AK	61:08	66	1:09

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Main Result

Calculation: WON019_ShadowFlickering

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

No.	Name	Worst case [h/year]
1	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (1)	20:18
2	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (2)	81:12
3	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (3)	175:51
4	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (4)	288:21
5	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (5)	2:23
6	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)	554:20
7	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)	136:36
8	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)	383:26
9	VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (9)	145:27

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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15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: A - Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (1)

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	07:31		07:54 (8)	07:16		07:37 (7)	06:39		06:58 (6)	06:47	06:00	05:29
	16:41	41	08:35 (8)	17:16	71	08:56 (8)	17:51	26	07:24 (6)	19:27	20:00	20:31
2	07:31		07:54 (8)	07:15		07:36 (7)	06:38		06:57 (6)	06:45	05:58	05:29
	16:42	42	08:36 (8)	17:17	72	08:56 (8)	17:53	29	07:26 (6)	19:28	20:01	20:32
3	07:31		07:54 (8)	07:14		07:35 (7)	06:36		06:55 (6)	06:43	05:57	05:29
	16:42	43	08:37 (8)	17:18	73	08:56 (8)	17:54	32	07:27 (6)	19:29	20:02	20:32
4	07:31		07:54 (8)	07:13		07:34 (7)	06:34		06:55 (6)	06:42	05:56	05:28
	16:43	44	08:38 (8)	17:20	73	08:56 (8)	17:55	33	07:28 (6)	19:30	20:04	20:33
5	07:31		07:54 (8)	07:12		07:32 (7)	06:33		06:53 (6)	06:40	05:54	05:28
	16:44	45	08:39 (8)	17:21	74	08:55 (8)	17:56	35	07:28 (6)	19:31	20:05	20:34
6	07:31		07:53 (8)	07:11		07:31 (7)	06:31		06:52 (6)	06:38	05:53	05:27
	16:45	46	08:39 (8)	17:22	73	08:55 (8)	17:57	36	07:28 (6)	19:33	20:06	20:35
7	07:31		07:53 (8)	07:10		07:30 (7)	06:29		06:52 (6)	06:37	05:52	05:27
	16:46	47	08:40 (8)	17:24	73	08:55 (8)	17:59	37	07:29 (6)	19:34	20:07	20:35
8	07:31		07:53 (8)	07:09		07:31 (7)	06:28		06:51 (6)	06:35	05:51	05:27
	16:47	48	08:41 (8)	17:25	67	08:55 (8)	18:00	38	07:29 (6)	19:35	20:08	20:36
9	07:30		07:53 (8)	07:08		07:50 (8)	06:26		06:50 (6)	06:33	05:49	05:27
	16:48	49	08:42 (8)	17:26	65	08:55 (8)	18:01	38	07:28 (6)	19:36	20:09	20:37
10	07:30		07:53 (8)	07:06		07:49 (8)	06:24		06:51 (6)	06:32	05:48	05:26
	16:49	50	08:43 (8)	17:28	65	08:54 (8)	18:02	38	07:29 (6)	19:37	20:10	20:37
11	07:30		07:52 (8)	07:05		07:50 (8)	06:23		06:50 (6)	06:30	05:47	05:26
	16:50	51	08:43 (8)	17:29	64	08:54 (8)	18:03	38	07:28 (6)	19:38	20:11	20:38
12	07:30		07:52 (8)	07:04		07:51 (8)	06:21		06:50 (6)	06:28	05:46	05:26
	16:51	53	08:45 (8)	17:30	62	08:53 (8)	18:04	37	07:27 (6)	19:39	20:12	20:38
13	07:29		07:51 (8)	07:02		07:51 (8)	06:19		06:50 (6)	06:27	05:45	05:26
	16:53	54	08:45 (8)	17:31	61	08:52 (8)	18:06	36	07:26 (6)	19:40	20:13	20:39
14	07:29		07:51 (8)	07:01		07:52 (8)	06:18		06:51 (6)	06:25	05:44	05:26
	16:54	55	08:46 (8)	17:33	59	08:51 (8)	18:07	35	07:26 (6)	19:41	20:14	20:39
15	07:29		07:50 (8)	07:00		07:53 (8)	06:16		06:51 (6)	06:23	05:43	05:26
	16:55	56	08:46 (8)	17:34	58	08:51 (8)	18:08	34	07:25 (6)	19:43	20:15	20:40
16	07:28		07:50 (8)	06:58		07:54 (8)	06:14		06:51 (6)	06:22	05:42	05:26
	16:56	58	08:48 (8)	17:35	55	08:49 (8)	18:09	33	07:24 (6)	19:44	20:16	20:40
17	07:28		07:49 (8)	06:57		07:55 (8)	06:13		06:53 (6)	06:20	05:41	05:26
	16:57	59	08:48 (8)	17:36	53	08:48 (8)	18:10	30	07:23 (6)	19:45	20:17	20:40
18	07:27		07:49 (8)	06:56		07:56 (8)	06:11		06:53 (6)	06:19	05:40	05:26
	16:58	60	08:49 (8)	17:38	50	08:46 (8)	18:11	28	07:21 (6)	19:46	20:18	20:41
19	07:27		07:48 (8)	06:54		07:57 (8)	06:09		06:54 (6)	06:17	05:39	05:26
	17:00	62	08:50 (8)	17:39	48	08:45 (8)	18:12	25	07:19 (6)	19:47	20:19	20:41
20	07:26		07:47 (8)	06:53		07:58 (8)	06:07		06:56 (6)	06:16	05:38	05:26
	17:01	63	08:50 (8)	17:40	45	08:43 (8)	18:14	20	07:16 (6)	19:48	20:20	20:41
21	07:25		07:47 (8)	06:51		08:00 (8)	06:06		06:59 (6)	06:14	05:37	05:26
	17:02	65	08:52 (8)	17:42	42	08:42 (8)	18:15	14	07:13 (6)	19:49	20:21	20:42
22	07:25		07:46 (8)	06:50		08:02 (8)	06:04			06:13	05:36	05:27
	17:03	66	08:52 (8)	17:43	37	08:39 (8)	18:16			19:50	20:22	20:42
23	07:24		07:46 (8)	06:48		08:04 (8)	06:02			06:11	05:35	05:27
	17:04	66	08:52 (8)	17:44	33	08:37 (8)	18:17			19:51	20:23	20:42
24	07:23		07:46 (8)	06:47		08:07 (8)	06:01			06:09	05:35	05:27
	17:06	67	08:53 (8)	17:45	26	08:33 (8)	18:18			19:53	20:24	20:42
25	07:23		07:47 (8)	06:45		08:11 (8)	05:59			06:08	05:34	05:27
	17:07	67	08:54 (8)	17:46	18	08:29 (8)	18:19			19:54	20:25	20:42
26	07:22		07:46 (8)	06:44		07:06 (6)	05:57			06:07	05:33	05:28
	17:08	68	08:54 (8)	17:48	11	07:17 (6)	18:20			19:55	20:26	20:42
27	07:21		07:46 (8)	06:42		07:03 (6)	05:55			06:05	05:32	05:28
	17:09	69	08:55 (8)	17:49	18	07:21 (6)	18:21			19:56	20:27	20:42
28	07:20		07:46 (8)	06:41		07:00 (6)	05:54			06:04	05:32	05:28
	17:11	69	08:55 (8)	17:50	23	07:23 (6)	18:22			19:57	20:28	20:42
29	07:19		07:46 (8)				06:52			06:02	05:31	05:29
	17:12	69	08:55 (8)				19:24			19:58	20:29	20:42
30	07:18		07:47 (8)				06:50			06:01	05:31	05:29
	17:13	68	08:55 (8)				19:25			19:59	20:29	20:42
31	07:17		07:38 (7)				06:48				05:30	
	17:15	70	08:56 (8)				19:26				20:30	
Potential sun hours	294			296			369			400	451	456
Total, worst case		1770			1469			672				

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:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: A - Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (1)

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	05:30	05:55	06:27			06:58		07:30 (6)	06:34		07:19 (8)	07:10		07:34 (8)
	20:42	20:22	19:38			18:46	37	08:07 (6)	16:57	65	08:24 (8)	16:32	51	08:25 (8)
2	05:30	05:56	06:28			06:59		07:29 (6)	06:35		07:18 (8)	07:11		07:35 (8)
	20:42	20:21	19:36			18:44	38	08:07 (6)	16:56	66	08:24 (8)	16:32	50	08:25 (8)
3	05:31	05:57	06:29			07:00		07:29 (6)	06:36		07:00 (7)	07:12		07:36 (8)
	20:42	20:20	19:34			18:42	38	08:07 (6)	16:55	69	08:25 (8)	16:31	49	08:25 (8)
4	05:31	05:58	06:30			07:01		07:28 (6)	06:38		07:00 (7)	07:13		07:37 (8)
	20:42	20:19	19:33			18:41	38	08:06 (6)	16:54	73	08:25 (8)	16:31	48	08:25 (8)
5	05:32	05:59	06:31			07:03		07:28 (6)	06:39		07:01 (7)	07:14		07:38 (8)
	20:41	20:18	19:31			18:39	38	08:06 (6)	16:52	74	08:25 (8)	16:31	47	08:25 (8)
6	05:32	06:00	06:32			07:04		07:28 (6)	06:40		07:03 (7)	07:15		07:39 (8)
	20:41	20:16	19:29			18:37	37	08:05 (6)	16:51	74	08:26 (8)	16:31	46	08:25 (8)
7	05:33	06:01	06:33			07:05		07:28 (6)	06:41		07:04 (7)	07:16		07:40 (8)
	20:41	20:15	19:28			18:35	36	08:04 (6)	16:50	73	08:26 (8)	16:31	45	08:25 (8)
8	05:34	06:02	06:34			07:06		07:28 (6)	06:43		07:05 (7)	07:17		07:41 (8)
	20:40	20:14	19:26			18:34	35	08:03 (6)	16:49	73	08:26 (8)	16:31	44	08:25 (8)
9	05:34	06:03	06:35			07:07		07:29 (6)	06:44		07:07 (7)	07:18		07:42 (8)
	20:40	20:13	19:24			18:32	34	08:03 (6)	16:48	72	08:27 (8)	16:31	43	08:25 (8)
10	05:35	06:04	06:36			07:08		07:29 (6)	06:45		07:08 (7)	07:19		07:43 (8)
	20:40	20:11	19:22			18:30	33	08:02 (6)	16:47	71	08:27 (8)	16:31	42	08:25 (8)
11	05:36	06:05	06:37			07:09		07:30 (6)	06:46		07:18 (8)	07:20		07:44 (8)
	20:39	20:10	19:21			18:29	31	08:01 (6)	16:46	68	08:26 (8)	16:31	41	08:25 (8)
12	05:37	06:06	06:38			07:10		07:31 (6)	06:48		07:18 (8)	07:21		07:45 (8)
	20:39	20:08	19:19			18:27	28	07:59 (6)	16:45	69	08:27 (8)	16:31	40	08:25 (8)
13	05:37	06:07	06:39			07:11		07:32 (6)	06:49		07:18 (8)	07:21		07:46 (8)
	20:38	20:07	19:17			18:25	25	07:57 (6)	16:44	69	08:27 (8)	16:31	40	08:26 (8)
14	05:38	06:08	06:40			07:13		07:33 (6)	06:50		07:18 (8)	07:22		07:46 (8)
	20:38	20:06	19:15			18:24	22	07:55 (6)	16:43	69	08:27 (8)	16:31	39	08:25 (8)
15	05:39	06:09	06:41			07:14		07:37 (6)	06:51		07:18 (8)	07:23		07:47 (8)
	20:37	20:04	19:14			18:22	16	07:53 (6)	16:42	68	08:26 (8)	16:31	39	08:26 (8)
16	05:40	06:10	06:42			07:15		07:41 (6)	06:52		07:19 (8)	07:24		07:48 (8)
	20:36	20:03	19:12			18:21	16	08:57 (8)	16:41	68	08:27 (8)	16:31	38	08:26 (8)
17	05:41	06:11	06:43			07:16		08:41 (8)	06:54		07:20 (8)	07:24		07:48 (8)
	20:36	20:01	19:10			18:19	22	09:03 (8)	16:40	67	08:27 (8)	16:32	38	08:26 (8)
18	05:41	06:12	06:44			07:17		08:37 (8)	06:55		07:20 (8)	07:25		07:49 (8)
	20:35	20:00	19:08			18:18	29	09:06 (8)	16:39	67	08:27 (8)	16:32	37	08:26 (8)
19	05:42	06:13	06:45			07:18		08:34 (8)	06:56		07:21 (8)	07:26		07:50 (8)
	20:34	19:58	19:07			18:16	34	09:08 (8)	16:39	66	08:27 (8)	16:32	37	08:27 (8)
20	05:43	06:14	06:47			07:20		08:32 (8)	06:57		07:21 (8)	07:26		07:50 (8)
	20:34	19:57	19:05			18:14	39	09:11 (8)	16:38	66	08:27 (8)	16:33	37	08:27 (8)
21	05:44	06:15	06:48			07:21		08:30 (8)	06:59		07:22 (8)	07:27		07:51 (8)
	20:33	19:55	19:03			18:13	43	09:13 (8)	16:37	65	08:27 (8)	16:33	37	08:28 (8)
22	05:45	06:16	06:49		07:45 (6)	07:22		08:28 (8)	07:00		07:23 (8)	07:27		07:51 (8)
	20:32	19:54	19:01	11	07:56 (6)	18:11	46	09:14 (8)	16:36	63	08:26 (8)	16:34	37	08:28 (8)
23	05:46	06:17	06:50		07:41 (6)	07:23		08:27 (8)	07:01		07:25 (8)	07:28		07:52 (8)
	20:31	19:52	19:00	19	08:00 (6)	18:10	48	09:15 (8)	16:36	62	08:27 (8)	16:34	37	08:29 (8)
24	05:47	06:18	06:51		07:39 (6)	07:24		08:26 (8)	07:02		07:26 (8)	07:28		07:52 (8)
	20:30	19:51	18:58	23	08:02 (6)	18:08	51	09:17 (8)	16:35	60	08:26 (8)	16:35	37	08:29 (8)
25	05:48	06:19	06:52		07:36 (6)	06:25		07:24 (8)	07:03		07:27 (8)	07:29		07:52 (8)
	20:29	19:49	18:56	27	08:03 (6)	17:07	54	08:18 (8)	16:35	59	08:26 (8)	16:35	37	08:29 (8)
26	05:49	06:20	06:53		07:35 (6)	06:27		07:23 (8)	07:04		07:28 (8)	07:29		07:53 (8)
	20:28	19:48	18:54	29	08:04 (6)	17:06	56	08:19 (8)	16:34	58	08:26 (8)	16:36	37	08:30 (8)
27	05:50	06:21	06:54		07:33 (6)	06:28		07:22 (8)	07:06		07:30 (8)	07:29		07:53 (8)
	20:27	19:46	18:53	32	08:05 (6)	17:04	58	08:20 (8)	16:34	57	08:27 (8)	16:37	38	08:31 (8)
28	05:51	06:23	06:55		07:32 (6)	06:29		07:22 (8)	07:07		07:31 (8)	07:30		07:53 (8)
	20:27	19:44	18:51	33	08:05 (6)	17:03	59	08:21 (8)	16:33	55	08:26 (8)	16:37	38	08:31 (8)
29	05:52	06:24	06:56		07:31 (6)	06:30		07:21 (8)	07:08		07:32 (8)	07:30		07:53 (8)
	20:25	19:43	18:49	35	08:06 (6)	17:01	61	08:22 (8)	16:33	54	08:26 (8)	16:38	39	08:32 (8)
30	05:53	06:25	06:57		07:31 (6)	06:32		07:20 (8)	07:09		07:33 (8)	07:30		07:54 (8)
	20:24	19:41	18:47	36	08:07 (6)	17:00	62	08:22 (8)	16:32	53	08:26 (8)	16:39	39	08:33 (8)
31	05:54	06:26				06:33		07:20 (8)				07:30		07:54 (8)
	20:23	19:39				16:59	63	08:23 (8)				16:40	40	08:34 (8)
Potential sun hours	462	430	375			344			295			284		
Total, worst case				245			1227			1973			1267	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: B - Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (2)

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	07:31		08:11 (8)	07:16		07:37 (7)	06:39		07:05 (6)	06:47	06:00	05:29
	16:41	78	09:29 (8)	17:16	66	09:29 (8)	17:51	41	07:46 (6)	19:27	20:00	20:31
2	07:31		08:12 (8)	07:15		07:36 (7)	06:38		07:05 (6)	06:45	05:58	05:29
	16:42	78	09:30 (8)	17:17	64	09:28 (8)	17:53	42	07:47 (6)	19:28	20:01	20:32
3	07:31		08:12 (8)	07:14		07:35 (7)	06:36		07:05 (6)	06:43	05:57	05:29
	16:42	78	09:30 (8)	17:18	61	09:27 (8)	17:54	41	07:46 (6)	19:29	20:02	20:32
4	07:31		08:13 (8)	07:13		08:34 (8)	06:34		07:05 (6)	06:42	05:56	05:28
	16:43	77	09:30 (8)	17:20	52	09:26 (8)	17:55	42	07:47 (6)	19:30	20:04	20:33
5	07:31		08:13 (8)	07:12		08:34 (8)	06:33		07:05 (6)	06:40	05:54	05:28
	16:44	78	09:31 (8)	17:21	50	09:24 (8)	17:56	41	07:46 (6)	19:31	20:05	20:34
6	07:31		08:13 (8)	07:11		08:36 (8)	06:31		07:05 (6)	06:38	05:53	05:27
	16:45	77	09:30 (8)	17:22	46	09:22 (8)	17:57	40	07:45 (6)	19:33	20:06	20:35
7	07:31		08:13 (8)	07:10		08:38 (8)	06:29		07:05 (6)	06:37	05:52	05:27
	16:46	78	09:31 (8)	17:24	42	09:20 (8)	17:58	40	07:45 (6)	19:34	20:07	20:35
8	07:31		08:14 (8)	07:09		08:40 (8)	06:28		07:05 (6)	06:35	05:51	05:27
	16:47	78	09:32 (8)	17:25	38	09:18 (8)	18:00	39	07:44 (6)	19:35	20:08	20:36
9	07:30		08:15 (8)	07:08		08:43 (8)	06:26		07:05 (6)	06:33	05:49	05:27
	16:48	77	09:32 (8)	17:26	33	09:16 (8)	18:01	38	07:43 (6)	19:36	20:09	20:37
10	07:30		08:16 (8)	07:06		08:45 (8)	06:24		07:06 (6)	06:32	05:48	05:26
	16:49	77	09:33 (8)	17:28	27	09:12 (8)	18:02	35	07:41 (6)	19:37	20:10	20:37
11	07:30		08:15 (8)	07:05		08:49 (8)	06:23		07:07 (6)	06:30	05:47	05:26
	16:50	77	09:32 (8)	17:29	19	09:08 (8)	18:03	33	07:40 (6)	19:38	20:11	20:38
12	07:30		08:16 (8)	07:04			06:21		07:08 (6)	06:28	05:46	05:26
	16:51	77	09:33 (8)	17:30			18:04	31	07:39 (6)	19:39	20:12	20:38
13	07:29		08:16 (8)	07:02			06:19		07:09 (6)	06:27	05:45	05:26
	16:53	77	09:33 (8)	17:31			18:06	27	07:36 (6)	19:40	20:13	20:39
14	07:29		08:17 (8)	07:01			06:18		07:11 (6)	06:25	05:44	05:26
	16:54	76	09:33 (8)	17:33			18:07	24	07:35 (6)	19:41	20:14	20:39
15	07:29		08:17 (8)	07:00			06:16		07:13 (6)	06:23	05:43	05:26
	16:55	76	09:33 (8)	17:34			18:08	19	07:32 (6)	19:43	20:15	20:40
16	07:28		08:18 (8)	06:58			06:14		07:17 (6)	06:22	05:42	05:26
	16:56	76	09:34 (8)	17:35			18:09	10	07:27 (6)	19:44	20:16	20:40
17	07:28		08:18 (8)	06:57			06:13			06:20	05:41	05:26
	16:57	75	09:33 (8)	17:36			18:10			19:45	20:17	20:40
18	07:27		08:19 (8)	06:56		07:20 (6)	06:11			06:19	05:40	05:26
	16:58	75	09:34 (8)	17:38	14	07:34 (6)	18:11			19:46	20:18	20:41
19	07:27		08:19 (8)	06:54		07:17 (6)	06:09			06:17	05:39	05:26
	17:00	75	09:34 (8)	17:39	21	07:38 (6)	18:12			19:47	20:19	20:41
20	07:26		08:20 (8)	06:53		07:14 (6)	06:07			06:16	05:38	05:26
	17:01	73	09:33 (8)	17:40	26	07:40 (6)	18:14			19:48	20:20	20:41
21	07:25		08:21 (8)	06:51		07:13 (6)	06:06			06:14	05:37	05:26
	17:02	73	09:34 (8)	17:42	29	07:42 (6)	18:15			19:49	20:21	20:42
22	07:25		08:21 (8)	06:50		07:11 (6)	06:04			06:12	05:36	05:27
	17:03	73	09:34 (8)	17:43	32	07:43 (6)	18:16			19:50	20:22	20:42
23	07:24		08:22 (8)	06:48		07:10 (6)	06:02			06:11	05:35	05:27
	17:04	71	09:33 (8)	17:44	34	07:44 (6)	18:17			19:51	20:23	20:42
24	07:23		08:22 (8)	06:47		07:09 (6)	06:01			06:09	05:35	05:27
	17:06	71	09:33 (8)	17:45	36	07:45 (6)	18:18			19:53	20:24	20:42
25	07:23		08:24 (8)	06:45		07:08 (6)	05:59			06:08	05:34	05:27
	17:07	69	09:33 (8)	17:46	38	07:46 (6)	18:19			19:54	20:25	20:42
26	07:22		07:43 (7)	06:44		07:07 (6)	05:57			06:07	05:33	05:28
	17:08	71	09:33 (8)	17:48	39	07:46 (6)	18:20			19:55	20:26	20:42
27	07:21		07:42 (7)	06:42		07:07 (6)	05:55			06:05	05:32	05:28
	17:09	70	09:32 (8)	17:49	40	07:47 (6)	18:21			19:56	20:27	20:42
28	07:20		07:41 (7)	06:41		07:06 (6)	05:54			06:04	05:32	05:28
	17:11	70	09:32 (8)	17:50	41	07:47 (6)	18:22			19:57	20:28	20:42
29	07:19		07:40 (7)				06:52			06:02	05:31	05:29
	17:12	69	09:31 (8)				19:24			19:58	20:29	20:42
30	07:18		07:39 (7)				06:50			06:01	05:31	05:29
	17:13	68	09:30 (8)				19:25			19:59	20:29	20:42
31	07:17		07:38 (7)				06:48				05:30	
	17:15	68	09:30 (8)				19:26				20:30	
Potential sun hours	294			296			369			400	451	456
Total, worst case		2306			848			543				

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: B - Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (2)

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	05:30		05:54		06:27			06:58		07:48 (6)	06:34		08:14 (8)	07:10		07:57 (8)
	20:42		20:22		19:38			18:46	30	08:18 (6)	16:57	29	08:43 (8)	16:32	78	09:15 (8)
2	05:30		05:56		06:28			06:59		07:46 (6)	06:35		08:11 (8)	07:11		07:58 (8)
	20:42		20:21		19:36			18:44	33	08:19 (6)	16:56	34	08:45 (8)	16:32	77	09:15 (8)
3	05:31		05:57		06:29			07:00		07:45 (6)	06:36		08:10 (8)	07:12		07:58 (8)
	20:42		20:20		19:34			18:42	34	08:19 (6)	16:55	39	08:49 (8)	16:31	77	09:15 (8)
4	05:31		05:58		06:30			07:01		07:44 (6)	06:38		08:08 (8)	07:13		07:58 (8)
	20:42		20:19		19:33			18:41	36	08:20 (6)	16:54	43	08:51 (8)	16:31	78	09:16 (8)
5	05:32		05:59		06:31			07:03		07:42 (6)	06:39		08:06 (8)	07:14		07:58 (8)
	20:41		20:18		19:31			18:39	38	08:20 (6)	16:52	46	08:52 (8)	16:31	78	09:16 (8)
6	05:32		06:00		06:32			07:04		07:41 (6)	06:40		08:05 (8)	07:15		07:59 (8)
	20:41		20:16		19:29			18:37	40	08:21 (6)	16:51	50	08:55 (8)	16:31	78	09:17 (8)
7	05:33		06:01		06:33			07:05		07:40 (6)	06:41		08:03 (8)	07:16		07:59 (8)
	20:41		20:15		19:28			18:35	41	08:21 (6)	16:50	53	08:56 (8)	16:31	78	09:17 (8)
8	05:34		06:02		06:34			07:06		07:40 (6)	06:43		07:05 (7)	07:17		08:00 (8)
	20:40		20:14		19:26			18:34	41	08:21 (6)	16:49	61	08:57 (8)	16:31	77	09:17 (8)
9	05:34		06:03		06:35			07:07		07:40 (6)	06:44		07:07 (7)	07:18		08:00 (8)
	20:40		20:13		19:24			18:32	41	08:21 (6)	16:48	64	08:59 (8)	16:31	78	09:18 (8)
10	05:35		06:04		06:36			07:08		07:39 (6)	06:45		07:08 (7)	07:19		08:01 (8)
	20:40		20:11		19:22			18:30	42	08:21 (6)	16:47	66	09:00 (8)	16:31	78	09:19 (8)
11	05:36		06:05		06:37			07:09		07:39 (6)	06:46		07:09 (7)	07:20		08:01 (8)
	20:39		20:10		19:21			18:29	42	08:21 (6)	16:46	69	09:01 (8)	16:31	78	09:19 (8)
12	05:37		06:06		06:38			07:10		07:39 (6)	06:48		07:11 (7)	07:21		08:02 (8)
	20:39		20:08		19:19			18:27	41	08:20 (6)	16:45	69	09:02 (8)	16:31	78	09:20 (8)
13	05:37		06:07		06:39			07:11		07:39 (6)	06:49		07:12 (7)	07:21		08:03 (8)
	20:38		20:07		19:17			18:25	41	08:20 (6)	16:44	69	09:03 (8)	16:31	77	09:20 (8)
14	05:38		06:08		06:40			07:13		07:39 (6)	06:50		07:13 (7)	07:22		08:02 (8)
	20:38		20:06		19:15			18:24	40	08:19 (6)	16:43	70	09:04 (8)	16:31	78	09:20 (8)
15	05:39		06:09		06:41			07:14		07:40 (6)	06:51		07:14 (7)	07:23		08:03 (8)
	20:37		20:04		19:14			18:22	39	08:19 (6)	16:42	70	09:04 (8)	16:31	78	09:21 (8)
16	05:40		06:10		06:42			07:15		07:40 (6)	06:52		07:16 (7)	07:24		08:04 (8)
	20:36		20:03		19:12			18:21	38	08:18 (6)	16:41	71	09:06 (8)	16:31	78	09:22 (8)
17	05:41		06:11		06:43			07:16		07:40 (6)	06:54		07:57 (8)	07:24		08:04 (8)
	20:36		20:01		19:10			18:19	37	08:17 (6)	16:40	69	09:06 (8)	16:32	77	09:21 (8)
18	05:41		06:12		06:44			07:17		07:41 (6)	06:55		07:56 (8)	07:25		08:04 (8)
	20:35		20:00		19:08			18:18	35	08:16 (6)	16:39	71	09:07 (8)	16:32	78	09:22 (8)
19	05:42		06:13		06:45			07:18		07:41 (6)	06:56		07:57 (8)	07:26		08:05 (8)
	20:34		19:58		19:07			18:16	33	08:14 (6)	16:39	71	09:08 (8)	16:32	78	09:23 (8)
20	05:43		06:14		06:47			07:20		07:43 (6)	06:57		07:56 (8)	07:26		08:05 (8)
	20:34		19:57		19:05			18:14	31	08:14 (6)	16:38	73	09:09 (8)	16:33	78	09:23 (8)
21	05:44		06:15		06:48			07:21		07:44 (6)	06:59		07:56 (8)	07:27		08:06 (8)
	20:33		19:55		19:03			18:13	28	08:12 (6)	16:37	73	09:09 (8)	16:33	78	09:24 (8)
22	05:45		06:16		06:49			07:22		07:46 (6)	07:00		07:56 (8)	07:27		08:06 (8)
	20:32		19:54		19:01			18:11	24	08:10 (6)	16:36	73	09:09 (8)	16:34	78	09:24 (8)
23	05:46		06:17		06:50			07:23		07:48 (6)	07:01		07:56 (8)	07:28		08:07 (8)
	20:31		19:52		19:00			18:10	19	08:07 (6)	16:36	75	09:11 (8)	16:34	78	09:25 (8)
24	05:47		06:18		06:51			07:24		07:52 (6)	07:02		07:56 (8)	07:28		08:07 (8)
	20:30		19:51		18:58			18:08	12	08:04 (6)	16:35	75	09:11 (8)	16:35	78	09:25 (8)
25	05:48		06:19		06:52			06:25			07:03		07:56 (8)	07:29		08:07 (8)
	20:29		19:49		18:56			17:07			16:35	75	09:11 (8)	16:35	78	09:25 (8)
26	05:49		06:20		06:53			06:27			07:04		07:56 (8)	07:29		08:09 (8)
	20:28		19:48		18:54			17:06			16:34	76	09:12 (8)	16:36	77	09:26 (8)
27	05:50		06:21		06:54		08:03 (6)	06:28			07:06		07:57 (8)	07:29		08:09 (8)
	20:27		19:46		18:53	1	08:04 (6)	17:04			16:34	76	09:13 (8)	16:37	77	09:26 (8)
28	05:51		06:23		06:55		07:55 (6)	06:29			07:07		07:57 (8)	07:30		08:09 (8)
	20:27		19:44		18:51	16	08:11 (6)	17:03			16:33	76	09:13 (8)	16:37	78	09:27 (8)
29	05:52		06:24		06:56		07:52 (6)	06:30			07:08		07:57 (8)	07:30		08:09 (8)
	20:25		19:43		18:49	21	08:13 (6)	17:01			16:33	77	09:14 (8)	16:38	78	09:27 (8)
30	05:53		06:25		06:57		07:50 (6)	06:32		08:24 (8)	07:09		07:57 (8)	07:30		08:11 (8)
	20:24		19:41		18:47	26	08:16 (6)	17:00	7	08:31 (8)	16:32	77	09:14 (8)	16:39	77	09:28 (8)
31	05:53		06:26					06:33		08:18 (8)				07:30		08:11 (8)
	20:23		19:39					16:59	21	08:39 (8)				16:40	78	09:29 (8)
Potential sun hours	462		430		375			344			295			284		
Total, worst case						64			864			1940			2410	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: C - Shadow Receptor: 1.0 × 1.0 Azimuth: -40.0° Slope: 90.0° (3)

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	07:31		08:31 (8)	07:16			06:39		07:16 (6)	06:47	06:00	05:29
	16:41	71	09:42 (8)	17:16			17:51	39	07:55 (6)	19:27	20:00	20:31
2	07:31		08:32 (8)	07:15			06:38		07:17 (6)	06:45	05:58	05:29
	16:42	70	09:42 (8)	17:17			17:53	38	07:55 (6)	19:28	20:01	20:32
3	07:31		08:32 (8)	07:14			06:36		07:17 (6)	06:43	05:57	05:29
	16:42	71	09:43 (8)	17:18			17:54	37	07:54 (6)	19:29	20:02	20:32
4	07:31		08:33 (8)	07:13			06:34		07:18 (6)	06:42	05:56	05:28
	16:43	70	09:43 (8)	17:20			17:55	35	07:53 (6)	19:30	20:04	20:33
5	07:31		08:34 (8)	07:12			06:33		07:19 (6)	06:40	05:54	05:28
	16:44	69	09:43 (8)	17:21			17:56	33	07:52 (6)	19:31	20:05	20:34
6	07:31		08:33 (8)	07:11			06:31		07:19 (6)	06:38	05:53	05:27
	16:45	70	09:43 (8)	17:22			17:57	31	07:50 (6)	19:33	20:06	20:35
7	07:31		08:34 (8)	07:10			06:29		07:21 (6)	06:37	05:52	05:27
	16:46	69	09:43 (8)	17:24			17:58	28	07:49 (6)	19:34	20:07	20:35
8	07:31		08:35 (8)	07:09			06:28		07:23 (6)	06:35	05:51	05:27
	16:47	68	09:43 (8)	17:25			18:00	23	07:46 (6)	19:35	20:08	20:36
9	07:30		08:36 (8)	07:08			06:26		07:25 (6)	06:33	05:49	05:27
	16:48	68	09:44 (8)	17:26			18:01	18	07:43 (6)	19:36	20:09	20:37
10	07:30		08:37 (8)	07:06			06:24		07:28 (6)	06:32	05:48	05:26
	16:49	67	09:44 (8)	17:28			18:02	10	07:38 (6)	19:37	20:10	20:37
11	07:30		08:37 (8)	07:05		07:31 (6)	06:23			06:30	05:47	05:26
	16:50	66	09:43 (8)	17:29	13	07:44 (6)	18:03			19:38	20:11	20:38
12	07:30		08:38 (8)	07:04		07:28 (6)	06:21			06:28	05:46	05:26
	16:51	66	09:44 (8)	17:30	20	07:48 (6)	18:04			19:39	20:12	20:38
13	07:29		08:38 (8)	07:02		07:25 (6)	06:19			06:27	05:45	05:26
	16:53	65	09:43 (8)	17:31	24	07:49 (6)	18:06			19:40	20:13	20:39
14	07:29		08:40 (8)	07:01		07:24 (6)	06:18			06:25	05:44	05:26
	16:54	63	09:43 (8)	17:33	27	07:51 (6)	18:07			19:41	20:14	20:39
15	07:29		08:40 (8)	07:00		07:23 (6)	06:16			06:23	05:43	05:26
	16:55	63	09:43 (8)	17:34	30	07:53 (6)	18:08			19:43	20:15	20:40
16	07:28		08:41 (8)	06:58		07:21 (6)	06:14			06:22	05:42	05:26
	16:56	62	09:43 (8)	17:35	33	07:54 (6)	18:09			19:44	20:16	20:40
17	07:28		08:42 (8)	06:57		07:20 (6)	06:13			06:20	05:41	05:26
	16:57	60	09:42 (8)	17:36	35	07:55 (6)	18:10			19:45	20:17	20:40
18	07:27		08:43 (8)	06:56		07:19 (6)	06:11			06:19	05:40	05:26
	16:58	59	09:42 (8)	17:38	36	07:55 (6)	18:11			19:46	20:18	20:41
19	07:27		08:44 (8)	06:54		07:18 (6)	06:09			06:17	05:39	05:26
	17:00	57	09:41 (8)	17:39	39	07:57 (6)	18:12			19:47	20:19	20:41
20	07:26		08:45 (8)	06:53		07:17 (6)	06:07			06:16	05:38	05:26
	17:01	56	09:41 (8)	17:40	40	07:57 (6)	18:14			19:48	20:20	20:41
21	07:25		08:47 (8)	06:51		07:17 (6)	06:06			06:14	05:37	05:26
	17:02	54	09:41 (8)	17:42	40	07:57 (6)	18:15			19:49	20:21	20:42
22	07:25		07:46 (7)	06:50		07:16 (6)	06:04			06:12	05:36	05:27
	17:03	54	09:40 (8)	17:43	41	07:57 (6)	18:16			19:50	20:22	20:42
23	07:24		07:45 (7)	06:48		07:16 (6)	06:02			06:11	05:35	05:27
	17:04	54	09:39 (8)	17:44	42	07:58 (6)	18:17			19:51	20:23	20:42
24	07:23		07:44 (7)	06:47		07:16 (6)	06:01			06:09	05:35	05:27
	17:06	51	09:37 (8)	17:45	41	07:57 (6)	18:18			19:53	20:24	20:42
25	07:23		07:44 (7)	06:45		07:16 (6)	05:59			06:08	05:34	05:27
	17:07	50	09:37 (8)	17:46	42	07:58 (6)	18:19			19:54	20:25	20:42
26	07:22		07:43 (7)	06:44		07:15 (6)	05:57			06:07	05:33	05:28
	17:08	49	09:36 (8)	17:48	42	07:57 (6)	18:20			19:55	20:26	20:42
27	07:21		07:42 (7)	06:42		07:16 (6)	05:55			06:05	05:32	05:28
	17:09	45	09:34 (8)	17:49	41	07:57 (6)	18:21			19:56	20:27	20:42
28	07:20		07:41 (7)	06:41		07:16 (6)	05:54			06:04	05:32	05:28
	17:11	42	09:32 (8)	17:50	40	07:56 (6)	18:22			19:57	20:28	20:42
29	07:19		07:40 (7)				06:52			06:02	05:31	05:29
	17:12	38	09:30 (8)				19:24			19:58	20:29	20:42
30	07:18		07:39 (7)				06:50			06:01	05:31	05:29
	17:13	32	09:27 (8)				19:25			19:59	20:29	20:42
31	07:17		07:38 (7)				06:48				05:30	
	17:15	24	09:23 (8)				19:26				20:30	
Potential sun hours	294			296			369			400	451	456
Total, worst case		1803			626			292				

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: C - Shadow Receptor: 1.0 × 1.0 Azimuth: -40.0° Slope: 90.0° (3)

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	05:30		05:54		06:27		06:58			06:34			07:10		08:19 (8)
	20:42		20:22		19:38		18:46			16:57			16:32	66	09:25 (8)
2	05:30		05:55		06:28		06:59			06:35			07:11		08:19 (8)
	20:42		20:21		19:36		18:44			16:56			16:32	67	09:26 (8)
3	05:31		05:57		06:29		07:00			06:36			07:12		08:19 (8)
	20:42		20:20		19:34		18:42			16:55			16:31	68	09:27 (8)
4	05:31		05:58		06:30		07:01		08:04 (6)	06:38			07:13		08:19 (8)
	20:42		20:19		19:33		18:40	15	08:19 (6)	16:54			16:31	68	09:27 (8)
5	05:32		05:59		06:31		07:03		08:00 (6)	06:39			07:14		08:19 (8)
	20:41		20:18		19:31		18:39	22	08:22 (6)	16:52			16:31	69	09:28 (8)
6	05:32		06:00		06:32		07:04		07:58 (6)	06:40			07:15		08:19 (8)
	20:41		20:16		19:29		18:37	25	08:23 (6)	16:51			16:31	70	09:29 (8)
7	05:33		06:01		06:33		07:05		07:56 (6)	06:41			07:16		08:20 (8)
	20:41		20:15		19:28		18:35	29	08:25 (6)	16:50			16:31	69	09:29 (8)
8	05:34		06:02		06:34		07:06		07:54 (6)	06:43			07:17		08:20 (8)
	20:40		20:14		19:26		18:34	32	08:26 (6)	16:49			16:31	70	09:30 (8)
9	05:34		06:03		06:35		07:07		07:53 (6)	06:44			07:18		08:20 (8)
	20:40		20:13		19:24		18:32	35	08:28 (6)	16:48			16:31	71	09:31 (8)
10	05:35		06:04		06:36		07:08		07:52 (6)	06:45			07:19		08:21 (8)
	20:40		20:11		19:22		18:30	36	08:28 (6)	16:47			16:31	70	09:31 (8)
11	05:36		06:05		06:37		07:09		07:51 (6)	06:46		07:09 (7)	07:20		08:21 (8)
	20:39		20:10		19:21		18:29	38	08:29 (6)	16:46	24	08:54 (8)	16:31	71	09:32 (8)
12	05:37		06:06		06:38		07:10		07:50 (6)	06:48		07:11 (7)	07:21		08:22 (8)
	20:39		20:08		19:19		18:27	39	08:29 (6)	16:45	32	08:59 (8)	16:31	71	09:33 (8)
13	05:37		06:07		06:39		07:11		07:49 (6)	06:49		07:12 (7)	07:21		08:22 (8)
	20:38		20:07		19:17		18:25	40	08:29 (6)	16:44	38	09:02 (8)	16:31	72	09:34 (8)
14	05:38		06:08		06:40		07:13		07:48 (6)	06:50		07:13 (7)	07:22		08:22 (8)
	20:38		20:06		19:15		18:24	41	08:29 (6)	16:43	42	09:04 (8)	16:31	71	09:33 (8)
15	05:39		06:09		06:41		07:14		07:48 (6)	06:51		07:14 (7)	07:23		08:22 (8)
	20:37		20:04		19:14		18:22	42	08:30 (6)	16:42	45	09:06 (8)	16:31	72	09:34 (8)
16	05:40		06:10		06:42		07:15		07:48 (6)	06:52		07:16 (7)	07:24		08:23 (8)
	20:36		20:03		19:12		18:21	42	08:30 (6)	16:41	49	09:09 (8)	16:31	72	09:35 (8)
17	05:41		06:11		06:43		07:16		07:47 (6)	06:54		07:17 (7)	07:24		08:23 (8)
	20:36		20:01		19:10		18:19	42	08:29 (6)	16:40	50	09:10 (8)	16:32	72	09:35 (8)
18	05:41		06:12		06:44		07:17		07:47 (6)	06:55		07:18 (7)	07:25		08:24 (8)
	20:35		20:00		19:08		18:18	42	08:29 (6)	16:39	51	09:11 (8)	16:32	72	09:36 (8)
19	05:42		06:13		06:45		07:18		07:47 (6)	06:56		07:20 (7)	07:26		08:25 (8)
	20:34		19:58		19:07		18:16	41	08:28 (6)	16:39	54	09:14 (8)	16:32	72	09:37 (8)
20	05:43		06:14		06:47		07:20		07:48 (6)	06:57		07:21 (7)	07:26		08:24 (8)
	20:34		19:57		19:05		18:14	41	08:29 (6)	16:38	54	09:15 (8)	16:33	73	09:37 (8)
21	05:44		06:15		06:48		07:21		07:48 (6)	06:59		08:22 (8)	07:27		08:25 (8)
	20:33		19:55		19:03		18:13	40	08:28 (6)	16:37	54	09:16 (8)	16:33	73	09:38 (8)
22	05:45		06:16		06:49		07:22		07:48 (6)	07:00		08:21 (8)	07:27		08:25 (8)
	20:32		19:54		19:01		18:11	39	08:27 (6)	16:36	56	09:17 (8)	16:34	73	09:38 (8)
23	05:46		06:17		06:50		07:23		07:48 (6)	07:01		08:21 (8)	07:28		08:26 (8)
	20:31		19:52		19:00		18:10	38	08:26 (6)	16:36	57	09:18 (8)	16:34	73	09:39 (8)
24	05:47		06:18		06:51		07:24		07:50 (6)	07:02		08:20 (8)	07:28		08:27 (8)
	20:30		19:51		18:58		18:08	36	08:26 (6)	16:35	59	09:19 (8)	16:35	72	09:39 (8)
25	05:48		06:19		06:52		06:25		06:50 (6)	07:03		08:20 (8)	07:29		08:27 (8)
	20:29		19:49		18:56		17:07	35	07:25 (6)	16:35	60	09:20 (8)	16:35	72	09:39 (8)
26	05:49		06:20		06:53		06:27		06:51 (6)	07:04		08:19 (8)	07:29		08:28 (8)
	20:28		19:48		18:54		17:06	32	07:23 (6)	16:34	62	09:21 (8)	16:36	72	09:40 (8)
27	05:50		06:21		06:54		06:28		06:52 (6)	07:06		08:20 (8)	07:29		08:28 (8)
	20:27		19:46		18:53		17:04	29	07:21 (6)	16:34	63	09:23 (8)	16:37	72	09:40 (8)
28	05:51		06:23		06:55		06:29		06:54 (6)	07:07		08:20 (8)	07:30		08:28 (8)
	20:27		19:44		18:51		17:03	27	07:21 (6)	16:33	63	09:23 (8)	16:37	72	09:40 (8)
29	05:52		06:24		06:56		06:30		06:55 (6)	07:08		08:19 (8)	07:30		08:29 (8)
	20:25		19:43		18:49		17:01	23	07:18 (6)	16:33	65	09:24 (8)	16:38	71	09:40 (8)
30	05:53		06:25		06:57		06:32		06:57 (6)	07:09		08:19 (8)	07:30		08:30 (8)
	20:24		19:41		18:47		17:00	19	07:16 (6)	16:32	66	09:25 (8)	16:39	72	09:42 (8)
31	05:53		06:26				06:33		07:02 (6)				07:30		08:30 (8)
	20:23		19:39				16:59	11	07:13 (6)				16:40	72	09:42 (8)
Potential sun hours	462		430		375		344			295			284		
Total, worst case								931			1044			2200	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: D - Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (4)

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	07:31		09:14 (8)	07:16			06:39		07:30 (6)	06:47	06:00	05:29
	16:41	59	10:13 (8)	17:16			17:51	36	08:06 (6)	19:27	20:00	20:31
2	07:31		09:14 (8)	07:15			06:38		07:31 (6)	06:45	05:58	05:29
	16:42	59	10:13 (8)	17:17			17:53	34	08:05 (6)	19:28	20:01	20:32
3	07:31		09:15 (8)	07:14			06:36		07:32 (6)	06:43	05:57	05:29
	16:42	58	10:13 (8)	17:18			17:54	31	08:03 (6)	19:29	20:02	20:32
4	07:31		09:16 (8)	07:13		07:44 (6)	06:34		07:34 (6)	06:42	05:56	05:28
	16:43	57	10:13 (8)	17:20	12	07:56 (6)	17:55	28	08:02 (6)	19:30	20:04	20:33
5	07:31		09:17 (8)	07:12		07:40 (6)	06:33		07:36 (6)	06:40	05:54	05:28
	16:44	56	10:13 (8)	17:21	19	07:59 (6)	17:56	23	07:59 (6)	19:31	20:05	20:34
6	07:31		09:17 (8)	07:11		07:38 (6)	06:31		07:38 (6)	06:38	05:53	05:27
	16:45	55	10:12 (8)	17:22	23	08:01 (6)	17:57	17	07:55 (6)	19:33	20:06	20:35
7	07:31		09:18 (8)	07:10		07:36 (6)	06:29		07:44 (6)	06:37	05:52	05:27
	16:46	54	10:12 (8)	17:24	28	08:04 (6)	17:58	6	07:50 (6)	19:34	20:07	20:35
8	07:31		09:20 (8)	07:09		07:35 (6)	06:28			06:35	05:51	05:27
	16:47	52	10:12 (8)	17:25	31	08:06 (6)	18:00			19:35	20:08	20:36
9	07:30		09:21 (8)	07:08		07:34 (6)	06:26			06:33	05:49	05:27
	16:48	51	10:12 (8)	17:26	33	08:07 (6)	18:01			19:36	20:09	20:37
10	07:30		09:23 (8)	07:06		07:32 (6)	06:24			06:32	05:48	05:26
	16:49	48	10:11 (8)	17:28	36	08:08 (6)	18:02			19:37	20:10	20:37
11	07:30		09:23 (8)	07:05		07:31 (6)	06:23			06:30	05:47	05:26
	16:50	47	10:10 (8)	17:29	38	08:09 (6)	18:03			19:38	20:11	20:38
12	07:30		09:25 (8)	07:04		07:31 (6)	06:21			06:28	05:46	05:26
	16:51	45	10:10 (8)	17:30	39	08:10 (6)	18:04			19:39	20:12	20:38
13	07:29		09:26 (8)	07:02		07:29 (6)	06:19			06:27	05:45	05:26
	16:53	42	10:08 (8)	17:31	41	08:10 (6)	18:06			19:40	20:13	20:39
14	07:29		09:28 (8)	07:01		07:29 (6)	06:18			06:25	05:44	05:26
	16:54	39	10:07 (8)	17:33	42	08:11 (6)	18:07			19:41	20:14	20:39
15	07:29		09:29 (8)	07:00		07:29 (6)	06:16			06:23	05:43	05:26
	16:55	37	10:06 (8)	17:34	43	08:12 (6)	18:08			19:43	20:15	20:40
16	07:28		07:50 (7)	06:58		07:28 (6)	06:14			06:22	05:42	05:26
	16:56	34	10:05 (8)	17:35	44	08:12 (6)	18:09			19:44	20:16	20:40
17	07:28		07:49 (7)	06:57		07:28 (6)	06:13			06:20	05:41	05:26
	16:57	31	10:02 (8)	17:36	45	08:13 (6)	18:10			19:45	20:17	20:40
18	07:27		07:49 (7)	06:56		07:27 (6)	06:11			06:19	05:40	05:26
	16:58	27	10:01 (8)	17:38	45	08:12 (6)	18:11			19:46	20:18	20:41
19	07:27		07:48 (7)	06:54		07:27 (6)	06:09			06:17	05:39	05:26
	17:00	21	09:57 (8)	17:39	46	08:13 (6)	18:12			19:47	20:19	20:41
20	07:26		07:47 (7)	06:53		07:27 (6)	06:07			06:16	05:38	05:26
	17:01	5	07:52 (7)	17:40	45	08:12 (6)	18:14			19:48	20:20	20:41
21	07:25		07:47 (7)	06:51		07:27 (6)	06:06			06:14	05:37	05:26
	17:02	6	07:53 (7)	17:41	46	08:13 (6)	18:15			19:49	20:21	20:42
22	07:25		07:46 (7)	06:50		07:27 (6)	06:04			06:12	05:36	05:26
	17:03	7	07:53 (7)	17:43	45	08:12 (6)	18:16			19:50	20:22	20:42
23	07:24		07:45 (7)	06:48		07:27 (6)	06:02			06:11	05:35	05:27
	17:04	7	07:52 (7)	17:44	45	08:12 (6)	18:17			19:51	20:23	20:42
24	07:23		07:44 (7)	06:47		07:27 (6)	06:01			06:09	05:35	05:27
	17:06	8	07:52 (7)	17:45	44	08:11 (6)	18:18			19:53	20:24	20:42
25	07:23		07:44 (7)	06:45		07:28 (6)	05:59			06:08	05:34	05:27
	17:07	8	07:52 (7)	17:46	43	08:11 (6)	18:19			19:54	20:25	20:42
26	07:22		07:43 (7)	06:44		07:28 (6)	05:57			06:07	05:33	05:28
	17:08	9	07:52 (7)	17:48	42	08:10 (6)	18:20			19:55	20:26	20:42
27	07:21		07:42 (7)	06:42		07:29 (6)	05:55			06:05	05:32	05:28
	17:09	8	07:50 (7)	17:49	40	08:09 (6)	18:21			19:56	20:27	20:42
28	07:20		07:43 (7)	06:41		07:29 (6)	05:54			06:04	05:32	05:28
	17:11	5	07:48 (7)	17:50	39	08:08 (6)	18:22			19:57	20:28	20:42
29	07:19						06:52			06:02	05:31	05:29
	17:12						19:24			19:58	20:29	20:42
30	07:18						06:50			06:01	05:31	05:29
	17:13						19:25			19:59	20:29	20:42
31	07:17						06:48				05:30	
	17:15						19:26				20:30	
Potential sun hours	294			296			369			400	451	456
Total, worst case		935			954			175				

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: D - Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (4)

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	05:30		05:54		06:27		06:58			06:34		07:02 (6)	07:10		09:05 (8)
	20:42		20:22		19:38		18:46			16:57	35	07:37 (6)	16:32	47	09:52 (8)
2	05:30		05:55		06:28		06:59			06:35		07:03 (6)	07:11		09:05 (8)
	20:42		20:21		19:36		18:44			16:56	33	07:36 (6)	16:32	48	09:53 (8)
3	05:31		05:57		06:29		07:00			06:36		07:05 (6)	07:12		09:04 (8)
	20:42		20:20		19:34		18:42			16:55	30	07:35 (6)	16:31	51	09:55 (8)
4	05:31		05:58		06:30		07:01			06:38		07:06 (6)	07:13		09:04 (8)
	20:42		20:19		19:33		18:40			16:54	27	07:33 (6)	16:31	52	09:56 (8)
5	05:32		05:59		06:31		07:03			06:39		07:08 (6)	07:14		09:03 (8)
	20:41		20:18		19:31		18:39			16:52	23	07:31 (6)	16:31	54	09:57 (8)
6	05:32		06:00		06:32		07:04			06:40		07:11 (6)	07:15		09:03 (8)
	20:41		20:16		19:29		18:37			16:51	18	07:29 (6)	16:31	55	09:58 (8)
7	05:33		06:01		06:33		07:05		08:16 (6)	06:41		07:14 (6)	07:16		09:03 (8)
	20:41		20:15		19:28		18:35	13	08:29 (6)	16:50	11	07:25 (6)	16:31	56	09:59 (8)
8	05:34		06:02		06:34		07:06		08:12 (6)	06:43			07:17		09:03 (8)
	20:40		20:14		19:26		18:34	20	08:32 (6)	16:49			16:31	57	10:00 (8)
9	05:34		06:03		06:35		07:07		08:10 (6)	06:44			07:18		09:03 (8)
	20:40		20:13		19:24		18:32	26	08:36 (6)	16:48			16:31	58	10:01 (8)
10	05:35		06:04		06:36		07:08		08:08 (6)	06:45			07:19		09:03 (8)
	20:40		20:11		19:22		18:30	29	08:37 (6)	16:47			16:31	59	10:02 (8)
11	05:36		06:05		06:37		07:09		08:06 (6)	06:46			07:20		09:04 (8)
	20:39		20:10		19:21		18:29	32	08:38 (6)	16:46			16:31	59	10:03 (8)
12	05:37		06:06		06:38		07:10		08:04 (6)	06:48			07:21		09:04 (8)
	20:39		20:08		19:19		18:27	35	08:39 (6)	16:45			16:31	60	10:04 (8)
13	05:37		06:07		06:39		07:11		08:03 (6)	06:49			07:21		09:04 (8)
	20:38		20:07		19:17		18:25	37	08:40 (6)	16:44			16:31	61	10:05 (8)
14	05:38		06:08		06:40		07:13		08:01 (6)	06:50		07:15 (7)	07:22		09:04 (8)
	20:38		20:06		19:15		18:24	40	08:41 (6)	16:43	5	07:20 (7)	16:31	61	10:05 (8)
15	05:39		06:09		06:41		07:14		08:01 (6)	06:51		07:14 (7)	07:23		09:04 (8)
	20:37		20:04		19:14		18:22	41	08:42 (6)	16:42	9	07:23 (7)	16:31	62	10:06 (8)
16	05:40		06:10		06:42		07:15		08:00 (6)	06:52		07:16 (7)	07:24		09:05 (8)
	20:36		20:03		19:12		18:21	42	08:42 (6)	16:41	9	07:25 (7)	16:31	62	10:07 (8)
17	05:41		06:11		06:43		07:16		07:59 (6)	06:54		07:17 (7)	07:24		09:05 (8)
	20:36		20:01		19:10		18:19	44	08:43 (6)	16:40	8	07:25 (7)	16:32	62	10:07 (8)
18	05:41		06:12		06:44		07:17		07:58 (6)	06:55		07:18 (7)	07:25		09:05 (8)
	20:35		20:00		19:08		18:18	45	08:43 (6)	16:39	8	07:26 (7)	16:32	63	10:08 (8)
19	05:42		06:13		06:45		07:18		07:58 (6)	06:56		07:20 (7)	07:26		09:06 (8)
	20:34		19:58		19:07		18:16	45	08:43 (6)	16:39	7	07:27 (7)	16:32	63	10:09 (8)
20	05:43		06:14		06:47		07:20		07:58 (6)	06:57		07:21 (7)	07:26		09:06 (8)
	20:34		19:57		19:05		18:14	45	08:43 (6)	16:38	7	07:28 (7)	16:33	63	10:09 (8)
21	05:44		06:15		06:48		07:21		07:58 (6)	06:59		07:22 (7)	07:27		09:07 (8)
	20:33		19:55		19:03		18:13	45	08:43 (6)	16:37	6	07:28 (7)	16:33	63	10:10 (8)
22	05:45		06:16		06:49		07:22		07:57 (6)	07:00		07:23 (7)	07:27		09:07 (8)
	20:32		19:54		19:01		18:11	46	08:43 (6)	16:36	5	07:28 (7)	16:34	63	10:10 (8)
23	05:46		06:17		06:50		07:23		07:57 (6)	07:01		07:25 (7)	07:28		09:08 (8)
	20:31		19:52		19:00		18:10	45	08:42 (6)	16:36	21	09:34 (8)	16:34	63	10:11 (8)
24	05:47		06:18		06:51		07:24		07:58 (6)	07:02		07:26 (7)	07:28		09:08 (8)
	20:30		19:51		18:58		18:08	45	08:43 (6)	16:35	27	09:38 (8)	16:35	63	10:11 (8)
25	05:48		06:19		06:52		06:25		06:58 (6)	07:03		07:27 (7)	07:29		09:08 (8)
	20:29		19:49		18:56		17:07	44	07:42 (6)	16:35	30	09:40 (8)	16:35	63	10:11 (8)
26	05:49		06:20		06:53		06:27		06:58 (6)	07:04		07:28 (7)	07:29		09:09 (8)
	20:28		19:48		18:54		17:06	44	07:42 (6)	16:34	34	09:43 (8)	16:36	63	10:12 (8)
27	05:50		06:21		06:54		06:28		06:58 (6)	07:06		09:09 (8)	07:29		09:10 (8)
	20:27		19:46		18:53		17:04	43	07:41 (6)	16:34	37	09:46 (8)	16:37	62	10:12 (8)
28	05:51		06:23		06:55		06:29		06:59 (6)	07:07		09:08 (8)	07:30		09:10 (8)
	20:26		19:44		18:51		17:03	42	07:41 (6)	16:33	39	09:47 (8)	16:37	62	10:12 (8)
29	05:52		06:24		06:56		06:30		06:59 (6)	07:08		09:07 (8)	07:30		09:11 (8)
	20:25		19:43		18:49		17:01	41	07:40 (6)	16:33	42	09:49 (8)	16:38	61	10:12 (8)
30	05:52		06:25		06:57		06:31		07:00 (6)	07:09		09:06 (8)	07:30		09:12 (8)
	20:24		19:41		18:47		17:00	39	07:39 (6)	16:32	45	09:51 (8)	16:39	61	10:13 (8)
31	05:53		06:26				06:33		07:01 (6)				07:30		09:13 (8)
	20:23		19:39				16:59	38	07:39 (6)				16:40	60	10:13 (8)
Potential sun hours	462		430		375		344			295			284		
Total, worst case								966			516			1837	

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: E - Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (5)

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	07:31		07:16		07:50 (6)	06:39	08:00 (6)	06:47	06:00	05:29
	16:41		17:16	49	08:39 (6)	17:51	25	08:25 (6)	19:27	20:00	20:31
2	07:31		07:15		07:50 (6)	06:38		08:04 (6)	06:45	05:58	05:29
	16:42		17:17	49	08:39 (6)	17:53	18	08:22 (6)	19:28	20:01	20:32
3	07:31		07:14		07:50 (6)	06:36		08:10 (6)	06:43	05:57	05:29
	16:42		17:18	50	08:40 (6)	17:54	4	08:14 (6)	19:29	20:02	20:32
4	07:31	07:54 (7)	07:13		07:49 (6)	06:34			06:42	05:56	05:28
	16:43	1 07:55 (7)	17:20	52	08:41 (6)	17:55			19:30	20:04	20:33
5	07:31	07:54 (7)	07:12		07:48 (6)	06:33			06:40	05:54	05:28
	16:44	1 07:55 (7)	17:21	53	08:41 (6)	17:56			19:31	20:05	20:34
6	07:31	07:53 (7)	07:11		07:48 (6)	06:31			06:38	05:53	05:27
	16:45	2 07:55 (7)	17:22	54	08:42 (6)	17:57			19:33	20:06	20:35
7	07:31	07:53 (7)	07:10		07:48 (6)	06:29			06:37	05:52	05:27
	16:46	3 07:56 (7)	17:24	54	08:42 (6)	17:58			19:34	20:07	20:35
8	07:31	07:53 (7)	07:09		07:48 (6)	06:28			06:35	05:51	05:27
	16:47	4 07:57 (7)	17:25	55	08:43 (6)	18:00			19:35	20:08	20:36
9	07:30	07:53 (7)	07:07		07:48 (6)	06:26			06:33	05:49	05:27
	16:48	4 07:57 (7)	17:26	55	08:43 (6)	18:01			19:36	20:09	20:36
10	07:30	07:52 (7)	07:06		07:47 (6)	06:24			06:32	05:48	05:26
	16:49	5 07:57 (7)	17:28	56	08:43 (6)	18:02			19:37	20:10	20:37
11	07:30	07:52 (7)	07:05		07:47 (6)	06:23			06:30	05:47	05:26
	16:50	6 07:58 (7)	17:29	56	08:43 (6)	18:03			19:38	20:11	20:38
12	07:30	07:52 (7)	07:04		07:48 (6)	06:21			06:28	05:46	05:26
	16:51	7 07:59 (7)	17:30	55	08:43 (6)	18:04			19:39	20:12	20:38
13	07:29	07:51 (7)	07:02		07:47 (6)	06:19			06:27	05:45	05:26
	16:53	8 07:59 (7)	17:31	56	08:43 (6)	18:05			19:40	20:13	20:39
14	07:29	07:51 (7)	07:01		07:47 (6)	06:18			06:25	05:44	05:26
	16:54	8 07:59 (7)	17:33	56	08:43 (6)	18:07			19:41	20:14	20:39
15	07:29	07:50 (7)	07:00		07:48 (6)	06:16			06:23	05:43	05:26
	16:55	9 07:59 (7)	17:34	55	08:43 (6)	18:08			19:43	20:15	20:40
16	07:28	07:50 (7)	06:58		07:48 (6)	06:14			06:22	05:42	05:26
	16:56	10 08:00 (7)	17:35	54	08:42 (6)	18:09			19:44	20:16	20:40
17	07:28	07:49 (7)	06:57		07:48 (6)	06:13			06:20	05:41	05:26
	16:57	10 07:59 (7)	17:36	54	08:42 (6)	18:10			19:45	20:17	20:40
18	07:27	07:49 (7)	06:56		07:48 (6)	06:11			06:19	05:40	05:26
	16:58	10 07:59 (7)	17:38	53	08:41 (6)	18:11			19:46	20:18	20:41
19	07:27	07:48 (7)	06:54		07:49 (6)	06:09			06:17	05:39	05:26
	17:00	11 07:59 (7)	17:39	52	08:41 (6)	18:12			19:47	20:19	20:41
20	07:26	07:47 (7)	06:53		07:49 (6)	06:07			06:16	05:38	05:26
	17:01	25 08:18 (6)	17:40	51	08:40 (6)	18:13			19:48	20:20	20:41
21	07:25	07:47 (7)	06:51		07:50 (6)	06:06			06:14	05:37	05:26
	17:02	31 08:22 (6)	17:41	49	08:39 (6)	18:15			19:49	20:21	20:42
22	07:25	07:49 (7)	06:50		07:50 (6)	06:04			06:12	05:36	05:26
	17:03	31 08:24 (6)	17:43	48	08:38 (6)	18:16			19:50	20:22	20:42
23	07:24	07:58 (6)	06:48		07:51 (6)	06:02			06:11	05:35	05:27
	17:04	28 08:26 (6)	17:44	46	08:37 (6)	18:17			19:51	20:23	20:42
24	07:23	07:57 (6)	06:47		07:52 (6)	06:01			06:09	05:35	05:27
	17:06	31 08:28 (6)	17:45	43	08:35 (6)	18:18			19:53	20:24	20:42
25	07:23	07:56 (6)	06:45		07:54 (6)	05:59			06:08	05:34	05:27
	17:07	34 08:30 (6)	17:46	40	08:34 (6)	18:19			19:54	20:25	20:42
26	07:22	07:55 (6)	06:44		07:54 (6)	05:57			06:07	05:33	05:28
	17:08	37 08:32 (6)	17:48	38	08:32 (6)	18:20			19:55	20:26	20:42
27	07:21	07:54 (6)	06:42		07:56 (6)	05:55			06:05	05:32	05:28
	17:09	39 08:33 (6)	17:49	35	08:31 (6)	18:21			19:56	20:27	20:42
28	07:20	07:53 (6)	06:41		07:58 (6)	05:54			06:04	05:32	05:28
	17:11	41 08:34 (6)	17:50	30	08:28 (6)	18:22			19:57	20:28	20:42
29	07:19	07:52 (6)				06:52			06:02	05:31	05:29
	17:12	43 08:35 (6)				19:24			19:58	20:29	20:42
30	07:18	07:52 (6)				06:50			06:01	05:31	05:29
	17:13	45 08:37 (6)				19:25			19:59	20:29	20:42
31	07:17	07:51 (6)				06:48				05:30	
	17:15	47 08:38 (6)				19:26				20:30	
Potential sun hours	294		296			369		400	451	456	
Total, worst case		531		1398			47				

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

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

Licensed user:
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Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: E - Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (5)

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	05:30	05:54	06:27	06:58			06:34		07:17 (6)	07:10		07:34 (7)
	20:42	20:22	19:38	18:46			16:57	55	08:12 (6)	16:32	6	07:40 (7)
2	05:30	05:55	06:28	06:59			06:35		07:17 (6)	07:11		07:35 (7)
	20:42	20:21	19:36	18:44			16:56	55	08:12 (6)	16:32	5	07:40 (7)
3	05:31	05:56	06:29	07:00			06:36		07:18 (6)	07:12		07:36 (7)
	20:42	20:20	19:34	18:42			16:55	55	08:13 (6)	16:31	5	07:41 (7)
4	05:31	05:58	06:30	07:01			06:38		07:18 (6)	07:13		07:37 (7)
	20:42	20:19	19:33	18:40			16:54	54	08:12 (6)	16:31	4	07:41 (7)
5	05:32	05:59	06:31	07:03			06:39		07:18 (6)	07:14		07:38 (7)
	20:41	20:18	19:31	18:39			16:52	53	08:11 (6)	16:31	3	07:41 (7)
6	05:32	06:00	06:32	07:04			06:40		07:19 (6)	07:15		07:39 (7)
	20:41	20:16	19:29	18:37			16:51	53	08:12 (6)	16:31	2	07:41 (7)
7	05:33	06:01	06:33	07:05			06:41		07:19 (6)	07:16		07:40 (7)
	20:41	20:15	19:28	18:35			16:50	52	08:11 (6)	16:31	1	07:41 (7)
8	05:34	06:02	06:34	07:06			06:43		07:19 (6)	07:17		07:41 (7)
	20:40	20:14	19:26	18:34			16:49	51	08:10 (6)	16:31	1	07:42 (7)
9	05:34	06:03	06:35	07:07			06:44		07:21 (6)	07:18		
	20:40	20:13	19:24	18:32			16:48	49	08:10 (6)	16:31		
10	05:35	06:04	06:36	07:08			06:45		07:21 (6)	07:19		
	20:40	20:11	19:22	18:30			16:47	48	08:09 (6)	16:31		
11	05:36	06:05	06:37	07:09		08:40 (6)	06:46		07:22 (6)	07:20		
	20:39	20:10	19:21	18:29	13	08:53 (6)	16:46	46	08:08 (6)	16:31		
12	05:37	06:06	06:38	07:10		08:35 (6)	06:48		07:23 (6)	07:21		
	20:39	20:08	19:19	18:27	22	08:57 (6)	16:45	45	08:08 (6)	16:31		
13	05:37	06:07	06:39	07:11		08:32 (6)	06:49		07:24 (6)	07:21		
	20:38	20:07	19:17	18:25	27	08:59 (6)	16:44	43	08:07 (6)	16:31		
14	05:38	06:08	06:40	07:13		08:29 (6)	06:50		07:25 (6)	07:22		
	20:38	20:06	19:15	18:24	33	09:02 (6)	16:43	41	08:06 (6)	16:31		
15	05:39	06:09	06:41	07:14		08:28 (6)	06:51		07:26 (6)	07:23		
	20:37	20:04	19:14	18:22	36	09:04 (6)	16:42	39	08:05 (6)	16:31		
16	05:40	06:10	06:42	07:15		08:26 (6)	06:52		07:28 (6)	07:24		
	20:36	20:03	19:12	18:21	39	09:05 (6)	16:41	37	08:05 (6)	16:31		
17	05:41	06:11	06:43	07:16		08:25 (6)	06:54		07:29 (6)	07:24		
	20:36	20:01	19:10	18:19	41	09:06 (6)	16:40	34	08:03 (6)	16:32		
18	05:41	06:12	06:44	07:17		08:23 (6)	06:55		07:31 (6)	07:25		
	20:35	20:00	19:08	18:18	44	09:07 (6)	16:39	31	08:02 (6)	16:32		
19	05:42	06:13	06:45	07:18		08:22 (6)	06:56		07:33 (6)	07:26		
	20:34	19:58	19:07	18:16	46	09:08 (6)	16:39	28	08:01 (6)	16:32		
20	05:43	06:14	06:46	07:20		08:21 (6)	06:57		07:24 (7)	07:26		
	20:34	19:57	19:05	18:14	49	09:10 (6)	16:38	31	07:59 (6)	16:33		
21	05:44	06:15	06:48	07:21		08:20 (6)	06:59		07:22 (7)	07:27		
	20:33	19:55	19:03	18:13	50	09:10 (6)	16:37	31	07:57 (6)	16:33		
22	05:45	06:16	06:49	07:22		08:19 (6)	07:00		07:23 (7)	07:27		
	20:32	19:54	19:01	18:11	51	09:10 (6)	16:36	25	07:54 (6)	16:34		
23	05:46	06:17	06:50	07:23		08:18 (6)	07:01		07:25 (7)	07:28		
	20:31	19:52	19:00	18:10	53	09:11 (6)	16:36	11	07:36 (7)	16:34		
24	05:47	06:18	06:51	07:24		08:19 (6)	07:02		07:26 (7)	07:28		
	20:30	19:51	18:58	18:08	53	09:12 (6)	16:35	10	07:36 (7)	16:35		
25	05:48	06:19	06:52	06:25		07:18 (6)	07:03		07:27 (7)	07:29		
	20:29	19:49	18:56	17:07	54	08:12 (6)	16:35	10	07:37 (7)	16:35		
26	05:49	06:20	06:53	06:27		07:17 (6)	07:04		07:28 (7)	07:29		
	20:28	19:48	18:54	17:06	55	08:12 (6)	16:34	10	07:38 (7)	16:36		
27	05:50	06:21	06:54	06:28		07:17 (6)	07:06		07:30 (7)	07:29		
	20:27	19:46	18:53	17:04	55	08:12 (6)	16:34	9	07:39 (7)	16:37		
28	05:51	06:23	06:55	06:29		07:17 (6)	07:07		07:31 (7)	07:30		
	20:26	19:44	18:51	17:03	56	08:13 (6)	16:33	8	07:39 (7)	16:37		
29	05:52	06:24	06:56	06:30		07:17 (6)	07:08		07:32 (7)	07:30		
	20:25	19:43	18:49	17:01	56	08:13 (6)	16:33	8	07:40 (7)	16:38		
30	05:52	06:25	06:57	06:31		07:16 (6)	07:09		07:33 (7)	07:30		
	20:24	19:41	18:47	17:00	56	08:12 (6)	16:32	7	07:40 (7)	16:39		
31	05:53	06:26		06:33		07:17 (6)				07:30		
	20:23	19:39		16:59	56	08:13 (6)				16:40		
Potential sun hours	462	430	375	344			295			284		
Total, worst case					945			1029			27	

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: F - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (6)

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	07:31		07:54 (7)		08:11 (6)	06:39	06:47	05:59	05:29	05:30	05:54	06:27	06:58		06:34	07:46 (6)	07:10	07:34 (7)
	16:41	49	08:50 (6)	58	09:09 (6)	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:46		16:57	48 08:34 (6)	16:32	61 08:41 (6)
2	07:31		07:54 (7)		08:12 (6)	06:38	06:45	05:58	05:29	05:30	05:55	06:28	06:59		06:35	07:45 (6)	07:11	07:35 (7)
	16:42	50	08:51 (6)	57	09:09 (6)	17:53	19:28	20:01	20:32	20:42	20:21	19:36	18:44		16:56	50 08:35 (6)	16:32	60 08:40 (6)
3	07:31		07:54 (7)		08:12 (6)	06:36	06:43	05:57	05:29	05:31	05:56	06:29	07:00		06:36	07:45 (6)	07:12	07:36 (7)
	16:42	51	08:52 (6)	57	09:09 (6)	17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42		16:55	51 08:36 (6)	16:31	59 08:40 (6)
4	07:31		07:54 (7)		08:13 (6)	06:34	06:42	05:56	05:28	05:31	05:58	06:30	07:01		06:38	07:44 (6)	07:13	07:37 (7)
	16:43	53	08:53 (6)	56	09:09 (6)	17:55	19:30	20:04	20:33	20:42	20:19	19:33	18:40		16:54	53 08:37 (6)	16:31	57 08:40 (6)
5	07:31		07:54 (7)		08:13 (6)	06:33	06:40	05:54	05:28	05:32	05:59	06:31	07:03		06:39	07:43 (6)	07:14	07:38 (7)
	16:44	54	08:54 (6)	54	09:07 (6)	17:56	19:31	20:05	20:34	20:41	20:18	19:31	18:39		16:52	54 08:37 (6)	16:31	56 08:40 (6)
6	07:31		07:53 (7)		08:13 (6)	06:31	06:38	05:53	05:27	05:32	06:00	06:32	07:04		06:40	07:43 (6)	07:15	07:39 (7)
	16:45	55	08:54 (6)	54	09:07 (6)	17:57	19:33	20:06	20:35	20:41	20:16	19:29	18:37		16:51	55 08:38 (6)	16:31	56 08:40 (6)
7	07:31		07:53 (7)		08:14 (6)	06:29	06:37	05:52	05:27	05:33	06:01	06:33	07:05		06:41	07:43 (6)	07:16	07:40 (7)
	16:46	56	08:55 (6)	53	09:07 (6)	17:58	19:34	20:07	20:35	20:41	20:15	19:28	18:35		16:50	55 08:38 (6)	16:31	54 08:40 (6)
8	07:31		07:53 (7)		08:15 (6)	06:28	06:35	05:50	05:27	05:34	06:02	06:34	07:06		06:43	07:42 (6)	07:17	07:41 (7)
	16:47	57	08:56 (6)	51	09:06 (6)	18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34		16:49	57 08:39 (6)	16:31	53 08:40 (6)
9	07:30		07:53 (7)		08:16 (6)	06:26	06:33	05:49	05:27	05:34	06:03	06:35	07:07		06:44	07:43 (6)	07:18	07:42 (7)
	16:48	59	08:57 (6)	50	09:06 (6)	18:01	19:36	20:09	20:36	20:40	20:13	19:24	18:32		16:48	57 08:40 (6)	16:31	51 08:40 (6)
10	07:30		07:52 (7)		08:16 (6)	06:24	06:32	05:48	05:26	05:35	06:04	06:36	07:08		06:45	07:42 (6)	07:19	07:43 (7)
	16:49	60	08:57 (6)	48	09:04 (6)	18:02	19:37	20:10	20:37	20:40	20:11	19:22	18:30		16:47	58 08:40 (6)	16:31	50 08:40 (6)
11	07:30		07:52 (7)		08:17 (6)	06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09		06:46	07:42 (6)	07:20	07:44 (7)
	16:50	60	08:58 (6)	47	09:04 (6)	18:03	19:38	20:11	20:38	20:39	20:10	19:21	18:29		16:46	58 08:40 (6)	16:31	49 08:40 (6)
12	07:30		07:52 (7)		08:19 (6)	06:21	06:28	05:46	05:26	05:37	06:06	06:38	07:10		06:48	07:43 (6)	07:21	07:45 (7)
	16:51	62	09:00 (6)	44	09:03 (6)	18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27		16:45	58 08:41 (6)	16:31	48 08:41 (6)
13	07:29		07:52 (7)		08:19 (6)	06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11		06:49	07:42 (6)	07:21	07:46 (7)
	16:53	62	09:00 (6)	42	09:01 (6)	18:05	19:40	20:13	20:39	20:38	20:07	19:17	18:25		16:44	59 08:41 (6)	16:31	47 08:41 (6)
14	07:29		07:54 (7)		08:21 (6)	06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:13		06:50	07:42 (6)	07:22	07:46 (7)
	16:54	60	09:01 (6)	39	09:00 (6)	18:07	19:41	20:14	20:39	20:38	20:06	19:15	18:24		16:43	58 08:40 (6)	16:31	46 08:40 (6)
15	07:29		07:55 (7)		08:23 (6)	06:16	06:23	05:43	05:26	05:39	06:09	06:41	07:14		06:51	07:42 (6)	07:23	07:47 (7)
	16:55	58	09:01 (6)	35	08:58 (6)	18:08	19:43	20:15	20:40	20:37	20:04	19:14	18:22		16:42	58 08:40 (6)	16:31	45 08:41 (6)
16	07:28		08:10 (6)		08:24 (6)	06:14	06:22	05:42	05:26	05:40	06:10	06:42	07:15		06:52	07:43 (6)	07:24	07:48 (7)
	16:56	53	09:03 (6)	32	08:56 (6)	18:09	19:44	20:16	20:40	20:36	20:03	19:12	18:21		16:41	58 08:41 (6)	16:31	44 08:41 (6)
17	07:28		08:09 (6)		08:27 (6)	06:13	06:20	05:41	05:26	05:41	06:11	06:43	07:16		06:54	07:43 (6)	07:24	07:48 (7)
	16:57	54	09:03 (6)	27	08:54 (6)	18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19		16:40	58 08:41 (6)	16:32	44 08:41 (6)
18	07:27		08:10 (6)		08:29 (6)	06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17		06:55	07:43 (6)	07:25	07:49 (7)
	16:58	54	09:04 (6)	21	08:50 (6)	18:11	19:46	20:18	20:41	20:35	20:00	19:08	18:18		16:39	58 08:41 (6)	16:32	44 08:42 (6)
19	07:27		08:09 (6)		08:34 (6)	06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18		06:56	07:44 (6)	07:26	07:50 (7)
	17:00	55	09:04 (6)	11	08:45 (6)	18:12	19:47	20:19	20:41	20:34	19:58	19:07	18:16		16:39	57 08:41 (6)	16:32	43 08:42 (6)
20	07:26		08:09 (6)		06:53	06:07	06:16	05:38	05:26	05:43	06:14	06:46	07:20		06:57	07:45 (6)	07:26	07:50 (7)
	17:01	56	09:05 (6)		17:40	18:13	19:48	20:20	20:41	20:34	19:57	19:05	18:14		16:38	56 08:41 (6)	16:33	42 08:42 (6)
21	07:25		08:10 (6)		06:51	06:06	06:14	05:37	05:26	05:44	06:15	06:48	07:21		06:59	07:45 (6)	07:27	07:51 (7)
	17:02	56	09:06 (6)		17:41	18:15	19:49	20:21	20:42	20:33	19:55	19:03	18:13		16:37	56 08:41 (6)	16:33	42 08:43 (6)
22	07:25		08:10 (6)		06:50	06:04	06:12	05:36	05:26	05:45	06:16	06:49	07:22		07:00	07:45 (6)	07:27	07:51 (7)
	17:03	56	09:06 (6)		17:43	18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11		16:36	56 08:41 (6)	16:34	42 08:43 (6)
23	07:24		08:09 (6)		06:48	06:02	06:11	05:35	05:27	05:46	06:17	06:50	07:23		09:02 (6)	07:01	07:46 (6)	07:28	07:52 (7)
	17:04	57	09:06 (6)		17:44	18:17	19:51	20:23	20:42	20:31	19:52	19:00	18:10	14	09:16 (6)	16:36	55 08:41 (6)	16:34	42 08:44 (6)
24	07:23		08:09 (6)		06:47	06:01	06:09	05:35	05:27	05:47	06:18	06:51	07:24		08:59 (6)	07:02	07:47 (6)	07:28	07:52 (7)
	17:06	58	09:07 (6)		17:45	18:18	19:53	20:24	20:42	20:30	19:51	18:58	18:08	22	09:21 (6)	16:35	54 08:41 (6)	16:35	43 08:44 (6)
25	07:23		08:10 (6)		06:45	05:59	06:08	05:34	05:27	05:48	06:19	06:52	06:25		07:56 (6)	07:03	07:47 (6)	07:29	07:52 (7)
	17:07	58	09:08 (6)		17:46	18:19	19:54	20:25	20:42	20:29	19:49	18:56	17:07	28	08:24 (6)	16:35	54 08:41 (6)	16:35	43 08:44 (6)
26	07:22		08:10 (6)		06:44	05:57	06:07	05:33	05:28	05:49	06:20	06:53	06:27		07:53 (6)	07:04	07:48 (6)	07:29	07:53 (7)
	17:08	58	09:08 (6)		17:48	18:20	19:55	20:26	20:42	20:28	19:48	18:54	17:06	33	08:26 (6)	16:34	53 08:41 (6)	16:36	44 08:46 (6)
27	07:21		08:10 (6)		06:42	05:55	06:05	05:32	05:28	05:50	06:21	06:54	06:28		07:51 (6)	07:06	07:36 (7)	07:29	07:53 (7)
	17:09	58	09:08 (6)		17:49	18:21	19:56	20:27	20:42	20:27	19:46	18:53	17:04	36	08:27 (6)	16:34	56 08:41 (6)	16:37	44 08:46 (6)
28	07:20		08:10 (6)		06:41	05:54	06:04	05:32	05:28	05:51	06:23	06:55	06:29		07:50 (6)	07:07	07:34 (7)	07:30	07:53 (7)
	17:11	58	09:08 (6)		17:50	18:22	19:57	20:28	20:42	20:26	19:44	18:51	17:03	40	08:30 (6)	16:33	60 08:41 (6)	16:37	45 08:47 (6)
29	07:19		08:11 (6)			06:52	06:02	05:31	05:29	05:51	06:24	06:56	06:30		07:49 (6)	07:08	07:33 (7)	07:30	07:53 (7)
	17:12	58	09:09 (6)			19:24	19:58	20:29	20:42	20:25	19:43	18:49	17:01	42	08:31 (6)	16:33	62 08:41 (6)	16:38	45 08:47 (6)
30	07:18		08:11 (6)			06:50	06:01	05:31	05:29	05:52	06:25	06:57	06:31		07:47 (6)	07:09	07:33 (7)	07:30	07:54 (7)
	17:13	58	09:09 (6)			19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00	45	08:32 (6)	16:32	62 08:41 (6)	16:39	47 08:49 (6)
31	07:17		08:11 (6)			06:48		05:30		05:53	06:26		06:33		07:47 (6)			07:30	07:54 (7)
	17:15	58	09:09 (6)			19:26		20:30		20:23	19:39		16:59	47	08:34 (6)			16:40	47 08:49 (6)
Potential sun hours	294		296		369	400	451	456	462	430	375	344			295		284	
Total, worst case		1751		836									307			1684		1493

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: G - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (7)

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	07:31		07:54 (7)	07:16		08:10 (6)	06:39	06:47	05:59	05:29
	16:41	44	08:48 (6)	17:16	60	09:10 (6)	17:51	19:27	20:00	20:31
2	07:31		07:54 (7)	07:15		08:10 (6)	06:38	06:45	05:58	05:29
	16:42	46	08:49 (6)	17:17	60	09:10 (6)	17:53	19:28	20:01	20:32
3	07:31		07:54 (7)	07:14		08:10 (6)	06:36	06:43	05:57	05:29
	16:42	47	08:50 (6)	17:18	60	09:10 (6)	17:54	19:29	20:02	20:32
4	07:31		07:54 (7)	07:13		08:11 (6)	06:34	06:42	05:56	05:28
	16:43	48	08:51 (6)	17:20	59	09:10 (6)	17:55	19:30	20:04	20:33
5	07:31		07:54 (7)	07:12		08:10 (6)	06:33	06:40	05:54	05:28
	16:44	50	08:52 (6)	17:21	59	09:09 (6)	17:56	19:31	20:05	20:34
6	07:31		07:53 (7)	07:11		08:11 (6)	06:31	06:38	05:53	05:27
	16:45	51	08:52 (6)	17:22	58	09:09 (6)	17:57	19:33	20:06	20:35
7	07:31		07:53 (7)	07:10		08:11 (6)	06:29	06:37	05:52	05:27
	16:46	53	08:53 (6)	17:24	58	09:09 (6)	17:58	19:34	20:07	20:35
8	07:31		07:53 (7)	07:09		08:12 (6)	06:28	06:35	05:50	05:27
	16:47	54	08:54 (6)	17:25	57	09:09 (6)	18:00	19:35	20:08	20:36
9	07:30		07:53 (7)	07:07		08:13 (6)	06:26	06:33	05:49	05:27
	16:48	56	08:55 (6)	17:26	56	09:09 (6)	18:01	19:36	20:09	20:36
10	07:30		07:52 (7)	07:06		08:13 (6)	06:24	06:32	05:48	05:26
	16:49	58	08:56 (6)	17:28	54	09:07 (6)	18:02	19:37	20:10	20:37
11	07:30		07:52 (7)	07:05		08:14 (6)	06:23	06:30	05:47	05:26
	16:50	59	08:57 (6)	17:29	53	09:07 (6)	18:03	19:38	20:11	20:38
12	07:30		07:52 (7)	07:04		08:15 (6)	06:21	06:28	05:46	05:26
	16:51	60	08:58 (6)	17:30	51	09:06 (6)	18:04	19:39	20:12	20:38
13	07:29		07:51 (7)	07:02		08:15 (6)	06:19	06:27	05:45	05:26
	16:53	62	08:59 (6)	17:31	50	09:05 (6)	18:05	19:40	20:13	20:39
14	07:29		07:52 (7)	07:01		08:16 (6)	06:18	06:25	05:44	05:26
	16:54	62	09:00 (6)	17:33	48	09:04 (6)	18:07	19:41	20:14	20:39
15	07:29		07:53 (7)	07:00		08:18 (6)	06:16	06:23	05:43	05:26
	16:55	60	09:00 (6)	17:34	45	09:03 (6)	18:08	19:43	20:15	20:40
16	07:28		07:55 (7)	06:58		08:18 (6)	06:14	06:22	05:42	05:26
	16:56	58	09:02 (6)	17:35	43	09:01 (6)	18:09	19:44	20:16	20:40
17	07:28		08:09 (6)	06:57		08:20 (6)	06:13	06:20	05:41	05:26
	16:57	53	09:02 (6)	17:36	40	09:00 (6)	18:10	19:45	20:17	20:40
18	07:27		08:10 (6)	06:56		08:21 (6)	06:11	06:19	05:40	05:26
	16:58	54	09:04 (6)	17:38	36	08:57 (6)	18:11	19:46	20:18	20:41
19	07:27		08:09 (6)	06:54		08:23 (6)	06:09	06:17	05:39	05:26
	17:00	55	09:04 (6)	17:39	33	08:56 (6)	18:12	19:47	20:19	20:41
20	07:26		08:09 (6)	06:53		08:25 (6)	06:07	06:16	05:38	05:26
	17:01	55	09:04 (6)	17:40	28	08:53 (6)	18:13	19:48	20:20	20:41
21	07:25		08:09 (6)	06:51		08:28 (6)	06:06	06:14	05:37	05:26
	17:02	57	09:06 (6)	17:41	22	08:50 (6)	18:15	19:49	20:21	20:42
22	07:25		08:09 (6)	06:50		08:33 (6)	06:04	06:12	05:36	05:26
	17:03	57	09:06 (6)	17:43	11	08:44 (6)	18:16	19:50	20:22	20:42
23	07:24		08:09 (6)	06:48			06:02	06:11	05:35	05:27
	17:04	57	09:06 (6)	17:44			18:17	19:51	20:23	20:42
24	07:23		08:08 (6)	06:47			06:01	06:09	05:35	05:27
	17:06	59	09:07 (6)	17:45			18:18	19:53	20:24	20:42
25	07:23		08:09 (6)	06:45			05:59	06:08	05:34	05:27
	17:07	59	09:08 (6)	17:46			18:19	19:54	20:25	20:42
26	07:22		08:09 (6)	06:44			05:57	06:07	05:33	05:28
	17:08	59	09:08 (6)	17:48			18:20	19:55	20:26	20:42
27	07:21		08:09 (6)	06:42			05:55	06:05	05:32	05:28
	17:09	60	09:09 (6)	17:49			18:21	19:56	20:27	20:42
28	07:20		08:09 (6)	06:41			05:54	06:04	05:32	05:28
	17:11	60	09:09 (6)	17:50			18:22	19:57	20:28	20:42
29	07:19		08:09 (6)				06:52	06:02	05:31	05:29
	17:12	60	09:09 (6)				19:24	19:58	20:29	20:42
30	07:18		08:09 (6)				06:50	06:01	05:31	05:29
	17:13	61	09:10 (6)				19:25	19:59	20:29	20:42
31	07:17		08:09 (6)				06:48		05:30	
	17:15	61	09:10 (6)				19:26		20:30	
Potential sun hours	294			296			369	400	451	456
Total, worst case		1735			1041					

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: G - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (7)

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	05:30	05:54	06:27	06:58			06:34		07:42 (6)	07:10		07:34 (7)
	20:42	20:22	19:38	18:46			16:57	55	08:37 (6)	16:32	59	08:39 (6)
2	05:30	05:55	06:28	06:59			06:35		07:42 (6)	07:11		07:35 (7)
	20:42	20:21	19:36	18:44			16:56	55	08:37 (6)	16:32	58	08:39 (6)
3	05:31	05:56	06:29	07:00			06:36		07:42 (6)	07:12		07:36 (7)
	20:42	20:20	19:34	18:42			16:55	57	08:39 (6)	16:31	57	08:39 (6)
4	05:31	05:58	06:30	07:01			06:38		07:41 (6)	07:13		07:37 (7)
	20:42	20:19	19:33	18:40			16:54	58	08:39 (6)	16:31	54	08:38 (6)
5	05:32	05:59	06:31	07:03			06:39		07:40 (6)	07:14		07:38 (7)
	20:41	20:18	19:31	18:39			16:52	59	08:39 (6)	16:31	53	08:38 (6)
6	05:32	06:00	06:32	07:04			06:40		07:41 (6)	07:15		07:39 (7)
	20:41	20:16	19:29	18:37			16:51	59	08:40 (6)	16:31	51	08:38 (6)
7	05:33	06:01	06:33	07:05			06:41		07:41 (6)	07:16		07:40 (7)
	20:41	20:15	19:28	18:35			16:50	59	08:40 (6)	16:31	50	08:38 (6)
8	05:34	06:02	06:34	07:06			06:43		07:40 (6)	07:17		07:41 (7)
	20:40	20:14	19:26	18:34			16:49	60	08:40 (6)	16:31	48	08:38 (6)
9	05:34	06:03	06:35	07:07			06:44		07:41 (6)	07:18		07:42 (7)
	20:40	20:13	19:24	18:32			16:48	60	08:41 (6)	16:31	47	08:38 (6)
10	05:35	06:04	06:36	07:08			06:45		07:41 (6)	07:19		07:43 (7)
	20:40	20:11	19:22	18:30			16:47	60	08:41 (6)	16:31	46	08:38 (6)
11	05:36	06:05	06:37	07:09			06:46		07:40 (6)	07:20		07:44 (7)
	20:39	20:10	19:21	18:29			16:46	61	08:41 (6)	16:31	44	08:38 (6)
12	05:37	06:06	06:38	07:10			06:48		07:41 (6)	07:21		07:45 (7)
	20:39	20:08	19:19	18:27			16:45	60	08:41 (6)	16:31	43	08:38 (6)
13	05:37	06:07	06:39	07:11			06:49		07:41 (6)	07:21		07:46 (7)
	20:38	20:07	19:17	18:25			16:44	60	08:41 (6)	16:31	41	08:38 (6)
14	05:38	06:08	06:40	07:13			06:50		07:41 (6)	07:22		07:46 (7)
	20:38	20:06	19:15	18:24			16:43	60	08:41 (6)	16:31	40	08:37 (6)
15	05:39	06:09	06:41	07:14			06:51		07:41 (6)	07:23		07:47 (7)
	20:37	20:04	19:14	18:22			16:42	60	08:41 (6)	16:31	40	08:38 (6)
16	05:40	06:10	06:42	07:15			06:52		07:42 (6)	07:24		07:48 (7)
	20:36	20:03	19:12	18:21			16:41	59	08:41 (6)	16:31	39	08:38 (6)
17	05:41	06:11	06:43	07:16			06:54		07:42 (6)	07:24		07:48 (7)
	20:36	20:01	19:10	18:19			16:40	59	08:41 (6)	16:32	38	08:38 (6)
18	05:41	06:12	06:44	07:17			06:55		07:42 (6)	07:25		07:49 (7)
	20:35	20:00	19:08	18:17			16:39	59	08:41 (6)	16:32	36	08:38 (6)
19	05:42	06:13	06:45	07:18			06:56		07:44 (6)	07:26		07:50 (7)
	20:34	19:58	19:07	18:16			16:39	57	08:41 (6)	16:32	36	08:39 (6)
20	05:43	06:14	06:46	07:20		09:02 (6)	06:57		07:44 (6)	07:26		07:50 (7)
	20:34	19:57	19:05	18:14	15	09:17 (6)	16:38	57	08:41 (6)	16:33	36	08:39 (6)
21	05:44	06:15	06:48	07:21		08:58 (6)	06:59		07:44 (6)	07:27		07:51 (7)
	20:33	19:55	19:03	18:13	23	09:21 (6)	16:37	57	08:41 (6)	16:33	36	08:40 (6)
22	05:45	06:16	06:49	07:22		08:55 (6)	07:00		07:45 (6)	07:27		07:51 (7)
	20:32	19:54	19:01	18:11	29	09:24 (6)	16:36	55	08:40 (6)	16:34	36	08:40 (6)
23	05:46	06:17	06:50	07:23		08:52 (6)	07:01		07:46 (6)	07:28		07:52 (7)
	20:31	19:52	19:00	18:10	34	09:26 (6)	16:36	55	08:41 (6)	16:34	36	08:41 (6)
24	05:47	06:18	06:51	07:24		08:51 (6)	07:02		07:47 (6)	07:28		07:52 (7)
	20:30	19:51	18:58	18:08	38	09:29 (6)	16:35	54	08:41 (6)	16:35	36	08:41 (6)
25	05:48	06:19	06:52	06:25		07:49 (6)	07:03		07:47 (6)	07:29		07:52 (7)
	20:29	19:49	18:56	17:07	41	08:30 (6)	16:35	53	08:40 (6)	16:35	36	08:41 (6)
26	05:49	06:20	06:53	06:27		07:48 (6)	07:04		07:33 (7)	07:29		07:53 (7)
	20:28	19:48	18:54	17:06	43	08:31 (6)	16:34	58	08:40 (6)	16:36	38	08:43 (6)
27	05:50	06:21	06:54	06:28		07:46 (6)	07:06		07:33 (7)	07:29		07:53 (7)
	20:27	19:46	18:53	17:04	46	08:32 (6)	16:34	60	08:40 (6)	16:37	38	08:43 (6)
28	05:51	06:23	06:55	06:29		07:46 (6)	07:07		07:32 (7)	07:30		07:53 (7)
	20:26	19:44	18:51	17:03	48	08:34 (6)	16:33	62	08:40 (6)	16:37	40	08:44 (6)
29	05:51	06:24	06:56	06:30		07:44 (6)	07:08		07:32 (7)	07:30		07:53 (7)
	20:25	19:43	18:49	17:01	51	08:35 (6)	16:33	62	08:40 (6)	16:38	40	08:44 (6)
30	05:52	06:25	06:57	06:31		07:43 (6)	07:09		07:33 (7)	07:30		07:54 (7)
	20:24	19:41	18:47	17:00	52	08:35 (6)	16:32	60	08:39 (6)	16:39	41	08:46 (6)
31	05:53	06:26		06:33		07:43 (6)				07:30		07:54 (7)
	20:23	19:39		16:59	54	08:37 (6)				16:40	43	08:47 (6)
Potential sun hours	462	430	375	344			295			284		
Total, worst case					474			1750			1336	

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: H - Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (8)

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	07:31		09:07 (6)	07:16	06:39	06:47	05:59	05:29	05:30	05:54	06:27	06:58	06:34			07:10		08:56 (6)
	16:41	64	10:11 (6)	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:46	16:57			16:32	57	09:53 (6)
2	07:31		09:08 (6)	07:15	06:38	06:45	05:58	05:29	05:30	05:55	06:28	06:59	06:35			07:11		08:56 (6)
	16:41	63	10:11 (6)	17:17	17:53	19:28	20:01	20:32	20:42	20:21	19:36	18:44	16:56			16:32	58	09:54 (6)
3	07:31		09:09 (6)	07:14	06:36	06:43	05:57	05:29	05:31	05:56	06:29	07:00	06:36			07:12		08:56 (6)
	16:42	62	10:11 (6)	17:18	17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42	16:55			16:31	59	09:55 (6)
4	07:31		09:09 (6)	07:13	06:34	06:42	05:56	05:28	05:31	05:57	06:30	07:01	06:38			07:13		08:56 (6)
	16:43	62	10:11 (6)	17:20	17:55	19:30	20:04	20:33	20:42	20:19	19:33	18:40	16:54			16:31	60	09:56 (6)
5	07:31		09:10 (6)	07:12	06:33	06:40	05:54	05:28	05:32	05:59	06:31	07:03	06:39			07:14		08:56 (6)
	16:44	62	10:12 (6)	17:21	17:56	19:31	20:05	20:34	20:41	20:18	19:31	18:39	16:52			16:31	60	09:56 (6)
6	07:31		09:10 (6)	07:11	06:31	06:38	05:53	05:27	05:32	06:00	06:32	07:04	06:40			07:15		08:56 (6)
	16:45	61	10:11 (6)	17:22	17:57	19:33	20:06	20:35	20:41	20:16	19:29	18:37	16:51			16:31	61	09:57 (6)
7	07:31		09:11 (6)	07:10	06:29	06:37	05:52	05:27	05:33	06:01	06:33	07:05	06:41			07:16		08:56 (6)
	16:46	60	10:11 (6)	17:24	17:58	19:34	20:07	20:35	20:41	20:15	19:28	18:35	16:50			16:31	62	09:58 (6)
8	07:31		09:12 (6)	07:09	06:28	06:35	05:50	05:27	05:34	06:02	06:34	07:06	06:43			07:17		08:56 (6)
	16:47	59	10:11 (6)	17:25	18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34	16:49			16:31	62	09:58 (6)
9	07:30		09:12 (6)	07:07	06:26	06:33	05:49	05:27	05:34	06:03	06:35	07:07	06:44			07:18		08:57 (6)
	16:48	60	10:12 (6)	17:26	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48			16:30	62	09:59 (6)
10	07:30		09:13 (6)	07:06	06:24	06:32	05:48	05:26	05:35	06:04	06:36	07:08	06:45			07:19		08:57 (6)
	16:49	58	10:11 (6)	17:28	18:02	19:37	20:10	20:37	20:40	20:11	19:22	18:30	16:47			16:31	63	10:00 (6)
11	07:30		09:14 (6)	07:05	06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09	06:46			07:20		08:57 (6)
	16:50	57	10:11 (6)	17:29	18:03	19:38	20:11	20:38	20:39	20:10	19:21	18:29	16:46			16:31	64	10:01 (6)
12	07:30		09:15 (6)	07:04	06:21	06:28	05:46	05:26	05:37	06:06	06:38	07:10	06:48			07:21		08:58 (6)
	16:51	57	10:12 (6)	17:30	18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27	16:45			16:31	63	10:01 (6)
13	07:29		09:15 (6)	07:02	06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11	06:49			07:21		08:59 (6)
	16:53	56	10:11 (6)	17:31	18:05	19:40	20:13	20:39	20:38	20:07	19:17	18:25	16:44			16:31	63	10:02 (6)
14	07:29		09:16 (6)	07:01	06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:13	06:50		09:12 (6)	07:22		08:58 (6)
	16:54	55	10:11 (6)	17:33	18:07	19:41	20:14	20:39	20:38	20:06	19:15	18:24	16:43	12	09:24 (6)	16:31	64	10:02 (6)
15	07:29		09:17 (6)	07:00	06:16	06:23	05:43	05:26	05:39	06:09	06:41	07:14	06:51		09:08 (6)	07:23		08:59 (6)
	16:55	53	10:10 (6)	17:34	18:08	19:43	20:15	20:40	20:37	20:04	19:14	18:22	16:42	21	09:29 (6)	16:31	64	10:03 (6)
16	07:28		09:18 (6)	06:58	06:14	06:22	05:42	05:26	05:40	06:10	06:42	07:15	06:52		09:06 (6)	07:24		08:59 (6)
	16:56	52	10:10 (6)	17:35	18:09	19:44	20:16	20:40	20:36	20:03	19:12	18:21	16:41	26	09:32 (6)	16:31	65	10:04 (6)
17	07:28		09:19 (6)	06:57	06:13	06:20	05:41	05:26	05:40	06:11	06:43	07:16	06:54		09:04 (6)	07:24		08:59 (6)
	16:57	51	10:10 (6)	17:36	18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19	16:40	31	09:35 (6)	16:32	64	10:03 (6)
18	07:27		09:20 (6)	06:56	06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17	06:55		09:02 (6)	07:25		09:00 (6)
	16:58	50	10:10 (6)	17:38	18:11	19:46	20:18	20:41	20:35	20:00	19:08	18:17	16:39	35	09:37 (6)	16:32	64	10:04 (6)
19	07:27		09:21 (6)	06:54	06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18	06:56		09:01 (6)	07:26		09:01 (6)
	16:59	48	10:09 (6)	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:07	18:16	16:39	38	09:39 (6)	16:32	64	10:05 (6)
20	07:26		09:22 (6)	06:53	06:07	06:16	05:38	05:26	05:43	06:14	06:46	07:20	06:57		09:00 (6)	07:26		09:01 (6)
	17:01	45	10:07 (6)	17:40	18:13	19:48	20:20	20:41	20:34	19:57	19:05	18:14	16:38	41	09:41 (6)	16:33	64	10:05 (6)
21	07:25		09:24 (6)	06:51	06:06	06:14	05:37	05:26	05:44	06:15	06:48	07:21	06:59		08:59 (6)	07:27		09:02 (6)
	17:02	43	10:07 (6)	17:41	18:15	19:49	20:21	20:42	20:33	19:55	19:03	18:13	16:37	43	09:42 (6)	16:33	64	10:06 (6)
22	07:25		09:25 (6)	06:50	06:04	06:12	05:36	05:26	05:45	06:16	06:49	07:22	07:00		08:58 (6)	07:27		09:02 (6)
	17:03	41	10:06 (6)	17:43	18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11	16:36	45	09:43 (6)	16:34	64	10:06 (6)
23	07:24		09:26 (6)	06:48	06:02	06:11	05:35	05:27	05:46	06:17	06:50	07:23	07:01		08:58 (6)	07:28		09:03 (6)
	17:04	38	10:04 (6)	17:44	18:17	19:51	20:23	20:42	20:31	19:52	19:00	18:10	16:36	48	09:46 (6)	16:34	64	10:07 (6)
24	07:23		09:28 (6)	06:47	06:01	06:09	05:35	05:27	05:47	06:18	06:51	07:24	07:02		08:57 (6)	07:28		09:03 (6)
	17:06	35	10:03 (6)	17:45	18:18	19:53	20:24	20:42	20:30	19:51	18:58	18:08	16:35	50	09:47 (6)	16:35	64	10:07 (6)
25	07:23		09:31 (6)	06:45	05:59	06:08	05:34	05:27	05:48	06:19	06:52	06:25	07:03		08:57 (6)	07:29		09:03 (6)
	17:07	31	10:02 (6)	17:46	18:19	19:54	20:25	20:42	20:29	19:49	18:56	17:07	16:35	51	09:48 (6)	16:35	64	10:07 (6)
26	07:22		09:33 (6)	06:44	05:57	06:07	05:33	05:28	05:49	06:20	06:53	06:27	07:04		08:56 (6)	07:29		09:04 (6)
	17:08	26	09:59 (6)	17:48	18:20	19:55	20:26	20:42	20:28	19:48	18:54	17:06	16:34	52	09:48 (6)	16:36	64	10:08 (6)
27	07:21		09:36 (6)	06:42	05:55	06:05	05:32	05:28	05:50	06:21	06:54	06:28	07:06		08:57 (6)	07:29		09:04 (6)
	17:09	20	09:56 (6)	17:49	18:21	19:56	20:27	20:42	20:27	19:46	18:53	17:04	16:34	53	09:50 (6)	16:37	65	10:09 (6)
28	07:20		09:41 (6)	06:41	05:54	06:04	05:32	05:28	05:51	06:23	06:55	06:29	07:07		08:56 (6)	07:30		09:05 (6)
	17:11	11	09:52 (6)	17:50	18:22	19:57	20:28	20:42	20:26	19:44	18:51	17:03	16:33	55	09:51 (6)	16:37	64	10:09 (6)
29	07:19				06:52	06:02	05:31	05:29	05:51	06:24	06:56	06:30	07:08		08:56 (6)	07:30		09:05 (6)
	17:12				19:24	19:58	20:29	20:42	20:25	19:43	18:49	17:01	16:33	56	09:52 (6)	16:38	64	10:09 (6)
30	07:18				06:50	06:01	05:31	05:29	05:52	06:25	06:57	06:31	07:09		08:56 (6)	07:30		09:06 (6)
	17:13				19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	57	09:53 (6)	16:39	64	10:10 (6)
31	07:17				06:48		05:30		05:53	06:26		06:33				07:30		09:07 (6)
	17:15				19:26		20:30		20:23	19:39		16:59				16:40	63	10:10 (6)
Potential sun hours	294			296	369	400	451	456	462	430	375	344	295			284		
Total, worst case		1380												714			1947	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: I - Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (9)

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	07:31	07:16	06:39	06:47	05:59	05:29	05:30	05:54	06:27	06:58	06:34	07:10		
	16:41	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:46	16:57	16:32		
2	07:31	07:15	06:37	06:45	05:58	05:29	05:30	05:55	06:28	06:59	06:35	07:11		
	16:41	17:17	17:52	19:28	20:01	20:32	20:42	20:21	19:36	18:44	16:56	16:32		
3	07:31	07:14	06:36	06:43	05:57	05:28	05:31	05:56	06:29	07:00	06:36	07:12		
	16:42	17:18	17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42	16:55	16:31		
4	07:31	07:13	06:34	06:42	05:55	05:28	05:31	05:57	06:30	07:01	06:38	07:13		
	16:43	17:20	17:55	19:30	20:04	20:33	20:42	20:19	19:33	18:40	16:54	16:31		
5	07:31	07:12	06:33	06:40	05:54	05:28	05:32	05:59	06:31	07:03	06:39	07:14		
	16:44	17:21	17:56	19:31	20:05	20:34	20:41	20:18	19:31	18:39	16:52	16:31		
6	07:31	07:11	06:31	06:38	05:53	05:27	05:32	06:00	06:32	07:04	06:40	07:15		
	16:45	17:22	17:57	19:32	20:06	20:35	20:41	20:16	19:29	18:37	16:51	16:31		
7	07:31	07:10	06:29	06:37	05:52	05:27	05:33	06:01	06:33	07:05	06:41	07:16		
	16:46	17:24	17:58	19:34	20:07	20:35	20:41	20:15	19:28	18:35	16:50	16:31		
8	07:31	07:09	06:28	06:35	05:50	05:27	05:34	06:02	06:34	07:06	06:43	07:17		
	16:47	17:25	18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34	16:49	16:31		
9	07:30	07:07	06:26	06:33	05:49	05:27	05:34	06:03	06:35	07:07	06:44	07:18		
	16:48	17:26	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48	16:30		
10	07:30	07:06	06:24	06:32	05:48	05:26	05:35	06:04	06:36	07:08	06:45	07:19		
	16:49	17:28	18:02	19:37	20:10	20:37	20:40	20:11	19:22	18:30	16:47	16:30		
11	07:30	07:05	06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09	06:46	07:20		
	16:50	17:29	18:03	19:38	20:11	20:38	20:39	20:10	19:21	18:29	16:46	16:31		
12	07:30	07:04	06:21	06:28	05:46	05:26	05:37	06:06	06:38	07:10	06:48	07:21		10:39 (6)
	16:51	17:30	18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27	16:45	16:31	6	10:45 (6)
13	07:29	07:02	06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11	06:49	07:21		10:37 (6)
	16:53	17:31	18:05	19:40	20:13	20:39	20:38	20:07	19:17	18:25	16:44	16:31	12	10:49 (6)
14	07:29	07:01	06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:13	06:50	07:22		10:35 (6)
	16:54	17:33	18:07	19:41	20:14	20:39	20:38	20:06	19:15	18:24	16:43	16:31	15	10:50 (6)
15	07:29	07:00	06:16	06:23	05:43	05:26	05:39	06:09	06:41	07:14	06:51	07:23		10:34 (6)
	16:55	17:34	18:08	19:43	20:15	20:40	20:37	20:04	19:14	18:22	16:42	16:31	18	10:52 (6)
16	07:28	06:58	06:14	06:22	05:42	05:26	05:40	06:10	06:42	07:15	06:52	07:24		10:34 (6)
	16:56	17:35	18:09	19:44	20:16	20:40	20:36	20:03	19:12	18:21	16:41	16:31	20	10:54 (6)
17	07:28	06:57	06:13	06:20	05:41	05:26	05:40	06:11	06:43	07:16	06:54	07:24		10:33 (6)
	16:57	17:36	18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19	16:40	16:32	21	10:54 (6)
18	07:27	06:56	06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17	06:55	07:25		10:34 (6)
	16:58	17:38	18:11	19:46	20:18	20:41	20:35	20:00	19:08	18:17	16:39	16:32	22	10:56 (6)
19	07:27	06:54	06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18	06:56	07:26		10:34 (6)
	16:59	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:07	18:16	16:39	16:32	23	10:57 (6)
20	07:26	06:53	06:07	06:16	05:38	05:26	05:43	06:14	06:46	07:19	06:57	07:26		10:34 (6)
	17:01	17:40	18:13	19:48	20:20	20:41	20:34	19:57	19:05	18:14	16:38	16:33	23	10:57 (6)
21	07:25	06:51	06:06	06:14	05:37	05:26	05:44	06:15	06:48	07:21	06:59	07:27		10:35 (6)
	17:02	17:41	18:15	19:49	20:21	20:41	20:33	19:55	19:03	18:13	16:37	16:33	23	10:58 (6)
22	07:25	06:50	06:04	06:12	05:36	05:26	05:45	06:16	06:49	07:22	07:00	07:27		10:35 (6)
	17:03	17:43	18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11	16:36	16:34	23	10:58 (6)
23	07:24	06:48	06:02	06:11	05:35	05:27	05:46	06:17	06:50	07:23	07:01	07:28		10:36 (6)
	17:04	17:44	18:17	19:51	20:23	20:42	20:31	19:52	19:00	18:10	16:36	16:34	23	10:59 (6)
24	07:23	06:47	06:01	06:09	05:35	05:27	05:47	06:18	06:51	07:24	07:02	07:28		10:36 (6)
	17:06	17:45	18:18	19:53	20:24	20:42	20:30	19:51	18:58	18:08	16:35	16:35	23	10:59 (6)
25	07:23	06:45	05:59	06:08	05:34	05:27	05:48	06:19	06:52	06:25	07:03	07:29		10:36 (6)
	17:07	17:46	18:19	19:54	20:25	20:42	20:29	19:49	18:56	17:07	16:35	16:35	23	10:59 (6)
26	07:22	06:44	05:57	06:07	05:33	05:28	05:49	06:20	06:53	06:27	07:04	07:29		10:38 (6)
	17:08	17:48	18:20	19:55	20:26	20:42	20:28	19:47	18:54	17:06	16:34	16:36	22	11:00 (6)
27	07:21	06:42	05:55	06:05	05:32	05:28	05:50	06:21	06:54	06:28	07:06	07:29		10:39 (6)
	17:09	17:49	18:21	19:56	20:27	20:42	20:27	19:46	18:53	17:04	16:33	16:37	20	10:59 (6)
28	07:20	06:41	05:54	06:04	05:32	05:28	05:51	06:22	06:55	06:29	07:07	07:30		10:40 (6)
	17:11	17:50	18:22	19:57	20:28	20:42	20:26	19:44	18:51	17:03	16:33	16:37	18	10:58 (6)
29	07:19		06:52	06:02	05:31	05:29	05:51	06:24	06:56	06:30	07:08	07:30		10:41 (6)
	17:12		19:24	19:58	20:29	20:42	20:25	19:43	18:49	17:01	16:33	16:38	17	10:58 (6)
30	07:18		06:50	06:01	05:31	05:29	05:52	06:25	06:57	06:31	07:09	07:30		10:44 (6)
	17:13		19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	16:39	13	10:57 (6)
31	07:17		06:48		05:30		05:53	06:26		06:33		07:30		10:47 (6)
	17:15		19:26		20:30		20:23	19:39		16:59		16:40	8	10:55 (6)
Potential sun hours	294	296	369	400	451	456	462	430	375	344	295	284		
Total, worst case													373	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: J - Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (10)

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	07:31		14:42 (6)	07:16		14:54 (6)	06:39	06:47	05:59	05:29
	16:41	63	15:45 (6)	17:16	97	16:52 (8)	17:51	19:27	20:00	20:31
2	07:31		14:42 (6)	07:15		14:54 (6)	06:37	06:45	05:58	05:29
	16:41	64	15:46 (6)	17:17	98	16:53 (8)	17:52	19:28	20:01	20:32
3	07:31		14:43 (6)	07:14		14:55 (6)	06:36	06:43	05:57	05:28
	16:42	63	15:46 (6)	17:18	98	16:54 (8)	17:54	19:29	20:02	20:32
4	07:31		14:43 (6)	07:13		14:56 (6)	06:34	06:42	05:55	05:28
	16:43	64	15:47 (6)	17:20	95	16:53 (8)	17:55	19:30	20:04	20:33
5	07:31		14:43 (6)	07:12		14:57 (6)	06:33	06:40	05:54	05:28
	16:44	65	15:48 (6)	17:21	93	16:53 (8)	17:56	19:31	20:05	20:34
6	07:31		14:43 (6)	07:11		14:58 (6)	06:31	06:38	05:53	05:27
	16:45	64	15:47 (6)	17:22	92	16:54 (8)	17:57	19:32	20:06	20:35
7	07:31		14:43 (6)	07:10		14:59 (6)	06:29	06:37	05:52	05:27
	16:46	65	15:48 (6)	17:24	90	16:54 (8)	17:58	19:34	20:07	20:35
8	07:31		14:44 (6)	07:09		15:01 (6)	06:28	06:35	05:50	05:27
	16:47	65	15:49 (6)	17:25	85	16:53 (8)	18:00	19:35	20:08	20:36
9	07:30		14:44 (6)	07:07		15:02 (6)	06:26	06:33	05:49	05:26
	16:48	66	15:50 (6)	17:26	82	16:52 (8)	18:01	19:36	20:09	20:36
10	07:30		14:44 (6)	07:06		15:03 (6)	06:24	06:32	05:48	05:26
	16:49	66	15:50 (6)	17:27	79	16:52 (8)	18:02	19:37	20:10	20:37
11	07:30		14:44 (6)	07:05		15:06 (6)	06:23	06:30	05:47	05:26
	16:50	67	15:51 (6)	17:29	73	16:51 (8)	18:03	19:38	20:11	20:38
12	07:30		14:45 (6)	07:04		15:08 (6)	06:21	06:28	05:46	05:26
	16:51	66	15:51 (6)	17:30	68	16:51 (8)	18:04	19:39	20:12	20:38
13	07:29		14:45 (6)	07:02		15:09 (6)	06:19	06:27	05:45	05:26
	16:52	66	15:51 (6)	17:31	62	16:49 (8)	18:05	19:40	20:13	20:39
14	07:29		14:45 (6)	07:01		15:12 (6)	06:18	06:25	05:44	05:26
	16:54	67	15:52 (6)	17:33	54	16:48 (8)	18:07	19:41	20:14	20:39
15	07:29		14:45 (6)	07:00		15:15 (6)	06:16	06:23	05:43	05:26
	16:55	67	15:52 (6)	17:34	43	16:45 (8)	18:08	19:42	20:15	20:40
16	07:28		14:46 (6)	06:58		15:21 (6)	06:14	06:22	05:42	05:26
	16:56	71	16:30 (8)	17:35	28	16:43 (8)	18:09	19:44	20:16	20:40
17	07:28		14:46 (6)	06:57		16:35 (8)	06:13	06:20	05:41	05:26
	16:57	75	16:31 (8)	17:36	2	16:37 (8)	18:10	19:45	20:17	20:40
18	07:27		14:47 (6)	06:56			06:11	06:19	05:40	05:26
	16:58	78	16:33 (8)	17:38			18:11	19:46	20:18	20:41
19	07:27		14:47 (6)	06:54			06:09	06:17	05:39	05:26
	16:59	80	16:34 (8)	17:39			18:12	19:47	20:19	20:41
20	07:26		14:47 (6)	06:53			06:07	06:15	05:38	05:26
	17:01	82	16:35 (8)	17:40			18:13	19:48	20:20	20:41
21	07:25		14:48 (6)	06:51			06:06	06:14	05:37	05:26
	17:02	85	16:37 (8)	17:41			18:15	19:49	20:21	20:41
22	07:25		14:48 (6)	06:50			06:04	06:12	05:36	05:26
	17:03	86	16:38 (8)	17:43			18:16	19:50	20:22	20:42
23	07:24		14:48 (6)	06:48			06:02	06:11	05:35	05:27
	17:04	88	16:39 (8)	17:44			18:17	19:51	20:23	20:42
24	07:23		14:48 (6)	06:47			06:00	06:09	05:34	05:27
	17:06	90	16:40 (8)	17:45			18:18	19:52	20:24	20:42
25	07:23		14:50 (6)	06:45			05:59	06:08	05:34	05:27
	17:07	91	16:42 (8)	17:46			18:19	19:54	20:25	20:42
26	07:22		14:50 (6)	06:44			05:57	06:06	05:33	05:28
	17:08	93	16:44 (8)	17:48			18:20	19:55	20:26	20:42
27	07:21		14:50 (6)	06:42			05:55	06:05	05:32	05:28
	17:09	95	16:45 (8)	17:49			18:21	19:56	20:27	20:42
28	07:20		14:51 (6)	06:41			05:54	06:04	05:32	05:28
	17:11	95	16:46 (8)	17:50			18:22	19:57	20:28	20:42
29	07:19		14:51 (6)				06:52	06:02	05:31	05:29
	17:12	97	16:48 (8)				19:24	19:58	20:28	20:42
30	07:18		14:52 (6)				06:50	06:01	05:30	05:29
	17:13	97	16:49 (8)				19:25	19:59	20:29	20:42
31	07:17		14:53 (6)				06:48		05:30	
	17:15	97	16:50 (8)				19:26		20:30	
Potential sun hours	294			296			369	400	451	456
Total, worst case		2378			1239					

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: J - Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (10)

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	05:30	05:54	06:27	06:58			06:34		14:33 (6)	07:10		14:26 (6)
	20:42	20:22	19:38	18:46			16:57	80	16:22 (8)	16:32	67	15:33 (6)
2	05:30	05:55	06:28	06:59			06:35		14:31 (6)	07:11		14:27 (6)
	20:42	20:21	19:36	18:44			16:56	84	16:22 (8)	16:32	66	15:33 (6)
3	05:31	05:56	06:29	07:00			06:36		14:30 (6)	07:12		14:27 (6)
	20:42	20:20	19:34	18:42			16:55	86	16:23 (8)	16:31	66	15:33 (6)
4	05:31	05:57	06:30	07:01			06:38		14:29 (6)	07:13		14:28 (6)
	20:42	20:19	19:33	18:40			16:54	89	16:23 (8)	16:31	65	15:33 (6)
5	05:32	05:58	06:31	07:02			06:39		14:28 (6)	07:14		14:28 (6)
	20:41	20:18	19:31	18:39			16:52	92	16:23 (8)	16:31	65	15:33 (6)
6	05:32	06:00	06:32	07:04			06:40		14:26 (6)	07:15		14:29 (6)
	20:41	20:16	19:29	18:37			16:51	94	16:23 (8)	16:31	64	15:33 (6)
7	05:33	06:01	06:33	07:05			06:41		14:26 (6)	07:16		14:29 (6)
	20:41	20:15	19:27	18:35			16:50	96	16:24 (8)	16:31	65	15:34 (6)
8	05:34	06:02	06:34	07:06			06:43		14:25 (6)	07:17		14:30 (6)
	20:40	20:14	19:26	18:34			16:49	98	16:24 (8)	16:30	64	15:34 (6)
9	05:34	06:03	06:35	07:07			06:44		14:24 (6)	07:18		14:31 (6)
	20:40	20:12	19:24	18:32			16:48	98	16:23 (8)	16:30	63	15:34 (6)
10	05:35	06:04	06:36	07:08			06:45		14:24 (6)	07:19		14:31 (6)
	20:40	20:11	19:22	18:30			16:47	98	16:23 (8)	16:30	64	15:35 (6)
11	05:36	06:05	06:37	07:09			06:46		14:24 (6)	07:20		14:32 (6)
	20:39	20:10	19:21	18:29			16:46	97	16:21 (8)	16:31	63	15:35 (6)
12	05:36	06:06	06:38	07:10			06:48		14:23 (6)	07:21		14:33 (6)
	20:39	20:08	19:19	18:27			16:45	97	16:20 (8)	16:31	63	15:36 (6)
13	05:37	06:07	06:39	07:11			06:49		14:23 (6)	07:21		14:34 (6)
	20:38	20:07	19:17	18:25			16:44	96	16:19 (8)	16:31	62	15:36 (6)
14	05:38	06:08	06:40	07:13			06:50		14:23 (6)	07:22		14:33 (6)
	20:38	20:06	19:15	18:24			16:43	95	16:18 (8)	16:31	63	15:36 (6)
15	05:39	06:09	06:41	07:14			06:51		14:22 (6)	07:23		14:34 (6)
	20:37	20:04	19:14	18:22			16:42	95	16:17 (8)	16:31	62	15:36 (6)
16	05:40	06:10	06:42	07:15			06:52		14:23 (6)	07:24		14:35 (6)
	20:36	20:03	19:12	18:21			16:41	93	16:17 (8)	16:31	62	15:37 (6)
17	05:40	06:11	06:43	07:16			06:54		14:23 (6)	07:24		14:35 (6)
	20:36	20:01	19:10	18:19			16:40	91	16:15 (8)	16:32	62	15:37 (6)
18	05:41	06:12	06:44	07:17			06:55		14:22 (6)	07:25		14:36 (6)
	20:35	20:00	19:08	18:17			16:39	90	16:14 (8)	16:32	61	15:37 (6)
19	05:42	06:13	06:45	07:18			06:56		14:23 (6)	07:26		14:37 (6)
	20:34	19:58	19:07	18:16			16:39	88	16:14 (8)	16:32	61	15:38 (6)
20	05:43	06:14	06:46	07:19			06:57		14:23 (6)	07:26		14:37 (6)
	20:34	19:57	19:05	18:14			16:38	86	16:13 (8)	16:33	61	15:38 (6)
21	05:44	06:15	06:47	07:21			06:59		14:23 (6)	07:27		14:38 (6)
	20:33	19:55	19:03	18:13			16:37	85	16:12 (8)	16:33	61	15:39 (6)
22	05:45	06:16	06:49	07:22			07:00		14:23 (6)	07:27		14:38 (6)
	20:32	19:54	19:01	18:11			16:36	82	16:11 (8)	16:34	61	15:39 (6)
23	05:46	06:17	06:50	07:23			07:01		14:24 (6)	07:28		14:39 (6)
	20:31	19:52	19:00	18:10			16:36	80	16:11 (8)	16:34	61	15:40 (6)
24	05:47	06:18	06:51	07:24			07:02		14:24 (6)	07:28		14:39 (6)
	20:30	19:51	18:58	18:08			16:35	78	16:10 (8)	16:35	61	15:40 (6)
25	05:48	06:19	06:52	06:25		16:02 (8)	07:03		14:24 (6)	07:29		14:39 (6)
	20:29	19:49	18:56	17:07	8	16:10 (8)	16:35	75	16:09 (8)	16:35	61	15:40 (6)
26	05:49	06:20	06:53	06:27		14:49 (6)	07:04		14:24 (6)	07:29		14:40 (6)
	20:28	19:47	18:54	17:06	32	16:13 (8)	16:34	71	16:08 (8)	16:36	62	15:42 (6)
27	05:50	06:21	06:54	06:28		14:44 (6)	07:06		14:25 (6)	07:29		14:40 (6)
	20:27	19:46	18:53	17:04	45	16:15 (8)	16:33	67	15:32 (6)	16:37	62	15:42 (6)
28	05:50	06:22	06:55	06:29		14:41 (6)	07:07		14:25 (6)	07:30		14:40 (6)
	20:26	19:44	18:51	17:03	56	16:18 (8)	16:33	67	15:32 (6)	16:37	62	15:42 (6)
29	05:51	06:24	06:56	06:30		14:39 (6)	07:08		14:26 (6)	07:30		14:40 (6)
	20:25	19:43	18:49	17:01	63	16:19 (8)	16:33	66	15:32 (6)	16:38	63	15:43 (6)
30	05:52	06:25	06:57	06:31		14:36 (6)	07:09		14:26 (6)	07:30		14:42 (6)
	20:24	19:41	18:47	17:00	69	16:20 (8)	16:32	67	15:33 (6)	16:39	62	15:44 (6)
31	05:53	06:26		06:33		14:35 (6)				07:30		14:42 (6)
	20:23	19:39		16:59	74	16:21 (8)				16:40	62	15:44 (6)
Potential sun hours	462	430	375	344			295			284		
Total, worst case					347			2581			1947	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: K - Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (11)

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	07:31		14:29 (6)	07:16		14:46 (6)	06:39	06:47	05:59	05:29
	16:41	71	15:40 (6)	17:16	99	16:52 (8)	17:51	19:27	20:00	20:31
2	07:31		14:29 (6)	07:15		14:47 (6)	06:37	06:45	05:58	05:29
	16:41	72	15:41 (6)	17:17	97	16:52 (8)	17:52	19:28	20:01	20:32
3	07:31		14:29 (6)	07:14		14:48 (6)	06:36	06:43	05:57	05:28
	16:42	72	15:41 (6)	17:18	96	16:53 (8)	17:54	19:29	20:02	20:32
4	07:31		14:30 (6)	07:13		14:49 (6)	06:34	06:42	05:55	05:28
	16:43	72	15:42 (6)	17:20	93	16:52 (8)	17:55	19:30	20:04	20:33
5	07:31		14:30 (6)	07:12		14:50 (6)	06:33	06:40	05:54	05:28
	16:44	72	15:42 (6)	17:21	89	16:51 (8)	17:56	19:31	20:05	20:34
6	07:31		14:30 (6)	07:11		14:52 (6)	06:31	06:38	05:53	05:27
	16:45	72	15:42 (6)	17:22	85	16:51 (8)	17:57	19:32	20:06	20:35
7	07:31		14:30 (6)	07:10		14:54 (6)	06:29	06:37	05:52	05:27
	16:46	73	15:43 (6)	17:24	82	16:51 (8)	17:58	19:34	20:07	20:35
8	07:31		14:31 (6)	07:09		14:56 (6)	06:28	06:35	05:50	05:27
	16:47	72	15:43 (6)	17:25	77	16:51 (8)	18:00	19:35	20:08	20:36
9	07:30		14:32 (6)	07:07		14:57 (6)	06:26	06:33	05:49	05:26
	16:48	72	15:44 (6)	17:26	72	16:49 (8)	18:01	19:36	20:09	20:36
10	07:30		14:31 (6)	07:06		15:00 (6)	06:24	06:32	05:48	05:26
	16:49	74	16:23 (8)	17:27	66	16:49 (8)	18:02	19:37	20:10	20:37
11	07:30		14:32 (6)	07:05		15:03 (6)	06:23	06:30	05:47	05:26
	16:50	77	16:24 (8)	17:29	58	16:48 (8)	18:03	19:38	20:11	20:38
12	07:30		14:33 (6)	07:04		15:07 (6)	06:21	06:28	05:46	05:26
	16:51	79	16:26 (8)	17:30	49	16:47 (8)	18:04	19:39	20:12	20:38
13	07:29		14:33 (6)	07:02		15:11 (6)	06:19	06:27	05:45	05:26
	16:52	81	16:26 (8)	17:31	35	16:44 (8)	18:05	19:40	20:13	20:39
14	07:29		14:34 (6)	07:01		16:26 (8)	06:18	06:25	05:44	05:26
	16:54	83	16:28 (8)	17:33	16	16:42 (8)	18:07	19:41	20:14	20:39
15	07:29		14:33 (6)	07:00		16:29 (8)	06:16	06:23	05:43	05:26
	16:55	86	16:29 (8)	17:34	8	16:37 (8)	18:08	19:42	20:15	20:40
16	07:28		14:34 (6)	06:58			06:14	06:22	05:42	05:26
	16:56	87	16:30 (8)	17:35			18:09	19:44	20:16	20:40
17	07:28		14:35 (6)	06:57			06:13	06:20	05:41	05:26
	16:57	87	16:31 (8)	17:36			18:10	19:45	20:17	20:40
18	07:27		14:36 (6)	06:56			06:11	06:19	05:40	05:26
	16:58	89	16:33 (8)	17:38			18:11	19:46	20:18	20:41
19	07:27		14:36 (6)	06:54			06:09	06:17	05:39	05:26
	16:59	91	16:34 (8)	17:39			18:12	19:47	20:19	20:41
20	07:26		14:36 (6)	06:53			06:07	06:15	05:38	05:26
	17:01	93	16:35 (8)	17:40			18:13	19:48	20:20	20:41
21	07:25		14:37 (6)	06:51			06:06	06:14	05:37	05:26
	17:02	95	16:37 (8)	17:41			18:15	19:49	20:21	20:41
22	07:25		14:37 (6)	06:50			06:04	06:12	05:36	05:26
	17:03	96	16:38 (8)	17:43			18:16	19:50	20:22	20:42
23	07:24		14:38 (6)	06:48			06:02	06:11	05:35	05:27
	17:04	96	16:39 (8)	17:44			18:17	19:51	20:23	20:42
24	07:23		14:38 (6)	06:47			06:00	06:09	05:34	05:27
	17:06	97	16:40 (8)	17:45			18:18	19:52	20:24	20:42
25	07:23		14:40 (6)	06:45			05:59	06:08	05:34	05:27
	17:07	97	16:42 (8)	17:46			18:19	19:54	20:25	20:42
26	07:22		14:40 (6)	06:44			05:57	06:06	05:33	05:28
	17:08	99	16:44 (8)	17:48			18:20	19:55	20:26	20:42
27	07:21		14:41 (6)	06:42			05:55	06:05	05:32	05:28
	17:09	100	16:45 (8)	17:49			18:21	19:56	20:27	20:42
28	07:20		14:42 (6)	06:41			05:54	06:04	05:32	05:28
	17:11	99	16:46 (8)	17:50			18:22	19:57	20:28	20:42
29	07:19		14:43 (6)				06:52	06:02	05:31	05:29
	17:12	100	16:48 (8)				19:24	19:58	20:28	20:42
30	07:18		14:44 (6)				06:50	06:01	05:30	05:29
	17:13	100	16:49 (8)				19:25	19:59	20:29	20:42
31	07:17		14:45 (6)				06:48		05:30	
	17:15	98	16:50 (8)				19:26		20:30	
Potential sun hours	294			296			369	400	451	456
Total, worst case		2652			1022					

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: K - Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (11)

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	05:30	05:54	06:27	06:58			06:34		14:29 (6)	07:10		14:14 (6)
	20:42	20:22	19:38	18:46			16:57	67	16:19 (8)	16:32	77	16:06 (8)
2	05:30	05:55	06:28	06:59			06:35		14:27 (6)	07:11		14:14 (6)
	20:42	20:21	19:36	18:44			16:56	73	16:19 (8)	16:32	74	16:06 (8)
3	05:31	05:56	06:29	07:00			06:36		14:25 (6)	07:12		14:15 (6)
	20:42	20:20	19:34	18:42			16:55	79	16:21 (8)	16:31	72	15:27 (6)
4	05:31	05:57	06:30	07:01			06:38		14:23 (6)	07:13		14:15 (6)
	20:42	20:19	19:33	18:40			16:54	83	16:21 (8)	16:31	72	15:27 (6)
5	05:32	05:58	06:31	07:03			06:39		14:21 (6)	07:14		14:15 (6)
	20:41	20:18	19:31	18:39			16:52	87	16:21 (8)	16:31	73	15:28 (6)
6	05:32	06:00	06:32	07:04			06:40		14:20 (6)	07:15		14:16 (6)
	20:41	20:16	19:29	18:37			16:51	89	16:21 (8)	16:31	72	15:28 (6)
7	05:33	06:01	06:33	07:05			06:41		14:19 (6)	07:16		14:16 (6)
	20:41	20:15	19:27	18:35			16:50	93	16:22 (8)	16:31	72	15:28 (6)
8	05:34	06:02	06:34	07:06			06:43		14:18 (6)	07:17		14:17 (6)
	20:40	20:14	19:26	18:34			16:49	96	16:22 (8)	16:31	72	15:29 (6)
9	05:34	06:03	06:35	07:07			06:44		14:17 (6)	07:18		14:17 (6)
	20:40	20:12	19:24	18:32			16:48	97	16:22 (8)	16:30	72	15:29 (6)
10	05:35	06:04	06:36	07:08			06:45		14:16 (6)	07:19		14:18 (6)
	20:40	20:11	19:22	18:30			16:47	100	16:23 (8)	16:30	72	15:30 (6)
11	05:36	06:05	06:37	07:09			06:46		14:15 (6)	07:20		14:19 (6)
	20:39	20:10	19:21	18:29			16:46	100	16:21 (8)	16:31	71	15:30 (6)
12	05:37	06:06	06:38	07:10			06:48		14:14 (6)	07:21		14:19 (6)
	20:39	20:08	19:19	18:27			16:45	101	16:20 (8)	16:31	72	15:31 (6)
13	05:37	06:07	06:39	07:11			06:49		14:15 (6)	07:21		14:20 (6)
	20:38	20:07	19:17	18:25			16:44	99	16:19 (8)	16:31	71	15:31 (6)
14	05:38	06:08	06:40	07:13			06:50		14:14 (6)	07:22		14:20 (6)
	20:38	20:06	19:15	18:24			16:43	99	16:18 (8)	16:31	71	15:31 (6)
15	05:39	06:09	06:41	07:14			06:51		14:13 (6)	07:23		14:20 (6)
	20:37	20:04	19:14	18:22			16:42	100	16:17 (8)	16:31	72	15:32 (6)
16	05:40	06:10	06:42	07:15			06:52		14:13 (6)	07:24		14:21 (6)
	20:36	20:03	19:12	18:21			16:41	100	16:17 (8)	16:31	71	15:32 (6)
17	05:40	06:11	06:43	07:16			06:54		14:13 (6)	07:24		14:21 (6)
	20:36	20:01	19:10	18:19			16:40	97	16:15 (8)	16:32	71	15:32 (6)
18	05:41	06:12	06:44	07:17			06:55		14:12 (6)	07:25		14:22 (6)
	20:35	20:00	19:08	18:17			16:39	97	16:14 (8)	16:32	71	15:33 (6)
19	05:42	06:13	06:45	07:18			06:56		14:13 (6)	07:26		14:23 (6)
	20:34	19:58	19:07	18:16			16:39	96	16:14 (8)	16:32	71	15:34 (6)
20	05:43	06:14	06:46	07:19			06:57		14:13 (6)	07:26		14:23 (6)
	20:34	19:57	19:05	18:14			16:38	95	16:13 (8)	16:33	71	15:34 (6)
21	05:44	06:15	06:47	07:21			06:59		14:12 (6)	07:27		14:24 (6)
	20:33	19:55	19:03	18:13			16:37	95	16:12 (8)	16:33	71	15:35 (6)
22	05:45	06:16	06:49	07:22			07:00		14:12 (6)	07:27		14:24 (6)
	20:32	19:54	19:01	18:11			16:36	93	16:11 (8)	16:34	71	15:35 (6)
23	05:46	06:17	06:50	07:23			07:01		14:13 (6)	07:28		14:25 (6)
	20:31	19:52	19:00	18:10			16:36	91	16:11 (8)	16:34	71	15:36 (6)
24	05:47	06:18	06:51	07:24			07:02		14:13 (6)	07:28		14:25 (6)
	20:30	19:51	18:58	18:08			16:35	89	16:10 (8)	16:35	71	15:36 (6)
25	05:48	06:19	06:52	06:25			07:03		14:13 (6)	07:29		14:25 (6)
	20:29	19:49	18:56	17:07			16:35	87	16:09 (8)	16:35	71	15:36 (6)
26	05:49	06:20	06:53	06:27			07:04		14:13 (6)	07:29		14:26 (6)
	20:28	19:47	18:54	17:06			16:34	86	16:08 (8)	16:36	71	15:37 (6)
27	05:50	06:21	06:54	06:28		15:58 (8)	07:06		14:14 (6)	07:29		14:26 (6)
	20:27	19:46	18:53	17:04	10	16:08 (8)	16:33	85	16:09 (8)	16:37	71	15:37 (6)
28	05:50	06:22	06:55	06:29		15:55 (8)	07:07		14:14 (6)	07:30		14:26 (6)
	20:26	19:44	18:51	17:03	17	16:12 (8)	16:33	83	16:08 (8)	16:37	72	15:38 (6)
29	05:51	06:24	06:56	06:30		14:39 (6)	07:08		14:14 (6)	07:30		14:27 (6)
	20:25	19:43	18:49	17:01	39	16:14 (8)	16:33	81	16:07 (8)	16:38	71	15:38 (6)
30	05:52	06:25	06:57	06:31		14:35 (6)	07:09		14:14 (6)	07:30		14:28 (6)
	20:24	19:41	18:47	17:00	51	16:16 (8)	16:32	79	16:07 (8)	16:39	71	15:39 (6)
31	05:53	06:26		06:33		14:32 (6)				07:30		14:28 (6)
	20:23	19:39		16:59	61	16:18 (8)				16:40	72	15:40 (6)
Potential sun hours	462	430	375	344			295			284		
Total, worst case					178			2717			2223	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: L - Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (12)

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	07:31		15:25 (6)	07:16		15:14 (6)	06:39	06:47	05:59	05:29
	16:41	20	15:45 (6)	17:16	84	16:52 (8)	17:51	19:27	20:00	20:31
2	07:31		15:24 (6)	07:15		15:14 (6)	06:37	06:45	05:58	05:29
	16:41	22	15:46 (6)	17:17	86	16:53 (8)	17:52	19:28	20:01	20:32
3	07:31		15:23 (6)	07:14		15:14 (6)	06:36	06:43	05:57	05:28
	16:42	25	15:48 (6)	17:18	88	16:55 (8)	17:54	19:29	20:02	20:32
4	07:31		15:23 (6)	07:13		15:13 (6)	06:34	06:42	05:55	05:28
	16:43	26	15:49 (6)	17:20	91	16:55 (8)	17:55	19:30	20:04	20:33
5	07:31		15:22 (6)	07:12		15:14 (6)	06:33	06:40	05:54	05:28
	16:44	29	15:51 (6)	17:21	92	16:57 (8)	17:56	19:31	20:05	20:34
6	07:31		15:21 (6)	07:11		15:14 (6)	06:31	06:38	05:53	05:27
	16:45	30	15:51 (6)	17:22	94	16:58 (8)	17:57	19:32	20:06	20:35
7	07:31		15:21 (6)	07:10		15:14 (6)	06:29	06:37	05:52	05:27
	16:46	32	15:53 (6)	17:24	97	17:00 (8)	17:58	19:34	20:07	20:35
8	07:31		15:20 (6)	07:09		15:15 (6)	06:28	06:35	05:50	05:27
	16:47	35	15:55 (6)	17:25	98	17:02 (8)	18:00	19:35	20:08	20:36
9	07:30		15:20 (6)	07:07		15:15 (6)	06:26	06:33	05:49	05:26
	16:48	36	15:56 (6)	17:26	98	17:02 (8)	18:01	19:36	20:09	20:36
10	07:30		15:19 (6)	07:06		15:15 (6)	06:24	06:32	05:48	05:26
	16:49	38	15:57 (6)	17:27	98	17:03 (8)	18:02	19:37	20:10	20:37
11	07:30		15:19 (6)	07:05		15:16 (6)	06:23	06:30	05:47	05:26
	16:50	39	15:58 (6)	17:29	97	17:03 (8)	18:03	19:38	20:11	20:38
12	07:30		15:19 (6)	07:04		15:17 (6)	06:21	06:28	05:46	05:26
	16:51	41	16:00 (6)	17:30	96	17:03 (8)	18:04	19:39	20:12	20:38
13	07:29		15:18 (6)	07:02		15:17 (6)	06:19	06:27	05:45	05:26
	16:52	43	16:01 (6)	17:31	95	17:03 (8)	18:05	19:40	20:13	20:39
14	07:29		15:18 (6)	07:01		15:18 (6)	06:18	06:25	05:44	05:26
	16:54	44	16:02 (6)	17:33	93	17:03 (8)	18:07	19:41	20:14	20:39
15	07:29		15:17 (6)	07:00		15:18 (6)	06:16	06:23	05:43	05:26
	16:55	46	16:03 (6)	17:34	92	17:02 (8)	18:08	19:42	20:15	20:39
16	07:28		15:17 (6)	06:58		15:19 (6)	06:14	06:22	05:42	05:26
	16:56	47	16:04 (6)	17:35	89	17:02 (8)	18:09	19:44	20:16	20:40
17	07:28		15:16 (6)	06:57		15:21 (6)	06:13	06:20	05:41	05:26
	16:57	49	16:05 (6)	17:36	85	17:01 (8)	18:10	19:45	20:17	20:40
18	07:27		15:16 (6)	06:56		15:21 (6)	06:11	06:19	05:40	05:26
	16:58	51	16:07 (6)	17:38	82	17:00 (8)	18:11	19:46	20:18	20:41
19	07:27		15:16 (6)	06:54		15:23 (6)	06:09	06:17	05:39	05:26
	16:59	51	16:07 (6)	17:39	77	16:59 (8)	18:12	19:47	20:19	20:41
20	07:26		15:15 (6)	06:53		15:23 (6)	06:07	06:15	05:38	05:26
	17:01	53	16:08 (6)	17:40	72	16:57 (8)	18:13	19:48	20:20	20:41
21	07:25		15:15 (6)	06:51		15:25 (6)	06:06	06:14	05:37	05:26
	17:02	55	16:10 (6)	17:41	67	16:56 (8)	18:15	19:49	20:21	20:41
22	07:25		15:15 (6)	06:50		15:26 (6)	06:04	06:12	05:36	05:26
	17:03	55	16:10 (6)	17:43	59	16:53 (8)	18:16	19:50	20:22	20:42
23	07:24		15:14 (6)	06:48		15:29 (6)	06:02	06:11	05:35	05:27
	17:04	57	16:11 (6)	17:44	48	16:50 (8)	18:17	19:51	20:23	20:42
24	07:23		15:14 (6)	06:47		15:31 (6)	06:00	06:09	05:34	05:27
	17:06	57	16:11 (6)	17:45	33	16:04 (6)	18:18	19:52	20:24	20:42
25	07:23		15:15 (6)	06:45		15:34 (6)	05:59	06:08	05:34	05:27
	17:07	58	16:13 (6)	17:46	28	16:02 (6)	18:19	19:54	20:25	20:42
26	07:22		15:14 (6)	06:44		15:37 (6)	05:57	06:06	05:33	05:28
	17:08	60	16:14 (6)	17:48	21	15:58 (6)	18:20	19:55	20:26	20:42
27	07:21		15:14 (6)	06:42		15:43 (6)	05:55	06:05	05:32	05:28
	17:09	60	16:14 (6)	17:49	10	15:53 (6)	18:21	19:56	20:27	20:42
28	07:20		15:14 (6)	06:41			05:54	06:04	05:32	05:28
	17:11	69	16:46 (8)	17:50			18:22	19:57	20:28	20:42
29	07:19		15:14 (6)				06:52	06:02	05:31	05:29
	17:12	74	16:48 (8)				19:24	19:58	20:28	20:42
30	07:18		15:14 (6)				06:50	06:01	05:30	05:29
	17:13	77	16:49 (8)				19:25	19:59	20:29	20:42
31	07:17		15:14 (6)				06:48		05:30	
	17:15	80	16:50 (8)				19:26		20:30	
Potential sun hours	294			296			369	400	451	456
Total, worst case		1459			2070					

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

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

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SHADOW - Calendar

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Assumptions for shadow calculations

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The sun is shining all the day, from sunrise to sunset
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The WTG is always operating

	July	August	September	October			November			December		
1	05:30	05:54	06:27	06:58			06:34		14:45 (6)	07:10		15:01 (6)
	20:42	20:22	19:38	18:46			16:57	98	16:32 (8)	16:32	39	15:40 (6)
2	05:30	05:55	06:28	06:59			06:35		14:44 (6)	07:11		15:02 (6)
	20:42	20:21	19:36	18:44			16:56	99	16:32 (8)	16:32	38	15:40 (6)
3	05:31	05:56	06:29	07:00			06:36		14:45 (6)	07:12		15:03 (6)
	20:42	20:20	19:34	18:42			16:55	97	16:31 (8)	16:31	36	15:39 (6)
4	05:31	05:57	06:30	07:01			06:38		14:44 (6)	07:13		15:04 (6)
	20:42	20:19	19:33	18:40			16:54	96	16:30 (8)	16:31	35	15:39 (6)
5	05:32	05:58	06:31	07:02			06:39		14:44 (6)	07:14		15:06 (6)
	20:41	20:18	19:31	18:39			16:52	94	16:28 (8)	16:31	32	15:38 (6)
6	05:32	06:00	06:32	07:04			06:40		14:43 (6)	07:15		15:07 (6)
	20:41	20:16	19:29	18:37			16:51	93	16:27 (8)	16:31	31	15:38 (6)
7	05:33	06:01	06:33	07:05			06:41		14:44 (6)	07:16		15:08 (6)
	20:41	20:15	19:27	18:35			16:50	91	16:26 (8)	16:31	29	15:37 (6)
8	05:34	06:02	06:34	07:06			06:43		14:44 (6)	07:17		15:10 (6)
	20:40	20:14	19:26	18:34			16:49	87	16:24 (8)	16:30	27	15:37 (6)
9	05:34	06:03	06:35	07:07			06:44		14:44 (6)	07:18		15:11 (6)
	20:40	20:12	19:24	18:32			16:48	86	16:23 (8)	16:30	25	15:36 (6)
10	05:35	06:04	06:36	07:08			06:45		14:45 (6)	07:19		15:13 (6)
	20:40	20:11	19:22	18:30			16:47	83	16:23 (8)	16:30	23	15:36 (6)
11	05:36	06:05	06:37	07:09			06:46		14:45 (6)	07:20		15:15 (6)
	20:39	20:10	19:21	18:29			16:46	80	16:21 (8)	16:31	20	15:35 (6)
12	05:36	06:06	06:38	07:10			06:47		14:45 (6)	07:21		15:16 (6)
	20:39	20:08	19:19	18:27			16:45	77	16:20 (8)	16:31	19	15:35 (6)
13	05:37	06:07	06:39	07:11			06:49		14:46 (6)	07:21		15:18 (6)
	20:38	20:07	19:17	18:25			16:44	73	16:19 (8)	16:31	16	15:34 (6)
14	05:38	06:08	06:40	07:13			06:50		14:46 (6)	07:22		15:19 (6)
	20:38	20:06	19:15	18:24			16:43	69	16:18 (8)	16:31	14	15:33 (6)
15	05:39	06:09	06:41	07:14		16:12 (6)	06:51		14:46 (6)	07:23		15:21 (6)
	20:37	20:04	19:14	18:22	15	16:27 (6)	16:42	60	15:46 (6)	16:31	11	15:32 (6)
16	05:40	06:10	06:42	07:15		16:08 (6)	06:52		14:47 (6)	07:24		15:23 (6)
	20:36	20:03	19:12	18:21	24	16:32 (6)	16:41	60	15:47 (6)	16:31	9	15:32 (6)
17	05:40	06:11	06:43	07:16		16:04 (6)	06:54		14:48 (6)	07:24		15:24 (6)
	20:36	20:01	19:10	18:19	30	16:34 (6)	16:40	58	15:46 (6)	16:32	6	15:30 (6)
18	05:41	06:12	06:44	07:17		16:01 (6)	06:55		14:48 (6)	07:25		
	20:35	20:00	19:08	18:17	35	16:36 (6)	16:39	57	15:45 (6)	16:32		
19	05:42	06:13	06:45	07:18		15:59 (6)	06:56		14:49 (6)	07:26		
	20:34	19:58	19:07	18:16	51	17:22 (8)	16:39	57	15:46 (6)	16:32		
20	05:43	06:14	06:46	07:19		15:57 (6)	06:57		14:50 (6)	07:26		
	20:34	19:57	19:05	18:14	63	17:26 (8)	16:38	55	15:45 (6)	16:33		
21	05:44	06:15	06:47	07:21		15:55 (6)	06:58		14:50 (6)	07:27		
	20:33	19:55	19:03	18:13	68	17:27 (8)	16:37	55	15:45 (6)	16:33		
22	05:45	06:16	06:49	07:22		15:54 (6)	07:00		14:51 (6)	07:27		
	20:32	19:54	19:01	18:11	73	17:28 (8)	16:36	53	15:44 (6)	16:34		
23	05:46	06:17	06:50	07:23		15:52 (6)	07:01		14:53 (6)	07:28		
	20:31	19:52	19:00	18:10	79	17:29 (8)	16:36	51	15:44 (6)	16:34		
24	05:47	06:18	06:51	07:24		15:51 (6)	07:02		14:53 (6)	07:28		
	20:30	19:51	18:58	18:08	84	17:31 (8)	16:35	51	15:44 (6)	16:35		
25	05:48	06:19	06:52	06:25		14:50 (6)	07:03		14:54 (6)	07:29		
	20:29	19:49	18:56	17:07	86	16:31 (8)	16:35	49	15:43 (6)	16:35		
26	05:49	06:20	06:53	06:27		14:49 (6)	07:04		14:55 (6)	07:29		15:30 (6)
	20:28	19:47	18:54	17:06	88	16:31 (8)	16:34	48	15:43 (6)	16:36	4	15:34 (6)
27	05:50	06:21	06:54	06:28		14:47 (6)	07:06		14:57 (6)	07:29		15:28 (6)
	20:27	19:46	18:53	17:04	92	16:31 (8)	16:33	46	15:43 (6)	16:37	8	15:36 (6)
28	05:50	06:22	06:55	06:29		14:47 (6)	07:07		14:58 (6)	07:30		15:27 (6)
	20:26	19:44	18:51	17:03	94	16:32 (8)	16:33	44	15:42 (6)	16:37	11	15:38 (6)
29	05:51	06:24	06:56	06:30		14:46 (6)	07:08		14:59 (6)	07:30		15:26 (6)
	20:25	19:43	18:49	17:01	95	16:32 (8)	16:33	43	15:42 (6)	16:38	13	15:39 (6)
30	05:52	06:25	06:57	06:31		14:45 (6)	07:09		15:00 (6)	07:30		15:26 (6)
	20:24	19:41	18:47	17:00	97	16:32 (8)	16:32	41	15:41 (6)	16:39	16	15:42 (6)
31	05:53	06:26		06:33		14:46 (6)				07:30		15:26 (6)
	20:23	19:39		16:59	97	16:33 (8)				16:40	17	15:43 (6)
Potential sun hours	462	430	375	344			295			284		
Total, worst case					1171			2051			479	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: M - Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (13)

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	07:31			07:16		15:18 (6)	06:39		15:33 (6)	06:47	05:59	05:29
	16:41			17:16	74	16:52 (8)	17:51	35	16:08 (6)	19:27	20:00	20:31
2	07:31			07:15		15:18 (6)	06:37		15:36 (6)	06:45	05:58	05:29
	16:41			17:17	77	16:53 (8)	17:52	30	16:06 (6)	19:28	20:01	20:32
3	07:31			07:14		15:18 (6)	06:36		15:39 (6)	06:43	05:57	05:28
	16:42			17:18	82	16:55 (8)	17:54	23	16:02 (6)	19:29	20:02	20:32
4	07:31			07:13		15:17 (6)	06:34		15:44 (6)	06:42	05:55	05:28
	16:43			17:20	85	16:55 (8)	17:55	13	15:57 (6)	19:30	20:04	20:33
5	07:31			07:12		15:17 (6)	06:33			06:40	05:54	05:28
	16:44			17:21	88	16:57 (8)	17:56			19:31	20:05	20:34
6	07:31			07:11		15:17 (6)	06:31			06:38	05:53	05:27
	16:45			17:22	90	16:58 (8)	17:57			19:32	20:06	20:35
7	07:31			07:10		15:17 (6)	06:29			06:37	05:52	05:27
	16:46			17:24	93	17:00 (8)	17:58			19:34	20:07	20:35
8	07:31			07:09		15:17 (6)	06:28			06:35	05:50	05:27
	16:47			17:25	96	17:02 (8)	18:00			19:35	20:08	20:36
9	07:30			07:07		15:17 (6)	06:26			06:33	05:49	05:26
	16:48			17:26	97	17:02 (8)	18:01			19:36	20:09	20:36
10	07:30		15:39 (6)	07:06		15:17 (6)	06:24			06:32	05:48	05:26
	16:49	6	15:45 (6)	17:27	100	17:04 (8)	18:02			19:37	20:10	20:37
11	07:30		15:35 (6)	07:05		15:18 (6)	06:23			06:30	05:47	05:26
	16:50	15	15:50 (6)	17:29	101	17:06 (8)	18:03			19:38	20:11	20:38
12	07:30		15:34 (6)	07:04		15:18 (6)	06:21			06:28	05:46	05:26
	16:51	19	15:53 (6)	17:30	102	17:07 (8)	18:04			19:39	20:12	20:38
13	07:29		15:31 (6)	07:02		15:18 (6)	06:19			06:27	05:45	05:26
	16:52	24	15:55 (6)	17:31	101	17:06 (8)	18:05			19:40	20:13	20:39
14	07:29		15:30 (6)	07:01		15:18 (6)	06:18			06:25	05:44	05:26
	16:54	27	15:57 (6)	17:33	102	17:07 (8)	18:07			19:41	20:14	20:39
15	07:29		15:29 (6)	07:00		15:18 (6)	06:16			06:23	05:43	05:26
	16:55	30	15:59 (6)	17:34	101	17:06 (8)	18:08			19:42	20:15	20:39
16	07:28		15:28 (6)	06:58		15:19 (6)	06:14			06:22	05:42	05:26
	16:56	33	16:01 (6)	17:35	99	17:06 (8)	18:09			19:44	20:16	20:40
17	07:28		15:27 (6)	06:57		15:20 (6)	06:13			06:20	05:41	05:26
	16:57	36	16:03 (6)	17:36	97	17:06 (8)	18:10			19:45	20:17	20:40
18	07:27		15:26 (6)	06:56		15:20 (6)	06:11			06:19	05:40	05:26
	16:58	39	16:05 (6)	17:38	96	17:05 (8)	18:11			19:46	20:18	20:41
19	07:27		15:25 (6)	06:54		15:21 (6)	06:09			06:17	05:39	05:26
	16:59	41	16:06 (6)	17:39	94	17:05 (8)	18:12			19:47	20:19	20:41
20	07:26		15:24 (6)	06:53		15:21 (6)	06:07			06:15	05:38	05:26
	17:01	43	16:07 (6)	17:40	91	17:04 (8)	18:13			19:48	20:20	20:41
21	07:25		15:24 (6)	06:51		15:22 (6)	06:06			06:14	05:37	05:26
	17:02	45	16:09 (6)	17:41	88	17:03 (8)	18:15			19:49	20:21	20:41
22	07:25		15:23 (6)	06:50		15:23 (6)	06:04			06:12	05:36	05:26
	17:03	47	16:10 (6)	17:43	84	17:02 (8)	18:16			19:50	20:22	20:42
23	07:24		15:22 (6)	06:48		15:24 (6)	06:02			06:11	05:35	05:27
	17:04	49	16:11 (6)	17:44	80	17:01 (8)	18:17			19:51	20:23	20:42
24	07:23		15:21 (6)	06:47		15:25 (6)	06:00			06:09	05:34	05:27
	17:06	51	16:12 (6)	17:45	74	16:59 (8)	18:18			19:52	20:24	20:42
25	07:23		15:22 (6)	06:45		15:27 (6)	05:59			06:08	05:34	05:27
	17:07	52	16:14 (6)	17:46	67	16:57 (8)	18:19			19:54	20:25	20:42
26	07:22		15:21 (6)	06:44		15:28 (6)	05:57			06:06	05:33	05:28
	17:08	54	16:15 (6)	17:48	57	16:53 (8)	18:20			19:55	20:26	20:42
27	07:21		15:20 (6)	06:42		15:30 (6)	05:55			06:05	05:32	05:28
	17:09	56	16:16 (6)	17:49	43	16:13 (6)	18:21			19:56	20:27	20:42
28	07:20		15:20 (6)	06:41		15:31 (6)	05:54			06:04	05:32	05:28
	17:11	57	16:17 (6)	17:50	39	16:10 (6)	18:22			19:57	20:28	20:42
29	07:19		15:19 (6)				06:52			06:02	05:31	05:29
	17:12	58	16:17 (6)				19:24			19:58	20:28	20:42
30	07:18		15:19 (6)				06:50			06:01	05:30	05:29
	17:13	59	16:18 (6)				19:25			19:59	20:29	20:42
31	07:17		15:19 (6)				06:48				05:30	
	17:15	66	16:50 (8)				19:26				20:30	
Potential sun hours	294			296			369			400	451	456
Total, worst case		907			2398			101				

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:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: M - Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (13)

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	05:30	05:54	06:27	06:58			06:34		14:47 (6)	07:10		15:17 (6)
	20:42	20:22	19:38	18:46			16:57	98	16:33 (8)	16:32	15	15:32 (6)
2	05:30	05:55	06:28	06:59			06:35		14:47 (6)	07:11		15:22 (6)
	20:42	20:21	19:36	18:44			16:56	97	16:32 (8)	16:32	6	15:28 (6)
3	05:31	05:56	06:29	07:00			06:36		14:47 (6)	07:12		
	20:42	20:20	19:34	18:42			16:55	95	16:31 (8)	16:31		
4	05:31	05:57	06:30	07:01			06:38		14:47 (6)	07:13		
	20:42	20:19	19:33	18:40			16:54	93	16:30 (8)	16:31		
5	05:32	05:58	06:31	07:02			06:39		14:47 (6)	07:14		
	20:41	20:18	19:31	18:39			16:52	90	16:28 (8)	16:31		
6	05:32	06:00	06:32	07:04			06:40		14:47 (6)	07:15		
	20:41	20:16	19:29	18:37			16:51	88	16:27 (8)	16:31		
7	05:33	06:01	06:33	07:05			06:41		14:48 (6)	07:16		
	20:41	20:15	19:27	18:35			16:50	84	16:26 (8)	16:31		
8	05:34	06:02	06:34	07:06			06:43		14:48 (6)	07:17		
	20:40	20:14	19:26	18:34			16:49	81	16:24 (8)	16:30		
9	05:34	06:03	06:35	07:07			06:44		14:48 (6)	07:18		
	20:40	20:12	19:24	18:32			16:48	77	16:23 (8)	16:30		
10	05:35	06:04	06:36	07:08		16:16 (6)	06:45		14:49 (6)	07:19		
	20:40	20:11	19:22	18:30	19	16:35 (6)	16:47	73	16:23 (8)	16:30		
11	05:36	06:05	06:37	07:09		16:12 (6)	06:46		14:50 (6)	07:20		
	20:39	20:10	19:21	18:29	26	16:38 (6)	16:46	64	16:20 (8)	16:31		
12	05:36	06:06	06:38	07:10		16:08 (6)	06:47		14:50 (6)	07:21		
	20:39	20:08	19:19	18:27	32	16:40 (6)	16:45	59	15:49 (6)	16:31		
13	05:37	06:07	06:39	07:11		16:05 (6)	06:49		14:51 (6)	07:21		
	20:38	20:07	19:17	18:25	37	16:42 (6)	16:44	58	15:49 (6)	16:31		
14	05:38	06:08	06:40	07:13		16:03 (6)	06:50		14:52 (6)	07:22		
	20:38	20:06	19:15	18:24	41	16:44 (6)	16:43	56	15:48 (6)	16:31		
15	05:39	06:09	06:41	07:14		16:01 (6)	06:51		14:52 (6)	07:23		
	20:37	20:04	19:14	18:22	44	16:45 (6)	16:42	56	15:48 (6)	16:31		
16	05:40	06:10	06:42	07:15		16:00 (6)	06:52		14:54 (6)	07:24		
	20:36	20:03	19:12	18:21	61	17:27 (8)	16:41	54	15:48 (6)	16:31		
17	05:40	06:11	06:43	07:16		15:58 (6)	06:54		14:55 (6)	07:24		
	20:36	20:01	19:10	18:19	68	17:29 (8)	16:40	52	15:47 (6)	16:32		
18	05:41	06:12	06:44	07:17		15:56 (6)	06:55		14:55 (6)	07:25		
	20:35	20:00	19:08	18:17	76	17:31 (8)	16:39	51	15:46 (6)	16:32		
19	05:42	06:13	06:45	07:18		15:54 (6)	06:56		14:57 (6)	07:26		
	20:34	19:58	19:07	18:16	82	17:32 (8)	16:39	49	15:46 (6)	16:32		
20	05:43	06:14	06:46	07:19		15:54 (6)	06:57		14:58 (6)	07:26		
	20:34	19:57	19:05	18:14	85	17:34 (8)	16:38	47	15:45 (6)	16:33		
21	05:44	06:15	06:47	07:21		15:53 (6)	06:58		14:59 (6)	07:27		
	20:33	19:55	19:03	18:13	88	17:34 (8)	16:37	45	15:44 (6)	16:33		
22	05:45	06:16	06:49	07:22		15:51 (6)	07:00		15:00 (6)	07:27		
	20:32	19:54	19:01	18:11	93	17:35 (8)	16:36	43	15:43 (6)	16:34		
23	05:46	06:17	06:50	07:23		15:50 (6)	07:01		15:02 (6)	07:28		
	20:31	19:52	19:00	18:10	95	17:35 (8)	16:36	41	15:43 (6)	16:34		
24	05:47	06:18	06:51	07:24		15:50 (6)	07:02		15:03 (6)	07:28		
	20:30	19:51	18:58	18:08	97	17:36 (8)	16:35	39	15:42 (6)	16:35		
25	05:48	06:19	06:52	06:25		14:49 (6)	07:03		15:05 (6)	07:29		
	20:29	19:49	18:56	17:07	99	16:36 (8)	16:35	36	15:41 (6)	16:35		
26	05:49	06:20	06:53	06:27		14:48 (6)	07:04		15:06 (6)	07:29		
	20:28	19:47	18:54	17:06	100	16:36 (8)	16:34	33	15:39 (6)	16:36		
27	05:50	06:21	06:54	06:28		14:48 (6)	07:06		15:09 (6)	07:29		
	20:27	19:46	18:53	17:04	101	16:36 (8)	16:33	30	15:39 (6)	16:37		
28	05:50	06:22	06:55	06:29		14:48 (6)	07:07		15:10 (6)	07:30		
	20:26	19:44	18:51	17:03	100	16:36 (8)	16:33	28	15:38 (6)	16:37		
29	05:51	06:24	06:56	06:30		14:47 (6)	07:08		15:12 (6)	07:30		
	20:25	19:43	18:49	17:01	102	16:36 (8)	16:33	24	15:36 (6)	16:38		
30	05:52	06:25	06:57	06:31		14:47 (6)	07:09		15:15 (6)	07:30		
	20:24	19:41	18:47	17:00	101	16:35 (8)	16:32	19	15:34 (6)	16:39		
31	05:53	06:26		06:33		14:47 (6)				07:30		
	20:23	19:39		16:59	101	16:35 (8)				16:40		
Potential sun hours	462	430	375	344			295			284		
Total, worst case					1648			1760			21	

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: N - Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (14)

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	07:31		07:16		15:27 (6)	06:39	15:31 (6)	06:47	05:59	05:29	05:30	05:54	06:27	06:58		06:34	14:53 (6)	07:10
	16:41		07:16	54	16:21 (6)	17:51	48 16:19 (6)	19:27	20:00	20:31	20:42	20:22	19:38	18:46		16:57	92 16:33 (8)	16:32
2	07:31		07:15		15:26 (6)	06:37	15:34 (6)	06:45	05:58	05:29	05:30	05:55	06:28	06:59		06:35	14:53 (6)	07:11
	16:41		07:17	56	16:22 (6)	17:52	44 16:18 (6)	19:28	20:01	20:32	20:42	20:21	19:36	18:44		16:56	90 16:32 (8)	16:32
3	07:31		07:14		15:26 (6)	06:36	15:35 (6)	06:43	05:57	05:28	05:31	05:56	06:29	07:00		06:36	14:54 (6)	07:12
	16:42		07:18	65	16:54 (8)	17:54	41 16:16 (6)	19:29	20:02	20:32	20:42	20:20	19:34	18:42		16:55	87 16:31 (8)	16:31
4	07:31		07:13		15:24 (6)	06:34	15:36 (6)	06:42	05:55	05:28	05:31	05:57	06:30	07:01		06:38	14:54 (6)	07:13
	16:43		07:20	72	16:55 (8)	17:55	37 16:13 (6)	19:30	20:04	20:33	20:42	20:19	19:33	18:40		16:54	84 16:30 (8)	16:31
5	07:31		07:12		15:24 (6)	06:33	15:39 (6)	06:40	05:54	05:28	05:32	05:58	06:31	07:02		06:39	14:54 (6)	07:14
	16:44		07:21	77	16:57 (8)	17:56	33 16:12 (6)	19:31	20:05	20:34	20:41	20:18	19:31	18:39		16:52	81 16:28 (8)	16:31
6	07:31		07:11		15:24 (6)	06:31	15:42 (6)	06:38	05:53	05:27	05:32	06:00	06:32	07:04	16:25 (6)	06:40	14:54 (6)	07:15
	16:45		07:22	81	16:58 (8)	17:57	26 16:08 (6)	19:32	20:06	20:35	20:41	20:16	19:29	18:37	13 16:38 (6)	16:51	77 16:27 (8)	16:31
7	07:31		07:10		15:24 (6)	06:29	15:45 (6)	06:37	05:52	05:27	05:33	06:01	06:33	07:05	16:19 (6)	06:41	14:55 (6)	07:16
	16:46		07:24	85	17:00 (8)	17:58	19 16:04 (6)	19:34	20:07	20:35	20:41	20:15	19:27	18:35	23 16:42 (6)	16:50	72 16:26 (8)	16:31
8	07:31		07:09		15:24 (6)	06:28		06:35	05:50	05:27	05:34	06:02	06:34	07:06	16:16 (6)	06:43	14:56 (6)	07:17
	16:47		07:25	88	17:02 (8)	18:00		19:35	20:08	20:36	20:40	20:14	19:26	18:34	29 16:45 (6)	16:49	63 16:23 (8)	16:30
9	07:30		07:07		15:23 (6)	06:26		06:33	05:49	05:26	05:34	06:03	06:35	07:07	16:12 (6)	06:44	14:56 (6)	07:18
	16:48		07:26	90	17:02 (8)	18:01		19:36	20:09	20:36	20:40	20:12	19:24	18:32	35 16:47 (6)	16:48	56 15:52 (6)	16:30
10	07:30		07:06		15:23 (6)	06:24		06:32	05:48	05:26	05:35	06:04	06:36	07:08	16:11 (6)	06:45	14:58 (6)	07:19
	16:49		07:27	94	17:04 (8)	18:02		19:37	20:10	20:37	20:40	20:11	19:22	18:30	38 16:49 (6)	16:47	54 15:52 (6)	16:30
11	07:30		07:05		15:23 (6)	06:23		06:30	05:47	05:26	05:36	06:05	06:37	07:09	16:08 (6)	06:46	14:58 (6)	07:20
	16:50		07:29	96	17:06 (8)	18:03		19:38	20:11	20:38	20:39	20:10	19:21	18:29	43 16:51 (6)	16:46	53 15:51 (6)	16:31
12	07:30		07:04		15:23 (6)	06:21		06:28	05:46	05:26	05:36	06:06	06:38	07:10	16:06 (6)	06:47	14:59 (6)	07:21
	16:51		07:30	98	17:07 (8)	18:04		19:39	20:12	20:38	20:39	20:08	19:19	18:27	46 16:52 (6)	16:45	51 15:50 (6)	16:31
13	07:29		07:02		15:23 (6)	06:19		06:27	05:45	05:26	05:37	06:07	06:39	07:11	16:04 (6)	06:49	15:01 (6)	07:21
	16:52		07:31	99	17:08 (8)	18:05		19:40	20:13	20:39	20:38	20:07	19:17	18:25	52 17:24 (8)	16:44	49 15:50 (6)	16:31
14	07:29		07:01		15:23 (6)	06:18		06:25	05:44	05:26	05:38	06:08	06:40	07:13	16:02 (6)	06:50	15:01 (6)	07:22
	16:54		07:33	101	17:09 (8)	18:07		19:41	20:14	20:39	20:38	20:06	19:15	18:24	65 17:29 (8)	16:43	48 15:49 (6)	16:31
15	07:29		07:00		15:22 (6)	06:16		06:23	05:43	05:26	05:39	06:09	06:41	07:14	16:01 (6)	06:51	15:02 (6)	07:23
	16:55		07:34	101	17:08 (8)	18:08		19:42	20:15	20:39	20:37	20:04	19:14	18:22	73 17:32 (8)	16:42	46 15:48 (6)	16:31
16	07:28		06:58		15:23 (6)	06:14		06:22	05:42	05:26	05:40	06:10	06:42	07:15	16:00 (6)	06:52	15:04 (6)	07:24
	16:56		07:35	102	17:09 (8)	18:09		19:44	20:16	20:40	20:36	20:03	19:12	18:21	79 17:34 (8)	16:41	43 15:47 (6)	16:31
17	07:28		06:57		15:24 (6)	06:13		06:20	05:41	05:26	05:40	06:11	06:43	07:16	15:59 (6)	06:54	15:06 (6)	07:24
	16:57		07:36	100	17:09 (8)	18:10		19:45	20:17	20:40	20:36	20:01	19:10	18:19	84 17:35 (8)	16:40	40 15:46 (6)	16:32
18	07:27	15:47 (6)	06:56		15:23 (6)	06:11		06:19	05:40	05:26	05:41	06:12	06:44	07:17	15:58 (6)	06:55	15:07 (6)	07:25
	16:58	7 15:54 (6)	07:38	100	17:08 (8)	18:11		19:46	20:18	20:41	20:35	20:00	19:08	18:17	87 17:36 (8)	16:39	37 15:44 (6)	16:32
19	07:27	15:42 (6)	06:54		15:24 (6)	06:09		06:17	05:39	05:26	05:42	06:13	06:45	07:18	15:56 (6)	06:56	15:09 (6)	07:26
	16:59	17 15:59 (6)	07:39	98	17:08 (8)	18:12		19:47	20:19	20:41	20:34	19:58	19:07	18:16	92 17:37 (8)	16:39	35 15:44 (6)	16:32
20	07:26	15:39 (6)	06:53		15:24 (6)	06:07		06:15	05:38	05:26	05:43	06:14	06:46	07:19	15:56 (6)	06:57	15:11 (6)	07:26
	17:01	23 16:02 (6)	07:40	97	17:08 (8)	18:13		19:48	20:20	20:41	20:34	19:57	19:05	18:14	94 17:38 (8)	16:38	31 15:42 (6)	16:33
21	07:25	15:38 (6)	06:51		15:25 (6)	06:06		06:14	05:37	05:26	05:44	06:15	06:47	07:21	15:55 (6)	06:58	15:13 (6)	07:27
	17:02	27 16:05 (6)	07:41	94	17:07 (8)	18:15		19:49	20:21	20:41	20:33	19:55	19:03	18:13	96 17:38 (8)	16:37	27 15:40 (6)	16:33
22	07:25	15:36 (6)	06:50		15:25 (6)	06:04		06:12	05:36	05:26	05:45	06:16	06:49	07:22	15:54 (6)	07:00	15:15 (6)	07:27
	17:03	31 16:07 (6)	07:43	92	17:06 (8)	18:16		19:50	20:22	20:42	20:32	19:54	19:01	18:11	98 17:38 (8)	16:36	23 15:38 (6)	16:34
23	07:24	15:34 (6)	06:48		15:26 (6)	06:02		06:11	05:35	05:27	05:46	06:17	06:50	07:23	15:54 (6)	07:01	15:19 (6)	07:28
	17:04	35 16:09 (6)	07:44	90	17:06 (8)	18:17		19:51	20:23	20:42	20:31	19:52	19:00	18:10	99 17:38 (8)	16:36	17 15:36 (6)	16:34
24	07:23	15:33 (6)	06:47		15:26 (6)	06:00		06:09	05:34	05:27	05:47	06:18	06:51	07:24	15:54 (6)	07:02	15:24 (6)	07:28
	17:06	37 16:10 (6)	07:45	86	17:04 (8)	18:18		19:52	20:24	20:42	20:30	19:51	18:58	18:08	100 17:39 (8)	16:35	8 15:32 (6)	16:35
25	07:23	15:33 (6)	06:45		15:28 (6)	05:59		06:08	05:34	05:27	05:48	06:19	06:52	06:25	14:53 (6)	07:03		07:29
	17:07	40 16:13 (6)	07:46	82	17:03 (8)	18:19		19:54	20:25	20:42	20:29	19:49	18:56	17:07	102 16:39 (8)	16:35		16:35
26	07:22	15:31 (6)	06:44		15:28 (6)	05:57		06:06	05:33	05:28	05:49	06:20	06:53	06:27	14:53 (6)	07:04		07:29
	17:08	43 16:14 (6)	07:48	76	17:01 (8)	18:20		19:55	20:26	20:42	20:28	19:47	18:54	17:06	100 16:38 (8)	16:34		16:36
27	07:21	15:30 (6)	06:42		15:30 (6)	05:55		06:05	05:32	05:28	05:50	06:21	06:54	06:28	14:52 (6)	07:06		07:29
	17:09	46 16:16 (6)	07:49	70	16:59 (8)	18:21		19:56	20:27	20:42	20:27	19:46	18:53	17:04	101 16:38 (8)	16:33		16:37
28	07:20	15:29 (6)	06:41		15:31 (6)	05:54		06:04	05:32	05:28	05:50	06:22	06:55	06:29	14:53 (6)	07:07		07:30
	17:11	48 16:17 (6)	17:50	61	16:56 (8)	18:22		19:57	20:28	20:42	20:26	19:44	18:51	17:03	99 16:38 (8)	16:33		16:37
29	07:19	15:29 (6)				06:52		06:02	05:31	05:29	05:51	06:24	06:56	06:30	14:52 (6)	07:08		07:30
	17:12	49 16:18 (6)				19:24		19:58	20:28	20:42	20:25	19:43	18:49	17:01	99 16:37 (8)	16:33		16:38
30	07:18	15:28 (6)				06:50		06:01	05:30	05:29	05:52	06:25	06:57	06:31	14:52 (6)	07:09		07:30
	17:13	51 16:19 (6)				19:25		19:59	20:29	20:42	20:24	19:41	18:47	17:00	98 16:36 (8)	16:32		16:39
31	07:17	15:27 (6)				06:48			05:30		05:53	06:26		06:33	14:53 (6)			07:30
	17:15	53 16:20 (6)				19:26			20:30		20:23	19:39		16:59	95 16:35 (8)			16:40
Potential sun hours	294		296		369		400	451	456	462	430	375	344		295		284	
Total, worst case		507		2405		248								1940		1264		

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: O - Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (15)

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	07:31		07:16		15:37 (6)	06:39	15:41 (6)	06:47	05:59	05:29	05:30	05:54	06:27	06:58		06:34	15:02 (6)	07:10
	16:41		07:16	46	16:23 (6)	17:51	40 16:21 (6)	19:27	20:00	20:31	20:42	20:22	19:38	18:46		16:57	84 16:33 (8)	16:32
2	07:31		07:15		15:37 (6)	06:37	15:44 (6)	06:45	05:58	05:29	05:30	05:55	06:28	06:59		06:35	15:02 (6)	07:11
	16:41		07:17	48	16:25 (6)	17:52	36 16:20 (6)	19:28	20:01	20:32	20:42	20:21	19:36	18:44		16:56	82 16:32 (8)	16:32
3	07:31		07:14		15:36 (6)	06:36	15:45 (6)	06:43	05:57	05:28	05:31	05:56	06:29	07:00		06:36	15:04 (6)	07:12
	16:42		07:18	50	16:26 (6)	17:54	32 16:17 (6)	19:29	20:02	20:32	20:42	20:20	19:34	18:42		16:55	77 16:31 (8)	16:31
4	07:31		07:13		15:35 (6)	06:34	15:47 (6)	06:42	05:55	05:28	05:31	05:57	06:30	07:01		06:38	15:04 (6)	07:13
	16:43		07:20	58	16:53 (8)	17:55	28 16:15 (6)	19:30	20:04	20:33	20:42	20:19	19:33	18:40		16:54	74 16:30 (8)	16:31
5	07:31		07:12		15:34 (6)	06:33	15:51 (6)	06:40	05:54	05:28	05:32	05:58	06:31	07:02		06:39	15:04 (6)	07:14
	16:44		07:21	67	16:57 (8)	17:56	21 16:12 (6)	19:31	20:05	20:34	20:41	20:18	19:31	18:39		16:52	70 16:28 (8)	16:31
6	07:31		07:11		15:34 (6)	06:31	15:56 (6)	06:38	05:53	05:27	05:32	06:00	06:32	07:04		06:40	15:04 (6)	07:15
	16:45		07:22	71	16:58 (8)	17:57	10 16:06 (6)	19:32	20:06	20:35	20:41	20:16	19:29	18:37		16:51	66 16:27 (8)	16:31
7	07:31		07:10		15:34 (6)	06:29		06:37	05:52	05:27	05:33	06:01	06:33	07:05		06:41	15:06 (6)	07:16
	16:46		07:24	74	17:00 (8)	17:58		19:34	20:07	20:35	20:41	20:15	19:27	18:35		16:50	55 16:23 (8)	16:31
8	07:31		07:09		15:34 (6)	06:28		06:35	05:50	05:27	05:34	06:02	06:34	07:06	16:28 (6)	06:43	15:06 (6)	07:17
	16:47		07:25	78	17:02 (8)	18:00		19:35	20:08	20:36	20:40	20:14	19:26	18:34	16 16:44 (6)	16:49	49 15:55 (6)	16:30
9	07:30		07:07		15:33 (6)	06:26		06:33	05:49	05:26	05:34	06:03	06:35	07:07	16:24 (6)	06:44	15:07 (6)	07:18
	16:48		07:26	81	17:02 (8)	18:01		19:36	20:09	20:36	20:40	20:12	19:24	18:32	24 16:48 (6)	16:48	47 15:54 (6)	16:30
10	07:30		07:06		15:33 (6)	06:24		06:32	05:48	05:26	05:35	06:04	06:36	07:08	16:21 (6)	06:45	15:08 (6)	07:19
	16:49		07:27	85	17:04 (8)	18:02		19:37	20:10	20:37	20:40	20:11	19:22	18:30	30 16:51 (6)	16:47	46 15:54 (6)	16:30
11	07:30		07:05		15:33 (6)	06:23		06:30	05:47	05:26	05:36	06:05	06:37	07:09	16:19 (6)	06:46	15:09 (6)	07:20
	16:50		07:29	87	17:06 (8)	18:03		19:38	20:11	20:38	20:39	20:10	19:21	18:29	34 16:53 (6)	16:46	44 15:53 (6)	16:31
12	07:30		07:04		15:33 (6)	06:21		06:28	05:46	05:26	05:36	06:06	06:38	07:10	16:16 (6)	06:47	15:10 (6)	07:21
	16:51		07:30	90	17:07 (8)	18:04		19:39	20:12	20:38	20:39	20:08	19:19	18:27	38 16:54 (6)	16:45	42 15:52 (6)	16:31
13	07:29		07:02		15:32 (6)	06:19		06:27	05:45	05:26	05:37	06:07	06:39	07:11	16:14 (6)	06:49	15:12 (6)	07:21
	16:52		07:31	92	17:07 (8)	18:05		19:40	20:13	20:39	20:38	20:07	19:17	18:25	41 16:55 (6)	16:44	39 15:51 (6)	16:31
14	07:29		07:01		15:33 (6)	06:18		06:25	05:44	05:26	05:38	06:08	06:40	07:13	16:12 (6)	06:50	15:13 (6)	07:22
	16:54		07:33	92	17:08 (8)	18:07		19:41	20:14	20:39	20:38	20:06	19:15	18:24	53 17:27 (8)	16:43	37 15:50 (6)	16:31
15	07:29		07:00		15:32 (6)	06:16		06:23	05:43	05:26	05:39	06:09	06:41	07:14	16:10 (6)	06:51	15:15 (6)	07:23
	16:55		07:34	92	17:08 (8)	18:08		19:42	20:15	20:39	20:37	20:04	19:14	18:22	64 17:31 (8)	16:42	33 15:48 (6)	16:31
16	07:28		06:58		15:32 (6)	06:14		06:22	05:42	05:26	05:40	06:10	06:42	07:15	16:10 (6)	06:52	15:17 (6)	07:24
	16:56		07:35	93	17:08 (8)	18:09		19:44	20:16	20:40	20:36	20:03	19:12	18:21	69 17:33 (8)	16:41	31 15:48 (6)	16:31
17	07:28		06:57		15:33 (6)	06:13		06:20	05:41	05:26	05:40	06:11	06:43	07:16	16:08 (6)	06:54	15:19 (6)	07:24
	16:57		07:36	92	17:08 (8)	18:10		19:45	20:17	20:40	20:36	20:01	19:10	18:19	75 17:34 (8)	16:40	27 15:46 (6)	16:32
18	07:27		06:56		15:33 (6)	06:11		06:19	05:40	05:26	05:41	06:12	06:44	07:17	16:07 (6)	06:55	15:21 (6)	07:25
	16:58		07:38	91	17:08 (8)	18:11		19:46	20:18	20:41	20:35	20:00	19:08	18:17	79 17:35 (8)	16:39	22 15:43 (6)	16:32
19	07:27		06:54		15:33 (6)	06:09		06:17	05:39	05:26	05:42	06:13	06:45	07:18	16:06 (6)	06:56	15:25 (6)	07:26
	16:59		07:39	91	17:08 (8)	18:12		19:47	20:19	20:41	20:34	19:58	19:07	18:16	82 17:36 (8)	16:39	16 15:41 (6)	16:32
20	07:26		06:53		15:33 (6)	06:07		06:15	05:38	05:26	05:43	06:14	06:46	07:19	16:06 (6)	06:57	15:29 (6)	07:26
	17:01		07:40	90	17:07 (8)	18:13		19:48	20:20	20:41	20:34	19:57	19:05	18:14	84 17:37 (8)	16:38	8 15:37 (6)	16:33
21	07:25		06:51		15:34 (6)	06:06		06:14	05:37	05:26	05:44	06:15	06:47	07:21	16:05 (6)	06:58		07:27
	17:02		07:41	88	17:07 (8)	18:15		19:49	20:21	20:41	20:33	19:55	19:03	18:13	87 17:38 (8)	16:37		16:33
22	07:25	15:55 (6)	06:50		15:34 (6)	06:04		06:12	05:36	05:26	05:45	06:16	06:49	07:22	16:04 (6)	07:00		07:27
	17:03	6 16:01 (6)	17:43	86	17:06 (8)	18:16		19:50	20:22	20:42	20:32	19:54	19:01	18:11	89 17:38 (8)	16:36		16:34
23	07:24	15:50 (6)	06:48		15:36 (6)	06:02		06:11	05:35	05:27	05:46	06:17	06:50	07:23	16:03 (6)	07:01		07:28
	17:04	16 16:06 (6)	17:44	80	17:05 (8)	18:17		19:51	20:23	20:42	20:31	19:52	19:00	18:10	91 17:38 (8)	16:36		16:34
24	07:23	15:47 (6)	06:47		15:36 (6)	06:00		06:09	05:34	05:27	05:47	06:18	06:51	07:24	16:03 (6)	07:02		07:28
	17:06	22 16:09 (6)	17:45	77	17:03 (8)	18:18		19:52	20:24	20:42	20:30	19:51	18:58	18:08	92 17:38 (8)	16:35		16:35
25	07:23	15:46 (6)	06:45		15:37 (6)	05:59		06:08	05:34	05:27	05:48	06:19	06:52	06:25	15:03 (6)	07:03		07:29
	17:07	27 16:13 (6)	17:46	73	17:02 (8)	18:19		19:54	20:25	20:42	20:29	19:49	18:56	17:07	92 16:38 (8)	16:35		16:35
26	07:22	15:44 (6)	06:44		15:38 (6)	05:57		06:06	05:33	05:28	05:49	06:20	06:53	06:27	15:02 (6)	07:04		07:29
	17:08	31 16:15 (6)	17:48	66	17:00 (8)	18:20		19:55	20:26	20:42	20:28	19:47	18:54	17:06	92 16:38 (8)	16:34		16:36
27	07:21	15:42 (6)	06:42		15:39 (6)	05:55		06:05	05:32	05:28	05:50	06:21	06:54	06:28	15:02 (6)	07:06		07:29
	17:09	34 16:16 (6)	17:49	60	16:58 (8)	18:21		19:56	20:27	20:42	20:27	19:46	18:53	17:04	92 16:37 (8)	16:33		16:37
28	07:20	15:41 (6)	06:41		15:40 (6)	05:54		06:04	05:32	05:28	05:50	06:22	06:55	06:29	15:02 (6)	07:07		07:30
	17:11	37 16:18 (6)	17:50	47	16:52 (8)	18:22		19:57	20:28	20:42	20:26	19:44	18:51	17:03	93 16:38 (8)	16:33		16:37
29	07:19	15:40 (6)				06:52		06:02	05:31	05:29	05:51	06:24	06:56	06:30	15:02 (6)	07:08		07:30
	17:12	40 16:20 (6)				19:24		19:58	20:28	20:42	20:25	19:43	18:49	17:01	91 16:37 (8)	16:33		16:38
30	07:18	15:39 (6)				06:50		06:01	05:30	05:29	05:52	06:25	06:57	06:31	15:02 (6)	07:09		07:30
	17:13	42 16:21 (6)				19:25		19:59	20:29	20:42	20:24	19:41	18:47	17:00	90 16:36 (8)	16:32		16:39
31	07:17	15:38 (6)				06:48			05:30		05:53	06:26		06:33	15:02 (6)			07:30
	17:15	44 16:22 (6)				19:26			20:30		20:23	19:39		16:59	87 16:35 (8)			16:40
Potential sun hours	294		296		369		400	451	456	462	430	375	344		295		284	
Total, worst case		299		2145		167								1685		949		

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: P - Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (16)

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	07:31	07:16		06:39	16:24 (6)	06:47	05:59	05:29	05:30	05:54	06:27		06:58	16:57 (6)	06:34	07:10
	16:41	17:16		17:51 65	17:29 (8)	19:27	20:00	20:31	20:42	20:22	19:38		18:46 68	18:05 (8)	16:57	16:32
2	07:31	07:15		06:37	16:23 (6)	06:45	05:58	05:29	05:30	05:55	06:28		06:59	16:57 (6)	06:35	07:11
	16:41	17:17		17:52 68	17:31 (8)	19:28	20:01	20:32	20:42	20:21	19:36		18:44 69	18:06 (8)	16:56	16:32
3	07:31	07:14		06:36	16:22 (6)	06:43	05:57	05:28	05:31	05:56	06:29		07:00	16:56 (6)	06:36	07:12
	16:42	17:18		17:54 70	17:32 (8)	19:29	20:02	20:32	20:42	20:20	19:34		18:42 71	18:07 (8)	16:55	16:31
4	07:31	07:13		06:34	16:21 (6)	06:42	05:55	05:28	05:31	05:57	06:30		07:01	16:56 (6)	06:38	07:13
	16:43	17:20		17:55 72	17:33 (8)	19:30	20:04	20:33	20:42	20:19	19:33		18:40 72	18:08 (8)	16:54	16:31
5	07:31	07:12		06:33	16:21 (6)	06:40	05:54	05:28	05:32	05:58	06:31		07:02	16:55 (6)	06:39	07:14
	16:44	17:21		17:56 74	17:35 (8)	19:31	20:05	20:34	20:41	20:18	19:31		18:39 74	18:09 (8)	16:52	16:31
6	07:31	07:11		06:31	16:20 (6)	06:38	05:53	05:27	05:32	06:00	06:32		07:04	16:55 (6)	06:40	07:15
	16:45	17:22		17:57 74	17:34 (8)	19:32	20:06	20:35	20:41	20:16	19:29		18:37 74	18:09 (8)	16:51	16:31
7	07:31	07:10		06:29	16:19 (6)	06:37	05:52	05:27	05:33	06:01	06:33		07:05	16:55 (6)	06:41	07:16
	16:46	17:24		17:58 74	17:33 (8)	19:34	20:07	20:35	20:41	20:15	19:27		18:35 74	18:09 (8)	16:50	16:31
8	07:31	07:09		06:28	16:19 (6)	06:35	05:50	05:27	05:34	06:02	06:34		07:06	16:55 (6)	06:43	07:17
	16:47	17:25		18:00 73	17:32 (8)	19:35	20:08	20:36	20:40	20:14	19:26		18:34 74	18:09 (8)	16:49	16:30
9	07:30	07:07		06:26	16:18 (6)	06:33	05:49	05:26	05:34	06:03	06:35		07:07	16:55 (6)	06:44	07:18
	16:48	17:26		18:01 73	17:31 (8)	19:36	20:09	20:36	20:40	20:12	19:24		18:32 73	18:08 (8)	16:48	16:30
10	07:30	07:06		06:24	16:17 (6)	06:32	05:48	05:26	05:35	06:04	06:36		07:08	16:56 (6)	06:45	07:19
	16:49	17:27		18:02 72	17:29 (8)	19:37	20:10	20:37	20:40	20:11	19:22		18:30 71	18:07 (8)	16:47	16:30
11	07:30	07:05		06:23	16:18 (6)	06:30	05:47	05:26	05:36	06:05	06:37		07:09	16:57 (6)	06:46	07:20
	16:50	17:29		18:03 70	17:28 (8)	19:38	20:11	20:38	20:39	20:10	19:21		18:29 69	18:06 (8)	16:46	16:31
12	07:30	07:04		06:21	16:17 (6)	06:28	05:46	05:26	05:36	06:06	06:38		07:10	16:57 (6)	06:47	07:21
	16:51	17:30		18:04 69	17:26 (8)	19:39	20:12	20:38	20:39	20:08	19:19		18:27 67	18:04 (8)	16:45	16:31
13	07:29	07:02		06:19	16:17 (6)	06:27	05:45	05:26	05:37	06:07	06:39		07:11	16:58 (6)	06:49	07:21
	16:52	17:31		18:05 66	17:23 (8)	19:40	20:13	20:39	20:38	20:07	19:17 14	17:42 (6)	18:25 64	18:02 (8)	16:44	16:31
14	07:29	07:01		06:18	16:18 (6)	06:25	05:44	05:26	05:38	06:08	06:40		17:23 (6)	07:13	16:58 (6)	06:50	07:22
	16:54	17:33		18:07 59	17:17 (8)	19:41	20:14	20:39	20:38	20:06	19:15 23	17:46 (6)	18:24 62	18:00 (8)	16:43	16:31
15	07:29	07:00		06:16	16:18 (6)	06:23	05:43	05:26	05:39	06:09	06:41		17:20 (6)	07:14	16:59 (6)	06:51	07:23
	16:55	17:34		18:08 59	17:17 (8)	19:42	20:15	20:39	20:37	20:04	19:14 29	17:49 (6)	18:22 59	17:58 (8)	16:42	16:31
16	07:28	06:58		06:14	16:17 (6)	06:22	05:42	05:26	05:40	06:10	06:42		17:17 (6)	07:15	17:01 (6)	06:52	07:24
	16:56	17:35		18:09 59	17:16 (6)	19:44	20:16	20:40	20:36	20:03	19:12 33	17:50 (6)	18:21 56	17:57 (8)	16:41	16:31
17	07:28	06:57		06:13	16:17 (6)	06:20	05:41	05:26	05:40	06:11	06:43		17:14 (6)	07:16	17:02 (6)	06:54	07:24
	16:57	17:36		18:10 58	17:15 (6)	19:45	20:17	20:40	20:36	20:01	19:10 38	17:52 (6)	18:19 54	17:56 (8)	16:40	16:32
18	07:27	06:56		06:11	16:19 (6)	06:19	05:40	05:26	05:41	06:12	06:44		17:12 (6)	07:17	17:04 (6)	06:55	07:25
	16:58	17:38		18:11 56	17:15 (6)	19:46	20:18	20:41	20:35	20:00	19:08 41	17:53 (6)	18:17 50	17:54 (8)	16:39	16:32
19	07:27	06:54		06:09	16:19 (6)	06:17	05:39	05:26	05:42	06:13	06:45		17:10 (6)	07:18	17:06 (6)	06:56	07:26
	16:59	17:39		18:12 55	17:14 (6)	19:47	20:19	20:41	20:34	19:58	19:07 44	17:54 (6)	18:16 44	17:52 (8)	16:39	16:32
20	07:26	06:53	16:46 (6)	06:07	16:19 (6)	06:15	05:38	05:26	05:43	06:14	06:46		17:08 (6)	07:19	17:09 (6)	06:57	07:26
	17:01	17:40 10	17:17 (8)	18:13 53	17:12 (6)	19:48	20:20	20:41	20:34	19:57	19:05 47	17:55 (6)	18:14 36	17:51 (8)	16:38	16:33
21	07:25	06:51	16:40 (6)	06:06	16:19 (6)	06:14	05:37	05:26	05:44	06:15	06:47		17:07 (6)	07:21	17:12 (6)	06:58	07:27
	17:02	17:41 28	17:19 (8)	18:15 52	17:11 (6)	19:49	20:21	20:41	20:33	19:55	19:03 49	17:56 (6)	18:13 25	17:49 (8)	16:37	16:33
22	07:25	06:50	16:36 (6)	06:04	16:21 (6)	06:12	05:36	05:26	05:45	06:16	06:49		17:05 (6)	07:22		07:00	07:27
	17:03	17:43 39	17:20 (8)	18:16 49	17:10 (6)	19:50	20:22	20:42	20:32	19:54	19:01 51	17:56 (6)	18:11			16:36	16:34
23	07:24	06:48	16:34 (6)	06:02	16:22 (6)	06:11	05:35	05:27	05:46	06:17	06:50		17:04 (6)	07:23		07:01	07:28
	17:04	17:44 47	17:22 (8)	18:17 47	17:09 (6)	19:51	20:23	20:42	20:31	19:52	19:00 53	17:57 (6)	18:10			16:36	16:34
24	07:23	06:47	16:32 (6)	06:00	16:22 (6)	06:09	05:34	05:27	05:47	06:18	06:51		17:02 (6)	07:24		07:02	07:28
	17:06	17:45 51	17:23 (8)	18:18 45	17:07 (6)	19:52	20:24	20:42	20:30	19:51	18:58 55	17:57 (6)	18:08			16:35	16:35
25	07:23	06:45	16:30 (6)	05:59	16:24 (6)	06:08	05:34	05:27	05:48	06:19	06:52		17:01 (6)	06:25		07:03	07:29
	17:07	17:46 55	17:25 (8)	18:19 42	17:06 (6)	19:54	20:25	20:42	20:29	19:49	18:56 56	17:57 (6)	17:07			16:35	16:35
26	07:22	06:44	16:28 (6)	05:57	16:26 (6)	06:06	05:33	05:28	05:49	06:20	06:53		17:00 (6)	06:27		07:04	07:29
	17:08	17:48 58	17:26 (8)	18:20 38	17:04 (6)	19:55	20:26	20:42	20:28	19:47	18:54 57	17:57 (6)	17:06			16:34	16:36
27	07:21	06:42	16:27 (6)	05:55	16:27 (6)	06:05	05:32	05:28	05:50	06:21	06:54		16:59 (6)	06:28		07:06	07:29
	17:09	17:49 60	17:27 (8)	18:21 35	17:02 (6)	19:56	20:27	20:42	20:27	19:46	18:53 58	17:57 (6)	17:04			16:33	16:37
28	07:20	06:41	16:25 (6)	05:54	16:29 (6)	06:04	05:32	05:28	05:50	06:22	06:55		16:58 (6)	06:29		07:07	07:30
	17:11	17:50 63	17:28 (8)	18:22 30	16:59 (6)	19:57	20:28	20:42	20:26	19:44	18:51 59	17:57 (6)	17:03			16:33	16:37
29	07:19			06:52	17:32 (6)	06:02	05:31	05:29	05:51	06:24	06:56		16:57 (6)	06:30		07:08	07:30
	17:12			19:24 24	17:56 (6)	19:58	20:28	20:42	20:25	19:43	18:49 60	17:57 (6)	17:01			16:33	16:38
30	07:18			06:50	17:36 (6)	06:01	05:30	05:29	05:52	06:25	06:57		16:57 (6)	06:31		07:09	07:30
	17:13			19:25 16	17:52 (6)	19:59	20:29	20:42	20:24	19:41	18:47 64	18:01 (8)	17:00			16:32	16:39
31	07:17			06:48			05:30		05:53	06:26			06:33				07:30
	17:15			19:26			20:30		20:23	19:39			16:59				16:40
Potential sun hours	294	296		369		400	451	456	462	430	375		344		295	284
Total, worst case			411		1697							831		1306		

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

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

Licensed user:
Iron solar s.r.l.
via Lanzone, 31
IT-20122 Milano
+393487125089
Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: Q - Shadow Receptor: 1.0 × 1.0 Azimuth: -160.0° Slope: 90.0° (17)

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	07:31	07:16	06:39		06:47	06:00	05:29	05:30	05:55	06:27		06:58	07:19 (7)	06:34	07:10
	16:41	17:16	17:51		19:27	20:00	20:31	20:42	20:22	19:38		18:46	8 07:27 (7)	16:57	16:32
2	07:31	07:15	06:38		06:45	05:58	05:29	05:30	05:56	06:28		06:59	07:20 (7)	06:35	07:11
	16:42	17:17	17:53		19:28	20:01	20:32	20:42	20:21	19:36		18:44	6 07:26 (7)	16:56	16:32
3	07:31	07:14	06:36		06:43	05:57	05:29	05:31	05:57	06:29		07:00	07:21 (7)	06:36	07:12
	16:42	17:18	17:54		19:29	20:02	20:32	20:42	20:20	19:34		18:42	4 07:25 (7)	16:55	16:31
4	07:31	07:13	06:34		06:42	05:56	05:28	05:31	05:58	06:30		07:01	07:22 (7)	06:38	07:13
	16:43	17:20	17:55		19:30	20:04	20:33	20:42	20:19	19:33		18:40	2 07:24 (7)	16:54	16:31
5	07:31	07:12	06:33		06:40	05:54	05:28	05:32	05:59	06:31		07:03		06:39	07:14
	16:44	17:21	17:56		19:31	20:05	20:34	20:41	20:18	19:31		18:39		16:52	16:31
6	07:31	07:11	06:31		06:38	05:53	05:27	05:32	06:00	06:32		07:04		06:40	07:15
	16:45	17:22	17:57		19:33	20:06	20:35	20:41	20:16	19:29		18:37		16:51	16:31
7	07:31	07:10	06:29		06:37	05:52	05:27	05:33	06:01	06:33		07:05		06:41	07:16
	16:46	17:24	17:58		19:34	20:07	20:35	20:41	20:15	19:28		18:35		16:50	16:31
8	07:31	07:09	06:28		06:35	05:51	05:27	05:34	06:02	06:34		07:06		06:43	07:17
	16:47	17:25	18:00		19:35	20:08	20:36	20:40	20:14	19:26		18:34		16:49	16:31
9	07:30	07:07	06:26		06:33	05:49	05:27	05:34	06:03	06:35		07:07		06:44	07:18
	16:48	17:26	18:01		19:36	20:09	20:36	20:40	20:12	19:24		18:32		16:48	16:31
10	07:30	07:06	06:24	06:43 (7)	06:32	05:48	05:26	05:35	06:04	06:36		07:08		06:45	07:19
	16:49	17:28	18:02	3 06:46 (7)	19:37	20:10	20:37	20:40	20:11	19:22		18:30		16:47	16:31
11	07:30	07:05	06:23	06:42 (7)	06:30	05:47	05:26	05:36	06:05	06:37		07:09		06:46	07:20
	16:50	17:29	18:03	6 06:48 (7)	19:38	20:11	20:38	20:39	20:10	19:21		18:29		16:46	16:31
12	07:30	07:04	06:21	06:40 (7)	06:28	05:46	05:26	05:37	06:06	06:38		07:10		06:48	07:21
	16:51	17:30	18:04	8 06:48 (7)	19:39	20:12	20:38	20:39	20:08	19:19		18:27		16:45	16:31
13	07:29	07:02	06:19	06:38 (7)	06:27	05:45	05:26	05:37	06:07	06:39		07:11		06:49	07:21
	16:53	17:31	18:06	9 06:47 (7)	19:40	20:13	20:39	20:38	20:07	19:17		18:25		16:44	16:31
14	07:29	07:01	06:18	06:37 (7)	06:25	05:44	05:26	05:38	06:08	06:40		07:13		06:50	07:22
	16:54	17:33	18:07	11 06:48 (7)	19:41	20:14	20:39	20:38	20:06	19:15		18:24		16:43	16:31
15	07:29	07:00	06:16	06:35 (7)	06:23	05:43	05:26	05:39	06:09	06:41		07:14		06:51	07:23
	16:55	17:34	18:08	12 06:47 (7)	19:43	20:15	20:40	20:37	20:04	19:14		18:22		16:42	16:31
16	07:28	06:58	06:14	06:33 (7)	06:22	05:42	05:26	05:40	06:10	06:42		07:15		06:52	07:24
	16:56	17:35	18:09	13 06:46 (7)	19:44	20:16	20:40	20:36	20:03	19:12		18:21		16:41	16:31
17	07:28	06:57	06:13	06:31 (7)	06:20	05:41	05:26	05:41	06:11	06:43		07:16		06:54	07:24
	16:57	17:36	18:10	13 06:44 (7)	19:45	20:17	20:40	20:36	20:01	19:10		18:19		16:40	16:32
18	07:27	06:56	06:11	06:30 (7)	06:19	05:40	05:26	05:41	06:12	06:44		07:17		06:55	07:25
	16:58	17:38	18:11	13 06:43 (7)	19:46	20:18	20:41	20:35	20:00	19:08		18:18		16:39	16:32
19	07:27	06:54	06:09	06:32 (7)	06:17	05:39	05:26	05:42	06:13	06:45		07:18		06:56	07:26
	17:00	17:39	18:12	8 06:40 (7)	19:47	20:19	20:41	20:34	19:58	19:07		18:16		16:39	16:32
20	07:26	06:53	06:07		06:16	05:38	05:26	05:43	06:14	06:47		07:20		06:57	07:26
	17:01	17:40	18:13		19:48	20:20	20:41	20:34	19:57	19:05		18:14		16:38	16:33
21	07:25	06:51	06:06		06:14	05:37	05:26	05:44	06:15	06:48		07:21		06:59	07:27
	17:02	17:42	18:15		19:49	20:21	20:41	20:33	19:55	19:03		18:13		16:37	16:33
22	07:25	06:50	06:04		06:13	05:36	05:27	05:45	06:16	06:49		07:22		07:00	07:27
	17:03	17:43	18:16		19:50	20:22	20:42	20:32	19:54	19:01		18:11		16:36	16:34
23	07:24	06:48	06:02		06:11	05:35	05:27	05:46	06:17	06:50		07:23		07:01	07:28
	17:04	17:44	18:17		19:51	20:23	20:42	20:31	19:52	19:00		18:10		16:36	16:34
24	07:23	06:47	06:01		06:09	05:35	05:27	05:47	06:18	06:51	07:17 (7)	07:24		07:02	07:28
	17:06	17:45	18:18		19:53	20:24	20:42	20:30	19:51	18:58	5 07:22 (7)	18:08		16:35	16:35
25	07:23	06:45	05:59		06:08	05:34	05:27	05:48	06:19	06:52	07:14 (7)	06:25		07:03	07:29
	17:07	17:46	18:19		19:54	20:25	20:42	20:29	19:49	18:56	11 07:25 (7)	17:07		16:35	16:35
26	07:22	06:44	05:57		06:07	05:33	05:28	05:49	06:20	06:53	07:13 (7)	06:27		07:04	07:29
	17:08	17:48	18:20		19:55	20:26	20:42	20:28	19:48	18:54	13 07:26 (7)	17:06		16:34	16:36
27	07:21	06:42	05:55		06:05	05:32	05:28	05:50	06:21	06:54	07:14 (7)	06:28		07:06	07:29
	17:09	17:49	18:21		19:56	20:27	20:42	20:27	19:46	18:53	13 07:27 (7)	17:04		16:34	16:37
28	07:20	06:41	05:54		06:04	05:32	05:28	05:51	06:23	06:55	07:15 (7)	06:29		07:07	07:30
	17:11	17:50	18:22		19:57	20:28	20:42	20:26	19:44	18:51	12 07:27 (7)	17:03		16:33	16:37
29	07:19		06:52		06:02	05:31	05:29	05:52	06:24	06:56	07:16 (7)	06:30		07:08	07:30
	17:12		19:24		19:58	20:28	20:42	20:25	19:43	18:49	11 07:27 (7)	17:01		16:33	16:38
30	07:18		06:50		06:01	05:31	05:29	05:53	06:25	06:57	07:18 (7)	06:31		07:09	07:30
	17:13		19:25		19:59	20:29	20:42	20:24	19:41	18:47	10 07:28 (7)	17:00		16:32	16:39
31	07:17		06:48			05:30		05:54	06:26			06:33			07:30
	17:15		19:26			20:30		20:23	19:39			16:59			16:40
Potential sun hours	294	296	369		400	451	456	462	430	375		344		296	284
Total, worst case				96							75		20		

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: R - Shadow Receptor: 1.0 × 1.0 Azimuth: 160.0° Slope: 90.0° (18)

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	07:31	07:16	06:39	06:47	06:00	05:29	05:30	05:54	06:27	06:58	06:34	07:10
	16:41	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:46	16:57	16:32
2	07:31	07:15	06:38	06:45	05:58	05:29	05:30	05:56	06:28	06:59	06:35	07:11
	16:42	17:17	17:53	19:28	20:01	20:32	20:42	20:21	19:36	18:44	16:56	16:32
3	07:31	07:14	06:36	06:43	05:57	05:29	05:31	05:57	06:29	07:00	06:36	07:12
	16:42	17:18	17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42	16:55	16:31
4	07:31	07:13	06:34	06:42	05:56	05:28	05:31	05:58	06:30	07:01	06:38	07:13
	16:43	17:20	17:55	19:30	20:04	20:33	20:42	20:19	19:33	18:40	16:54	16:31
5	07:31	07:12	06:33	06:40	05:54	05:28	05:32	05:59	06:31	07:03	06:39	07:14
	16:44	17:21	17:56	19:31	20:05	20:34	20:41	20:18	19:31	18:39	16:52	16:31
6	07:31	07:11	06:31	06:38	05:53	05:27	05:32	06:00	06:32	07:04	06:40	07:15
	16:45	17:22	17:57	19:32	20:06	20:35	20:41	20:16	19:29	18:37	16:51	16:31
7	07:31	07:10	06:29	06:37	05:52	05:27	05:33	06:01	06:33	07:05	06:41	07:16
	16:46	17:24	17:58	19:34	20:07	20:35	20:41	20:15	19:28	18:35	16:50	16:31
8	07:31	07:09	06:28	06:35	05:51	05:27	05:34	06:02	06:34	07:06	06:43	07:17
	16:47	17:25	18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34	16:49	16:31
9	07:30	07:07	06:26	06:33	05:49	05:27	05:34	06:03	06:35	07:07	06:44	07:18
	16:48	17:26	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48	16:31
10	07:30	07:06	06:24	06:32	05:48	05:26	05:35	06:04	06:36	07:08	06:45	07:19
	16:49	17:28	18:02	19:37	20:10	20:37	20:40	20:11	19:22	18:30	16:47	16:31
11	07:30	07:05	06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09	06:46	07:20
	16:50	17:29	18:03	19:38	20:11	20:38	20:39	20:10	19:21	18:29	16:46	16:31
12	07:30	07:04	06:21	06:28	05:46	05:26	05:37	06:06	06:38	07:10	06:48	07:21
	16:51	17:30	18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27	16:45	16:31
13	07:29	07:02	06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11	06:49	07:21
	16:53	17:31	18:05	19:40	20:13	20:39	20:38	20:07	19:17	18:25	16:44	16:31
14	07:29	07:01	06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:13	06:50	07:22
	16:54	17:33	18:07	19:41	20:14	20:39	20:38	20:06	19:15	18:24	16:43	16:31
15	07:29	07:00	06:16	06:23	05:43	05:26	05:39	06:09	06:41	07:14	06:51	07:23
	16:55	17:34	18:08	19:43	20:15	20:40	20:37	20:04	19:14	18:22	16:42	16:31
16	07:28	06:58	06:14	06:22	05:42	05:26	05:40	06:10	06:42	07:15	06:52	07:24
	16:56	17:35	18:09	19:44	20:16	20:40	20:36	20:03	19:12	18:21	16:41	16:31
17	07:28	06:57	06:13	06:20	05:41	05:26	05:41	06:11	06:43	07:16	06:54	07:24
	16:57	17:36	18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19	16:40	16:32
18	07:27	06:56	06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17	06:55	07:25
	16:58	17:38	18:11	19:46	20:18	20:41	20:35	20:00	19:08	18:18	16:39	16:32
19	07:27	06:54	06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18	06:56	07:26
	17:00	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:07	18:16	16:39	16:32
20	07:26	06:53	06:07	06:16	05:38	05:26	05:43	06:14	06:46	07:19	06:57	07:26
	17:01	17:40	18:13	19:48	20:20	20:41	20:34	19:57	19:05	18:14	16:38	16:33
21	07:25	06:51	06:06	06:14	05:37	05:26	05:44	06:15	06:48	07:21	06:59	07:27
	17:02	17:41	18:15	19:49	20:21	20:41	20:33	19:55	19:03	18:13	16:37	16:33
22	07:25	06:50	06:04	06:12	05:36	05:27	05:45	06:16	06:49	07:22	07:00	07:27
	17:03	17:43	18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11	16:36	16:34
23	07:24	06:48	06:02	06:11	05:35	05:27	05:46	06:17	06:50	07:23	07:01	07:28
	17:04	17:44	18:17	19:51	20:23	20:42	20:31	19:52	19:00	18:10	16:36	16:34
24	07:23	06:47	06:01	06:09	05:35	05:27	05:47	06:18	06:51	07:24	07:02	07:28
	17:06	17:45	18:18	19:52	20:24	20:42	20:30	19:51	18:58	18:08	16:35	16:35
25	07:23	06:45	05:59	06:08	05:34	05:27	05:48	06:19	06:52	06:25	07:03	07:29
	17:07	17:46	18:19	19:54	20:25	20:42	20:29	19:49	18:56	17:07	16:35	16:35
26	07:22	06:44	05:57	06:07	05:33	05:28	05:49	06:20	06:53	06:27	07:04	07:29
	17:08	17:48	18:20	19:55	20:26	20:42	20:28	19:47	18:54	17:06	16:34	16:36
27	07:21	06:42	05:55	06:05	05:32	05:28	05:50	06:21	06:54	06:28	07:06	07:29
	17:09	17:49	18:21	19:56	20:27	20:42	20:27	19:46	18:53	17:04	16:34	16:37
28	07:20	06:41	05:54	06:04	05:32	05:28	05:51	06:23	06:55	06:29	07:07	07:30
	17:11	17:50	18:22	19:57	20:28	20:42	20:26	19:44	18:51	17:03	16:33	16:37
29	07:19		06:52	06:02	05:31	05:29	05:52	06:24	06:56	06:30	07:08	07:30
	17:12		19:24	19:58	20:28	20:42	20:25	19:43	18:49	17:01	16:33	16:38
30	07:18		06:50	06:01	05:31	05:29	05:53	06:25	06:57	06:31	07:09	07:30
	17:13		19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	16:39
31	07:17		06:48		05:30		05:53	06:26		06:33		07:30
	17:15		19:26		20:30		20:23	19:39		16:59		16:40
Potential sun hours	294	296	369	400	451	456	462	430	375	344	296	284
Total, worst case												

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: S - Shadow Receptor: 1.0 × 1.0 Azimuth: -150.0° Slope: 90.0° (19)

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	07:31	07:16	06:39		06:47	06:00	05:29	05:30	05:55	06:27		06:58	07:19 (7)	06:34	07:10
	16:41	17:16	17:51		19:27	20:00	20:31	20:42	20:22	19:38		18:46	5 07:24 (7)	16:57	16:32
2	07:31	07:15	06:38		06:45	05:58	05:29	05:30	05:56	06:28		06:59	07:20 (7)	06:35	07:11
	16:42	17:17	17:53		19:28	20:01	20:32	20:42	20:21	19:36		18:44	3 07:23 (7)	16:56	16:32
3	07:31	07:14	06:36		06:43	05:57	05:29	05:31	05:57	06:29		07:00	07:21 (7)	06:36	07:12
	16:42	17:18	17:54		19:29	20:02	20:32	20:42	20:20	19:34		18:42	1 07:22 (7)	16:55	16:31
4	07:31	07:13	06:34		06:42	05:56	05:28	05:31	05:58	06:30		07:01		06:38	07:13
	16:43	17:20	17:55		19:30	20:04	20:33	20:42	20:19	19:33		18:41		16:54	16:31
5	07:31	07:12	06:33		06:40	05:54	05:28	05:32	05:59	06:31		07:03		06:39	07:14
	16:44	17:21	17:56		19:31	20:05	20:34	20:41	20:18	19:31		18:39		16:53	16:31
6	07:31	07:11	06:31		06:38	05:53	05:27	05:32	06:00	06:32		07:04		06:40	07:15
	16:45	17:22	17:57		19:33	20:06	20:35	20:41	20:16	19:29		18:37		16:51	16:31
7	07:31	07:10	06:29		06:37	05:52	05:27	05:33	06:01	06:33		07:05		06:41	07:16
	16:46	17:24	17:59		19:34	20:07	20:35	20:41	20:15	19:28		18:35		16:50	16:31
8	07:31	07:09	06:28		06:35	05:51	05:27	05:34	06:02	06:34		07:06		06:43	07:17
	16:47	17:25	18:00		19:35	20:08	20:36	20:40	20:14	19:26		18:34		16:49	16:31
9	07:30	07:07	06:26		06:33	05:49	05:27	05:34	06:03	06:35		07:07		06:44	07:18
	16:48	17:26	18:01		19:36	20:09	20:36	20:40	20:12	19:24		18:32		16:48	16:31
10	07:30	07:06	06:24		06:32	05:48	05:26	05:35	06:04	06:36		07:08		06:45	07:19
	16:49	17:28	18:02		19:37	20:10	20:37	20:40	20:11	19:22		18:30		16:47	16:31
11	07:30	07:05	06:23		06:42 (7)	06:30	05:47	05:26	05:36	06:05	06:37		07:09		06:46	07:20
	16:50	17:29	18:03	3	06:45 (7)	19:38	20:11	20:38	20:39	20:10	19:21		18:29		16:46	16:31
12	07:30	07:04	06:21		06:40 (7)	06:28	05:46	05:26	05:37	06:06	06:38		07:10		06:48	07:21
	16:51	17:30	18:04	5	06:45 (7)	19:39	20:12	20:38	20:39	20:08	19:19		18:27		16:45	16:31
13	07:29	07:02	06:19		06:38 (7)	06:27	05:45	05:26	05:37	06:07	06:39		07:11		06:49	07:21
	16:53	17:31	18:06	6	06:44 (7)	19:40	20:13	20:39	20:38	20:07	19:17		18:25		16:44	16:31
14	07:29	07:01	06:18		06:37 (7)	06:25	05:44	05:26	05:38	06:08	06:40		07:13		06:50	07:22
	16:54	17:33	18:07	8	06:45 (7)	19:41	20:14	20:39	20:38	20:06	19:15		18:24		16:43	16:31
15	07:29	07:00	06:16		06:35 (7)	06:23	05:43	05:26	05:39	06:09	06:41		07:14		06:51	07:23
	16:55	17:34	18:08	9	06:44 (7)	19:43	20:15	20:40	20:37	20:04	19:14		18:22		16:42	16:31
16	07:28	06:58	06:14		06:33 (7)	06:22	05:42	05:26	05:40	06:10	06:42		07:15		06:52	07:24
	16:56	17:35	18:09	10	06:43 (7)	19:44	20:16	20:40	20:36	20:03	19:12		18:21		16:41	16:31
17	07:28	06:57	06:13		06:31 (7)	06:20	05:41	05:26	05:41	06:11	06:43		07:16		06:54	07:24
	16:57	17:36	18:10	11	06:42 (7)	19:45	20:17	20:40	20:36	20:01	19:10		18:19		16:40	16:32
18	07:27	06:56	06:11		06:30 (7)	06:19	05:40	05:26	05:41	06:12	06:44		07:17		06:55	07:25
	16:58	17:38	18:11	11	06:41 (7)	19:46	20:18	20:41	20:35	20:00	19:08		18:18		16:39	16:32
19	07:27	06:54	06:09		06:30 (7)	06:17	05:39	05:26	05:42	06:13	06:45		07:18		06:56	07:26
	17:00	17:39	18:12	8	06:38 (7)	19:47	20:19	20:41	20:34	19:58	19:07		18:16		16:39	16:32
20	07:26	06:53	06:07			06:16	05:38	05:26	05:43	06:14	06:47		07:20		06:57	07:26
	17:01	17:40	18:14			19:48	20:20	20:41	20:34	19:57	19:05		18:14		16:38	16:33
21	07:25	06:51	06:06			06:14	05:37	05:26	05:44	06:15	06:48		07:21		06:59	07:27
	17:02	17:42	18:15			19:49	20:21	20:41	20:33	19:55	19:03		18:13		16:37	16:33
22	07:25	06:50	06:04			06:13	05:36	05:27	05:45	06:16	06:49		07:22		07:00	07:27
	17:03	17:43	18:16			19:50	20:22	20:42	20:32	19:54	19:01		18:11		16:36	16:34
23	07:24	06:48	06:02			06:11	05:35	05:27	05:46	06:17	06:50		07:23		07:01	07:28
	17:04	17:44	18:17			19:51	20:23	20:42	20:31	19:52	19:00		18:10		16:36	16:34
24	07:23	06:47	06:01			06:10	05:35	05:27	05:47	06:18	06:51	07:15 (7)	07:24		07:02	07:28
	17:06	17:45	18:18			19:53	20:24	20:42	20:30	19:51	18:58	5 07:20 (7)	18:08		16:35	16:35
25	07:23	06:45	05:59			06:08	05:34	05:27	05:48	06:19	06:52	07:12 (7)	06:25		07:03	07:29
	17:07	17:46	18:19			19:54	20:25	20:42	20:29	19:49	18:56	11 07:23 (7)	17:07		16:35	16:35
26	07:22	06:44	05:57			06:07	05:33	05:28	05:49	06:20	06:53	07:13 (7)	06:27		07:04	07:29
	17:08	17:48	18:20			19:55	20:26	20:42	20:28	19:48	18:54	11 07:24 (7)	17:06		16:34	16:36
27	07:21	06:42	05:55			06:05	05:32	05:28	05:50	06:21	06:54	07:14 (7)	06:28		07:06	07:29
	17:09	17:49	18:21			19:56	20:27	20:42	20:27	19:46	18:53	10 07:24 (7)	17:04		16:34	16:37
28	07:20	06:41	05:54			06:04	05:32	05:28	05:51	06:23	06:55	07:15 (7)	06:29		07:07	07:30
	17:11	17:50	18:22			19:57	20:28	20:42	20:26	19:44	18:51	10 07:25 (7)	17:03		16:33	16:37
29	07:19		06:52			06:02	05:31	05:29	05:52	06:24	06:56	07:16 (7)	06:30		07:08	07:30
	17:12		19:24			19:58	20:29	20:42	20:25	19:43	18:49	9 07:25 (7)	17:01		16:33	16:38
30	07:18		06:50			06:01	05:31	05:29	05:53	06:25	06:57	07:18 (7)	06:31		07:09	07:30
	17:13		19:25			19:59	20:29	20:42	20:24	19:41	18:47	7 07:25 (7)	17:00		16:32	16:39
31	07:17		06:48				05:30		05:54	06:26			06:33			07:30
	17:15		19:26				20:30		20:23	19:39			16:59			16:40
Potential sun hours	294	296	369		400	451	456	462	430	375		344		296	284
Total, worst case				71							63		9		

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: T - Shadow Receptor: 1.0 × 1.0 Azimuth: -100.0° Slope: 90.0° (20)

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	07:31	07:16			06:39	06:47			06:00		06:40 (8)	05:29
	16:41	17:16			17:51	19:27			20:00	60	07:40 (8)	20:31
2	07:31	07:15			06:38	06:45		07:11 (8)	05:58		06:40 (8)	05:29
	16:42	17:17			17:53	19:28	14	07:25 (8)	20:01	59	07:39 (8)	20:32
3	07:31	07:14			06:36	06:43		07:05 (8)	05:57		06:41 (8)	05:29
	16:42	17:18			17:54	19:29	24	07:29 (8)	20:02	58	07:39 (8)	20:32
4	07:31	07:13			06:34	06:42		07:01 (8)	05:56		06:41 (8)	05:28
	16:43	17:20			17:55	19:30	31	07:32 (8)	20:04	57	07:38 (8)	20:33
5	07:31	07:12			06:33	06:40		06:59 (8)	05:54		06:41 (8)	05:28
	16:44	17:21			17:56	19:31	36	07:35 (8)	20:05	56	07:37 (8)	20:34
6	07:31	07:11			06:31	06:38		06:57 (8)	05:53		06:42 (8)	05:27
	16:45	17:22			17:57	19:33	39	07:36 (8)	20:06	54	07:36 (8)	20:35
7	07:31	07:10			06:29	06:37		06:55 (8)	05:52		06:43 (8)	05:27
	16:46	17:24			17:59	19:34	43	07:38 (8)	20:07	53	07:36 (8)	20:35
8	07:31	07:09			06:28	06:35		06:54 (8)	05:51		06:44 (8)	05:27
	16:47	17:25			18:00	19:35	45	07:39 (8)	20:08	51	07:35 (8)	20:36
9	07:30	07:08			06:26	06:33		06:52 (8)	05:49		06:44 (8)	05:27
	16:48	17:26			18:01	19:36	48	07:40 (8)	20:09	49	07:33 (8)	20:37
10	07:30	07:06			06:24	06:32		06:50 (8)	05:48		06:45 (8)	05:26
	16:49	17:28			18:02	19:37	51	07:41 (8)	20:10	47	07:32 (8)	20:37
11	07:30	07:05			06:23	06:30		06:49 (8)	05:47		06:46 (8)	05:26
	16:50	17:29			18:03	19:38	53	07:42 (8)	20:11	45	07:31 (8)	20:38
12	07:30	07:04			06:21	06:28		06:47 (8)	05:46		06:47 (8)	05:26
	16:51	17:30			18:04	19:39	55	07:42 (8)	20:12	43	07:30 (8)	20:38
13	07:29	07:02			06:19	06:27		06:46 (8)	05:45		06:48 (8)	05:26
	16:53	17:31			18:06	19:40	57	07:43 (8)	20:13	41	07:29 (8)	20:39
14	07:29	07:01			06:18	06:25		06:45 (8)	05:44		06:49 (8)	05:26
	16:54	17:33			18:07	19:41	58	07:43 (8)	20:14	39	07:28 (8)	20:39
15	07:29	07:00			06:16	06:23		06:43 (6)	05:43		06:50 (8)	05:26
	16:55	17:34			18:08	19:43	60	07:43 (8)	20:15	37	07:27 (8)	20:40
16	07:28	06:58			06:14	06:22		06:43 (8)	05:42		06:51 (8)	05:26
	16:56	17:35			18:09	19:44	61	07:44 (8)	20:16	34	07:25 (8)	20:40
17	07:28	06:57			06:13	06:20		06:42 (8)	05:41		06:53 (8)	05:26
	16:57	17:37			18:10	19:45	62	07:44 (8)	20:17	30	07:23 (8)	20:40
18	07:27	06:56			06:11	06:19		06:42 (8)	05:40		06:55 (8)	05:26
	16:58	17:38			18:11	19:46	62	07:44 (8)	20:18	28	07:23 (8)	20:41
19	07:27	06:54			06:09	06:17		06:41 (8)	05:39		06:57 (8)	05:26
	17:00	17:39			18:12	19:47	63	07:44 (8)	20:19	23	07:20 (8)	20:41
20	07:26	06:53			06:07	06:16		06:41 (8)	05:38		06:59 (8)	05:26
	17:01	17:40			18:14	19:48	63	07:44 (8)	20:20	19	07:18 (8)	20:41
21	07:25	06:51			06:06	06:14		06:40 (8)	05:37		07:02 (8)	05:26
	17:02	17:42			18:15	19:49	64	07:44 (8)	20:21	12	07:14 (8)	20:42
22	07:25	06:50		07:09 (7)	06:04	06:13		06:40 (8)	05:36			05:27
	17:03	17:43	2	07:11 (7)	18:16	19:50	64	07:44 (8)	20:22			20:42
23	07:24	06:48		07:08 (7)	06:02	06:11		06:40 (8)	05:35			05:27
	17:04	17:44	4	07:12 (7)	18:17	19:51	63	07:43 (8)	20:23			20:42
24	07:23	06:47		07:06 (7)	06:01	06:10		06:40 (8)	05:35			05:27
	17:06	17:45	5	07:11 (7)	18:18	19:53	64	07:44 (8)	20:24			20:42
25	07:23	06:45		07:05 (7)	05:59	06:08		06:39 (8)	05:34			05:27
	17:07	17:46	6	07:11 (7)	18:19	19:54	64	07:43 (8)	20:25			20:42
26	07:22	06:44		07:03 (7)	05:57	06:07		06:40 (8)	05:33			05:28
	17:08	17:48	7	07:10 (7)	18:20	19:55	63	07:43 (8)	20:26			20:42
27	07:21	06:42		07:02 (7)	05:55	06:05		06:40 (8)	05:32			05:28
	17:09	17:49	7	07:09 (7)	18:21	19:56	63	07:43 (8)	20:27			20:42
28	07:20	06:41		07:00 (7)	05:54	06:04		06:39 (8)	05:32			05:28
	17:11	17:50	6	07:06 (7)	18:22	19:57	63	07:42 (8)	20:28			20:42
29	07:19				06:52	06:02		06:40 (8)	05:31			05:29
	17:12				19:24	19:58	61	07:41 (8)	20:29			20:42
30	07:18				06:50	06:01		06:39 (8)	05:31			05:29
	17:13				19:25	19:59	61	07:40 (8)	20:29			20:42
31	07:17				06:49				05:30			
	17:15				19:26				20:30			
Potential sun hours	294	296			369	400			451			456
Total, worst case			37				1555			895		

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: T - Shadow Receptor: 1.0 × 1.0 Azimuth: -100.0° Slope: 90.0° (20)

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	05:30			05:55		06:57 (8)	06:27		06:48 (8)	06:58			06:34	07:10
	20:42			20:22	44	07:41 (8)	19:38	53	07:41 (8)	18:46			16:57	16:32
2	05:30			05:56		06:56 (8)	06:28		06:49 (8)	06:59			06:35	07:11
	20:42			20:21	46	07:42 (8)	19:36	51	07:40 (8)	18:44			16:56	16:32
3	05:31			05:57		06:55 (8)	06:29		06:50 (8)	07:00			06:36	07:12
	20:42			20:20	48	07:43 (8)	19:34	48	07:38 (8)	18:42			16:55	16:31
4	05:31			05:58		06:54 (8)	06:30		06:51 (8)	07:01			06:38	07:13
	20:42			20:19	50	07:44 (8)	19:33	46	07:37 (8)	18:41			16:54	16:31
5	05:32			05:59		06:53 (8)	06:31		06:52 (8)	07:03			06:39	07:14
	20:41			20:18	52	07:45 (8)	19:31	43	07:35 (8)	18:39			16:53	16:31
6	05:32			06:00		06:52 (8)	06:32		06:53 (8)	07:04			06:40	07:15
	20:41			20:16	54	07:46 (8)	19:29	40	07:33 (8)	18:37			16:51	16:31
7	05:33			06:01		06:52 (8)	06:33		06:54 (8)	07:05			06:41	07:16
	20:41			20:15	54	07:46 (8)	19:28	36	07:30 (8)	18:35			16:50	16:31
8	05:34			06:02		06:51 (8)	06:34		06:56 (8)	07:06			06:43	07:17
	20:40			20:14	56	07:47 (8)	19:26	31	07:27 (8)	18:34			16:49	16:31
9	05:34			06:03		06:50 (8)	06:35		06:59 (8)	07:07			06:44	07:18
	20:40			20:13	57	07:47 (8)	19:24	25	07:24 (8)	18:32			16:48	16:31
10	05:35			06:04		06:50 (8)	06:36		07:03 (8)	07:08			06:45	07:19
	20:40			20:11	58	07:48 (8)	19:22	16	07:19 (8)	18:30			16:47	16:31
11	05:36			06:05		06:49 (8)	06:37			07:09			06:46	07:20
	20:39			20:10	59	07:48 (8)	19:21			18:29			16:46	16:31
12	05:37			06:06		06:48 (8)	06:38			07:10			06:48	07:21
	20:39			20:08	61	07:49 (8)	19:19			18:27			16:45	16:31
13	05:37			06:07		06:48 (8)	06:39			07:11			06:49	07:21
	20:38			20:07	61	07:49 (8)	19:17			18:25			16:44	16:31
14	05:38			06:08		06:47 (8)	06:40			07:13		07:33 (7)	06:50	07:22
	20:38			20:06	62	07:49 (8)	19:15			18:24	7	07:40 (7)	16:43	16:31
15	05:39			06:09		06:47 (8)	06:41			07:14		07:35 (7)	06:51	07:23
	20:37			20:04	62	07:49 (8)	19:14			18:22	7	07:42 (7)	16:42	16:31
16	05:40			06:10		06:47 (8)	06:42			07:15		07:36 (7)	06:52	07:24
	20:36			20:03	62	07:49 (8)	19:12			18:21	7	07:43 (7)	16:41	16:31
17	05:41			06:11		06:46 (8)	06:43			07:16		07:37 (7)	06:54	07:24
	20:36			20:01	63	07:49 (8)	19:10			18:19	6	07:43 (7)	16:40	16:32
18	05:41			06:12		06:46 (8)	06:44			07:17		07:38 (7)	06:55	07:25
	20:35			20:00	63	07:49 (8)	19:08			18:18	5	07:43 (7)	16:39	16:32
19	05:42			06:13		06:46 (8)	06:45			07:18		07:39 (7)	06:56	07:26
	20:34			19:58	63	07:49 (8)	19:07			18:16	3	07:42 (7)	16:39	16:32
20	05:43			06:14		06:45 (8)	06:47			07:20		07:41 (7)	06:57	07:26
	20:34			19:57	64	07:49 (8)	19:05			18:14	2	07:43 (7)	16:38	16:33
21	05:44			06:15		06:45 (8)	06:48			07:21			06:59	07:27
	20:33			19:55	64	07:49 (8)	19:03			18:13			16:37	16:33
22	05:45		07:16 (8)	06:16		06:45 (8)	06:49			07:22			07:00	07:27
	20:32	6	07:22 (8)	19:54	64	07:49 (8)	19:01			18:11			16:36	16:34
23	05:46		07:11 (8)	06:17		06:45 (8)	06:50			07:23			07:01	07:28
	20:31	16	07:27 (8)	19:52	63	07:48 (8)	19:00			18:10			16:36	16:34
24	05:47		07:09 (8)	06:18		06:45 (8)	06:51			07:24			07:02	07:28
	20:30	21	07:30 (8)	19:51	63	07:48 (8)	18:58			18:08			16:35	16:35
25	05:48		07:06 (8)	06:19		06:45 (8)	06:52			06:25			07:03	07:29
	20:29	25	07:31 (8)	19:49	62	07:47 (8)	18:56			17:07			16:35	16:35
26	05:49		07:04 (8)	06:20		06:45 (8)	06:53			06:27			07:04	07:29
	20:28	29	07:33 (8)	19:48	62	07:47 (8)	18:54			17:06			16:34	16:36
27	05:50		07:03 (8)	06:22		06:45 (8)	06:54			06:28			07:06	07:29
	20:27	32	07:35 (8)	19:46	61	07:46 (8)	18:53			17:04			16:34	16:37
28	05:51		07:01 (8)	06:23		06:45 (6)	06:55			06:29			07:07	07:30
	20:26	35	07:36 (8)	19:44	60	07:45 (8)	18:51			17:03			16:33	16:37
29	05:52		07:00 (8)	06:24		06:46 (8)	06:56			06:30			07:08	07:30
	20:25	38	07:38 (8)	19:43	58	07:44 (8)	18:49			17:01			16:33	16:38
30	05:53		06:59 (8)	06:25		06:46 (8)	06:57			06:32			07:09	07:30
	20:24	40	07:39 (8)	19:41	57	07:43 (8)	18:47			17:00			16:32	16:39
31	05:54		06:58 (8)	06:26		06:47 (8)				06:33				07:30
	20:23	42	07:40 (8)	19:39	55	07:42 (8)				16:59				16:40
Potential sun hours	462			430			375			344			295	284
Total, worst case		284			1808			389			37			

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: U - Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (21)

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	07:31		07:54 (7)	07:16		07:51 (7)	06:39		06:58 (5)	06:47			05:59		06:19 (4)	05:29
	16:41	47	08:41 (7)	17:16	66	08:57 (7)	17:51	3	07:01 (5)	19:27			20:00	15	06:34 (4)	20:31
2	07:31		07:54 (7)	07:15		07:51 (7)	06:37		06:57 (5)	06:45			05:58		06:18 (4)	05:29
	16:41	48	08:42 (7)	17:17	66	08:57 (7)	17:52	5	07:02 (5)	19:28			20:01	14	06:32 (4)	20:32
3	07:31		07:54 (7)	07:14		07:52 (7)	06:36		06:55 (5)	06:43			05:57		06:21 (4)	05:28
	16:42	49	08:43 (7)	17:18	65	08:57 (7)	17:54	6	07:01 (5)	19:29			20:02	10	06:31 (4)	20:32
4	07:31		07:54 (7)	07:13		07:51 (7)	06:34		06:53 (5)	06:42			05:55			05:28
	16:43	49	08:43 (7)	17:20	65	08:56 (7)	17:55	7	07:00 (5)	19:30			20:03			20:33
5	07:31		07:54 (7)	07:12		07:52 (7)	06:33		06:52 (5)	06:40			05:54			05:28
	16:44	50	08:44 (7)	17:21	64	08:56 (7)	17:56	9	07:01 (5)	19:31			20:05			20:34
6	07:31		07:53 (7)	07:11		07:53 (7)	06:31		06:50 (5)	06:38			05:53			05:27
	16:45	51	08:44 (7)	17:22	62	08:55 (7)	17:57	9	06:59 (5)	19:32			20:06			20:35
7	07:31		07:53 (7)	07:10		07:53 (7)	06:29		06:48 (5)	06:37			05:52			05:27
	16:46	52	08:45 (7)	17:24	62	08:55 (7)	17:58	10	06:58 (5)	19:34			20:07			20:35
8	07:31		07:53 (7)	07:09		07:54 (7)	06:28		06:47 (5)	06:35			05:50			05:27
	16:47	53	08:46 (7)	17:25	61	08:55 (7)	18:00	10	06:57 (5)	19:35			20:08			20:36
9	07:30		07:53 (7)	07:07		07:54 (7)	06:26		06:45 (5)	06:33			05:49			05:27
	16:48	54	08:47 (7)	17:26	59	08:53 (7)	18:01	9	06:54 (5)	19:36			20:09			20:36
10	07:30		07:52 (7)	07:06		07:55 (7)	06:24			06:32			05:48			05:26
	16:49	55	08:47 (7)	17:27	58	08:53 (7)	18:02			19:37			20:10			20:37
11	07:30		07:52 (7)	07:05		07:56 (7)	06:23			06:30			05:47			05:26
	16:50	56	08:48 (7)	17:29	56	08:52 (7)	18:03			19:38			20:11			20:38
12	07:30		07:52 (7)	07:04		07:58 (7)	06:21			06:28			05:46			05:26
	16:51	57	08:49 (7)	17:30	54	08:52 (7)	18:04			19:39			20:12			20:38
13	07:29		07:51 (7)	07:02		07:58 (7)	06:19			06:27			05:45			05:26
	16:52	58	08:49 (7)	17:31	52	08:50 (7)	18:05			19:40			20:13			20:39
14	07:29		07:51 (7)	07:01		08:00 (7)	06:18			06:25			05:44			05:26
	16:54	59	08:50 (7)	17:33	49	08:49 (7)	18:07			19:41			20:14			20:39
15	07:29		07:50 (7)	07:00		08:00 (7)	06:16			06:23			05:43			05:26
	16:55	61	08:51 (7)	17:34	47	08:47 (7)	18:08			19:42			20:15			20:39
16	07:28		07:50 (7)	06:58		08:02 (7)	06:14			06:22			05:42			05:26
	16:56	62	08:52 (7)	17:35	44	08:46 (7)	18:09			19:44			20:16			20:40
17	07:28		07:49 (7)	06:57		08:04 (7)	06:13			06:20			05:41			05:26
	16:57	63	08:52 (7)	17:36	40	08:44 (7)	18:10			19:45			20:17			20:40
18	07:27		07:49 (7)	06:56		08:05 (7)	06:11			06:19			05:40			05:26
	16:58	64	08:53 (7)	17:38	36	08:41 (7)	18:11			19:46			20:18			20:41
19	07:27		07:48 (7)	06:54		08:08 (7)	06:09			06:17			05:39			05:26
	16:59	65	08:53 (7)	17:39	31	08:39 (7)	18:12			19:47			20:19			20:41
20	07:26		07:48 (7)	06:53		08:10 (7)	06:07			06:15		06:35 (4)	05:38			05:26
	17:01	66	08:54 (7)	17:40	26	08:36 (7)	18:13			19:48	2	06:37 (4)	20:20			20:41
21	07:25		07:49 (7)	06:51		08:15 (7)	06:06			06:14		06:33 (4)	05:37			05:26
	17:02	66	08:55 (7)	17:41	17	08:32 (7)	18:15			19:49	4	06:37 (4)	20:21			20:41
22	07:25		07:48 (7)	06:50			06:04			06:12		06:32 (4)	05:36			05:26
	17:03	67	08:55 (7)	17:43			18:16			19:50	6	06:38 (4)	20:22			20:42
23	07:24		07:48 (7)	06:48			06:02			06:11		06:30 (4)	05:35			05:27
	17:04	67	08:55 (7)	17:44			18:17			19:51	8	06:38 (4)	20:23			20:42
24	07:23		07:48 (7)	06:47			06:00			06:09		06:29 (4)	05:34			05:27
	17:06	67	08:55 (7)	17:45			18:18			19:52	9	06:38 (4)	20:24			20:42
25	07:23		07:48 (7)	06:45			05:59			06:08		06:27 (4)	05:34			05:27
	17:07	67	08:55 (7)	17:46			18:19			19:54	11	06:38 (4)	20:25			20:42
26	07:22		07:49 (7)	06:44			05:57			06:06		06:26 (4)	05:33			05:28
	17:08	68	08:57 (7)	17:48			18:20			19:55	12	06:38 (4)	20:26			20:42
27	07:21		07:49 (7)	06:42			05:55			06:05		06:24 (4)	05:32			05:28
	17:09	68	08:57 (7)	17:49			18:21			19:56	13	06:37 (4)	20:27			20:42
28	07:20		07:50 (7)	06:41		07:00 (5)	05:54			06:04		06:23 (4)	05:32			05:28
	17:11	67	08:57 (7)	17:50	1	07:01 (5)	18:22			19:57	14	06:37 (4)	20:28			20:42
29	07:19		07:50 (7)				06:52			06:02		06:22 (4)	05:31			05:29
	17:12	67	08:57 (7)				19:24			19:58	14	06:36 (4)	20:28			20:42
30	07:18		07:50 (7)				06:50			06:01		06:20 (4)	05:30			05:29
	17:13	67	08:57 (7)				19:25			19:59	15	06:35 (4)	20:29			20:42
31	07:17		07:50 (7)				06:48						05:30			
	17:15	67	08:57 (7)				19:26						20:30			
Potential sun hours	294			296			369			400			451			456
Total, worst case		1857			1081			68			108			39		

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:
Iron solar s.r.l.
via Lanzone, 31
IT-20122 Milano
+393487125089
Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: U - Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (21)

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	05:30	05:54		06:27	06:58			06:34	07:25 (7)	07:10		07:34 (7)
	20:42	20:22		19:38	18:46			16:57	58 08:23 (7)	16:32	56	08:30 (7)
2	05:30	05:55		06:28	06:59			06:35	07:24 (7)	07:11		07:35 (7)
	20:42	20:21		19:36	18:44			16:56	59 08:23 (7)	16:32	55	08:30 (7)
3	05:31	05:56		06:29	07:00			06:36	07:23 (7)	07:12		07:36 (7)
	20:42	20:20		19:34	18:42			16:55	61 08:24 (7)	16:31	54	08:30 (7)
4	05:31	05:57		06:30	07:01		07:22 (5)	06:38	07:23 (7)	07:13		07:37 (7)
	20:42	20:19		19:33	18:40	9	07:31 (5)	16:54	62 08:25 (7)	16:31	53	08:30 (7)
5	05:32	05:58		06:31	07:02		07:23 (5)	06:39	07:22 (7)	07:14		07:38 (7)
	20:41	20:17		19:31	18:39	10	07:33 (5)	16:52	63 08:25 (7)	16:31	52	08:30 (7)
6	05:32	06:00		06:32	07:04		07:24 (5)	06:40	07:22 (7)	07:15		07:39 (7)
	20:41	20:16		19:29	18:37	10	07:34 (5)	16:51	63 08:25 (7)	16:31	51	08:30 (7)
7	05:33	06:01		06:33	07:05		07:25 (5)	06:41	07:22 (7)	07:16		07:40 (7)
	20:41	20:15		19:27	18:35	10	07:35 (5)	16:50	65 08:27 (7)	16:31	50	08:30 (7)
8	05:34	06:02		06:34	07:06		07:26 (5)	06:43	07:22 (7)	07:17		07:41 (7)
	20:40	20:14		19:26	18:34	9	07:35 (5)	16:49	65 08:27 (7)	16:31	50	08:31 (7)
9	05:34	06:03	06:32 (4)	06:35	07:07		07:27 (5)	06:44	07:21 (7)	07:18		07:42 (7)
	20:40	20:12	5 06:37 (4)	19:24	18:32	8	07:35 (5)	16:48	66 08:27 (7)	16:30	49	08:31 (7)
10	05:35	06:04	06:29 (4)	06:36	07:08		07:29 (5)	06:45	07:22 (7)	07:19		07:43 (7)
	20:40	20:11	11 06:40 (4)	19:22	18:30	7	07:36 (5)	16:47	66 08:28 (7)	16:30	48	08:31 (7)
11	05:36	06:05	06:27 (4)	06:37	07:09		07:30 (5)	06:46	07:21 (7)	07:20		07:44 (7)
	20:39	20:10	14 06:41 (4)	19:21	18:29	5	07:35 (5)	16:46	67 08:28 (7)	16:31	47	08:31 (7)
12	05:37	06:06	06:28 (4)	06:38	07:10		07:31 (5)	06:47	07:21 (7)	07:20		07:45 (7)
	20:39	20:08	15 06:43 (4)	19:19	18:27	4	07:35 (5)	16:45	67 08:28 (7)	16:31	47	08:32 (7)
13	05:37	06:07	06:29 (4)	06:39	07:11		07:32 (5)	06:49	07:22 (7)	07:21		07:46 (7)
	20:38	20:07	14 06:43 (4)	19:17	18:25	2	07:34 (5)	16:44	67 08:29 (7)	16:31	46	08:32 (7)
14	05:38	06:08	06:30 (4)	06:40	07:13			06:50	07:21 (7)	07:22		07:46 (7)
	20:38	20:06	14 06:44 (4)	19:15	18:24			16:43	68 08:29 (7)	16:31	46	08:32 (7)
15	05:39	06:09	06:31 (4)	06:41	07:14			06:51	07:21 (7)	07:23		07:47 (7)
	20:37	20:04	13 06:44 (4)	19:14	18:22			16:42	68 08:29 (7)	16:31	45	08:32 (7)
16	05:40	06:10	06:32 (4)	06:42	07:15			06:52	07:22 (7)	07:24		07:48 (7)
	20:36	20:03	13 06:45 (4)	19:12	18:21			16:41	68 08:30 (7)	16:31	45	08:33 (7)
17	05:40	06:11	06:33 (4)	06:43	07:16			06:54	07:22 (7)	07:24		07:48 (7)
	20:36	20:01	12 06:45 (4)	19:10	18:19			16:40	67 08:29 (7)	16:32	44	08:32 (7)
18	05:41	06:12	06:34 (4)	06:44	07:17			06:55	07:22 (7)	07:25		07:49 (7)
	20:35	20:00	10 06:44 (4)	19:08	18:17			16:39	67 08:29 (7)	16:32	44	08:33 (7)
19	05:42	06:13	06:35 (4)	06:45	07:18			06:56	07:23 (7)	07:26		07:50 (7)
	20:34	19:58	9 06:44 (4)	19:07	18:16			16:39	67 08:30 (7)	16:32	44	08:34 (7)
20	05:43	06:14	06:36 (4)	06:46	07:19		08:51 (7)	06:57	07:23 (7)	07:26		07:50 (7)
	20:34	19:57	8 06:44 (4)	19:05	18:14	7	08:58 (7)	16:38	67 08:30 (7)	16:33	44	08:34 (7)
21	05:44	06:15	06:37 (4)	06:47	07:21		08:44 (7)	06:58	07:24 (7)	07:27		07:51 (7)
	20:33	19:55	6 06:43 (4)	19:03	18:13	20	09:04 (7)	16:37	66 08:30 (7)	16:33	44	08:35 (7)
22	05:45	06:16	06:38 (4)	06:49	07:22		08:40 (7)	07:00	07:24 (7)	07:27		07:51 (7)
	20:32	19:54	4 06:42 (4)	19:01	18:11	27	09:07 (7)	16:36	66 08:30 (7)	16:34	44	08:35 (7)
23	05:46	06:17	06:39 (4)	06:50	07:23		08:37 (7)	07:01	07:25 (7)	07:28		07:52 (7)
	20:31	19:52	2 06:41 (4)	19:00	18:10	33	09:10 (7)	16:36	65 08:30 (7)	16:34	44	08:36 (7)
24	05:47	06:18		06:51	07:24		08:35 (7)	07:02	07:26 (7)	07:28		07:52 (7)
	20:30	19:51		18:58	18:08	38	09:13 (7)	16:35	64 08:30 (7)	16:35	44	08:36 (7)
25	05:48	06:19		06:52	06:25		07:33 (7)	07:03	07:27 (7)	07:29		07:52 (7)
	20:29	19:49		18:56	17:07	41	08:14 (7)	16:35	63 08:30 (7)	16:35	44	08:36 (7)
26	05:49	06:20		06:53	06:27		07:31 (7)	07:04	07:28 (7)	07:29		07:53 (7)
	20:28	19:47		18:54	17:06	45	08:16 (7)	16:34	62 08:30 (7)	16:36	44	08:37 (7)
27	05:50	06:21		06:54	06:28		07:30 (7)	07:05	07:29 (7)	07:29		07:53 (7)
	20:27	19:46		18:53	17:04	47	08:17 (7)	16:33	61 08:30 (7)	16:37	45	08:38 (7)
28	05:50	06:22		06:55	06:29		07:29 (7)	07:07	07:31 (7)	07:30		07:53 (7)
	20:26	19:44		18:51	17:03	50	08:19 (7)	16:33	60 08:31 (7)	16:37	45	08:38 (7)
29	05:51	06:24		06:56	06:30		07:27 (7)	07:08	07:32 (7)	07:30		07:53 (7)
	20:25	19:43		18:49	17:01	53	08:20 (7)	16:33	58 08:30 (7)	16:38	45	08:38 (7)
30	05:52	06:25		06:57	06:31		07:26 (7)	07:09	07:33 (7)	07:30		07:53 (7)
	20:24	19:41		18:47	17:00	55	08:21 (7)	16:32	57 08:30 (7)	16:39	46	08:39 (7)
31	05:53	06:26			06:33		07:26 (7)			07:30		07:54 (7)
	20:23	19:39			16:59	56	08:22 (7)			16:40	46	08:40 (7)
Potential sun hours	462	430		375	344			295		284		
Total, worst case			150			546			1923		1461	

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: V - Shadow Receptor: 1.0 × 1.0 Azimuth: 30.0° Slope: 90.0° (22)

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	07:31		12:51 (4)	07:16	06:39	06:47	05:59	05:29	05:30	05:54	06:27	06:58	06:34			07:10		12:43 (4)
	16:41	65	13:56 (4)	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:45	16:57			16:32	53	13:36 (4)
2	07:31		12:52 (4)	07:15	06:37	06:45	05:58	05:29	05:30	05:55	06:28	06:59	06:35			07:11		12:43 (4)
	16:41	64	13:56 (4)	17:17	17:52	19:28	20:01	20:32	20:42	20:21	19:36	18:44	16:56			16:31	54	13:37 (4)
3	07:31		12:53 (4)	07:14	06:36	06:43	05:57	05:28	05:31	05:56	06:29	07:00	06:36			07:12		12:42 (4)
	16:42	63	13:56 (4)	17:18	17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42	16:55			16:31	56	13:38 (4)
4	07:31		12:54 (4)	07:13	06:34	06:42	05:55	05:28	05:31	05:57	06:30	07:01	06:37			07:13		12:42 (4)
	16:43	62	13:56 (4)	17:20	17:55	19:30	20:03	20:33	20:41	20:19	19:33	18:40	16:54			16:31	57	13:39 (4)
5	07:31		12:54 (4)	07:12	06:33	06:40	05:54	05:28	05:32	05:58	06:31	07:02	06:39			07:14		12:41 (4)
	16:44	61	13:55 (4)	17:21	17:56	19:31	20:05	20:34	20:41	20:17	19:31	18:39	16:52			16:31	59	13:40 (4)
6	07:31		12:55 (4)	07:11	06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03	06:40			07:15		12:41 (4)
	16:45	60	13:55 (4)	17:22	17:57	19:32	20:06	20:34	20:41	20:16	19:29	18:37	16:51			16:31	60	13:41 (4)
7	07:31		12:56 (4)	07:10	06:29	06:36	05:52	05:27	05:33	06:00	06:33	07:05	06:41			07:16		12:41 (4)
	16:46	59	13:55 (4)	17:23	17:58	19:33	20:07	20:35	20:41	20:15	19:27	18:35	16:50			16:30	61	13:42 (4)
8	07:31		12:58 (4)	07:09	06:28	06:35	05:50	05:27	05:34	06:01	06:34	07:06	06:42			07:17		12:41 (4)
	16:47	57	13:55 (4)	17:25	18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34	16:49			16:30	62	13:43 (4)
9	07:30		12:59 (4)	07:07	06:26	06:33	05:49	05:26	05:34	06:03	06:35	07:07	06:44			07:18		12:41 (4)
	16:48	56	13:55 (4)	17:26	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48			16:30	63	13:44 (4)
10	07:30		13:00 (4)	07:06	06:24	06:31	05:48	05:26	05:35	06:04	06:36	07:08	06:45			07:19		12:41 (4)
	16:49	54	13:54 (4)	17:27	18:02	19:37	20:10	20:37	20:40	20:11	19:22	18:30	16:47			16:30	64	13:45 (4)
11	07:30		13:01 (4)	07:05	06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09	06:46			07:20		12:41 (4)
	16:50	53	13:54 (4)	17:29	18:03	19:38	20:11	20:37	20:39	20:10	19:20	18:29	16:46			16:30	65	13:46 (4)
12	07:30		13:03 (4)	07:04	06:21	06:28	05:46	05:26	05:36	06:06	06:38	07:10	06:47			07:20		12:41 (4)
	16:51	51	13:54 (4)	17:30	18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27	16:45			16:31	66	13:47 (4)
13	07:29		13:04 (4)	07:02	06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11	06:49			07:21		12:41 (4)
	16:52	49	13:53 (4)	17:31	18:05	19:40	20:13	20:39	20:38	20:07	19:17	18:25	16:44			16:31	66	13:47 (4)
14	07:29		13:06 (4)	07:01	06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:12	06:50			07:22		12:41 (4)
	16:54	47	13:53 (4)	17:33	18:07	19:41	20:14	20:39	20:38	20:06	19:15	18:24	16:43			16:31	66	13:47 (4)
15	07:29		13:08 (4)	07:00	06:16	06:23	05:43	05:26	05:39	06:09	06:41	07:14	06:51			07:23		12:42 (4)
	16:55	43	13:51 (4)	17:34	18:08	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42			16:31	66	13:48 (4)
16	07:28		13:10 (4)	06:58	06:14	06:22	05:41	05:26	05:40	06:10	06:42	07:15	06:52			07:24		12:42 (4)
	16:56	41	13:51 (4)	17:35	18:09	19:43	20:16	20:40	20:36	20:03	19:12	18:20	16:41			16:31	67	13:49 (4)
17	07:28		13:12 (4)	06:57	06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16	06:54			07:24		12:42 (4)
	16:57	37	13:49 (4)	17:36	18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19	16:40			16:32	67	13:49 (4)
18	07:27		13:16 (4)	06:55	06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17	06:55			07:25		12:43 (4)
	16:58	32	13:48 (4)	17:38	18:11	19:46	20:18	20:41	20:35	20:00	19:08	18:17	16:39			16:32	67	13:50 (4)
19	07:27		13:18 (4)	06:54	06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18	06:56			07:25		12:43 (4)
	16:59	28	13:46 (4)	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16	16:38			16:32	68	13:51 (4)
20	07:26		13:22 (4)	06:53	06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57			07:26		12:43 (4)
	17:01	20	13:42 (4)	17:40	18:13	19:48	20:20	20:41	20:33	19:57	19:05	18:14	16:38			16:33	68	13:51 (4)
21	07:25		13:29 (4)	06:51	06:06	06:14	05:37	05:26	05:44	06:15	06:47	07:21	06:58		13:05 (4)	07:27		12:44 (4)
	17:02	8	13:37 (4)	17:41	18:14	19:49	20:21	20:41	20:33	19:55	19:03	18:13	16:37	7	13:12 (4)	16:33	68	13:52 (4)
22	07:25			06:50	06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:22	07:00		12:58 (4)	07:27		12:44 (4)
	17:03			17:43	18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11	16:36	20	13:18 (4)	16:34	68	13:52 (4)
23	07:24			06:48	06:02	06:11	05:35	05:27	05:46	06:17	06:49	07:23	07:01		12:55 (4)	07:28		12:44 (4)
	17:04			17:44	18:17	19:51	20:23	20:42	20:31	19:52	18:59	18:10	16:36	28	13:23 (4)	16:34	68	13:52 (4)
24	07:23			06:47	06:00	06:09	05:34	05:27	05:47	06:18	06:51	07:24	07:02		12:53 (4)	07:28		12:45 (4)
	17:06			17:45	18:18	19:52	20:24	20:42	20:30	19:51	18:58	18:08	16:35	32	13:25 (4)	16:35	68	13:53 (4)
25	07:22			06:45	05:59	06:08	05:34	05:27	05:48	06:19	06:52	06:25	07:03		12:50 (4)	07:29		12:45 (4)
	17:07			17:46	18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07	16:34	37	13:27 (4)	16:35	68	13:53 (4)
26	07:22			06:44	05:57	06:06	05:33	05:27	05:48	06:20	06:53	06:26	07:04		12:48 (4)	07:29		12:47 (4)
	17:08			17:48	18:20	19:55	20:26	20:42	20:28	19:47	18:54	17:05	16:34	41	13:29 (4)	16:36	67	13:54 (4)
27	07:21			06:42	05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:28	07:05		12:47 (4)	07:29		12:47 (4)
	17:09			17:49	18:21	19:56	20:27	20:42	20:27	19:46	18:52	17:04	16:33	43	13:30 (4)	16:36	67	13:54 (4)
28	07:20			06:41	05:53	06:04	05:32	05:28	05:50	06:22	06:55	06:29	07:07		12:46 (4)	07:30		12:47 (4)
	17:11			17:50	18:22	19:57	20:28	20:42	20:26	19:44	18:51	17:03	16:33	47	13:33 (4)	16:37	67	13:54 (4)
29	07:19				06:52	06:02	05:31	05:29	05:51	06:23	06:56	06:30	07:08		12:45 (4)	07:30		12:48 (4)
	17:12				19:23	19:58	20:28	20:42	20:25	19:43	18:49	17:01	16:32	49	13:34 (4)	16:38	66	13:54 (4)
30	07:18				06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:09		12:44 (4)	07:30		12:48 (4)
	17:13				19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	51	13:35 (4)	16:39	67	13:55 (4)
31	07:17				06:48		05:30		05:53	06:26		06:33				07:30		12:50 (4)
	17:14				19:26		20:30		20:23	19:39		16:59				16:39	66	13:56 (4)
Potential sun hours	294			296	369	400	451	456	462	430	375	344	295			284		
Total, worst case		1010												355			1995	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: W - Shadow Receptor: 1.0 × 1.0 Azimuth: 10.0° Slope: 90.0° (23)

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	07:31		12:36 (4)	07:16	06:39			06:47	05:59	05:29
	16:41	60	13:36 (4)	17:16	17:51			19:27	20:00	20:31
2	07:31		12:37 (4)	07:15	06:37			06:45	05:58	05:29
	16:41	59	13:36 (4)	17:17	17:52			19:28	20:01	20:32
3	07:31		12:38 (4)	07:14	06:36			06:43	05:57	05:28
	16:42	58	13:36 (4)	17:18	17:54			19:29	20:02	20:32
4	07:31		12:40 (4)	07:13	06:34			06:42	05:55	05:28
	16:43	56	13:36 (4)	17:20	17:55			19:30	20:03	20:33
5	07:31		12:40 (4)	07:12	06:33			06:40	05:54	05:28
	16:44	55	13:35 (4)	17:21	17:56			19:31	20:05	20:34
6	07:31		12:41 (4)	07:11	06:31		17:28 (6)	06:38	05:53	05:27
	16:45	54	13:35 (4)	17:22	17:57	7	17:35 (6)	19:32	20:06	20:34
7	07:31		12:43 (4)	07:10	06:29		17:25 (6)	06:36	05:52	05:27
	16:46	52	13:35 (4)	17:24	17:58	11	17:36 (6)	19:33	20:07	20:35
8	07:31		12:44 (4)	07:09	06:28		17:25 (6)	06:35	05:50	05:27
	16:47	50	13:34 (4)	17:25	18:00	13	17:38 (6)	19:35	20:08	20:36
9	07:30		12:46 (4)	07:07	06:26		17:24 (6)	06:33	05:49	05:26
	16:48	48	13:34 (4)	17:26	18:01	14	17:38 (6)	19:36	20:09	20:36
10	07:30		12:47 (4)	07:06	06:24		17:23 (6)	06:31	05:48	05:26
	16:49	46	13:33 (4)	17:27	18:02	15	17:38 (6)	19:37	20:10	20:37
11	07:30		12:49 (4)	07:05	06:23		17:23 (6)	06:30	05:47	05:26
	16:50	43	13:32 (4)	17:29	18:03	15	17:38 (6)	19:38	20:11	20:37
12	07:30		12:51 (4)	07:04	06:21		17:23 (6)	06:28	05:46	05:26
	16:51	41	13:32 (4)	17:30	18:04	14	17:37 (6)	19:39	20:12	20:38
13	07:29		12:53 (4)	07:02	06:19		17:24 (6)	06:27	05:45	05:26
	16:52	37	13:30 (4)	17:31	18:05	12	17:36 (6)	19:40	20:13	20:39
14	07:29		12:56 (4)	07:01	06:18		17:26 (6)	06:25	05:44	05:26
	16:54	33	13:29 (4)	17:33	18:07	9	17:35 (6)	19:41	20:14	20:39
15	07:29		12:58 (4)	07:00	06:16			06:23	05:43	05:26
	16:55	29	13:27 (4)	17:34	18:08			19:42	20:15	20:39
16	07:28		13:02 (4)	06:58	06:14			06:22	05:41	05:26
	16:56	23	13:25 (4)	17:35	18:09			19:43	20:16	20:40
17	07:28		13:07 (4)	06:57	06:12			06:20	05:41	05:26
	16:57	13	13:20 (4)	17:36	18:10			19:45	20:17	20:40
18	07:27			06:55	06:11			06:19	05:40	05:26
	16:58			17:38	18:11			19:46	20:18	20:41
19	07:27			06:54	06:09			06:17	05:39	05:26
	16:59			17:39	18:12			19:47	20:19	20:41
20	07:26			06:53	06:07			06:15	05:38	05:26
	17:01			17:40	18:13			19:48	20:20	20:41
21	07:25			06:51	06:06			06:14	05:37	05:26
	17:02			17:41	18:14			19:49	20:21	20:41
22	07:25			06:50	06:04			06:12	05:36	05:26
	17:03			17:43	18:16			19:50	20:22	20:42
23	07:24			06:48	06:02			06:11	05:35	05:27
	17:04			17:44	18:17			19:51	20:23	20:42
24	07:23			06:47	06:00			06:09	05:34	05:27
	17:06			17:45	18:18			19:52	20:24	20:42
25	07:22			06:45	05:59			06:08	05:34	05:27
	17:07			17:46	18:19			19:53	20:25	20:42
26	07:22			06:44	05:57			06:06	05:33	05:27
	17:08			17:48	18:20			19:55	20:26	20:42
27	07:21			06:42	05:55			06:05	05:32	05:28
	17:09			17:49	18:21			19:56	20:27	20:42
28	07:20			06:41	05:53			06:04	05:32	05:28
	17:11			17:50	18:22			19:57	20:28	20:42
29	07:19				06:52			06:02	05:31	05:29
	17:12				19:23			19:58	20:28	20:42
30	07:18				06:50			06:01	05:30	05:29
	17:13				19:25			19:59	20:29	20:42
31	07:17				06:48				05:30	
	17:14				19:26				20:30	
Potential sun hours	294			296	369			400	451	456
Total, worst case		757				110				

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: W - Shadow Receptor: 1.0 × 1.0 Azimuth: 10.0° Slope: 90.0° (23)

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	05:30	05:54	06:27	06:58 18:02 (6)	06:34	07:10 12:31 (4)
	20:42	20:22	19:38	18:45 13 18:15 (6)	16:57	16:32 43 13:14 (4)
2	05:30	05:55	06:28	06:59 18:02 (6)	06:35	07:11 12:30 (4)
	20:42	20:21	19:36	18:44 15 18:17 (6)	16:56	16:31 46 13:16 (4)
3	05:31	05:56	06:29	07:00 18:01 (6)	06:36	07:12 12:29 (4)
	20:42	20:20	19:34	18:42 15 18:16 (6)	16:55	16:31 48 13:17 (4)
4	05:31	05:57	06:30	07:01 18:01 (6)	06:37	07:13 12:28 (4)
	20:41	20:19	19:33	18:40 15 18:16 (6)	16:54	16:31 50 13:18 (4)
5	05:32	05:58	06:31	07:02 18:01 (6)	06:39	07:14 12:28 (4)
	20:41	20:17	19:31	18:39 14 18:15 (6)	16:52	16:31 52 13:20 (4)
6	05:32	05:59	06:32	07:03 18:01 (6)	06:40	07:15 12:27 (4)
	20:41	20:16	19:29	18:37 13 18:14 (6)	16:51	16:31 54 13:21 (4)
7	05:33	06:00	06:33	07:05 18:02 (6)	06:41	07:16 12:27 (4)
	20:41	20:15	19:27	18:35 10 18:12 (6)	16:50	16:30 55 13:22 (4)
8	05:34	06:01	06:34	07:06 18:05 (6)	06:42	07:17 12:27 (4)
	20:40	20:14	19:26	18:34 4 18:09 (6)	16:49	16:30 56 13:23 (4)
9	05:34	06:03	06:35	07:07	06:44	07:18 12:27 (4)
	20:40	20:12	19:24	18:32	16:48	16:30 57 13:24 (4)
10	05:35	06:04	06:36	07:08	06:45	07:19 12:26 (4)
	20:40	20:11	19:22	18:30	16:47	16:30 59 13:25 (4)
11	05:36	06:05	06:37	07:09	06:46	07:20 12:27 (4)
	20:39	20:10	19:20	18:29	16:46	16:30 59 13:26 (4)
12	05:36	06:06	06:38	07:10	06:47	07:20 12:27 (4)
	20:39	20:08	19:19	18:27	16:45	16:31 60 13:27 (4)
13	05:37	06:07	06:39	07:11	06:49	07:21 12:26 (4)
	20:38	20:07	19:17	18:25	16:44	16:31 61 13:27 (4)
14	05:38	06:08	06:40	07:12	06:50	07:22 12:26 (4)
	20:38	20:06	19:15	18:24	16:43	16:31 62 13:28 (4)
15	05:39	06:09	06:41	07:14	06:51	07:23 12:27 (4)
	20:37	20:04	19:13	18:22	16:42	16:31 62 13:29 (4)
16	05:40	06:10	06:42	07:15	06:52	07:24 12:27 (4)
	20:36	20:03	19:12	18:20	16:41	16:31 63 13:30 (4)
17	05:40	06:11	06:43	07:16	06:54	07:24 12:27 (4)
	20:36	20:01	19:10	18:19	16:40	16:32 63 13:30 (4)
18	05:41	06:12	06:44	07:17	06:55	07:25 12:28 (4)
	20:35	20:00	19:08	18:17	16:39	16:32 63 13:31 (4)
19	05:42	06:13	06:45	07:18	06:56	07:25 12:28 (4)
	20:34	19:58	19:06	18:16	16:38	16:32 64 13:32 (4)
20	05:43	06:14	06:46	07:19	06:57	07:26 12:28 (4)
	20:33	19:57	19:05	18:14	16:38	16:33 64 13:32 (4)
21	05:44	06:15	06:47	07:21	06:58	07:27 12:29 (4)
	20:33	19:55	19:03	18:13	16:37	16:33 64 13:33 (4)
22	05:45	06:16	06:48	07:22	07:00	07:27 12:29 (4)
	20:32	19:54	19:01	18:11	16:36	16:34 64 13:33 (4)
23	05:46	06:17	06:50	07:23	07:01	07:28 12:29 (4)
	20:31	19:52	18:59	18:10	16:36	16:34 64 13:33 (4)
24	05:47	06:18	06:51	07:24	07:02	07:28 12:30 (4)
	20:30	19:51	18:58	18:08	16:35	16:35 64 13:34 (4)
25	05:48	06:19	06:52	06:25	07:03 12:45 (4)	07:29 12:30 (4)
	20:29	19:49	18:56	17:07	16:34 13 12:58 (4)	16:35 64 13:34 (4)
26	05:48	06:20	06:53	06:26	07:04 12:40 (4)	07:29 12:32 (4)
	20:28	19:47	18:54	17:05	16:34 23 13:03 (4)	16:36 63 13:35 (4)
27	05:49	06:21	06:54	06:28	07:05 12:37 (4)	07:29 12:32 (4)
	20:27	19:46	18:52	17:04	16:33 29 13:06 (4)	16:36 63 13:35 (4)
28	05:50	06:22	06:55	06:29	07:07 12:36 (4)	07:30 12:33 (4)
	20:26	19:44	18:51	17:03	16:33 33 13:09 (4)	16:37 62 13:35 (4)
29	05:51	06:23	06:56 18:06 (6)	06:30	07:08 12:34 (4)	07:30 12:33 (4)
	20:25	19:43	18:49 7 18:13 (6)	17:01	16:32 37 13:11 (4)	16:38 62 13:35 (4)
30	05:52	06:24	06:57 18:04 (6)	06:31	07:09 12:32 (4)	07:30 12:34 (4)
	20:24	19:41	18:47 11 18:15 (6)	17:00	16:32 41 13:13 (4)	16:39 61 13:35 (4)
31	05:53	06:26		06:33		07:30 12:35 (4)
	20:23	19:39		16:59		16:39 61 13:36 (4)
Potential sun hours	462	430	375	344	295	284
Total, worst case			18	99	176	1833

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: X - Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (24)

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	07:31		13:40 (4)	07:16		14:18 (4)	06:39	06:47	05:59	05:29	05:30	05:54	06:27	06:58	06:34			07:10		13:28 (4)
	16:41	85	15:54 (7)	17:16	23	14:41 (4)	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:45	16:57			16:32	69	14:37 (4)
2	07:31		13:40 (4)	07:15		14:23 (4)	06:37	06:45	05:58	05:29	05:30	05:55	06:28	06:59	06:35			07:11		13:28 (4)
	16:41	85	15:54 (7)	17:17	13	14:36 (4)	17:52	19:28	20:01	20:32	20:42	20:21	19:36	18:44	16:56			16:31	69	14:37 (4)
3	07:31		13:41 (4)	07:14			06:36	06:43	05:57	05:28	05:31	05:56	06:29	07:00	06:36			07:12		13:28 (4)
	16:42	83	15:54 (7)	17:18			17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42	16:55			16:31	70	14:38 (4)
4	07:31		13:42 (4)	07:13			06:34	06:41	05:55	05:28	05:31	05:57	06:30	07:01	06:37			07:13		13:28 (4)
	16:43	80	15:54 (7)	17:20			17:55	19:30	20:03	20:33	20:41	20:19	19:32	18:40	16:54			16:31	70	14:38 (4)
5	07:31		13:41 (4)	07:12			06:33	06:40	05:54	05:28	05:32	05:58	06:31	07:02	06:39			07:14		13:28 (4)
	16:44	79	15:52 (7)	17:21			17:56	19:31	20:05	20:34	20:41	20:17	19:31	18:39	16:52			16:31	71	14:39 (4)
6	07:31		13:42 (4)	07:11			06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03	06:40			07:15		13:28 (4)
	16:45	72	15:50 (7)	17:22			17:57	19:32	20:06	20:34	20:41	20:16	19:29	18:37	16:51			16:31	71	14:39 (4)
7	07:31		13:43 (4)	07:10			06:29	06:36	05:52	05:27	05:33	06:00	06:33	07:05	06:41			07:16		13:28 (4)
	16:46	71	14:54 (4)	17:23			17:58	19:33	20:07	20:35	20:41	20:15	19:27	18:35	16:50			16:30	78	15:39 (7)
8	07:30		13:44 (4)	07:09			06:28	06:35	05:50	05:27	05:34	06:01	06:34	07:06	06:42			07:17		13:29 (4)
	16:47	70	14:54 (4)	17:25			18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34	16:49			16:30	80	15:41 (7)
9	07:30		13:45 (4)	07:07			06:26	06:33	05:49	05:26	05:34	06:03	06:35	07:07	06:44		13:52 (4)	07:18		13:29 (4)
	16:48	70	14:55 (4)	17:26			18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48	15	14:07 (4)	16:30	83	15:42 (7)
10	07:30		13:45 (4)	07:06			06:24	06:31	05:48	05:26	05:35	06:04	06:36	07:08	06:45		13:48 (4)	07:19		13:29 (4)
	16:49	69	14:54 (4)	17:27			18:02	19:37	20:10	20:37	20:40	20:11	19:22	18:30	16:47	24	14:12 (4)	16:30	85	15:43 (7)
11	07:30		13:46 (4)	07:05			06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09	06:46		13:45 (4)	07:20		13:30 (4)
	16:50	69	14:55 (4)	17:29			18:03	19:38	20:11	20:37	20:39	20:10	19:20	18:29	16:46	30	14:15 (4)	16:30	85	15:44 (7)
12	07:30		13:47 (4)	07:04			06:21	06:28	05:46	05:26	05:36	06:06	06:38	07:10	06:47		13:42 (4)	07:20		13:30 (4)
	16:51	68	14:55 (4)	17:30			18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27	16:45	35	14:17 (4)	16:31	87	15:45 (7)
13	07:29		13:47 (4)	07:02			06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11	06:49		13:40 (4)	07:21		13:30 (4)
	16:52	68	14:55 (4)	17:31			18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:44	39	14:19 (4)	16:31	87	15:45 (7)
14	07:29		13:48 (4)	07:01			06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:12	06:50		13:38 (4)	07:22		13:31 (4)
	16:54	67	14:55 (4)	17:33			18:06	19:41	20:14	20:39	20:37	20:06	19:15	18:24	16:43	43	14:21 (4)	16:31	88	15:46 (7)
15	07:29		13:49 (4)	07:00			06:16	06:23	05:42	05:26	05:39	06:09	06:41	07:14	06:51		13:36 (4)	07:23		13:31 (4)
	16:55	66	14:55 (4)	17:34			18:08	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42	46	14:22 (4)	16:31	88	15:47 (7)
16	07:28		13:50 (4)	06:58			06:14	06:22	05:41	05:26	05:40	06:10	06:42	07:15	06:52		13:36 (4)	07:23		13:32 (4)
	16:56	65	14:55 (4)	17:35			18:09	19:43	20:16	20:40	20:36	20:03	19:12	18:20	16:41	48	14:24 (4)	16:31	89	15:48 (7)
17	07:28		13:51 (4)	06:57			06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16	06:54		13:34 (4)	07:24		13:32 (4)
	16:57	64	14:55 (4)	17:36			18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19	16:40	51	14:25 (4)	16:32	89	15:48 (7)
18	07:27		13:52 (4)	06:55			06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17	06:55		13:33 (4)	07:25		13:32 (4)
	16:58	63	14:55 (4)	17:38			18:11	19:46	20:18	20:41	20:35	20:00	19:08	18:17	16:39	53	14:26 (4)	16:32	91	15:49 (7)
19	07:27		13:53 (4)	06:54			06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18	06:56		13:33 (4)	07:25		13:33 (4)
	16:59	61	14:54 (4)	17:39			18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16	16:38	55	14:28 (4)	16:32	91	15:50 (7)
20	07:26		13:54 (4)	06:53			06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57		13:32 (4)	07:26		13:33 (4)
	17:01	60	14:54 (4)	17:40			18:13	19:48	20:20	20:41	20:33	19:57	19:05	18:14	16:38	56	14:28 (4)	16:33	91	15:50 (7)
21	07:25		13:56 (4)	06:51			06:06	06:14	05:37	05:26	05:44	06:15	06:47	07:21	06:58		13:31 (4)	07:27		13:34 (4)
	17:02	58	14:54 (4)	17:41			18:14	19:49	20:21	20:41	20:33	19:55	19:03	18:13	16:37	58	14:29 (4)	16:33	91	15:51 (7)
22	07:25		13:57 (4)	06:50			06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:22	07:00		13:30 (4)	07:27		13:34 (4)
	17:03	56	14:53 (4)	17:43			18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11	16:36	60	14:30 (4)	16:34	91	15:51 (7)
23	07:24		13:58 (4)	06:48			06:02	06:11	05:35	05:27	05:46	06:17	06:49	07:23	07:01		13:30 (4)	07:28		13:34 (4)
	17:04	55	14:53 (4)	17:44			18:17	19:51	20:23	20:42	20:31	19:52	18:59	18:10	16:36	61	14:31 (4)	16:34	91	15:51 (7)
24	07:23		13:59 (4)	06:47			06:00	06:09	05:34	05:27	05:47	06:18	06:51	07:24	07:02		13:29 (4)	07:28		13:35 (4)
	17:06	53	14:52 (4)	17:45			18:18	19:52	20:24	20:42	20:30	19:51	18:58	18:08	16:35	63	14:32 (4)	16:35	91	15:52 (7)
25	07:22		14:00 (4)	06:45			05:59	06:08	05:34	05:27	05:47	06:19	06:52	06:25	07:03		13:29 (4)	07:29		13:35 (4)
	17:07	51	14:51 (4)	17:46			18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07	16:34	64	14:33 (4)	16:35	91	15:52 (7)
26	07:22		14:03 (4)	06:44			05:57	06:06	05:33	05:27	05:48	06:20	06:53	06:26	07:04		13:28 (4)	07:29		13:37 (4)
	17:08	48	14:51 (4)	17:48			18:20	19:55	20:26	20:42	20:28	19:47	18:54	17:05	16:34	65	14:33 (4)	16:36	89	15:53 (7)
27	07:21		14:04 (4)	06:42			05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:28	07:05		13:28 (4)	07:29		13:37 (4)
	17:09	46	14:50 (4)	17:49			18:21	19:56	20:27	20:42	20:27	19:46	18:52	17:04	16:33	66	14:34 (4)	16:36	89	15:53 (7)
28	07:20		14:06 (4)	06:41			05:53	06:04	05:32	05:28	05:50	06:22	06:55	06:29	07:07		13:29 (4)	07:30		13:37 (4)
	17:11	43	14:49 (4)	17:50			18:22	19:57	20:28	20:42	20:26	19:44	18:51	17:03	16:33	66	14:35 (4)	16:37	89	15:53 (7)
29	07:19		14:09 (4)				06:52	06:02	05:31	05:29	05:51	06:23	06:56	06:30	07:08		13:28 (4)	07:30		13:37 (4)
	17:12	38	14:47 (4)				19:23	19:58	20:28	20:42	20:25	19:43	18:49	17:01	16:32	68	14:36 (4)	16:38	88	15:53 (7)
30	07:18		14:11 (4)				06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:09		13:28 (4)	07:30		13:38 (4)
	17:13	35	14:46 (4)				19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	68	14:36 (4)	16:39	88	15:53 (7)
31	07:17		14:14 (4)				06:48		05:30		05:53	06:26		06:33				07:30		13:39 (4)
	17:14	29	14:43 (4)				19:26		20:30		20:23	19:39		16:59				16:39	87	15:54 (7)
Potential sun hours	294			296			369	400	451	456	462	430	375	344	295			284		
Total, worst case		1927			36											1134			2617	

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

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

Licensed user:
Iron solar s.r.l.
via Lanzone, 31
IT-20122 Milano
+393487125089
Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: Y - Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (25)

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	07:31		14:08 (4)	07:16		14:27 (4)	06:39	06:47	05:59	05:29	05:30	05:54	06:27	06:58			06:34		14:15 (4)	07:10		13:54 (4)
	16:41	92	16:05 (7)	17:16	56	15:23 (4)	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:45			16:57	24	14:39 (4)	16:32	82	15:46 (7)
2	07:31		14:08 (4)	07:15		14:29 (4)	06:37	06:45	05:58	05:29	05:30	05:55	06:28	06:59			06:35		14:11 (4)	07:11		13:54 (4)
	16:41	92	16:05 (7)	17:17	53	15:22 (4)	17:52	19:28	20:01	20:32	20:42	20:21	19:36	18:44			16:56	31	14:42 (4)	16:31	85	15:47 (7)
3	07:31		14:09 (4)	07:14		14:30 (4)	06:36	06:43	05:57	05:28	05:31	05:56	06:29	07:00			06:36		14:08 (4)	07:12		13:54 (4)
	16:42	90	16:05 (7)	17:18	52	15:22 (4)	17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42			16:55	36	14:44 (4)	16:31	86	15:48 (7)
4	07:31		14:09 (4)	07:13		14:31 (4)	06:34	06:41	05:55	05:28	05:31	05:57	06:30	07:01			06:37		14:07 (4)	07:13		13:54 (4)
	16:43	91	16:05 (7)	17:20	49	15:20 (4)	17:55	19:30	20:03	20:33	20:41	20:19	19:32	18:40			16:54	39	14:46 (4)	16:31	88	15:49 (7)
5	07:31		14:09 (4)	07:12		14:33 (4)	06:33	06:40	05:54	05:28	05:32	05:58	06:31	07:02			06:39		14:04 (4)	07:14		13:55 (4)
	16:44	90	16:05 (7)	17:21	46	15:19 (4)	17:56	19:31	20:05	20:34	20:41	20:17	19:31	18:39			16:52	44	14:48 (4)	16:31	89	15:50 (7)
6	07:31		14:09 (4)	07:11		14:35 (4)	06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03			06:40		14:02 (4)	07:15		13:55 (4)
	16:45	90	16:05 (7)	17:22	43	15:18 (4)	17:57	19:32	20:06	20:34	20:41	20:16	19:29	18:37			16:51	47	14:49 (4)	16:31	90	15:51 (7)
7	07:31		14:10 (4)	07:10		14:37 (4)	06:29	06:36	05:52	05:27	05:33	06:00	06:33	07:05			06:41		14:02 (4)	07:16		13:56 (4)
	16:46	89	16:05 (7)	17:23	39	15:16 (4)	17:58	19:33	20:07	20:35	20:41	20:15	19:27	18:35			16:50	49	14:51 (4)	16:30	90	15:52 (7)
8	07:30		14:10 (4)	07:09		14:40 (4)	06:28	06:35	05:50	05:27	05:34	06:01	06:34	07:06			06:42		14:00 (4)	07:17		13:56 (4)
	16:47	88	16:05 (7)	17:25	35	15:15 (4)	18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34			16:49	52	14:52 (4)	16:30	90	15:52 (7)
9	07:30		14:11 (4)	07:07		14:42 (4)	06:26	06:33	05:49	05:26	05:34	06:02	06:35	07:07			06:44		13:58 (4)	07:18		13:57 (4)
	16:48	86	16:05 (7)	17:26	30	15:12 (4)	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32			16:48	54	14:52 (4)	16:30	90	15:53 (7)
10	07:30		14:11 (4)	07:06		14:46 (4)	06:24	06:31	05:48	05:26	05:35	06:04	06:36	07:08			06:45		13:58 (4)	07:19		13:57 (4)
	16:49	85	16:04 (7)	17:27	23	15:09 (4)	18:02	19:37	20:10	20:37	20:40	20:11	19:22	18:30			16:47	56	14:54 (4)	16:30	92	15:54 (7)
11	07:30		14:12 (4)	07:05		14:52 (4)	06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09			06:46		13:57 (4)	07:20		13:58 (4)
	16:50	82	16:04 (7)	17:29	12	15:04 (4)	18:03	19:38	20:11	20:37	20:39	20:10	19:20	18:29			16:46	58	14:55 (4)	16:30	91	15:55 (7)
12	07:30		14:12 (4)	07:04			06:21	06:28	05:46	05:26	05:36	06:06	06:38	07:10			06:47		13:56 (4)	07:20		13:58 (4)
	16:51	81	16:04 (7)	17:30			18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27			16:45	59	14:55 (4)	16:30	92	15:55 (7)
13	07:29		14:12 (4)	07:02			06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11			06:49		13:56 (4)	07:21		13:58 (4)
	16:52	76	16:01 (7)	17:31			18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25			16:44	61	14:57 (4)	16:31	91	15:55 (7)
14	07:29		14:13 (4)	07:01			06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:12			06:50		13:55 (4)	07:22		13:59 (4)
	16:53	72	15:25 (4)	17:33			18:06	19:41	20:14	20:39	20:37	20:06	19:15	18:24			16:43	62	14:57 (4)	16:31	92	15:56 (7)
15	07:29		14:13 (4)	07:00			06:16	06:23	05:42	05:26	05:39	06:09	06:41	07:14			06:51		13:54 (4)	07:23		14:00 (4)
	16:55	71	15:24 (4)	17:34			18:08	19:42	20:15	20:39	20:37	20:04	19:13	18:22			16:42	63	14:57 (4)	16:31	92	15:57 (7)
16	07:28		14:14 (4)	06:58			06:14	06:22	05:41	05:26	05:40	06:10	06:42	07:15			06:52		13:54 (4)	07:23		14:00 (4)
	16:56	71	15:25 (4)	17:35			18:09	19:43	20:16	20:40	20:36	20:03	19:12	18:20			16:41	65	14:59 (4)	16:31	92	15:57 (7)
17	07:28		14:14 (4)	06:57			06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16			06:54		13:53 (4)	07:24		14:00 (4)
	16:57	71	15:25 (4)	17:36			18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19			16:40	66	14:59 (4)	16:32	92	15:57 (7)
18	07:27		14:16 (4)	06:55			06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17			06:55		13:53 (4)	07:25		14:01 (4)
	16:58	70	15:26 (4)	17:38			18:11	19:46	20:18	20:41	20:35	20:00	19:08	18:17			16:39	66	14:59 (4)	16:32	92	15:58 (7)
19	07:27		14:16 (4)	06:54			06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18			06:56		13:53 (4)	07:25		14:02 (4)
	16:59	70	15:26 (4)	17:39			18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16			16:38	68	15:01 (4)	16:32	92	15:59 (7)
20	07:26		14:16 (4)	06:53			06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19			06:57		13:53 (4)	07:26		14:02 (4)
	17:01	69	15:25 (4)	17:40			18:13	19:48	20:20	20:41	20:33	19:57	19:05	18:14			16:38	68	15:01 (4)	16:33	92	15:59 (7)
21	07:25		14:17 (4)	06:51			06:06	06:14	05:37	05:26	05:44	06:15	06:47	07:21			06:58		13:52 (4)	07:27		14:03 (4)
	17:02	69	15:26 (4)	17:41			18:14	19:49	20:21	20:41	20:33	19:55	19:03	18:13			16:37	69	15:01 (4)	16:33	92	16:00 (7)
22	07:25		14:18 (4)	06:50			06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:22			07:00		13:52 (4)	07:27		14:03 (4)
	17:03	68	15:26 (4)	17:43			18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11			16:36	69	15:01 (4)	16:34	92	16:00 (7)
23	07:24		14:18 (4)	06:48			06:02	06:11	05:35	05:27	05:46	06:17	06:49	07:23			07:01		13:53 (4)	07:28		14:03 (4)
	17:04	68	15:26 (4)	17:44			18:17	19:51	20:23	20:42	20:31	19:52	18:59	18:10			16:36	70	15:03 (4)	16:34	92	16:00 (7)
24	07:23		14:19 (4)	06:47			06:00	06:09	05:34	05:27	05:47	06:18	06:51	07:24			07:02		13:53 (4)	07:28		14:04 (4)
	17:06	66	15:25 (4)	17:45			18:18	19:52	20:24	20:42	20:30	19:51	18:58	18:08			16:35	70	15:03 (4)	16:35	92	16:01 (7)
25	07:22		14:19 (4)	06:45			05:59	06:08	05:34	05:27	05:47	06:19	06:52	06:25			07:03		13:52 (4)	07:29		14:04 (4)
	17:07	66	15:25 (4)	17:46			18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07			16:34	71	15:03 (4)	16:35	92	16:01 (7)
26	07:22		14:21 (4)	06:44			05:57	06:06	05:33	05:27	05:48	06:20	06:53	06:26			07:04		13:52 (4)	07:29		14:05 (4)
	17:08	65	15:26 (4)	17:48			18:20	19:55	20:26	20:42	20:28	19:47	18:54	17:05			16:34	71	15:03 (4)	16:36	92	16:02 (7)
27	07:21		14:22 (4)	06:42			05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:28			07:05		13:52 (4)	07:29		14:05 (4)
	17:09	63	15:25 (4)	17:49			18:21	19:56	20:27	20:42	20:27	19:46	18:52	17:04			16:33	71	15:03 (4)	16:36	92	16:02 (7)
28	07:20		14:23 (4)	06:41			05:53	06:04	05:32	05:28	05:50	06:22	06:55	06:29			07:07		13:53 (4)	07:30		14:05 (4)
	17:11	62	15:25 (4)	17:50			18:22	19:57	20:28	20:42	20:26	19:44	18:51	17:03			16:33	72	15:05 (4)	16:37	93	16:03 (7)
29	07:19		14:24 (4)				06:52	06:02	05:31	05:29	05:51	06:23	06:56	06:30			07:08		13:53 (4)	07:30		14:06 (4)
	17:12	61	15:25 (4)				19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01			16:32	76	15:42 (7)	16:38	92	16:03 (7)
30	07:18		14:25 (4)				06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31			07:09		13:53 (4)	07:30		14:06 (4)
	17:13	59	15:24 (4)				19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00			16:32	81	15:45 (7)	16:39	92	16:03 (7)
31	07:17		14:26 (4)				06:48		05:30		05:53	06:26		06:33		14:19 (4)				07:30		14:07 (4)
	17:14	58	15:24 (4)				19:26		20:30		20:23	19:39		16:59	15	14:34 (4)				16:39	92	16:04 (7)
Potential sun hours	294			296			369	400	451	456	462	430	375	344			295			284		
Total, worst case		2331			438										15			1788			2813	

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: Z - Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (26)

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	07:31	07:16		06:39		07:00 (4)	06:47	05:59	05:29	05:30	05:54	06:27		06:58		07:32 (4)	06:34	07:10
	16:41	17:16		17:51	54	07:54 (4)	19:27	20:00	20:31	20:42	20:22	19:38		18:46	62	08:34 (4)	16:57	16:32
2	07:31	07:15		06:37		07:00 (4)	06:45	05:58	05:29	05:30	05:55	06:28		06:59		07:32 (4)	06:35	07:11
	16:41	17:17		17:52	55	07:55 (4)	19:28	20:01	20:32	20:42	20:21	19:36		18:44	63	08:35 (4)	16:56	16:31
3	07:31	07:14		06:36		06:58 (4)	06:43	05:57	05:28	05:31	05:56	06:29		07:00		07:32 (4)	06:36	07:12
	16:42	17:18		17:54	57	07:55 (4)	19:29	20:02	20:32	20:42	20:20	19:34		18:42	62	08:34 (4)	16:55	16:31
4	07:31	07:13		06:34		06:57 (4)	06:42	05:55	05:28	05:31	05:57	06:30		07:01		07:32 (4)	06:38	07:13
	16:43	17:20		17:55	58	07:55 (4)	19:30	20:03	20:33	20:41	20:19	19:33		18:40	62	08:34 (4)	16:54	16:31
5	07:31	07:12		06:33		06:57 (4)	06:40	05:54	05:28	05:32	05:58	06:31		07:02		07:32 (4)	06:39	07:14
	16:44	17:21		17:56	59	07:56 (4)	19:31	20:05	20:34	20:41	20:17	19:31		18:39	61	08:33 (4)	16:52	16:31
6	07:31	07:11		06:31		06:56 (4)	06:38	05:53	05:27	05:32	05:59	06:32		07:04		07:31 (4)	06:40	07:15
	16:45	17:22		17:57	60	07:56 (4)	19:32	20:06	20:34	20:41	20:16	19:29		18:37	62	08:33 (4)	16:51	16:31
7	07:31	07:10		06:29		06:55 (4)	06:36	05:52	05:27	05:33	06:00	06:33		07:05		07:31 (4)	06:41	07:16
	16:46	17:24		17:58	61	07:56 (4)	19:34	20:07	20:35	20:41	20:15	19:27		18:35	61	08:32 (4)	16:50	16:31
8	07:31	07:09		06:28		06:55 (4)	06:35	05:50	05:27	05:34	06:02	06:34		07:06		07:31 (4)	06:42	07:17
	16:47	17:25		18:00	62	07:57 (4)	19:35	20:08	20:36	20:40	20:14	19:26		18:34	60	08:31 (4)	16:49	16:30
9	07:30	07:07		06:26		06:54 (4)	06:33	05:49	05:26	05:34	06:03	06:35		07:07		07:32 (4)	06:44	07:18
	16:48	17:26		18:01	62	07:56 (4)	19:36	20:09	20:36	20:40	20:12	19:24		18:32	58	08:30 (4)	16:48	16:30
10	07:30	07:06		06:24		06:53 (4)	06:31	05:48	05:26	05:35	06:04	06:36		07:08		07:33 (4)	06:45	07:19
	16:49	17:27		18:02	63	07:56 (4)	19:37	20:10	20:37	20:40	20:11	19:22		18:30	57	08:30 (4)	16:47	16:30
11	07:30	07:05		06:23		06:54 (4)	06:30	05:47	05:26	05:36	06:05	06:37		07:09		07:33 (4)	06:46	07:20
	16:50	17:29		18:03	62	07:56 (4)	19:38	20:11	20:38	20:39	20:10	19:21		18:29	56	08:29 (4)	16:46	16:30
12	07:30	07:04		06:21		06:53 (4)	06:28	05:46	05:26	05:36	06:06	06:38		08:04 (4)	07:10	07:33 (4)	06:47	07:20
	16:51	17:30		18:04	63	07:56 (4)	19:39	20:12	20:38	20:39	20:08	19:19	11	08:15 (4)	18:27	55	08:28 (4)	16:45	16:31
13	07:29	07:02		06:19		06:53 (4)	06:27	05:45	05:26	05:37	06:07	06:39		07:58 (4)	07:11	07:34 (4)	06:49	07:21
	16:52	17:31		18:05	62	07:55 (4)	19:40	20:13	20:39	20:38	20:07	19:17	22	08:20 (4)	18:25	53	08:27 (4)	16:44	16:31
14	07:29	07:01		06:18		06:53 (4)	06:25	05:44	05:26	05:38	06:08	06:40		07:55 (4)	07:12	07:35 (4)	06:50	07:22
	16:54	17:33		18:07	62	07:55 (4)	19:41	20:14	20:39	20:38	20:06	19:15	28	08:23 (4)	18:24	50	08:25 (4)	16:43	16:31
15	07:29	07:00		06:16		06:53 (4)	06:23	05:43	05:26	05:39	06:09	06:41		07:52 (4)	07:14	07:35 (4)	06:51	07:23
	16:55	17:34		18:08	61	07:54 (4)	19:42	20:15	20:39	20:37	20:04	19:14	33	08:25 (4)	18:22	49	08:24 (4)	16:42	16:31
16	07:28	06:58		06:14		06:53 (4)	06:22	05:42	05:26	05:40	06:10	06:42		07:49 (4)	07:15	07:37 (4)	06:52	07:24
	16:56	17:35		18:09	60	07:53 (4)	19:44	20:16	20:40	20:36	20:03	19:12	38	08:27 (4)	18:21	46	08:23 (4)	16:41	16:31
17	07:28	06:57		06:12		06:53 (4)	06:20	05:41	05:26	05:40	06:11	06:43		07:47 (4)	07:16	07:38 (4)	06:54	07:24
	16:57	17:36		18:10	59	07:52 (4)	19:45	20:17	20:40	20:36	20:01	19:10	41	08:28 (4)	18:19	43	08:21 (4)	16:40	16:32
18	07:27	06:56		06:11		06:53 (4)	06:19	05:40	05:26	05:41	06:12	06:44		07:45 (4)	07:17	07:40 (4)	06:55	07:25
	16:58	17:38		18:11	59	07:52 (4)	19:46	20:18	20:41	20:35	20:00	19:08	45	08:30 (4)	18:17	39	08:19 (4)	16:39	16:32
19	07:27	06:54		06:09		06:53 (4)	06:17	05:39	05:26	05:42	06:13	06:45		07:44 (4)	07:18	07:41 (4)	06:56	07:26
	16:59	17:39		18:12	58	07:51 (4)	19:47	20:19	20:41	20:34	19:58	19:06	47	08:31 (4)	18:16	35	08:16 (4)	16:38	16:32
20	07:26	06:53	07:19 (4)	06:07		06:54 (4)	06:15	05:38	05:26	05:43	06:14	06:46		07:42 (4)	07:19	07:43 (4)	06:57	07:26
	17:01	17:40	18 07:37 (4)	18:13	55	07:49 (4)	19:48	20:20	20:41	20:33	19:57	19:05	50	08:32 (4)	18:14	31	08:14 (4)	16:38	16:33
21	07:25	06:51	07:15 (4)	06:06		06:54 (4)	06:14	05:37	05:26	05:44	06:15	06:47		07:41 (4)	07:21	07:47 (4)	06:58	07:27
	17:02	17:41	27 07:42 (4)	18:15	54	07:48 (4)	19:49	20:21	20:41	20:33	19:55	19:03	51	08:32 (4)	18:13	24	08:11 (4)	16:37	16:33
22	07:25	06:50	07:12 (4)	06:04		06:55 (4)	06:12	05:36	05:26	05:45	06:16	06:48		07:39 (4)	07:22	07:51 (4)	07:00	07:27
	17:03	17:43	32 07:44 (4)	18:16	52	07:47 (4)	19:50	20:22	20:42	20:32	19:54	19:01	54	08:33 (4)	18:11	15 08:06 (4)	16:36	16:34
23	07:24	06:48	07:10 (4)	06:02		06:56 (4)	06:11	05:35	05:27	05:46	06:17	06:50		07:38 (4)	07:23		07:01	07:28
	17:04	17:44	37 07:47 (4)	18:17	50	07:46 (4)	19:51	20:23	20:42	20:31	19:52	18:59	56	08:34 (4)	18:10		16:36	16:34
24	07:23	06:47	07:08 (4)	06:00		06:56 (4)	06:09	05:34	05:27	05:47	06:18	06:51		07:37 (4)	07:24		07:02	07:28
	17:06	17:45	40 07:48 (4)	18:18	48	07:44 (4)	19:52	20:24	20:42	20:30	19:51	18:58	57	08:34 (4)	18:08		16:35	16:35
25	07:22	06:45	07:06 (4)	05:59		06:57 (4)	06:08	05:34	05:27	05:48	06:19	06:52		07:36 (4)	06:25		07:03	07:29
	17:07	17:46	44 07:50 (4)	18:19	45	07:42 (4)	19:54	20:25	20:42	20:29	19:49	18:56	58	08:34 (4)	17:07		16:34	16:35
26	07:22	06:44	07:04 (4)	05:57		06:59 (4)	06:06	05:33	05:27	05:48	06:20	06:53		07:35 (4)	06:27		07:04	07:29
	17:08	17:48	47 07:51 (4)	18:20	42	07:41 (4)	19:55	20:26	20:42	20:28	19:47	18:54	60	08:35 (4)	17:05		16:34	16:36
27	07:21	06:42	07:03 (4)	05:55		07:00 (4)	06:05	05:32	05:28	05:49	06:21	06:54		07:34 (4)	06:28		07:05	07:29
	17:09	17:49	49 07:52 (4)	18:21	38	07:38 (4)	19:56	20:27	20:42	20:27	19:46	18:52	61	08:35 (4)	17:04		16:33	16:37
28	07:20	06:41	07:02 (4)	05:54		07:01 (4)	06:04	05:32	05:28	05:50	06:22	06:55		07:34 (4)	06:29		07:07	07:30
	17:11	17:50	51 07:53 (4)	18:22	34	07:35 (4)	19:57	20:28	20:42	20:26	19:44	18:51	61	08:35 (4)	17:03		16:33	16:37
29	07:19			06:52		08:04 (4)	06:02	05:31	05:29	05:51	06:23	06:56		07:33 (4)	06:30		07:08	07:30
	17:12			19:23	29	08:33 (4)	19:58	20:28	20:42	20:25	19:43	18:49	62	08:35 (4)	17:01		16:33	16:38
30	07:18			06:50		08:07 (4)	06:01	05:30	05:29	05:52	06:25	06:57		07:32 (4)	06:31		07:09	07:30
	17:13			19:25	22	08:29 (4)	19:59	20:29	20:42	20:24	19:41	18:47	62	08:34 (4)	17:00		16:32	16:39
31	07:17			06:48		08:11 (4)		05:30		05:53	06:26				06:33			07:30
	17:14			19:26	13	08:24 (4)		20:30		20:23	19:39				16:59			16:39
Potential sun hours	294	296		369			400	451	456	462	430	375			344		295	284
Total, worst case			345		1619								897			1104		

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AA - Shadow Receptor: 1.0 × 1.0 Azimuth: -70.0° Slope: 90.0° (27)

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	07:31	07:16		06:39		06:58 (4)	06:47	05:59	05:29	05:30	05:54	06:27		06:58		07:30 (4)	06:34	07:10
	16:41	17:16		17:51	50	07:48 (4)	19:27	20:00	20:31	20:42	20:22	19:38		18:46	58	08:28 (4)	16:57	16:32
2	07:31	07:15		06:37		06:58 (4)	06:45	05:58	05:29	05:30	05:55	06:28		06:59		07:31 (4)	06:35	07:11
	16:41	17:17		17:52	52	07:50 (4)	19:28	20:01	20:32	20:42	20:21	19:36		18:44	58	08:29 (4)	16:56	16:31
3	07:31	07:14		06:36		06:56 (4)	06:43	05:57	05:28	05:31	05:56	06:29		07:00		07:30 (4)	06:36	07:12
	16:42	17:18		17:54	54	07:50 (4)	19:29	20:02	20:32	20:42	20:20	19:34		18:42	59	08:29 (4)	16:55	16:31
4	07:31	07:13		06:34		06:55 (4)	06:42	05:55	05:28	05:31	05:57	06:30		07:01		07:30 (4)	06:38	07:13
	16:43	17:20		17:55	55	07:50 (4)	19:30	20:03	20:33	20:42	20:19	19:33		18:40	58	08:28 (4)	16:54	16:31
5	07:31	07:12		06:33		06:55 (4)	06:40	05:54	05:28	05:32	05:58	06:31		07:02		07:30 (4)	06:39	07:14
	16:44	17:21		17:56	56	07:51 (4)	19:31	20:05	20:34	20:41	20:17	19:31		18:39	58	08:28 (4)	16:52	16:31
6	07:31	07:11		06:31		06:54 (4)	06:38	05:53	05:27	05:32	05:59	06:32		07:04		07:30 (4)	06:40	07:15
	16:45	17:22		17:57	57	07:51 (4)	19:32	20:06	20:34	20:41	20:16	19:29		18:37	57	08:27 (4)	16:51	16:31
7	07:31	07:10		06:29		06:53 (4)	06:36	05:52	05:27	05:33	06:00	06:33		07:05		07:29 (4)	06:41	07:16
	16:46	17:24		17:58	57	07:50 (4)	19:34	20:07	20:35	20:41	20:15	19:27		18:35	58	08:27 (4)	16:50	16:31
8	07:31	07:09		06:28		06:53 (4)	06:35	05:50	05:27	05:34	06:02	06:34		07:06		07:29 (4)	06:42	07:17
	16:47	17:25		18:00	58	07:51 (4)	19:35	20:08	20:36	20:40	20:14	19:26		18:34	57	08:26 (4)	16:49	16:30
9	07:30	07:07		06:26		06:52 (4)	06:33	05:49	05:26	05:34	06:03	06:35		07:07		07:30 (4)	06:44	07:18
	16:48	17:26		18:01	59	07:51 (4)	19:36	20:09	20:36	20:40	20:12	19:24		18:32	55	08:25 (4)	16:48	16:30
10	07:30	07:06		06:24		06:52 (4)	06:31	05:48	05:26	05:35	06:04	06:36		07:08		07:31 (4)	06:45	07:19
	16:49	17:27		18:02	58	07:50 (4)	19:37	20:10	20:37	20:40	20:11	19:22		18:30	54	08:25 (4)	16:47	16:30
11	07:30	07:05		06:23		06:52 (4)	06:30	05:47	05:26	05:36	06:05	06:37		07:09		07:31 (4)	06:46	07:20
	16:50	17:29		18:03	59	07:51 (4)	19:38	20:11	20:38	20:39	20:10	19:21		18:29	53	08:24 (4)	16:46	16:30
12	07:30	07:04		06:21		06:52 (4)	06:28	05:46	05:26	05:36	06:06	06:38		07:10		07:31 (4)	06:47	07:20
	16:51	17:30		18:04	58	07:50 (4)	19:39	20:12	20:38	20:39	20:08	19:19		18:27	52	08:23 (4)	16:45	16:31
13	07:29	07:02		06:19		06:51 (4)	06:27	05:45	05:26	05:37	06:07	06:39		07:11		07:32 (4)	06:49	07:21
	16:52	17:31		18:05	58	07:49 (4)	19:40	20:13	20:39	20:38	20:07	19:17		18:25	49	08:21 (4)	16:44	16:31
14	07:29	07:01		06:18		06:52 (4)	06:25	05:44	05:26	05:38	06:08	06:40		08:01 (4)		07:12	07:33 (4)	06:50	07:22
	16:54	17:33		18:07	57	07:49 (4)	19:41	20:14	20:39	20:38	20:06	19:15	9	08:10 (4)		18:24	47	08:20 (4)	16:43	16:31
15	07:29	07:00		06:16		06:52 (4)	06:23	05:43	05:26	05:39	06:09	06:41		07:55 (4)		07:14	07:34 (4)	06:51	07:23
	16:55	17:34		18:08	56	07:48 (4)	19:42	20:15	20:39	20:37	20:04	19:14	20	08:15 (4)		18:22	44	08:18 (4)	16:42	16:31
16	07:28	06:58		06:14		06:51 (4)	06:22	05:42	05:26	05:40	06:10	06:42		07:51 (4)		07:15	07:36 (4)	06:52	07:24
	16:56	17:35		18:09	56	07:47 (4)	19:44	20:16	20:40	20:36	20:03	19:12	27	08:18 (4)		18:21	41	08:17 (4)	16:41	16:31
17	07:28	06:57		06:12		06:51 (4)	06:20	05:41	05:26	05:40	06:11	06:43		07:48 (4)		07:16	07:37 (4)	06:54	07:24
	16:57	17:36		18:10	55	07:46 (4)	19:45	20:17	20:40	20:36	20:01	19:10	32	08:20 (4)		18:19	39	08:16 (4)	16:40	16:32
18	07:27	06:56		06:11		06:52 (4)	06:19	05:40	05:26	05:41	06:12	06:44		07:46 (4)		07:17	07:38 (4)	06:55	07:25
	16:58	17:38		18:11	54	07:46 (4)	19:46	20:18	20:41	20:35	20:00	19:08	36	08:22 (4)		18:17	35	08:13 (4)	16:39	16:32
19	07:27	06:54		06:09		06:53 (4)	06:17	05:39	05:26	05:42	06:13	06:45		07:44 (4)		07:18	07:40 (4)	06:56	07:26
	16:59	17:39		18:12	51	07:44 (4)	19:47	20:19	20:41	20:34	19:58	19:07	39	08:23 (4)		18:16	31	08:11 (4)	16:38	16:32
20	07:26	06:53	07:19 (4)	06:07		06:53 (4)	06:15	05:38	05:26	05:43	06:14	06:46		07:42 (4)		07:19	07:42 (4)	06:57	07:26
	17:01	17:40	11 07:30 (4)	18:13	50	07:43 (4)	19:48	20:20	20:41	20:34	19:57	19:05	43	08:25 (4)		18:14	26	08:08 (4)	16:38	16:33
21	07:25	06:51	07:14 (4)	06:06		06:53 (4)	06:14	05:37	05:26	05:44	06:15	06:47		07:40 (4)		07:21	07:46 (4)	06:58	07:27
	17:02	17:41	22 07:36 (4)	18:15	48	07:41 (4)	19:49	20:21	20:41	20:33	19:55	19:03	46	08:26 (4)		18:13	19	08:05 (4)	16:37	16:33
22	07:25	06:50	07:10 (4)	06:04		06:55 (4)	06:12	05:36	05:26	05:45	06:16	06:48		07:39 (4)		07:22	07:52 (4)	07:00	07:27
	17:03	17:43	28 07:38 (4)	18:16	46	07:41 (4)	19:50	20:22	20:42	20:32	19:54	19:01	47	08:26 (4)		18:11	6	07:58 (4)	16:36	16:34
23	07:24	06:48	07:08 (4)	06:02		06:55 (4)	06:11	05:35	05:27	05:46	06:17	06:50		07:37 (4)		07:23			07:01	07:28
	17:04	17:44	33 07:41 (4)	18:17	44	07:39 (4)	19:51	20:23	20:42	20:31	19:52	18:59	50	08:27 (4)		18:10			16:36	16:34
24	07:23	06:47	07:06 (4)	06:00		06:56 (4)	06:09	05:34	05:27	05:47	06:18	06:51		07:36 (4)		07:24			07:02	07:28
	17:06	17:45	36 07:42 (4)	18:18	40	07:36 (4)	19:52	20:24	20:42	20:30	19:51	18:58	52	08:28 (4)		18:08			16:35	16:35
25	07:22	06:45	07:05 (4)	05:59		06:57 (4)	06:08	05:34	05:27	05:48	06:19	06:52		07:35 (4)		06:25			07:03	07:29
	17:07	17:46	40 07:45 (4)	18:19	37	07:34 (4)	19:54	20:25	20:42	20:29	19:49	18:56	53	08:28 (4)		17:07			16:34	16:35
26	07:22	06:44	07:03 (4)	05:57		07:00 (4)	06:06	05:33	05:27	05:48	06:20	06:53		07:34 (4)		06:27			07:04	07:29
	17:08	17:48	43 07:46 (4)	18:20	32	07:32 (4)	19:55	20:26	20:42	20:28	19:47	18:54	54	08:28 (4)		17:05			16:34	16:36
27	07:21	06:42	07:01 (4)	05:55		07:01 (4)	06:05	05:32	05:28	05:49	06:21	06:54		07:33 (4)		06:28			07:05	07:29
	17:09	17:49	45 07:46 (4)	18:21	28	07:29 (4)	19:56	20:27	20:42	20:27	19:46	18:52	56	08:29 (4)		17:04			16:33	16:37
28	07:20	06:41	07:00 (4)	05:54		07:04 (4)	06:04	05:32	05:28	05:50	06:22	06:55		07:32 (4)		06:29			07:07	07:30
	17:11	17:50	48 07:48 (4)	18:22	22	07:26 (4)	19:57	20:28	20:42	20:26	19:44	18:51	57	08:29 (4)		17:03			16:33	16:37
29	07:19			06:52		08:09 (4)	06:02	05:31	05:29	05:51	06:23	06:56		07:32 (4)		06:30			07:08	07:30
	17:12			19:23	12	08:21 (4)	19:58	20:28	20:42	20:25	19:43	18:49	57	08:29 (4)		17:01			16:33	16:38
30	07:18			06:50			06:01	05:30	05:29	05:52	06:25	06:57		07:31 (4)		06:31			07:09	07:30
	17:13			19:25			19:59	20:29	20:42	20:24	19:41	18:47	58	08:29 (4)		17:00			16:32	16:39
31	07:17			06:48				05:30		05:53	06:26					06:33				07:30
	17:14			19:26				20:30		20:23	19:39					16:59				16:39
Potential sun hours	294	296		369		400	451	456	462	430	375			344			295	284	
Total, worst case			306		1419							736			1014				

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AB - Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (28)

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	07:31	07:16		06:39		06:58 (4)	06:47	05:59	05:29	05:30	05:54	06:27		06:58		07:28 (4)	06:34	07:10
	16:41	17:16		17:51	44	07:42 (4)	19:27	20:00	20:31	20:42	20:22	19:38		18:46	54	08:22 (4)	16:57	16:32
2	07:31	07:15		06:37		06:57 (4)	06:45	05:58	05:29	05:30	05:55	06:28		06:59		07:28 (4)	06:35	07:11
	16:41	17:17		17:52	46	07:43 (4)	19:28	20:01	20:32	20:42	20:21	19:36		18:44	55	08:23 (4)	16:56	16:31
3	07:31	07:14		06:36		06:55 (4)	06:43	05:57	05:28	05:31	05:56	06:29		07:00		07:28 (4)	06:36	07:12
	16:42	17:18		17:54	48	07:43 (4)	19:29	20:02	20:32	20:42	20:20	19:34		18:42	55	08:23 (4)	16:55	16:31
4	07:31	07:13		06:34		06:53 (4)	06:42	05:55	05:28	05:31	05:57	06:30		07:01		07:28 (4)	06:38	07:13
	16:43	17:20		17:55	51	07:44 (4)	19:30	20:03	20:33	20:42	20:19	19:33		18:40	54	08:22 (4)	16:54	16:31
5	07:31	07:12		06:33		06:53 (4)	06:40	05:54	05:28	05:32	05:58	06:31		07:02		07:27 (4)	06:39	07:14
	16:44	17:21		17:56	52	07:45 (4)	19:31	20:05	20:34	20:41	20:17	19:31		18:39	55	08:22 (4)	16:52	16:31
6	07:31	07:11		06:31		06:52 (4)	06:38	05:53	05:27	05:32	05:59	06:32		07:04		07:27 (4)	06:40	07:15
	16:45	17:22		17:57	52	07:44 (4)	19:32	20:06	20:34	20:41	20:16	19:29		18:37	54	08:21 (4)	16:51	16:31
7	07:31	07:10		06:29		06:51 (4)	06:36	05:52	05:27	05:33	06:00	06:33		07:05		07:27 (4)	06:41	07:16
	16:46	17:24		17:58	53	07:44 (4)	19:34	20:07	20:35	20:41	20:15	19:27		18:35	53	08:20 (4)	16:50	16:31
8	07:31	07:09		06:28		06:51 (4)	06:35	05:50	05:27	05:34	06:02	06:34		07:06		07:27 (4)	06:42	07:17
	16:47	17:25		18:00	54	07:45 (4)	19:35	20:08	20:36	20:40	20:14	19:26		18:34	52	08:19 (4)	16:49	16:30
9	07:30	07:07		06:26		06:50 (4)	06:33	05:49	05:26	05:34	06:03	06:35		07:07		07:27 (4)	06:44	07:18
	16:48	17:26		18:01	54	07:44 (4)	19:36	20:09	20:36	20:40	20:12	19:24		18:32	52	08:19 (4)	16:48	16:30
10	07:30	07:06		06:24		06:49 (4)	06:31	05:48	05:26	05:35	06:04	06:36		07:08		07:29 (4)	06:45	07:19
	16:49	17:27		18:02	55	07:44 (4)	19:37	20:10	20:37	20:40	20:11	19:22		18:30	50	08:19 (4)	16:47	16:30
11	07:30	07:05		06:23		06:50 (4)	06:30	05:47	05:26	05:36	06:05	06:37		07:09		07:30 (4)	06:46	07:20
	16:50	17:29		18:03	54	07:44 (4)	19:38	20:11	20:38	20:39	20:10	19:21		18:29	47	08:17 (4)	16:46	16:30
12	07:30	07:04		06:21		06:49 (4)	06:28	05:46	05:26	05:36	06:06	06:38		07:10		07:31 (4)	06:47	07:20
	16:51	17:30		18:04	55	07:44 (4)	19:39	20:12	20:38	20:39	20:08	19:19		18:27	45	08:16 (4)	16:45	16:31
13	07:29	07:02		06:19		06:49 (4)	06:27	05:45	05:26	05:37	06:07	06:39		07:11		07:32 (4)	06:49	07:21
	16:52	17:31		18:05	54	07:43 (4)	19:40	20:13	20:39	20:38	20:07	19:17		18:25	43	08:15 (4)	16:44	16:31
14	07:29	07:01		06:18		06:50 (4)	06:25	05:44	05:26	05:38	06:08	06:40		07:12		07:33 (4)	06:50	07:22
	16:54	17:33		18:07	53	07:43 (4)	19:41	20:14	20:39	20:38	20:06	19:15		18:24	40	08:13 (4)	16:43	16:31
15	07:29	07:00		06:16		06:49 (4)	06:23	05:43	05:26	05:39	06:09	06:41		07:14		07:34 (4)	06:51	07:23
	16:55	17:34		18:08	53	07:42 (4)	19:42	20:15	20:39	20:37	20:04	19:14		18:22	38	08:12 (4)	16:42	16:31
16	07:28	06:58		06:14		06:49 (4)	06:22	05:42	05:26	05:40	06:10	06:42	07:53 (4)	07:15		07:36 (4)	06:52	07:24
	16:56	17:35		18:09	52	07:41 (4)	19:44	20:16	20:40	20:36	20:03	19:12	15 08:08 (4)	18:21	35	08:11 (4)	16:41	16:31
17	07:28	06:57		06:12		06:49 (4)	06:20	05:41	05:26	05:40	06:11	06:43	07:49 (4)	07:16		07:37 (4)	06:54	07:24
	16:57	17:36		18:10	51	07:40 (4)	19:45	20:17	20:40	20:36	20:01	19:10	23 08:12 (4)	18:19	32	08:09 (4)	16:40	16:32
18	07:27	06:56		06:11		06:50 (4)	06:19	05:40	05:26	05:41	06:12	06:44	07:45 (4)	07:17		07:38 (4)	06:55	07:25
	16:58	17:38		18:11	49	07:39 (4)	19:46	20:18	20:41	20:35	20:00	19:08	29 08:14 (4)	18:17	28	08:06 (4)	16:39	16:32
19	07:27	06:54		06:09		06:51 (4)	06:17	05:39	05:26	05:42	06:13	06:45	07:43 (4)	07:18		07:39 (4)	06:56	07:26
	16:59	17:39		18:12	47	07:38 (4)	19:47	20:19	20:41	20:34	19:58	19:07	33 08:16 (4)	18:16	24	08:03 (4)	16:38	16:32
20	07:26	06:53		06:07		06:51 (4)	06:15	05:38	05:26	05:43	06:14	06:46	07:41 (4)	07:19		07:43 (4)	06:57	07:26
	17:01	17:40		18:13	45	07:36 (4)	19:48	20:20	20:41	20:34	19:57	19:05	36 08:17 (4)	18:14	17	08:00 (4)	16:38	16:33
21	07:25	06:51	07:15 (4)	06:06		06:51 (4)	06:14	05:37	05:26	05:44	06:15	06:47	07:39 (4)	07:21		07:50 (4)	06:58	07:27
	17:02	17:41	10 07:25 (4)	18:15	43	07:34 (4)	19:49	20:21	20:41	20:33	19:55	19:03	40 08:19 (4)	18:13	2	07:52 (4)	16:37	16:33
22	07:25	06:50	07:10 (4)	06:04		06:53 (4)	06:12	05:36	05:26	05:45	06:16	06:48	07:37 (4)	07:22			07:00	07:27
	17:03	17:43	20 07:30 (4)	18:16	41	07:34 (4)	19:50	20:22	20:42	20:32	19:54	19:01	43 08:20 (4)	18:11			16:36	16:34
23	07:24	06:48	07:08 (4)	06:02		06:54 (4)	06:11	05:35	05:27	05:46	06:17	06:50	07:36 (4)	07:23			07:01	07:28
	17:04	17:44	25 07:33 (4)	18:17	37	07:31 (4)	19:51	20:23	20:42	20:31	19:52	18:59	44 08:20 (4)	18:10			16:36	16:34
24	07:23	06:47	07:06 (4)	06:00		06:55 (4)	06:09	05:34	05:27	05:47	06:18	06:51	07:34 (4)	07:24			07:02	07:28
	17:06	17:45	29 07:35 (4)	18:18	34	07:29 (4)	19:52	20:24	20:42	20:30	19:51	18:58	47 08:21 (4)	18:08			16:35	16:35
25	07:22	06:45	07:05 (4)	05:59		06:57 (4)	06:08	05:34	05:27	05:48	06:19	06:52	07:33 (4)	06:25			07:03	07:29
	17:07	17:46	33 07:38 (4)	18:19	29	07:26 (4)	19:54	20:25	20:42	20:29	19:49	18:56	48 08:21 (4)	17:07			16:34	16:35
26	07:22	06:44	07:03 (4)	05:57		07:00 (4)	06:06	05:33	05:27	05:48	06:20	06:53	07:32 (4)	06:27			07:04	07:29
	17:08	17:48	36 07:39 (4)	18:20	24	07:24 (4)	19:55	20:26	20:42	20:28	19:47	18:54	50 08:22 (4)	17:05			16:34	16:36
27	07:21	06:42	07:01 (4)	05:55		07:03 (4)	06:05	05:32	05:28	05:49	06:21	06:54	07:31 (4)	06:28			07:05	07:29
	17:09	17:49	39 07:40 (4)	18:21	17	07:20 (4)	19:56	20:27	20:42	20:27	19:46	18:52	51 08:22 (4)	17:04			16:33	16:37
28	07:20	06:41	07:00 (4)	05:54			06:04	05:32	05:28	05:50	06:22	06:55	07:30 (4)	06:29			07:07	07:30
	17:11	17:50	41 07:41 (4)	18:22			19:57	20:28	20:42	20:26	19:44	18:51	52 08:22 (4)	17:03			16:33	16:37
29	07:19			06:52			06:02	05:31	05:29	05:51	06:23	06:56	07:29 (4)	06:30			07:08	07:30
	17:12			19:23			19:58	20:28	20:42	20:25	19:43	18:49	53 08:22 (4)	17:01			16:33	16:38
30	07:18			06:50			06:01	05:30	05:29	05:52	06:25	06:57	07:29 (4)	06:31			07:09	07:30
	17:13			19:25			19:59	20:29	20:42	20:24	19:41	18:47	53 08:22 (4)	17:00			16:32	16:39
31	07:17			06:48				05:30		05:53	06:26			06:33				07:30
	17:14			19:26				20:30		20:23	19:39			16:59				16:39
Potential sun hours	294	296		369		400	451	456	462	430	375		344		295	284		
Total, worst case			233		1247							617		885				

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

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

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Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AC - Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (29)

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	07:31	07:16	06:39	06:59 (4) 06:47	07:45 (4) 05:59	05:29	05:30	05:54	06:27	06:58	07:20 (4) 06:34	07:10
	16:41	17:16	17:51 24	07:23 (4) 19:27 33	08:18 (4) 20:00	20:31	20:42	20:22	19:38	18:46 55	08:15 (4) 16:57	16:32
2	07:31	07:15	06:37	06:57 (4) 06:45	07:48 (4) 05:58	05:29	05:30	05:55	06:28	06:59	07:21 (4) 06:35	07:11
	16:41	17:17	17:52 29	07:26 (4) 19:28 28	08:16 (4) 20:01	20:32	20:42	20:21	19:36	18:44 54	08:15 (4) 16:56	16:31
3	07:31	07:14	06:36	06:55 (4) 06:43	07:50 (4) 05:57	05:28	05:31	05:56	06:29	07:00	07:21 (4) 06:36	07:12
	16:42	17:18	17:54 33	07:28 (4) 19:29 22	08:12 (4) 20:02	20:32	20:42	20:20	19:34	18:42 53	08:14 (4) 16:55	16:31
4	07:31	07:13	06:34	06:53 (4) 06:42	07:53 (4) 05:55	05:28	05:31	05:57	06:30	07:01	07:22 (4) 06:38	07:13
	16:43	17:20	17:55 36	07:29 (4) 19:30 14	08:07 (4) 20:03	20:33	20:42	20:19	19:33	18:40 51	08:13 (4) 16:54	16:31
5	07:31	07:12	06:33	06:52 (4) 06:40	05:54	05:28	05:32	05:58	06:31	07:02	07:23 (4) 06:39	07:14
	16:44	17:21	17:56 39	07:31 (4) 19:31	20:05	20:34	20:41	20:17	19:31	18:39 48	08:11 (4) 16:52	16:31
6	07:31	07:11	06:31	06:50 (4) 06:38	05:53	05:27	05:32	05:59	06:32	07:04	07:24 (4) 06:40	07:15
	16:45	17:22	17:57 42	07:32 (4) 19:32	20:06	20:34	20:41	20:16	19:29	18:37 46	08:10 (4) 16:51	16:31
7	07:31	07:10	06:29	06:48 (4) 06:36	05:52	05:27	05:33	06:00	06:33	07:05	07:25 (4) 06:41	07:16
	16:46	17:24	17:58 45	07:33 (4) 19:34	20:07	20:35	20:41	20:15	19:27	18:35 43	08:08 (4) 16:50	16:31
8	07:31	07:09	06:28	06:47 (4) 06:35	05:50	05:27	05:34	06:02	06:34	07:49 (4) 07:06	07:26 (4) 06:42	07:17
	16:47	17:25	18:00 47	07:34 (4) 19:35	20:08	20:36	20:40	20:14	19:26 13	08:02 (4) 18:34 41	08:07 (4) 16:49	16:30
9	07:30	07:07	06:26	06:45 (4) 06:33	05:49	05:26	05:34	06:03	06:35	07:44 (4) 07:07	07:27 (4) 06:44	07:18
	16:48	17:26	18:01 50	07:35 (4) 19:36	20:09	20:36	20:40	20:12	19:24 22	08:06 (4) 18:32 38	08:05 (4) 16:48	16:30
10	07:30	07:06	06:24	06:43 (4) 06:31	05:48	05:26	05:35	06:04	06:36	07:41 (4) 07:08	07:29 (4) 06:45	07:19
	16:49	17:27	18:02 52	07:35 (4) 19:37	20:10	20:37	20:40	20:11	19:22 27	08:08 (4) 18:30 35	08:04 (4) 16:47	16:30
11	07:30	07:05	06:23	06:43 (4) 06:30	05:47	05:26	05:36	06:05	06:37	07:38 (4) 07:09	07:30 (4) 06:46	07:20
	16:50	17:29	18:03 53	07:36 (4) 19:38	20:11	20:38	20:39	20:10	19:21 32	08:10 (4) 18:29 31	08:01 (4) 16:46	16:30
12	07:30	07:04	06:21	06:42 (4) 06:28	05:46	05:26	05:36	06:06	06:38	07:36 (4) 07:10	07:31 (4) 06:47	07:20
	16:51	17:30	18:04 54	07:36 (4) 19:39	20:12	20:38	20:39	20:08	19:19 36	08:12 (4) 18:27 28	07:59 (4) 16:45	16:31
13	07:29	07:02	06:19	06:41 (4) 06:27	05:45	05:26	05:37	06:07	06:39	07:34 (4) 07:11	07:33 (4) 06:49	07:21
	16:52	17:31	18:05 55	07:36 (4) 19:40	20:13	20:39	20:38	20:07	19:17 39	08:13 (4) 18:25 22	07:55 (4) 16:44	16:31
14	07:29	07:01	06:18	06:41 (4) 06:25	05:44	05:26	05:38	06:08	06:40	07:32 (4) 07:12	07:38 (4) 06:50	07:22
	16:54	17:33	18:07 55	07:36 (4) 19:41	20:14	20:39	20:38	20:06	19:15 42	08:14 (4) 18:24 12	07:50 (4) 16:43	16:31
15	07:29	07:00	06:16	06:40 (4) 06:23	05:43	05:26	05:39	06:09	06:41	07:31 (4) 07:14	06:51	07:23
	16:55	17:34	18:08 56	07:36 (4) 19:42	20:15	20:39	20:37	20:04	19:14 44	08:15 (4) 18:22	16:42	16:31
16	07:28	06:58	06:14	06:39 (4) 06:22	05:42	05:26	05:40	06:10	06:42	07:29 (4) 07:15	06:52	07:24
	16:56	17:35	18:09 57	07:36 (4) 19:44	20:16	20:40	20:36	20:03	19:12 47	08:16 (4) 18:21	16:41	16:31
17	07:28	06:57	06:12	06:38 (4) 06:20	05:41	05:26	05:40	06:11	06:43	07:28 (4) 07:16	06:54	07:24
	16:57	17:36	18:10 57	07:35 (4) 19:45	20:17	20:40	20:36	20:01	19:10 49	08:17 (4) 18:19	16:40	16:32
18	07:27	06:56	06:11	06:39 (4) 06:19	05:40	05:26	05:41	06:12	06:44	07:27 (4) 07:17	06:55	07:25
	16:58	17:38	18:11 56	07:35 (4) 19:46	20:18	20:41	20:35	20:00	19:08 50	08:17 (4) 18:17	16:39	16:32
19	07:27	06:54	06:09	06:38 (4) 06:17	05:39	05:26	05:42	06:13	06:45	07:26 (4) 07:18	06:56	07:26
	16:59	17:39	18:12 57	07:35 (4) 19:47	20:19	20:41	20:34	19:58	19:07 52	08:18 (4) 18:16	16:38	16:32
20	07:26	06:53	06:07	06:38 (4) 06:15	05:38	05:26	05:43	06:14	06:46	07:25 (4) 07:19	06:57	07:26
	17:01	17:40	18:13 56	07:34 (4) 19:48	20:20	20:41	20:34	19:57	19:05 53	08:18 (4) 18:14	16:38	16:33
21	07:25	06:51	06:06	06:38 (4) 06:14	05:37	05:26	05:44	06:15	06:47	07:24 (4) 07:21	06:58	07:27
	17:02	17:41	18:15 55	07:33 (4) 19:49	20:21	20:41	20:33	19:55	19:03 54	08:18 (4) 18:13	16:37	16:33
22	07:25	06:50	06:04	06:38 (4) 06:12	05:36	05:26	05:45	06:16	06:48	07:23 (4) 07:22	07:00	07:27
	17:03	17:43	18:16 55	07:33 (4) 19:50	20:22	20:42	20:32	19:54	19:01 55	08:18 (4) 18:11	16:36	16:34
23	07:24	06:48	06:02	06:38 (4) 06:11	05:35	05:27	05:46	06:17	06:50	07:22 (4) 07:23	07:01	07:28
	17:04	17:44	18:17 54	07:32 (4) 19:51	20:23	20:42	20:31	19:52	18:59 56	08:18 (4) 18:10	16:36	16:34
24	07:23	06:47	06:00	06:38 (4) 06:09	05:34	05:27	05:47	06:18	06:51	07:22 (4) 07:24	07:02	07:28
	17:06	17:45	18:18 53	07:31 (4) 19:52	20:24	20:42	20:30	19:51	18:58 56	08:18 (4) 18:08	16:35	16:35
25	07:22	06:45	05:59	06:38 (4) 06:08	05:34	05:27	05:48	06:19	06:52	07:21 (4) 06:25	07:03	07:29
	17:07	17:46	18:19 51	07:29 (4) 19:54	20:25	20:42	20:29	19:49	18:56 57	08:18 (4) 17:07	16:34	16:35
26	07:22	06:44	05:57	06:40 (4) 06:06	05:33	05:27	05:48	06:20	06:53	07:21 (4) 06:27	07:04	07:29
	17:08	17:48	18:20 49	07:29 (4) 19:55	20:26	20:42	20:28	19:47	18:54 56	08:17 (4) 17:05	16:34	16:36
27	07:21	06:42	05:55	06:40 (4) 06:05	05:32	05:28	05:49	06:21	06:54	07:20 (4) 06:28	07:05	07:29
	17:09	17:49	18:21 47	07:27 (4) 19:56	20:27	20:42	20:27	19:46	18:52 57	08:17 (4) 17:04	16:33	16:37
28	07:20	06:41 07:03 (4)	05:54	06:40 (4) 06:04	05:32	05:28	05:50	06:22	06:55	07:20 (4) 06:29	07:07	07:30
	17:11	17:50 17 07:20 (4)	18:22 45	07:25 (4) 19:57	20:28	20:42	20:26	19:44	18:51 57	08:17 (4) 17:03	16:33	16:37
29	07:19		06:52	07:42 (4) 06:02	05:31	05:29	05:51	06:23	06:56	07:20 (4) 06:30	07:08	07:30
	17:12		19:23 42	08:24 (4) 19:58	20:28	20:42	20:25	19:43	18:49 56	08:16 (4) 17:01	16:33	16:38
30	07:18		06:50	07:43 (4) 06:01	05:30	05:29	05:52	06:25	06:57	07:20 (4) 06:31	07:09	07:30
	17:13		19:25 39	08:22 (4) 19:59	20:29	20:42	20:24	19:41	18:47 55	08:15 (4) 17:00	16:32	16:39
31	07:17		06:48	07:44 (4)	05:30		05:53	06:26		06:33		07:30
	17:14		19:26 36	08:20 (4)	20:30		20:23	19:39		16:59		16:39
Potential sun hours	294	296	369	400	451	456	462	430	375	344	295	284
Total, worst case		17	1479	97					1065	557		

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AD - Shadow Receptor: 1.0 × 1.0 Azimuth: -90.0° Slope: 90.0° (30)

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	07:30	07:16	06:39			06:47		07:59 (9)	05:59		07:23 (9)	05:29		07:39 (9)
	16:41	17:16	17:51			19:27	23	08:22 (9)	20:00	77	08:40 (9)	20:31	39	08:18 (9)
2	07:31	07:15	06:37			06:45		07:55 (9)	05:58		07:23 (9)	05:29		07:41 (9)
	16:42	17:17	17:52			19:28	32	08:27 (9)	20:01	77	08:40 (9)	20:31	37	08:18 (9)
3	07:31	07:14	06:36			06:43		07:51 (9)	05:57		07:22 (9)	05:29		07:42 (9)
	16:42	17:18	17:54			19:29	39	08:30 (9)	20:02	76	08:38 (9)	20:32	35	08:17 (9)
4	07:31	07:13	06:34			06:42		07:48 (9)	05:55		07:23 (9)	05:28		07:42 (9)
	16:43	17:20	17:55			19:30	44	08:32 (9)	20:03	75	08:38 (9)	20:33	34	08:16 (9)
5	07:31	07:12	06:33			06:40		07:46 (9)	05:54		07:23 (9)	05:28		07:44 (9)
	16:44	17:21	17:56			19:31	48	08:34 (9)	20:04	75	08:38 (9)	20:34	32	08:16 (9)
6	07:31	07:11	06:31			06:38		07:44 (9)	05:53		07:23 (9)	05:27		07:45 (9)
	16:45	17:22	17:57			19:32	51	08:35 (9)	20:05	74	08:37 (9)	20:34	30	08:15 (9)
7	07:30	07:10	06:29			06:36		07:41 (9)	05:52		07:24 (9)	05:27		07:45 (9)
	16:46	17:24	17:58			19:33	55	08:36 (9)	20:07	73	08:37 (9)	20:35	29	08:14 (9)
8	07:30	07:08	06:28			06:35		07:40 (9)	05:50		07:24 (9)	05:27		07:47 (9)
	16:47	17:25	18:00			19:35	58	08:38 (9)	20:08	73	08:37 (9)	20:36	26	08:13 (9)
9	07:30	07:07	06:26			06:33		07:38 (9)	05:49		07:24 (9)	05:27		07:48 (9)
	16:48	17:26	18:01			19:36	61	08:39 (9)	20:09	71	08:35 (9)	20:36	24	08:12 (9)
10	07:30	07:06	06:24			06:31		07:36 (9)	05:48		07:24 (9)	05:26		07:49 (9)
	16:49	17:27	18:02			19:37	63	08:39 (9)	20:10	70	08:34 (9)	20:37	23	08:12 (9)
11	07:30	07:05	06:23			06:30		07:35 (9)	05:47		07:24 (9)	05:26		07:50 (9)
	16:50	17:29	18:03			19:38	66	08:41 (9)	20:11	70	08:34 (9)	20:37	21	08:11 (9)
12	07:29	07:04	06:21			06:28		07:34 (9)	05:46		07:25 (9)	05:26		07:52 (9)
	16:51	17:30	18:04			19:39	67	08:41 (9)	20:12	68	08:33 (9)	20:38	19	08:11 (9)
13	07:29	07:02	06:19			06:27		07:32 (9)	05:45		07:25 (9)	05:26		07:53 (9)
	16:53	17:31	18:05			19:40	69	08:41 (9)	20:13	68	08:33 (9)	20:38	17	08:10 (9)
14	07:29	07:01	06:18			06:25		07:31 (9)	05:44		07:26 (9)	05:26		07:53 (9)
	16:54	17:33	18:07			19:41	71	08:42 (9)	20:14	66	08:32 (9)	20:39	15	08:08 (9)
15	07:28	07:00	06:16			06:23		07:30 (9)	05:43		07:26 (9)	05:26		07:54 (9)
	16:55	17:34	18:08			19:42	72	08:42 (9)	20:15	65	08:31 (9)	20:39	13	08:07 (9)
16	07:28	06:58	06:14			06:22		07:30 (9)	05:42		07:27 (9)	05:26		07:56 (9)
	16:56	17:35	18:09			19:43	73	08:43 (9)	20:16	63	08:30 (9)	20:40	12	08:08 (9)
17	07:27	06:57	06:12			06:20		07:28 (9)	05:41		07:27 (9)	05:26		07:57 (9)
	16:57	17:36	18:10			19:45	75	08:43 (9)	20:17	62	08:29 (9)	20:40	10	08:07 (9)
18	07:27	06:55	06:11			06:19		07:28 (9)	05:40		07:28 (9)	05:26		07:58 (9)
	16:58	17:38	18:11			19:46	75	08:43 (9)	20:18	61	08:29 (9)	20:40	8	08:06 (9)
19	07:26	06:54	06:09			06:17		07:27 (9)	05:39		07:29 (9)	05:26		07:59 (9)
	16:59	17:39	18:12			19:47	76	08:43 (9)	20:19	60	08:29 (9)	20:41	7	08:06 (9)
20	07:26	06:53	06:07			06:15		07:27 (9)	05:38		07:30 (9)	05:26		07:59 (9)
	17:01	17:40	18:13			19:48	76	08:43 (9)	20:20	58	08:28 (9)	20:41	6	08:05 (9)
21	07:25	06:51	06:06			06:14		07:26 (9)	05:37		07:30 (9)	05:26		07:59 (9)
	17:02	17:41	18:14			19:49	77	08:43 (9)	20:21	57	08:27 (9)	20:41	6	08:05 (9)
22	07:25	06:50	06:04			06:12		07:26 (9)	05:36		07:31 (9)	05:26		07:59 (9)
	17:03	17:43	18:16			19:50	77	08:43 (9)	20:22	55	08:26 (9)	20:41	6	08:05 (9)
23	07:24	06:48	06:02			06:11		07:25 (9)	05:35		07:32 (9)	05:27		08:00 (9)
	17:04	17:44	18:17			19:51	78	08:43 (9)	20:23	54	08:26 (9)	20:42	7	08:07 (9)
24	07:23	06:47	06:00			06:09		07:25 (9)	05:35		07:33 (9)	05:27		07:59 (9)
	17:06	17:45	18:18			19:52	78	08:43 (9)	20:24	52	08:25 (9)	20:42	8	08:07 (9)
25	07:22	06:45	05:59			06:08		07:24 (9)	05:34		07:33 (9)	05:27		07:58 (9)
	17:07	17:46	18:19			19:53	78	08:42 (9)	20:25	51	08:24 (9)	20:42	10	08:08 (9)
26	07:22	06:44	05:57			06:06		07:24 (9)	05:33		07:34 (9)	05:28		07:58 (9)
	17:08	17:48	18:20			19:55	78	08:42 (9)	20:26	49	08:23 (9)	20:42	11	08:09 (9)
27	07:21	06:42	05:55			06:05		07:23 (9)	05:32		07:35 (9)	05:28		07:57 (9)
	17:09	17:49	18:21			19:56	78	08:41 (9)	20:27	47	08:22 (9)	20:42	13	08:10 (9)
28	07:20	06:40	05:53			06:04		07:23 (9)	05:32		07:36 (9)	05:28		07:56 (9)
	17:11	17:50	18:22			19:57	78	08:41 (9)	20:27	45	08:21 (9)	20:42	15	08:11 (9)
29	07:19		06:52			06:02		07:23 (9)	05:31		07:37 (9)	05:29		07:56 (9)
	17:12		19:23			19:58	78	08:41 (9)	20:28	44	08:21 (9)	20:42	17	08:13 (9)
30	07:18		06:50			06:01		07:23 (9)	05:31		07:37 (9)	05:29		07:55 (9)
	17:13		19:25			19:59	77	08:40 (9)	20:29	43	08:20 (9)	20:42	18	08:13 (9)
31	07:17		06:48		08:09 (9)				05:30		07:39 (9)			
	17:15		19:26	5	08:14 (9)				20:30	40	08:19 (9)			
Potential sun hours	295	296	369			400			451			456		
Total, worst case				5			1971			1919			548	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AD - Shadow Receptor: 1.0 × 1.0 Azimuth: -90.0° Slope: 90.0° (30)

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	05:30		07:55 (9)	05:54		07:35 (9)	06:27		07:34 (9)	06:58	06:34	07:10
	20:42	20	08:15 (9)	20:22	69	08:44 (9)	19:37	66	08:40 (9)	18:46	16:57	16:32
2	05:30		07:54 (9)	05:55		07:35 (9)	06:28		07:35 (9)	06:59	06:35	07:11
	20:42	22	08:16 (9)	20:21	70	08:45 (9)	19:36	63	08:38 (9)	18:44	16:56	16:32
3	05:31		07:54 (9)	05:56		07:34 (9)	06:29		07:36 (9)	07:00	06:36	07:12
	20:42	23	08:17 (9)	20:20	71	08:45 (9)	19:34	61	08:37 (9)	18:42	16:55	16:31
4	05:31		07:52 (9)	05:57		07:34 (9)	06:30		07:37 (9)	07:01	06:37	07:13
	20:41	26	08:18 (9)	20:19	72	08:46 (9)	19:32	58	08:35 (9)	18:40	16:54	16:31
5	05:32		07:52 (9)	05:58		07:34 (9)	06:31		07:38 (9)	07:02	06:39	07:14
	20:41	27	08:19 (9)	20:17	72	08:46 (9)	19:31	56	08:34 (9)	18:39	16:52	16:31
6	05:32		07:52 (9)	06:00		07:33 (9)	06:32		07:40 (9)	07:03	06:40	07:15
	20:41	29	08:21 (9)	20:16	74	08:47 (9)	19:29	52	08:32 (9)	18:37	16:51	16:31
7	05:33		07:50 (9)	06:01		07:33 (9)	06:33		07:41 (9)	07:05	06:41	07:16
	20:40	31	08:21 (9)	20:15	74	08:47 (9)	19:27	48	08:29 (9)	18:35	16:50	16:31
8	05:34		07:50 (9)	06:02		07:33 (9)	06:34		07:43 (9)	07:06	06:42	07:17
	20:40	33	08:23 (9)	20:14	75	08:48 (9)	19:26	44	08:27 (9)	18:34	16:49	16:31
9	05:34		07:49 (9)	06:03		07:32 (9)	06:35		07:45 (9)	07:07	06:44	07:18
	20:40	34	08:23 (9)	20:12	76	08:48 (9)	19:24	39	08:24 (9)	18:32	16:48	16:31
10	05:35		07:48 (9)	06:04		07:32 (9)	06:36		07:48 (9)	07:08	06:45	07:19
	20:39	37	08:25 (9)	20:11	76	08:48 (9)	19:22	32	08:20 (9)	18:30	16:47	16:31
11	05:36		07:48 (9)	06:05		07:32 (9)	06:37		07:52 (9)	07:09	06:46	07:19
	20:39	38	08:26 (9)	20:10	76	08:48 (9)	19:20	24	08:16 (9)	18:29	16:46	16:31
12	05:37		07:48 (9)	06:06		07:31 (9)	06:38		07:58 (9)	07:10	06:47	07:20
	20:38	39	08:27 (9)	20:08	78	08:49 (9)	19:19	10	08:08 (9)	18:27	16:45	16:31
13	05:37		07:46 (9)	06:07		07:31 (9)	06:39			07:11	06:49	07:21
	20:38	42	08:28 (9)	20:07	78	08:49 (9)	19:17			18:25	16:44	16:31
14	05:38		07:46 (9)	06:08		07:31 (9)	06:40			07:12	06:50	07:22
	20:37	43	08:29 (9)	20:05	78	08:49 (9)	19:15			18:24	16:43	16:31
15	05:39		07:45 (9)	06:09		07:31 (9)	06:41			07:14	06:51	07:23
	20:37	45	08:30 (9)	20:04	78	08:49 (9)	19:13			18:22	16:42	16:31
16	05:40		07:45 (9)	06:10		07:31 (9)	06:42			07:15	06:52	07:23
	20:36	46	08:31 (9)	20:03	78	08:49 (9)	19:12			18:21	16:41	16:31
17	05:41		07:43 (9)	06:11		07:31 (9)	06:43			07:16	06:53	07:24
	20:35	49	08:32 (9)	20:01	78	08:49 (9)	19:10			18:19	16:40	16:32
18	05:41		07:43 (9)	06:12		07:30 (9)	06:44			07:17	06:55	07:25
	20:35	50	08:33 (9)	20:00	79	08:49 (9)	19:08			18:17	16:39	16:32
19	05:42		07:42 (9)	06:13		07:30 (9)	06:45			07:18	06:56	07:25
	20:34	52	08:34 (9)	19:58	79	08:49 (9)	19:06			18:16	16:39	16:32
20	05:43		07:42 (9)	06:14		07:30 (9)	06:46			07:19	06:57	07:26
	20:33	53	08:35 (9)	19:57	78	08:48 (9)	19:05			18:14	16:38	16:33
21	05:44		07:41 (9)	06:15		07:30 (9)	06:47			07:20	06:58	07:27
	20:33	55	08:36 (9)	19:55	78	08:48 (9)	19:03			18:13	16:37	16:33
22	05:45		07:41 (9)	06:16		07:31 (9)	06:48			07:22	06:59	07:27
	20:32	56	08:37 (9)	19:54	77	08:48 (9)	19:01			18:11	16:36	16:34
23	05:46		07:41 (9)	06:17		07:31 (9)	06:49			07:23	07:01	07:28
	20:31	57	08:38 (9)	19:52	76	08:47 (9)	18:59			18:10	16:36	16:34
24	05:47		07:40 (9)	06:18		07:31 (9)	06:51			07:24	07:02	07:28
	20:30	59	08:39 (9)	19:50	76	08:47 (9)	18:58			18:08	16:35	16:35
25	05:48		07:39 (9)	06:19		07:31 (9)	06:52			06:25	07:03	07:28
	20:29	60	08:39 (9)	19:49	75	08:46 (9)	18:56			17:07	16:35	16:35
26	05:49		07:38 (9)	06:20		07:31 (9)	06:53			06:26	07:04	07:29
	20:28	62	08:40 (9)	19:47	75	08:46 (9)	18:54			17:05	16:34	16:36
27	05:50		07:38 (9)	06:21		07:32 (9)	06:54			06:28	07:05	07:29
	20:27	62	08:40 (9)	19:46	73	08:45 (9)	18:52			17:04	16:33	16:37
28	05:50		07:37 (9)	06:22		07:32 (9)	06:55			06:29	07:06	07:29
	20:26	64	08:41 (9)	19:44	72	08:44 (9)	18:51			17:03	16:33	16:37
29	05:51		07:37 (9)	06:23		07:32 (9)	06:56			06:30	07:08	07:30
	20:25	65	08:42 (9)	19:42	71	08:43 (9)	18:49			17:01	16:33	16:38
30	05:52		07:36 (9)	06:25		07:33 (9)	06:57			06:31	07:09	07:30
	20:24	67	08:43 (9)	19:41	69	08:42 (9)	18:47			17:00	16:32	16:39
31	05:53		07:36 (9)	06:26		07:34 (9)				06:32		07:30
	20:23	67	08:43 (9)	19:39	67	08:41 (9)				16:59		16:40
Potential sun hours	462			430			375			344	296	285
Total, worst case		1413			2318			553				

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:
Iron solar s.r.l.
via Lanzone, 31
IT-20122 Milano
+393487125089
Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AE - Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (31)

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	07:30	07:16	06:39	06:46	05:59		05:29		05:51 (1)	05:29	05:52 (1)	05:54	06:26	06:58	06:33	07:09
	16:40	17:16	17:51	19:26	20:00		20:30	17	06:08 (1)	20:42	29	06:21 (1)	20:22	19:37	18:45	16:57	16:32
2	07:30	07:15	06:37	06:45	05:58		05:29		05:51 (1)	05:30	05:53 (1)	05:55	06:27	06:59	06:35	07:11
	16:41	17:17	17:52	19:28	20:01		20:31	18	06:09 (1)	20:41	29	06:22 (1)	20:21	19:36	18:44	16:56	16:31
3	07:30	07:14	06:35	06:43	05:56		05:28		05:50 (1)	05:30	05:54 (1)	05:56	06:28	07:00	06:36	07:12
	16:42	17:18	17:53	19:29	20:02		20:32	20	06:10 (1)	20:41	28	06:22 (1)	20:19	19:34	18:42	16:55	16:31
4	07:30	07:13	06:34	06:41	05:55		05:28		05:50 (1)	05:31	05:54 (1)	05:57	06:29	07:01	06:37	07:13
	16:43	17:19	17:55	19:30	20:03		20:33	22	06:12 (1)	20:41	27	06:21 (1)	20:18	19:32	18:40	16:53	16:31
5	07:30	07:12	06:32	06:40	05:54		05:27		05:50 (1)	05:32	05:55 (1)	05:58	06:30	07:02	06:38	07:14
	16:44	17:21	17:56	19:31	20:04		20:33	23	06:13 (1)	20:41	26	06:21 (1)	20:17	19:30	18:38	16:52	16:31
6	07:30	07:11	06:31	06:38	05:53		05:27		05:49 (1)	05:32	05:55 (1)	05:59	06:32	07:03	06:40	07:15
	16:45	17:22	17:57	19:32	20:05		20:34	24	06:13 (1)	20:41	25	06:20 (1)	20:16	19:29	18:37	16:51	16:30
7	07:30	07:09	06:29	06:36	05:51		05:27		05:49 (1)	05:33	05:56 (1)	06:00	06:33	07:04	06:41	07:16
	16:46	17:23	17:58	19:33	20:06		20:35	25	06:14 (1)	20:40	24	06:20 (1)	20:15	19:27	18:35	16:50	16:30
8	07:30	07:08	06:27	06:35	05:50		05:26		05:49 (1)	05:33	05:57 (1)	06:01	06:34	07:05	06:42	07:17
	16:47	17:25	17:59	19:34	20:07		20:35	27	06:16 (1)	20:40	22	06:19 (1)	20:13	19:25	18:33	16:49	16:30
9	07:30	07:07	06:26	06:33	05:49		05:26		05:49 (1)	05:34	05:57 (1)	06:02	06:35	07:07	06:43	07:17
	16:48	17:26	18:00	19:35	20:08		20:36	27	06:16 (1)	20:40	21	06:18 (1)	20:12	19:24	18:32	16:48	16:30
10	07:30	07:06	06:24	06:31	05:48		05:26		05:48 (1)	05:35	05:58 (1)	06:03	06:36	07:08	06:45	07:18
	16:49	17:27	18:02	19:36	20:10		20:37	28	06:16 (1)	20:39	19	06:17 (1)	20:11	19:22	18:30	16:46	16:30
11	07:29	07:05	06:22	06:30	05:47		05:26		05:48 (1)	05:35	05:59 (1)	06:04	06:37	07:09	06:46	07:19
	16:50	17:28	18:03	19:38	20:11		20:37	29	06:17 (1)	20:39	17	06:16 (1)	20:09	19:20	18:28	16:45	16:30
12	07:29	07:03	06:21	06:28	05:46		05:26		05:48 (1)	05:36	05:59 (1)	06:05	06:38	07:10	06:47	07:20
	16:51	17:30	18:04	19:39	20:12		20:38	30	06:18 (1)	20:38	15	06:14 (1)	20:08	19:18	18:27	16:44	16:30
13	07:29	07:02	06:19	06:26	05:44		05:26		05:48 (1)	05:37	06:00 (1)	06:06	06:39	07:11	06:48	07:21
	16:52	17:31	18:05	19:40	20:13		20:38	30	06:18 (1)	20:38	13	06:13 (1)	20:07	19:17	18:25	16:43	16:30
14	07:29	07:01	06:17	06:25	05:43		05:26		05:48 (1)	05:38	06:01 (1)	06:08	06:40	07:12	06:50	07:22
	16:53	17:32	18:06	19:41	20:14		20:39	31	06:19 (1)	20:37	11	06:12 (1)	20:05	19:15	18:23	16:42	16:31
15	07:28	06:59	06:16	06:23	05:42		05:25		05:48 (1)	05:39	06:02 (1)	06:09	06:41	07:13	06:51	07:22
	16:54	17:34	18:07	19:42	20:15		20:39	31	06:19 (1)	20:37	7	06:09 (1)	20:04	19:13	18:22	16:42	16:31
16	07:28	06:58	06:14	06:21	05:41		05:25		05:48 (1)	05:39	06:02 (1)	06:10	06:42	07:14	06:52	07:23
	16:56	17:35	18:09	19:43	20:16		20:39	32	06:20 (1)	20:36	2	06:04 (1)	20:02	19:11	18:20	16:41	16:31
17	07:27	06:57	06:12	06:20	05:40		05:26		05:48 (1)	05:40		06:11	06:43	07:16	06:53	07:24
	16:57	17:36	18:10	19:44	20:17		20:40	32	06:20 (1)	20:35		20:01	19:10	18:19	16:40	16:31
18	07:27	06:55	06:10	06:18	05:39		05:26		05:48 (1)	05:41		06:12	06:44	07:17	06:54	07:24
	16:58	17:37	18:11	19:45	20:18		20:40	32	06:20 (1)	20:35		19:59	19:08	18:17	16:39	16:32
19	07:26	06:54	06:09	06:17	05:38		05:26		05:49 (1)	05:42		06:13	06:45	07:18	06:56	07:25
	16:59	17:39	18:12	19:46	20:19		20:40	33	06:22 (1)	20:34		19:58	19:06	18:16	16:38	16:32
20	07:26	06:52	06:07	06:15	05:38		05:26		05:49 (1)	05:43		06:14	06:46	07:19	06:57	07:26
	17:00	17:40	18:13	19:48	20:20		20:41	33	06:22 (1)	20:33		19:56	19:04	18:14	16:37	16:32
21	07:25	06:51	06:05	06:14	05:37		05:26		05:49 (1)	05:44		06:15	06:47	07:20	06:58	07:26
	17:02	17:41	18:14	19:49	20:21		20:41	33	06:22 (1)	20:32		19:55	19:03	18:13	16:37	16:33
22	07:24	06:49	06:04	06:12	05:36		05:26		05:49 (1)	05:45		06:16	06:48	07:21	06:59	07:27
	17:03	17:42	18:15	19:50	20:22		20:41	33	06:22 (1)	20:31		19:53	19:01	18:11	16:36	16:33
23	07:24	06:48	06:02	06:11	05:35		05:26		05:49 (1)	05:45		06:17	06:49	07:23	07:00	07:27
	17:04	17:44	18:16	19:51	20:23		20:41	33	06:22 (1)	20:31		19:52	18:59	18:10	16:35	16:34
24	07:23	06:46	06:00	06:09	05:34		05:27		05:50 (1)	05:46		06:18	06:50	07:24	07:02	07:28
	17:05	17:45	18:18	19:52	20:24		20:41	32	06:22 (1)	20:30		19:50	18:57	18:08	16:35	16:34
25	07:22	06:45	05:58	06:08	05:33		05:27		05:50 (1)	05:47		06:19	06:51	06:25	07:03	07:28
	17:07	17:46	18:19	19:53	20:24		20:42	32	06:22 (1)	20:29		19:49	18:56	17:07	16:34	16:35
26	07:21	06:43	05:57	06:06	05:33		05:27		05:50 (1)	05:48		06:20	06:52	06:26	07:04	07:29
	17:08	17:47	18:20	19:54	20:25		20:42	32	06:22 (1)	20:28		19:47	18:54	17:05	16:34	16:36
27	07:20	06:42	05:55	06:05	05:32		05:28		05:51 (1)	05:49		06:21	06:53	06:27	07:05	07:29
	17:09	17:48	18:21	19:55	20:26		20:42	32	06:23 (1)	20:27		19:45	18:52	17:04	16:33	16:36
28	07:20	06:40	05:53	06:03	05:31	05:53 (1)	05:28		05:51 (1)	05:50		06:22	06:55	06:29	07:06	07:29
	17:10	17:50	18:22	19:56	20:27	5 05:58 (1)	20:42	31	06:22 (1)	20:26		19:44	18:50	17:02	16:33	16:37
29	07:19		06:51	06:02	05:31	05:52 (1)	05:28		05:52 (1)	05:51		06:23	06:56	06:30	07:07	07:30
	17:12		19:23	19:58	20:28	9 06:01 (1)	20:42	31	06:23 (1)	20:25		19:42	18:49	17:01	16:32	16:38
30	07:18		06:50	06:01	05:30	05:52 (1)	05:29		05:52 (1)	05:52		06:24	06:57	06:31	07:08	07:30
	17:13		19:24	19:59	20:29	12 06:04 (1)	20:42	30	06:22 (1)	20:24		19:41	18:47	17:00	16:32	16:38
31	07:17		06:48		05:30	05:51 (1)				05:53		06:25		06:32		07:30
	17:14		19:25		20:30	14 06:05 (1)				20:23		19:39		16:58		16:39
Potential sun hours	295	296	369	400	451		456		462		430	375	344	296	285	
Total, worst case						40		863		315						

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AF - Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (32)

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	07:30	07:16	06:39	06:46	05:59	05:29		05:29		05:52 (1)	05:54	06:26	06:58	06:33	07:09
	16:40	17:16	17:51	19:26	20:00	20:30		20:42	19	06:11 (1)	20:22	19:37	18:45	16:57	16:32
2	07:30	07:15	06:37	06:45	05:58	05:29		05:30		05:53 (1)	05:55	06:27	06:59	06:35	07:11
	16:41	17:17	17:52	19:28	20:01	20:31		20:41	18	06:11 (1)	20:21	19:36	18:43	16:56	16:31
3	07:30	07:14	06:35	06:43	05:56	05:28		05:30		05:54 (1)	05:56	06:28	07:00	06:36	07:12
	16:42	17:18	17:53	19:29	20:02	20:32		20:41	17	06:11 (1)	20:19	19:34	18:42	16:55	16:31
4	07:30	07:13	06:34	06:41	05:55	05:28		05:31		05:54 (1)	05:57	06:29	07:01	06:37	07:13
	16:43	17:19	17:55	19:30	20:03	20:33		20:41	15	06:09 (1)	20:18	19:32	18:40	16:53	16:31
5	07:30	07:12	06:32	06:40	05:54	05:27		05:32		05:55 (1)	05:58	06:30	07:02	06:38	07:14
	16:44	17:21	17:56	19:31	20:04	20:33		20:41	13	06:08 (1)	20:17	19:30	18:38	16:52	16:31
6	07:30	07:11	06:31	06:38	05:53	05:27	05:49 (1)	05:32		05:55 (1)	05:59	06:32	07:03	06:40	07:15
	16:45	17:22	17:57	19:32	20:05	20:34	9 05:58 (1)	20:41	10	06:05 (1)	20:16	19:29	18:37	16:51	16:30
7	07:30	07:09	06:29	06:36	05:51	05:27	05:49 (1)	05:33		05:56 (1)	06:00	06:33	07:04	06:41	07:16
	16:46	17:23	17:58	19:33	20:06	20:35	12 06:01 (1)	20:40	7	06:03 (1)	20:15	19:27	18:35	16:50	16:30
8	07:30	07:08	06:27	06:35	05:50	05:26	05:49 (1)	05:33			06:01	06:34	07:05	06:42	07:17
	16:47	17:25	17:59	19:34	20:07	20:35	14 06:03 (1)	20:40			20:13	19:25	18:33	16:49	16:30
9	07:30	07:07	06:26	06:33	05:49	05:26	05:49 (1)	05:34			06:02	06:35	07:07	06:43	07:17
	16:48	17:26	18:00	19:35	20:08	20:36	16 06:05 (1)	20:40			20:12	19:24	18:32	16:48	16:30
10	07:30	07:06	06:24	06:31	05:48	05:26	05:48 (1)	05:35			06:03	06:36	07:08	06:45	07:18
	16:49	17:27	18:02	19:36	20:10	20:37	18 06:06 (1)	20:39			20:11	19:22	18:30	16:46	16:30
11	07:29	07:05	06:22	06:30	05:47	05:26	05:48 (1)	05:35			06:04	06:37	07:09	06:46	07:19
	16:50	17:28	18:03	19:38	20:11	20:37	19 06:07 (1)	20:39			20:09	19:20	18:28	16:45	16:30
12	07:29	07:03	06:21	06:28	05:46	05:26	05:48 (1)	05:36			06:05	06:38	07:10	06:47	07:20
	16:51	17:30	18:04	19:39	20:12	20:38	20 06:08 (1)	20:38			20:08	19:18	18:27	16:44	16:30
13	07:29	07:02	06:19	06:26	05:44	05:26	05:48 (1)	05:37			06:06	06:39	07:11	06:48	07:21
	16:52	17:31	18:05	19:40	20:13	20:38	21 06:09 (1)	20:38			20:07	19:17	18:25	16:43	16:30
14	07:29	07:01	06:17	06:25	05:43	05:26	05:48 (1)	05:38			06:08	06:40	07:12	06:50	07:22
	16:53	17:32	18:06	19:41	20:14	20:39	22 06:10 (1)	20:37			20:05	19:15	18:23	16:42	16:31
15	07:28	06:59	06:16	06:23	05:42	05:25	05:48 (1)	05:39			06:09	06:41	07:13	06:51	07:22
	16:54	17:34	18:07	19:42	20:15	20:39	23 06:11 (1)	20:37			20:04	19:13	18:22	16:42	16:31
16	07:28	06:58	06:14	06:21	05:41	05:25	05:48 (1)	05:39			06:10	06:42	07:14	06:52	07:23
	16:56	17:35	18:09	19:43	20:16	20:39	23 06:11 (1)	20:36			20:02	19:11	18:20	16:41	16:31
17	07:27	06:57	06:12	06:20	05:40	05:26	05:48 (1)	05:40			06:11	06:43	07:16	06:53	07:24
	16:57	17:36	18:10	19:44	20:17	20:40	24 06:12 (1)	20:35			20:01	19:10	18:19	16:40	16:31
18	07:27	06:55	06:10	06:18	05:39	05:26	05:48 (1)	05:41			06:12	06:44	07:17	06:54	07:24
	16:58	17:37	18:11	19:45	20:18	20:40	24 06:12 (1)	20:35			19:59	19:08	18:17	16:39	16:32
19	07:26	06:54	06:09	06:17	05:38	05:26	05:49 (1)	05:42			06:13	06:45	07:18	06:56	07:25
	16:59	17:39	18:12	19:46	20:19	20:40	24 06:13 (1)	20:34			19:58	19:06	18:16	16:38	16:32
20	07:26	06:52	06:07	06:15	05:38	05:26	05:49 (1)	05:43			06:14	06:46	07:19	06:57	07:26
	17:00	17:40	18:13	19:48	20:20	20:41	25 06:14 (1)	20:33			19:56	19:04	18:14	16:37	16:32
21	07:25	06:51	06:05	06:14	05:37	05:26	05:49 (1)	05:44			06:15	06:47	07:20	06:58	07:26
	17:02	17:41	18:14	19:49	20:21	20:41	25 06:14 (1)	20:32			19:55	19:03	18:13	16:37	16:33
22	07:24	06:49	06:04	06:12	05:36	05:26	05:49 (1)	05:45			06:16	06:48	07:21	06:59	07:27
	17:03	17:42	18:15	19:50	20:22	20:41	25 06:14 (1)	20:31			19:53	19:01	18:11	16:36	16:33
23	07:24	06:48	06:02	06:11	05:35	05:26	05:49 (1)	05:45			06:17	06:49	07:23	07:00	07:27
	17:04	17:44	18:16	19:51	20:23	20:41	24 06:13 (1)	20:31			19:52	18:59	18:10	16:35	16:34
24	07:23	06:46	06:00	06:09	05:34	05:27	05:50 (1)	05:46			06:18	06:50	07:24	07:02	07:28
	17:05	17:45	18:18	19:52	20:24	20:41	24 06:14 (1)	20:30			19:50	18:57	18:08	16:35	16:34
25	07:22	06:45	05:58	06:08	05:33	05:27	05:50 (1)	05:47			06:19	06:51	06:25	07:03	07:28
	17:07	17:46	18:19	19:53	20:24	20:42	24 06:14 (1)	20:29			19:49	18:56	17:07	16:34	16:35
26	07:21	06:43	05:57	06:06	05:33	05:27	05:50 (1)	05:48			06:20	06:52	06:26	07:04	07:29
	17:08	17:47	18:20	19:54	20:25	20:42	23 06:13 (1)	20:28			19:47	18:54	17:05	16:34	16:36
27	07:20	06:42	05:55	06:05	05:32	05:28	05:51 (1)	05:49			06:21	06:53	06:27	07:05	07:29
	17:09	17:48	18:21	19:55	20:26	20:42	23 06:14 (1)	20:27			19:45	18:52	17:04	16:33	16:36
28	07:20	06:40	05:53	06:03	05:31	05:28	05:51 (1)	05:50			06:22	06:55	06:29	07:06	07:29
	17:10	17:50	18:22	19:56	20:27	20:42	22 06:13 (1)	20:26			19:44	18:50	17:02	16:33	16:37
29	07:19		06:51	06:02	05:31	05:28	05:52 (1)	05:51			06:23	06:56	06:30	07:07	07:30
	17:12		19:23	19:58	20:28	20:42	21 06:13 (1)	20:25			19:42	18:49	17:01	16:32	16:38
30	07:18		06:50	06:01	05:30	05:29	05:52 (1)	05:52			06:24	06:57	06:31	07:08	07:30
	17:13		19:24	19:59	20:29	20:42	21 06:13 (1)	20:24			19:41	18:47	17:00	16:32	16:38
31	07:17		06:48		05:30			05:53			06:25		06:32		07:30
	17:14		19:25		20:30			20:23			19:39		16:58		16:39
Potential sun hours	295	296	369	400	451	456		462		430	375	344	296	285	
Total, worst case							526		99						

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AG - Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (33)

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	07:30	07:16	06:39	06:46	05:59	05:29	05:29	05:54	06:26	06:58	06:33	07:09
	16:40	17:16	17:51	19:26	20:00	20:30	20:42	20:22	19:37	18:45	16:57	16:32
2	07:30	07:15	06:37	06:45	05:58	05:29	05:30	05:55	06:27	06:59	06:35	07:11
	16:41	17:17	17:52	19:28	20:01	20:31	20:41	20:21	19:36	18:43	16:56	16:31
3	07:30	07:14	06:35	06:43	05:56	05:28	05:30	05:56	06:28	07:00	06:36	07:12
	16:42	17:18	17:53	19:29	20:02	20:32	20:41	20:19	19:34	18:42	16:55	16:31
4	07:30	07:13	06:34	06:41	05:55	05:28	05:31	05:57	06:29	07:01	06:37	07:13
	16:43	17:19	17:55	19:30	20:03	20:33	20:41	20:18	19:32	18:40	16:53	16:31
5	07:30	07:12	06:32	06:40	05:54	05:27	05:32	05:58	06:30	07:02	06:38	07:14
	16:44	17:21	17:56	19:31	20:04	20:33	20:41	20:17	19:30	18:38	16:52	16:31
6	07:30	07:11	06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03	06:40	07:15
	16:45	17:22	17:57	19:32	20:05	20:34	20:41	20:16	19:29	18:37	16:51	16:30
7	07:30	07:09	06:29	06:36	05:51	05:27	05:33	06:00	06:33	07:04	06:41	07:16
	16:46	17:23	17:58	19:33	20:06	20:35	20:40	20:15	19:27	18:35	16:50	16:30
8	07:30	07:08	06:27	06:35	05:50	05:26	05:33	06:01	06:34	07:05	06:42	07:17
	16:47	17:25	17:59	19:34	20:07	20:35	20:40	20:13	19:25	18:33	16:49	16:30
9	07:30	07:07	06:26	06:33	05:49	05:26	05:34	06:02	06:35	07:07	06:43	07:17
	16:48	17:26	18:00	19:35	20:08	20:36	20:40	20:12	19:24	18:32	16:48	16:30
10	07:30	07:06	06:24	06:31	05:48	05:26	05:35	06:03	06:36	07:08	06:45	07:18
	16:49	17:27	18:02	19:36	20:10	20:37	20:39	20:11	19:22	18:30	16:46	16:30
11	07:29	07:05	06:22	06:30	05:47	05:26	05:35	06:04	06:37	07:09	06:46	07:19
	16:50	17:28	18:03	19:38	20:11	20:37	20:39	20:09	19:20	18:28	16:45	16:30
12	07:29	07:03	06:21	06:28	05:46	05:26	05:36	06:05	06:38	07:10	06:47	07:20
	16:51	17:30	18:04	19:39	20:12	20:38	20:38	20:08	19:18	18:27	16:44	16:30
13	07:29	07:02	06:19	06:26	05:44	05:26	05:37	06:06	06:39	07:11	06:48	07:21
	16:52	17:31	18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:43	16:30
14	07:29	07:01	06:17	06:25	05:43	05:26	05:38	06:07	06:40	07:12	06:50	07:22
	16:53	17:32	18:06	19:41	20:14	20:39	20:37	20:05	19:15	18:23	16:42	16:31
15	07:28	06:59	06:16	06:23	05:42	05:25	05:39	06:09	06:41	07:13	06:51	07:22
	16:54	17:34	18:07	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42	16:31
16	07:28	06:58	06:14	06:21	05:41	05:25	05:39	06:10	06:42	07:14	06:52	07:23
	16:56	17:35	18:09	19:43	20:16	20:39	20:36	20:02	19:11	18:20	16:41	16:31
17	07:27	06:57	06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16	06:53	07:24
	16:57	17:36	18:10	19:44	20:17	20:40	20:35	20:01	19:10	18:19	16:40	16:31
18	07:27	06:55	06:10	06:18	05:39	05:26	05:41	06:12	06:44	07:17	06:54	07:24
	16:58	17:37	18:11	19:45	20:18	20:40	20:35	19:59	19:08	18:17	16:39	16:32
19	07:26	06:54	06:09	06:17	05:38	05:26	05:42	06:13	06:45	07:18	06:56	07:25
	16:59	17:39	18:12	19:46	20:19	20:40	20:34	19:58	19:06	18:16	16:38	16:32
20	07:26	06:52	06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57	07:26
	17:00	17:40	18:13	19:48	20:20	20:41	20:33	19:56	19:04	18:14	16:37	16:32
21	07:25	06:51	06:05	06:14	05:37	05:26	05:44	06:15	06:47	07:20	06:58	07:26
	17:02	17:41	18:14	19:49	20:21	20:41	20:32	19:55	19:03	18:13	16:37	16:33
22	07:24	06:49	06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:21	06:59	07:27
	17:03	17:42	18:15	19:50	20:22	20:41	20:31	19:53	19:01	18:11	16:36	16:33
23	07:24	06:48	06:02	06:11	05:35	05:26	05:45	06:17	06:49	07:23	07:00	07:27
	17:04	17:44	18:16	19:51	20:23	20:41	20:31	19:52	18:59	18:10	16:35	16:34
24	07:23	06:46	06:00	06:09	05:34	05:27	05:46	06:18	06:50	07:24	07:02	07:28
	17:05	17:45	18:18	19:52	20:24	20:41	20:30	19:50	18:57	18:08	16:35	16:34
25	07:22	06:45	05:58	06:08	05:33	05:27	05:47	06:19	06:51	06:25	07:03	07:28
	17:07	17:46	18:19	19:53	20:24	20:42	20:29	19:49	18:56	17:07	16:34	16:35
26	07:21	06:43	05:57	06:06	05:33	05:27	05:48	06:20	06:52	06:26	07:04	07:29
	17:08	17:47	18:20	19:54	20:25	20:42	20:28	19:47	18:54	17:05	16:34	16:36
27	07:20	06:42	05:55	06:05	05:32	05:28	05:49	06:21	06:53	06:27	07:05	07:29
	17:09	17:48	18:21	19:55	20:26	20:42	20:27	19:45	18:52	17:04	16:33	16:36
28	07:20	06:40	05:53	06:03	05:31	05:28	05:50	06:22	06:55	06:29	07:06	07:29
	17:10	17:50	18:22	19:56	20:27	20:42	20:26	19:44	18:50	17:02	16:33	16:37
29	07:19		06:51	06:02	05:31	05:28	05:51	06:23	06:56	06:30	07:07	07:29
	17:12		19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01	16:32	16:38
30	07:18		06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:08	07:30
	17:13		19:24	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	16:38
31	07:17		06:48		05:30		05:53	06:25		06:32		07:30
	17:14		19:25		20:30		20:23	19:39		16:58		16:39
Potential sun hours	295	296	369	400	451	456	462	430	375	344	296	285
Total, worst case												

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AH - Shadow Receptor: 1.0 × 1.0 Azimuth: -10.0° Slope: 90.0° (34)

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	07:30		10:50 (2)	07:16	06:39	06:46	05:59	05:29	05:29	05:54	06:26	06:58	06:34			07:10		10:41 (2)
	16:40	75	12:05 (2)	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:37	18:45	16:57			16:32	66	11:47 (2)
2	07:30		10:51 (2)	07:15	06:37	06:45	05:58	05:29	05:30	05:55	06:27	06:59	06:35			07:11		10:40 (2)
	16:41	74	12:05 (2)	17:17	17:52	19:28	20:01	20:31	20:42	20:21	19:36	18:44	16:56			16:31	68	11:48 (2)
3	07:30		10:52 (2)	07:14	06:36	06:43	05:57	05:28	05:30	05:56	06:28	07:00	06:36			07:12		10:40 (2)
	16:42	73	12:05 (2)	17:18	17:53	19:29	20:02	20:32	20:41	20:20	19:34	18:42	16:55			16:31	69	11:49 (2)
4	07:31		10:52 (2)	07:13	06:34	06:41	05:55	05:28	05:31	05:57	06:29	07:01	06:37			07:13		10:40 (2)
	16:43	73	12:05 (2)	17:19	17:55	19:30	20:03	20:33	20:41	20:18	19:32	18:40	16:53			16:31	70	11:50 (2)
5	07:31		10:53 (2)	07:12	06:32	06:40	05:54	05:27	05:32	05:58	06:31	07:02	06:38			07:14		10:40 (2)
	16:44	73	12:06 (2)	17:21	17:56	19:31	20:04	20:34	20:41	20:17	19:31	18:38	16:52			16:31	71	11:51 (2)
6	07:30		10:54 (2)	07:11	06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03	06:40			07:15		10:40 (2)
	16:45	72	12:06 (2)	17:22	17:57	19:32	20:05	20:34	20:41	20:16	19:29	18:37	16:51			16:30	72	11:52 (2)
7	07:30		10:55 (2)	07:09	06:29	06:36	05:51	05:27	05:33	06:00	06:33	07:04	06:41			07:16		10:40 (2)
	16:46	71	12:06 (2)	17:23	17:58	19:33	20:06	20:35	20:40	20:15	19:27	18:35	16:50			16:30	73	11:53 (2)
8	07:30		10:56 (2)	07:08	06:27	06:35	05:50	05:26	05:33	06:01	06:34	07:05	06:42			07:17		10:40 (2)
	16:47	70	12:06 (2)	17:25	17:59	19:34	20:08	20:35	20:40	20:13	19:25	18:33	16:49			16:30	73	11:53 (2)
9	07:30		10:56 (2)	07:07	06:26	06:33	05:49	05:26	05:34	06:02	06:35	07:07	06:43			07:18		10:41 (2)
	16:48	69	12:05 (2)	17:26	18:00	19:35	20:09	20:36	20:40	20:12	19:24	18:32	16:48			16:30	73	11:54 (2)
10	07:30		10:57 (2)	07:06	06:24	06:31	05:48	05:26	05:35	06:03	06:36	07:08	06:45			07:18		10:41 (2)
	16:49	68	12:05 (2)	17:27	18:02	19:37	20:10	20:37	20:39	20:11	19:22	18:30	16:47			16:30	74	11:55 (2)
11	07:30		10:59 (2)	07:05	06:22	06:30	05:47	05:26	05:36	06:04	06:37	07:09	06:46			07:19		10:41 (2)
	16:50	66	12:05 (2)	17:28	18:03	19:38	20:11	20:37	20:39	20:09	19:20	18:28	16:45			16:30	75	11:56 (2)
12	07:29		10:59 (2)	07:03	06:21	06:28	05:46	05:26	05:36	06:05	06:38	07:10	06:47			07:20		10:41 (2)
	16:51	66	12:05 (2)	17:30	18:04	19:39	20:12	20:38	20:38	20:08	19:19	18:27	16:44			16:30	75	11:56 (2)
13	07:29		11:00 (2)	07:02	06:19	06:26	05:44	05:26	05:37	06:06	06:39	07:11	06:48			07:21		10:41 (2)
	16:52	65	12:05 (2)	17:31	18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:43			16:30	75	11:56 (2)
14	07:29		11:02 (2)	07:01	06:17	06:25	05:43	05:26	05:38	06:08	06:40	07:12	06:50			07:22		10:42 (2)
	16:53	63	12:05 (2)	17:32	18:06	19:41	20:14	20:39	20:37	20:05	19:15	18:24	16:43			16:31	75	11:57 (2)
15	07:28		11:03 (2)	06:59	06:16	06:23	05:42	05:26	05:39	06:09	06:41	07:13	06:51			07:23		10:42 (2)
	16:54	60	12:03 (2)	17:34	18:07	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42			16:31	76	11:58 (2)
16	07:28		11:03 (2)	06:58	06:14	06:21	05:41	05:25	05:39	06:10	06:42	07:15	06:52		11:04 (2)	07:23		10:42 (2)
	16:56	59	12:02 (2)	17:35	18:09	19:43	20:16	20:40	20:36	20:02	19:12	18:20	16:41	7	11:11 (2)	16:31	76	11:58 (2)
17	07:27		11:05 (2)	06:57	06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16	06:53		10:57 (2)	07:24		10:43 (2)
	16:57	57	12:02 (2)	17:36	18:10	19:44	20:17	20:40	20:35	20:01	19:10	18:19	16:40	23	11:20 (2)	16:31	76	11:59 (2)
18	07:27		11:06 (2)	06:55	06:11	06:18	05:39	05:26	05:41	06:12	06:44	07:17	06:55		10:54 (2)	07:25		10:43 (2)
	16:58	55	12:01 (2)	17:37	18:11	19:45	20:18	20:40	20:35	20:00	19:08	18:17	16:39	30	11:24 (2)	16:32	77	12:00 (2)
19	07:26		11:08 (2)	06:54	06:09	06:17	05:38	05:26	05:42	06:13	06:45	07:18	06:56		10:51 (2)	07:25		10:43 (2)
	16:59	52	12:00 (2)	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16	16:38	36	11:27 (2)	16:32	77	12:00 (2)
20	07:26		11:10 (2)	06:52	06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57		10:49 (2)	07:26		10:44 (2)
	17:00	49	11:59 (2)	17:40	18:13	19:48	20:20	20:41	20:33	19:57	19:04	18:14	16:37	42	11:31 (2)	16:32	77	12:01 (2)
21	07:25		11:11 (2)	06:51	06:05	06:14	05:37	05:26	05:44	06:15	06:47	07:20	06:58		10:48 (2)	07:26		10:44 (2)
	17:02	46	11:57 (2)	17:41	18:14	19:49	20:21	20:41	20:32	19:55	19:03	18:13	16:37	45	11:33 (2)	16:33	77	12:01 (2)
22	07:24		11:14 (2)	06:49	06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:21	06:59		10:46 (2)	07:27		10:45 (2)
	17:03	42	11:56 (2)	17:42	18:15	19:50	20:22	20:41	20:32	19:53	19:01	18:11	16:36	49	11:35 (2)	16:33	77	12:02 (2)
23	07:24		11:17 (2)	06:48	06:02	06:11	05:35	05:26	05:45	06:17	06:49	07:23	07:01		10:45 (2)	07:27		10:45 (2)
	17:04	36	11:53 (2)	17:44	18:17	19:51	20:23	20:41	20:31	19:52	18:59	18:10	16:35	51	11:36 (2)	16:34	77	12:02 (2)
24	07:23		11:20 (2)	06:46	06:00	06:09	05:34	05:27	05:46	06:18	06:50	07:24	07:02		10:44 (2)	07:28		10:46 (2)
	17:05	30	11:50 (2)	17:45	18:18	19:52	20:24	20:42	20:30	19:50	18:57	18:08	16:35	55	11:39 (2)	16:34	77	12:03 (2)
25	07:22		11:24 (2)	06:45	05:58	06:08	05:33	05:27	05:47	06:19	06:51	06:25	07:03		10:43 (2)	07:28		10:46 (2)
	17:07	22	11:46 (2)	17:46	18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07	16:34	57	11:40 (2)	16:35	77	12:03 (2)
26	07:21		11:31 (2)	06:43	05:57	06:06	05:33	05:27	05:48	06:20	06:52	06:26	07:04		10:42 (2)	07:29		10:47 (2)
	17:08	7	11:38 (2)	17:47	18:20	19:54	20:26	20:42	20:28	19:47	18:54	17:05	16:34	59	11:41 (2)	16:36	76	12:03 (2)
27	07:21			06:42	05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:27	07:05		10:42 (2)	07:29		10:48 (2)
	17:09			17:49	18:21	19:55	20:26	20:42	20:27	19:46	18:52	17:04	16:33	60	11:42 (2)	16:36	76	12:04 (2)
28	07:20			06:40	05:53	06:03	05:31	05:28	05:50	06:22	06:55	06:29	07:06		10:41 (2)	07:29		10:48 (2)
	17:10			17:50	18:22	19:57	20:27	20:42	20:26	19:44	18:50	17:02	16:33	63	11:44 (2)	16:37	76	12:04 (2)
29	07:19				06:52	06:02	05:31	05:28	05:51	06:23	06:56	06:30	07:07		10:41 (2)	07:30		10:49 (2)
	17:12				19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01	16:32	65	11:46 (2)	16:38	75	12:04 (2)
30	07:18				06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:09		10:41 (2)	07:30		10:49 (2)
	17:13				19:24	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	66	11:47 (2)	16:39	75	12:04 (2)
31	07:17				06:48		05:30		05:53	06:25		06:32				07:30		10:49 (2)
	17:14				19:25		20:30		20:23	19:39		16:58				16:39	76	12:05 (2)
Potential sun hours	294			296	369	400	451	456	462	430	375	344	296			284		
Total, worst case		1493												708			2307	

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AI - Shadow Receptor: 1.0 × 1.0 Azimuth: -60.0° Slope: 90.0° (35)

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	07:30			07:16		07:38 (2)	06:39		07:24 (3)	06:47		05:59	05:29
	16:40			17:16	17	07:55 (2)	17:51	81	08:45 (3)	19:27		20:00	20:31
2	07:31			07:15		07:37 (2)	06:37		07:24 (3)	06:45		05:58	05:29
	16:41			17:17	16	07:53 (2)	17:52	81	08:45 (3)	19:28		20:01	20:31
3	07:31			07:14		07:39 (2)	06:36		07:23 (3)	06:43		05:57	05:28
	16:42			17:18	14	07:53 (2)	17:53	82	08:45 (3)	19:29		20:02	20:32
4	07:31			07:13		07:40 (2)	06:34		07:23 (3)	06:41		05:55	05:28
	16:43			17:20	12	07:52 (2)	17:55	81	08:44 (3)	19:30		20:03	20:33
5	07:31			07:12		07:42 (2)	06:32		07:23 (3)	06:40		05:54	05:27
	16:44			17:21	21	08:12 (3)	17:56	82	08:45 (3)	19:31		20:04	20:34
6	07:31			07:11		07:54 (3)	06:31		07:23 (3)	06:38		05:53	05:27
	16:45			17:22	24	08:18 (3)	17:57	81	08:44 (3)	19:32		20:05	20:34
7	07:30			07:10		07:50 (3)	06:29		07:22 (3)	06:36		05:51	05:27
	16:46			17:23	32	08:22 (3)	17:58	81	08:43 (3)	19:33		20:07	20:35
8	07:30			07:08		07:47 (3)	06:27		07:23 (3)	06:35		05:50	05:27
	16:47			17:25	37	08:24 (3)	17:59	80	08:43 (3)	19:34		20:08	20:36
9	07:30			07:07		07:45 (3)	06:26		07:22 (3)	06:33		05:49	05:26
	16:48			17:26	42	08:27 (3)	18:01	80	08:42 (3)	19:36		20:09	20:36
10	07:30			07:06		07:43 (3)	06:24		07:22 (3)	06:31		05:48	05:26
	16:49			17:27	46	08:29 (3)	18:02	79	08:41 (3)	19:37		20:10	20:37
11	07:30			07:05		07:42 (3)	06:22		07:23 (3)	06:30		05:47	05:26
	16:50			17:29	50	08:32 (3)	18:03	78	08:41 (3)	19:38		20:11	20:37
12	07:29			07:03		07:39 (3)	06:21		07:23 (3)	06:28		05:46	05:26
	16:51			17:30	54	08:33 (3)	18:04	77	08:40 (3)	19:39		20:12	20:38
13	07:29			07:02		07:38 (3)	06:19		07:22 (3)	06:26		05:45	05:26
	16:52			17:31	57	08:35 (3)	18:05	77	08:39 (3)	19:40		20:13	20:38
14	07:29			07:01		07:37 (3)	06:17		07:22 (3)	06:25		05:43	05:26
	16:53			17:32	59	08:36 (3)	18:06	75	08:37 (3)	19:41		20:14	20:39
15	07:28			07:00		07:35 (3)	06:16		07:23 (3)	06:23		05:42	05:26
	16:55			17:34	62	08:37 (3)	18:08	74	08:37 (3)	19:42		20:15	20:39
16	07:28			06:58		07:34 (3)	06:14		07:23 (3)	06:22		05:41	05:26
	16:56			17:35	64	08:38 (3)	18:09	73	08:36 (3)	19:43		20:16	20:40
17	07:27			06:57		07:33 (3)	06:12		07:24 (3)	06:20		05:40	05:26
	16:57			17:36	66	08:39 (3)	18:10	70	08:34 (3)	19:44		20:17	20:40
18	07:27			06:55		07:32 (3)	06:11		07:24 (3)	06:18		05:39	05:26
	16:58			17:37	68	08:40 (3)	18:11	68	08:32 (3)	19:46		20:18	20:40
19	07:26			06:54		07:31 (3)	06:09		07:25 (3)	06:17		05:39	05:26
	16:59			17:39	71	08:42 (3)	18:12	67	08:32 (3)	19:47		20:19	20:41
20	07:26			06:52		07:30 (3)	06:07		07:26 (3)	06:15		05:38	05:26
	17:00			17:40	72	08:42 (3)	18:13	64	08:30 (3)	19:48		20:20	20:41
21	07:25		07:46 (2)	06:51		07:30 (3)	06:05		07:26 (3)	06:14		05:37	05:26
	17:02	2	07:48 (2)	17:41	73	08:43 (3)	18:14	62	08:28 (3)	19:49		20:21	20:41
22	07:25		07:46 (2)	06:50		07:28 (3)	06:04		07:28 (3)	06:12		05:36	05:26
	17:03	4	07:50 (2)	17:42	75	08:43 (3)	18:15	59	08:27 (3)	19:50		20:22	20:41
23	07:24		07:45 (2)	06:48		07:28 (3)	06:02		07:29 (3)	06:11		05:35	05:26
	17:04	6	07:51 (2)	17:44	76	08:44 (3)	18:17	56	08:25 (3)	19:51		20:23	20:42
24	07:23		07:44 (2)	06:47		07:27 (3)	06:00		07:29 (3)	06:09		05:34	05:27
	17:05	8	07:52 (2)	17:45	77	08:44 (3)	18:18	53	08:22 (3)	19:52		20:24	20:42
25	07:22		07:43 (2)	06:45		07:26 (3)	05:59		07:30 (3)	06:08		05:34	05:27
	17:07	9	07:52 (2)	17:46	78	08:44 (3)	18:19	50	08:20 (3)	19:53		20:25	20:42
26	07:22		07:42 (2)	06:44		07:26 (3)	05:57		07:33 (3)	06:06		05:33	05:27
	17:08	11	07:53 (2)	17:47	79	08:45 (3)	18:20	45	08:18 (3)	19:54		20:26	20:42
27	07:21		07:41 (2)	06:42		07:25 (3)	05:55		07:34 (3)	06:05		05:32	05:28
	17:09	12	07:53 (2)	17:49	80	08:45 (3)	18:21	41	08:15 (3)	19:56		20:26	20:42
28	07:20		07:41 (2)	06:40		07:25 (3)	05:53		07:36 (3)	06:03		05:32	05:28
	17:10	14	07:55 (2)	17:50	80	08:45 (3)	18:22	35	08:11 (3)	19:57		20:27	20:42
29	07:19		07:40 (2)				06:52		08:39 (3)	06:02		05:31	05:29
	17:12	15	07:55 (2)				19:23	28	09:07 (3)	19:58		20:28	20:42
30	07:18		07:39 (2)				06:50		08:43 (3)	06:01		05:30	05:29
	17:13	16	07:55 (2)				19:24	20	09:03 (3)	19:59		20:29	20:42
31	07:17		07:38 (2)				06:48					05:30	
	17:14	17	07:55 (2)				19:26					20:30	
Potential sun hours	294			296			369			400		451	456
Total, worst case		114			1502			1980					

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:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AI - Shadow Receptor: 1.0 × 1.0 Azimuth: -60.0° Slope: 90.0° (35)

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	05:29	05:54	06:26			06:58		08:01 (3)	06:34		07:13 (3)	07:10
	20:42	20:22	19:37			18:45	77	09:18 (3)	16:57	46	07:59 (3)	16:32
2	05:30	05:55	06:27			06:59		08:01 (3)	06:35		07:15 (3)	07:11
	20:42	20:21	19:36			18:44	78	09:19 (3)	16:56	41	07:56 (3)	16:31
3	05:30	05:56	06:29			07:00		08:01 (3)	06:36		07:17 (3)	07:12
	20:42	20:20	19:34			18:42	79	09:20 (3)	16:55	37	07:54 (3)	16:31
4	05:31	05:57	06:30			07:01		08:00 (3)	06:37		07:21 (3)	07:13
	20:41	20:18	19:32			18:40	80	09:20 (3)	16:53	30	07:51 (3)	16:31
5	05:32	05:58	06:31			07:02		07:59 (3)	06:39		07:24 (3)	07:14
	20:41	20:17	19:31			18:39	81	09:20 (3)	16:52	23	07:47 (3)	16:31
6	05:32	05:59	06:32			07:03		07:59 (3)	06:40		07:12 (2)	07:15
	20:41	20:16	19:29			18:37	81	09:20 (3)	16:51	19	07:41 (3)	16:30
7	05:33	06:00	06:33			07:04		07:58 (3)	06:41		07:11 (2)	07:16
	20:40	20:15	19:27			18:35	81	09:19 (3)	16:50	12	07:23 (2)	16:30
8	05:33	06:01	06:34			07:06		07:58 (3)	06:42		07:09 (2)	07:17
	20:40	20:14	19:26			18:33	81	09:19 (3)	16:49	15	07:24 (2)	16:30
9	05:34	06:02	06:35			07:07		07:58 (3)	06:44		07:08 (2)	07:18
	20:40	20:12	19:24			18:32	81	09:19 (3)	16:48	16	07:24 (2)	16:30
10	05:35	06:03	06:36			07:08		07:57 (3)	06:45		07:08 (2)	07:19
	20:39	20:11	19:22			18:30	82	09:19 (3)	16:47	18	07:26 (2)	16:30
11	05:36	06:04	06:37			07:09		07:58 (3)	06:46		07:09 (2)	07:19
	20:39	20:10	19:20			18:28	81	09:19 (3)	16:46	17	07:26 (2)	16:30
12	05:36	06:06	06:38			07:10		07:58 (3)	06:47		07:10 (2)	07:20
	20:38	20:08	19:19			18:27	81	09:19 (3)	16:45	16	07:26 (2)	16:30
13	05:37	06:07	06:39		08:35 (3)	07:11		07:58 (3)	06:48		07:12 (2)	07:21
	20:38	20:07	19:17	19	08:54 (3)	18:25	80	09:18 (3)	16:44	15	07:27 (2)	16:31
14	05:38	06:08	06:40		08:31 (3)	07:12		07:57 (3)	06:50		07:13 (2)	07:22
	20:37	20:05	19:15	27	08:58 (3)	18:24	81	09:18 (3)	16:43	14	07:27 (2)	16:31
15	05:39	06:09	06:41		08:27 (3)	07:13		07:57 (3)	06:51		07:14 (2)	07:23
	20:37	20:04	19:13	34	09:01 (3)	18:22	80	09:17 (3)	16:42	12	07:26 (2)	16:31
16	05:39	06:10	06:42		08:24 (3)	07:15		07:57 (3)	06:52		07:15 (2)	07:23
	20:36	20:03	19:12	40	09:04 (3)	18:20	79	09:16 (3)	16:41	11	07:26 (2)	16:31
17	05:40	06:11	06:43		08:21 (3)	07:16		07:58 (3)	06:53		07:17 (2)	07:24
	20:35	20:01	19:10	45	09:06 (3)	18:19	78	09:16 (3)	16:40	9	07:26 (2)	16:31
18	05:41	06:12	06:44		08:19 (3)	07:17		07:59 (3)	06:55		07:18 (2)	07:25
	20:35	20:00	19:08	48	09:07 (3)	18:17	76	09:15 (3)	16:39	8	07:26 (2)	16:32
19	05:42	06:13	06:45		08:17 (3)	07:18		07:59 (3)	06:56		07:19 (2)	07:25
	20:34	19:58	19:06	52	09:09 (3)	18:16	75	09:14 (3)	16:38	6	07:25 (2)	16:32
20	05:43	06:14	06:46		08:15 (3)	07:19		07:59 (3)	06:57		07:21 (2)	07:26
	20:33	19:57	19:05	55	09:10 (3)	18:14	74	09:13 (3)	16:38	4	07:25 (2)	16:33
21	05:44	06:15	06:47		08:13 (3)	07:20		08:00 (3)	06:58		07:22 (2)	07:27
	20:33	19:55	19:03	59	09:12 (3)	18:13	73	09:13 (3)	16:37	2	07:24 (2)	16:33
22	05:45	06:16	06:48		08:12 (3)	07:22		08:01 (3)	06:59			07:27
	20:32	19:54	19:01	61	09:13 (3)	18:11	71	09:12 (3)	16:36			16:33
23	05:46	06:17	06:49		08:10 (3)	07:23		08:01 (3)	07:01			07:28
	20:31	19:52	18:59	64	09:14 (3)	18:10	70	09:11 (3)	16:36			16:34
24	05:46	06:18	06:50		08:09 (3)	07:24		08:02 (3)	07:02			07:28
	20:30	19:50	18:58	66	09:15 (3)	18:08	68	09:10 (3)	16:35			16:35
25	05:47	06:19	06:51		08:08 (3)	06:25		07:03 (3)	07:03			07:28
	20:29	19:49	18:56	68	09:16 (3)	17:07	66	08:09 (3)	16:34			16:35
26	05:48	06:20	06:53		08:06 (3)	06:26		07:04 (3)	07:04			07:29
	20:28	19:47	18:54	70	09:16 (3)	17:05	64	08:08 (3)	16:34			16:36
27	05:49	06:21	06:54		08:05 (3)	06:28		07:05 (3)	07:05			07:29
	20:27	19:46	18:52	72	09:17 (3)	17:04	61	08:06 (3)	16:33			16:36
28	05:50	06:22	06:55		08:04 (3)	06:29		07:06 (3)	07:06			07:29
	20:26	19:44	18:51	73	09:17 (3)	17:03	59	08:05 (3)	16:33			16:37
29	05:51	06:23	06:56		08:03 (3)	06:30		07:08 (3)	07:08			07:30
	20:25	19:42	18:49	75	09:18 (3)	17:01	56	08:04 (3)	16:32			16:38
30	05:52	06:24	06:57		08:02 (3)	06:31		07:09 (3)	07:09			07:30
	20:24	19:41	18:47	76	09:18 (3)	17:00	53	08:02 (3)	16:32			16:39
31	05:53	06:25				06:32		07:11 (3)				07:30
	20:23	19:39				16:58	49	08:00 (3)				16:39
Potential sun hours	462	430	375			344			296			284
Total, worst case				1004			2276			371		

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:
Iron solar s.r.l.
via Lanzone, 31
IT-20122 Milano
+393487125089
Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AJ - Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (36)

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	07:30	07:16	06:39	06:46	05:59	05:29	05:29	05:54	06:26	06:58	06:34	07:10
	16:40	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:37	18:45	16:57	16:32
2	07:30	07:15	06:37	06:45	05:58	05:29	05:30	05:55	06:27	06:59	06:35	07:11
	16:41	17:17	17:52	19:28	20:01	20:31	20:42	20:21	19:36	18:44	16:56	16:31
3	07:31	07:14	06:36	06:43	05:57	05:28	05:30	05:56	06:29	07:00	06:36	07:12
	16:42	17:18	17:53	19:29	20:02	20:32	20:41	20:20	19:34	18:42	16:55	16:31
4	07:31	07:13	06:34	06:41	05:55	05:28	05:31	05:57	06:30	07:01	06:37	07:13
	16:43	17:20	17:55	19:30	20:03	20:33	20:41	20:18	19:32	18:40	16:53	16:31
5	07:31	07:12	06:32	06:40	05:54	05:27	05:32	05:58	06:31	07:02	06:39	07:14
	16:44	17:21	17:56	19:31	20:04	20:34	20:41	20:17	19:31	18:39	16:52	16:31
6	07:31	07:11	06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03	06:40	07:15
	16:45	17:22	17:57	19:32	20:05	20:34	20:41	20:16	19:29	18:37	16:51	16:30
7	07:30	07:10	06:29	06:36	05:51	05:27	05:33	06:00	06:33	07:04	06:41	07:16
	16:46	17:23	17:58	19:33	20:07	20:35	20:40	20:15	19:27	18:35	16:50	16:30
8	07:30	07:08	06:27	06:35	05:50	05:27	05:33	06:01	06:34	07:06	06:42	07:17
	16:47	17:25	17:59	19:34	20:08	20:36	20:40	20:13	19:26	18:33	16:49	16:30
9	07:30	07:07	06:26	06:33	05:49	05:26	05:34	06:02	06:35	07:07	06:44	07:18
	16:48	17:26	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48	16:30
10	07:30	07:06	06:24	06:31	05:48	05:26	05:35	06:03	06:36	07:08	06:45	07:19
	16:49	17:27	18:02	19:37	20:10	20:37	20:39	20:11	19:22	18:30	16:47	16:30
11	07:30	07:05	06:22	06:30	05:47	05:26	05:36	06:04	06:37	07:09	06:46	07:19
	16:50	17:29	18:03	19:38	20:11	20:37	20:39	20:10	19:20	18:28	16:46	16:30
12	07:29	07:03	06:21	06:28	05:46	05:26	05:36	06:06	06:38	07:10	06:47	07:20
	16:51	17:30	18:04	19:39	20:12	20:38	20:38	20:08	19:19	18:27	16:45	16:30
13	07:29	07:02	06:19	06:26	05:45	05:26	05:37	06:07	06:39	07:11	06:48	07:21
	16:52	17:31	18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:44	16:31
14	07:29	07:01	06:17	06:25	05:43	05:26	05:38	06:08	06:40	07:12	06:50	07:22
	16:53	17:32	18:06	19:41	20:14	20:39	20:37	20:05	19:15	18:24	16:43	16:31
15	07:28	06:59	06:16	06:23	05:42	05:26	05:39	06:09	06:41	07:13	06:51	07:23
	16:55	17:34	18:08	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42	16:31
16	07:28	06:58	06:14	06:22	05:41	05:26	05:39	06:10	06:42	07:15	06:52	07:23
	16:56	17:35	18:09	19:43	20:16	20:40	20:36	20:03	19:12	18:20	16:41	16:31
17	07:27	06:57	06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16	06:53	07:24
	16:57	17:36	18:10	19:44	20:17	20:40	20:35	20:01	19:10	18:19	16:40	16:31
18	07:27	06:55	06:11	06:18	05:39	05:26	05:41	06:12	06:44	07:17	06:55	07:25
	16:58	17:37	18:11	19:46	20:18	20:40	20:35	20:00	19:08	18:17	16:39	16:32
19	07:26	06:54	06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18	06:56	07:25
	16:59	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16	16:38	16:32
20	07:26	06:52	06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57	07:26
	17:00	17:40	18:13	19:48	20:20	20:41	20:33	19:57	19:05	18:14	16:38	16:33
21	07:25	06:51	06:05	06:14	05:37	05:26	05:44	06:15	06:47	07:20	06:58	07:26
	17:02	17:41	18:14	19:49	20:21	20:41	20:32	19:55	19:03	18:13	16:37	16:33
22	07:24	06:50	06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:22	06:59	07:27
	17:03	17:42	18:15	19:50	20:22	20:41	20:32	19:53	19:01	18:11	16:36	16:33
23	07:24	06:48	06:02	06:11	05:35	05:26	05:46	06:17	06:49	07:23	07:01	07:27
	17:04	17:44	18:17	19:51	20:23	20:42	20:31	19:52	18:59	18:10	16:36	16:34
24	07:23	06:47	06:00	06:09	05:34	05:27	05:46	06:18	06:50	07:24	07:02	07:28
	17:05	17:45	18:18	19:52	20:24	20:42	20:30	19:50	18:58	18:08	16:35	16:35
25	07:22	06:45	05:59	06:08	05:34	05:27	05:47	06:19	06:51	06:25	07:03	07:28
	17:07	17:46	18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07	16:34	16:35
26	07:21	06:43	05:57	06:06	05:33	05:27	05:48	06:20	06:53	06:26	07:04	07:29
	17:08	17:47	18:20	19:54	20:26	20:42	20:28	19:47	18:54	17:05	16:34	16:36
27	07:21	06:42	05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:28	07:05	07:29
	17:09	17:49	18:21	19:56	20:26	20:42	20:27	19:46	18:52	17:04	16:33	16:36
28	07:20	06:40	05:53	06:03	05:32	05:28	05:50	06:22	06:55	06:29	07:06	07:29
	17:10	17:50	18:22	19:57	20:27	20:42	20:26	19:44	18:51	17:03	16:33	16:37
29	07:19		06:52	06:02	05:31	05:29	05:51	06:23	06:56	06:30	07:07	07:30
	17:12		19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01	16:32	16:38
30	07:18		06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:09	07:30
	17:13		19:24	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	16:39
31	07:17		06:48		05:30		05:53	06:25		06:32		07:30
	17:14		19:26		20:30		20:23	19:39		16:58		16:39
Potential sun hours	294	296	369	400	451	456	462	430	375	344	296	284
Total, worst case												

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

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

SHADOW - Calendar

Calculation: WON019_ShadowFlickering Shadow receptor: AK - Shadow Receptor: 1.0 × 1.0 Azimuth: 20.0° Slope: 90.0° (37)

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	07:30		12:47 (3)	07:16	06:39	06:46	05:59	05:29	05:29	05:54	06:26	06:58	06:34			07:10		12:40 (3)
	16:40	67	13:54 (3)	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:37	18:45	16:57			16:32	56	13:36 (3)
2	07:31		12:48 (3)	07:15	06:37	06:45	05:58	05:29	05:30	05:55	06:27	06:59	06:35			07:11		12:39 (3)
	16:41	66	13:54 (3)	17:17	17:52	19:28	20:01	20:31	20:42	20:21	19:36	18:44	16:56			16:31	58	13:37 (3)
3	07:31		12:49 (3)	07:14	06:36	06:43	05:57	05:28	05:30	05:56	06:29	07:00	06:36			07:12		12:39 (3)
	16:42	65	13:54 (3)	17:18	17:53	19:29	20:02	20:32	20:41	20:20	19:34	18:42	16:55			16:31	59	13:38 (3)
4	07:31		12:50 (3)	07:13	06:34	06:41	05:55	05:28	05:31	05:57	06:30	07:01	06:37			07:13		12:38 (3)
	16:43	64	13:54 (3)	17:19	17:55	19:30	20:03	20:33	20:41	20:18	19:32	18:40	16:53			16:31	61	13:39 (3)
5	07:31		12:51 (3)	07:12	06:32	06:40	05:54	05:27	05:32	05:58	06:31	07:02	06:39			07:14		12:38 (3)
	16:44	64	13:55 (3)	17:21	17:56	19:31	20:04	20:34	20:41	20:17	19:31	18:38	16:52			16:31	62	13:40 (3)
6	07:31		12:52 (3)	07:11	06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03	06:40			07:15		12:38 (3)
	16:45	63	13:55 (3)	17:22	17:57	19:32	20:05	20:34	20:41	20:16	19:29	18:37	16:51			16:30	63	13:41 (3)
7	07:30		12:53 (3)	07:10	06:29	06:36	05:51	05:27	05:33	06:00	06:33	07:04	06:41			07:16		12:38 (3)
	16:46	62	13:55 (3)	17:23	17:58	19:33	20:07	20:35	20:40	20:15	19:27	18:35	16:50			16:30	64	13:42 (3)
8	07:30		12:54 (3)	07:08	06:27	06:35	05:50	05:27	05:33	06:01	06:34	07:06	06:42			07:17		12:38 (3)
	16:47	61	13:55 (3)	17:25	17:59	19:34	20:08	20:36	20:40	20:13	19:26	18:33	16:49			16:30	64	13:42 (3)
9	07:30		12:55 (3)	07:07	06:26	06:33	05:49	05:26	05:34	06:02	06:35	07:07	06:44			07:18		12:38 (3)
	16:48	59	13:54 (3)	17:26	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48			16:30	65	13:43 (3)
10	07:30		12:56 (3)	07:06	06:24	06:31	05:48	05:26	05:35	06:03	06:36	07:08	06:45			07:19		12:38 (3)
	16:49	58	13:54 (3)	17:27	18:02	19:37	20:10	20:37	20:39	20:11	19:22	18:30	16:47			16:30	66	13:44 (3)
11	07:30		12:58 (3)	07:05	06:22	06:30	05:47	05:26	05:36	06:04	06:37	07:09	06:46			07:19		12:39 (3)
	16:50	56	13:54 (3)	17:29	18:03	19:38	20:11	20:37	20:39	20:10	19:20	18:28	16:46			16:30	66	13:45 (3)
12	07:29		12:58 (3)	07:03	06:21	06:28	05:46	05:26	05:36	06:05	06:38	07:10	06:47			07:20		12:39 (3)
	16:51	55	13:53 (3)	17:30	18:04	19:39	20:12	20:38	20:38	20:08	19:19	18:27	16:45			16:30	67	13:46 (3)
13	07:29		13:00 (3)	07:02	06:19	06:26	05:44	05:26	05:37	06:07	06:39	07:11	06:48			07:21		12:38 (3)
	16:52	53	13:53 (3)	17:31	18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:44			16:31	67	13:45 (3)
14	07:29		13:02 (3)	07:01	06:17	06:25	05:43	05:26	05:38	06:08	06:40	07:12	06:50			07:22		12:39 (3)
	16:53	51	13:53 (3)	17:32	18:06	19:41	20:14	20:39	20:37	20:05	19:15	18:24	16:43			16:31	67	13:46 (3)
15	07:28		13:03 (3)	06:59	06:16	06:23	05:42	05:26	05:39	06:09	06:41	07:13	06:51			07:23		12:39 (3)
	16:55	49	13:52 (3)	17:34	18:08	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42			16:31	68	13:47 (3)
16	07:28		13:05 (3)	06:58	06:14	06:22	05:41	05:26	05:39	06:10	06:42	07:15	06:52			07:23		12:39 (3)
	16:56	47	13:52 (3)	17:35	18:09	19:43	20:16	20:40	20:36	20:03	19:12	18:20	16:41			16:31	68	13:47 (3)
17	07:27		13:07 (3)	06:57	06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16	06:53			07:24		12:39 (3)
	16:57	44	13:51 (3)	17:36	18:10	19:44	20:17	20:40	20:35	20:01	19:10	18:19	16:40			16:31	69	13:48 (3)
18	07:27		13:08 (3)	06:55	06:11	06:18	05:39	05:26	05:41	06:12	06:44	07:17	06:55			07:25		12:40 (3)
	16:58	41	13:49 (3)	17:37	18:11	19:46	20:18	20:40	20:35	20:00	19:08	18:17	16:39			16:32	69	13:49 (3)
19	07:26		13:11 (3)	06:54	06:09	06:17	05:38	05:26	05:42	06:13	06:45	07:18	06:56		13:02 (3)	07:25		12:40 (3)
	16:59	38	13:49 (3)	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16	16:38	8	13:10 (3)	16:32	69	13:49 (3)
20	07:26		13:14 (3)	06:52	06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57		12:56 (3)	07:26		12:41 (3)
	17:00	33	13:47 (3)	17:40	18:13	19:48	20:20	20:41	20:33	19:57	19:05	18:14	16:38	21	13:17 (3)	16:33	69	13:50 (3)
21	07:25		13:17 (3)	06:51	06:05	06:14	05:37	05:26	05:44	06:15	06:47	07:20	06:58		12:53 (3)	07:26		12:41 (3)
	17:02	27	13:44 (3)	17:41	18:14	19:49	20:21	20:41	20:33	19:55	19:03	18:13	16:37	27	13:20 (3)	16:33	69	13:50 (3)
22	07:24		13:21 (3)	06:50	06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:22	06:59		12:50 (3)	07:27		12:42 (3)
	17:03	21	13:42 (3)	17:42	18:15	19:50	20:22	20:41	20:32	19:54	19:01	18:11	16:36	33	13:23 (3)	16:33	69	13:51 (3)
23	07:24		13:28 (3)	06:48	06:02	06:11	05:35	05:26	05:46	06:17	06:49	07:23	07:01		12:47 (3)	07:28		12:42 (3)
	17:04	8	13:36 (3)	17:44	18:17	19:51	20:23	20:42	20:31	19:52	18:59	18:10	16:35	38	13:25 (3)	16:34	69	13:51 (3)
24	07:23			06:47	06:00	06:09	05:34	05:27	05:46	06:18	06:50	07:24	07:02		12:46 (3)	07:28		12:43 (3)
	17:05			17:45	18:18	19:52	20:24	20:42	20:30	19:50	18:58	18:08	16:35	41	13:27 (3)	16:35	69	13:52 (3)
25	07:22			06:45	05:59	06:08	05:34	05:27	05:47	06:19	06:51	06:25	07:03		12:45 (3)	07:28		12:43 (3)
	17:07			17:46	18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07	16:34	44	13:29 (3)	16:35	69	13:52 (3)
26	07:22			06:43	05:57	06:06	05:33	05:27	05:48	06:20	06:53	06:26	07:04		12:43 (3)	07:29		12:43 (3)
	17:08			17:47	18:20	19:54	20:26	20:42	20:28	19:47	18:54	17:05	16:34	47	13:30 (3)	16:36	69	13:52 (3)
27	07:21			06:42	05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:28	07:05		12:42 (3)	07:29		12:45 (3)
	17:09			17:49	18:21	19:56	20:26	20:42	20:27	19:46	18:52	17:04	16:33	49	13:31 (3)	16:36	68	13:53 (3)
28	07:20			06:40	05:53	06:03	05:31	05:28	05:50	06:22	06:55	06:29	07:06		12:41 (3)	07:29		12:45 (3)
	17:10			17:50	18:22	19:57	20:27	20:42	20:26	19:44	18:51	17:03	16:33	51	13:32 (3)	16:37	68	13:53 (3)
29	07:19				06:52	06:02	05:31	05:28	05:51	06:23	06:56	06:30	07:08		12:41 (3)	07:30		12:45 (3)
	17:12				19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01	16:32	53	13:34 (3)	16:38	68	13:53 (3)
30	07:18				06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:09		12:40 (3)	07:30		12:46 (3)
	17:13				19:24	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	55	13:35 (3)	16:39	67	13:53 (3)
31	07:17				06:48		05:30		05:53	06:25		06:32				07:30		12:47 (3)
	17:14				19:26		20:30		20:23	19:39		16:58				16:39	67	13:54 (3)
Potential sun hours	294			296	369	400	451	456	462	430	375	344	295			284		
Total, worst case		1152												467			2049	

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

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

Project:
WON019_V3_definitivo

Licensed user:
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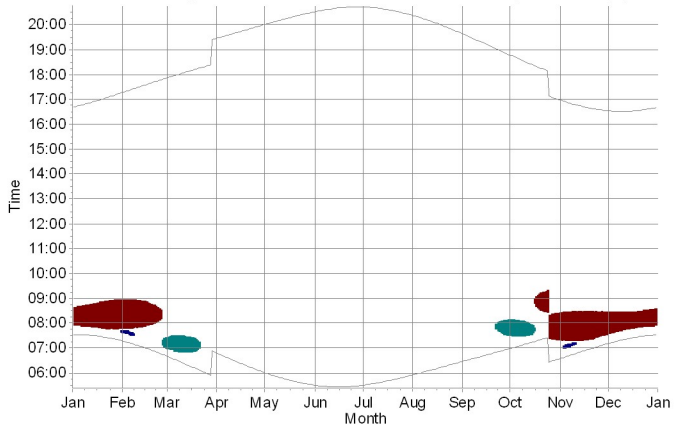
Calculated:
15/02/2024 21:59/3.6.377

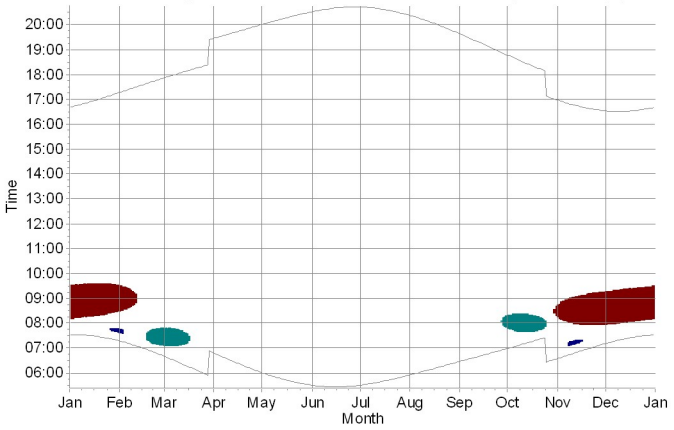
SHADOW - Calendar, graphical

Calculation: WON019_ShadowFlickering

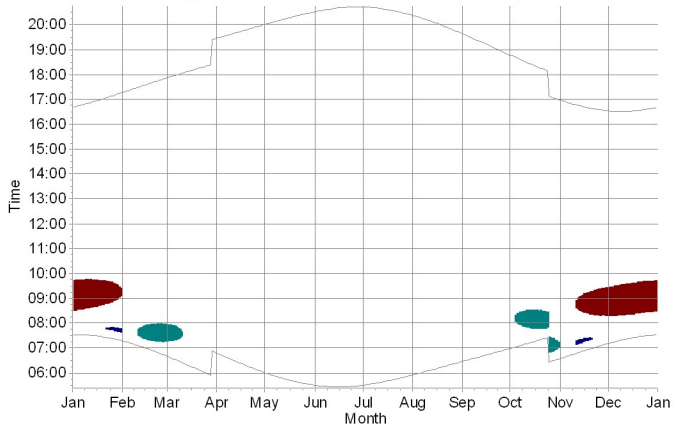
A: Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (1)



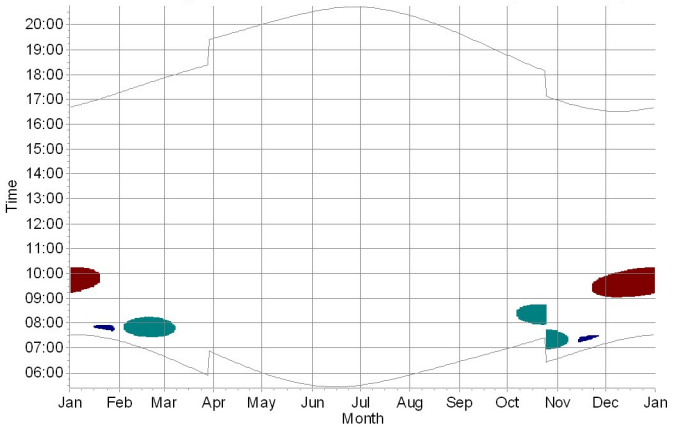
B: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (2)



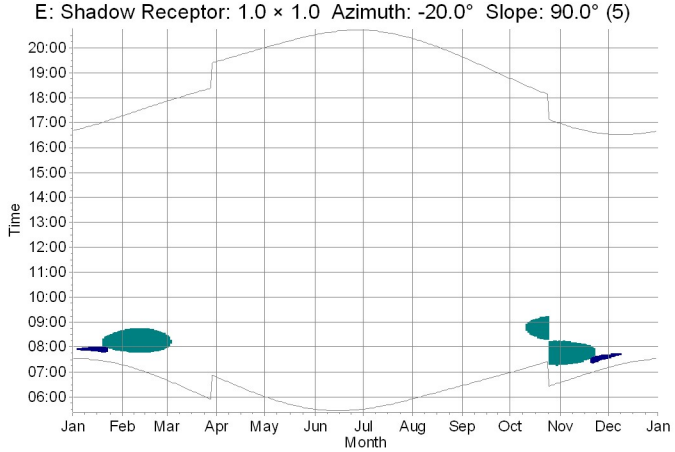
C: Shadow Receptor: 1.0 × 1.0 Azimuth: -40.0° Slope: 90.0° (3)



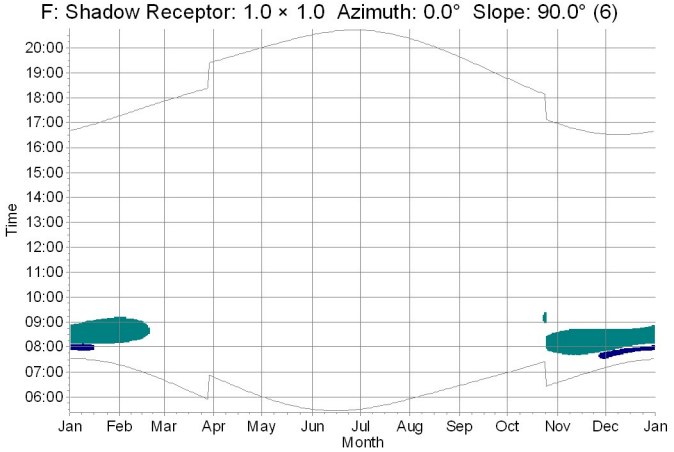
D: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (4)



E: Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (5)



F: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (6)



WTGs

6: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)

7: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)

8: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)

Project:
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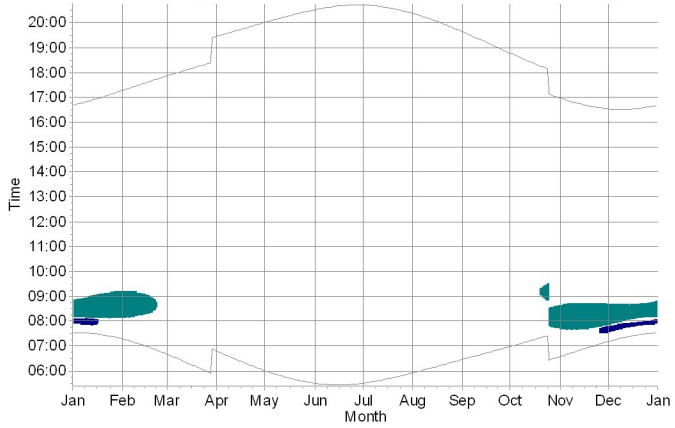
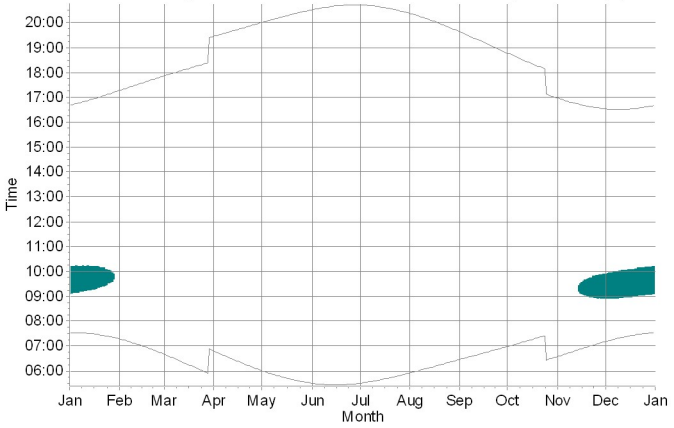
SHADOW - Calendar, graphical

Calculation: WON019_ShadowFlickering

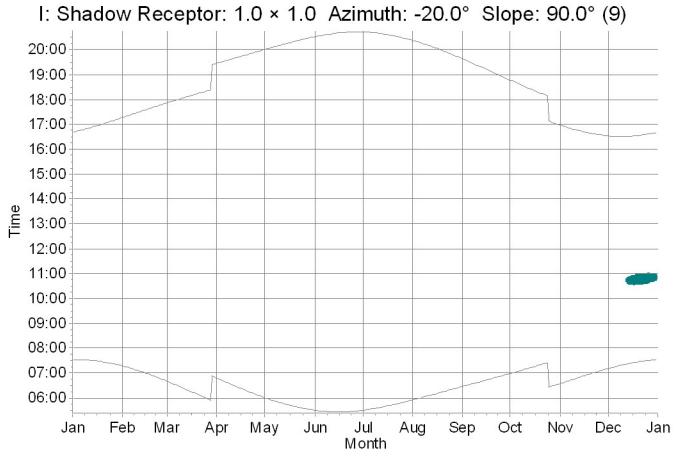
G: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (7)



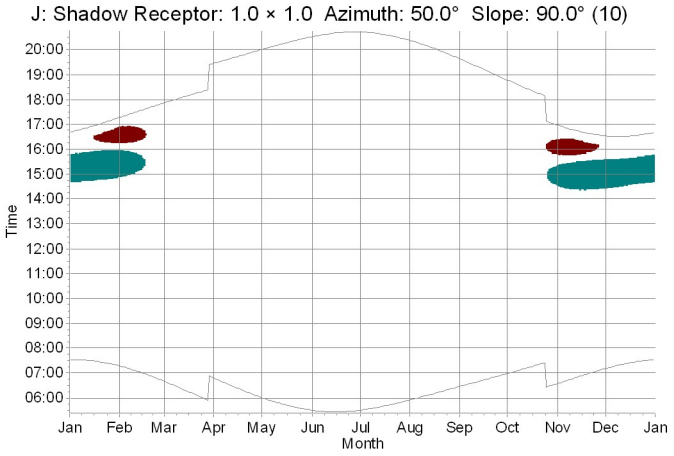
H: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (8)



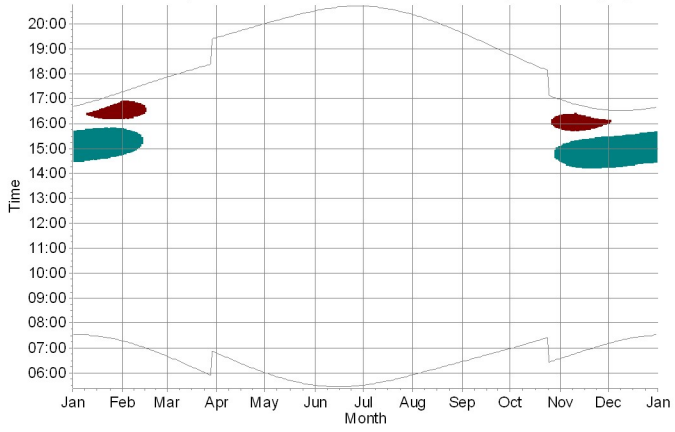
I: Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (9)



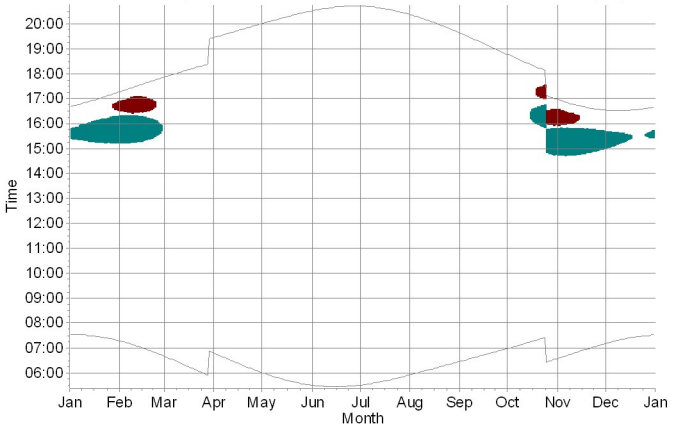
J: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (10)



K: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (11)



L: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (12)



WTGs

6: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)

7: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)

8: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)

Project:
WON019_V3_definitivo

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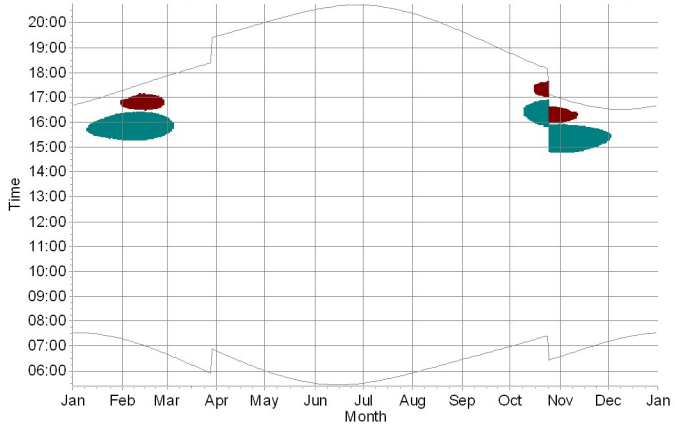
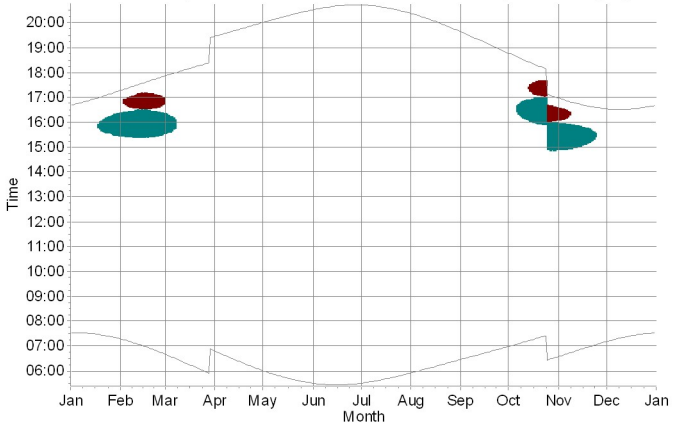
SHADOW - Calendar, graphical

Calculation: WON019_ShadowFlickering

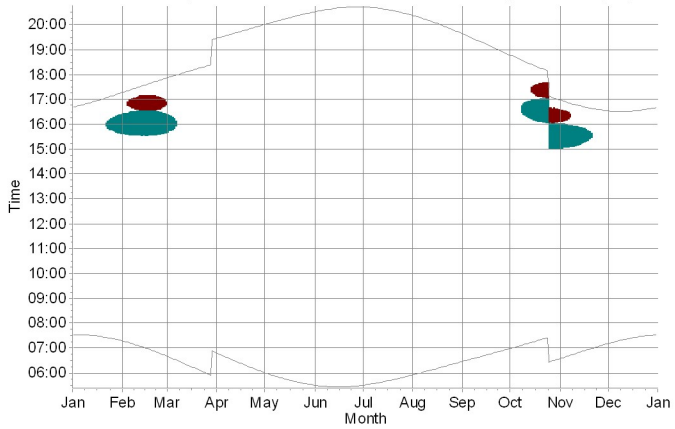
M: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (13)



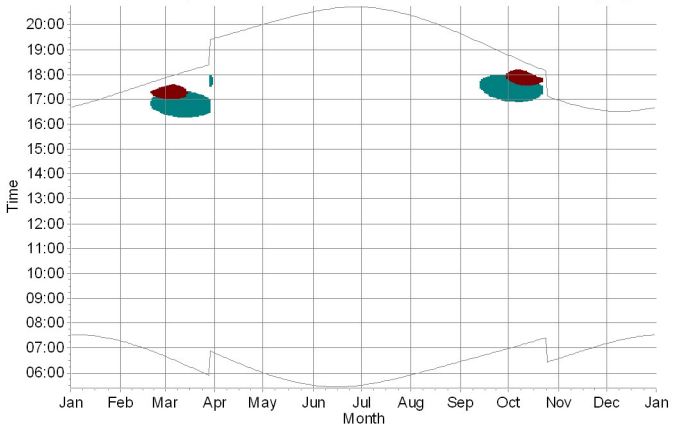
N: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (14)



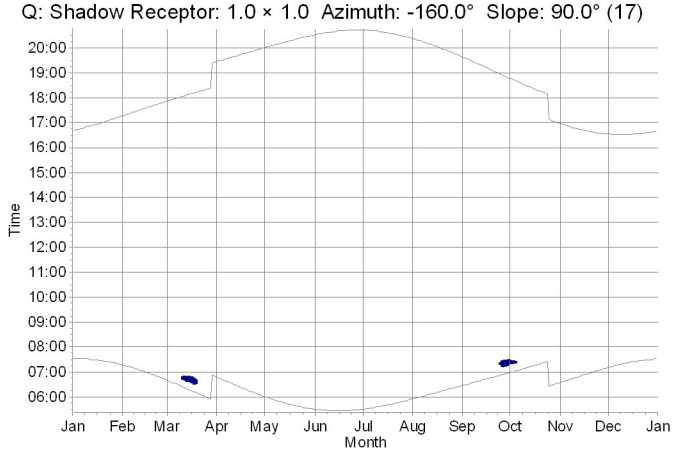
O: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (15)



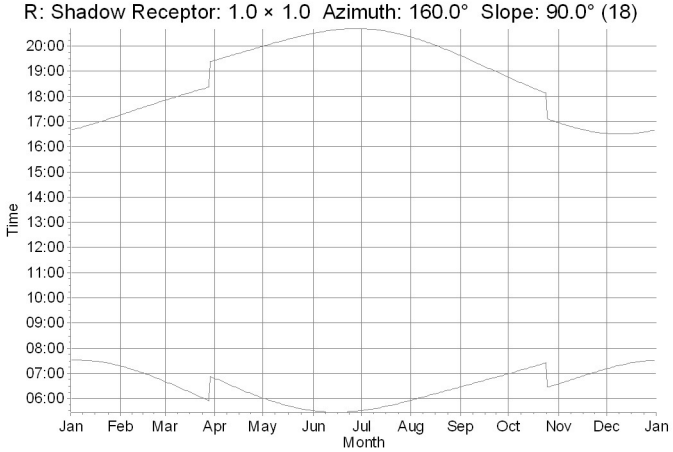
P: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (16)



Q: Shadow Receptor: 1.0 × 1.0 Azimuth: -160.0° Slope: 90.0° (17)



R: Shadow Receptor: 1.0 × 1.0 Azimuth: 160.0° Slope: 90.0° (18)



WTGs

6: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)

7: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)

8: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)

Project:
WON019_V3_definitivo

Licensed user:
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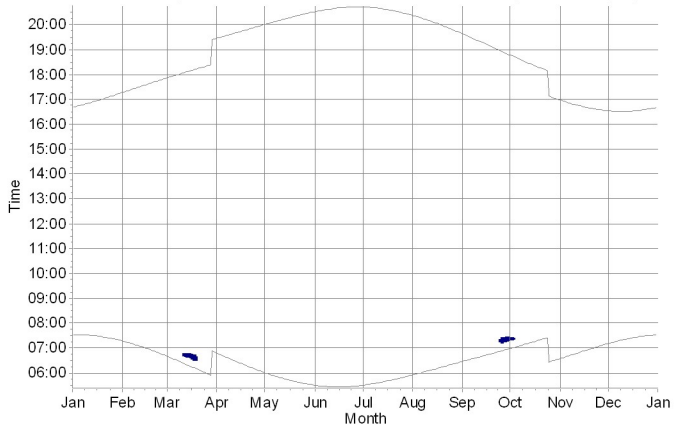
Calculated:
15/02/2024 21:59/3.6.377

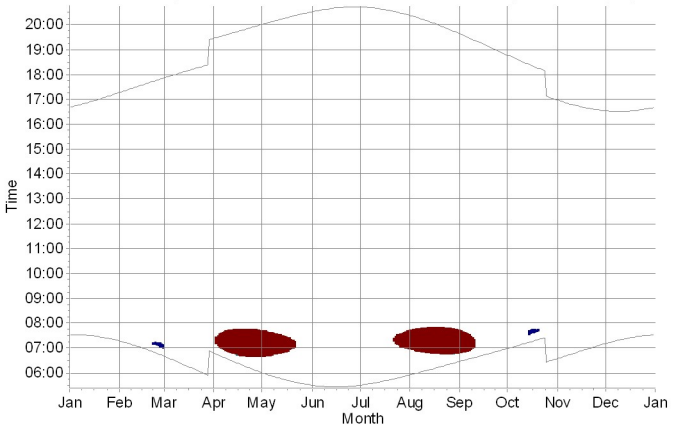
SHADOW - Calendar, graphical

Calculation: WON019_ShadowFlickering

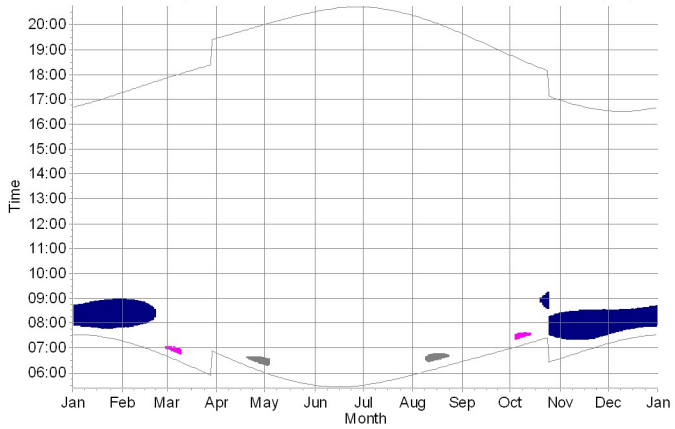
S: Shadow Receptor: 1.0 × 1.0 Azimuth: -150.0° Slope: 90.0° (19)



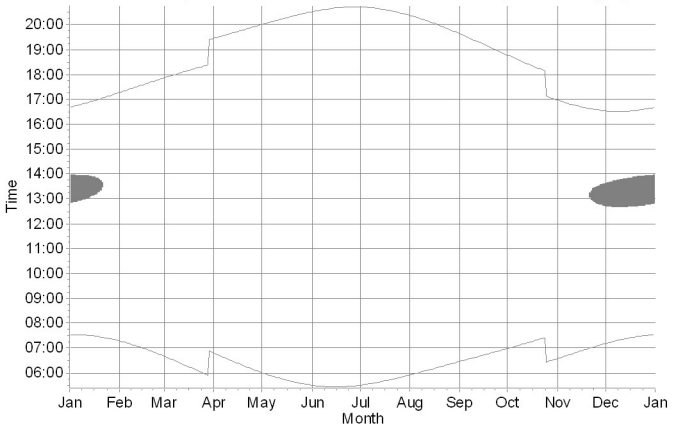
T: Shadow Receptor: 1.0 × 1.0 Azimuth: -100.0° Slope: 90.0° (20)



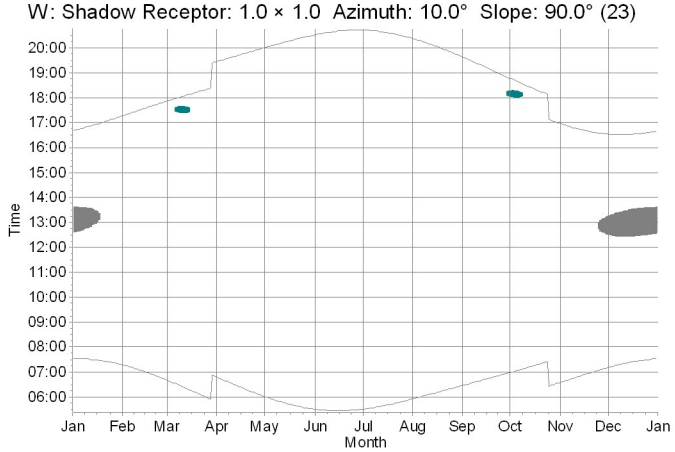
U: Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (21)



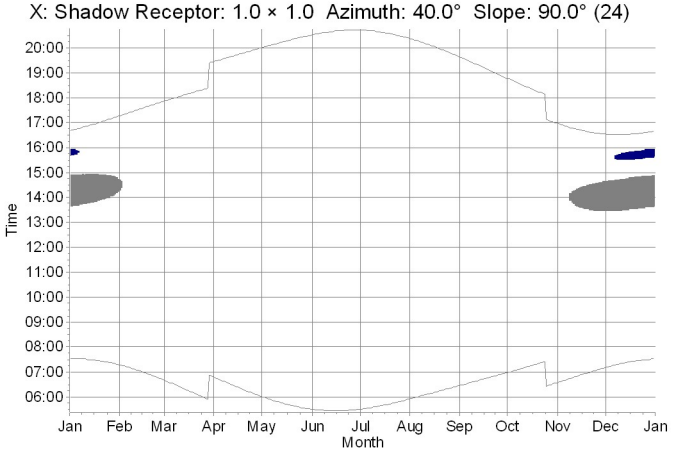
V: Shadow Receptor: 1.0 × 1.0 Azimuth: 30.0° Slope: 90.0° (22)



W: Shadow Receptor: 1.0 × 1.0 Azimuth: 10.0° Slope: 90.0° (23)



X: Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (24)



WTGs

- 4: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (4)
- 5: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (5)
- 6: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)
- 7: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)
- 8: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)

Project:
WON019_V3_definitivo

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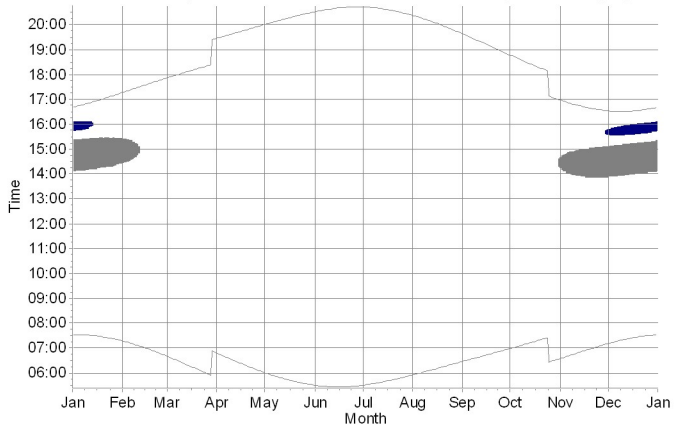
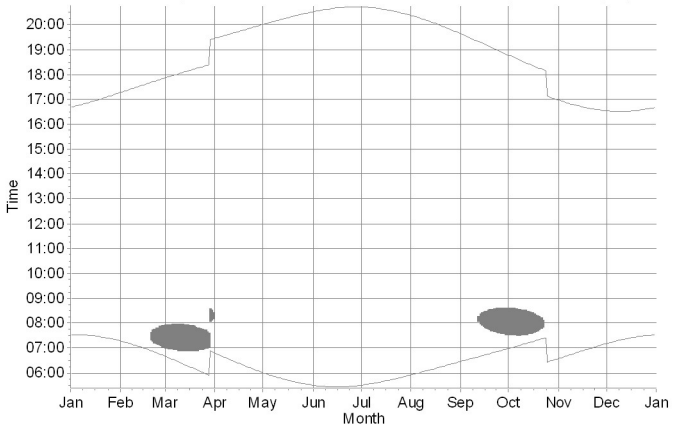
SHADOW - Calendar, graphical

Calculation: WON019_ShadowFlickering

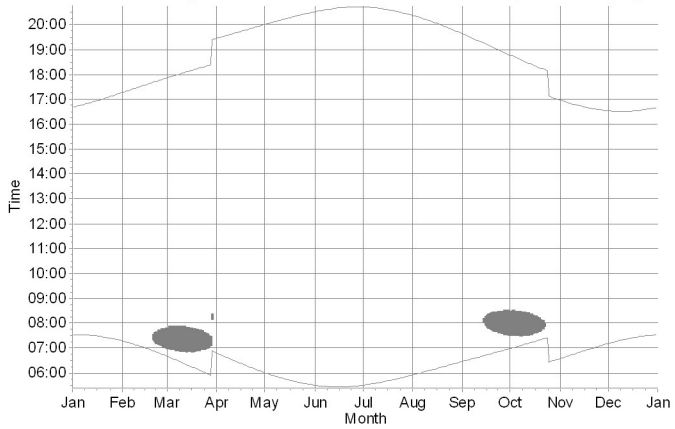
Y: Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (25)



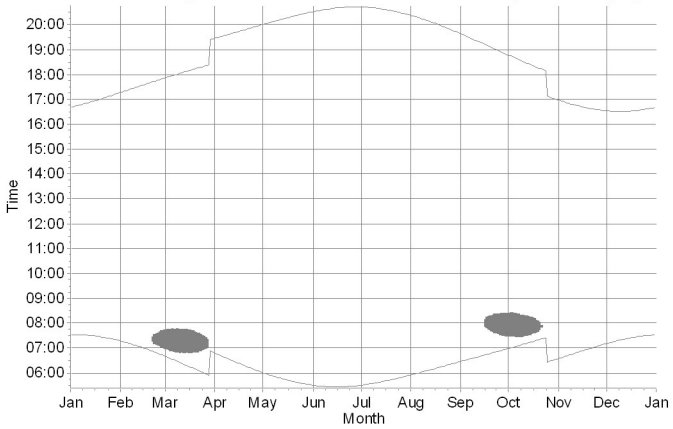
Z: Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (26)



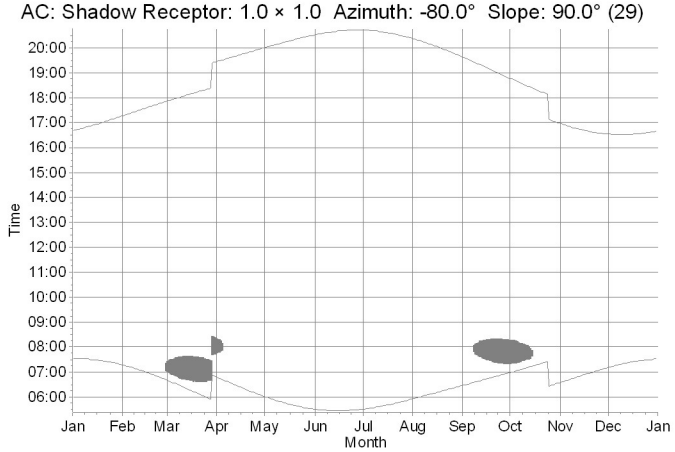
AA: Shadow Receptor: 1.0 × 1.0 Azimuth: -70.0° Slope: 90.0° (27)



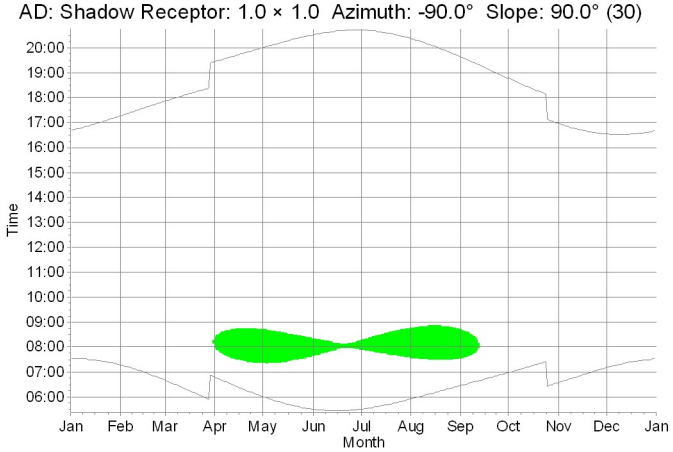
AB: Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (28)



AC: Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (29)



AD: Shadow Receptor: 1.0 × 1.0 Azimuth: -90.0° Slope: 90.0° (30)



WTGs

4: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (4)

7: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)

9: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (9)

Project:
WON019_V3_definitivo

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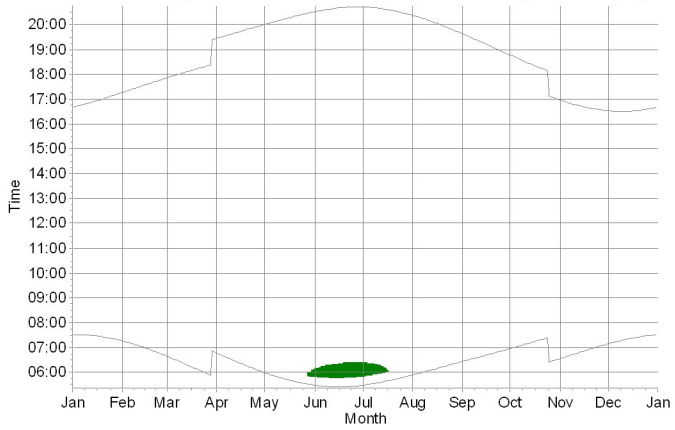
Calculated:
15/02/2024 21:59/3.6.377

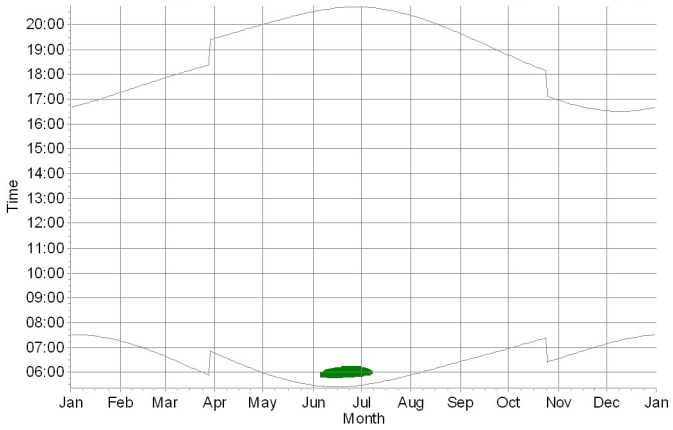
SHADOW - Calendar, graphical

Calculation: WON019_ShadowFlickering

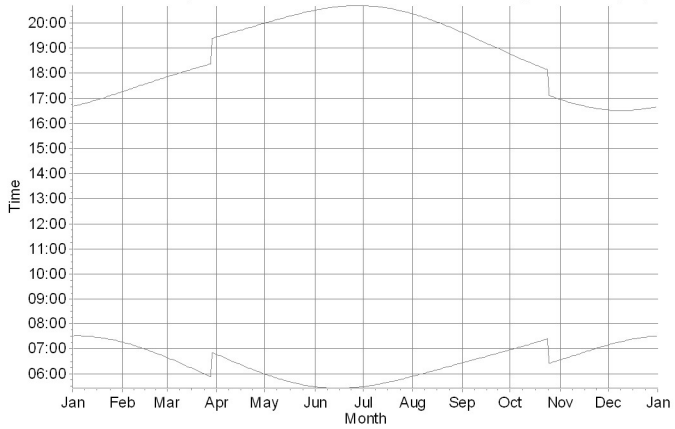
AE: Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (31)



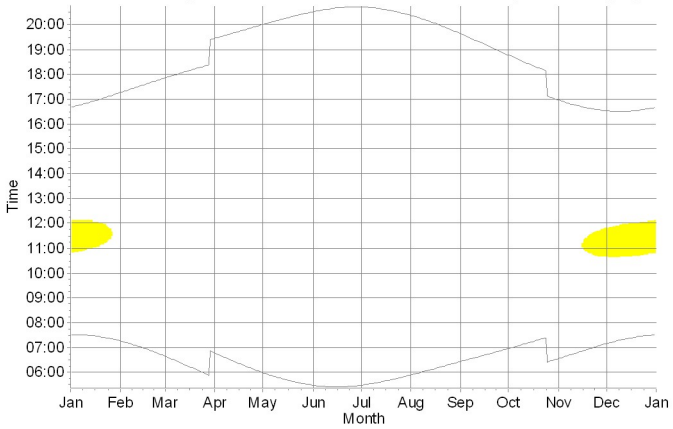
AF: Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (32)



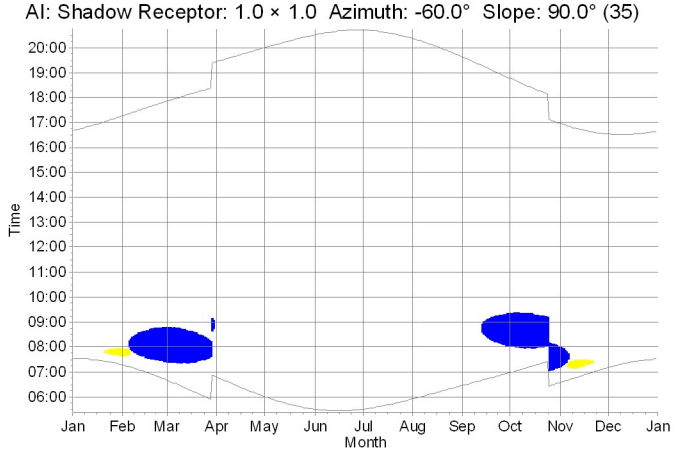
AG: Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (33)



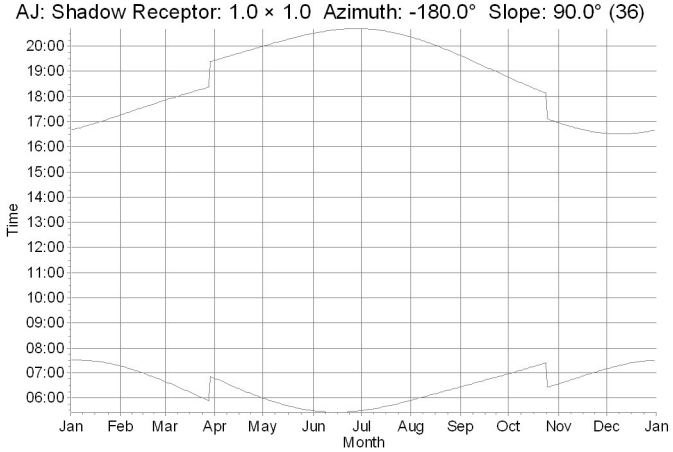
AH: Shadow Receptor: 1.0 × 1.0 Azimuth: -10.0° Slope: 90.0° (34)



AI: Shadow Receptor: 1.0 × 1.0 Azimuth: -60.0° Slope: 90.0° (35)



AJ: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (36)



WTGs

1: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (1)

2: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (2)

3: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (3)

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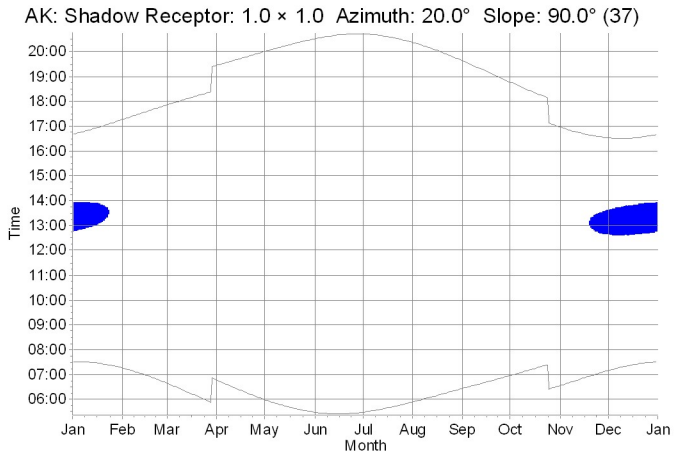
SHADOW - Calendar, graphical

Calculation: WON019_ShadowFlickering



WTGs

3: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (3)

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 1 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (1)

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	07:30	07:16	06:39	06:46	05:59	05:29 05:51-06:08/17	05:29 05:52-06:21/29	05:54	06:26	06:58	06:33	07:09
	16:40	17:15	17:51	19:26	20:00	20:30	20:42	20:22	19:37	18:45	16:57	16:32
2	07:30	07:15	06:37	06:45	05:58	05:29 05:51-06:09/18	05:30 05:53-06:22/29	05:55	06:27	06:59	06:35	07:11
	16:41	17:17	17:52	19:28	20:01	20:31	20:41	20:21	19:36	18:43	16:56	16:31
3	07:30	07:14	06:35	06:43	05:56	05:28 05:50-06:10/20	05:30 05:54-06:22/28	05:56	06:28	07:00	06:36	07:12
	16:42	17:18	17:53	19:29	20:02	20:32	20:41	20:19	19:34	18:42	16:55	16:31
4	07:30	07:13	06:34	06:41	05:55	05:28 05:50-06:12/22	05:31 05:54-06:21/27	05:57	06:29	07:01	06:37	07:13
	16:43	17:19	17:54	19:30	20:03	20:33	20:41	20:18	19:32	18:40	16:53	16:31
5	07:30	07:12	06:32	06:40	05:54	05:27 05:50-06:13/23	05:32 05:55-06:21/26	05:58	06:30	07:02	06:38	07:14
	16:44	17:21	17:56	19:31	20:04	20:33	20:41	20:17	19:30	18:38	16:52	16:31
6	07:30	07:11	06:31	06:38	05:53	05:27 05:49-06:13/24	05:32 05:55-06:20/25	05:59	06:31	07:03	06:40	07:15
	16:45	17:22	17:57	19:32	20:05	20:34	20:41	20:16	19:29	18:37	16:51	16:30
7	07:30	07:09	06:29	06:36	05:51	05:27 05:49-06:14/25	05:33 05:56-06:20/24	06:00	06:33	07:04	06:41	07:16
	16:46	17:23	17:58	19:33	20:06	20:35	20:40	20:15	19:27	18:35	16:50	16:30
8	07:30	07:08	06:27	06:35	05:50	05:26 05:49-06:16/27	05:33 05:57-06:19/22	06:01	06:34	07:05	06:42	07:17
	16:47	17:25	17:59	19:34	20:07	20:35	20:40	20:13	19:25	18:33	16:49	16:30
9	07:30	07:07	06:26	06:33	05:49	05:26 05:49-06:16/27	05:34 05:57-06:18/21	06:02	06:35	07:06	06:43	07:17
	16:48	17:26	18:00	19:35	20:08	20:36	20:40	20:12	19:24	18:32	16:48	16:30
10	07:30	07:06	06:24	06:31	05:48	05:26 05:48-06:16/28	05:35 05:58-06:17/19	06:03	06:36	07:08	06:45	07:18
	16:49	17:27	18:02	19:36	20:10	20:37	20:39	20:11	19:22	18:30	16:46	16:30
11	07:29	07:05	06:22	06:30	05:47	05:26 05:48-06:17/29	05:35 05:59-06:16/17	06:04	06:37	07:09	06:46	07:19
	16:50	17:28	18:03	19:38	20:11	20:37	20:39	20:09	19:20	18:28	16:45	16:30
12	07:29	07:03	06:21	06:28	05:45	05:26 05:48-06:18/30	05:36 05:59-06:14/15	06:05	06:38	07:10	06:47	07:20
	16:51	17:30	18:04	19:39	20:12	20:38	20:38	20:08	19:18	18:27	16:44	16:30
13	07:29	07:02	06:19	06:26	05:44	05:26 05:48-06:18/30	05:37 06:00-06:13/13	06:06	06:39	07:11	06:48	07:21
	16:52	17:31	18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:43	16:30
14	07:29	07:01	06:17	06:25	05:43	05:25 05:48-06:19/31	05:38 06:01-06:12/11	06:07	06:40	07:12	06:49	07:22
	16:53	17:32	18:06	19:41	20:14	20:39	20:37	20:05	19:15	18:23	16:42	16:31
15	07:28	06:59	06:16	06:23	05:42	05:25 05:48-06:19/31	05:39 06:02-06:09/7	06:09	06:41	07:13	06:51	07:22
	16:54	17:34	18:07	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42	16:31
16	07:28	06:58	06:14	06:21	05:41	05:25 05:48-06:20/32	05:39 06:02-06:04/2	06:10	06:42	07:14	06:52	07:23
	16:56	17:35	18:08	19:43	20:16	20:39	20:36	20:02	19:11	18:20	16:41	16:31
17	07:27	06:57	06:12	06:20	05:40	05:25 05:48-06:20/32	05:40	06:11	06:43	07:16	06:53	07:24
	16:57	17:36	18:10	19:44	20:17	20:40	20:35	20:01	19:10	18:19	16:40	16:31
18	07:27	06:55	06:10	06:18	05:39	05:26 05:48-06:20/32	05:41	06:12	06:44	07:17	06:54	07:24
	16:58	17:37	18:11	19:45	20:18	20:40	20:35	19:59	19:08	18:17	16:39	16:32
19	07:26	06:54	06:09	06:17	05:38	05:26 05:49-06:22/33	05:42	06:13	06:45	07:18	06:56	07:25
	16:59	17:39	18:12	19:46	20:19	20:40	20:34	19:58	19:06	18:16	16:38	16:32
20	07:26	06:52	06:07	06:15	05:37	05:26 05:49-06:22/33	05:43	06:14	06:46	07:19	06:57	07:26
	17:00	17:40	18:13	19:48	20:20	20:41	20:33	19:56	19:04	18:14	16:37	16:32
21	07:25	06:51	06:05	06:14	05:37	05:26 05:49-06:22/33	05:44	06:15	06:47	07:20	06:58	07:26
	17:02	17:41	18:14	19:49	20:21	20:41	20:32	19:55	19:03	18:12	16:37	16:33
22	07:24	06:49	06:04	06:12	05:36	05:26 05:49-06:22/33	05:45	06:16	06:48	07:21	06:59	07:27
	17:03	17:42	18:15	19:50	20:22	20:41	20:31	19:53	19:01	18:11	16:36	16:33
23	07:24	06:48	06:02	06:11	05:35	05:26 05:49-06:22/33	05:45	06:17	06:49	07:23	07:00	07:27
	17:04	17:44	18:16	19:51	20:23	20:41	20:31	19:52	18:59	18:10	16:35	16:34
24	07:23	06:46	06:00	06:09	05:34	05:27 05:50-06:22/32	05:46	06:18	06:50	07:24	07:02	07:28
	17:05	17:45	18:18	19:52	20:24	20:41	20:30	19:50	18:57	18:08	16:35	16:34
25	07:22	06:45	05:58	06:08	05:33	05:27 05:50-06:22/32	05:47	06:19	06:51	06:25	07:03	07:28
	17:07	17:46	18:19	19:53	20:24	20:42	20:29	19:49	18:56	17:07	16:34	16:35
26	07:21	06:43	05:57	06:06	05:33	05:27 05:50-06:22/32	05:48	06:20	06:52	06:26	07:04	07:29
	17:08	17:47	18:20	19:54	20:25	20:42	20:28	19:47	18:54	17:05	16:34	16:36
27	07:20	06:42	05:55	06:05	05:32	05:28 05:51-06:23/32	05:49	06:21	06:53	06:27	07:05	07:29
	17:09	17:48	18:21	19:55	20:26	20:42	20:27	19:45	18:52	17:04	16:33	16:36
28	07:20	06:40	05:53	06:03	05:31 05:53-05:58/5	05:28 05:51-06:22/31	05:50	06:22	06:55	06:29	07:06	07:29
	17:10	17:50	18:22	19:56	20:27	20:42	20:26	19:44	18:50	17:02	16:33	16:37
29	07:19		06:51	06:02	05:31 05:52-06:01/9	05:28 05:52-06:23/31	05:51	06:23	06:56	06:30	07:07	07:29
	17:12		19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01	16:32	16:38
30	07:18		06:50	06:00	05:30 05:52-06:04/12	05:29 05:52-06:22/30	05:52	06:24	06:57	06:31	07:08	07:30
	17:13		19:24	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	16:38
31	07:17		06:48		05:30 05:51-06:05/14		05:53	06:25		06:32		07:30
	17:14		19:25		20:30		20:23	19:39		16:58		16:39
Potential sun hours	295	296	369	400	451	456	462	430	375	344	296	285
Sum of minutes with flicker	0	0	0	0	40	863	315	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: WON019_ShadowFlickering WTG: 2 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (2)

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	07:30 10:50-12:05/75	07:16 07:38-07:55/17	06:39	06:46	05:59	05:29	05:29	05:54	06:26	06:58	06:34	07:10 10:41-11:47/66
	16:40	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:37	18:45	16:57	16:32
2	07:30 10:51-12:05/74	07:15 07:37-07:53/16	06:37	06:45	05:58	05:29	05:30	05:55	06:27	06:59	06:35	07:11 10:40-11:48/68
	16:41	17:17	17:52	19:28	20:01	20:31	20:42	20:21	19:36	18:44	16:56	16:31
3	07:30 10:52-12:05/73	07:14 07:39-07:53/14	06:36	06:43	05:57	05:28	05:30	05:56	06:28	07:00	06:36	07:12 10:40-11:49/69
	16:42	17:18	17:53	19:29	20:02	20:32	20:41	20:20	19:34	18:42	16:55	16:31
4	07:31 10:52-12:05/73	07:13 07:40-07:52/12	06:34	06:41	05:55	05:28	05:31	05:57	06:29	07:01	06:37	07:13 10:40-11:50/70
	16:43	17:19	17:55	19:30	20:03	20:33	20:41	20:18	19:32	18:40	16:53	16:31
5	07:30 10:53-12:06/73	07:12 07:42-07:50/8	06:32	06:40	05:54	05:27	05:32	05:58	06:31	07:02	06:38	07:14 10:40-11:51/71
	16:44	17:21	17:56	19:31	20:04	20:33	20:41	20:17	19:31	18:38	16:52	16:31
6	07:30 10:54-12:06/72	07:11	06:31	06:38	05:53	05:27	05:32	05:59	06:32	07:03	06:40 07:12-07:20/8	07:15 10:40-11:52/72
	16:45	17:22	17:57	19:32	20:05	20:34	20:41	20:16	19:29	18:37	16:51	16:30
7	07:30 10:55-12:06/71	07:09	06:29	06:36	05:51	05:27	05:33	06:00	06:33	07:04	06:41 07:11-07:23/12	07:16 10:40-11:53/73
	16:46	17:23	17:58	19:33	20:06	20:35	20:40	20:15	19:27	18:35	16:50	16:30
8	07:30 10:56-12:06/70	07:08	06:27	06:35	05:50	05:26	05:33	06:01	06:34	07:05	06:42 07:09-07:24/15	07:17 10:40-11:53/73
	16:47	17:25	17:59	19:34	20:08	20:35	20:40	20:13	19:25	18:33	16:49	16:30
9	07:30 10:56-12:05/69	07:07	06:26	06:33	05:49	05:26	05:34	06:02	06:35	07:07	06:43 07:08-07:24/16	07:18 10:41-11:54/73
	16:48	17:26	18:00	19:35	20:09	20:36	20:40	20:12	19:24	18:32	16:48	16:30
10	07:30 10:57-12:05/68	07:06	06:24	06:31	05:48	05:26	05:35	06:03	06:36	07:08	06:45 07:08-07:26/18	07:18 10:41-11:55/74
	16:49	17:27	18:02	19:37	20:10	20:37	20:39	20:11	19:22	18:30	16:47	16:30
11	07:30 10:59-12:05/66	07:05	06:22	06:30	05:47	05:26	05:36	06:04	06:37	07:09	06:46 07:09-07:26/17	07:19 10:41-11:56/75
	16:50	17:28	18:03	19:38	20:11	20:37	20:39	20:09	19:20	18:28	16:45	16:30
12	07:29 10:59-12:05/66	07:03	06:21	06:28	05:46	05:26	05:36	06:05	06:38	07:10	06:47 07:10-07:26/16	07:20 10:41-11:56/75
	16:51	17:30	18:04	19:39	20:12	20:38	20:38	20:08	19:19	18:27	16:44	16:30
13	07:29 11:00-12:05/65	07:02	06:19	06:26	05:44	05:26	05:37	06:07	06:39	07:11	06:48 07:12-07:27/15	07:21 10:41-11:56/75
	16:52	17:31	18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:43	16:30
14	07:29 11:02-12:05/63	07:01	06:17	06:25	05:43	05:26	05:38	06:08	06:40	07:12	06:50 07:13-07:27/14	07:22 10:42-11:57/75
	16:53	17:32	18:06	19:41	20:14	20:39	20:37	20:05	19:15	18:24	16:43	16:31
15	07:28 11:03-12:03/60	06:59	06:16	06:23	05:42	05:26	05:39	06:09	06:41	07:13	06:51 07:14-07:26/12	07:23 10:42-11:58/76
	16:55	17:34	18:07	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42	16:31
16	07:28 11:03-12:02/59	06:58	06:14	06:21	05:41	05:26	05:39	06:10	06:42	07:14	06:52 07:15-07:26/11	07:23 10:42-11:58/76
	16:56	17:35	18:09	19:43	20:16	20:40	20:36	20:02	19:12	18:20	16:41 11:04-11:11/7	16:31
17	07:27 11:05-12:02/57	06:57	06:12	06:20	05:40	05:26	05:40	06:11	06:43	07:16	06:53 07:17-07:26/9	07:24 10:43-11:59/76
	16:57	17:36	18:10	19:44	20:17	20:40	20:35	20:01	19:10	18:19	16:40 10:57-11:20/23	16:31
18	07:27 11:06-12:01/55	06:55	06:11	06:18	05:39	05:26	05:41	06:12	06:44	07:17	06:55 07:18-07:26/8	07:25 10:43-12:00/77
	16:58	17:37	18:11	19:45	20:18	20:40	20:35	19:59	19:08	18:17	16:39 10:54-11:24/30	16:32
19	07:26 11:08-12:00/52	06:54	06:09	06:17	05:38	05:26	05:42	06:13	06:45	07:18	06:56 07:19-07:25/6	07:25 10:43-12:00/77
	16:59	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16	16:38 10:51-11:27/36	16:32
20	07:26 11:10-11:59/49	06:52	06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57 07:21-07:25/4	07:26 10:44-12:01/77
	17:00	17:40	18:13	19:48	20:20	20:41	20:33	19:56	19:04	18:14	16:38 10:49-11:31/42	16:32
21	07:25 07:46-07:48/2	06:51	06:05	06:14	05:37	05:26	05:44	06:15	06:47	07:20	06:58 07:22-07:24/2	07:26 10:44-12:01/77
	17:02 11:11-11:57/46	17:41	18:14	19:49	20:21	20:41	20:32	19:55	19:03	18:13	16:37 10:48-11:33/45	16:33
22	07:24 07:46-07:50/4	06:49	06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:21	06:59 10:46-11:35/49	07:27 10:45-12:02/77
	17:03 11:14-11:56/42	17:42	18:15	19:50	20:22	20:41	20:32	19:53	19:01	18:11	16:36	16:33
23	07:24 07:45-07:51/6	06:48	06:02	06:11	05:35	05:26	05:45	06:17	06:49	07:23	07:01 10:45-11:36/51	07:27 10:45-12:02/77
	17:04 11:17-11:53/36	17:44	18:17	19:51	20:23	20:41	20:31	19:52	18:59	18:10	16:35	16:34
24	07:23 07:44-07:52/8	06:46	06:00	06:09	05:34	05:27	05:46	06:18	06:50	07:24	07:02 10:44-11:39/55	07:28 10:46-12:03/77
	17:05 11:20-11:50/30	17:45	18:18	19:52	20:24	20:42	20:30	19:50	18:57	18:08	16:35	16:34
25	07:22 07:43-07:52/9	06:45	05:58	06:08	05:33	05:27	05:47	06:19	06:51	06:25	07:03 10:43-11:40/57	07:28 10:46-12:03/77
	17:07 11:24-11:46/22	17:46	18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07	16:34	16:35
26	07:21 07:42-07:53/11	06:43	05:57	06:06	05:33	05:27	05:48	06:20	06:52	06:26	07:04 10:42-11:41/59	07:29 10:47-12:03/76
	17:08 11:31-11:38/7	17:47	18:20	19:54	20:25	20:42	20:28	19:47	18:54	17:05	16:34	16:36
27	07:21 07:41-07:53/12	06:42	05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:27	07:05 10:42-11:42/60	07:29 10:48-12:04/76
	17:09	17:49	18:21	19:55	20:26	20:42	20:27	19:46	18:52	17:04	16:33	16:36
28	07:20 07:41-07:55/14	06:40	05:53	06:03	05:31	05:28	05:50	06:22	06:55	06:29	07:06 10:41-11:44/63	07:29 10:48-12:04/76
	17:10	17:50	18:22	19:57	20:27	20:42	20:26	19:44	18:50	17:02	16:33	16:37
29	07:19 07:40-07:55/15		06:52	06:02	05:31	05:28	05:51	06:23	06:56	06:30	07:07 10:41-11:46/65	07:30 10:49-12:04/75
	17:12		19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01	16:32	16:38
30	07:18 07:39-07:55/16		06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:09 10:41-11:47/66	07:30 10:49-12:04/75
	17:13		19:24	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	16:39
31	07:17 07:38-07:55/17		06:48		05:30		05:53	06:25		06:32		07:30 10:49-12:05/76
	17:14		19:25		20:30		20:23	19:39		16:58		16:39
Potential sun hours	294	296	369	400	451	456	462	430	375	344	296	285
Sum of minutes with flicker	1607	67	0	0	0	0	0	0	0	0	891	2307

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

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

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15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 3 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (3)

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	07:30 12:47-13:54/67 16:40	07:16 17:16	06:39 07:24-08:45/81 17:51	06:46 19:27	05:59 20:00	05:29 20:31
2	07:30 12:48-13:54/66 16:41	07:15 17:17	06:37 07:24-08:45/81 17:52	06:45 19:28	05:58 20:01	05:29 20:31
3	07:31 12:49-13:54/65 16:42	07:14 17:18	06:36 07:23-08:45/82 17:53	06:43 19:29	05:57 20:02	05:28 20:32
4	07:31 12:50-13:54/64 16:43	07:13 17:19	06:34 07:23-08:44/81 17:55	06:41 19:30	05:55 20:03	05:28 20:33
5	07:31 12:51-13:55/64 16:44	07:12 07:59-08:12/13 17:21	06:32 07:23-08:45/82 17:56	06:40 19:31	05:54 20:04	05:27 20:34
6	07:31 12:52-13:55/63 16:45	07:11 07:54-08:18/24 17:22	06:31 07:23-08:44/81 17:57	06:38 19:32	05:53 20:05	05:27 20:34
7	07:30 12:53-13:55/62 16:46	07:10 07:50-08:22/32 17:23	06:29 07:22-08:43/81 17:58	06:36 19:33	05:51 20:07	05:27 20:35
8	07:30 12:54-13:55/61 16:47	07:08 07:47-08:24/37 17:25	06:27 07:23-08:43/80 17:59	06:35 19:34	05:50 20:08	05:27 20:36
9	07:30 12:55-13:54/59 16:48	07:07 07:45-08:27/42 17:26	06:26 07:22-08:42/80 18:01	06:33 19:36	05:49 20:09	05:26 20:36
10	07:30 12:56-13:54/58 16:49	07:06 07:43-08:29/46 17:27	06:24 07:22-08:41/79 18:02	06:31 19:37	05:48 20:10	05:26 20:37
11	07:30 12:58-13:54/56 16:50	07:05 07:42-08:32/50 17:29	06:22 07:23-08:41/78 18:03	06:30 19:38	05:47 20:11	05:26 20:37
12	07:29 12:58-13:53/55 16:51	07:03 07:39-08:33/54 17:30	06:21 07:23-08:40/77 18:04	06:28 19:39	05:46 20:12	05:26 20:38
13	07:29 13:00-13:53/53 16:52	07:02 07:38-08:35/57 17:31	06:19 07:22-08:39/77 18:05	06:26 19:40	05:45 20:13	05:26 20:38
14	07:29 13:02-13:53/51 16:53	07:01 07:37-08:36/59 17:32	06:17 07:22-08:37/75 18:06	06:25 19:41	05:43 20:14	05:26 20:39
15	07:28 13:03-13:52/49 16:55	06:59 07:35-08:37/62 17:34	06:16 07:23-08:37/74 18:08	06:23 19:42	05:42 20:15	05:26 20:39
16	07:28 13:05-13:52/47 16:56	06:58 07:34-08:38/64 17:35	06:14 07:23-08:36/73 18:09	06:22 19:43	05:41 20:16	05:26 20:40
17	07:27 13:07-13:51/44 16:57	06:57 07:33-08:39/66 17:36	06:12 07:24-08:34/70 18:10	06:20 19:44	05:40 20:17	05:26 20:40
18	07:27 13:08-13:49/41 16:58	06:55 07:32-08:40/68 17:37	06:11 07:24-08:32/68 18:11	06:18 19:46	05:39 20:18	05:26 20:40
19	07:26 13:11-13:49/38 16:59	06:54 07:31-08:42/71 17:39	06:09 07:25-08:32/67 18:12	06:17 19:47	05:39 20:19	05:26 20:41
20	07:26 13:14-13:47/33 17:00	06:52 07:30-08:42/72 17:40	06:07 07:26-08:30/64 18:13	06:15 19:48	05:38 20:20	05:26 20:41
21	07:25 13:17-13:44/27 17:02	06:51 07:30-08:43/73 17:41	06:05 07:26-08:28/62 18:14	06:14 19:49	05:37 20:21	05:26 20:41
22	07:24 13:21-13:42/21 17:03	06:50 07:28-08:43/75 17:42	06:04 07:28-08:27/59 18:15	06:12 19:50	05:36 20:22	05:26 20:41
23	07:24 13:28-13:36/8 17:04	06:48 07:28-08:44/76 17:44	06:02 07:29-08:25/56 18:17	06:11 19:51	05:35 20:23	05:26 20:42
24	07:23 17:05	06:47 07:27-08:44/77 17:45	06:00 07:29-08:22/53 18:18	06:09 19:52	05:34 20:24	05:27 20:42
25	07:22 17:07	06:45 07:26-08:44/78 17:46	05:59 07:30-08:20/50 18:19	06:08 19:53	05:34 20:25	05:27 20:42
26	07:21 17:08	06:43 07:26-08:45/79 17:47	05:57 07:33-08:18/45 18:20	06:06 19:54	05:33 20:26	05:27 20:42
27	07:21 17:09	06:42 07:25-08:45/80 17:49	05:55 07:34-08:15/41 18:21	06:05 19:56	05:32 20:26	05:28 20:42
28	07:20 17:10	06:40 07:25-08:45/80 17:50	05:53 07:36-08:11/35 18:22	06:03 19:57	05:31 20:27	05:28 20:42
29	07:19 17:12		06:52 08:39-09:07/28 19:23	06:02 19:58	05:31 20:28	05:29 20:42
30	07:18 17:13		06:50 08:43-09:03/20 19:24	06:01 19:59	05:30 20:29	05:29 20:42
31	07:17 17:14		06:48 19:26		05:30 20:30	
Potential sun hours	294	296	369	400	451	456
Sum of minutes with flicker	1152	1435	1980	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:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 3 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (3)

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	05:29 20:42	05:54 20:22	06:26 19:37	06:58 08:01-09:18/77 18:45	06:34 07:13-07:59/46 16:57	07:10 12:40-13:36/56 16:32
2	05:30 20:42	05:55 20:21	06:27 19:36	06:59 08:01-09:19/78 18:44	06:35 07:15-07:56/41 16:56	07:11 12:39-13:37/58 16:31
3	05:30 20:41	05:56 20:20	06:29 19:34	07:00 08:01-09:20/79 18:42	06:36 07:17-07:54/37 16:55	07:12 12:39-13:38/59 16:31
4	05:31 20:41	05:57 20:18	06:30 19:32	07:01 08:00-09:20/80 18:40	06:37 07:21-07:51/30 16:53	07:13 12:38-13:39/61 16:31
5	05:32 20:41	05:58 20:17	06:31 19:31	07:02 07:59-09:20/81 18:39	06:39 07:24-07:47/23 16:52	07:14 12:38-13:40/62 16:31
6	05:32 20:41	05:59 20:16	06:32 19:29	07:03 07:59-09:20/81 18:37	06:40 07:30-07:41/11 16:51	07:15 12:38-13:41/63 16:30
7	05:33 20:40	06:00 20:15	06:33 19:27	07:04 07:58-09:19/81 18:35	06:41 16:50	07:16 12:38-13:42/64 16:30
8	05:33 20:40	06:01 20:13	06:34 19:26	07:06 07:58-09:19/81 18:33	06:42 16:49	07:17 12:38-13:42/64 16:30
9	05:34 20:40	06:02 20:12	06:35 19:24	07:07 07:58-09:19/81 18:32	06:44 16:48	07:18 12:38-13:43/65 16:30
10	05:35 20:39	06:03 20:11	06:36 19:22	07:08 07:57-09:19/82 18:30	06:45 16:47	07:19 12:38-13:44/66 16:30
11	05:36 20:39	06:04 20:10	06:37 19:20	07:09 07:58-09:19/81 18:28	06:46 16:46	07:19 12:39-13:45/66 16:30
12	05:36 20:38	06:06 20:08	06:38 19:19	07:10 07:58-09:19/81 18:27	06:47 16:45	07:20 12:39-13:46/67 16:30
13	05:37 20:38	06:07 20:07	06:39 08:35-08:54/19 19:17	07:11 07:58-09:18/80 18:25	06:48 16:44	07:21 12:38-13:45/67 16:31
14	05:38 20:37	06:08 20:05	06:40 08:31-08:58/27 19:15	07:12 07:57-09:18/81 18:24	06:50 16:43	07:22 12:39-13:46/67 16:31
15	05:39 20:37	06:09 20:04	06:41 08:27-09:01/34 19:13	07:13 07:57-09:17/80 18:22	06:51 16:42	07:23 12:39-13:47/68 16:31
16	05:39 20:36	06:10 20:03	06:42 08:24-09:04/40 19:12	07:15 07:57-09:16/79 18:20	06:52 16:41	07:23 12:39-13:47/68 16:31
17	05:40 20:35	06:11 20:01	06:43 08:21-09:06/45 19:10	07:16 07:58-09:16/78 18:19	06:53 16:40	07:24 12:39-13:48/69 16:31
18	05:41 20:35	06:12 20:00	06:44 08:19-09:07/48 19:08	07:17 07:59-09:15/76 18:17	06:55 16:39	07:25 12:40-13:49/69 16:32
19	05:42 20:34	06:13 19:58	06:45 08:17-09:09/52 19:06	07:18 07:59-09:14/75 18:16	06:56 13:02-13:10/8 16:38	07:25 12:40-13:49/69 16:32
20	05:43 20:33	06:14 19:57	06:46 08:15-09:10/55 19:05	07:19 07:59-09:13/74 18:14	06:57 12:56-13:17/21 16:38	07:26 12:41-13:50/69 16:33
21	05:44 20:33	06:15 19:55	06:47 08:13-09:12/59 19:03	07:20 08:00-09:13/73 18:13	06:58 12:53-13:20/27 16:37	07:26 12:41-13:50/69 16:33
22	05:45 20:32	06:16 19:54	06:48 08:12-09:13/61 19:01	07:22 08:01-09:12/71 18:11	06:59 12:50-13:23/33 16:36	07:27 12:42-13:51/69 16:33
23	05:46 20:31	06:17 19:52	06:49 08:10-09:14/64 18:59	07:23 08:01-09:11/70 18:10	07:01 12:47-13:25/38 16:35	07:28 12:42-13:51/69 16:34
24	05:46 20:30	06:18 19:50	06:50 08:09-09:15/66 18:58	07:24 08:02-09:10/68 18:08	07:02 12:46-13:27/41 16:35	07:28 12:43-13:52/69 16:35
25	05:47 20:29	06:19 19:49	06:51 08:08-09:16/68 18:56	06:25 07:03-08:09/66 17:07	07:03 12:45-13:29/44 16:34	07:28 12:43-13:52/69 16:35
26	05:48 20:28	06:20 19:47	06:53 08:06-09:16/70 18:54	06:26 07:04-08:08/64 17:05	07:04 12:43-13:30/47 16:34	07:29 12:43-13:52/69 16:36
27	05:49 20:27	06:21 19:46	06:54 08:05-09:17/72 18:52	06:28 07:05-08:06/61 17:04	07:05 12:42-13:31/49 16:33	07:29 12:45-13:53/68 16:36
28	05:50 20:26	06:22 19:44	06:55 08:04-09:17/73 18:51	06:29 07:06-08:05/59 17:03	07:06 12:41-13:32/51 16:33	07:29 12:45-13:53/68 16:37
29	05:51 20:25	06:23 19:42	06:56 08:03-09:18/75 18:49	06:30 07:08-08:04/56 17:01	07:07 12:41-13:34/53 16:32	07:30 12:45-13:53/68 16:38
30	05:52 20:24	06:24 19:41	06:57 08:02-09:18/76 18:47	06:31 07:09-08:02/53 17:00	07:09 12:40-13:35/55 16:32	07:30 12:46-13:53/67 16:39
31	05:53 20:23	06:25 19:39		06:32 07:11-08:00/49 16:58		07:30 12:47-13:54/67 16:39
Potential sun hours	462	430	375	344	296	284
Sum of minutes with flicker	0	0	1004	2276	655	2049

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 4 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (4)

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	07:31 12:36-15:19/163	07:16 14:18-15:23/65	06:39 06:58-07:54/56	06:47 07:45-08:18/33	05:59 06:19-06:34/15	05:29
	16:41	17:16	17:51	19:27	20:00	20:31
2	07:31 12:37-15:20/163	07:15 14:23-15:22/59	06:37 06:57-07:55/58	06:45 07:48-08:16/28	05:58 06:18-06:32/14	05:29
	16:41	17:17	17:52	19:28	20:01	20:32
3	07:31 12:38-15:20/162	07:14 14:30-15:22/52	06:36 06:55-07:55/60	06:43 07:50-08:12/22	05:57 06:21-06:31/10	05:28
	16:42	17:18	17:54	19:29	20:02	20:32
4	07:31 12:40-15:21/161	07:13 14:31-15:20/49	06:34 06:53-07:55/62	06:42 07:53-08:07/14	05:55	05:28
	16:43	17:20	17:55	19:30	20:03	20:33
5	07:31 12:40-15:20/160	07:12 14:33-15:19/46	06:33 06:52-07:56/64	06:40	05:54	05:28
	16:44	17:21	17:56	19:31	20:05	20:34
6	07:31 12:41-15:21/160	07:11 14:35-15:18/43	06:31 06:50-07:56/66	06:38	05:53	05:27
	16:45	17:22	17:57	19:32	20:06	20:34
7	07:31 12:43-15:22/159	07:10 14:37-15:16/39	06:29 06:48-07:56/68	06:36	05:52	05:27
	16:46	17:24	17:58	19:33	20:07	20:35
8	07:30 12:44-15:22/158	07:09 14:40-15:15/35	06:28 06:47-07:57/70	06:35	05:50	05:27
	16:47	17:25	18:00	19:35	20:08	20:36
9	07:30 12:46-15:23/157	07:07 14:42-15:12/30	06:26 06:45-07:56/71	06:33	05:49	05:26
	16:48	17:26	18:01	19:36	20:09	20:36
10	07:30 12:47-15:23/156	07:06 14:46-15:09/23	06:24 06:43-07:56/73	06:31	05:48	05:26
	16:49	17:27	18:02	19:37	20:10	20:37
11	07:30 12:49-15:23/154	07:05 14:52-15:04/12	06:23 06:43-07:56/73	06:30	05:47	05:26
	16:50	17:29	18:03	19:38	20:11	20:37
12	07:30 12:51-15:24/153	07:04	06:21 06:42-07:56/74	06:28	05:46	05:26
	16:51	17:30	18:04	19:39	20:12	20:38
13	07:29 12:53-15:24/151	07:02	06:19 06:41-07:55/74	06:27	05:45	05:26
	16:52	17:31	18:05	19:40	20:13	20:38
14	07:29 12:56-15:25/149	07:01	06:18 06:41-07:55/74	06:25	05:44	05:26
	16:54	17:33	18:07	19:41	20:14	20:39
15	07:29 12:58-15:24/146	07:00	06:16 06:40-07:54/74	06:23	05:43	05:26
	16:55	17:34	18:08	19:42	20:15	20:39
16	07:28 13:02-15:25/143	06:58	06:14 06:39-07:53/74	06:22	05:42	05:26
	16:56	17:35	18:09	19:43	20:16	20:40
17	07:28 13:51-15:25/94	06:57	06:12 06:38-07:52/74	06:20	05:41	05:26
	16:57 13:07-13:49/42	17:36	18:10	19:45	20:17	20:40
18	07:27 13:52-15:26/94	06:55	06:11 06:39-07:52/73	06:19	05:40	05:26
	16:58 13:16-13:48/32	17:38	18:11	19:46	20:18	20:41
19	07:27 13:53-15:26/93	06:54	06:09 06:38-07:51/73	06:17	05:39	05:26
	16:59 13:18-13:46/28	17:39	18:12	19:47	20:19	20:41
20	07:26 13:54-15:25/91	06:53 07:19-07:37/18	06:07 06:38-07:49/71	06:15 06:35-06:37/2	05:38	05:26
	17:01 13:22-13:42/20	17:40	18:13	19:48	20:20	20:41
21	07:25 13:56-15:26/90	06:51 07:14-07:42/28	06:06 06:38-07:48/70	06:14 06:33-06:37/4	05:37	05:26
	17:02 13:29-13:37/8	17:41	18:14	19:49	20:21	20:41
22	07:25 13:57-15:26/89	06:50 07:10-07:44/34	06:04 06:38-07:47/69	06:12 06:32-06:38/6	05:36	05:26
	17:03	17:43	18:16	19:50	20:22	20:42
23	07:24 13:58-15:26/88	06:48 07:08-07:47/39	06:02 06:38-07:46/68	06:11 06:30-06:38/8	05:35	05:27
	17:04	17:44	18:17	19:51	20:23	20:42
24	07:23 13:59-15:25/86	06:47 07:06-07:48/42	06:00 06:38-07:44/66	06:09 06:29-06:38/9	05:34	05:27
	17:06	17:45	18:18	19:52	20:24	20:42
25	07:22 14:00-15:25/85	06:45 07:05-07:50/45	05:59 06:38-07:42/64	06:08 06:27-06:38/11	05:34	05:27
	17:07	17:46	18:19	19:53	20:25	20:42
26	07:22 14:03-15:26/83	06:44 07:03-07:51/48	05:57 06:40-07:41/61	06:06 06:26-06:38/12	05:33	05:27
	17:08	17:48	18:20	19:55	20:26	20:42
27	07:21 14:04-15:25/81	06:42 07:01-07:52/51	05:55 06:40-07:38/58	06:05 06:24-06:37/13	05:32	05:28
	17:09	17:49	18:21	19:56	20:27	20:42
28	07:20 14:06-15:25/79	06:41 07:00-07:53/53	05:53 06:40-07:35/55	06:04 06:23-06:37/14	05:32	05:28
	17:11	17:50	18:22	19:57	20:28	20:42
29	07:19 14:09-15:25/76		06:52 07:42-08:33/51	06:02 06:22-06:36/14	05:31	05:29
	17:12		19:23	19:58	20:28	20:42
30	07:18 14:11-15:24/73		06:50 07:43-08:29/46	06:01 06:20-06:35/15	05:30	05:29
	17:13		19:25	19:59	20:29	20:42
31	07:17 14:14-15:24/70		06:48 07:44-08:24/40		05:30	
	17:14		19:26		20:30	
Potential sun hours	294	296	369	400	451	456
Sum of minutes with flicker	3897	811	2030	205	39	0

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

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

Licensed user:
Iron solar s.r.l.
via Lanzone, 31
IT-20122 Milano
+393487125089
Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 4 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (4)

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	05:30	05:54	06:27	06:58 07:20-08:34/74	06:34 14:15-14:39/24	07:10 12:31-15:05/154
	20:42	20:22	19:38	18:45	16:57	16:32
2	05:30	05:55	06:28	06:59 07:21-08:35/74	06:35 14:11-14:42/31	07:11 12:30-15:06/156
	20:42	20:21	19:36	18:44	16:56	16:31
3	05:31	05:56	06:29	07:00 07:21-08:34/73	06:36 14:08-14:44/36	07:12 12:29-15:06/157
	20:42	20:20	19:34	18:42	16:55	16:31
4	05:31	05:57	06:30	07:01 07:22-08:34/72	06:37 14:07-14:46/39	07:13 12:28-15:06/158
	20:41	20:19	19:33	18:40	16:54	16:31
5	05:32	05:58	06:31	07:02 07:23-08:33/70	06:39 14:04-14:48/44	07:14 12:28-15:07/159
	20:41	20:17	19:31	18:39	16:52	16:31
6	05:32	05:59	06:32	07:04 07:24-08:33/69	06:40 14:02-14:49/47	07:15 12:27-15:07/160
	20:41	20:16	19:29	18:37	16:51	16:31
7	05:33	06:00	06:33	07:05 07:25-08:32/67	06:41 14:02-14:51/49	07:16 12:27-15:07/160
	20:41	20:15	19:27	18:35	16:50	16:30
8	05:34	06:01	06:34 07:49-08:02/13	07:06 07:26-08:31/65	06:42 14:00-14:52/52	07:17 12:27-15:08/161
	20:40	20:14	19:26	18:34	16:49	16:30
9	05:34	06:03 06:32-06:37/5	06:35 07:44-08:06/22	07:07 07:27-08:30/63	06:44 13:52-14:52/60	07:18 12:27-15:08/161
	20:40	20:12	19:24	18:32	16:48	16:30
10	05:35	06:04 06:29-06:40/11	06:36 07:41-08:08/27	07:08 07:29-08:30/61	06:45 13:48-14:54/66	07:19 12:26-15:09/163
	20:40	20:11	19:22	18:30	16:47	16:30
11	05:36	06:05 06:27-06:41/14	06:37 07:38-08:10/32	07:09 07:30-08:29/59	06:46 13:45-14:55/70	07:20 12:27-15:09/162
	20:39	20:10	19:20	18:29	16:46	16:30
12	05:36	06:06 06:28-06:43/15	06:38 07:36-08:15/39	07:10 07:31-08:28/57	06:47 13:42-14:55/73	07:20 12:27-15:10/163
	20:39	20:08	19:19	18:27	16:45	16:31
13	05:37	06:07 06:29-06:43/14	06:39 07:34-08:20/46	07:11 07:32-08:27/55	06:49 13:40-14:57/77	07:21 12:26-15:09/163
	20:38	20:07	19:17	18:25	16:44	16:31
14	05:38	06:08 06:30-06:44/14	06:40 07:32-08:23/51	07:12 07:33-08:25/52	06:50 13:38-14:57/79	07:22 12:26-15:10/164
	20:37	20:06	19:15	18:24	16:43	16:31
15	05:39	06:09 06:31-06:44/13	06:41 07:31-08:25/54	07:14 07:34-08:24/50	06:51 13:36-14:57/81	07:23 12:27-15:11/164
	20:37	20:04	19:13	18:22	16:42	16:31
16	05:40	06:10 06:32-06:45/13	06:42 07:29-08:27/58	07:15 07:36-08:23/47	06:52 13:36-14:59/83	07:23 12:27-15:11/164
	20:36	20:03	19:12	18:21	16:41	16:31
17	05:40	06:11 06:33-06:45/12	06:43 07:28-08:28/60	07:16 07:37-08:21/44	06:54 13:34-14:59/85	07:24 12:27-15:11/164
	20:36	20:01	19:10	18:19	16:40	16:32
18	05:41	06:12 06:34-06:44/10	06:44 07:27-08:30/63	07:17 07:38-08:19/41	06:55 13:33-14:59/86	07:25 12:28-15:12/164
	20:35	20:00	19:08	18:17	16:39	16:32
19	05:42	06:13 06:35-06:44/9	06:45 07:26-08:31/65	07:18 07:39-08:16/37	06:56 13:33-15:01/88	07:25 12:28-15:13/165
	20:34	19:58	19:06	18:16	16:38	16:32
20	05:43	06:14 06:36-06:44/8	06:46 07:25-08:32/67	07:19 07:42-08:14/32	06:57 13:32-15:01/89	07:26 12:28-15:13/165
	20:33	19:57	19:05	18:14	16:38	16:33
21	05:44	06:15 06:37-06:43/6	06:47 07:24-08:32/68	07:21 07:46-08:11/25	06:58 13:31-15:01/90	07:27 12:29-15:14/165
	20:33	19:55	19:03	18:13	16:37 13:05-13:12/7	16:33
22	05:45	06:16 06:38-06:42/4	06:48 07:23-08:33/70	07:22 07:51-08:06/15	07:00 13:30-15:01/91	07:27 12:29-15:14/165
	20:32	19:54	19:01	18:11	16:36 12:58-13:18/20	16:34
23	05:46	06:17 06:39-06:41/2	06:50 07:22-08:34/72	07:23	07:01 13:30-15:03/93	07:28 12:29-15:14/165
	20:31	19:52	18:59	18:10	16:36 12:55-13:23/28	16:34
24	05:47	06:18	06:51 07:22-08:34/72	07:24	07:02 13:29-15:03/94	07:28 12:30-15:15/165
	20:30	19:51	18:58	18:08	16:35 12:53-13:25/32	16:35
25	05:48	06:19	06:52 07:21-08:34/73	06:25	07:03 13:29-15:03/94	07:29 12:30-15:15/165
	20:29	19:49	18:56	17:07	16:34 12:45-13:27/42	16:35
26	05:48	06:20	06:53 07:21-08:35/74	06:26	07:04 12:40-15:03/143	07:29 12:32-15:16/164
	20:28	19:47	18:54	17:05	16:34	16:36
27	05:49	06:21	06:54 07:20-08:35/75	06:28	07:05 12:37-15:03/146	07:29 12:32-15:16/164
	20:27	19:46	18:52	17:04	16:33	16:37
28	05:50	06:22	06:55 07:20-08:35/75	06:29	07:07 12:36-15:05/149	07:30 12:33-15:17/164
	20:26	19:44	18:51	17:03	16:33	16:37
29	05:51	06:23	06:56 07:20-08:35/75	06:30	07:08 12:34-15:05/151	07:30 12:33-15:17/164
	20:25	19:43	18:49	17:01	16:32	16:38
30	05:52	06:24	06:57 07:20-08:34/74	06:31	07:09 12:32-15:05/153	07:30 12:34-15:17/163
	20:24	19:41	18:47	17:00	16:32	16:39
31	05:53	06:26		06:33 14:19-14:34/15		07:30 12:35-15:19/164
	20:23	19:39		16:59		16:39
Potential sun hours	462	430	375	344	295	284
Sum of minutes with flicker	0	150	1325	1217	2592	5035

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

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

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 5 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (5)

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	07:31	07:16	06:39 06:58-07:01/3	06:47	05:59	05:29	05:30	05:54	06:27	06:58	06:34	07:10
	16:41	17:16	17:51	19:27	20:00	20:31	20:42	20:22	19:38	18:45	16:57	16:32
2	07:31	07:15	06:37 06:57-07:02/5	06:45	05:58	05:29	05:30	05:55	06:28	06:59	06:35	07:11
	16:41	17:17	17:52	19:28	20:01	20:32	20:42	20:21	19:36	18:44	16:56	16:31
3	07:31	07:14	06:36 06:55-07:01/6	06:43	05:57	05:28	05:31	05:56	06:29	07:00	06:36	07:12
	16:42	17:18	17:54	19:29	20:02	20:32	20:42	20:20	19:34	18:42	16:55	16:31
4	07:31	07:13	06:34 06:53-07:00/7	06:42	05:55	05:28	05:31	05:57	06:30	07:01 07:22-07:31/9	06:37	07:13
	16:43	17:20	17:55	19:30	20:03	20:33	20:41	20:19	19:32	18:40	16:54	16:31
5	07:31	07:12	06:33 06:52-07:01/9	06:40	05:54	05:28	05:32	05:58	06:31	07:02 07:23-07:33/10	06:39	07:14
	16:44	17:21	17:56	19:31	20:04	20:34	20:41	20:17	19:31	18:39	16:52	16:31
6	07:31	07:11	06:31 06:50-06:59/9	06:38	05:53	05:27	05:32	05:59	06:32	07:03 07:24-07:34/10	06:40	07:15
	16:45	17:22	17:57	19:32	20:06	20:34	20:41	20:16	19:29	18:37	16:51	16:31
7	07:31	07:10	06:29 06:48-06:58/10	06:36	05:52	05:27	05:33	06:00	06:33	07:05 07:25-07:35/10	06:41	07:16
	16:46	17:24	17:58	19:33	20:07	20:35	20:41	20:15	19:27	18:35	16:50	16:31
8	07:30	07:09	06:28 06:47-06:57/10	06:35	05:50	05:27	05:34	06:01	06:34	07:06 07:26-07:35/9	06:42	07:17
	16:47	17:25	18:00	19:35	20:08	20:36	20:40	20:14	19:26	18:34	16:49	16:30
9	07:30	07:07	06:26 06:45-06:54/9	06:33	05:49	05:26	05:34	06:03	06:35	07:07 07:27-07:35/8	06:44	07:18
	16:48	17:26	18:01	19:36	20:09	20:36	20:40	20:12	19:24	18:32	16:48	16:30
10	07:30	07:06	06:24	06:31	05:48	05:26	05:35	06:04	06:36	07:08 07:29-07:36/7	06:45	07:19
	16:49	17:27	18:02	19:37	20:10	20:37	20:39	20:11	19:22	18:30	16:47	16:30
11	07:30	07:05	06:23	06:30	05:47	05:26	05:36	06:05	06:37	07:09 07:30-07:35/5	06:46	07:20
	16:50	17:29	18:03	19:38	20:11	20:37	20:39	20:10	19:20	18:29	16:46	16:30
12	07:30	07:04	06:21	06:28	05:46	05:26	05:36	06:06	06:38	07:10 07:31-07:35/4	06:47	07:20
	16:51	17:30	18:04	19:39	20:12	20:38	20:39	20:08	19:19	18:27	16:45	16:31
13	07:29	07:02	06:19	06:27	05:45	05:26	05:37	06:07	06:39	07:11 07:32-07:34/2	06:49	07:21
	16:52	17:31	18:05	19:40	20:13	20:38	20:38	20:07	19:17	18:25	16:44	16:31
14	07:29	07:01	06:18	06:25	05:44	05:26	05:38	06:08	06:40	07:12	06:50	07:22
	16:54	17:33	18:07	19:41	20:14	20:39	20:37	20:06	19:15	18:24	16:43	16:31
15	07:28	07:00	06:16	06:23	05:43	05:26	05:39	06:09	06:41	07:14	06:51	07:23
	16:55	17:34	18:08	19:42	20:15	20:39	20:37	20:04	19:13	18:22	16:42	16:31
16	07:28	06:58	06:14	06:22	05:42	05:26	05:40	06:10	06:42	07:15	06:52	07:23
	16:56	17:35	18:09	19:43	20:16	20:40	20:36	20:03	19:12	18:21	16:41	16:31
17	07:28	06:57	06:12	06:20	05:41	05:26	05:40	06:11	06:43	07:16	06:54	07:24
	16:57	17:36	18:10	19:45	20:17	20:40	20:36	20:01	19:10	18:19	16:40	16:32
18	07:27	06:55	06:11	06:19	05:40	05:26	05:41	06:12	06:44	07:17	06:55	07:25
	16:58	17:38	18:11	19:46	20:18	20:40	20:35	20:00	19:08	18:17	16:39	16:32
19	07:26	06:54	06:09	06:17	05:39	05:26	05:42	06:13	06:45	07:18	06:56	07:25
	16:59	17:39	18:12	19:47	20:19	20:41	20:34	19:58	19:06	18:16	16:38	16:32
20	07:26	06:53	06:07	06:15	05:38	05:26	05:43	06:14	06:46	07:19	06:57	07:26
	17:01	17:40	18:13	19:48	20:20	20:41	20:33	19:57	19:05	18:14	16:38	16:33
21	07:25	06:51	06:06	06:14	05:37	05:26	05:44	06:15	06:47	07:21	06:58	07:27
	17:02	17:41	18:14	19:49	20:21	20:41	20:33	19:55	19:03	18:13	16:37	16:33
22	07:25	06:50	06:04	06:12	05:36	05:26	05:45	06:16	06:48	07:22	07:00	07:27
	17:03	17:43	18:16	19:50	20:22	20:42	20:32	19:54	19:01	18:11	16:36	16:34
23	07:24	06:48	06:02	06:11	05:35	05:27	05:46	06:17	06:50	07:23	07:01	07:28
	17:04	17:44	18:17	19:51	20:23	20:42	20:31	19:52	18:59	18:10	16:36	16:34
24	07:23	06:47	06:00	06:09	05:34	05:27	05:47	06:18	06:51	07:24	07:02	07:28
	17:06	17:45	18:18	19:52	20:24	20:42	20:30	19:51	18:58	18:08	16:35	16:35
25	07:22	06:45	05:59	06:08	05:34	05:27	05:48	06:19	06:52	06:25	07:03	07:29
	17:07	17:46	18:19	19:53	20:25	20:42	20:29	19:49	18:56	17:07	16:34	16:35
26	07:22	06:44	05:57	06:06	05:33	05:27	05:48	06:20	06:53	06:26	07:04	07:29
	17:08	17:48	18:20	19:55	20:26	20:42	20:28	19:47	18:54	17:05	16:34	16:36
27	07:21	06:42	05:55	06:05	05:32	05:28	05:49	06:21	06:54	06:28	07:05	07:29
	17:09	17:49	18:21	19:56	20:27	20:42	20:27	19:46	18:52	17:04	16:33	16:37
28	07:20	06:41 07:00-07:01/1	05:53	06:04	05:32	05:28	05:50	06:22	06:55	06:29	07:07	07:30
	17:11	17:50	18:22	19:57	20:27	20:42	20:26	19:44	18:51	17:03	16:33	16:37
29	07:19		06:52	06:02	05:31	05:29	05:51	06:23	06:56	06:30	07:08	07:30
	17:12		19:23	19:58	20:28	20:42	20:25	19:42	18:49	17:01	16:33	16:38
30	07:18		06:50	06:01	05:30	05:29	05:52	06:24	06:57	06:31	07:09	07:30
	17:13		19:25	19:59	20:29	20:42	20:24	19:41	18:47	17:00	16:32	16:39
31	07:17		06:48		05:30		05:53	06:26		06:33		07:30
	17:14		19:26		20:30		20:23	19:39		16:59		16:39
Potential sun hours	294	296	369	400	451	456	462	430	375	344	296	284
Sum of minutes with flicker	0	1	68	0	0	0	0	0	0	74	0	0

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

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

Licensed user:
Iron solar s.r.l.
via Lanzone, 31
IT-20122 Milano
+393487125089
Fabio Paccapelo / francesca.saccarola@hopegroup.it
Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 6 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)

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	07:31 14:29-15:45/76 08:10-08:50/40	07:16 14:46-16:23/97	06:39 16:24-17:15/51 06:58-08:25/87	06:47	05:59 06:45-07:06/21	05:29
	16:41 09:07-10:11/64	17:16 07:50-09:10/80	17:51 15:31-16:21/50	19:27	20:00	20:31
2	07:31 14:29-15:46/77 08:10-08:51/41	07:15 14:47-16:25/98	06:37 16:23-17:16/53 06:57-08:22/85	06:45	05:58 06:46-07:05/19	05:29
	16:41 09:08-10:11/63	17:17 07:50-09:10/80	17:52 15:34-16:20/46	19:28	20:01	20:32
3	07:31 14:29-15:48/79 08:10-08:52/42	07:14 14:48-16:26/98	06:36 16:22-17:17/55 08:10-08:14/4	06:43	05:57 06:49-07:03/14	05:29
	16:42 09:09-10:11/62	17:18 07:50-09:10/80	17:54 15:35-16:17/42 06:55-08:03/68	19:29	20:02	20:32
4	07:31 14:30-15:49/79 08:10-08:53/43	07:13 14:49-16:26/97	06:34 16:21-17:17/56 06:55-08:02/67	06:42	05:55 06:52-06:58/6	05:28
	16:43 09:09-10:11/62	17:20 07:44-09:10/86	17:55 15:36-16:15/39	19:30	20:04	20:33
5	07:31 14:30-15:51/81 08:10-08:54/44	07:12 14:50-16:27/97	06:33 16:21-17:18/57 06:53-07:59/66	06:40	05:54	05:28
	16:44 09:10-10:12/62	17:21 07:40-09:09/89	17:56 15:39-16:12/33	19:31	20:05	20:34
6	07:31 14:30-15:51/81 08:09-08:54/45	07:11 14:52-16:28/96	06:31 17:28-17:35/7 15:42-16:08/26	06:38	05:53	05:27
	16:45 09:10-10:11/61	17:22 07:38-09:09/91	17:57 16:20-17:18/58 06:52-07:55/63	19:32	20:06	20:35
7	07:31 14:30-15:53/83 08:10-08:55/45	07:10 14:54-16:28/94	06:29 17:25-17:36/11 15:45-16:04/19	06:37	05:52	05:27
	16:46 09:11-10:11/60	17:24 07:36-09:09/93	17:58 16:19-17:18/59 06:52-07:50/58	19:34	20:07	20:35
8	07:31 14:31-15:55/84 08:10-08:56/46	07:09 14:56-16:29/93	06:28 17:25-17:38/13 06:51-07:46/55	06:35	05:50	05:27
	16:47 09:12-10:11/59	17:25 07:35-09:09/94	18:00 16:19-17:18/59	19:35	20:08	20:36
9	07:30 14:32-15:56/84 08:10-08:57/47	07:07 14:57-16:29/92	06:26 17:24-17:38/14 06:50-07:43/53	06:33 06:57-07:04/7	05:49	05:27
	16:48 09:12-10:12/60	17:26 07:34-09:09/95	18:01 16:18-17:18/60	19:36	20:09	20:36
10	07:30 14:31-15:57/86 08:09-08:57/48	07:06 15:00-16:30/90	06:24 17:23-17:38/15 06:51-07:41/50	06:32 06:52-07:08/16	05:48	05:26
	16:49 09:13-10:11/58	17:28 07:32-09:07/95	18:02 16:17-17:18/61	19:37	20:10	20:37
11	07:30 14:32-15:58/86 08:10-08:58/48	07:05 15:03-16:30/87	06:23 17:23-17:38/15 06:50-07:40/50	06:30 06:50-07:11/21	05:47	05:26
	16:50 09:14-10:11/57	17:29 07:31-09:07/96	18:03 16:18-17:18/60	19:38	20:11	20:38
12	07:30 14:33-16:00/87 08:10-09:00/50	07:04 15:07-16:31/84	06:21 17:23-17:37/14 06:50-07:39/49	06:28 06:48-07:12/24	05:46	05:26
	16:51 09:15-10:12/57	17:30 07:28-09:06/98	18:04 16:17-17:18/61	19:39	20:12	20:38
13	07:29 14:33-16:01/88 08:09-09:00/51	07:02 15:09-16:31/82	06:19 17:24-17:36/12 06:50-07:36/46	06:27 06:47-07:13/26	05:45	05:26
	16:53 09:15-10:11/56	17:31 07:25-09:05/100	18:05 16:17-17:17/60	19:40	20:13	20:39
14	07:29 14:34-16:02/88 08:10-09:01/51	07:01 15:12-16:31/79	06:18 17:26-17:35/9 06:51-07:35/44	06:25 06:45-07:14/29	05:44	05:26
	16:54 09:16-10:11/55	17:33 07:24-09:04/100	18:07 16:18-17:17/59	19:41	20:14	20:39
15	07:29 14:33-16:03/90 08:09-09:01/52	07:00 15:15-16:30/75	06:16 16:18-17:17/59	06:23 06:43-07:14/31	05:43	05:26
	16:55 09:17-10:10/53	17:34 07:23-09:03/100	18:08 06:51-07:32/41	19:42	20:15	20:40
16	07:28 14:34-16:04/90 08:10-09:03/53	06:58 15:19-16:31/72	06:14 16:17-17:16/59	06:22 06:43-07:15/32	05:42	05:26
	16:56 09:18-10:10/52	17:35 07:21-09:01/100	18:09 06:51-07:27/36	19:44	20:16	20:40
17	07:28 14:35-16:05/90 08:09-09:03/54	06:57 15:20-16:31/71	06:13 16:17-17:15/58	06:20 06:42-07:15/33	05:41	05:26
	16:57 09:19-10:10/51	17:36 07:20-09:00/100	18:10 06:53-07:23/30	19:45	20:17	20:40
18	07:27 14:36-16:07/91 08:10-09:04/54	06:56 15:20-16:30/70	06:11 16:19-17:15/56	06:19 06:42-07:16/34	05:40	05:26
	16:58 09:20-10:10/50	17:38 07:19-08:57/98	18:11 06:53-07:21/28	19:46	20:18	20:41
19	07:27 14:36-16:07/91 08:09-09:04/55	06:54 15:21-16:30/69	06:09 16:19-17:14/55	06:17 06:41-07:15/34	05:39	05:26
	16:59 09:21-10:09/48	17:39 07:17-08:56/99	18:12 06:54-07:19/25	19:47	20:19	20:41
20	07:26 14:36-16:08/92 08:04-09:05/61	06:53 16:46-16:55/9 07:14-08:53/99	06:07 16:19-17:12/53	06:16 06:41-07:16/35	05:38	05:26
	17:01 09:22-10:07/45	17:40 15:21-16:30/69	18:13 06:56-07:16/20	19:48	20:20	20:41
21	07:25 14:37-16:10/93 08:02-09:06/64	06:51 16:40-17:01/21 07:13-08:50/97	06:06 16:19-17:11/52	06:14 06:40-07:15/35	05:37	05:26
	17:02 09:24-10:07/43	17:41 15:22-16:30/68	18:15 06:59-07:13/14	19:49	20:21	20:41
22	07:25 14:37-16:10/93 08:00-09:06/66	06:50 16:36-17:04/28 07:11-08:44/93	06:04 16:21-17:10/49	06:12 06:40-07:15/35	05:36	05:26
	17:03 09:25-10:06/41	17:43 15:23-16:29/66	18:16	19:50	20:22	20:42
23	07:24 14:38-16:11/93 07:58-09:06/68	06:48 16:34-17:07/33 07:10-08:37/87	06:02 16:22-17:09/47	06:11 06:40-07:14/34	05:35	05:27
	17:04 09:26-10:04/38	17:44 15:24-16:28/64	18:17	19:51	20:23	20:42
24	07:23 14:38-16:12/94 07:57-09:07/70	06:47 16:32-17:09/37 07:09-08:35/86	06:01 16:22-17:07/45	06:09 06:40-07:14/34	05:35	05:27
	17:06 09:28-10:03/35	17:45 15:25-16:27/62	18:18	19:52	20:24	20:42
25	07:23 14:40-16:14/94 07:56-09:08/72	06:45 16:30-17:11/41 07:08-08:34/86	05:59 16:24-17:06/42	06:08 06:40-07:13/33	05:34	05:27
	17:07 09:31-10:02/31	17:46 15:27-16:27/60	18:19	19:54	20:25	20:42
26	07:22 14:40-16:15/95 07:55-09:08/73	06:44 16:28-17:12/44 07:06-08:32/86	05:57 16:26-17:04/38	06:07 06:41-07:12/31	05:33	05:28
	17:08 09:33-09:59/26	17:48 15:28-16:25/57	18:20	19:55	20:26	20:42
27	07:21 14:41-16:16/95 07:54-09:09/75	06:42 16:27-17:14/47 07:03-08:31/88	05:55 16:27-17:02/35	06:05 06:42-07:12/30	05:32	05:28
	17:09 09:36-09:56/20	17:49 15:30-16:25/55	18:21	19:56	20:27	20:42
28	07:20 14:42-16:18/96 07:53-09:09/76	06:41 16:25-17:14/49 07:00-08:28/88	05:54 16:29-16:59/30	06:04 06:42-07:10/28	05:32	05:28
	17:11 09:41-09:52/11	17:50 15:31-16:23/52	18:22	19:57	20:28	20:42
29	07:19 14:43-16:20/97		06:52 17:32-17:56/24	06:02 06:43-07:10/27	05:31	05:29
	17:12 07:52-09:09/77		19:24	19:58	20:28	20:42
30	07:18 14:44-16:21/97		06:50 17:36-17:52/16	06:01 06:43-07:08/25	05:31	05:29
	17:13 07:52-09:10/78		19:25	19:59	20:29	20:42
31	07:17 14:45-16:22/97		06:48		05:30	
	17:15 07:51-09:10/79		19:26		20:30	
Potential sun hours	294	296	369	400	451	456
Sum of minutes with flicker	5895	5087	2931	634	60	0

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

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

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 6 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)

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	05:30	05:54	06:27 06:49-07:10/21	06:58 18:02-18:15/13 07:30-08:18/48	06:34 14:29-15:59/90	07:10 14:14-15:40/86 07:52-08:41/49
	20:42	20:22	19:38	18:46 16:57-17:57/60	16:57 07:02-08:37/95	16:32 08:56-09:53/57
2	05:30	05:55	06:28 06:51-07:07/16	06:59 18:02-18:17/15 07:29-08:19/50	06:35 14:27-15:59/92	07:11 14:14-15:40/86 07:52-08:40/48
	20:42	20:21	19:36	18:44 16:57-17:57/60	16:56 07:03-08:37/94	16:32 08:56-09:54/58
3	05:31	05:56	06:29 06:55-07:02/7	07:00 18:01-18:16/15 07:29-08:19/50	06:36 14:25-15:59/94	07:12 14:15-15:39/84 07:53-08:40/47
	20:42	20:20	19:34	18:42 16:56-17:56/60	16:55 07:05-08:39/94	16:31 08:56-09:55/59
4	05:31	05:57	06:30	07:01 18:01-18:16/15 07:28-08:20/52	06:38 14:23-15:58/95	07:13 14:15-15:39/84 07:54-08:40/46
	20:42	20:19	19:33	18:40 16:56-17:56/60	16:54 07:06-08:39/93	16:31 08:56-09:56/60
5	05:32	05:59	06:31	07:03 18:01-18:15/14 07:28-08:22/54	06:39 14:21-15:57/96	07:14 14:15-15:38/83 07:55-08:40/45
	20:41	20:18	19:31	18:39 16:55-17:55/60	16:52 07:08-08:39/91	16:31 08:56-09:56/60
6	05:32	06:00	06:32	07:04 18:01-18:14/13 16:25-16:38/13	06:40 14:20-15:56/96	07:15 14:16-15:38/82 07:55-08:40/45
	20:41	20:16	19:29	18:37 16:55-17:54/59 07:28-08:23/55	16:51 07:11-08:40/89	16:31 08:56-09:57/61
7	05:33	06:01	06:33	07:05 18:02-18:12/10 16:19-16:42/23	06:41 14:19-15:56/97	07:16 14:16-15:37/81 07:56-08:40/44
	20:41	20:15	19:28	18:35 16:55-17:54/59 07:28-08:29/61	16:50 07:14-08:40/86	16:31 08:56-09:58/62
8	05:34	06:02	06:34	07:06 18:05-18:09/4 16:16-16:45/29	06:43 14:18-15:55/97	07:17 14:17-15:37/80 07:57-08:40/43
	20:40	20:14	19:26	18:34 16:55-17:53/58 07:28-08:32/64	16:49 07:19-08:40/81	16:31 08:56-09:58/62
9	05:34	06:03 07:00-07:09/9	06:35	07:07 16:55-17:52/57 07:29-08:36/67	06:44 14:17-15:54/97	07:18 14:17-15:36/79 07:58-08:40/42
	20:40	20:12	19:24	18:32 16:12-16:48/36	16:48 07:21-08:41/80	16:30 08:57-09:59/62
10	05:35	06:04 06:57-07:12/15	06:36	07:08 16:56-17:52/56 07:29-08:37/68	06:45 14:16-15:54/98	07:19 14:18-15:36/78 07:59-08:40/41
	20:40	20:11	19:22	18:30 16:11-16:51/40	16:47 07:21-08:41/80	16:31 08:57-10:00/63
11	05:36	06:05 06:55-07:14/19	06:37	07:09 16:57-17:51/54 08:40-08:53/13	06:46 14:15-15:53/98	07:20 14:19-15:35/76 08:00-08:40/40
	20:39	20:10	19:21	18:29 16:08-16:53/45 07:30-08:38/68	16:46 07:22-08:41/79	16:31 08:57-10:01/64
12	05:37	06:06 06:53-07:15/22	06:38	07:10 16:57-17:49/52 07:31-08:57/86	06:48 14:14-15:52/98	07:21 14:19-15:36/77 08:58-10:01/63
	20:39	20:08	19:19	18:27 16:06-16:54/48	16:45 07:23-08:41/78	16:31 10:39-10:45/6 08:01-08:41/40
13	05:37	06:07 06:51-07:17/26	06:39 17:28-17:42/14	07:11 16:58-17:48/50 07:32-08:59/87	06:49 14:15-15:51/96	07:21 14:20-15:36/76 08:59-10:02/63
	20:38	20:07	19:17	18:25 16:04-16:55/51	16:44 07:24-08:41/77	16:31 10:37-10:49/12 08:02-08:41/39
14	05:38	06:08 06:50-07:17/27	06:40 17:23-17:46/23	07:13 16:58-17:46/48 07:33-09:02/89	06:50 14:14-15:50/96 07:25-08:41/76	07:22 14:20-15:36/76 08:58-10:02/64
	20:38	20:06	19:15	18:24 16:02-16:56/54	16:43 09:12-09:24/12	16:31 10:35-10:50/15 08:02-08:40/38
15	05:39	06:09 06:49-07:18/29	06:41 17:20-17:49/29	07:14 16:59-17:45/46 07:37-09:04/87	06:51 14:13-15:48/95 07:26-08:41/75	07:23 14:20-15:36/76 08:59-10:03/64
	20:37	20:04	19:14	18:22 16:01-16:57/56	16:42 09:08-09:29/21	16:31 10:34-10:52/18 08:03-08:41/38
16	05:40	06:10 06:48-07:19/31	06:42 17:17-17:50/33	07:15 17:01-17:44/43 07:40-09:05/85	06:52 14:13-15:48/95 07:28-08:41/73	07:24 14:21-15:37/76 08:59-10:04/65
	20:36	20:03	19:12	18:21 16:00-16:58/58	16:41 09:06-09:32/26	16:31 10:34-10:54/20 08:04-08:41/37
17	05:40	06:11 06:47-07:19/32	06:43 17:14-17:52/38	07:16 17:02-17:42/40 07:40-09:06/86	06:54 14:13-15:47/94 07:29-08:41/72	07:24 14:21-15:37/76 08:59-10:03/64
	20:36	20:01	19:10	18:19 15:58-16:59/61	16:40 09:04-09:35/31	16:32 10:33-10:54/21 08:04-08:41/37
18	05:41	06:12 06:47-07:20/33	06:44 17:12-17:53/41	07:17 17:04-17:39/35 07:41-09:07/86	06:55 14:12-15:46/94 07:31-08:41/70	07:25 14:22-15:37/75 09:00-10:04/64
	20:35	20:00	19:08	18:17 15:56-16:59/63	16:39 09:02-09:37/35	16:32 10:34-10:56/22 08:05-08:42/37
19	05:42	06:13 06:46-07:20/34	06:45 17:10-17:54/44	07:18 17:06-17:37/31 07:41-09:08/87	06:56 14:13-15:46/93 07:33-08:41/68	07:26 14:23-15:38/75 09:01-10:05/64
	20:34	19:58	19:07	18:16 15:54-16:59/65	16:39 09:01-09:39/38	16:32 10:34-10:57/23 08:06-08:42/36
20	05:43	06:14 06:46-07:20/34	06:46 17:08-17:55/47	07:19 17:09-17:35/26 07:43-09:17/94	06:57 14:13-15:45/92 07:35-08:41/66	07:26 14:23-15:38/75 09:01-10:05/64
	20:34	19:57	19:05	18:14 15:54-17:00/66	16:38 09:00-09:41/41	16:33 10:34-10:57/23 08:06-08:42/36
21	05:44	06:15 06:45-07:20/35	06:48 17:07-17:56/49	07:21 17:12-17:31/19 07:44-09:21/97	06:59 14:12-15:45/93 07:37-08:41/64	07:27 14:24-15:39/75 09:02-10:06/64
	20:33	19:55	19:03	18:13 15:53-17:00/67	16:37 08:59-09:42/43	16:33 10:35-10:58/23 08:07-08:43/36
22	05:45	06:16 06:45-07:20/35	06:49 17:05-17:56/51	07:22 15:51-17:00/69	07:00 14:12-15:44/92 07:40-08:41/61	07:27 14:24-15:39/75 09:02-10:06/64
	20:32	19:54	19:01 07:45-07:56/11	18:11 07:46-09:24/98	16:36 08:58-09:43/45	16:34 10:35-10:58/23 08:07-08:43/36
23	05:46	06:17 06:45-07:19/34	06:50 17:04-17:57/53	07:23 15:50-17:00/70	07:01 14:13-15:44/91 07:46-08:41/55	07:28 14:25-15:40/75 09:03-10:07/64
	20:31	19:52	19:00 07:41-08:00/19	18:10 07:48-09:26/98	16:36 08:58-09:46/48	16:34 10:36-10:59/23 08:08-08:44/36
24	05:47	06:18 06:45-07:19/34	06:51 17:02-17:57/55	07:24 15:50-17:01/71	07:02 14:13-15:44/91 07:47-08:41/54	07:28 14:25-15:40/75 09:03-10:07/64
	20:30	19:51	18:58 07:39-08:02/23	18:08 07:50-09:29/99	16:35 08:57-09:47/50	16:35 10:36-10:59/23 08:08-08:44/36
25	05:48	06:19 06:45-07:18/33	06:52 17:01-17:57/56	06:25 14:49-16:01/72	07:03 14:13-15:43/90 07:47-08:41/54	07:29 14:25-15:40/75 09:03-10:07/64
	20:29	19:49	18:56 07:36-08:03/27	17:07 06:50-08:30/100	16:35 08:57-09:48/51	16:35 10:36-10:59/23 08:08-08:44/36
26	05:49	06:20 06:45-07:18/33	06:53 17:00-17:57/57	06:27 14:48-16:00/72	07:04 14:13-15:43/90 07:48-08:41/53	07:29 14:26-15:42/76 09:04-10:08/64
	20:28	19:47	18:54 07:35-08:04/29	17:06 06:51-08:31/100	16:34 08:56-09:48/52	16:36 10:38-11:00/22 08:09-08:46/37
27	05:50	06:21 06:45-07:17/32	06:54 16:59-17:57/58	06:28 14:44-16:00/76	07:06 14:14-15:43/89 07:49-08:41/52	07:29 14:26-15:42/76 09:04-10:09/65
	20:27	19:46	18:53 07:33-08:05/32	17:04 06:52-08:32/100	16:33 08:57-09:50/53	16:37 10:39-10:59/20 08:09-08:46/37
28	05:51	06:22 06:45-07:16/31	06:55 16:58-17:57/59	06:29 14:41-16:01/80	07:07 14:14-15:42/88 07:50-08:41/51	07:30 14:26-15:42/76 09:05-10:09/64
	20:26	19:44	18:51 07:32-08:11/39	17:03 06:54-08:34/100	16:33 08:56-09:51/55	16:37 10:40-10:58/18 08:09-08:47/38
29	05:51	06:24 06:46-07:15/29	06:56 18:06-18:13/7 07:31-08:13/42	06:30 14:39-16:00/81	07:08 14:14-15:42/88 07:50-08:41/51	07:30 14:27-15:43/76 09:05-10:09/64
	20:25	19:43	18:49 16:57-17:57/60	17:01 06:55-08:35/100	16:33 08:56-09:52/56	16:38 10:41-10:58/17 08:09-08:47/38
30	05:52	06:25 06:47-07:13/26	06:57 18:04-18:15/11 07:31-08:16/45	06:31 14:35-16:00/85	07:09 14:14-15:41/87 07:51-08:41/50	07:30 14:28-15:44/76 09:06-10:10/64
	20:24	19:41	18:47 16:57-17:57/60	17:00 06:57-08:35/98	16:32 08:56-09:53/57	16:39 10:44-10:57/13 08:10-08:49/39
31	05:53	06:26 06:48-07:12/24		06:33 14:32-16:00/88		07:30 14:28-15:44/76 09:07-10:10/63
	20:23	19:39		16:59 07:01-08:37/96		16:40 10:47-10:55/8 08:10-08:49/39
Potential sun hours	462	430	375	344	295	284
Sum of minutes with flicker	0	657	1156	5194	5678	5968

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

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

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 7 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)

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	07:31 15:41-16:05/24	07:16 07:51-08:57/66	06:39	06:47	05:59	05:29
	16:41 07:54-08:41/47	17:16 07:37-07:44/7	17:51	19:27	20:00	20:31
2	07:31 15:42-16:05/23	07:15 07:51-08:57/66	06:37	06:45	05:58	05:29
	16:41 07:54-08:42/48	17:17 07:36-07:43/7	17:52	19:28	20:01	20:32
3	07:31 15:43-16:05/22	07:14 07:52-08:57/65	06:36	06:43	05:57	05:28
	16:42 07:54-08:43/49	17:18 07:35-07:41/6	17:54	19:29	20:02	20:32
4	07:31 15:45-16:05/20	07:13 07:51-08:56/65	06:34	06:42	05:55	05:28
	16:43 07:54-08:43/49	17:20 07:34-07:39/5	17:55	19:30	20:03	20:33
5	07:31 15:45-16:05/20	07:12 07:52-08:56/64	06:33	06:40	05:54	05:28
	16:44 07:54-08:44/50	17:21 07:32-07:38/6	17:56	19:31	20:05	20:34
6	07:31 15:47-16:05/18	07:11 07:53-08:55/62	06:31	06:38	05:53	05:27
	16:45 07:53-08:44/51	17:22 07:31-07:37/6	17:57	19:32	20:06	20:34
7	07:31 15:48-16:05/17	07:10 07:53-08:55/62	06:29	06:37	05:52	05:27
	16:46 07:53-08:45/52	17:24 07:30-07:36/6	17:58	19:34	20:07	20:35
8	07:31 15:49-16:05/16	07:09 07:54-08:55/61	06:28	06:35	05:50	05:27
	16:47 07:53-08:46/53	17:25 07:31-07:32/1	18:00	19:35	20:08	20:36
9	07:30 15:51-16:05/14	07:07 07:54-08:53/59	06:26	06:33	05:49	05:26
	16:48 07:53-08:47/54	17:26	18:01	19:36	20:09	20:36
10	07:30 15:51-16:04/13	07:06 07:55-08:53/58	06:24 06:43-06:46/3	06:32	05:48	05:26
	16:49 07:52-08:47/55	17:27	18:02	19:37	20:10	20:37
11	07:30 15:53-16:04/11	07:05 07:56-08:52/56	06:23 06:42-06:48/6	06:30	05:47	05:26
	16:50 07:52-08:48/56	17:29	18:03	19:38	20:11	20:38
12	07:30 15:55-16:04/9	07:04 07:58-08:52/54	06:21 06:40-06:48/8	06:28	05:46	05:26
	16:51 07:52-08:49/57	17:30	18:04	19:39	20:12	20:38
13	07:29 15:57-16:01/4	07:02 07:58-08:50/52	06:19 06:38-06:47/9	06:27	05:45	05:26
	16:52 07:51-08:49/58	17:31	18:05	19:40	20:13	20:39
14	07:29 07:51-08:50/59	07:01 08:00-08:49/49	06:18 06:37-06:48/11	06:25	05:44	05:26
	16:54	17:33	18:07	19:41	20:14	20:39
15	07:29 07:50-08:51/61	07:00 08:00-08:47/47	06:16 06:35-06:47/12	06:23	05:43	05:26
	16:55	17:34	18:08	19:42	20:15	20:39
16	07:28 07:50-08:52/62	06:58 08:02-08:46/44	06:14 06:33-06:46/13	06:22	05:42	05:26
	16:56	17:35	18:09	19:44	20:16	20:40
17	07:28 07:49-08:52/63	06:57 08:04-08:44/40	06:12 06:31-06:44/13	06:20	05:41	05:26
	16:57	17:36	18:10	19:45	20:17	20:40
18	07:27 07:49-08:53/64	06:56 08:05-08:41/36	06:11 06:30-06:43/13	06:19	05:40	05:26
	16:58	17:38	18:11	19:46	20:18	20:41
19	07:27 07:48-08:53/65	06:54 08:08-08:39/31	06:09 06:30-06:40/10	06:17	05:39	05:26
	16:59	17:39	18:12	19:47	20:19	20:41
20	07:26 07:47-08:54/67	06:53 08:10-08:36/26	06:07	06:15	05:38	05:26
	17:01	17:40	18:13	19:48	20:20	20:41
21	07:25 07:47-08:55/68	06:51 08:15-08:32/17	06:06	06:14	05:37	05:26
	17:02	17:41	18:15	19:49	20:21	20:41
22	07:25 07:46-08:55/69	06:50 07:09-07:11/2	06:04	06:12	05:36	05:26
	17:03	17:43	18:16	19:50	20:22	20:42
23	07:24 07:45-08:55/70	06:48 07:08-07:12/4	06:02	06:11	05:35	05:27
	17:04	17:44	18:17	19:51	20:23	20:42
24	07:23 07:44-08:55/71	06:47 07:06-07:11/5	06:00	06:09	05:34	05:27
	17:06	17:45	18:18	19:52	20:24	20:42
25	07:22 07:44-08:55/71	06:45 07:05-07:11/6	05:59	06:08	05:34	05:27
	17:07	17:46	18:19	19:54	20:25	20:42
26	07:22 07:43-08:57/74	06:44 07:03-07:10/7	05:57	06:06	05:33	05:28
	17:08	17:48	18:20	19:55	20:26	20:42
27	07:21 07:42-08:57/75	06:42 07:02-07:09/7	05:55	06:05	05:32	05:28
	17:09	17:49	18:21	19:56	20:27	20:42
28	07:20 07:50-08:57/67	06:41 07:00-07:06/6	05:54	06:04	05:32	05:28
	17:11 07:41-07:48/7	17:50	18:22	19:57	20:28	20:42
29	07:19 07:50-08:57/67		06:52	06:02	05:31	05:29
	17:12 07:40-07:47/7		19:24	19:58	20:28	20:42
30	07:18 07:50-08:57/67		06:50	06:01	05:30	05:29
	17:13 07:39-07:46/7		19:25	19:59	20:29	20:42
31	07:17 07:50-08:57/67		06:48		05:30	
	17:15 07:38-07:45/7		19:26		20:30	
Potential sun hours	294	296	369	400	451	456
Sum of minutes with flicker	2125	1161	98	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:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 7 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)

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	05:30	05:54	06:27	06:58 07:19-07:27/8	06:34 07:25-08:23/58	07:10 15:35-15:46/11
	20:42	20:22	19:38	18:46	16:57	16:32 07:34-08:30/56
2	05:30	05:55	06:28	06:59 07:20-07:26/6	06:35 07:24-08:23/59	07:11 15:34-15:47/13
	20:42	20:21	19:36	18:44	16:56	16:32 07:35-08:30/55
3	05:31	05:56	06:29	07:00 07:21-07:25/4	06:36 07:23-08:24/61	07:12 15:34-15:48/14
	20:42	20:20	19:34	18:42	16:55 07:00-07:03/3	16:31 07:36-08:30/54
4	05:31	05:57	06:30	07:01 07:22-07:24/2	06:38 07:23-08:25/62	07:13 15:33-15:49/16
	20:41	20:19	19:33	18:40	16:54 07:00-07:06/6	16:31 07:37-08:30/53
5	05:32	05:58	06:31	07:02	06:39 07:22-08:25/63	07:14 15:33-15:50/17
	20:41	20:17	19:31	18:39	16:52 07:01-07:07/6	16:31 07:38-08:30/52
6	05:32	05:59	06:32	07:04	06:40 07:22-08:25/63	07:15 15:33-15:51/18
	20:41	20:16	19:29	18:37	16:51 07:03-07:09/6	16:31 07:39-08:30/51
7	05:33	06:01	06:33	07:05	06:41 07:22-08:27/65	07:16 15:33-15:52/19
	20:41	20:15	19:27	18:35	16:50 07:04-07:09/5	16:31 07:40-08:30/50
8	05:34	06:02	06:34	07:06	06:42 07:22-08:27/65	07:17 15:32-15:52/20
	20:40	20:14	19:26	18:34	16:49 07:05-07:11/6	16:30 07:41-08:31/50
9	05:34	06:03	06:35	07:07	06:44 07:21-08:27/66	07:18 15:31-15:53/22
	20:40	20:12	19:24	18:32	16:48 07:07-07:14/7	16:30 07:42-08:31/49
10	05:35	06:04	06:36	07:08	06:45 07:22-08:28/66	07:19 15:31-15:54/23
	20:40	20:11	19:22	18:30	16:47 07:08-07:15/7	16:30 07:43-08:31/48
11	05:36	06:05	06:37	07:09	06:46 07:21-08:28/67	07:20 15:31-15:55/24
	20:39	20:10	19:21	18:29	16:46 07:09-07:16/7	16:31 07:44-08:31/47
12	05:36	06:06	06:38	07:10	06:47 07:21-08:28/67	07:20 15:31-15:55/24
	20:39	20:08	19:19	18:27	16:45 07:11-07:18/7	16:31 07:45-08:32/47
13	05:37	06:07	06:39	07:11	06:49 07:22-08:29/67	07:21 15:31-15:55/24
	20:38	20:07	19:17	18:25	16:44 07:12-07:19/7	16:31 07:46-08:32/46
14	05:38	06:08	06:40	07:12 07:33-07:40/7	06:50 07:21-08:29/68	07:22 15:31-15:56/25
	20:38	20:06	19:15	18:24	16:43 07:13-07:20/7	16:31 07:46-08:32/46
15	05:39	06:09	06:41	07:14 07:35-07:42/7	06:51 07:14-08:29/75	07:23 15:32-15:57/25
	20:37	20:04	19:14	18:22	16:42	16:31 07:47-08:32/45
16	05:40	06:10	06:42	07:15 07:36-07:43/7	06:52 07:16-08:30/74	07:24 15:32-15:57/25
	20:36	20:03	19:12	18:21	16:41	16:31 07:48-08:33/45
17	05:40	06:11	06:43	07:16 07:37-07:43/6	06:54 07:17-08:29/72	07:24 15:32-15:57/25
	20:36	20:01	19:10	18:19	16:40	16:32 07:48-08:32/44
18	05:41	06:12	06:44	07:17 07:38-07:43/5	06:55 07:18-08:29/71	07:25 15:32-15:58/26
	20:35	20:00	19:08	18:17	16:39	16:32 07:49-08:33/44
19	05:42	06:13	06:45	07:18 07:39-07:42/3	06:56 07:20-08:30/70	07:26 15:33-15:59/26
	20:34	19:58	19:07	18:16	16:39	16:32 07:50-08:34/44
20	05:43	06:14	06:46	07:19 08:51-08:58/7	06:57 07:21-08:30/69	07:26 15:33-15:59/26
	20:34	19:57	19:05	18:14 07:41-07:43/2	16:38	16:33 07:50-08:34/44
21	05:44	06:15	06:47	07:21 08:44-09:04/20	06:58 07:22-08:30/68	07:27 15:34-16:00/26
	20:33	19:55	19:03	18:13	16:37	16:33 07:51-08:35/44
22	05:45	06:16	06:49	07:22 08:40-09:07/27	07:00 07:23-08:30/67	07:27 15:34-16:00/26
	20:32	19:54	19:01	18:11	16:36	16:34 07:51-08:35/44
23	05:46	06:17	06:50	07:23 08:37-09:10/33	07:01 07:25-08:30/65	07:28 15:34-16:00/26
	20:31	19:52	18:59	18:10	16:36	16:34 07:52-08:36/44
24	05:47	06:18	06:51 07:15-07:22/7	07:24 08:35-09:13/38	07:02 07:26-08:30/64	07:28 15:35-16:01/26
	20:30	19:51	18:58	18:08	16:35	16:35 07:52-08:36/44
25	05:48	06:19	06:52 07:12-07:25/13	06:25 07:33-08:14/41	07:03 07:27-08:30/63	07:29 15:35-16:01/26
	20:29	19:49	18:56	17:07	16:35	16:35 07:52-08:36/44
26	05:49	06:20	06:53 07:13-07:26/13	06:27 07:31-08:16/45	07:04 07:28-08:30/62	07:29 15:37-16:02/25
	20:28	19:47	18:54	17:06	16:34	16:36 07:53-08:37/44
27	05:50	06:21	06:54 07:14-07:27/13	06:28 07:30-08:17/47	07:05 07:29-08:30/61	07:29 15:37-16:02/25
	20:27	19:46	18:52	17:04	16:33	16:37 07:53-08:38/45
28	05:50	06:22	06:55 07:15-07:27/12	06:29 07:29-08:19/50	07:07 07:31-08:31/60	07:30 15:37-16:03/26
	20:26	19:44	18:51	17:03	16:33	16:37 07:53-08:38/45
29	05:51	06:23	06:56 07:16-07:27/11	06:30 07:27-08:20/53	07:08 15:38-15:42/4	07:30 15:38-16:03/25
	20:25	19:43	18:49	17:01	16:33 07:32-08:30/58	16:38 07:53-08:38/45
30	05:52	06:25	06:57 07:18-07:28/10	06:31 07:26-08:21/55	07:09 15:36-15:45/9	07:30 15:38-16:03/25
	20:24	19:41	18:47	17:00	16:32 07:33-08:30/57	16:39 07:53-08:39/46
31	05:53	06:26		06:33 07:26-08:22/56		07:30 15:40-16:04/24
	20:23	19:39		16:59		16:40 07:54-08:40/46
Potential sun hours	462	430	375	344	296	284
Sum of minutes with flicker	0	0	79	529	2040	2164

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 8 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)

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	07:31 07:54-10:13/139	07:16 16:13-16:52/39	06:39 17:01-17:29/28	06:47	06:00 06:40-07:40/60	05:29
	16:41	17:16 07:47-09:29/102	17:51	19:27	20:00	20:31
2	07:31 07:54-10:13/139	07:15 16:13-16:53/40	06:38 17:01-17:31/30	06:45 07:11-07:25/14	05:58 06:40-07:39/59	05:29
	16:42	17:17 07:47-09:28/101	17:53	19:28	20:01	20:32
3	07:31 07:54-10:13/139	07:14 16:14-16:55/41	06:36 17:01-17:32/31	06:43 07:05-07:29/24	05:57 06:41-07:39/58	05:29
	16:42	17:18 07:47-09:27/100	17:54	19:29	20:02	20:32
4	07:31 07:54-10:13/139	07:13 16:13-16:55/42	06:34 17:00-17:33/33	06:42 07:01-07:32/31	05:56 06:41-07:38/57	05:28
	16:43	17:20 07:48-09:26/98	17:55	19:30	20:04	20:33
5	07:31 07:54-10:13/139	07:12 16:14-16:57/43	06:33 17:01-17:35/34	06:40 06:59-07:35/36	05:54 06:41-07:37/56	05:28
	16:44	17:21 07:47-09:24/97	17:56	19:31	20:05	20:34
6	07:31 07:53-10:12/139	07:11 16:15-16:58/43	06:31 17:01-17:34/33	06:38 06:57-07:36/39	05:53 06:42-07:36/54	05:27
	16:45	17:22 07:48-09:22/94	17:57	19:33	20:06	20:35
7	07:31 07:53-10:12/139	07:10 16:15-17:00/45	06:29 17:01-17:33/32	06:37 06:55-07:38/43	05:52 06:43-07:36/53	05:27
	16:46	17:24 07:48-09:20/92	17:58	19:34	20:07	20:35
8	07:31 07:53-10:12/139	07:09 16:17-17:02/45	06:28 17:02-17:32/30	06:35 06:54-07:39/45	05:51 06:44-07:35/51	05:27
	16:47	17:25 07:49-09:18/89	18:00	19:35	20:08	20:36
9	07:30 07:53-10:12/139	07:07 16:17-17:02/45	06:26 17:02-17:31/29	06:33 06:52-07:40/48	05:49 06:44-07:33/49	05:27
	16:48	17:26 07:50-09:16/86	18:01	19:36	20:09	20:36
10	07:30 16:22-16:23/1	07:06 16:18-17:04/46	06:24 17:03-17:29/26	06:32 06:50-07:41/51	05:48 06:45-07:32/47	05:26
	16:49 07:53-10:11/138	17:28 07:49-09:12/83	18:02	19:37	20:10	20:37
11	07:30 16:20-16:24/4	07:05 16:20-17:06/46	06:23 17:05-17:28/23	06:30 06:49-07:42/53	05:47 06:46-07:31/45	05:26
	16:50 07:52-10:10/138	17:29 07:50-09:08/78	18:03	19:38	20:11	20:38
12	07:30 16:19-16:26/7	07:04 16:21-17:07/46	06:21 17:06-17:26/20	06:28 06:47-07:42/55	05:46 06:47-07:30/43	05:26
	16:51 07:52-10:10/138	17:30 07:51-08:53/62	18:04	19:39	20:12	20:38
13	07:29 16:17-16:26/9	07:02 16:22-17:08/46	06:19 17:08-17:23/15	06:27 06:46-07:43/57	05:45 06:48-07:29/41	05:26
	16:53 07:51-10:08/137	17:31 07:51-08:52/61	18:05	19:40	20:13	20:39
14	07:29 16:17-16:28/11	07:01 16:24-17:09/45	06:18 17:14-17:17/3	06:25 06:45-07:43/58	05:44 06:49-07:28/39	05:26
	16:54 07:51-10:07/136	17:33 07:52-08:51/59	18:07	19:41	20:14	20:39
15	07:29 16:16-16:29/13	07:00 16:25-17:08/43	06:16	06:23 06:44-07:43/59	05:43 06:50-07:27/37	05:26
	16:55 07:50-10:06/136	17:34 07:53-08:51/58	18:08	19:43	20:15	20:40
16	07:28 16:16-16:30/14	06:58 16:28-17:09/41	06:14	06:22 06:43-07:44/61	05:42 06:51-07:25/34	05:26
	16:56 07:50-10:05/135	17:35 07:54-08:49/55	18:09	19:44	20:16	20:40
17	07:28 16:15-16:31/16	06:57 16:29-17:09/40	06:13	06:20 06:42-07:44/62	05:41 06:53-07:23/30	05:26
	16:57 07:49-10:02/133	17:36 07:55-08:48/53	18:10	19:45	20:17	20:40
18	07:27 16:15-16:33/18	06:56 16:30-17:08/38	06:11	06:19 06:42-07:44/62	05:40 06:55-07:23/28	05:26
	16:58 07:49-10:01/132	17:38 07:56-08:46/50	18:11	19:46	20:18	20:41
19	07:27 16:14-16:34/20	06:54 16:31-17:08/37	06:09	06:17 06:41-07:44/63	05:39 06:57-07:20/23	05:26
	17:00 07:48-09:57/129	17:39 07:57-08:45/48	18:12	19:47	20:19	20:41
20	07:26 16:13-16:35/22	06:53 17:16-17:17/1 07:58-08:43/45	06:07	06:16 06:41-07:44/63	05:38 06:59-07:18/19	05:26
	17:01 07:47-09:41/114	17:40 16:32-17:08/36	18:13	19:48	20:20	20:41
21	07:25 16:13-16:37/24	06:51 17:12-17:19/7 08:00-08:42/42	06:06	06:14 06:40-07:44/64	05:37 07:02-07:14/12	05:26
	17:02 07:47-09:41/114	17:41 16:33-17:07/34	18:15	19:49	20:21	20:41
22	07:25 16:13-16:38/25	06:50 17:09-17:20/11 08:02-08:39/37	06:04	06:12 06:40-07:44/64	05:36	05:26
	17:03 07:46-09:40/114	17:43 16:33-17:06/33	18:16	19:50	20:22	20:42
23	07:24 16:12-16:39/27	06:48 17:08-17:22/14 08:04-08:37/33	06:02	06:11 06:40-07:43/63	05:35	05:27
	17:04 07:46-09:39/113	17:44 16:35-17:06/31	18:17	19:51	20:23	20:42
24	07:23 16:12-16:40/28	06:47 17:06-17:23/17 08:07-08:33/26	06:01	06:09 06:40-07:44/64	05:35	05:27
	17:06 07:46-09:37/111	17:45 16:36-17:04/28	18:18	19:53	20:24	20:42
25	07:23 16:13-16:42/29	06:45 17:05-17:25/20 08:11-08:29/18	05:59	06:08 06:39-07:43/64	05:34	05:27
	17:07 07:47-09:37/110	17:46 16:37-17:03/26	18:19	19:54	20:25	20:42
26	07:22 16:13-16:44/31	06:44 17:03-17:26/23	05:57	06:07 06:40-07:43/63	05:33	05:28
	17:08 07:46-09:36/110	17:48 16:39-17:01/22	18:20	19:55	20:26	20:42
27	07:21 16:12-16:45/33	06:42 17:03-17:27/24	05:55	06:05 06:40-07:43/63	05:32	05:28
	17:09 07:46-09:34/108	17:49 16:41-16:59/18	18:21	19:56	20:27	20:42
28	07:20 16:12-16:46/34	06:41 17:02-17:28/26	05:54	06:04 06:39-07:42/63	05:32	05:28
	17:11 07:46-09:32/106	17:50 16:44-16:56/12	18:22	19:57	20:28	20:42
29	07:19 16:12-16:48/36		06:52	06:02 06:40-07:41/61	05:31	05:29
	17:12 07:46-09:31/105		19:24	19:58	20:29	20:42
30	07:18 16:12-16:49/37		06:50	06:01 06:39-07:40/61	05:31	05:29
	17:13 07:47-09:30/103		19:25	19:59	20:29	20:42
31	07:17 16:13-16:50/37		06:48		05:30	
	17:15 07:47-09:30/103		19:26		20:30	
Potential sun hours	294	296	369	400	451	456
Sum of minutes with flicker	4390	2861	367	1554	895	0

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 8 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)

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	05:30 20:42	05:54 06:57-07:41/44 20:22	06:27 06:48-07:41/53 19:38	06:58 17:47-18:05/18 18:46	06:34 15:48-16:33/45 16:57 07:19-08:43/84	07:10 16:02-16:06/4 16:32 07:34-09:52/138
2	05:30 20:42	05:55 06:56-07:42/46 20:21	06:28 06:49-07:40/51 19:36	06:59 17:44-18:06/22 18:44	06:35 15:46-16:32/46 16:56 07:18-08:45/87	07:11 16:05-16:06/1 16:32 07:35-09:53/138
3	05:31 20:42	05:57 06:55-07:43/48 20:20	06:29 06:50-07:38/48 19:34	07:00 17:42-18:07/25 18:42	06:36 15:46-16:31/45 16:55 07:19-08:49/90	07:12 07:36-09:55/139 16:31
4	05:31 20:42	05:58 06:54-07:44/50 20:19	06:30 06:51-07:37/46 19:33	07:01 17:40-18:08/28 18:40	06:38 15:45-16:30/45 16:54 07:18-08:51/93	07:13 07:37-09:56/139 16:31
5	05:32 20:41	05:59 06:53-07:45/52 20:18	06:31 06:52-07:35/43 19:31	07:03 17:39-18:09/30 18:39	06:39 15:44-16:28/44 16:52 07:17-08:52/95	07:14 07:38-09:57/139 16:31
6	05:32 20:41	06:00 06:52-07:46/54 20:16	06:32 06:53-07:33/40 19:29	07:04 17:38-18:09/31 18:37	06:40 15:44-16:27/43 16:51 07:18-08:55/97	07:15 07:39-09:58/139 16:31
7	05:33 20:41	06:01 06:52-07:46/54 20:15	06:33 06:54-07:30/36 19:28	07:05 17:37-18:09/32 18:35	06:41 15:44-16:26/42 16:50 07:18-08:56/98	07:16 07:40-09:59/139 16:31
8	05:34 20:40	06:02 06:51-07:47/56 20:14	06:34 06:56-07:27/31 19:26	07:06 17:36-18:09/33 18:34	06:43 15:43-16:24/41 16:49 07:17-08:57/100	07:17 07:41-10:00/139 16:31
9	05:34 20:40	06:03 06:50-07:47/57 20:12	06:35 06:59-07:24/25 19:24	07:07 17:35-18:08/33 18:32	06:44 15:43-16:23/40 16:48 07:18-08:59/101	07:18 07:42-10:01/139 16:31
10	05:35 20:40	06:04 06:50-07:48/58 20:11	06:36 07:03-07:19/16 19:22	07:08 17:36-18:07/31 18:30	06:45 15:44-16:23/39 16:47 07:18-09:00/102	07:19 07:43-10:02/139 16:31
11	05:36 20:39	06:05 06:49-07:48/59 20:10	06:37 19:21	07:09 17:35-18:06/31 18:29	06:46 15:43-16:21/38 16:46 07:18-09:01/103	07:20 07:44-10:03/139 16:31
12	05:37 20:39	06:06 06:48-07:49/61 20:08	06:38 19:19	07:10 17:35-18:04/29 18:27	06:48 15:43-16:20/37 16:45 07:18-09:02/104	07:21 07:45-10:04/139 16:31
13	05:37 20:38	06:07 06:48-07:49/61 20:07	06:39 19:17	07:11 17:35-18:02/27 18:25 17:21-17:24/3	06:49 15:44-16:19/35 16:44 07:18-09:03/105	07:21 07:46-10:05/139 16:31
14	05:38 20:38	06:08 06:47-07:49/62 20:06	06:40 19:15	07:13 17:35-18:00/25 18:24 17:15-17:29/14	06:50 15:44-16:18/34 16:43 07:18-09:04/106	07:22 07:46-10:05/139 16:31
15	05:39 20:37	06:09 06:47-07:49/62 20:04	06:41 19:14	07:14 17:35-17:58/23 18:22 17:12-17:32/20	06:51 15:44-16:17/33 16:42 07:18-09:06/108	07:23 07:47-10:06/139 16:31
16	05:40 20:36	06:10 06:47-07:49/62 20:03	06:42 19:12	07:15 17:36-17:57/21 08:47-08:57/10 18:21 17:10-17:34/24	06:52 15:45-16:17/32 16:41 07:19-09:09/110	07:24 07:48-10:07/139 16:31
17	05:41 20:36	06:11 06:46-07:49/63 20:01	06:43 19:10	07:16 17:37-17:56/19 08:41-09:03/22 18:19 17:08-17:35/27	06:54 15:46-16:15/29 16:40 07:20-09:10/110	07:24 07:48-10:07/139 16:32
18	05:41 20:35	06:12 06:46-07:49/63 20:00	06:44 19:08	07:17 17:38-17:54/16 08:37-09:06/29 18:18 17:07-17:36/29	06:55 15:46-16:14/28 16:39 07:20-09:11/111	07:25 07:49-10:08/139 16:32
19	05:42 20:34	06:13 06:46-07:49/63 19:58	06:45 19:07	07:18 17:39-17:52/13 08:34-09:08/34 18:16 17:05-17:37/32	06:56 15:47-16:14/27 16:39 07:21-09:14/113	07:26 07:50-10:09/139 16:32
20	05:43 20:34	06:14 06:45-07:49/64 19:57	06:46 19:05	07:20 17:41-17:51/10 08:32-09:11/39 18:14 17:05-17:38/33	06:57 15:48-16:13/25 16:38 07:21-09:15/114	07:26 07:50-10:09/139 16:33
21	05:44 20:33	06:15 06:45-07:49/64 19:55	06:48 19:03	07:21 17:43-17:49/6 08:30-09:13/43 18:13 17:03-17:38/35	06:59 15:48-16:12/24 16:37 07:22-09:16/114	07:27 07:51-10:10/139 16:33
22	05:45 07:16-07:22/6 20:32	06:16 06:45-07:49/64 19:54	06:49 19:01	07:22 17:02-17:38/36 18:11 08:28-09:14/46	07:00 15:49-16:11/22 16:36 07:23-09:17/114	07:27 07:51-10:10/139 16:34
23	05:46 07:11-07:27/16 20:31	06:17 06:45-07:48/63 19:52	06:50 19:00	07:23 17:00-17:38/38 18:10 08:27-09:15/48	07:01 15:51-16:11/20 16:36 07:25-09:34/129	07:28 07:52-10:11/139 16:34
24	05:47 07:09-07:30/21 20:30	06:18 06:45-07:48/63 19:51	06:51 18:58	07:24 17:00-17:39/39 18:08 08:26-09:17/51	07:02 15:52-16:10/18 16:35 07:26-09:38/132	07:28 07:52-10:11/139 16:35
25	05:48 07:06-07:31/25 20:29	06:19 06:45-07:47/62 19:49	06:52 18:56	06:25 15:59-16:39/40 17:07 07:24-08:18/54	07:03 15:53-16:09/16 16:35 07:27-09:40/133	07:29 07:52-10:11/139 16:35
26	05:49 07:04-07:33/29 20:28	06:20 06:45-07:47/62 19:48	06:53 18:54	06:27 15:57-16:38/41 17:06 07:23-08:19/56	07:04 15:54-16:08/14 16:34 07:28-09:43/135	07:29 07:53-10:12/139 16:36
27	05:50 07:03-07:35/32 20:27	06:21 06:45-07:46/61 19:46	06:54 18:53	06:28 15:55-16:38/43 17:04 07:22-08:20/58	07:06 15:56-16:09/13 16:34 07:30-09:46/136	07:29 07:53-10:12/139 16:37
28	05:51 07:01-07:36/35 20:26	06:23 06:46-07:45/59 19:44	06:55 18:51	06:29 15:53-16:38/45 17:03 07:22-08:21/59	07:07 15:57-16:08/11 16:33 07:31-09:47/136	07:30 07:53-10:12/139 16:37
29	05:52 07:00-07:38/38 20:25	06:24 06:46-07:44/58 19:43	06:56 18:49	06:30 15:51-16:37/46 17:01 07:21-08:22/61	07:08 15:58-16:07/9 16:33 07:32-09:49/137	07:30 07:53-10:12/139 16:38
30	05:52 06:59-07:39/40 20:24	06:25 06:46-07:43/57 19:41	06:57 17:49-18:01/12 18:47	06:31 15:50-16:36/46 07:20-08:22/62 17:00 08:24-08:31/7	07:09 16:00-16:07/7 16:32 07:33-09:51/138	07:30 07:54-10:13/139 16:39
31	05:53 06:58-07:40/42 20:23	06:26 06:47-07:42/55 19:39		06:33 15:49-16:35/46 16:59 07:20-08:39/79		07:30 07:54-10:13/139 16:40
Potential sun hours	462	430	375	344	295	284
Sum of minutes with flicker	284	1807	401	1898	4237	4312

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

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

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Calculated:
15/02/2024 21:59/3.6.377

SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 9 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (9)

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	07:30 16:41	07:16 17:16	06:39 17:51	06:47 07:59-08:22/23 19:27	05:59 07:23-08:40/77 20:00	05:29 07:39-08:18/39 20:31
2	07:31 16:41	07:15 17:17	06:37 17:52	06:45 07:55-08:27/32 19:28	05:58 07:23-08:40/77 20:01	05:29 07:41-08:18/37 20:31
3	07:31 16:42	07:14 17:18	06:36 17:54	06:43 07:51-08:30/39 19:29	05:57 07:22-08:38/76 20:02	05:28 07:42-08:17/35 20:32
4	07:31 16:43	07:13 17:20	06:34 17:55	06:42 07:48-08:32/44 19:30	05:55 07:23-08:38/75 20:03	05:28 07:42-08:16/34 20:33
5	07:31 16:44	07:12 17:21	06:32 17:56	06:40 07:46-08:34/48 19:31	05:54 07:23-08:38/75 20:04	05:28 07:44-08:16/32 20:34
6	07:31 16:45	07:11 17:22	06:31 17:57	06:38 07:44-08:35/51 19:32	05:53 07:23-08:37/74 20:05	05:27 07:45-08:15/30 20:34
7	07:30 16:46	07:10 17:24	06:29 17:58	06:36 07:41-08:36/55 19:33	05:52 07:24-08:37/73 20:07	05:27 07:45-08:14/29 20:35
8	07:30 16:47	07:08 17:25	06:28 18:00	06:35 07:40-08:38/58 19:35	05:50 07:24-08:37/73 20:08	05:27 07:47-08:13/26 20:36
9	07:30 16:48	07:07 17:26	06:26 18:01	06:33 07:38-08:39/61 19:36	05:49 07:24-08:35/71 20:09	05:27 07:48-08:12/24 20:36
10	07:30 16:49	07:06 17:27	06:24 18:02	06:31 07:36-08:39/63 19:37	05:48 07:24-08:34/70 20:10	05:26 07:49-08:12/23 20:37
11	07:30 16:50	07:05 17:29	06:23 18:03	06:30 07:35-08:41/66 19:38	05:47 07:24-08:34/70 20:11	05:26 07:50-08:11/21 20:37
12	07:29 16:51	07:03 17:30	06:21 18:04	06:28 07:34-08:41/67 19:39	05:46 07:25-08:33/68 20:12	05:26 07:52-08:11/19 20:38
13	07:29 16:52	07:02 17:31	06:19 18:05	06:27 07:32-08:41/69 19:40	05:45 07:25-08:33/68 20:13	05:26 07:53-08:10/17 20:38
14	07:29 16:54	07:01 17:33	06:18 18:06	06:25 07:31-08:42/71 19:41	05:44 07:26-08:32/66 20:14	05:26 07:53-08:08/15 20:39
15	07:28 16:55	07:00 17:34	06:16 18:08	06:23 07:30-08:42/72 19:42	05:43 07:26-08:31/65 20:15	05:26 07:54-08:07/13 20:39
16	07:28 16:56	06:58 17:35	06:14 18:09	06:22 07:30-08:43/73 19:43	05:42 07:27-08:30/63 20:16	05:26 07:56-08:08/12 20:40
17	07:27 16:57	06:57 17:36	06:12 18:10	06:20 07:28-08:43/75 19:45	05:41 07:27-08:29/62 20:17	05:26 07:57-08:07/10 20:40
18	07:27 16:58	06:55 17:38	06:11 18:11	06:19 07:28-08:43/75 19:46	05:40 07:28-08:29/61 20:18	05:26 07:58-08:06/8 20:40
19	07:26 16:59	06:54 17:39	06:09 18:12	06:17 07:27-08:43/76 19:47	05:39 07:29-08:29/60 20:19	05:26 07:59-08:06/7 20:41
20	07:26 17:01	06:53 17:40	06:07 18:13	06:15 07:27-08:43/76 19:48	05:38 07:30-08:28/58 20:20	05:26 07:59-08:05/6 20:41
21	07:25 17:02	06:51 17:41	06:06 18:14	06:14 07:26-08:43/77 19:49	05:37 07:30-08:27/57 20:21	05:26 07:59-08:05/6 20:41
22	07:25 17:03	06:50 17:43	06:04 18:16	06:12 07:26-08:43/77 19:50	05:36 07:31-08:26/55 20:22	05:26 07:59-08:05/6 20:41
23	07:24 17:04	06:48 17:44	06:02 18:17	06:11 07:25-08:43/78 19:51	05:35 07:32-08:26/54 20:23	05:27 08:00-08:07/7 20:42
24	07:23 17:06	06:47 17:45	06:00 18:18	06:09 07:25-08:43/78 19:52	05:35 07:33-08:25/52 20:24	05:27 07:59-08:07/8 20:42
25	07:22 17:07	06:45 17:46	05:59 18:19	06:08 07:24-08:42/78 19:53	05:34 07:33-08:24/51 20:25	05:27 07:58-08:08/10 20:42
26	07:22 17:08	06:44 17:48	05:57 18:20	06:06 07:24-08:42/78 19:54	05:33 07:34-08:23/49 20:26	05:28 07:58-08:09/11 20:42
27	07:21 17:09	06:42 17:49	05:55 18:21	06:05 07:23-08:41/78 19:56	05:32 07:35-08:22/47 20:26	05:28 07:57-08:10/13 20:42
28	07:20 17:11	06:40 17:50	05:53 18:22	06:04 07:23-08:41/78 19:57	05:32 07:36-08:21/45 20:27	05:28 07:56-08:11/15 20:42
29	07:19 17:12		06:52 19:23	06:02 07:23-08:41/78 19:58	05:31 07:37-08:21/44 20:28	05:29 07:56-08:13/17 20:42
30	07:18 17:13		06:50 19:25	06:01 07:23-08:40/77 19:59	05:30 07:37-08:20/43 20:29	05:29 07:55-08:13/18 20:42
31	07:17 17:15		06:48 08:09-08:14/5 19:26		05:30 07:39-08:19/40 20:30	
Potential sun hours	295	296	369	400	451	456
Sum of minutes with flicker	0	0	5	1971	1919	548

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

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

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SHADOW - Calendar per WTG

Calculation: WON019_ShadowFlickering WTG: 9 - VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (9)

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	05:30 07:55-08:15/20 20:42	05:54 07:35-08:44/69 20:22	06:27 07:34-08:40/66 19:37	06:58 18:45	06:34 16:57	07:10 16:32
2	05:30 07:54-08:16/22 20:42	05:55 07:35-08:45/70 20:21	06:28 07:35-08:38/63 19:36	06:59 18:44	06:35 16:56	07:11 16:32
3	05:31 07:54-08:17/23 20:41	05:56 07:34-08:45/71 20:20	06:29 07:36-08:37/61 19:34	07:00 18:42	06:36 16:55	07:12 16:31
4	05:31 07:52-08:18/26 20:41	05:57 07:34-08:46/72 20:18	06:30 07:37-08:35/58 19:32	07:01 18:40	06:37 16:54	07:13 16:31
5	05:32 07:52-08:19/27 20:41	05:58 07:34-08:46/72 20:17	06:31 07:38-08:34/56 19:31	07:02 18:39	06:39 16:52	07:14 16:31
6	05:32 07:52-08:21/29 20:41	05:59 07:33-08:47/74 20:16	06:32 07:40-08:32/52 19:29	07:03 18:37	06:40 16:51	07:15 16:31
7	05:33 07:50-08:21/31 20:40	06:01 07:33-08:47/74 20:15	06:33 07:41-08:29/48 19:27	07:05 18:35	06:41 16:50	07:16 16:31
8	05:34 07:50-08:23/33 20:40	06:02 07:33-08:48/75 20:14	06:34 07:43-08:27/44 19:26	07:06 18:34	06:42 16:49	07:17 16:31
9	05:34 07:49-08:23/34 20:40	06:03 07:32-08:48/76 20:12	06:35 07:45-08:24/39 19:24	07:07 18:32	06:44 16:48	07:18 16:30
10	05:35 07:48-08:25/37 20:39	06:04 07:32-08:48/76 20:11	06:36 07:48-08:20/32 19:22	07:08 18:30	06:45 16:47	07:19 16:30
11	05:36 07:48-08:26/38 20:39	06:05 07:32-08:48/76 20:10	06:37 07:52-08:16/24 19:20	07:09 18:29	06:46 16:46	07:19 16:31
12	05:37 07:48-08:27/39 20:38	06:06 07:31-08:49/78 20:08	06:38 07:58-08:08/10 19:19	07:10 18:27	06:47 16:45	07:20 16:31
13	05:37 07:46-08:28/42 20:38	06:07 07:31-08:49/78 20:07	06:39 19:17	07:11 18:25	06:49 16:44	07:21 16:31
14	05:38 07:46-08:29/43 20:37	06:08 07:31-08:49/78 20:05	06:40 19:15	07:12 18:24	06:50 16:43	07:22 16:31
15	05:39 07:45-08:30/45 20:37	06:09 07:31-08:49/78 20:04	06:41 19:13	07:14 18:22	06:51 16:42	07:23 16:31
16	05:40 07:45-08:31/46 20:36	06:10 07:31-08:49/78 20:03	06:42 19:12	07:15 18:21	06:52 16:41	07:23 16:31
17	05:40 07:43-08:32/49 20:35	06:11 07:31-08:49/78 20:01	06:43 19:10	07:16 18:19	06:53 16:40	07:24 16:32
18	05:41 07:43-08:33/50 20:35	06:12 07:30-08:49/79 20:00	06:44 19:08	07:17 18:17	06:55 16:39	07:25 16:32
19	05:42 07:42-08:34/52 20:34	06:13 07:30-08:49/79 19:58	06:45 19:06	07:18 18:16	06:56 16:39	07:25 16:32
20	05:43 07:42-08:35/53 20:33	06:14 07:30-08:48/78 19:57	06:46 19:05	07:19 18:14	06:57 16:38	07:26 16:33
21	05:44 07:41-08:36/55 20:33	06:15 07:30-08:48/78 19:55	06:47 19:03	07:20 18:13	06:58 16:37	07:26 16:33
22	05:45 07:41-08:37/56 20:32	06:16 07:31-08:48/77 19:54	06:48 19:01	07:22 18:11	06:59 16:36	07:27 16:34
23	05:46 07:41-08:38/57 20:31	06:17 07:31-08:47/76 19:52	06:49 18:59	07:23 18:10	07:01 16:36	07:28 16:34
24	05:47 07:40-08:39/59 20:30	06:18 07:31-08:47/76 19:50	06:51 18:58	07:24 18:08	07:02 16:35	07:28 16:35
25	05:48 07:39-08:39/60 20:29	06:19 07:31-08:46/75 19:49	06:52 18:56	06:25 17:07	07:03 16:35	07:28 16:35
26	05:49 07:38-08:40/62 20:28	06:20 07:31-08:46/75 19:47	06:53 18:54	06:26 17:05	07:04 16:34	07:29 16:36
27	05:50 07:38-08:40/62 20:27	06:21 07:32-08:45/73 19:46	06:54 18:52	06:28 17:04	07:05 16:33	07:29 16:37
28	05:50 07:37-08:41/64 20:26	06:22 07:32-08:44/72 19:44	06:55 18:51	06:29 17:03	07:06 16:33	07:29 16:37
29	05:51 07:37-08:42/65 20:25	06:23 07:32-08:43/71 19:42	06:56 18:49	06:30 17:01	07:08 16:33	07:30 16:38
30	05:52 07:36-08:43/67 20:24	06:24 07:33-08:42/69 19:41	06:57 18:47	06:31 17:00	07:09 16:32	07:30 16:39
31	05:53 07:36-08:43/67 20:23	06:26 07:34-08:41/67 19:39		06:32 16:59		07:30 16:40
Potential sun hours	462	430	375	344	296	285
Sum of minutes with flicker	1413	2318	553	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

Project:
WON019_V3_definitivo

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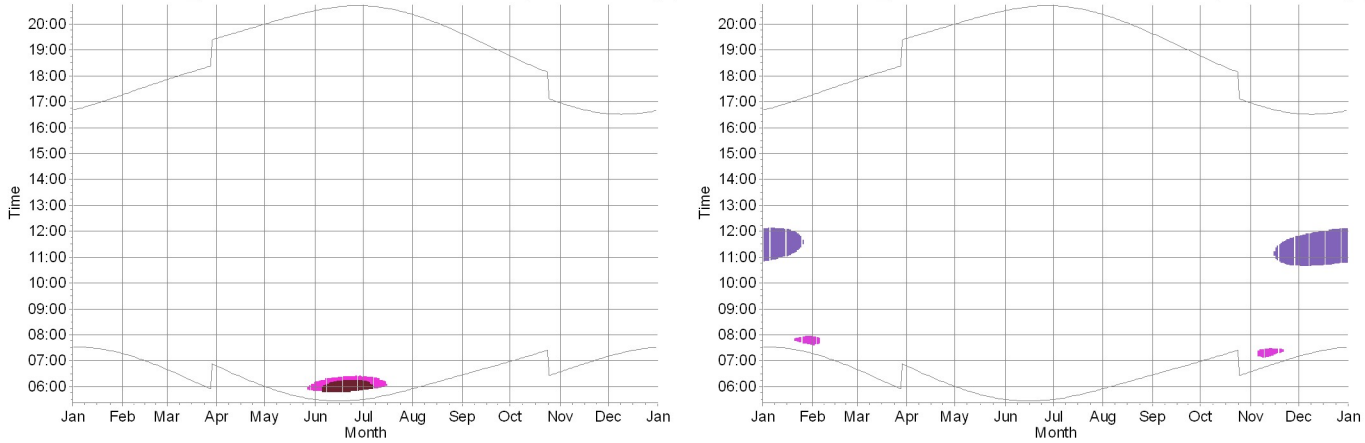
Calculated:
15/02/2024 21:59/3.6.377

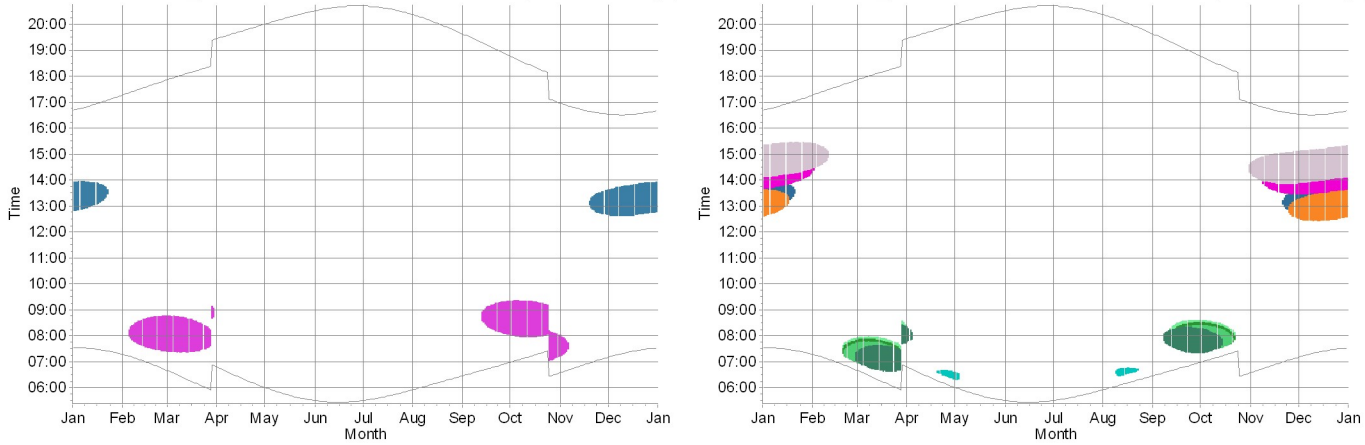
SHADOW - Calendar per WTG, graphical

Calculation: WON019_ShadowFlickering

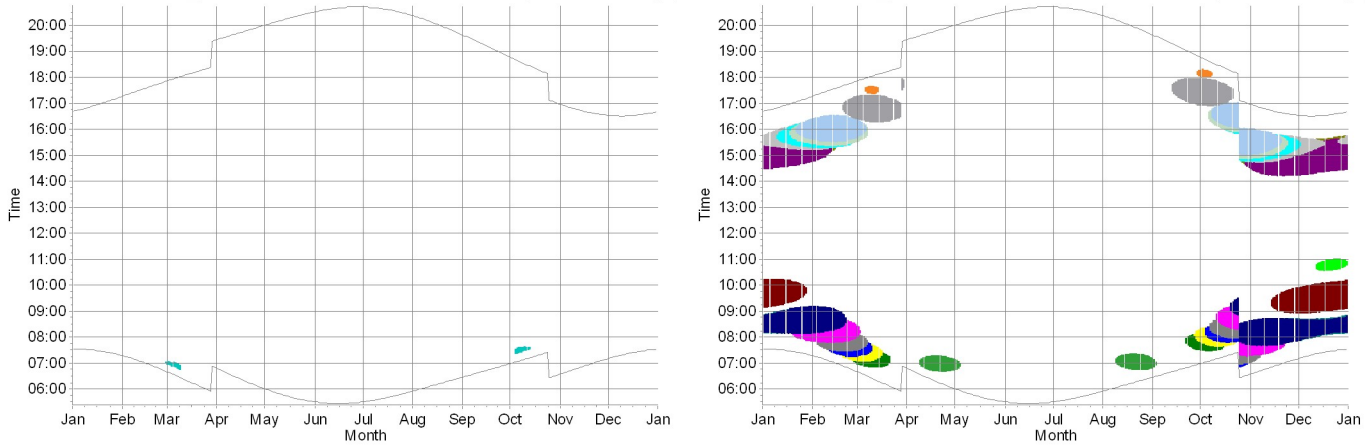
1: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (2: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (2)



3: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (4: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (4)



5: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (6)



Shadow receptors

- A: Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (1)
- B: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (2)
- C: Shadow Receptor: 1.0 × 1.0 Azimuth: -40.0° Slope: 90.0° (3)
- D: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (4)
- E: Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (5)
- F: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (6)
- G: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (7)
- H: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (8)
- I: Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (9)
- J: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (10)
- K: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (11)
- L: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (12)
- M: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (13)
- N: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (14)
- O: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (15)
- P: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (16)
- T: Shadow Receptor: 1.0 × 1.0 Azimuth: -100.0° Slope: 90.0° (20)
- U: Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (21)
- V: Shadow Receptor: 1.0 × 1.0 Azimuth: 30.0° Slope: 90.0° (22)
- W: Shadow Receptor: 1.0 × 1.0 Azimuth: 10.0° Slope: 90.0° (23)
- X: Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (24)
- Y: Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (25)
- Z: Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (26)
- AA: Shadow Receptor: 1.0 × 1.0 Azimuth: -70.0° Slope: 90.0° (27)
- AB: Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (28)
- AC: Shadow Receptor: 1.0 × 1.0 Azimuth: -80.0° Slope: 90.0° (29)
- AE: Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (31)
- AF: Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° Slope: 90.0° (32)
- AH: Shadow Receptor: 1.0 × 1.0 Azimuth: -10.0° Slope: 90.0° (34)
- AI: Shadow Receptor: 1.0 × 1.0 Azimuth: -60.0° Slope: 90.0° (35)
- AK: Shadow Receptor: 1.0 × 1.0 Azimuth: 20.0° Slope: 90.0° (37)

Project:
WON019_V3_definitivo

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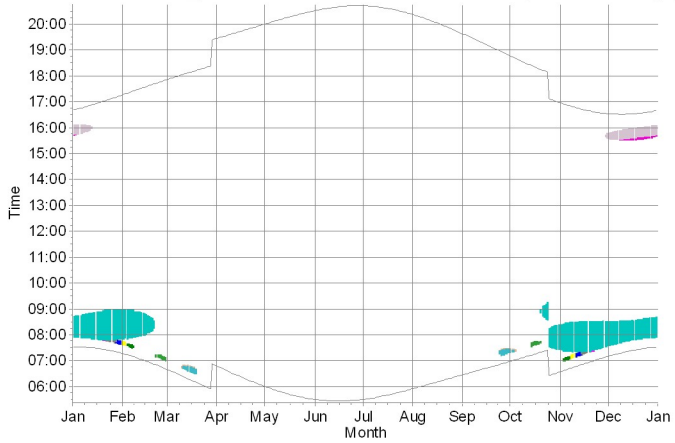
15/02/2024 21:59/3.6.377

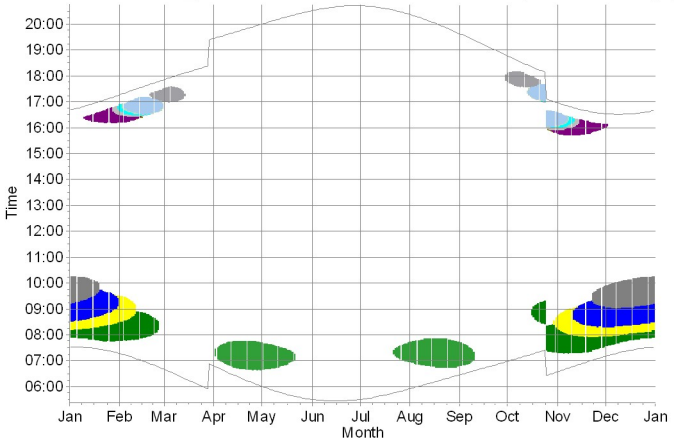
SHADOW - Calendar per WTG, graphical

Calculation: WON019_ShadowFlickering

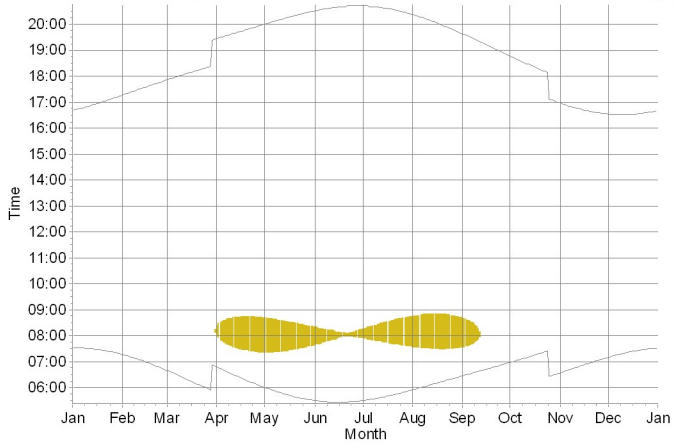
7: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (7)



8: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (8)



9: VESTAS V163-4.5_h150 4500 163.0 !O! hub: 150.0 m (TOT: 231.5 m) (9)



Shadow receptors

- A: Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (1)
- B: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (2)
- C: Shadow Receptor: 1.0 × 1.0 Azimuth: -40.0° Slope: 90.0° (3)
- D: Shadow Receptor: 1.0 × 1.0 Azimuth: -30.0° Slope: 90.0° (4)
- E: Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° Slope: 90.0° (5)
- F: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (6)
- G: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (7)
- J: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (10)
- K: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (11)
- L: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (12)
- M: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (13)
- N: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (14)
- O: Shadow Receptor: 1.0 × 1.0 Azimuth: 50.0° Slope: 90.0° (15)
- P: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (16)
- Q: Shadow Receptor: 1.0 × 1.0 Azimuth: -160.0° Slope: 90.0° (17)
- S: Shadow Receptor: 1.0 × 1.0 Azimuth: -150.0° Slope: 90.0° (19)
- T: Shadow Receptor: 1.0 × 1.0 Azimuth: -100.0° Slope: 90.0° (20)
- U: Shadow Receptor: 1.0 × 1.0 Azimuth: -50.0° Slope: 90.0° (21)
- X: Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (24)
- Y: Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° Slope: 90.0° (25)
- AD: Shadow Receptor: 1.0 × 1.0 Azimuth: -90.0° Slope: 90.0° (30)

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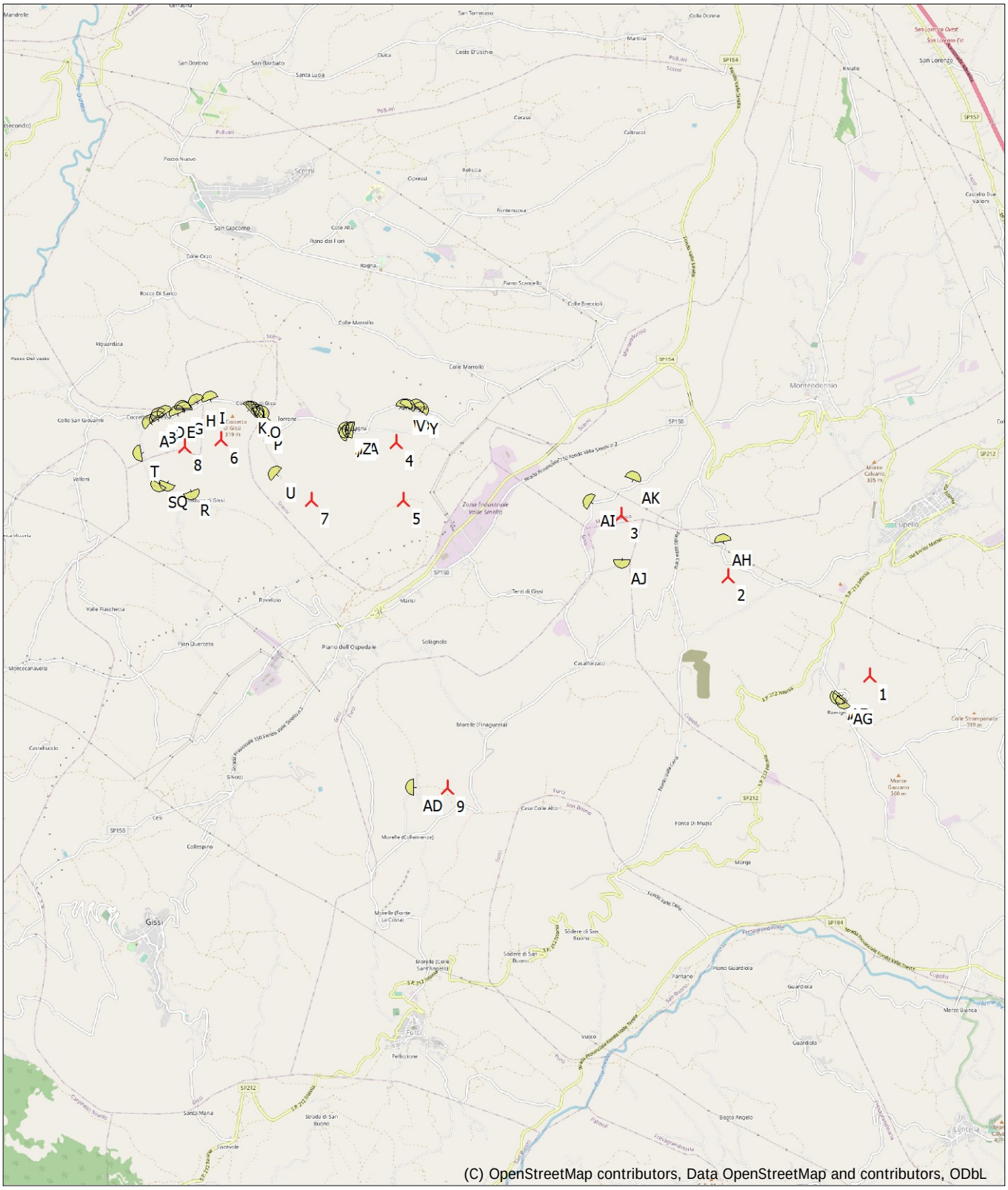
15/02/2024 21:59/3.6.377

SHADOW - Map

Calculation: WON019_ShadowFlickering



Map: EMD OpenStreetMap , Print scale 1:75,000, Map center UTM (north)-WGS84 Zone: 33 East: 467,135 North: 4,656,604

New WTG Shadow receptor

Flicker map level: Elevation Grid Data Object: WON019_V3_definitivo_EMDGrid_0.wpg (1)