

PROGETTO PER LA REALIZZAZIONE DI UN IMPIANTO PER LA  
PRODUZIONE DI ENERGIA MEDIANTE LO SFRUTTAMENTO DEL VENTO  
NEL TERRITORIO COMUNALE DI TARQUINIA (VT) LOC. BULIGNAME  
POTENZA NOMINALE 64,8 MW

**PROGETTO DEFINITIVO - SIA**

PROGETTAZIONE E SIA

ing. Fabio PACCAPELO

ing. Andrea ANGELINI

ing. Antonella Laura GIORDANO

ing. Francesca SACCAROLA

COLLABORATORI

dr.ssa Anastasia AGNOLI

ing. Giulia MONTRONE

STUDI SPECIALISTICI

IMPIANTI ELETTRICI

ing. Roberto DI MONTE

GEOLOGIA

geol. Matteo DI CARLO

ACUSTICA

ing. Antonio FALCONE

NATURA E BIODIVERSITÀ

BIOPHILIA - dr. Gianni PALUMBO dr. Michele BUX

STUDIO PEDO-AGRONOMICO

dr. Gianfranco GIUFFRIDA

ARCHEOLOGIA

ARSARCHEO - dr. archeol. Andrea RICCHIONI dr. archeol. Gabriele MONASTERO

INTERVENTI DI COMPENSAZIONE E VALORIZZAZIONE

arch. Gaetano FORNARELLI

arch. Andrea GIUFFRIDA

**SIA.ES. STUDI SPECIALISTICI**

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

REV.      DATA      DESCRIZIONE

REV.	DATA	DESCRIZIONE



## INDICE

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

### INDICE FIGURE

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

### INDICE TABELLE

<b>TAB. 1 – COORDINATE AEROGENERATORI</b>	<b>2</b>
<b>TAB. 2 – COORDINATE RECETTORI</b>	<b>5</b>
<b>TAB. 3 –DISTANZE DELLE TURBINE DAI RECETTORI PIÙ PROSSIMI</b>	<b>7</b>



## 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 Tarquinia (VT). Il progetto è composto da n°9 aerogeneratori del tipo IEC S - 150, con potenza unitaria fino a 7.2 MW, altezza al mozzo pari a 150 e diametro rotorico pari a 172.

In particolare, la posizione degli aerogeneratori è la seguente:

WTG	Coordinate WGS84 fuso 32N	
	Est	Nord
TRQ01	722586,49	4686419,76
TRQ02	719351,73	4686401,75
TRQ03	719965,52	4685921,13
TRQ04	720798,53	4684901,29
TRQ05	721264,44	4684443,29
TRQ06	723401,64	4684830,89
TRQ07	723474,50	4684052,71
TRQ08	721708,48	4686475,76
TRQ09	722061,49	4685716,76

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.





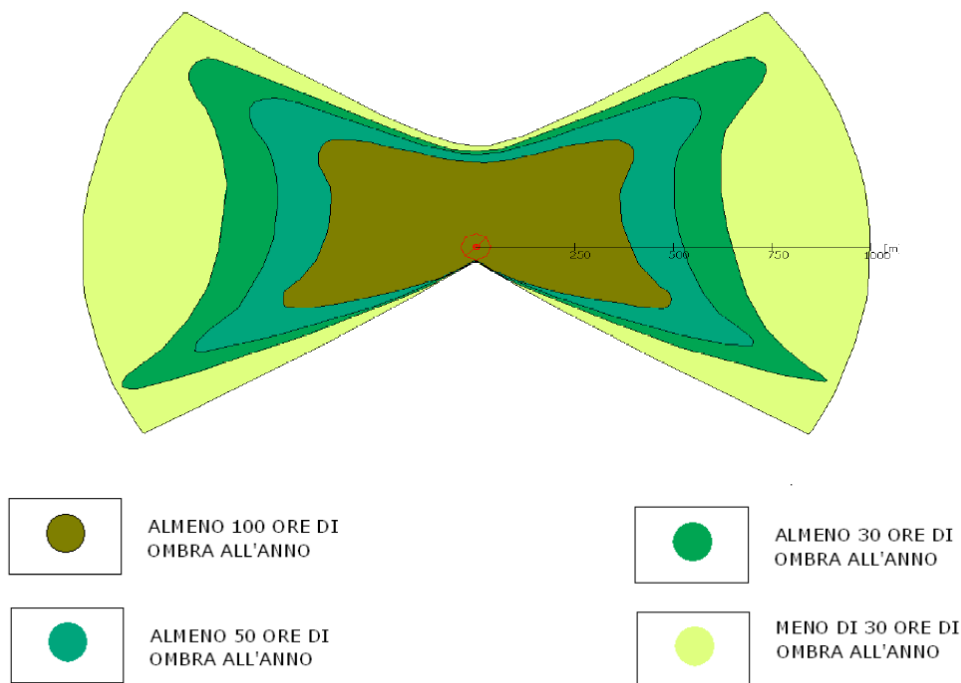


Figura 2: Evoluzione annuale tipo dell'ombra di una pala

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 nel Comune di Tarquinia prevede l'installazione 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 25 recettori che circondano l'impianto per i quali è stata stabilita l'abitabilità.



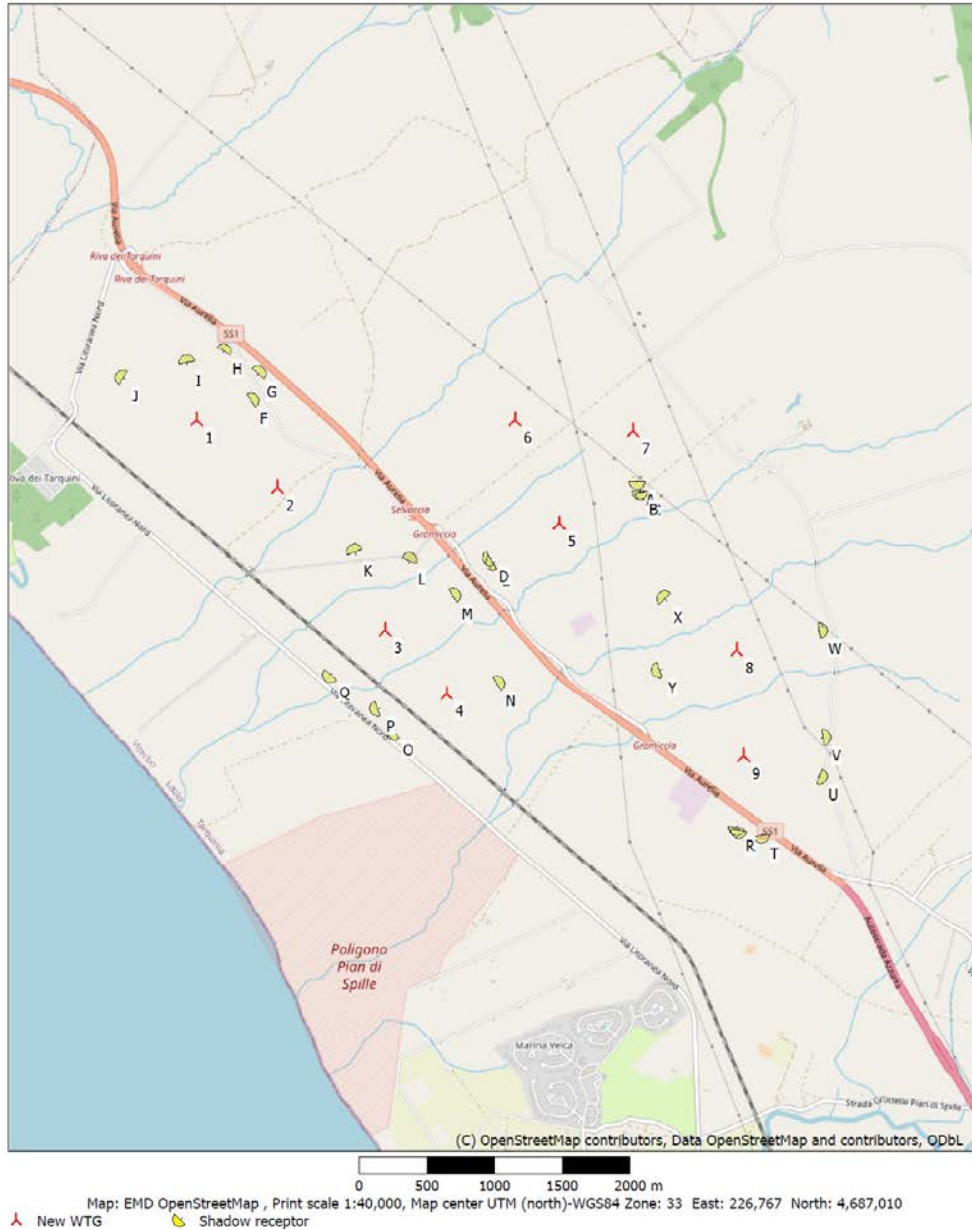
CODIFICA	Denominazione manufatto	Coordinate geografiche UTM WGS84 33N		Z [m]
		Est	Nord	
A	2	227997.87	4687788.74	47
B	3	228011.12	4687713.49	45.5
C	4	228038.68	4687706.07	45.3
D	11	226894.21	4687261.91	35
E	12	226912.36	4687236.34	35.2
F	15	225167.40	4688488.79	30.8
G	16	225224.96	4688681.29	34.3
H	17	224978.54	4688863.33	30.4
I	18	224704.03	4688786.22	30.5
J	19	224235.30	4688692.42	21.1
K	29	225888.05	4687342.00	26.4
L	30	226289.75	4687266.75	28.7
M	32	226599.76	4686997.54	29
N	34	226902.89	4686345.18	27.7
O	40	226126.64	4686013.00	14.8
P	41	226014.03	4686188.83	14.5
Q	43	225673.68	4686459.68	15
R	49	228636.60	4685218.32	34.1
S	50	228648.81	4685198.52	33.9
T	52	228813.48	4685156.80	36.2
U	53	229255.42	4685567.74	67.3
V	54	229298.31	4685851.46	60.7
W	56	229298.74	4686643.60	59
X	58	228164.26	4686915.00	41
Y	59	228103.53	4686398.52	38.5

Tab. 2 – Coordinate recettori



**SHADOW - Map**

Calculation: WON018\_ShadowFlickering



*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 MANUFATTO	Denominazione manufatto	Distanza WTG più vicina [m]	WTG più vicina	CODIFICA WTG
A	2	374	TRQ01	7
B	3	451	TRQ01	7
C	4	454	TRQ01	7
D	11	571	TRQ09	5
E	12	560	TRQ09	5
F	15	427	TRQ02	1
G	16	558	TRQ02	1
H	17	536	TRQ02	1
I	18	417	TRQ02	1
J	19	614	TRQ02	1
K	29	599	TRQ04	3
L	30	449	TRQ04	3
M	32	536	TRQ04	3
N	34	320	TRQ05	4
O	40	481	TRQ05	4
P	41	503	TRQ05	4
Q	43	524	TRQ04	3
R	49	520	TRQ07	9
S	50	527	TRQ07	9
T	52	565	TRQ07	9
U	53	570	TRQ07	9
V	54	597	TRQ07	9
W	56	619	TRQ06	8
X	58	658	TRQ06	8
Y	59	555	TRQ06	8

*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'orografia 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 un 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 recettori 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.

E' 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.



## SHADOW - Main Result

Calculation: WON018\_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

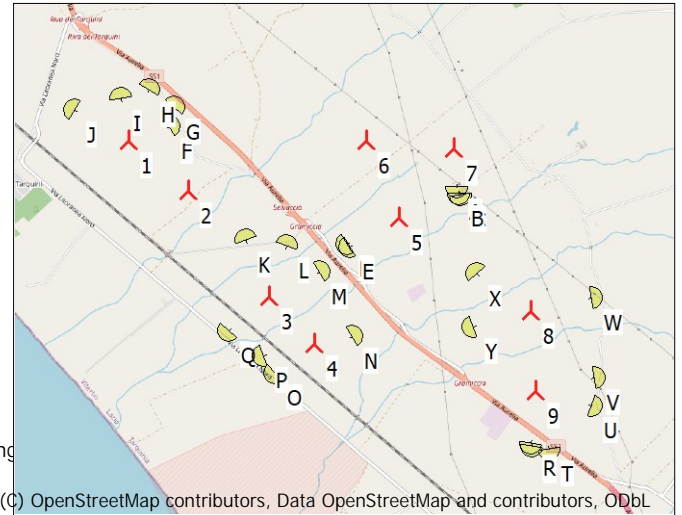
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Elevation Grid Data Object: WON018\_ShadowFlickering  
Receptor grid resolution: 1.0 m

All coordinates are in

UTM (north)-WGS84 Zone: 33

### WTGs



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

Scale 1:75,000

▲ New WTG

● Shadow receptor

	Easting	Northing	Z	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
1	224,756	4,688,373	22.7	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
2	225,335	4,687,850	23.6	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
3	226,094	4,686,774	22.3	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
4	226,527	4,686,284	23.0	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
5	227,412	4,687,499	38.9	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
6	227,113	4,688,281	41.3	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
7	227,985	4,688,163	47.9	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
8	228,687	4,686,520	47.4	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1
9	228,705	4,685,739	40.9	VESTAS V172-7.2 7200 172.0 !O! hu... Yes	Yes	VESTAS	V172-7.2-7,200	7,200	172.0	150.0	2,039	12.1

### 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]	[m]	[°]	[°]		[m]
A	227,998	4,687,789	47.0	1.0	1.0	1.0	-180.0	90.0	Fixed direction	2.0
B	228,011	4,687,713	45.5	1.0	1.0	1.0	-180.0	90.0	Fixed direction	2.0
C	228,039	4,687,706	45.3	1.0	1.0	1.0	-190.0	90.0	Fixed direction	2.0
D	226,894	4,687,262	35.0	1.0	1.0	1.0	-120.0	90.0	Fixed direction	2.0
E	226,912	4,687,236	35.2	1.0	1.0	1.0	-120.0	90.0	Fixed direction	2.0
F	225,167	4,688,489	30.8	1.0	1.0	1.0	60.0	90.0	Fixed direction	2.0
G	225,225	4,688,681	34.3	1.0	1.0	1.0	40.0	90.0	Fixed direction	2.0
H	224,979	4,688,863	30.4	1.0	1.0	1.0	30.0	90.0	Fixed direction	2.0
I	224,704	4,688,786	30.5	1.0	1.0	1.0	-10.0	90.0	Fixed direction	2.0
J	224,235	4,688,692	21.1	1.0	1.0	1.0	-60.0	90.0	Fixed direction	2.0
K	225,888	4,687,342	26.4	1.0	1.0	1.0	-20.0	90.0	Fixed direction	2.0
L	226,290	4,687,267	28.7	1.0	1.0	1.0	20.0	90.0	Fixed direction	2.0
M	226,600	4,686,998	29.0	1.0	1.0	1.0	60.0	90.0	Fixed direction	2.0
N	226,903	4,686,345	27.7	1.0	1.0	1.0	60.0	90.0	Fixed direction	2.0
O	226,127	4,686,013	14.8	1.0	1.0	1.0	-130.0	90.0	Fixed direction	2.0
P	226,014	4,686,189	14.5	1.0	1.0	1.0	-110.0	90.0	Fixed direction	2.0
Q	225,674	4,686,460	15.0	1.0	1.0	1.0	-140.0	90.0	Fixed direction	2.0
R	228,637	4,685,218	34.1	1.0	1.0	1.0	-170.0	90.0	Fixed direction	2.0
S	228,649	4,685,199	33.9	1.0	1.0	1.0	-170.0	90.0	Fixed direction	2.0
T	228,813	4,685,157	36.2	1.0	1.0	1.0	170.0	90.0	Fixed direction	2.0
U	229,255	4,685,568	67.3	1.0	1.0	1.0	110.0	90.0	Fixed direction	2.0
V	229,298	4,685,851	60.7	1.0	1.0	1.0	80.0	90.0	Fixed direction	2.0
W	229,299	4,686,644	59.0	1.0	1.0	1.0	80.0	90.0	Fixed direction	2.0
X	228,164	4,686,915	41.0	1.0	1.0	1.0	-40.0	90.0	Fixed direction	2.0
Y	228,104	4,686,399	38.5	1.0	1.0	1.0	-110.0	90.0	Fixed direction	2.0

Project:

WON018\_ShadowFlickering

Licensed user:

Iron solar s.r.l.

via Lanzo, 31

IT-20122 Milano

+393487125089

Fabio Paccapelo / francesca.saccarola@hopegroup.it

Calculated:

11/07/2023 08:25/3.6.361

## SHADOW - Main Result

Calculation: WON018\_ShadowFlickering

### 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	33:31	61	0:40
B	9:33	31	0:23
C	13:02	37	0:27
D	40:06	79	0:50
E	7:10	28	0:21
F	127:48	115	1:27
G	119:09	144	1:11
H	36:01	48	0:56
I	90:09	74	1:30
J	104:27	162	1:04
K	17:55	56	0:26
L	30:21	44	0:52
M	86:19	97	1:10
N	205:01	202	1:36
O	0:00	0	0:00
P	140:46	126	1:16
Q	33:13	57	0:45
R	0:00	0	0:00
S	0:00	0	0:00
T	0:00	0	0:00
U	132:34	130	1:10
V	68:28	83	1:04
W	63:54	81	1:02
X	79:13	103	1:01
Y	167:46	193	1:08

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

No.	Name	Worst case [h/year]
1	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (1)	444:05
2	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (2)	32:40
3	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (3)	165:03
4	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (4)	336:12
5	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (5)	45:25
6	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (6)	34:38
7	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (7)	0:00
8	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (8)	271:10
9	VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (9)	248:40

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.

## SHADOW - Calendar

Calculation: WON018\_ShadowFlickering Shadow receptor: A - Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° 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	July	August	September	October	November	December	
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:38	06:10 20:12	05:40 20:43	19:44 (6) 20:17 (6)	05:40 20:54	19:48 (6) 20:34	06:05 19:49	06:38 18:57	07:10 17:08	06:46 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	19:44 (6) 20:18 (6)	05:41 20:54	19:48 (6) 20:33	06:06 19:48	06:39 18:55	07:11 17:07	06:47 16:42
3	07:43 16:53	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14	05:39 20:45	19:43 (6) 20:18 (6)	05:41 20:54	19:48 (6) 20:32	06:07 19:46	06:40 18:53	07:12 17:06	06:48 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	19:44 (6) 20:19 (6)	05:42 20:54	19:48 (6) 20:31	06:08 19:44	06:41 18:52	07:13 17:05	06:49 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 20:46	19:44 (6) 20:19 (6)	05:43 20:54	19:49 (6) 20:29	06:09 19:43	06:42 18:50	07:14 17:03	06:51 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18	05:38 20:47	19:43 (6) 20:19 (6)	05:43 20:53	19:49 (6) 20:28	06:10 19:41	06:43 18:48	07:15 17:02	06:52 16:41
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	19:43 (6) 20:20 (6)	05:44 20:53	19:50 (6) 20:27	06:11 19:39	06:44 18:47	07:16 17:01	06:53 16:41
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:37 20:48	19:43 (6) 20:21 (6)	05:44 20:53	19:51 (6) 20:26	06:13 19:37	06:45 18:45	07:17 17:00	06:54 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21	05:37 20:49	19:43 (6) 20:22 (6)	05:45 20:52	19:50 (6) 20:24	06:14 19:36	06:46 18:49	07:19 16:59	06:56 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	19:44 (6) 20:22 (6)	05:46 20:51	19:51 (6) 20:23	06:15 19:34	06:47 18:42	07:20 16:58	06:57 16:41
11	07:42 17:01	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23	05:37 20:50	19:43 (6) 20:21 (6)	05:47 20:51	19:52 (6) 20:22	06:16 19:32	06:48 18:40	07:21 16:57	06:58 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:39 19:51	05:57 20:24	05:37 20:50	19:43 (6) 20:22 (6)	05:47 20:51	19:52 (6) 20:20	06:17 19:30	06:49 18:39	07:22 16:56	06:59 16:41
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	19:43 (6) 20:22 (6)	05:48 20:50	19:53 (6) 20:19	06:18 19:29	06:50 18:37	07:23 16:55	07:01 16:41
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:36 20:51	19:43 (6) 20:22 (6)	05:49 20:50	19:54 (6) 20:18	06:19 19:27	06:52 18:35	07:24 16:54	07:02 16:42
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 19:54	05:53 20:27	05:36 20:52	19:43 (6) 20:23 (6)	05:50 20:49	19:55 (6) 20:16	06:20 19:25	06:53 18:33	07:25 16:53	07:03 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	05:36 20:52	19:43 (6) 20:23 (6)	05:50 20:49	19:56 (6) 20:15	06:21 19:23	06:54 18:32	07:27 16:52	07:04 16:42
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29	05:36 20:52	19:43 (6) 20:23 (6)	05:51 20:48	19:57 (6) 20:13	06:22 19:22	06:55 18:30	07:28 16:51	07:06 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	05:50 20:30	05:37 20:53	19:44 (6) 20:23 (6)	05:52 20:47	19:58 (6) 20:12	06:23 19:20	06:56 18:29	07:29 16:50	07:07 16:43
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31	05:37 20:53	19:45 (6) 20:24 (6)	05:53 20:46	20:00 (6) 20:10	06:24 19:18	06:57 18:27	07:30 16:49	07:08 16:43
20	07:38 17:12	07:04 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	19:45 (6) 20:24 (6)	05:54 20:46	20:02 (6) 20:09	06:25 19:16	06:58 18:26	07:31 16:49	07:09 16:43
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	19:45 (6) 20:24 (6)	05:55 20:45	20:04 (6) 20:07	06:26 19:15	06:59 18:24	07:32 16:48	07:11 16:44
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	05:47 20:34	19:56 (6) 20:03 (6)	05:37 20:54	05:56 20:44	06:27 20:06	07:00 19:13	06:59 18:23	07:34 16:47	07:12 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	19:52 (6) 20:06 (6)	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	06:58 18:21	07:35 16:47	07:13 16:45
24	07:35 17:17	06:58 17:56	06:12 18:29	06:20 20:04	05:45 20:36	19:51 (6) 20:09 (6)	05:38 20:54	05:57 20:42	06:29 20:02	07:02 19:09	06:59 18:20	07:36 16:46	07:14 16:45
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	19:49 (6) 20:10 (6)	05:38 20:54	05:58 20:41	06:30 20:01	07:03 19:07	06:57 17:18	07:15 16:45	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	19:48 (6) 20:11 (6)	05:38 20:54	05:59 20:40	06:32 19:59	07:04 19:06	06:58 17:17	07:16 16:45	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	19:47 (6) 20:13 (6)	05:39 20:54	06:00 20:39	06:33 19:58	07:05 19:04	06:40 17:15	07:18 16:44	07:42 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	19:46 (6) 20:14 (6)	05:39 20:54	06:01 20:38	06:34 19:56	07:06 19:02	06:41 17:14	07:19 16:44	07:42 16:48
29	07:31 17:23	07:03 19:35	06:13 20:10	05:42 20:41	05:42 20:41	19:46 (6) 20:15 (6)	05:39 20:54	06:02 20:37	06:35 19:54	07:07 19:00	06:42 17:12	07:20 16:43	07:42 16:49
30	07:30 17:24	07:01 19:36	06:12 20:11	05:41 20:41	05:41 20:41	19:45 (6) 20:15 (6)	05:40 20:54	06:03 20:36	06:36 19:53	07:09 18:59	06:43 17:11	07:21 16:43	07:42 16:50
31	07:29 17:25	07:00 19:37	06:11 20:12	05:41 20:42	05:41 20:42	19:45 (6) 20:17 (6)	05:40 20:54	06:04 20:35	06:37 19:53	07:09 18:59	06:44 17:10	07:43 16:50	07:43 16:50
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284	
Total, worst case					228	1144	639						

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: B - Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° 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	July	August	September	October	November	December	
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:38	06:10 20:12	05:40 20:43	05:40 20:54	20:09 (6) 20:34	06:05 19:49	06:38 18:57	07:10 17:08	06:46 17:08	07:22 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	20:09 (6) 20:33	06:06 19:48	06:39 18:55	07:11 17:07	06:47 17:07	07:23 16:42
3	07:43 16:53	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14	05:39 20:45	05:41 20:54	20:10 (6) 20:32	06:07 19:46	06:40 18:53	07:12 17:06	06:48 17:06	07:24 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	05:42 20:54	20:11 (6) 20:31	06:08 19:44	06:41 18:52	07:13 17:05	06:49 17:05	07:25 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 20:46	05:43 20:54	20:13 (6) 20:29	06:09 19:43	06:42 18:50	07:14 17:03	06:51 17:03	07:26 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18	05:38 20:47	05:43 20:53	20:14 (6) 20:28	06:10 19:41	06:43 18:48	07:15 17:02	06:52 17:02	07:27 16:41
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	05:44 20:53	20:07 (6) 20:17 (6)	06:11 19:39	06:44 18:47	07:16 17:01	06:53 17:01	07:28 16:41
8	07:43 16:58	07:20 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:37 20:48	05:44 20:53	20:22 (6) 20:19 (6)	06:12 19:37	06:45 18:45	07:17 17:00	06:54 17:00	07:29 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21	05:37 20:49	05:45 20:52	20:06 (6) 20:20 (6)	06:14 19:36	06:46 18:43	07:19 17:01	06:56 16:59	07:30 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	05:46 20:52	20:05 (6) 20:22 (6)	06:15 19:34	06:47 18:42	07:20 17:02	06:57 16:58	07:31 16:41
11	07:42 17:01	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23	05:37 20:50	05:47 20:51	20:04 (6) 20:22 (6)	06:16 19:32	06:48 18:40	07:21 16:57	06:58 16:57	07:32 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:39 19:51	05:57 20:24	05:37 20:50	05:47 20:51	20:03 (6) 20:22 (6)	06:17 19:30	06:49 18:38	07:22 16:56	06:59 16:56	07:33 16:41
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	05:48 20:50	20:03 (6) 20:23 (6)	06:18 19:29	06:50 18:37	07:23 16:55	07:01 16:55	07:33 16:41
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:36 20:51	05:49 20:50	20:03 (6) 20:24 (6)	06:19 19:27	06:52 18:35	07:24 16:54	07:02 16:54	07:34 16:42
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 19:54	05:53 20:27	05:36 20:52	05:50 20:49	20:03 (6) 20:24 (6)	06:20 19:25	06:53 18:33	07:25 16:53	07:03 16:53	07:35 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	05:36 20:52	05:50 20:48	20:03 (6) 20:25 (6)	06:21 19:23	06:54 18:32	07:26 16:52	07:04 16:52	07:36 16:42
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29	05:36 20:52	05:51 20:48	20:03 (6) 20:25 (6)	06:22 19:22	06:55 18:30	07:28 16:51	07:06 16:51	07:36 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	05:50 20:30	05:37 20:53	05:52 20:47	20:03 (6) 20:25 (6)	06:23 19:20	06:56 18:29	07:29 16:50	07:07 16:50	07:37 16:43
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31	05:37 20:53	05:53 20:46	20:04 (6) 20:27 (6)	06:24 19:18	06:57 18:27	07:30 16:49	07:08 16:49	07:38 16:43
20	07:38 17:12	07:04 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	05:54 20:46	20:04 (6) 20:27 (6)	06:25 19:16	06:58 18:26	07:31 16:49	07:09 16:49	07:38 16:43
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	20:04 (6) 20:27 (6)	06:26 19:15	06:59 18:24	07:32 16:48	07:11 16:48	07:39 16:44
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	05:56 20:44	20:04 (6) 20:27 (6)	06:27 19:13	07:00 18:23	07:34 16:47	07:12 16:47	07:39 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	05:57 20:43	20:04 (6) 20:27 (6)	06:28 19:11	07:01 18:21	07:35 16:47	07:13 16:47	07:40 16:45
24	07:35 17:17	06:58 17:56	06:12 18:29	06:20 20:04	05:45 20:36	05:38 20:54	05:57 20:42	20:05 (6) 20:28 (6)	06:29 19:09	07:02 18:20	07:36 16:46	07:14 16:46	07:40 16:45
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	05:58 20:41	20:05 (6) 20:27 (6)	06:30 19:07	07:03 17:18	06:37 16:45	07:15 16:45	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	05:38 20:54	05:59 20:40	20:05 (6) 20:27 (6)	06:32 19:59	07:04 19:06	06:38 17:17	07:16 16:45	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	06:00 20:39	20:06 (6) 20:28 (6)	06:33 19:58	07:05 19:04	06:40 17:15	07:18 16:44	07:42 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	05:39 20:54	06:01 20:38	20:06 (6) 20:27 (6)	06:34 19:56	07:06 19:02	06:41 17:14	07:19 16:44	07:42 16:48
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:41	05:39 20:54	06:02 20:37	20:07 (6) 20:27 (6)	06:35 19:54	07:07 19:00	06:42 17:12	07:20 16:43	07:42 16:49
30	07:30 17:24		07:01 19:36	06:12 20:11	05:41 20:41	05:40 20:54	06:03 20:36	20:07 (6) 20:27 (6)	06:36 19:53	07:09 18:59	06:43 17:11	07:21 16:43	07:42 16:50
31	07:29 17:25		07:00 19:37		05:41 20:42		06:04 20:35		06:37 19:51		06:44 17:10		07:43 16:50
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284	
Total, worst case						489	84						

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: C - Shadow Receptor: 1.0 × 1.0 Azimuth: 170.0° 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	July	August	September	October	November	December
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:38	06:10 20:12	05:40 20:43	05:40 20:54	20:05 (6) 20:34	06:05 19:49	06:38 18:57	07:10 17:08	06:46 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	20:06 (6) 20:33	06:06 19:48	06:39 18:55	07:11 17:07	06:47 16:42
3	07:43 16:53	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14	05:39 20:45	20:08 (6) 20:54	05:41 20:28 (6)	06:07 19:46	06:40 18:53	07:12 17:06	06:48 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	20:06 (6) 20:54	05:42 20:27 (6)	06:08 19:44	06:41 18:52	07:13 17:05	06:49 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 20:46	20:05 (6) 20:53	05:43 20:28 (6)	06:09 19:43	06:42 18:50	07:14 17:03	06:51 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18	05:38 20:47	13 20:18 (6) 20:53	05:43 20:25 (6)	06:10 19:41	06:43 18:48	07:15 17:02	06:52 16:41
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	16 20:19 (6) 20:53	05:44 20:27 (6)	06:11 19:39	06:44 18:47	07:16 17:01	06:53 16:41
8	07:43 16:58	07:20 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:37 20:48	17 20:20 (6) 20:53	05:44 20:26 (6)	06:13 19:37	06:45 18:45	07:17 17:00	06:54 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21	05:37 20:49	19 20:21 (6) 20:52	05:45 20:22 (6)	06:14 19:36	06:46 18:43	07:19 16:59	06:56 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	20 20:22 (6) 20:52	05:46 20:23 (6)	06:15 19:34	06:47 18:42	07:20 16:58	06:57 16:41
11	07:42 17:01	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23	05:37 20:50	21 20:23 (6) 20:51	05:47 20:24 (6)	06:16 19:32	06:48 18:40	07:21 16:57	06:58 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:39 19:51	05:57 20:24	05:37 20:50	22 20:24 (6) 20:51	05:47 20:25 (6)	06:17 19:30	06:49 18:38	07:22 16:56	06:59 16:41
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	24 20:26 (6) 20:50	05:48 20:26 (6)	06:18 19:29	06:50 18:37	07:23 16:55	07:01 16:41
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:36 20:51	24 20:27 (6) 20:50	05:49 20:27 (6)	06:19 19:27	06:52 18:35	07:24 16:54	07:02 16:42
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 19:54	05:53 20:27	05:36 20:52	25 20:28 (6) 20:49	05:50 20:28 (6)	06:20 19:25	06:53 18:33	07:25 16:53	07:03 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	05:36 20:52	25 20:29 (6) 20:48	05:50 20:29 (6)	06:21 19:23	06:54 18:32	07:26 16:52	07:04 16:42
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29	05:36 20:52	26 20:30 (6) 20:48	05:51 20:29 (6)	06:22 19:22	06:55 18:30	07:28 16:51	07:06 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	05:50 20:30	05:37 20:53	26 20:31 (6) 20:47	05:52 20:29 (6)	06:23 19:20	06:56 18:29	07:29 16:50	07:07 16:43
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31	05:37 20:53	26 20:32 (6) 20:46	05:53 20:30 (6)	06:24 19:18	06:57 18:27	07:30 16:49	07:08 16:43
20	07:38 17:11	07:04 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	26 20:33 (6) 20:46	05:54 20:31 (6)	06:25 20:09	06:58 19:16	07:31 18:26	07:09 16:43
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	26 20:34 (6) 20:45	05:55 20:32 (6)	06:26 19:15	06:59 18:24	07:32 16:48	07:11 16:44
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	27 20:35 (6) 20:44	05:56 20:33 (6)	06:27 19:13	07:00 18:23	07:34 16:47	07:12 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	27 20:36 (6) 20:43	05:57 20:34 (6)	06:28 19:11	07:01 18:21	07:35 16:47	07:13 16:45
24	07:35 17:17	06:58 17:56	06:12 18:29	06:20 20:04	05:45 20:36	05:38 20:54	26 20:37 (6) 20:42	05:57 20:35 (6)	06:29 20:02	07:02 19:09	07:36 18:20	07:14 16:45
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	26 20:38 (6) 20:41	05:58 20:36 (6)	06:30 20:01	07:03 19:07	06:37 17:18	07:15 16:45
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	05:38 20:54	26 20:39 (6) 20:40	05:59 20:37 (6)	06:32 19:59	07:04 19:06	06:38 17:17	07:16 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	26 20:40 (6) 20:39	06:00 20:38 (6)	06:33 19:58	07:05 19:04	06:40 17:15	07:18 16:44
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	05:39 20:54	26 20:41 (6) 20:38	06:01 20:39 (6)	06:34 19:56	07:06 19:02	06:41 17:14	07:19 16:44
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:41	05:39 20:54	25 20:42 (6) 20:37	06:02 20:40 (6)	06:35 19:54	07:07 19:00	06:42 17:12	07:20 16:43
30	07:30 17:24		07:01 19:36	06:12 20:11	05:41 20:41	05:40 20:54	24 20:43 (6) 20:36	06:03 20:41 (6)	06:36 19:53	07:09 18:59	06:43 17:11	07:21 16:43
31	07:29 17:25		07:00 19:37		05:41 20:42			06:04 20:35	06:37 19:51		06:44 17:10	07:43 16:50
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284
Total, worst case						628	628	628	628	628	628	628

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: D - Shadow Receptor: 1.0 × 1.0 Azimuth: -120.0° 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	July	August	September	October	November	December
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:39	06:11 20:12	05:40 20:43	06:28 (5) 06:58 (5)	05:40 20:54	06:27 (5) 06:58 (5)	06:05 20:34	06:38 19:49	07:10 18:57
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	06:27 (5) 07:00 (5)	05:41 20:54	06:27 (5) 07:12 (5)	06:06 20:33	06:39 19:48	07:11 18:55
3	07:43 16:53	07:26 17:29	06:48 18:05	06:55 19:41	06:08 20:14	05:39 20:45	06:26 (5) 07:01 (5)	05:41 20:54	06:28 (5) 07:12 (5)	06:07 20:32	06:40 19:46	07:12 18:54
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	06:25 (5) 07:02 (5)	05:42 20:54	06:28 (5) 07:12 (5)	06:08 20:31	06:41 19:44	07:13 18:52
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 20:46	06:25 (5) 07:04 (5)	05:43 20:54	06:29 (5) 07:12 (5)	06:09 20:30	06:42 19:43	07:14 18:50
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44	06:04 20:18	05:38 20:47	06:24 (5) 07:04 (5)	05:43 20:53	06:29 (5) 07:10 (5)	06:11 20:28	06:43 19:41	07:15 18:48
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	06:23 (5) 07:05 (5)	05:44 20:53	06:31 (5) 07:10 (5)	06:12 20:27	06:44 19:39	07:16 18:47
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:38 20:48	06:23 (5) 07:06 (5)	05:44 20:53	06:32 (5) 07:10 (5)	06:13 20:26	06:45 19:37	07:17 18:45
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 19:48	06:00 20:21	05:37 20:49	06:23 (5) 07:07 (5)	05:45 20:52	06:33 (5) 07:09 (5)	06:14 20:24	06:46 19:36	07:19 18:43
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	06:23 (5) 07:08 (5)	05:46 20:52	06:34 (5) 07:08 (5)	06:15 20:23	06:47 19:34	07:20 18:42
11	07:42 17:01	07:17 17:40	07:37 (8) 18:15	06:34 19:50	06:41 20:23	05:37 20:50	06:22 (5) 07:08 (5)	05:47 20:51	06:36 (5) 07:07 (5)	06:16 20:22	06:48 19:32	07:21 18:40
12	07:42 17:02	07:16 17:41	07:36 (8) 18:16	06:33 19:51	06:39 20:24	05:37 20:50	06:22 (5) 07:08 (5)	05:47 20:51	06:38 (5) 07:06 (5)	06:17 20:20	06:49 19:30	07:22 18:38
13	07:41 17:03	07:14 17:42	07:34 (8) 18:17	06:31 19:52	06:38 20:25	05:37 20:51	06:22 (5) 07:09 (5)	05:48 20:50	06:39 (5) 07:04 (5)	06:18 20:19	06:51 19:29	07:23 18:37
14	07:41 17:05	07:13 17:44	07:33 (8) 18:18	06:29 19:53	06:36 20:26	05:37 20:51	06:21 (5) 07:09 (5)	05:49 20:50	06:41 (5) 07:02 (5)	06:19 20:18	06:52 19:27	07:24 18:35
15	07:41 17:06	07:12 17:45	07:31 (8) 18:19	06:27 19:54	06:35 20:27	05:37 20:52	06:21 (5) 07:10 (5)	05:50 20:49	06:44 (5) 07:00 (5)	06:20 20:16	06:53 19:25	07:25 18:33
16	07:40 17:07	07:10 17:46	07:30 (8) 18:20	06:26 19:55	06:33 20:28	05:37 20:52	06:21 (5) 07:10 (5)	05:50 20:49	06:49 (5) 06:55 (5)	06:21 20:15	06:54 19:23	07:27 18:32
17	07:40 17:08	07:09 17:48	07:29 (8) 18:22	06:24 19:56	06:31 20:29	05:37 20:53	06:21 (5) 07:11 (5)	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	07:36 18:03 (8)
18	07:39 17:09	07:07 17:49	07:27 (8) 18:23	06:22 19:58	06:30 20:30	05:37 20:53	06:22 (5) 07:12 (5)	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	07:37 18:01 (8)
19	07:39 17:10	07:06 17:50	07:26 (8) 18:24	06:21 19:59	06:28 20:31	05:37 20:53	06:22 (5) 07:12 (5)	05:53 20:46	06:24 20:10	06:57 19:18	07:30 18:27	07:38 16:08 (8)
20	07:38 17:12	07:05 17:51	07:26 (8) 18:25	06:19 20:00	06:27 20:32	05:37 20:53	06:22 (5) 07:12 (5)	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	07:38 16:09 (8)
21	07:37 17:13	07:03 17:53	07:27 (8) 18:26	06:17 20:01	06:25 20:33	05:37 20:54	06:22 (5) 07:12 (5)	05:55 20:45	06:26 20:07	06:59 19:15	07:32 18:24	07:39 16:48 (8)
22	07:37 17:14	07:02 17:54	07:27 (8) 18:27	06:15 20:02	06:24 20:34	05:37 20:54	06:22 (5) 07:12 (5)	05:56 20:44	06:27 20:06	06:59 19:13	07:34 18:23	07:39 16:47 (8)
23	07:36 17:15	07:00 17:55	07:29 (8) 18:28	06:14 20:03	06:22 20:35	05:37 20:54	06:23 (5) 07:13 (5)	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	07:40 16:45 (8)
24	07:35 17:17	06:59 17:56	07:30 (8) 18:30	06:12 20:04	06:21 20:36	05:38 20:54	06:23 (5) 07:13 (5)	05:58 20:42	06:29 20:02	07:02 19:09	07:36 18:20	07:40 16:46 (8)
25	07:35 17:18	06:57 17:58	07:32 (8) 18:31	06:10 20:05	06:19 20:37	05:38 20:54	06:23 (5) 07:13 (5)	05:59 20:41	06:31 20:01	07:03 19:08	06:37 18:18	07:41 16:45 (8)
26	07:34 17:19	06:55 17:59	06:55 18:32	06:08 20:07	06:18 20:38	05:38 20:54	06:23 (5) 07:12 (5)	05:59 20:40	06:32 19:59	07:04 19:06	06:38 17:17	07:41 16:45 (8)
27	07:33 17:20	06:54 18:00	06:54 18:33	06:07 20:08	06:16 20:39	05:39 20:54	06:24 (5) 07:13 (5)	06:00 20:40	06:33 19:58	07:05 19:04	06:40 17:15	07:42 16:44 (8)
28	07:32 17:22	06:52 18:01	06:52 18:34	06:05 20:09	06:15 20:40	05:39 20:54	06:24 (5) 07:13 (5)	06:01 20:38	06:34 19:56	07:06 19:02	06:41 17:14	07:42 16:44 (8)
29	07:31 17:23		07:03 19:35	06:13 20:10	06:13 20:41	05:39 20:54	06:25 (5) 07:13 (5)	06:02 20:37	06:35 19:54	07:08 19:00	06:42 17:13	07:42 16:43 (8)
30	07:30 17:24		07:02 19:36	06:12 20:11	06:12 20:41	05:39 20:54	06:26 (5) 07:13 (5)	06:03 20:36	06:36 19:53	07:09 18:59	06:43 17:11	07:42 16:43 (8)
31	07:29 17:26		07:00 19:37		06:11 20:42	05:39 20:54	06:26 (5) 06:57 (5)	06:04 20:35	06:37 19:51	07:11 17:10	06:45 17:10	07:43 16:50 (8)
Potential sun hours	294	295	369	400	452	457	463	463	430	376	344	295
Total, worst case		209			83	1365	537				212	284

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

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

## SHADOW - Calendar

Calculation: WON018\_ShadowFlickering Shadow receptor: E - Shadow Receptor: 1.0 × 1.0 Azimuth: -120.0° 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	July	August	September	October	November	December
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:39	06:11 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:09	07:22 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	06:47 17:07	07:23 16:42
3	07:43 16:53	07:26 17:29	06:48 18:05	06:55 19:41	06:08 20:14	05:39 20:45	05:41 20:54	06:07 20:32	06:40 19:46	07:12 18:54	06:48 17:06	07:24 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	05:42 20:54	06:08 20:31	06:41 19:44	07:13 18:52	06:49 17:05	07:25 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 20:46	05:43 20:54	06:09 20:30	06:42 19:43	07:14 18:50	06:51 17:03	07:26 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44	06:04 20:18	05:38 20:47	05:43 20:53	06:11 20:28	06:43 19:41	07:15 18:48	06:52 17:02	07:27 16:42
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	05:44 20:53	06:12 20:27	06:44 19:39	07:16 18:47	06:53 17:01	07:28 16:41
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:38 20:48	05:43 20:53	06:13 20:26	06:45 19:37	07:17 18:45	06:54 17:00	07:29 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 19:48	06:00 20:21	05:37 20:49	05:45 20:52	06:14 20:24	06:46 19:36	07:19 18:43	06:56 17:01	07:30 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	05:46 20:52	06:15 20:23	06:47 19:34	07:20 18:42	06:57 17:02	07:31 16:41
11	07:42 17:01	07:17 17:40	06:34 18:15	06:41 19:50	05:58 20:23	05:37 20:50	05:47 20:51	06:16 20:22	06:48 19:32	07:21 18:40	06:58 17:01	07:32 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:39 19:51	05:57 20:24	05:37 20:50	05:47 20:51	06:17 20:20	06:49 19:30	07:22 18:38	06:59 17:02	07:33 16:41
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	05:48 20:50	06:18 20:19	06:51 19:29	07:23 18:37	07:01 17:03	07:34 16:42
14	07:41 17:05	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:37 20:51	05:49 20:50	06:19 20:18	06:52 19:27	07:24 18:35	07:02 17:04	07:34 16:42
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 19:54	05:54 20:27	05:37 20:52	05:50 20:49	06:20 20:16	06:53 19:25	07:25 18:33	07:03 17:05	07:35 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:53 20:28	05:37 20:52	05:50 20:49	06:21 20:15	06:54 19:23	07:27 18:32	07:04 17:06	07:36 16:42
17	07:40 17:08	07:09 17:48	06:24 18:22	06:31 19:56	05:52 20:29	05:37 20:53	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	07:06 17:07	07:36 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	05:51 20:30	05:37 20:53	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	07:07 17:08	07:37 16:43
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31	05:37 20:53	05:53 20:46	06:24 20:10	06:57 19:18	07:30 18:27	07:08 17:09	07:38 16:43
20	07:38 17:12	07:05 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	07:09 17:11	07:38 16:44
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:15	07:32 18:24	07:11 17:12	07:39 16:44
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	05:56 20:44	06:27 20:06	07:00 19:13	07:34 18:23	07:12 17:13	07:39 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	07:13 17:14	07:40 16:45
24	07:35 17:17	06:59 17:56	06:12 18:30	06:21 20:04	05:45 20:36	05:38 20:54	05:58 20:42	06:29 20:02	07:02 19:09	07:36 18:20	07:14 17:15	07:40 16:46
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	05:59 20:41	06:31 20:01	07:03 19:08	06:37 17:18	07:15 17:16	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	05:38 20:54	05:59 20:40	06:32 19:59	07:04 19:06	06:38 17:17	07:16 17:14	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	06:00 20:39	06:33 19:58	07:05 19:04	06:40 17:15	07:18 17:16	07:42 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:43 20:40	05:39 20:54	06:01 20:38	06:34 19:56	07:06 19:02	06:41 17:14	07:19 17:17	07:42 16:48
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:41	05:39 20:54	06:02 20:37	06:35 19:54	07:08 19:00	06:42 17:13	07:20 17:18	07:42 16:49
30	07:30 17:24		07:02 19:36	06:12 20:11	05:41 20:41	05:40 20:54	06:03 20:36	06:36 19:53	07:09 18:59	06:43 17:11	07:21 17:19	07:42 16:50
31	07:29 17:26		07:00 19:37	06:11 20:42	05:41 20:42		06:04 20:35	06:37 19:51		06:45 17:10	07:22 17:20	07:43 16:50
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284
Total, worst case		214									216	

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: F - Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° 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
1	07:43 16:51	07:28 17:27	06:51 18:03	16:10 (1) 17:18 (1)	06:58 19:39	17:01 (1) 20:12
2	07:43 16:52	07:27 17:28	06:49 18:04	16:10 (1) 17:19 (1)	06:56 19:40	17:02 (1) 20:13
3	07:43 16:53	07:26 17:30	06:48 18:05	16:08 (1) 17:20 (1)	06:55 19:41	17:03 (1) 20:14
4	07:43 16:54	07:25 17:31	06:46 18:06	16:06 (1) 17:20 (1)	06:53 19:42	17:04 (1) 20:16
5	07:43 16:55	07:24 17:32	06:44 18:07	16:06 (1) 17:22 (1)	06:51 19:43	17:05 (1) 20:17
6	07:43 16:56	07:23 17:33	06:43 18:09	16:04 (1) 17:22 (1)	06:50 19:44	17:06 (1) 20:18
7	07:43 16:57	07:22 17:35	06:41 18:10	16:03 (1) 17:22 (1)	06:48 19:45	17:08 (1) 20:19
8	07:43 16:58	07:21 17:36	06:39 18:11	16:03 (1) 17:24 (1)	06:46 19:46	17:09 (1) 20:20
9	07:43 16:59	07:19 17:37	06:38 18:12	16:02 (1) 17:24 (1)	06:45 19:48	17:10 (1) 20:21
10	07:42 17:00	07:18 17:39	06:36 18:13	16:01 (1) 17:24 (1)	06:43 19:49	17:12 (1) 20:22
11	07:42 17:01	07:17 17:40	06:34 18:15	16:00 (1) 17:24 (1)	06:41 19:50	17:13 (1) 20:23
12	07:42 17:02	07:16 17:41	06:33 18:16	16:00 (1) 17:25 (1)	06:40 19:51	17:15 (1) 20:24
13	07:42 17:03	07:14 17:43	06:31 18:17	15:59 (1) 17:24 (1)	06:38 19:52	17:18 (1) 20:25
14	07:41 17:05	07:13 17:44	06:29 18:18	15:58 (1) 17:24 (1)	06:36 19:53	17:20 (1) 20:26
15	07:41 17:06	07:12 17:45	06:28 18:19	15:59 (1) 17:25 (1)	06:35 19:54	17:24 (1) 20:27
16	07:40 17:07	07:10 17:46	06:26 18:20	15:58 (1) 17:25 (1)	06:33 19:55	17:29 (1) 20:28
17	07:40 17:08	07:09 17:48	06:24 18:22	15:58 (1) 17:24 (1)	06:31 19:57	17:44 (1) 20:29
18	07:39 17:09	07:07 17:49	06:22 18:23	15:57 (1) 17:24 (1)	06:30 19:58	20:30
19	07:39 17:10	07:06 17:50	16:39 (1) 18:24	06:21 15:58 (1)	06:28 17:24 (1)	05:50 20:31
20	07:38 17:12	07:05 17:51	16:32 (1) 18:25	06:19 15:57 (1)	06:27 17:24 (1)	05:49 20:32
21	07:38 17:13	07:03 17:53	16:28 (1) 18:26	06:17 15:57 (1)	06:25 17:23 (1)	05:48 20:33
22	07:37 17:14	07:02 17:54	16:25 (1) 18:27	06:15 15:57 (1)	06:24 17:23 (1)	05:47 20:34
23	07:36 17:15	07:00 17:55	16:22 (1) 18:28	06:14 15:58 (1)	06:22 17:23 (1)	05:46 20:35
24	07:35 17:17	06:59 17:56	16:19 (1) 18:30	06:12 15:58 (1)	06:21 17:22 (1)	05:45 20:36
25	07:35 17:18	06:57 17:58	16:18 (1) 18:31	06:10 15:58 (1)	06:19 17:21 (1)	05:45 20:37
26	07:34 17:19	06:56 17:59	16:15 (1) 18:32	06:09 15:58 (1)	06:18 17:20 (1)	05:44 20:38
27	07:33 17:20	06:54 18:00	16:13 (1) 18:33	06:07 15:59 (1)	06:16 17:20 (1)	05:43 20:39
28	07:32 17:22	06:52 18:01	16:12 (1) 18:34	06:05 15:59 (1)	06:15 17:19 (1)	05:43 20:40
29	07:31 17:23		07:03 19:35	06:13 16:59 (1)	06:13 18:18 (1)	05:42 20:41
30	07:30 17:24		07:02 19:36	06:12 17:00 (1)	06:12 18:17 (1)	05:41 20:42
31	07:29 17:26		07:00 19:37	06:11 17:01 (1)	06:11 18:17 (1)	05:41 20:42
Potential sun hours	294	295	369	400	452	457
Total, worst case		451	2520	837		

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: F - Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° 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

	July	August	September	October	November	December		
1	05:40 20:54	06:05 20:34	06:38 19:49	17:12 (1) 17:59 (1)	07:10 18:57	16:38 (1) 18:03 (1)	06:46 17:09	07:22 16:43
2	05:41 20:54	06:06 20:33	06:39 19:48	17:10 (1) 18:01 (1)	07:11 18:55	16:38 (1) 18:03 (1)	06:47 17:07	07:23 16:42
3	05:41 20:54	06:07 20:32	06:40 19:46	17:08 (1) 18:02 (1)	07:12 18:54	16:38 (1) 18:02 (1)	06:48 17:06	07:24 16:42
4	05:42 20:54	06:09 20:31	06:41 19:44	17:06 (1) 18:03 (1)	07:13 18:52	16:39 (1) 18:02 (1)	06:50 17:05	07:25 16:42
5	05:43 20:54	06:10 20:30	06:42 19:43	17:04 (1) 18:04 (1)	07:14 18:50	16:39 (1) 18:01 (1)	06:51 17:04	07:26 16:42
6	05:43 20:53	06:11 20:28	06:43 19:41	17:02 (1) 18:05 (1)	07:15 18:48	16:40 (1) 17:59 (1)	06:52 17:02	07:27 16:42
7	05:44 20:53	06:12 20:27	06:44 19:39	17:00 (1) 18:06 (1)	07:16 18:47	16:40 (1) 17:58 (1)	06:53 17:01	07:28 16:41
8	05:45 20:53	06:13 20:26	06:45 19:38	16:58 (1) 18:06 (1)	07:18 18:45	16:40 (1) 17:57 (1)	06:55 17:00	07:29 16:41
9	05:45 20:52	06:14 20:25	06:46 19:36	16:57 (1) 18:07 (1)	07:19 18:43	16:41 (1) 17:56 (1)	06:56 16:59	07:30 16:41
10	05:46 20:52	06:15 20:23	06:47 19:34	16:55 (1) 18:07 (1)	07:20 18:42	16:41 (1) 17:54 (1)	06:57 16:58	07:31 16:41
11	05:47 20:51	06:16 20:22	06:49 19:32	16:54 (1) 18:08 (1)	07:21 18:40	16:43 (1) 17:54 (1)	06:58 16:57	07:32 16:41
12	05:47 20:51	06:17 20:20	06:50 19:31	16:52 (1) 18:08 (1)	07:22 18:38	16:43 (1) 17:52 (1)	07:00 16:56	07:33 16:41
13	05:48 20:50	06:18 20:19	06:51 19:29	16:51 (1) 18:08 (1)	07:23 18:37	16:44 (1) 17:50 (1)	07:01 16:55	07:34 16:42
14	05:49 20:50	06:19 20:18	06:52 19:27	16:50 (1) 18:08 (1)	07:24 18:35	16:45 (1) 17:48 (1)	07:02 16:54	07:34 16:42
15	05:50 20:49	06:20 20:16	06:53 19:25	16:48 (1) 18:08 (1)	07:25 18:34	16:46 (1) 17:47 (1)	07:03 16:53	07:35 16:42
16	05:51 20:49	06:21 20:15	06:54 19:23	16:47 (1) 18:09 (1)	07:27 18:32	16:49 (1) 17:45 (1)	07:05 16:52	07:36 16:42
17	05:51 20:48	06:22 20:13	06:55 19:22	16:46 (1) 18:09 (1)	07:28 18:30	16:50 (1) 17:43 (1)	07:06 16:51	07:37 16:43
18	05:52 20:47	06:23 20:12	06:56 19:20	16:45 (1) 18:08 (1)	07:29 18:29	16:52 (1) 17:41 (1)	07:07 16:50	07:37 16:43
19	05:53 20:47	06:24 20:10	06:57 19:18	16:45 (1) 18:09 (1)	07:30 18:27	16:54 (1) 17:38 (1)	07:08 16:50	07:38 16:43
20	05:54 20:46	06:25 20:09	06:58 19:16	16:44 (1) 18:09 (1)	07:31 18:26	16:57 (1) 17:36 (1)	07:09 16:49	07:39 16:44
21	05:55 20:45	06:26 20:07	06:59 19:15	16:43 (1) 18:09 (1)	07:33 18:24	17:00 (1) 17:32 (1)	07:11 16:48	07:39 16:44
22	05:56 20:44	06:27 20:06	07:00 19:13	16:43 (1) 18:09 (1)	07:34 18:23	17:04 (1) 17:27 (1)	07:12 16:47	07:40 16:45
23	05:57 20:43	06:28 20:04	07:01 19:11	16:42 (1) 18:08 (1)	07:35 18:21	17:13 (1) 17:18 (1)	07:13 16:47	07:40 16:45
24	05:58 20:42	06:30 20:03	07:02 19:09	16:41 (1) 18:08 (1)	07:36 18:20	16:47 16:46	07:14 16:46	07:41 16:46
25	05:59 20:42	06:31 20:01	07:03 19:08	16:41 (1) 18:07 (1)	06:37 17:18	16:45 16:45	07:15 16:45	07:41 16:46
26	06:00 20:41	06:32 19:59	07:04 19:06	16:40 (1) 18:07 (1)	06:39 17:17	16:44 16:45	07:17 16:47	07:41 16:47
27	06:00 20:40	06:33 19:58	17:30 (1) 17:46 (1)	07:05 19:04	06:40 18:06 (1)	16:45 16:44	07:18 16:47	07:42 16:47
28	06:01 20:39	06:34 19:56	17:25 (1) 17:51 (1)	07:07 19:02	06:41 18:06 (1)	16:46 16:44	07:19 16:48	07:42 16:48
29	06:02 20:38	06:35 19:54	17:21 (1) 17:54 (1)	07:08 19:01	06:42 18:05 (1)	16:47 16:44	07:20 16:49	07:42 16:49
30	06:03 20:37	06:36 19:53	17:18 (1) 17:56 (1)	07:09 18:59	06:43 18:04 (1)	16:48 16:43	07:21 16:50	07:43 16:50
31	06:04 20:35	06:37 19:51	17:15 (1) 17:58 (1)		06:45 17:10		07:22 16:50	07:43 16:50
Potential sun hours	463	430	376	344	295	284		
Total, worst case		156	2272	1432				

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: G - Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° 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	07:43 16:51	15:42 (1) 16:08 (1)	07:28 17:27	15:31 (1) 16:40 (1)	06:51 18:03	15:52 (1) 16:23 (1)	06:58 19:39	06:11 20:12	05:40 20:43
2	07:43 16:52	15:41 (1) 16:09 (1)	07:27 17:28	15:31 (1) 16:41 (1)	06:49 18:04	15:56 (1) 16:20 (1)	06:56 19:40	06:09 20:13	05:40 20:44
3	07:43 16:53	15:41 (1) 16:11 (1)	07:26 17:30	15:31 (1) 16:41 (1)	06:48 18:05	16:01 (1) 16:15 (1)	06:55 19:41	06:08 20:14	05:39 20:45
4	07:43 16:54	15:41 (1) 16:12 (1)	07:25 17:31	15:31 (1) 16:42 (1)	06:46 18:06		06:53 19:42	06:07 20:16	05:39 20:45
5	07:43 16:55	15:40 (1) 16:14 (1)	07:24 17:32	15:30 (1) 16:41 (1)	06:44 18:07		06:51 19:43	06:05 20:17	05:39 20:46
6	07:43 16:56	15:40 (1) 16:15 (1)	07:23 17:33	15:31 (1) 16:41 (1)	06:43 18:09		06:50 19:44	06:04 20:18	05:38 20:47
7	07:43 16:57	15:40 (1) 16:17 (1)	07:22 17:35	15:31 (1) 16:42 (1)	06:41 18:10		06:48 19:45	06:03 20:19	05:38 20:48
8	07:43 16:58	15:38 (1) 16:17 (1)	07:21 17:36	15:31 (1) 16:42 (1)	06:39 18:11		06:46 19:46	06:02 20:20	05:38 20:48
9	07:43 16:59	15:38 (1) 16:19 (1)	07:19 17:37	15:32 (1) 16:42 (1)	06:38 18:12		06:45 19:48	06:00 20:21	05:37 20:49
10	07:42 17:00	15:38 (1) 16:20 (1)	07:18 17:39	15:31 (1) 16:42 (1)	06:36 18:13		06:43 19:49	05:59 20:22	05:37 20:49
11	07:42 17:01	15:37 (1) 16:21 (1)	07:17 17:40	15:32 (1) 16:42 (1)	06:34 18:15		06:41 19:50	05:58 20:23	05:37 20:50
12	07:42 17:02	15:37 (1) 16:23 (1)	07:16 17:41	15:33 (1) 16:42 (1)	06:33 18:16		06:40 19:51	05:57 20:24	05:37 20:50
13	07:42 17:03	15:37 (1) 16:24 (1)	07:14 17:43	15:32 (1) 16:41 (1)	06:31 18:17		06:38 19:52	05:56 20:25	05:37 20:51
14	07:41 17:05	15:36 (1) 16:25 (1)	07:13 17:44	15:33 (1) 16:41 (1)	06:29 18:18		06:36 19:53	05:55 20:26	05:37 20:51
15	07:41 17:06	15:36 (1) 16:27 (1)	07:12 17:45	15:34 (1) 16:41 (1)	06:28 18:19		06:35 19:54	05:54 20:27	05:37 20:52
16	07:40 17:07	15:35 (1) 16:27 (1)	07:10 17:46	15:34 (1) 16:40 (1)	06:26 18:20		06:33 19:55	05:53 20:28	05:37 20:52
17	07:40 17:08	15:35 (1) 16:29 (1)	07:09 17:48	15:35 (1) 16:40 (1)	06:24 18:22		06:31 19:57	05:52 20:29	05:37 20:53
18	07:39 17:09	15:34 (1) 16:30 (1)	07:07 17:49	15:35 (1) 16:39 (1)	06:22 18:23		06:30 19:58	05:51 20:30	05:37 20:53
19	07:39 17:10	15:34 (1) 16:30 (1)	07:06 17:50	15:37 (1) 16:39 (1)	06:21 18:24		06:28 19:59	05:50 20:31	05:37 20:53
20	07:38 17:12	15:34 (1) 16:32 (1)	07:05 17:51	15:37 (1) 16:37 (1)	06:19 18:25		06:27 20:00	05:49 20:32	05:37 20:54
21	07:38 17:13	15:33 (1) 16:33 (1)	07:03 17:53	15:39 (1) 16:37 (1)	06:17 18:26		06:25 20:01	05:48 20:33	05:37 20:54
22	07:37 17:14	15:33 (1) 16:33 (1)	07:02 17:54	15:39 (1) 16:35 (1)	06:15 18:27		06:24 20:02	05:47 20:34	05:37 20:54
23	07:36 17:15	15:32 (1) 16:34 (1)	07:00 17:55	15:41 (1) 16:35 (1)	06:14 18:28		06:22 20:03	05:46 20:35	05:37 20:54
24	07:35 17:17	15:33 (1) 16:35 (1)	06:59 17:56	15:42 (1) 16:33 (1)	06:12 18:30		06:21 20:04	05:45 20:36	05:38 20:54
25	07:35 17:18	15:32 (1) 16:36 (1)	06:57 17:58	15:44 (1) 16:32 (1)	06:10 18:31		06:19 20:06	05:45 20:37	05:38 20:54
26	07:34 17:19	15:32 (1) 16:37 (1)	06:56 17:59	15:45 (1) 16:30 (1)	06:09 18:32		06:18 20:07	05:44 20:38	05:38 20:55
27	07:33 17:20	15:32 (1) 16:37 (1)	06:54 18:00	15:47 (1) 16:28 (1)	06:07 18:33		06:16 20:08	05:43 20:39	05:39 20:55
28	07:32 17:22	15:31 (1) 16:38 (1)	06:52 18:01	15:50 (1) 16:26 (1)	06:05 18:34		06:15 20:09	05:43 20:40	05:39 20:55
29	07:31 17:23	15:31 (1) 16:39 (1)			07:03 19:35		06:13 20:10	05:42 20:41	05:40 20:55
30	07:30 17:24	15:31 (1) 16:39 (1)			07:02 19:36		06:12 20:11	05:41 20:42	05:40 20:55
31	07:29 17:26	15:31 (1) 16:40 (1)			07:00 19:37			05:41 20:42	
Potential sun hours	294		295		369		400	452	457
Total, worst case	1566		1753		69				

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: G - Shadow Receptor: 1.0 × 1.0 Azimuth: 40.0° 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	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:09	15:01 (1) 16:11 (1)	07:22 16:43	15:19 (1) 16:03 (1)	
2	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	06:47 17:07	15:01 (1) 16:11 (1)	07:23 16:42	15:21 (1) 16:03 (1)	
3	05:41 20:54	06:07 20:32	06:40 19:46	07:12 18:54	06:48 17:06	15:01 (1) 16:12 (1)	07:24 16:42	15:22 (1) 16:03 (1)	
4	05:42 20:54	06:09 20:31	06:41 19:44	07:13 18:52	06:50 17:05	15:01 (1) 16:12 (1)	07:25 16:42	15:23 (1) 16:02 (1)	
5	05:43 20:54	06:10 20:30	06:42 19:43	07:14 18:50	06:51 17:04	15:01 (1) 16:11 (1)	07:26 16:42	15:25 (1) 16:02 (1)	
6	05:43 20:53	06:11 20:28	06:43 19:41	07:15 18:48	06:52 17:02	15:01 (1) 16:12 (1)	07:27 16:42	15:26 (1) 16:01 (1)	
7	05:44 20:53	06:12 20:27	06:44 19:39	07:16 18:47	06:53 17:01	15:01 (1) 16:11 (1)	07:28 16:41	15:27 (1) 16:01 (1)	
8	05:45 20:53	06:13 20:26	06:45 19:38	07:18 18:45	06:55 17:00	15:01 (1) 16:11 (1)	07:29 16:41	15:29 (1) 16:00 (1)	
9	05:45 20:52	06:14 20:25	06:46 19:36	07:19 18:43	06:56 16:59	15:02 (1) 16:12 (1)	07:30 16:41	15:30 (1) 16:00 (1)	
10	05:46 20:52	06:15 20:23	06:47 19:34	07:20 18:42	06:57 16:58	15:02 (1) 16:11 (1)	07:31 16:41	15:31 (1) 16:00 (1)	
11	05:47 20:51	06:16 20:22	06:49 19:32	07:21 18:40	16:32 (1) 16:52 (1)	06:58 16:57	15:02 (1) 16:41	07:32 16:41	15:32 (1) 15:58 (1)
12	05:47 20:51	06:17 20:20	06:50 19:31	07:22 18:38	16:28 (1) 16:55 (1)	07:00 16:56	15:03 (1) 16:41	07:33 16:41	15:33 (1) 15:58 (1)
13	05:48 20:50	06:18 20:19	06:51 19:29	07:23 18:37	16:24 (1) 16:55 (1)	07:01 16:55	15:03 (1) 16:42	07:34 16:42	15:35 (1) 15:58 (1)
14	05:49 20:50	06:19 20:18	06:52 19:27	07:24 18:35	16:21 (1) 16:54 (1)	07:02 16:54	15:03 (1) 16:42	07:34 16:42	15:36 (1) 15:58 (1)
15	05:50 20:49	06:20 20:16	06:53 19:25	07:25 18:34	16:18 (1) 17:01 (1)	07:03 16:53	15:05 (1) 16:42	07:35 16:42	15:37 (1) 15:56 (1)
16	05:51 20:49	06:21 20:15	06:54 19:23	07:27 18:32	16:17 (1) 17:03 (1)	07:05 16:52	15:05 (1) 16:42	07:36 16:42	15:39 (1) 15:56 (1)
17	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	16:15 (1) 17:04 (1)	07:06 16:51	15:05 (1) 16:43	07:37 16:43	15:40 (1) 15:57 (1)
18	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	16:13 (1) 17:05 (1)	07:07 16:50	15:07 (1) 16:43	07:37 16:43	15:41 (1) 15:56 (1)
19	05:53 20:47	06:24 20:10	06:57 19:18	07:30 18:27	16:11 (1) 17:06 (1)	07:08 16:50	15:07 (1) 16:43	07:38 16:43	15:42 (1) 15:56 (1)
20	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	16:10 (1) 17:07 (1)	07:09 16:49	15:08 (1) 16:44	07:39 16:44	15:43 (1) 15:57 (1)
21	05:55 20:45	06:26 20:07	06:59 19:15	07:33 18:24	16:09 (1) 17:08 (1)	07:11 16:48	15:08 (1) 16:44	07:39 16:44	15:43 (1) 15:56 (1)
22	05:56 20:44	06:27 20:06	07:00 19:13	07:34 18:23	16:07 (1) 17:08 (1)	07:12 16:47	15:10 (1) 16:45	07:40 16:45	15:44 (1) 15:57 (1)
23	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	16:06 (1) 17:08 (1)	07:13 16:47	15:11 (1) 16:45	07:40 16:45	15:44 (1) 15:58 (1)
24	05:58 20:42	06:30 20:03	07:02 19:09	07:36 18:20	16:06 (1) 17:10 (1)	07:14 16:46	15:11 (1) 16:46	07:41 16:46	15:44 (1) 15:58 (1)
25	05:59 20:42	06:31 20:01	07:03 19:08	06:37 17:18	15:05 (1) 16:10 (1)	07:15 16:45	15:12 (1) 16:46	07:41 16:46	15:45 (1) 15:59 (1)
26	06:00 20:41	06:32 19:59	07:04 19:06	06:39 17:17	15:04 (1) 16:10 (1)	07:17 16:45	15:14 (1) 16:47	07:41 16:47	15:44 (1) 16:00 (1)
27	06:00 20:40	06:33 19:58	07:05 19:04	06:40 17:15	15:03 (1) 16:10 (1)	07:18 16:44	15:15 (1) 16:47	07:42 16:47	15:44 (1) 16:01 (1)
28	06:01 20:39	06:34 19:56	07:07 19:02	06:41 17:14	15:03 (1) 16:11 (1)	07:19 16:44	15:16 (1) 16:48	07:42 16:48	15:44 (1) 16:03 (1)
29	06:02 20:38	06:35 19:54	07:08 19:01	06:42 17:13	15:02 (1) 16:11 (1)	07:20 16:44	15:17 (1) 16:49	07:42 16:49	15:44 (1) 16:04 (1)
30	06:03 20:37	06:36 19:53	07:09 18:59	06:43 17:11	15:01 (1) 16:11 (1)	07:21 16:43	15:18 (1) 16:50	07:43 16:50	15:43 (1) 16:05 (1)
31	06:04 20:35	06:37 19:51	07:10 19:10	06:45 17:10	15:02 (1) 16:12 (1)	07:22 16:43	15:18 (1) 16:50	07:43 16:50	15:43 (1) 16:07 (1)
Potential sun hours	463	430	376	344	295	284	740		
Total, worst case				1141	1880				

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: H - Shadow Receptor: 1.0 x 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	07:43 16:51	13:31 (1) 14:22 (1)	07:28 18:03	06:51 19:39	06:58 20:12	06:11 20:43	05:40 20:54	05:40 20:34	06:05 19:49	06:38 18:57	07:10 17:09	06:46 16:43	13:28 (1) 31 13:59 (1)	
2	07:43 16:52	13:32 (1) 14:22 (1)	07:27 18:04	06:49 19:40	06:56 20:13	06:09 20:44	05:40 20:54	05:41 20:33	06:06 19:48	06:39 18:55	07:11 17:07	06:47 16:42	13:27 (1) 34 14:01 (1)	
3	07:43 16:53	13:33 (1) 14:22 (1)	07:26 18:05	06:48 19:41	06:55 20:15	06:08 20:45	05:39 20:54	05:41 20:32	06:07 19:46	06:40 18:54	07:12 17:06	06:48 16:42	13:26 (1) 37 14:03 (1)	
4	07:43 16:54	13:34 (1) 14:21 (1)	07:25 18:06	06:46 19:42	06:53 20:16	06:07 20:46	05:39 20:54	05:42 20:31	06:09 19:44	06:41 18:52	07:13 17:05	06:50 16:42	13:25 (1) 39 14:04 (1)	
5	07:43 16:55	13:36 (1) 14:21 (1)	07:24 18:08	06:44 19:43	06:51 20:17	06:05 20:46	05:39 20:54	05:43 20:30	06:10 19:43	06:42 18:50	07:14 17:04	06:51 16:42	13:24 (1) 42 14:06 (1)	
6	07:43 16:56	13:37 (1) 14:21 (1)	07:23 18:09	06:43 19:44	06:50 20:18	06:04 20:47	05:38 20:53	05:43 20:28	06:11 19:41	06:43 18:48	07:15 17:02	06:52 16:42	13:23 (1) 44 14:07 (1)	
7	07:43 16:57	13:39 (1) 14:21 (1)	07:22 18:10	06:41 19:45	06:48 20:19	06:03 20:48	05:38 20:53	05:44 20:27	06:12 19:39	06:44 18:47	07:16 17:01	06:53 16:41	13:23 (1) 45 14:08 (1)	
8	07:43 16:58	13:40 (1) 14:20 (1)	07:21 18:11	06:39 19:47	06:46 20:20	06:02 20:48	05:38 20:53	05:45 20:26	06:13 19:38	06:45 18:45	07:18 17:00	06:55 16:41	13:23 (1) 46 14:09 (1)	
9	07:43 16:59	13:42 (1) 14:19 (1)	07:19 18:12	06:38 19:48	06:45 20:21	06:00 20:49	05:37 20:52	05:45 20:25	06:14 19:36	06:46 18:43	07:19 16:59	06:56 16:41	13:22 (1) 49 14:11 (1)	
10	07:42 17:00	13:44 (1) 14:17 (1)	07:18 18:13	06:36 19:49	06:43 20:22	05:59 20:49	05:37 20:52	05:46 20:23	06:15 19:34	06:47 18:42	07:20 16:58	06:57 16:41	13:22 (1) 50 14:12 (1)	
11	07:42 17:01	13:45 (1) 14:17 (1)	07:17 18:15	06:34 19:50	06:41 20:23	05:58 20:50	05:37 20:51	05:47 20:22	06:16 19:32	06:49 18:40	07:21 16:57	06:58 16:41	13:21 (1) 51 14:12 (1)	
12	07:42 17:02	13:48 (1) 14:16 (1)	07:16 18:16	06:33 19:51	06:40 20:24	05:57 20:50	05:37 20:52	05:47 20:20	06:17 19:31	06:50 18:38	07:22 16:56	07:00 16:41	13:21 (1) 52 14:13 (1)	
13	07:42 17:03	13:52 (1) 14:14 (1)	07:14 18:17	06:31 19:52	06:38 20:25	05:56 20:51	05:37 20:50	05:48 20:19	06:18 19:29	06:51 18:37	07:23 16:55	07:01 16:42	13:21 (1) 53 14:14 (1)	
14	07:41 17:05	13:55 (1) 14:11 (1)	07:13 18:18	06:29 19:53	06:36 20:26	05:55 20:51	05:37 20:50	05:49 20:18	06:19 19:27	06:52 18:35	07:24 16:54	07:02 16:42	13:22 (1) 53 14:15 (1)	
15	07:41 17:06	14:11 (1) 17:45	07:12 18:19	06:28 19:54	06:35 20:27	05:54 20:52	05:37 20:49	05:50 20:16	06:20 19:25	06:53 18:34	07:26 16:53	07:03 16:42	13:22 (1) 54 14:16 (1)	
16	07:40 17:07	17:46	07:10 18:20	06:26 19:55	06:33 20:28	05:53 20:52	05:37 20:49	05:51 20:15	06:21 19:24	06:54 18:32	07:27 16:52	07:05 16:42	13:22 (1) 54 14:16 (1)	
17	07:40 17:08	07:09 17:48	07:09 18:22	06:24 19:57	06:31 20:29	05:52 20:53	05:37 20:48	05:51 20:13	06:22 19:22	06:55 18:30	07:28 16:51	07:06 16:43	13:22 (1) 55 14:17 (1)	
18	07:39 17:09	07:08 17:49	07:08 18:23	06:22 19:58	06:30 20:31	05:51 20:53	05:37 20:47	05:52 20:12	06:23 19:20	06:56 18:29	07:29 16:50	07:07 16:43	13:22 (1) 55 14:17 (1)	
19	07:39 17:10	07:06 17:50	07:06 18:24	06:21 19:59	06:28 20:32	05:50 20:53	05:37 20:47	05:53 20:10	06:24 19:18	06:57 18:27	07:30 16:50	07:08 16:43	13:23 (1) 55 14:18 (1)	
20	07:38 17:12	07:05 17:51	07:05 18:25	06:19 20:00	06:27 20:32	05:49 20:54	05:37 20:46	05:54 20:09	06:25 19:16	06:58 18:26	07:31 16:49	07:09 16:44	13:23 (1) 56 14:19 (1)	
21	07:38 17:13	07:03 17:53	07:03 18:26	06:17 20:01	06:25 20:33	05:48 20:54	05:37 20:45	05:55 20:07	06:26 19:15	06:59 18:24	07:33 16:48	07:11 16:44	13:23 (1) 56 14:19 (1)	
22	07:37 17:14	07:02 17:54	07:02 18:27	06:15 20:02	06:24 20:34	05:47 20:54	05:37 20:44	05:56 20:06	06:27 19:13	07:00 18:23	07:34 16:47	07:12 16:45	13:24 (1) 56 14:20 (1)	
23	07:36 17:15	07:00 17:55	07:00 18:28	06:14 20:03	06:22 20:35	05:46 20:54	05:37 20:43	05:57 20:04	06:28 19:11	07:01 18:21	07:35 16:47	07:13 16:44	13:24 (1) 56 14:20 (1)	
24	07:35 17:17	06:59 17:57	06:12 18:30	06:21 20:04	06:21 20:36	05:45 20:54	05:38 20:42	05:58 20:03	06:30 19:09	07:02 18:20	07:36 16:46	07:14 16:45	13:24 (1) 56 14:20 (1)	
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:06	06:19 20:37	05:45 20:54	05:38 20:42	05:59 20:01	06:31 19:08	07:03 17:18	06:37 16:45	07:15 16:46	13:26 (1) 55 14:21 (1)	
26	07:34 17:19	06:56 17:59	06:09 18:32	06:18 20:07	06:18 20:38	05:44 20:55	05:38 20:41	06:00 19:59	06:32 19:06	07:04 17:17	06:39 16:45	07:17 16:45	13:26 (1) 55 14:21 (1)	
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	06:16 20:39	05:43 20:55	05:39 20:40	06:00 19:58	07:05 19:04	06:40 17:15	07:18 16:44	07:18 16:47	13:26 (1) 55 14:21 (1)	
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	06:15 20:40	05:43 20:55	05:39 20:39	06:01 19:56	06:34 19:02	07:07 17:14	06:41 16:44	07:19 16:44	13:28 (1) 54 14:22 (1)	
29	07:31 17:23	19:35	07:03 19:35	06:13 20:10	06:13 20:41	05:42 20:55	05:40 20:38	06:02 19:54	06:35 19:01	07:08 17:13	06:42 16:44	07:20 16:49	13:32 (1) 54 14:22 (1)	
30	07:30 17:24	19:36	07:02 19:36	06:12 20:11	06:12 20:42	05:41 20:55	05:40 20:37	06:03 19:53	06:36 18:59	07:09 17:11	06:43 16:43	07:21 16:43	13:29 (1) 53 14:22 (1)	
31	07:29 17:26	19:38	07:00 19:38	06:11	06:11	05:41	05:41	06:04	06:37	07:10	06:45	07:22	13:30 (1) 52 14:22 (1)	
Potential sun hours	294		295	369	400	452	457	463	430	376	344	295	284	1557
Total, worst case	538										66			

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

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

## SHADOW - Calendar

Calculation: WON018\_ShadowFlickering Shadow receptor: I - Shadow Receptor: 1.0 × 1.0 Azimuth: -10.0° 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	07:43 16:52	10:51 (1) 12:18 (1)	07:28 17:27	06:51 18:03	06:58 19:39	06:11 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:09	07:22 16:43
2	07:43 16:52	10:51 (1) 12:18 (1)	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	06:47 17:07	07:23 16:42
3	07:43 16:53	10:52 (1) 12:18 (1)	07:26 17:30	06:48 18:05	06:55 19:41	06:08 20:15	05:39 20:45	05:42 20:54	06:08 20:32	06:40 19:46	07:12 18:54	06:48 17:06	07:24 16:42
4	07:43 16:54	10:53 (1) 12:18 (1)	07:25 17:31	06:46 18:06	06:53 19:42	06:07 20:16	05:39 20:46	05:42 20:54	06:09 20:31	06:41 19:44	07:13 18:52	06:50 17:05	07:25 16:42
5	07:43 16:55	10:54 (1) 12:18 (1)	07:24 17:32	06:44 18:08	06:51 19:43	06:05 20:17	05:39 20:46	05:43 20:54	06:10 20:30	06:42 19:43	07:14 18:50	06:51 17:04	07:26 16:42
6	07:43 16:56	10:55 (1) 12:18 (1)	07:23 17:33	06:43 18:09	06:50 19:44	06:04 20:18	05:38 20:47	05:43 20:53	06:11 20:28	06:43 19:41	07:15 18:49	06:52 17:02	07:27 16:42
7	07:43 16:57	10:56 (1) 12:18 (1)	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:48	05:44 20:53	06:12 20:27	06:44 19:39	07:16 18:47	06:53 17:01	07:28 16:41
8	07:43 16:58	10:56 (1) 12:18 (1)	07:21 17:36	06:39 18:11	06:46 19:47	06:02 20:20	05:38 20:48	05:45 20:53	06:13 20:26	06:45 19:38	07:18 18:45	06:55 17:00	07:29 16:41
9	07:43 16:59	10:57 (1) 12:18 (1)	07:19 17:37	06:38 18:12	06:45 19:48	06:00 20:21	05:37 20:49	05:45 20:52	06:14 20:25	06:46 19:36	07:19 18:43	06:56 16:59	07:30 16:41
10	07:43 17:00	10:58 (1) 12:18 (1)	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	05:46 20:52	06:15 20:23	06:47 19:34	07:20 18:42	06:57 16:58	07:31 16:41
11	07:42 17:01	10:58 (1) 12:17 (1)	07:17 17:40	06:34 18:15	06:41 19:50	05:58 20:23	05:37 20:50	05:47 20:51	06:16 20:22	06:49 19:32	07:21 18:40	06:58 16:57	07:32 16:41
12	07:42 17:02	11:00 (1) 12:17 (1)	07:16 17:41	06:33 18:16	06:40 19:51	05:57 20:24	05:37 20:50	05:47 20:51	06:17 20:20	06:50 19:31	07:22 18:38	07:00 16:56	07:33 16:42
13	07:42 17:03	11:01 (1) 12:17 (1)	07:14 17:43	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	05:48 20:50	06:18 20:19	06:51 19:29	07:23 18:37	07:01 16:55	07:34 16:42
14	07:41 17:05	11:02 (1) 12:16 (1)	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:37 20:51	05:49 20:50	06:19 20:18	06:52 19:27	07:24 18:35	07:02 16:54	07:34 16:42
15	07:41 17:06	11:04 (1) 12:16 (1)	07:12 17:45	06:28 18:19	06:35 19:54	05:54 20:27	05:37 20:52	05:50 20:49	06:20 20:16	06:53 19:25	07:26 18:34	07:03 16:53	11:07 (1) 07:35
16	07:40 17:07	11:04 (1) 12:14 (1)	07:10 17:46	06:26 18:20	06:33 19:56	05:53 20:28	05:37 20:52	05:51 20:49	06:21 20:15	06:54 19:24	07:27 18:32	07:05 16:52	11:00 (1) 07:36
17	07:40 17:08	11:06 (1) 12:14 (1)	07:09 17:48	06:24 18:22	06:31 19:57	05:52 20:30	05:37 20:53	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	07:06 16:51	11:28 (1) 07:37
18	07:39 17:09	11:07 (1) 12:13 (1)	07:08 17:49	06:22 18:23	06:30 19:58	05:51 20:31	05:37 20:53	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	07:07 16:50	11:32 (1) 07:38
19	07:39 17:10	11:09 (1) 12:11 (1)	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:32	05:37 20:53	05:53 20:47	06:24 20:10	06:57 19:18	07:30 18:27	07:08 16:50	11:36 (1) 07:38
20	07:38 17:12	11:11 (1) 12:10 (1)	07:05 17:52	06:19 18:25	06:27 20:00	05:49 20:33	05:37 20:54	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	07:09 16:49	11:39 (1) 07:39
21	07:38 17:13	11:13 (1) 12:09 (1)	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:15	07:33 18:24	07:11 16:48	11:42 (1) 07:40
22	07:37 17:14	11:14 (1) 12:07 (1)	07:02 17:54	06:16 18:27	06:24 20:02	05:47 20:34	05:37 20:54	05:56 20:44	06:27 20:06	07:00 19:13	07:34 18:23	07:12 16:47	11:44 (1) 07:40
23	07:36 17:15	11:17 (1) 12:04 (1)	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	07:13 16:47	11:46 (1) 07:41
24	07:36 17:17	11:20 (1) 12:02 (1)	06:59 17:57	06:12 18:30	06:21 20:04	05:45 20:36	05:38 20:54	05:58 20:42	06:30 20:03	07:02 19:09	07:36 18:20	07:14 16:46	11:48 (1) 07:41
25	07:35 17:18	11:23 (1) 11:59 (1)	06:57 17:58	06:10 18:31	06:19 20:06	05:45 20:37	05:38 20:55	05:59 20:42	06:31 20:01	07:03 19:08	06:37 17:18	07:15 16:45	11:50 (1) 07:41
26	07:34 17:19	11:27 (1) 11:55 (1)	06:56 17:59	06:09 18:32	06:18 20:07	05:44 20:38	05:38 20:55	06:00 20:41	06:32 19:59	07:04 19:06	06:39 17:17	07:17 16:45	11:51 (1) 07:41
27	07:33 17:20	11:34 (1) 11:47 (1)	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:55	06:01 20:40	06:33 19:58	07:05 19:04	06:40 17:15	07:18 16:44	11:55 (1) 07:42
28	07:32 17:22	11:34 (1) 18:01	06:52 18:01	06:05 18:34	06:15 20:09	05:43 20:40	05:39 20:55	06:01 20:39	06:34 19:56	07:07 19:02	06:41 17:14	07:19 16:44	11:56 (1) 07:42
29	07:31 17:23			07:03 19:35	06:13 20:10	05:42 20:41	05:40 20:55	06:02 20:38	06:35 19:54	07:08 19:01	06:42 17:13	07:20 16:44	12:01 (1) 07:42
30	07:30 17:24			07:02 19:36	06:12 20:11	05:41 20:42	05:40 20:55	06:03 20:37	06:36 19:53	07:09 18:59	06:43 17:11	07:21 16:43	12:01 (1) 07:43
31	07:29 17:26			07:00 19:38	06:11 20:42	05:41 20:42		06:04 20:35	06:37 19:51	07:10 18:59	06:45 17:10	07:22 16:43	12:01 (1) 07:43
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284	2695
Total, worst case	1816										898		

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: J - Shadow Receptor: 1.0 × 1.0 Azimuth: -60.0° 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	07:43	08:06 (2)	07:28	08:07 (1)	06:51	07:58 (1)	06:58	06:11	05:40
	16:52	20 08:26 (2)	17:27	41 08:48 (1)	18:03	56 08:54 (1)	19:39	20:12	20:43
2	07:43	08:06 (2)	07:27	08:06 (1)	06:49	07:59 (1)	06:56	06:09	05:40
	16:52	21 08:27 (2)	17:28	44 08:50 (1)	18:04	54 08:53 (1)	19:40	20:13	20:44
3	07:43	08:06 (2)	07:26	08:05 (1)	06:48	07:59 (1)	06:55	06:08	05:39
	16:53	22 08:28 (2)	17:30	46 08:51 (1)	18:05	53 08:52 (1)	19:41	20:15	20:45
4	07:43	08:06 (2)	07:25	08:04 (1)	06:46	08:00 (1)	06:53	06:07	05:39
	16:54	22 08:28 (2)	17:31	48 08:52 (1)	18:06	50 08:50 (1)	19:42	20:16	20:46
5	07:43	08:06 (2)	07:24	08:03 (1)	06:44	08:02 (1)	06:51	06:05	05:39
	16:55	23 08:29 (2)	17:32	51 08:54 (1)	18:08	47 08:49 (1)	19:43	20:17	20:46
6	07:43	08:06 (2)	07:23	08:02 (1)	06:43	08:02 (1)	06:50	06:04	05:38
	16:56	24 08:30 (2)	17:33	52 08:54 (1)	18:09	45 08:47 (1)	19:44	20:18	20:47
7	07:43	08:06 (2)	07:22	08:01 (1)	06:41	08:03 (1)	06:48	06:03	05:38
	16:57	25 08:31 (2)	17:35	54 08:55 (1)	18:10	42 08:45 (1)	19:45	20:19	20:48
8	07:43	08:05 (2)	07:21	08:01 (1)	06:39	08:06 (1)	06:46	06:02	05:38
	16:58	26 08:31 (2)	17:36	55 08:56 (1)	18:11	37 08:43 (1)	19:47	20:20	20:48
9	07:43	08:05 (2)	07:19	08:00 (1)	06:38	08:07 (1)	06:45	06:00	05:37
	16:59	27 08:32 (2)	17:37	57 08:57 (1)	18:12	33 08:40 (1)	19:48	20:21	20:49
10	07:43	08:05 (2)	07:18	07:59 (1)	06:36	08:09 (1)	06:43	05:59	05:37
	17:00	28 08:33 (2)	17:39	58 08:57 (1)	18:13	28 08:37 (1)	19:49	20:22	20:49
11	07:42	08:06 (2)	07:17	07:59 (1)	06:34	08:13 (1)	06:41	05:58	05:37
	17:01	28 08:34 (2)	17:40	59 08:58 (1)	18:15	20 08:33 (1)	19:50	20:23	20:50
12	07:42	08:05 (2)	07:16	07:58 (1)	06:33	08:19 (1)	06:40	05:57	05:37
	17:02	29 08:34 (2)	17:41	61 08:59 (1)	18:16	7 08:26 (1)	19:51	20:24	20:51
13	07:42	08:06 (2)	07:14	07:57 (1)	06:31		06:38	05:56	05:37
	17:03	29 08:35 (2)	17:43	62 08:59 (1)	18:17		19:52	20:25	20:51
14	07:41	08:05 (2)	07:13	07:57 (1)	06:29		06:36	05:55	05:37
	17:05	30 08:35 (2)	17:44	63 09:00 (1)	18:18		19:53	20:26	20:51
15	07:41	08:06 (2)	07:12	07:57 (1)	06:28		06:35	05:54	05:37
	17:06	30 08:36 (2)	17:45	63 09:00 (1)	18:19		19:54	20:27	20:52
16	07:40	08:06 (2)	07:10	07:57 (1)	06:26		06:33	05:53	05:37
	17:07	30 08:36 (2)	17:46	63 09:00 (1)	18:20		19:56	20:29	20:52
17	07:40	08:07 (2)	07:09	07:57 (1)	06:24		06:31	05:52	05:37
	17:08	30 08:37 (2)	17:48	63 09:00 (1)	18:22		19:57	20:30	20:53
18	07:39	08:07 (2)	07:08	07:56 (1)	06:22		06:30	05:51	05:37
	17:09	30 08:37 (2)	17:49	64 09:00 (1)	18:23		19:58	20:31	20:53
19	07:39	08:07 (2)	07:06	07:56 (1)	06:21		06:28	05:50	05:37
	17:10	30 08:37 (2)	17:50	64 09:00 (1)	18:24		19:59	20:32	20:53
20	07:38	08:08 (2)	07:05	07:56 (1)	06:19		06:27	05:49	05:37
	17:12	30 08:38 (2)	17:52	63 08:59 (1)	18:25		20:00	20:33	20:54
21	07:38	08:08 (2)	07:03	07:56 (1)	06:17		06:25	05:48	05:37
	17:13	30 08:38 (2)	17:53	64 09:00 (1)	18:26		20:01	20:34	20:54
22	07:37	08:08 (2)	07:02	07:56 (1)	06:16		06:24	05:47	05:37
	17:14	29 08:37 (2)	17:54	63 08:59 (1)	18:27		20:02	20:34	20:54
23	07:36	08:08 (2)	07:00	07:56 (1)	06:14		06:22	05:46	05:38
	17:15	29 08:37 (2)	17:55	63 08:59 (1)	18:29		20:03	20:35	20:54
24	07:36	08:10 (2)	06:59	07:56 (1)	06:12		06:21	05:45	05:38
	17:17	28 08:38 (2)	17:57	62 08:58 (1)	18:30		20:04	20:36	20:54
25	07:35	08:10 (2)	06:57	07:57 (1)	06:10		06:19	05:45	05:38
	17:18	27 08:37 (2)	17:58	61 08:58 (1)	18:31		20:06	20:37	20:55
26	07:34	08:11 (2)	06:56	07:57 (1)	06:09		06:18	05:44	05:38
	17:19	26 08:37 (2)	17:59	60 08:57 (1)	18:32		20:07	20:38	20:55
27	07:33	08:12 (2)	06:54	07:57 (1)	06:07		06:16	05:43	05:39
	17:20	25 08:37 (1)	18:00	59 08:56 (1)	18:33		20:08	20:39	20:55
28	07:32	08:13 (2)	06:52	07:58 (1)	06:05		06:15	05:43	05:39
	17:22	27 08:40 (1)	18:01	57 08:55 (1)	18:34		20:09	20:40	20:55
29	07:31	08:12 (1)			07:03		06:13	05:42	05:40
	17:23	30 08:42 (1)			19:35		20:10	20:41	20:55
30	07:30	08:10 (1)			07:02		06:12	05:41	05:40
	17:24	34 08:44 (1)			19:36		20:11	20:42	20:55
31	07:29	08:08 (1)			07:00			05:41	
	17:26	38 08:46 (1)			19:38			20:42	
Potential sun hours	294		295		369		400	452	457
Total, worst case	857		1620		472				

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: J - Shadow Receptor: 1.0 × 1.0 Azimuth: -60.0° 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	05:40 20:54	06:05 20:34	06:38 19:50	07:10 18:57	06:46 17:09	07:29 (1) 07:22 08:16 (2)
2	05:41 20:54	06:07 20:33	06:39 19:48	07:11 18:55	08:53 (1) 06:47 16	07:29 (1) 07:23 07:48 (2)
3	05:42 20:54	06:08 20:32	06:40 19:46	07:12 18:54	08:49 (1) 06:48 25	07:30 (1) 07:24 08:16 (2)
4	05:42 20:54	06:09 20:31	06:41 19:44	07:13 18:52	09:14 (1) 17:06 56	08:26 (1) 16:42 27
5	05:43 20:54	06:10 20:30	06:42 19:43	07:14 18:50	08:46 (1) 06:50 30	07:31 (1) 07:25 07:50 (2)
6	05:43 20:53	06:11 20:28	06:43 19:41	07:15 18:49	09:16 (1) 17:05 54	08:25 (1) 16:42 26
7	05:44 20:53	06:12 20:27	06:44 19:39	07:16 18:47	08:43 (1) 06:51 36	07:32 (1) 07:26 07:51 (2)
8	05:45 20:53	06:13 20:26	06:45 19:38	07:18 18:45	09:19 (1) 17:04 52	08:24 (1) 16:42 25
9	05:45 20:52	06:14 20:25	06:46 19:36	07:19 18:43	08:41 (1) 06:52 43	07:33 (1) 07:27 07:52 (2)
10	05:47 20:52	06:16 20:23	06:49 19:34	07:21 18:42	09:20 (1) 17:02 50	08:23 (1) 16:42 24
11	05:47 20:52	06:17 20:22	06:50 19:32	07:22 18:40	08:39 (1) 06:53 43	07:34 (1) 07:28 07:53 (2)
12	05:48 20:51	06:18 20:21	06:51 19:31	07:23 18:38	09:22 (1) 17:01 48	08:22 (1) 16:42 23
13	05:48 20:50	06:19 20:19	06:52 19:29	07:24 18:37	08:37 (1) 06:55 46	07:35 (1) 07:29 07:54 (2)
14	05:49 20:50	06:19 20:18	06:52 19:27	07:24 18:35	09:23 (1) 17:00 46	08:21 (1) 16:41 22
15	05:50 20:49	06:20 20:16	06:53 19:25	07:26 18:34	08:35 (1) 06:56 49	07:37 (1) 07:30 07:55 (2)
16	05:51 20:49	06:22 20:15	06:55 19:24	07:28 18:32	09:24 (1) 16:59 43	08:20 (1) 16:41 22
17	05:51 20:48	06:23 20:13	06:56 19:22	07:28 18:30	08:35 (1) 06:57 51	07:38 (1) 07:31 07:56 (2)
18	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	09:26 (1) 16:58 41	08:19 (1) 16:41 21
19	05:53 20:47	06:24 20:10	06:57 19:18	07:30 18:27	08:33 (1) 06:58 54	07:39 (1) 07:32 07:56 (2)
20	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	09:27 (1) 16:57 38	08:17 (1) 16:41 20
21	05:55 20:45	06:26 20:07	06:59 19:15	07:33 18:24	08:32 (1) 07:00 55	07:42 (1) 07:33 07:57 (2)
22	05:56 20:44	06:27 20:06	07:00 19:13	07:34 18:23	09:27 (1) 16:56 34	08:16 (1) 16:42 19
23	05:57 20:43	06:29 20:04	07:01 19:11	07:35 18:21	08:31 (1) 07:01 57	07:44 (1) 07:34 07:58 (2)
24	05:58 20:43	06:30 20:03	07:02 19:09	07:36 18:20	09:28 (1) 16:55 30	08:14 (1) 16:42 19
25	05:59 20:42	06:31 20:01	07:03 19:08	07:37 18:18	08:30 (1) 07:02 58	07:45 (2) 07:34 07:59 (2)
26	06:00 20:41	06:32 19:59	07:04 19:06	07:39 18:16	09:28 (1) 16:54 26	08:11 (1) 16:42 18
27	06:01 20:40	06:33 19:58	07:06 19:04	07:40 18:15	08:29 (1) 07:03 24	08:09 (1) 16:42 17
28	06:02 20:39	06:34 19:56	07:07 19:02	07:41 18:14	09:29 (1) 16:53 24	08:09 (1) 16:42 17
29	06:02 20:38	06:35 19:55	07:08 19:01	07:42 18:13	08:29 (1) 07:05 26	07:44 (2) 07:36 08:00 (2)
30	06:03 20:37	06:36 19:53	07:09 19:01	07:43 18:13	09:30 (1) 16:52 26	08:10 (2) 16:42 17
31	06:04 20:35	06:37 19:51	07:10 19:00	07:44 18:12	08:28 (1) 07:06 34	07:43 (2) 07:37 08:01 (2)
Potential sun hours	463	430	376	344	295	284
Total, worst case				1618	1094	606

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: K - Shadow Receptor: 1.0 × 1.0 Azimuth: -20.0° 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	July	August	September	October	November	December	
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:39	06:11 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	06:59 (5) 07:20 (5)	07:10 18:57	06:46 17:09	07:22 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:00 (5) 07:19 (5)	07:11 18:55	06:47 17:07	07:23 16:42
3	07:43 16:53	07:26 17:30	06:48 18:05	06:55 19:41	06:08 20:14	05:39 20:45	05:41 20:54	06:07 20:32	06:40 19:46	07:01 (5) 07:17 (5)	07:12 18:54	06:48 17:06	07:24 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:07 20:16	05:39 20:45	05:42 20:54	06:09 20:31	06:41 19:44	07:02 (5) 07:14 (5)	07:13 18:52	06:50 17:05	07:25 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:39 20:46	05:43 20:54	06:10 20:30	06:42 19:43	07:07 (5) 07:09 (5)	07:14 18:50	06:51 17:04	07:26 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44	06:04 20:18	05:38 20:47	05:43 20:53	06:11 20:28	06:43 19:41	07:15 07:15	07:15 18:48	06:52 17:02	07:27 16:42
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	05:44 20:53	06:12 20:27	06:44 19:39	07:16 07:16	07:16 18:47	06:53 17:01	07:28 16:41
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	07:05 (5) 07:17 (5)	06:01 20:20	05:38 20:48	06:13 20:26	06:45 19:37	07:17 07:17	06:55 18:45	07:29 17:00	07:29 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:45 19:48	07:03 (5) 07:19 (5)	06:00 20:21	05:37 20:49	06:14 20:24	06:46 19:36	07:19 07:19	06:56 18:43	07:30 16:59	07:30 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	07:02 (5) 07:21 (5)	05:59 20:22	05:37 20:49	06:15 20:23	06:47 19:34	07:20 07:20	06:57 18:42	07:31 16:58	07:31 16:41
11	07:42 17:01	07:17 17:40	06:34 18:15	06:41 19:50	07:00 (5) 07:21 (5)	05:58 20:23	05:37 20:50	06:16 20:22	06:48 19:32	07:21 07:21	06:58 18:40	07:32 16:57	07:32 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:40 19:51	06:58 (5) 07:21 (5)	05:57 20:24	05:37 20:50	06:17 20:20	06:50 19:30	07:22 07:22	07:00 18:38	07:33 16:56	07:33 16:41
13	07:42 17:03	07:14 17:43	06:31 18:17	06:38 19:52	06:57 (5) 07:22 (5)	05:56 20:25	05:37 20:51	06:18 20:19	06:51 19:29	07:23 07:23	07:01 18:37	07:34 16:55	10:19 (3) 10:28 (3)
14	07:41 17:05	07:13 17:44	06:29 18:18	06:36 19:53	06:56 (5) 07:22 (5)	05:55 20:26	05:37 20:51	06:19 20:18	06:52 19:27	07:24 07:24	07:02 18:35	07:34 16:42	10:17 (3) 10:31 (3)
15	07:41 17:06	07:12 17:45	06:28 18:19	06:35 19:54	06:56 (5) 07:22 (5)	05:54 20:27	05:37 20:52	06:20 20:16	06:53 19:25	07:25 07:25	07:03 18:34	07:35 16:42	10:16 (3) 10:32 (3)
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	06:56 (5) 07:22 (5)	05:53 20:28	05:37 20:52	06:21 20:15	06:54 19:23	07:27 07:27	07:04 18:32	07:36 16:42	10:16 (3) 10:34 (3)
17	07:40 17:08	07:09 17:48	06:24 18:22	06:31 19:57	06:55 (5) 07:21 (5)	05:52 20:29	05:37 20:53	06:22 20:13	06:55 19:22	07:28 07:28	07:06 18:30	07:37 16:43	10:16 (3) 10:35 (3)
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	06:56 (5) 07:21 (5)	05:51 20:30	05:37 20:53	06:23 20:12	06:56 19:20	07:09 (5) 07:16 (5)	06:56 18:29	07:37 16:43	10:15 (3) 10:36 (3)
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	06:55 (5) 07:20 (5)	05:50 20:31	05:37 20:53	06:24 20:10	06:57 19:18	07:06 (5) 07:19 (5)	06:57 18:27	07:38 16:43	10:16 (3) 10:37 (3)
20	07:38 17:12	07:05 17:51	06:19 18:25	06:27 20:00	06:56 (5) 07:19 (5)	05:49 20:32	05:37 20:53	06:25 20:09	06:58 19:17	07:04 (5) 07:21 (5)	06:58 18:26	07:38 16:49	10:16 (3) 10:38 (3)
21	07:38 17:13	07:03 17:53	06:17 18:26	06:25 20:01	06:56 (5) 07:18 (5)	05:48 20:33	05:37 20:54	06:26 20:07	06:59 19:20	07:02 (5) 07:22 (5)	06:59 18:24	07:39 16:44	10:16 (3) 10:38 (3)
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	06:58 (5) 07:17 (5)	05:47 20:34	05:37 20:54	06:27 20:06	06:57 19:22	07:01 (5) 07:23 (5)	06:58 18:23	07:40 16:45	10:17 (3) 10:39 (3)
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	06:59 (5) 07:15 (5)	05:46 20:35	05:37 20:54	06:28 20:04	06:58 19:23	07:00 (5) 07:23 (5)	07:01 18:21	07:40 16:45	10:17 (3) 10:39 (3)
24	07:35 17:17	06:59 17:56	06:12 18:30	06:21 20:04	07:01 (5) 07:13 (5)	05:45 20:36	05:38 20:54	06:30 20:02	06:59 19:25	07:02 (5) 07:24 (5)	07:02 18:20	07:40 16:46	10:18 (3) 10:39 (3)
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:06	07:04 (5) 07:08 (5)	05:45 20:37	05:38 20:54	06:31 20:01	06:59 19:25	07:03 (5) 07:24 (5)	07:03 18:18	07:41 16:46	10:19 (3) 10:40 (3)
26	07:34 17:19	06:56 17:59	06:08 18:32	06:18 20:07	07:08 (5) 20:38	05:44 20:54	05:38 20:54	06:32 20:01	06:58 19:26	07:04 (5) 07:24 (5)	07:04 18:17	07:41 16:47	10:20 (3) 10:40 (3)
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:55	06:00 20:40	06:33 19:58	06:58 19:26	07:05 (5) 07:24 (5)	07:05 18:15	07:42 16:44	10:20 (3) 10:39 (3)
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:43 20:40	05:39 20:55	06:01 20:39	06:34 19:56	06:57 19:26	07:06 (5) 07:23 (5)	07:06 18:14	07:42 16:44	10:22 (3) 10:39 (3)
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:41	05:40 20:54	06:02 20:38	06:35 19:54	06:57 19:01	07:07 (5) 07:23 (5)	07:08 18:13	07:42 16:44	10:24 (3) 10:38 (3)
30	07:30 17:24		07:02 19:36	06:12 20:11	05:41 20:42	05:40 20:54	06:03 20:36	06:36 19:53	06:57 18:59	07:09 (5) 07:22 (5)	07:09 18:11	07:42 16:43	10:26 (3) 10:37 (3)
31	07:29 17:26		07:00 19:37		05:41 20:42		06:04 20:35	06:37 19:51	06:58 18:59	07:21 (5)	06:45 17:10	07:43 16:50	10:29 (3) 10:35 (3)
Potential sun hours	294	295	369	400	452	457	463	430	376	70	344	295	284
Total, worst case				366				304					335

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

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

### SHADOW - Calendar

Calculation: WON018\_ShadowFlickering Shadow receptor: L - Shadow Receptor: 1.0 × 1.0 Azimuth: 20.0° 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	July	August	September	October	November	December	
1	07:43 16:51	13:21 (3) 14:08 (3)	07:28 18:03	06:51 19:39	06:58 20:12	06:11 20:43	05:40 20:54	05:40 20:34	06:05 19:49	06:38 18:57	07:10 17:09	06:46 16:43	13:22 (3) 19 13:41 (3)
2	07:43 16:52	13:23 (3) 14:07 (3)	07:27 18:04	06:49 19:40	06:56 20:13	06:09 20:44	05:40 20:54	05:41 20:33	06:06 19:48	06:39 18:55	07:11 17:07	06:47 16:42	13:19 (3) 25 13:44 (3)
3	07:43 16:53	13:24 (3) 14:07 (3)	07:26 18:05	06:48 19:41	06:55 20:14	06:08 20:45	05:39 20:54	05:41 20:32	06:07 19:46	06:40 18:54	07:12 17:06	06:48 16:42	13:18 (3) 29 13:47 (3)
4	07:43 16:54	13:25 (3) 14:07 (3)	07:25 18:06	06:46 19:42	06:53 20:16	06:07 20:45	05:39 20:54	05:42 20:31	06:08 19:44	06:41 18:52	07:13 17:05	06:50 16:42	13:17 (3) 32 13:49 (3)
5	07:43 16:54	13:25 (3) 14:07 (3)	07:24 18:07	06:44 19:43	06:51 20:17	06:05 20:46	05:39 20:54	05:43 20:30	06:10 19:43	06:42 18:50	07:14 17:04	06:51 16:42	13:16 (3) 35 13:51 (3)
6	07:43 16:55	13:25 (3) 14:07 (3)	07:23 18:07	06:43 19:43	06:50 20:17	06:04 20:46	05:38 20:54	05:43 20:30	06:11 19:43	06:43 18:50	07:15 17:04	06:52 16:42	13:15 (3) 37 13:52 (3)
7	07:43 16:56	13:25 (3) 14:06 (3)	07:22 18:09	06:41 19:44	06:48 20:18	06:03 20:47	05:38 20:53	05:44 20:28	06:12 19:41	06:44 18:48	07:16 17:02	06:53 16:42	13:14 (3) 40 13:54 (3)
8	07:43 16:57	14:03 (3) 13:31 (3)	07:21 18:10	06:39 19:45	06:46 20:19	06:01 20:47	05:38 20:53	05:45 20:27	06:13 19:39	06:45 18:47	07:17 17:01	06:55 16:41	13:13 (3) 42 13:55 (3)
9	07:43 16:58	14:04 (3) 13:34 (3)	07:21 18:11	06:39 19:46	06:46 20:20	06:01 20:48	05:38 20:53	05:45 20:26	06:13 19:37	06:45 18:45	07:17 17:00	06:55 16:41	13:13 (3) 44 13:56 (3)
10	07:43 16:59	14:03 (3) 13:37 (3)	07:21 18:12	06:38 19:48	06:45 20:21	06:00 20:49	05:37 20:52	05:45 20:24	06:14 19:36	06:46 18:43	07:19 16:59	06:56 16:41	13:13 (3) 46 13:57 (3)
11	07:42 17:00	14:02 (3) 13:39 (3)	07:19 18:13	06:36 19:49	06:43 20:22	05:59 20:49	05:37 20:52	05:46 20:23	06:15 19:34	06:47 18:42	07:20 16:58	06:57 16:41	13:12 (3) 48 13:58 (3)
12	07:42 17:01	13:59 (3) 13:44 (3)	07:17 18:15	06:34 19:50	06:41 20:23	05:58 20:50	05:37 20:51	05:47 20:22	06:16 19:32	06:48 18:40	07:21 16:57	06:58 16:41	13:12 (3) 50 14:00 (3)
13	07:42 17:02	13:56 (3) 13:44 (3)	07:16 18:16	06:33 19:51	06:40 20:24	05:57 20:50	05:37 20:51	05:47 20:20	06:17 19:30	06:50 18:38	07:22 16:56	07:00 16:41	13:11 (3) 52 14:01 (3)
14	07:42 17:03	13:56 (3) 13:44 (3)	07:14 18:17	06:31 19:52	06:40 20:25	05:57 20:51	05:37 20:50	05:47 20:19	06:18 19:29	06:51 18:37	07:23 16:55	07:01 16:42	13:11 (3) 54 14:02 (3)
15	07:41 17:05	13:56 (3) 13:44 (3)	07:13 18:18	06:29 19:53	06:36 20:26	05:55 20:51	05:37 20:50	05:49 20:18	06:19 19:27	06:52 18:35	07:24 16:54	07:02 16:42	13:11 (3) 56 14:03 (3)
16	07:41 17:06	13:56 (3) 13:44 (3)	07:12 18:19	06:28 19:54	06:35 20:27	05:54 20:52	05:37 20:49	05:50 20:16	06:20 19:25	06:53 18:33	07:25 16:53	07:03 16:42	13:11 (3) 58 14:04 (3)
17	07:41 17:07	13:56 (3) 13:44 (3)	07:11 18:20	06:26 19:55	06:33 20:28	05:53 20:52	05:37 20:49	05:51 20:15	06:21 19:23	06:54 18:32	07:26 16:52	07:04 16:42	13:11 (3) 60 14:05 (3)
18	07:41 17:08	13:56 (3) 13:44 (3)	07:10 18:22	06:24 19:57	06:31 20:29	05:52 20:53	05:37 20:48	05:51 20:13	06:22 19:22	06:55 18:30	07:27 16:51	07:05 16:42	13:11 (3) 62 14:06 (3)
19	07:41 17:09	13:56 (3) 13:44 (3)	07:09 18:23	06:22 19:58	06:30 20:30	05:51 20:53	05:37 20:47	05:52 20:12	06:23 19:20	06:56 18:29	07:28 16:50	07:06 16:42	13:11 (3) 64 14:07 (3)
20	07:41 17:10	13:56 (3) 13:44 (3)	07:08 18:24	06:21 19:59	06:28 20:31	05:50 20:53	05:37 20:46	05:53 20:10	06:24 19:18	06:57 18:27	07:29 16:49	07:07 16:42	13:11 (3) 66 14:08 (3)
21	07:41 17:11	13:56 (3) 13:44 (3)	07:07 18:25	06:20 20:00	06:27 20:32	05:49 20:53	05:37 20:46	05:54 20:09	06:25 19:16	06:58 18:26	07:30 16:49	07:08 16:42	13:11 (3) 68 14:09 (3)
22	07:41 17:12	13:56 (3) 13:44 (3)	07:06 18:26	06:19 20:01	06:26 20:33	05:48 20:54	05:37 20:45	05:54 20:07	06:26 19:15	06:59 18:24	07:31 16:48	07:09 16:42	13:11 (3) 70 14:10 (3)
23	07:41 17:13	13:56 (3) 13:44 (3)	07:05 18:27	06:17 20:02	06:25 20:34	05:48 20:54	05:37 20:44	05:55 20:06	06:26 19:13	06:59 18:23	07:32 16:47	07:10 16:42	13:11 (3) 72 14:11 (3)
24	07:41 17:14	13:56 (3) 13:44 (3)	07:04 18:28	06:16 20:03	06:24 20:35	05:47 20:54	05:37 20:43	05:55 20:04	06:27 19:11	06:59 18:21	07:33 16:47	07:11 16:42	13:11 (3) 74 14:12 (3)
25	07:41 17:15	13:56 (3) 13:44 (3)	07:03 18:29	06:15 20:04	06:23 20:36	05:47 20:54	05:37 20:42	05:55 20:02	06:27 19:09	06:59 18:20	07:34 16:46	07:12 16:42	13:11 (3) 76 14:13 (3)
26	07:41 17:16	13:56 (3) 13:44 (3)	07:02 18:30	06:14 20:05	06:22 20:37	05:46 20:54	05:37 20:42	05:55 20:01	06:28 19:08	07:01 18:19	07:35 16:46	07:13 16:42	13:11 (3) 78 14:14 (3)
27	07:41 17:17	13:56 (3) 13:44 (3)	07:01 18:31	06:13 20:06	06:21 20:38	05:45 20:54	05:37 20:42	05:55 20:00	06:28 19:07	07:01 18:18	07:36 16:46	07:14 16:42	13:11 (3) 80 14:15 (3)
28	07:41 17:18	13:56 (3) 13:44 (3)	07:00 18:32	06:12 20:07	06:20 20:39	05:45 20:54	05:37 20:42	05:55 20:00	06:29 19:06	07:02 18:17	07:37 16:46	07:15 16:42	13:11 (3) 82 14:16 (3)
29	07:41 17:19	13:56 (3) 13:44 (3)	06:59 18:33	06:11 20:08	06:19 20:40	05:44 20:54	05:37 20:42	05:55 20:00	06:29 19:05	07:03 18:16	07:38 16:46	07:16 16:42	13:11 (3) 84 14:17 (3)
30	07:41 17:20	13:56 (3) 13:44 (3)	06:58 18:34	06:10 20:09	06:18 20:41	05:44 20:54	05:37 20:42	05:55 20:00	06:29 19:04	07:04 18:15	07:39 16:46	07:17 16:42	13:11 (3) 86 14:18 (3)
31	07:41 17:21	13:56 (3) 13:44 (3)	06:57 18:35	06:09 20:10	06:17 20:42	05:43 20:54	05:37 20:42	05:55 20:00	06:29 19:03	07:05 18:14	07:40 16:46	07:18 16:42	13:11 (3) 88 14:19 (3)
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284	1400
Total, worst case	409										12		

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

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

### SHADOW - Calendar

Calculation: WON018\_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	July	August	September	October	November		December				
1	07:43 16:51 17:27		16:27 (3)	06:51	15:58 (3)	06:58	06:11	05:40	05:40	06:05	06:38	07:10	16:44 (3)	06:46	15:37 (3)	07:22		
2	07:43 16:52 17:28	11	16:38 (3)	18:03	69	17:07 (3)	19:39	20:12	20:43	20:54	20:34	19:49	18:57	17:36 (3)	17:09	52	16:29 (3)	16:43
3	07:43 16:53 17:29	21	16:43 (3)	18:04	68	17:06 (3)	19:40	20:13	20:44	20:54	20:33	19:48	18:55	17:37 (3)	17:07	49	16:27 (3)	16:42
4	07:43 16:54 17:31	31	16:49 (3)	18:05	67	17:05 (3)	19:41	20:14	20:45	20:54	20:32	19:46	18:54	17:38 (3)	17:06	47	16:27 (3)	16:42
5	07:43 16:55 17:32	41	16:50 (3)	18:06	66	17:04 (3)	19:42	20:15	20:45	20:54	20:31	19:41	18:52	17:39 (3)	17:05	44	16:25 (3)	16:42
6	07:43 16:56 17:33	51	16:53 (3)	18:07	65	17:03 (3)	19:43	20:17	20:46	20:54	20:30	19:43	18:50	17:40 (3)	17:04	41	16:23 (3)	16:42
7	07:43 16:57 17:35	61	16:56 (3)	18:08	64	17:02 (3)	19:44	20:18	20:47	20:53	20:28	19:41	18:48	17:40 (3)	17:02	37	16:22 (3)	16:42
8	07:43 16:58 17:36	71	16:59 (3)	18:09	63	17:01 (3)	19:45	20:19	20:47	20:53	20:27	19:39	18:47	17:40 (3)	17:01	32	16:19 (3)	16:41
9	07:43 16:59 17:37	81	17:02 (3)	18:10	62	17:00 (3)	19:46	20:20	20:48	20:53	20:26	19:37	18:45	17:40 (3)	17:00	27	16:16 (3)	16:41
10	07:43 17:00	91	17:05 (3)	18:11	61	16:59 (3)	19:47	20:22	20:50	20:54	20:24	19:36	18:43	17:40 (3)	16:59	21	16:14 (3)	16:41
11	07:42 17:01	101	17:08 (3)	18:12	60	16:58 (3)	19:48	20:21	20:49	20:52	20:24	19:36	18:43	17:40 (3)	16:57	15:58 (3)	07:30	
12	07:42 17:02	111	17:11 (3)	18:13	59	16:57 (3)	19:49	20:22	20:49	20:52	20:23	19:34	18:42	17:40 (3)	16:58	10	16:08 (3)	16:41
13	07:41 17:03	121	17:14 (3)	18:14	58	16:56 (3)	19:50	20:23	20:50	20:51	20:22	19:32	18:40	17:40 (3)	16:57			
14	07:41 17:04	131	17:17 (3)	18:15	57	16:55 (3)	19:51	20:24	20:50	20:51	20:23	19:32	18:39	17:40 (3)	16:57			
15	07:41 17:05	141	17:20 (3)	18:16	56	16:54 (3)	19:52	20:25	20:50	20:51	20:24	19:32	18:38	17:40 (3)	16:57			
16	07:40 17:06	151	17:23 (3)	18:17	55	16:53 (3)	19:53	20:26	20:50	20:51	20:25	19:32	18:37	17:40 (3)	16:57			
17	07:40 17:07	161	17:26 (3)	18:18	54	16:52 (3)	19:54	20:27	20:50	20:51	20:26	19:32	18:36	17:40 (3)	16:57			
18	07:39 17:08	171	17:29 (3)	18:19	53	16:51 (3)	19:55	20:28	20:50	20:51	20:27	19:32	18:35	17:40 (3)	16:57			
19	07:39 17:09	181	17:32 (3)	18:20	52	16:50 (3)	19:56	20:29	20:50	20:51	20:28	19:32	18:34	17:40 (3)	16:57			
20	07:38 17:10	191	17:35 (3)	18:21	51	16:49 (3)	19:57	20:30	20:50	20:51	20:29	19:32	18:33	17:40 (3)	16:57			
21	07:38 17:11	201	17:38 (3)	18:22	50	16:48 (3)	19:58	20:31	20:50	20:51	20:30	19:32	18:32	17:40 (3)	16:57			
22	07:37 17:12	211	17:41 (3)	18:23	49	16:47 (3)	19:59	20:32	20:50	20:51	20:31	19:32	18:31	17:40 (3)	16:57			
23	07:36 17:13	221	17:44 (3)	18:24	48	16:46 (3)	20:00	20:33	20:50	20:51	20:32	19:32	18:30	17:40 (3)	16:57			
24	07:35 17:14	231	17:47 (3)	18:25	47	16:45 (3)	20:01	20:34	20:50	20:51	20:33	19:32	18:29	17:40 (3)	16:57			
25	07:35 17:15	241	17:50 (3)	18:26	46	16:44 (3)	20:02	20:35	20:50	20:51	20:34	19:32	18:28	17:40 (3)	16:57			
26	07:34 17:16	251	17:53 (3)	18:27	45	16:43 (3)	20:03	20:36	20:50	20:51	20:35	19:32	18:27	17:40 (3)	16:57			
27	07:33 17:17	261	17:56 (3)	18:28	44	16:42 (3)	20:04	20:37	20:50	20:51	20:36	19:32	18:26	17:40 (3)	16:57			
28	07:32 17:18	271	17:59 (3)	18:29	43	16:41 (3)	20:05	20:38	20:50	20:51	20:37	19:32	18:25	17:40 (3)	16:57			
29	07:31 17:19	281	18:02 (3)	18:30	42	16:40 (3)	20:06	20:39	20:50	20:51	20:38	19:32	18:24	17:40 (3)	16:57			
30	07:30 17:20	291	18:05 (3)	18:31	41	16:39 (3)	20:07	20:40	20:50	20:51	20:39	19:32	18:23	17:40 (3)	16:57			
31	07:29 17:21	301	18:08 (3)	18:32	40	16:38 (3)	20:08	20:41	20:50	20:51	20:40	19:32	18:22	17:40 (3)	16:57			
Potential sun hours	294	295	1541	309	1031	400	452	456	463	430	376	260	1987	360	284			
Total, worst case																		

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

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

Calculation: WON018\_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			
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:39	16:59 (4) 18:34 (4)	06:11 20:12	17:17 (4) 20:43	19:34 (3) 20:14 (3)	
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	16:59 (4) 18:34 (4)	06:09 20:13	17:19 (4) 20:44	19:35 (3) 20:15 (3)	
3	07:43 16:53	07:26 17:29	06:48 18:05	06:55 19:41	16:58 (4) 18:33 (4)	06:08 20:14	17:21 (4) 20:45	19:34 (3) 20:15 (3)	
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	16:59 (4) 18:34 (4)	06:07 20:15	17:22 (4) 20:45	19:34 (3) 20:16 (3)	
5	07:43 16:55	07:24 17:32	06:44 18:07	16:42 (4) 17:05 (4)	06:51 19:43	16:58 (4) 18:33 (4)	06:05 20:17	17:24 (4) 20:46	19:34 (3) 20:16 (3)
6	07:43 16:56	07:23 17:33	06:43 18:09	16:36 (4) 17:10 (4)	06:50 19:44	16:58 (4) 18:33 (4)	06:04 20:18	17:27 (4) 20:47	19:34 (3) 20:16 (3)
7	07:43 16:57	07:22 17:35	06:41 18:10	16:32 (4) 17:13 (4)	06:48 19:45	16:59 (4) 18:33 (4)	06:03 20:19	17:29 (4) 20:47	19:34 (3) 20:17 (3)
8	07:43 16:58	07:21 17:36	06:39 18:11	16:28 (4) 17:16 (4)	06:46 19:46	16:59 (4) 18:32 (4)	06:01 20:20	17:33 (4) 20:48	19:34 (3) 20:17 (3)
9	07:43 16:59	07:19 17:37	06:38 18:12	16:26 (4) 17:19 (4)	06:44 19:48	16:59 (4) 18:31 (4)	06:00 20:21	17:37 (4) 20:49	19:34 (3) 20:18 (3)
10	07:42 17:00	07:18 17:39	06:36 18:13	16:23 (4) 17:20 (4)	06:43 19:49	16:59 (4) 18:31 (4)	05:59 20:22	17:37 (4) 20:49	19:34 (3) 20:18 (3)
11	07:42 17:01	07:17 17:40	06:34 18:15	16:20 (4) 17:22 (4)	06:41 19:50	16:59 (4) 18:31 (4)	05:58 20:23	17:37 (4) 20:50	19:35 (3) 20:19 (3)
12	07:42 17:02	07:16 17:41	06:33 18:16	16:19 (4) 17:24 (4)	06:40 19:51	16:59 (4) 18:30 (4)	05:57 20:24	17:37 (4) 20:50	19:34 (3) 20:18 (3)
13	07:41 17:03	07:14 17:42	06:31 18:17	16:17 (4) 17:25 (4)	06:38 19:52	17:00 (4) 18:30 (4)	05:56 20:25	17:37 (4) 20:51	19:34 (3) 20:18 (3)
14	07:41 17:05	07:13 17:44	06:29 18:18	16:15 (4) 17:26 (4)	06:36 19:53	17:00 (4) 18:29 (4)	05:55 20:26	17:37 (4) 20:51	19:34 (3) 20:19 (3)
15	07:41 17:06	07:12 17:45	06:27 18:19	16:13 (4) 17:27 (4)	06:35 19:54	17:02 (4) 18:28 (4)	05:54 20:27	17:37 (4) 20:52	19:34 (3) 20:19 (3)
16	07:40 17:07	07:10 17:46	06:26 18:20	16:12 (4) 17:29 (4)	06:33 19:55	17:02 (4) 18:27 (4)	05:53 20:28	17:37 (4) 20:52	19:34 (3) 20:19 (3)
17	07:40 17:08	07:09 17:48	06:24 18:22	16:10 (4) 17:30 (4)	06:31 19:56	17:02 (4) 18:26 (4)	05:52 20:29	17:37 (4) 20:52	19:34 (3) 20:19 (3)
18	07:39 17:09	07:07 17:49	06:22 18:23	16:09 (4) 17:30 (4)	06:30 19:58	17:03 (4) 18:26 (4)	05:51 20:30	19:52 (3) 20:53	19:36 (3) 20:21 (3)
19	07:39 17:10	07:06 17:50	06:21 18:24	16:08 (4) 17:32 (4)	06:28 19:59	17:03 (4) 18:24 (4)	05:50 20:31	19:47 (3) 20:53	19:36 (3) 20:21 (3)
20	07:38 17:12	07:04 17:51	06:19 18:25	16:07 (4) 17:32 (4)	06:27 20:00	17:05 (4) 18:24 (4)	05:49 20:32	19:44 (3) 20:53	19:36 (3) 20:21 (3)
21	07:37 17:13	07:03 17:53	06:17 18:26	16:06 (4) 17:32 (4)	06:25 20:01	17:05 (4) 18:23 (4)	05:48 20:33	19:42 (3) 20:54	19:36 (3) 20:21 (3)
22	07:37 17:14	07:02 17:54	06:15 18:27	16:04 (4) 17:33 (4)	06:24 20:02	17:06 (4) 18:22 (4)	05:47 20:34	19:41 (3) 20:54	19:36 (3) 20:21 (3)
23	07:36 17:15	07:00 17:55	06:14 18:28	16:04 (4) 17:34 (4)	06:22 20:03	17:07 (4) 18:21 (4)	05:46 20:35	19:39 (3) 20:54	19:37 (3) 20:22 (3)
24	07:35 17:17	06:59 17:56	06:12 18:30	16:03 (4) 17:34 (4)	06:21 20:04	17:08 (4) 18:20 (4)	05:45 20:36	19:39 (3) 20:54	19:37 (3) 20:22 (3)
25	07:35 17:18	06:57 17:58	06:10 18:31	16:02 (4) 17:34 (4)	06:19 20:05	17:09 (4) 18:18 (4)	05:45 20:37	19:38 (3) 20:54	19:37 (3) 20:21 (3)
26	07:34 17:19	06:55 17:59	06:08 18:32	16:01 (4) 17:34 (4)	06:18 20:07	17:10 (4) 18:18 (4)	05:44 20:38	19:37 (3) 20:54	19:37 (3) 20:22 (3)
27	07:33 17:20	06:54 18:00	06:07 18:33	16:01 (4) 17:35 (4)	06:16 20:08	17:12 (4) 18:17 (4)	05:43 20:39	19:37 (3) 20:54	19:37 (3) 20:22 (3)
28	07:32 17:22	06:52 18:01	06:05 18:34	16:01 (4) 17:35 (4)	06:15 20:09	17:13 (4) 18:15 (4)	05:43 20:40	19:36 (3) 20:54	19:37 (3) 20:22 (3)
29	07:31 17:23		07:03 19:35	17:00 (4) 18:34 (4)	06:13 20:10	17:14 (4) 18:14 (4)	05:42 20:41	19:36 (3) 20:54	19:38 (3) 20:23 (3)
30	07:30 17:24		07:02 19:36	16:59 (4) 18:34 (4)	06:12 20:11	17:16 (4) 18:13 (4)	05:41 20:41	19:35 (3) 20:54	19:38 (3) 20:22 (3)
31	07:29 17:26		07:00 19:37	17:00 (4) 18:35 (4)			05:41 20:42	19:35 (3) 20:14 (3)	
Potential sun hours	294	295	369	400	452	716	456	1316	
Total, worst case			2016	2482					

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

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

Calculation: WON018\_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

	July		August		September		October		November		December		
1	05:40		19:39 (3)	06:05		06:38	16:58 (4)	07:10		16:57 (4)	06:46	07:22	
	20:54	44	20:23 (3)	20:34		19:49	18:30 (4)	18:57	67	18:04 (4)	17:09	16:43	
2	05:41		19:39 (3)	06:06		06:39	16:57 (4)	07:11		16:58 (4)	06:47	07:23	
	20:54	43	20:22 (3)	20:33		19:48	18:29 (4)	18:55	63	18:01 (4)	17:07	16:42	
3	05:41		19:39 (3)	06:07		06:40	16:57 (4)	07:12		17:00 (4)	06:48	07:24	
	20:54	44	20:23 (3)	20:32		19:46	18:29 (4)	18:54	59	17:59 (4)	17:06	16:42	
4	05:42		19:39 (3)	06:08		17:45 (4)	06:41	16:56 (4)	07:13		17:03 (4)	06:49	07:25
	20:54	43	20:22 (3)	20:31	18	18:03 (4)	19:44	18:29 (4)	18:52	54	17:57 (4)	17:05	16:42
5	05:43		19:40 (3)	06:10		17:41 (4)	06:42	16:55 (4)	07:14		17:05 (4)	06:51	07:26
	20:54	43	20:23 (3)	20:29	26	18:07 (4)	19:43	18:29 (4)	18:50	50	17:55 (4)	17:04	16:42
6	05:43		19:40 (3)	06:11		17:38 (4)	06:43	16:54 (4)	07:15		17:07 (4)	06:52	07:27
	20:53	42	20:22 (3)	20:28	32	18:10 (4)	19:41	18:29 (4)	18:48	44	17:51 (4)	17:02	16:42
7	05:44		19:40 (3)	06:12		17:35 (4)	06:44	16:54 (4)	07:16		17:10 (4)	06:53	07:28
	20:53	43	20:23 (3)	20:27	37	18:12 (4)	19:39	18:28 (4)	18:47	37	17:47 (4)	17:01	16:41
8	05:45		19:41 (3)	06:13		17:33 (4)	06:45	16:53 (4)	07:17		17:14 (4)	06:54	07:29
	20:53	42	20:23 (3)	20:26	41	18:14 (4)	19:37	18:28 (4)	18:45	29	17:43 (4)	17:00	16:41
9	05:45		19:41 (3)	06:14		17:31 (4)	06:46	16:52 (4)	07:19		17:20 (4)	06:56	07:30
	20:52	41	20:22 (3)	20:24	44	18:15 (4)	19:36	18:27 (4)	18:43	16	17:36 (4)	16:59	16:41
10	05:46		19:42 (3)	06:15		17:29 (4)	06:47	16:52 (4)	07:20			06:57	07:31
	20:52	40	20:22 (3)	20:23	48	18:17 (4)	19:34	18:27 (4)	18:42			16:58	16:41
11	05:47		19:42 (3)	06:16		17:27 (4)	06:48	16:51 (4)	07:21			06:58	07:32
	20:51	40	20:22 (3)	20:22	51	18:18 (4)	19:32	18:27 (4)	18:40			16:57	16:41
12	05:47		19:43 (3)	06:17		17:25 (4)	06:49	16:51 (4)	07:22			06:59	07:33
	20:51	39	20:22 (3)	20:20	55	18:20 (4)	19:30	18:26 (4)	18:38			16:56	16:41
13	05:48		19:43 (3)	06:18		17:23 (4)	06:51	16:50 (4)	07:23			07:01	07:33
	20:50	38	20:21 (3)	20:19	58	18:21 (4)	19:29	18:25 (4)	18:37			16:55	16:42
14	05:49		19:44 (3)	06:19		17:22 (4)	06:52	16:50 (4)	07:24			07:02	07:34
	20:50	37	20:21 (3)	20:18	60	18:22 (4)	19:27	18:25 (4)	18:35			16:54	16:42
15	05:50		19:45 (3)	06:20		17:20 (4)	06:53	16:50 (4)	07:25			07:03	07:35
	20:49	36	20:21 (3)	20:16	63	18:23 (4)	19:25	18:24 (4)	18:33			16:53	16:42
16	05:51		19:46 (3)	06:21		17:18 (4)	06:54	16:50 (4)	07:27			07:04	07:36
	20:49	35	20:21 (3)	20:15	66	18:24 (4)	19:23	18:23 (4)	18:32			16:52	16:42
17	05:51		19:46 (3)	06:22		17:17 (4)	06:55	16:49 (4)	07:28			07:06	07:36
	20:48	33	20:19 (3)	20:13	67	18:24 (4)	19:22	18:22 (4)	18:30			16:51	16:42
18	05:52		19:47 (3)	06:23		17:15 (4)	06:56	16:49 (4)	07:29			07:07	07:37
	20:47	32	20:19 (3)	20:12	70	18:25 (4)	19:20	18:21 (4)	18:29			16:50	16:43
19	05:53		19:48 (3)	06:24		17:14 (4)	06:57	16:49 (4)	07:30			07:08	07:38
	20:46	30	20:18 (3)	20:10	72	18:26 (4)	19:18	18:20 (4)	18:27			16:49	16:43
20	05:54		19:49 (3)	06:25		17:12 (4)	06:58	16:49 (4)	07:31			07:09	07:38
	20:46	29	20:18 (3)	20:09	75	18:27 (4)	19:16	18:19 (4)	18:26			16:49	16:44
21	05:55		19:50 (3)	06:26		17:11 (4)	06:59	16:51 (4)	07:32			07:11	07:39
	20:45	27	20:17 (3)	20:07	76	18:27 (4)	19:15	18:19 (4)	18:24			16:48	16:44
22	05:56		19:52 (3)	06:27		17:10 (4)	07:00	16:51 (4)	07:34			07:12	07:39
	20:44	23	20:15 (3)	20:06	78	18:28 (4)	19:13	18:18 (4)	18:23			16:47	16:44
23	05:57		19:54 (3)	06:28		17:08 (4)	07:01	16:51 (4)	07:35			07:13	07:40
	20:43	20	20:14 (3)	20:04	80	18:28 (4)	19:11	18:17 (4)	18:21			16:47	16:45
24	05:58		19:56 (3)	06:29		17:07 (4)	07:02	16:51 (4)	07:36			07:14	07:40
	20:42	16	20:12 (3)	20:02	81	18:28 (4)	19:09	18:16 (4)	18:20			16:46	16:46
25	05:59		19:58 (3)	06:31		17:06 (4)	07:03	16:52 (4)	06:37			07:15	07:41
	20:41	10	20:08 (3)	20:01	83	18:29 (4)	19:08	18:14 (4)	17:18			16:45	16:46
26	05:59			06:32		17:05 (4)	07:04	16:52 (4)	06:38			07:16	07:41
	20:40			19:59	84	18:29 (4)	19:06	18:13 (4)	17:17			16:45	16:47
27	06:00			06:33		17:04 (4)	07:05	16:53 (4)	06:40			07:18	07:42
	20:39			19:58	85	18:29 (4)	19:04	18:11 (4)	17:15			16:44	16:47
28	06:01			06:34		17:02 (4)	07:06	16:54 (4)	06:41			07:19	07:42
	20:38			19:56	87	18:29 (4)	19:02	18:09 (4)	17:14			16:44	16:48
29	06:02			06:35		17:01 (4)	07:08	16:55 (4)	06:42			07:20	07:42
	20:37			19:54	88	18:29 (4)	19:00	18:08 (4)	17:13			16:43	16:49
30	06:03			06:36		17:00 (4)	07:09	16:56 (4)	06:43			07:21	07:42
	20:36			19:53	90	18:30 (4)	18:59	18:06 (4)	17:11			16:43	16:50
31	06:04			06:37		16:59 (4)			06:45				07:43
	20:35			19:51	91	18:30 (4)			17:10				16:50
Potential sun hours	463			430		376		344		295		284	
Total, worst case		870		1806		2676		419					

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: O - Shadow Receptor: 1.0 × 1.0 Azimuth: -130.0° 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	07:43 16:52	07:28 17:27	06:51 18:03	06:58 19:39	06:11 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:09	07:22 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	06:47 17:07	07:23 16:42
3	07:43 16:53	07:26 17:30	06:48 18:05	06:55 19:41	06:08 20:14	05:39 20:45	05:42 20:54	06:07 20:32	06:40 19:46	07:12 18:54	06:48 17:06	07:24 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:07 20:15	05:39 20:45	05:42 20:54	06:09 20:31	06:41 19:44	07:13 18:52	06:50 17:05	07:25 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:39 20:46	05:43 20:54	06:10 20:30	06:42 19:43	07:14 18:50	06:51 17:04	07:26 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44	06:04 20:18	05:38 20:47	05:43 20:53	06:11 20:28	06:43 19:41	07:15 18:48	06:52 17:02	07:27 16:42
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	05:44 20:53	06:12 20:27	06:44 19:39	07:16 18:47	06:53 17:01	07:28 16:41
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	06:02 20:20	05:38 20:48	05:45 20:53	06:13 20:26	06:45 19:37	07:17 18:45	06:55 17:00	07:29 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:45 19:48	06:00 20:21	05:37 20:49	05:45 20:52	06:14 20:24	06:46 19:36	07:19 18:43	06:56 16:59	07:30 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	05:46 20:52	06:15 20:23	06:47 19:34	07:20 18:42	06:57 16:58	07:31 16:41
11	07:42 17:01	07:17 17:40	06:34 18:15	06:41 19:50	05:58 20:23	05:37 20:50	05:47 20:51	06:16 20:22	06:48 19:32	07:21 18:40	06:58 16:57	07:32 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:40 19:51	05:57 20:24	05:37 20:50	05:47 20:51	06:17 20:20	06:50 19:30	07:22 18:38	06:59 16:56	07:33 16:42
13	07:41 17:03	07:14 17:43	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	05:48 20:50	06:18 20:19	06:51 19:29	07:23 18:37	07:01 16:55	07:34 16:42
14	07:41 17:05	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:37 20:51	05:49 20:50	06:19 20:18	06:52 19:27	07:24 18:35	07:02 16:54	07:34 16:42
15	07:41 17:06	07:12 17:45	06:28 18:19	06:35 19:54	05:54 20:27	05:37 20:52	05:50 20:49	06:20 20:16	06:53 19:25	07:25 18:34	07:03 16:53	07:35 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:53 20:28	05:37 20:52	05:51 20:49	06:21 20:15	06:54 19:23	07:27 18:32	07:04 16:52	07:36 16:42
17	07:40 17:08	07:09 17:48	06:24 18:22	06:31 19:57	05:52 20:29	05:37 20:53	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	07:06 16:51	07:36 16:43
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	05:51 20:30	05:37 20:53	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	07:07 16:50	07:37 16:43
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31	05:37 20:53	05:53 20:46	06:24 20:10	06:57 19:18	07:30 18:27	07:08 16:50	07:38 16:43
20	07:38 17:12	07:05 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	07:09 16:49	07:38 16:44
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:15	07:32 18:24	07:11 16:48	07:39 16:44
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	05:56 20:44	06:27 20:06	07:00 19:13	07:34 18:23	07:12 16:47	07:39 16:45
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:38 20:54	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	07:13 16:47	07:40 16:45
24	07:35 17:17	06:59 17:56	06:12 18:30	06:21 20:04	05:45 20:36	05:38 20:54	05:58 20:42	06:30 20:02	07:02 19:09	07:36 18:20	07:14 16:46	07:40 16:46
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	05:59 20:41	06:31 20:01	07:03 19:08	07:37 17:18	07:15 16:45	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	05:38 20:54	06:00 20:40	06:32 19:59	07:04 19:06	07:38 17:17	07:16 16:45	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	06:00 20:40	06:33 19:58	07:05 19:04	07:39 17:15	07:18 16:44	07:42 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:43 20:40	05:39 20:54	06:01 20:39	06:34 19:56	07:06 19:02	07:40 17:14	07:19 16:44	07:42 16:48
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:41	05:40 20:54	06:02 20:37	06:35 19:54	07:08 19:01	07:41 17:13	07:20 16:44	07:42 16:49
30	07:30 17:24		07:02 19:36	06:12 20:11	05:41 20:41	05:40 20:54	06:03 20:36	06:36 19:53	07:09 18:59	07:42 17:11	07:21 16:43	07:42 16:50
31	07:29 17:26		07:00 19:37		05:41 20:42		06:04 20:35	06:37 19:51		06:45 17:10		07:43 16:50
Potential sun hours	294	295	369	400	452	456	463	430	376	344	295	284
Total, worst case												

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: P - Shadow Receptor: 1.0 × 1.0 Azimuth: -110.0° 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			
1	07:43 16:52	07:28 17:27	06:51 18:03	06:58 19:39		06:11 20:12	62	06:56 (4) 07:58 (4)	05:40 20:43	74	06:49 (4) 08:03 (4)
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40		06:09 20:13	63	06:56 (4) 07:59 (4)	05:40 20:44	75	06:49 (4) 08:04 (4)
3	07:43 16:53	07:26 17:30	06:48 18:05	06:55 19:41		06:08 20:14	65	06:55 (4) 08:00 (4)	05:39 20:45	74	06:49 (4) 08:03 (4)
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42		06:07 20:16	66	06:53 (4) 07:59 (4)	05:39 20:45	73	06:50 (4) 08:03 (4)
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43		06:05 20:17	67	06:53 (4) 08:00 (4)	05:39 20:46	74	06:50 (4) 08:04 (4)
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44		06:04 20:18	69	06:52 (4) 08:01 (4)	05:38 20:47	73	06:51 (4) 08:04 (4)
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45		06:03 20:19	70	06:52 (4) 08:02 (4)	05:38 20:47	73	06:50 (4) 08:03 (4)
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46		06:02 20:20	71	06:51 (4) 08:02 (4)	05:38 20:48	73	06:51 (4) 08:04 (4)
9	07:43 16:59	07:19 17:37	06:38 18:12	06:45 19:48		06:00 20:21	71	06:51 (4) 08:02 (4)	05:37 20:49	73	06:51 (4) 08:04 (4)
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49		05:59 20:22	72	06:50 (4) 08:02 (4)	05:37 20:49	72	06:52 (4) 08:04 (4)
11	07:42 17:01	07:17 17:40	06:34 18:15	06:41 19:50		05:58 20:23	73	06:49 (4) 08:02 (4)	05:37 20:50	72	06:52 (4) 08:04 (4)
12	07:42 17:02	07:16 17:41	06:33 18:16	06:40 19:51		05:57 20:24	73	06:49 (4) 08:02 (4)	05:37 20:50	71	06:52 (4) 08:03 (4)
13	07:41 17:03	07:14 17:43	06:31 18:17	06:38 19:52		05:56 20:25	74	06:49 (4) 08:03 (4)	05:37 20:51	72	06:52 (4) 08:04 (4)
14	07:41 17:05	07:13 17:44	06:29 18:18	06:36 19:53		05:55 20:26	75	06:48 (4) 08:03 (4)	05:37 20:51	72	06:52 (4) 08:04 (4)
15	07:41 17:06	07:12 17:45	06:28 18:19	06:35 19:54		05:54 20:27	75	06:48 (4) 08:03 (4)	05:37 20:52	72	06:52 (4) 08:04 (4)
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55		05:53 20:28	75	06:48 (4) 08:03 (4)	05:37 20:52	71	06:53 (4) 08:04 (4)
17	07:40 17:08	07:09 17:48	06:24 18:22	06:31 19:57		05:52 20:29	75	06:48 (4) 08:03 (4)	05:37 20:53	71	06:54 (4) 08:05 (4)
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58		05:51 20:30	76	06:48 (4) 08:04 (4)	05:37 20:53	71	06:54 (4) 08:05 (4)
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59		05:50 20:31	76	06:48 (4) 08:04 (4)	05:37 20:53	71	06:54 (4) 08:05 (4)
20	07:38 17:12	07:05 17:51	06:19 18:25	06:27 20:00	10	07:25 (4) 07:35 (4)	05:49 20:32	06:48 (4) 08:04 (4)	05:37 20:53	71	06:54 (4) 08:05 (4)
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	23	07:17 (4) 07:40 (4)	05:48 20:33	06:48 (4) 08:04 (4)	05:37 20:54	71	06:54 (4) 08:05 (4)
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	30	07:14 (4) 07:44 (4)	05:47 20:34	06:47 (4) 08:03 (4)	05:37 20:54	71	06:54 (4) 08:05 (4)
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	37	07:10 (4) 07:47 (4)	05:46 20:35	06:48 (4) 08:04 (4)	05:38 20:54	71	06:55 (4) 08:06 (4)
24	07:35 17:17	06:59 17:56	06:12 18:30	06:21 20:04	41	07:08 (4) 07:49 (4)	05:45 20:36	06:48 (4) 08:04 (4)	05:38 20:54	71	06:55 (4) 08:06 (4)
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	45	07:06 (4) 07:51 (4)	05:45 20:37	06:48 (4) 08:03 (4)	05:38 20:54	71	06:55 (4) 08:06 (4)
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	48	07:04 (4) 07:52 (4)	05:44 20:38	06:49 (4) 08:04 (4)	05:38 20:54	71	06:56 (4) 08:07 (4)
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	52	07:02 (4) 07:54 (4)	05:43 20:39	06:48 (4) 08:04 (4)	05:39 20:54	71	06:56 (4) 08:07 (4)
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	55	07:00 (4) 07:55 (4)	05:43 20:40	06:48 (4) 08:03 (4)	05:39 20:54	72	06:55 (4) 08:07 (4)
29	07:31 17:23		07:03 19:35	06:13 20:10	57	06:59 (4) 07:56 (4)	05:42 20:41	06:49 (4) 08:04 (4)	05:40 20:54	72	06:56 (4) 08:08 (4)
30	07:30 17:24		07:02 19:36	06:12 20:11	59	06:58 (4) 07:57 (4)	05:41 20:41	06:48 (4) 08:03 (4)	05:40 20:54	72	06:56 (4) 08:08 (4)
31	07:29 17:26		07:00 19:37				05:41 20:42	06:49 (4) 08:04 (4)			
Potential sun hours	294	295	369	400		452			456		
Total, worst case				457		2254			2161		

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: P - Shadow Receptor: 1.0 × 1.0 Azimuth: -110.0° 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

	July	August	September	October	November	December		
1	05:40	06:56 (4)	07:00 (4)	06:38	07:10	06:46	07:22	
	20:54	08:08 (4)	20:34	08:13 (4)	19:49	18:57	17:09	
2	05:41	06:56 (4)	06:06	07:00 (4)	06:39	07:11	06:47	07:23
	20:54	08:08 (4)	20:33	08:13 (4)	19:48	18:55	17:07	16:42
3	05:42	06:57 (4)	06:07	07:00 (4)	06:40	07:12	06:48	07:24
	20:54	08:09 (4)	20:32	08:12 (4)	19:46	18:54	17:06	16:42
4	05:42	06:56 (4)	06:09	07:01 (4)	06:41	07:13	06:50	07:25
	20:54	08:09 (4)	20:31	08:12 (4)	19:44	18:52	17:05	16:42
5	05:43	06:57 (4)	06:10	07:01 (4)	06:42	07:14	06:51	07:26
	20:54	08:09 (4)	20:30	08:11 (4)	19:43	18:50	17:04	16:42
6	05:43	06:56 (4)	06:11	07:02 (4)	06:43	07:15	06:52	07:27
	20:53	08:09 (4)	20:28	08:11 (4)	19:41	18:48	17:02	16:42
7	05:44	06:57 (4)	06:12	07:02 (4)	06:44	07:16	06:53	07:28
	20:53	08:10 (4)	20:27	08:10 (4)	19:39	18:47	17:01	16:41
8	05:45	06:57 (4)	06:13	07:03 (4)	06:45	07:17	06:55	07:29
	20:53	08:11 (4)	20:26	08:10 (4)	19:37	18:45	17:00	16:41
9	05:45	06:56 (4)	06:14	07:03 (4)	06:46	07:19	06:56	07:30
	20:52	08:10 (4)	20:24	08:09 (4)	19:36	18:43	16:59	16:41
10	05:46	06:57 (4)	06:15	07:04 (4)	06:47	07:20	06:57	07:31
	20:52	08:11 (4)	20:23	08:08 (4)	19:34	18:42	16:58	16:41
11	05:47	06:57 (4)	06:16	07:05 (4)	06:48	07:21	06:58	07:32
	20:51	08:11 (4)	20:22	08:07 (4)	19:32	18:40	16:57	16:41
12	05:47	06:57 (4)	06:17	07:05 (4)	06:50	07:22	07:00	07:33
	20:51	08:12 (4)	20:20	08:06 (4)	19:30	18:38	16:56	16:42
13	05:48	06:57 (4)	06:18	07:06 (4)	06:51	07:23	07:01	07:34
	20:50	08:12 (4)	20:19	08:05 (4)	19:29	18:37	16:55	16:42
14	05:49	06:57 (4)	06:19	07:07 (4)	06:52	07:24	07:02	07:34
	20:50	08:12 (4)	20:18	08:04 (4)	19:27	18:35	16:54	16:42
15	05:50	06:57 (4)	06:20	07:08 (4)	06:53	07:25	07:03	07:35
	20:49	08:13 (4)	20:16	08:02 (4)	19:25	18:34	16:53	16:42
16	05:51	06:58 (4)	06:21	07:10 (4)	06:54	07:27	07:04	07:36
	20:49	08:13 (4)	20:15	08:01 (4)	19:23	18:32	16:52	16:42
17	05:51	06:57 (4)	06:22	07:11 (4)	06:55	07:28	07:06	07:36
	20:48	08:12 (4)	20:13	07:59 (4)	19:22	18:30	16:51	16:43
18	05:52	06:57 (4)	06:23	07:12 (4)	06:56	07:29	07:07	07:37
	20:47	08:13 (4)	20:12	07:57 (4)	19:20	18:29	16:50	16:43
19	05:53	06:57 (4)	06:24	07:14 (4)	06:57	07:30	07:08	07:38
	20:46	08:13 (4)	20:10	07:55 (4)	19:18	18:27	16:50	16:43
20	05:54	06:58 (4)	06:25	07:16 (4)	06:58	07:31	07:09	07:38
	20:46	08:13 (4)	20:09	07:52 (4)	19:16	18:26	16:49	16:44
21	05:55	06:58 (4)	06:26	07:19 (4)	06:59	07:32	07:11	07:39
	20:45	08:14 (4)	20:07	07:49 (4)	19:15	18:24	16:48	16:44
22	05:56	06:58 (4)	06:27	07:23 (4)	07:00	07:34	07:12	07:39
	20:44	08:14 (4)	20:06	07:44 (4)	19:13	18:23	16:47	16:45
23	05:57	06:58 (4)	06:28	07:30 (4)	07:01	07:35	07:13	07:40
	20:43	08:14 (4)	20:04	07:37 (4)	19:11	18:21	16:47	16:45
24	05:58	06:59 (4)	06:30	07:02	07:36	07:14	07:40	
	20:42	08:14 (4)	20:02	19:09	18:20	16:46	16:46	
25	05:59	06:58 (4)	06:31	07:03	06:37	07:15	07:41	
	20:41	08:13 (4)	20:01	19:08	17:18	16:45	16:46	
26	06:00	06:58 (4)	06:32	07:04	06:38	07:16	07:41	
	20:40	08:14 (4)	19:59	19:06	17:17	16:45	16:47	
27	06:01	06:58 (4)	06:33	07:05	06:40	07:18	07:42	
	20:40	08:14 (4)	19:58	19:04	17:15	16:44	16:47	
28	06:01	06:58 (4)	06:34	07:06	06:41	07:19	07:42	
	20:39	08:14 (4)	19:56	19:02	17:14	16:44	16:48	
29	06:02	06:59 (4)	06:35	07:08	06:42	07:20	07:42	
	20:37	08:13 (4)	19:54	19:01	17:13	16:44	16:49	
30	06:03	06:59 (4)	06:36	07:09	06:43	07:21	07:42	
	20:36	08:13 (4)	19:53	18:59	17:11	16:43	16:50	
31	06:04	06:59 (4)	06:37		06:45		07:43	
	20:35	08:13 (4)	19:51		17:10		16:50	
Potential sun hours	463	430	376	344	295	284		
Total, worst case	2309	1265						

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: Q - Shadow Receptor: 1.0 × 1.0 Azimuth: -140.0° 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	07:43 16:52	07:28 17:27	06:51 18:03	06:58 19:39	07:59 (4) 08:25 (4)	06:11 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	07:39 (4) 17:09	06:46 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	08:01 (4) 08:22 (4)	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	07:40 (4) 17:07	06:47 16:42
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Potential sun hours	294	295	369	400	400	452	456	463	430	376	344	295	284
Total, worst case			930		60					823	180		

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: R - Shadow Receptor: 1.0 × 1.0 Azimuth: -170.0° 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	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:38	06:10 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:08	07:22 16:43
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31	07:29 17:26		07:00 19:37		05:41 20:42		06:04 20:35	06:37 19:51		06:44 17:10		07:42 16:50
Potential sun hours Total, worst case	294	295	369	400	452	456	463	430	375	344	295	284

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

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

## SHADOW - Calendar

Calculation: WON018\_ShadowFlickering Shadow receptor: S - Shadow Receptor: 1.0 × 1.0 Azimuth: -170.0° 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	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:38	06:10 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:08	07:22 16:43
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21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:14	07:32 18:24	07:10 16:48	07:39 16:44
22	07:37 17:14	07:01 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	05:56 20:44	06:27 20:05	07:00 19:13	07:33 18:22	07:12 16:47	07:39 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	07:13 16:47	07:40 16:45
24	07:35 17:17	06:58 17:56	06:12 18:29	06:20 20:04	05:45 20:36	05:38 20:54	05:58 20:42	06:29 20:02	07:02 19:09	07:36 18:20	07:14 16:46	07:40 16:46
25	07:34 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	05:58 20:41	06:30 20:01	07:03 19:07	07:37 17:18	07:15 16:45	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:06	05:44 20:38	05:38 20:54	05:59 20:40	06:32 19:59	07:04 19:06	07:38 17:17	07:16 16:45	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	06:00 20:39	06:33 19:58	07:05 19:04	07:39 17:15	07:17 16:44	07:41 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	05:39 20:54	06:01 20:38	06:34 19:56	07:06 19:02	07:40 17:14	07:19 16:44	07:42 16:48
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:40	05:39 20:54	06:02 20:37	06:35 19:54	07:07 19:00	07:41 17:12	07:20 16:43	07:42 16:49
30	07:30 17:24		07:01 19:36	06:12 20:11	05:41 20:41	05:40 20:54	06:03 20:36	06:36 19:53	07:09 18:59	07:42 17:11	07:21 16:43	07:42 16:50
31	07:29 17:26		07:00 19:37		05:41 20:42		06:04 20:35	06:37 19:51		06:44 17:10		07:42 16:50
Potential sun hours	294	295	369	400	452	456	463	430	375	344	295	284
Total, worst case												

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: T - Shadow Receptor: 1.0 × 1.0 Azimuth: 170.0° 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	July	August	September	October	November	December
1	07:43 16:51	07:28 17:27	06:51 18:02	06:58 19:38	06:10 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:08	07:22 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	06:47 17:07	07:23 16:42
3	07:43 16:53	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14	05:39 20:44	05:41 20:54	06:07 20:32	06:40 19:46	07:12 18:53	06:48 17:06	07:24 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	05:42 20:54	06:08 20:31	06:41 19:44	07:13 18:52	06:49 17:05	07:25 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:16	05:38 20:46	05:43 20:53	06:09 20:29	06:42 19:42	07:14 18:50	06:51 17:03	07:26 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18	05:38 20:47	05:43 20:53	06:10 20:28	06:43 19:41	07:15 18:48	06:52 17:02	07:27 16:41
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	05:44 20:53	06:12 20:27	06:44 19:39	07:16 18:47	06:53 17:01	07:28 16:41
8	07:43 16:58	07:20 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:37 20:48	05:44 20:52	06:13 20:26	06:45 19:37	07:17 18:45	06:54 17:00	07:29 16:41
9	07:42 16:59	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21	05:37 20:49	05:45 20:52	06:14 20:24	06:46 19:36	07:18 18:43	06:56 16:59	07:30 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	05:46 20:52	06:15 20:23	06:47 19:34	07:20 18:42	06:57 16:58	07:31 16:41
11	07:42 17:01	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23	05:37 20:50	05:47 20:51	06:16 20:22	06:48 19:32	07:21 18:40	06:58 16:57	07:32 16:41
12	07:42 17:02	07:15 17:41	06:32 18:16	06:39 19:51	05:57 20:24	05:37 20:50	05:47 20:51	06:17 20:20	06:49 19:30	07:22 18:38	06:59 16:56	07:33 16:41
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	05:48 20:50	06:18 20:19	06:50 19:29	07:23 18:37	07:01 16:55	07:33 16:42
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:37 20:51	05:49 20:50	06:19 20:17	06:51 19:27	07:24 18:35	07:02 16:54	07:34 16:42
15	07:41 17:06	07:11 17:45	06:27 18:19	06:35 19:54	05:53 20:27	05:36 20:52	05:50 20:49	06:20 20:16	06:53 19:25	07:25 18:33	07:03 16:53	07:35 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	05:36 20:52	05:50 20:48	06:21 20:15	06:54 19:23	07:26 18:32	07:04 16:52	07:36 16:42
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29	05:37 20:52	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	07:06 16:51	07:36 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:57	05:51 20:30	05:37 20:53	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	07:07 16:50	07:37 16:43
19	07:39 17:10	07:06 17:50	06:20 18:24	06:28 19:59	05:50 20:31	05:37 20:53	05:53 20:46	06:24 20:10	06:57 19:18	07:30 18:27	07:08 16:49	07:38 16:43
20	07:38 17:12	07:04 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	07:09 16:49	07:38 16:44
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:14	07:32 18:24	07:10 16:48	07:39 16:44
22	07:37 17:14	07:01 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	05:56 20:44	06:27 20:05	07:00 19:13	07:33 18:22	07:12 16:47	07:39 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	07:13 16:47	07:40 16:45
24	07:35 17:17	06:58 17:56	06:12 18:29	06:20 20:04	05:45 20:36	05:38 20:54	05:58 20:42	06:29 20:02	07:02 19:09	07:36 18:20	07:14 16:46	07:40 16:46
25	07:34 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	05:58 20:41	06:30 20:01	07:03 19:07	07:37 17:18	07:15 16:45	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:06	05:44 20:38	05:38 20:54	05:59 20:40	06:32 19:59	07:04 19:06	07:38 17:17	07:16 16:45	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	06:00 20:39	06:33 19:58	07:05 19:04	07:39 17:15	07:17 16:44	07:41 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	05:39 20:54	06:01 20:38	06:34 19:56	07:06 19:02	07:40 17:14	07:19 16:44	07:42 16:48
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:40	05:39 20:54	06:02 20:37	06:35 19:54	07:07 19:00	07:41 17:12	07:20 16:43	07:42 16:49
30	07:30 17:24		07:01 19:36	06:12 20:11	05:41 20:41	05:40 20:54	06:03 20:36	06:36 19:53	07:09 18:59	07:42 17:11	07:21 16:43	07:42 16:50
31	07:29 17:26		07:00 19:37		05:41 20:42		06:04 20:35	06:37 19:51		06:44 17:10		07:42 16:50
Potential sun hours	294	295	369	400	452	456	463	430	376	344	295	284
Total, worst case												

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: U - Shadow Receptor: 1.0 × 1.0 Azimuth: 110.0° 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	07:43 16:51	07:28 17:27	06:51 18:02	06:58 19:38	06:10 20:12	18:43 (9) 05:40 20:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	62 18:42 (9) 05:40 18:43 (9)
3	07:43 16:53	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14	64 19:46 (9) 20:44 65 19:48 (9)
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	65 18:41 (9) 05:39 18:43 (9)
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:16	67 19:47 (9) 20:46 64 19:48 (9)
6	07:43 16:56	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18	67 19:47 (9) 20:47 63 19:47 (9)
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	68 18:40 (9) 05:38 18:45 (9)
8	07:43 16:58	07:20 17:36	06:39 18:11	06:46 19:46	06:01 20:20	68 19:48 (9) 20:48 63 19:48 (9)
9	07:42 16:59	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21	69 19:47 (9) 20:48 62 19:48 (9)
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	70 18:38 (9) 05:37 20:49 61 19:48 (9)
11	07:42 17:01	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23	70 19:48 (9) 20:50 61 19:47 (9)
12	07:42 17:02	07:15 17:41	06:32 18:16	06:39 19:51	05:57 20:24	70 19:48 (9) 20:50 61 19:48 (9)
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	70 18:38 (9) 05:37 20:51 61 19:48 (9)
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	70 19:48 (9) 20:51 61 19:48 (9)
15	07:41 17:06	07:11 17:45	06:27 18:19	06:34 19:54	05:53 20:27	70 19:48 (9) 20:52 60 19:48 (9)
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	70 18:38 (9) 05:36 20:52 60 19:48 (9)
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29	70 18:38 (9) 05:36 20:52 60 19:48 (9)
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:57	19:10 (9) 20:30	05:50 19:48 (9) 20:53 60 19:48 (9)
19	07:39 17:10	07:06 17:50	06:20 18:24	06:28 19:59	19:04 (9) 20:31	05:50 18:39 (9) 05:37 20:53 60 19:49 (9)
20	07:38 17:12	07:04 17:51	06:19 18:25	06:27 20:00	19:01 (9) 20:32	05:49 18:39 (9) 05:37 20:53 59 19:49 (9)
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	18:57 (9) 20:33	05:48 18:39 (9) 05:37 20:54 59 19:49 (9)
22	07:37 17:14	07:01 17:54	06:15 18:27	06:23 20:02	18:55 (9) 20:34	05:47 18:39 (9) 05:37 20:54 59 19:49 (9)
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	18:53 (9) 20:35	05:46 18:39 (9) 05:37 20:54 59 19:49 (9)
24	07:35 17:17	06:58 17:56	06:12 18:29	06:20 20:04	18:52 (9) 20:36	05:45 18:40 (9) 05:38 20:54 60 19:50 (9)
25	07:34 17:18	06:57 17:58	06:10 18:31	06:19 20:05	18:49 (9) 20:37	05:45 18:40 (9) 05:38 20:54 60 19:50 (9)
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:06	18:48 (9) 20:38	05:44 18:40 (9) 05:38 20:54 60 19:50 (9)
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	18:47 (9) 20:39	05:43 18:41 (9) 05:39 20:54 60 19:51 (9)
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	18:46 (9) 20:40	05:42 18:41 (9) 05:39 20:54 61 19:51 (9)
29	07:31 17:23		07:03 19:35	06:13 20:10	18:45 (9) 20:40	05:42 18:42 (9) 05:39 20:54 61 19:52 (9)
30	07:30 17:24		07:01 19:36	06:12 20:11	18:44 (9) 20:41	05:41 18:42 (9) 05:40 20:54 61 19:52 (9)
31	07:29 17:25		07:00 19:37		05:41 20:42	18:42 (9) 19:48 (9) 66
Potential sun hours	294	295	369	400	452	456
Total, worst case				570	2111	1839

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: U - Shadow Receptor: 1.0 × 1.0 Azimuth: 110.0° 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	05:40	18:51 (9)	06:05	18:49 (9)	06:38	07:10	06:46	07:22	
	20:54	19:53 (9)	20:34	19:59 (9)	19:49	18:57	17:08	16:43	
2	05:41	18:51 (9)	06:06	18:49 (9)	06:39	07:11	06:47	07:23	
	20:54	19:52 (9)	20:33	19:59 (9)	19:48	18:55	17:07	16:42	
3	05:41	18:51 (9)	06:07	18:49 (9)	06:40	07:12	06:48	07:24	
	20:54	19:53 (9)	20:32	19:58 (9)	19:46	18:53	17:06	16:42	
4	05:42	18:51 (9)	06:08	18:49 (9)	06:41	07:13	06:49	07:25	
	20:54	19:53 (9)	20:31	19:58 (9)	19:44	18:52	17:05	16:42	
5	05:43	18:51 (9)	06:09	18:49 (9)	06:42	07:14	06:51	07:26	
	20:53	19:54 (9)	20:29	19:58 (9)	19:42	18:50	17:03	16:42	
6	05:43	18:50 (9)	06:10	18:49 (9)	06:43	07:15	06:52	07:27	
	20:53	19:54 (9)	20:28	19:57 (9)	19:41	18:48	17:02	16:41	
7	05:44	18:51 (9)	06:11	18:50 (9)	06:44	07:16	06:53	07:28	
	20:53	19:54 (9)	20:27	19:57 (9)	19:39	18:47	17:01	16:41	
8	05:44	18:51 (9)	06:13	18:50 (9)	06:45	07:17	06:54	07:29	
	20:52	19:55 (9)	20:26	19:56 (9)	19:37	18:45	17:00	16:41	
9	05:45	18:50 (9)	06:14	18:50 (9)	06:46	07:18	06:56	07:30	
	20:52	19:55 (9)	20:24	19:55 (9)	19:36	18:43	16:59	16:41	
10	05:46	18:50 (9)	06:15	18:51 (9)	06:47	07:20	06:57	07:31	
	20:52	19:55 (9)	20:23	19:55 (9)	19:34	18:42	16:58	16:41	
11	05:47	18:51 (9)	06:16	18:51 (9)	06:48	07:21	06:58	07:32	
	20:51	19:56 (9)	20:22	19:54 (9)	19:32	18:40	16:57	16:41	
12	05:47	18:50 (9)	06:17	18:52 (9)	06:49	07:22	06:59	07:33	
	20:51	19:56 (9)	20:20	19:53 (9)	19:30	18:38	16:56	16:41	
13	05:48	18:50 (9)	06:18	18:52 (9)	06:50	07:23	07:01	07:33	
	20:50	19:56 (9)	20:19	19:52 (9)	19:29	18:37	16:55	16:41	
14	05:49	18:50 (9)	06:19	18:53 (9)	06:51	07:24	07:02	07:34	
	20:50	19:57 (9)	20:17	19:51 (9)	19:27	18:35	16:54	16:42	
15	05:50	18:50 (9)	06:20	18:54 (9)	06:53	07:25	07:03	07:35	
	20:49	19:57 (9)	20:16	19:50 (9)	19:25	18:33	16:53	16:42	
16	05:50	18:50 (9)	06:21	18:54 (9)	06:54	07:26	07:04	07:36	
	20:48	19:58 (9)	20:15	19:49 (9)	19:23	18:32	16:52	16:42	
17	05:51	18:49 (9)	06:22	18:55 (9)	06:55	07:28	07:06	07:36	
	20:48	19:57 (9)	20:13	19:47 (9)	19:22	18:30	16:51	16:42	
18	05:52	18:49 (9)	06:23	18:56 (9)	06:56	07:29	07:07	07:37	
	20:47	19:58 (9)	20:12	19:46 (9)	19:20	18:29	16:50	16:43	
19	05:53	18:49 (9)	06:24	18:58 (9)	06:57	07:30	07:08	07:38	
	20:46	19:58 (9)	20:10	19:44 (9)	19:18	18:27	16:49	16:43	
20	05:54	18:49 (9)	06:25	18:59 (9)	06:58	07:31	07:09	07:38	
	20:46	19:58 (9)	20:09	19:42 (9)	19:16	18:25	16:49	16:43	
21	05:55	18:49 (9)	06:26	19:01 (9)	06:59	07:32	07:10	07:39	
	20:45	19:59 (9)	20:07	19:40 (9)	19:14	18:24	16:48	16:44	
22	05:56	18:49 (9)	06:27	19:03 (9)	07:00	07:33	07:12	07:39	
	20:44	19:59 (9)	20:05	19:38 (9)	19:13	18:22	16:47	16:44	
23	05:57	18:49 (9)	06:28	19:05 (9)	07:01	07:35	07:13	07:40	
	20:43	19:59 (9)	20:04	19:35 (9)	19:11	18:21	16:47	16:45	
24	05:57	18:49 (9)	06:29	19:08 (9)	07:02	07:36	07:14	07:40	
	20:42	19:59 (9)	20:02	19:31 (9)	19:09	18:19	16:46	16:45	
25	05:58	18:49 (9)	06:30	19:14 (9)	07:03	06:37	07:15	07:41	
	20:41	19:59 (9)	20:01	19:25 (9)	19:07	17:18	16:45	16:46	
26	05:59	18:49 (9)	06:31		07:04	06:38	07:16	07:41	
	20:40	19:59 (9)	19:59		19:06	17:17	16:45	16:47	
27	06:00	18:49 (9)	06:33		07:05	06:39	07:17	07:41	
	20:39	19:59 (9)	19:57		19:04	17:15	16:44	16:47	
28	06:01	18:49 (9)	06:34		07:06	06:41	07:19	07:42	
	20:38	19:59 (9)	19:56		19:02	17:14	16:44	16:48	
29	06:02	18:49 (9)	06:35		07:07	06:42	07:20	07:42	
	20:37	19:59 (9)	19:54		19:00	17:12	16:43	16:49	
30	06:03	18:49 (9)	06:36		07:08	06:43	07:21	07:42	
	20:36	19:59 (9)	19:53		18:59	17:11	16:43	16:50	
31	06:04	18:49 (9)	06:37			06:44		07:42	
	20:35	19:59 (9)	19:51			17:10		16:50	
Potential sun hours	463		430		376	344	295	284	
Total, worst case	2075		1359						

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: V - Shadow Receptor: 1.0 × 1.0 Azimuth: 80.0° 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	07:43 16:51	07:28 17:27	06:51 18:02	06:58 19:38	06:10 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 16:43	07:22 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	06:47 16:42	07:23 16:42
3	07:43 16:53	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14	05:39 20:44	05:41 20:54	06:07 20:32	06:40 19:46	07:12 18:53	06:48 16:41	07:24 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	05:42 20:54	06:08 20:31	06:41 19:44	07:13 18:52	06:49 16:42	07:25 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:16	05:38 20:46	05:43 20:53	06:09 20:29	06:42 19:42	07:14 18:50	06:51 16:42	07:26 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18	05:38 20:47	05:43 20:53	06:10 20:28	06:43 19:41	07:15 18:09	06:52 16:41	07:27 16:41
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	05:44 20:53	06:11 20:27	06:44 19:39	07:16 18:14	06:53 16:41	07:28 16:41
8	07:43 16:58	07:20 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:37 20:48	05:44 20:52	06:13 20:26	06:45 19:37	07:17 18:16	06:54 16:41	07:29 16:41
9	07:42 16:59	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21	05:37 20:49	05:45 20:52	06:14 20:24	06:46 19:36	07:18 18:18	06:56 16:41	07:30 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	05:46 20:52	06:15 20:23	06:47 19:34	07:20 18:20	06:57 16:41	07:31 16:41
11	07:42 17:01	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23	05:37 20:50	05:46 20:51	06:16 20:22	06:48 19:32	07:21 18:21	06:58 16:41	07:32 16:41
12	07:42 17:02	07:15 17:41	06:32 18:16	06:39 19:51	05:57 20:24	05:37 20:50	05:47 20:51	06:17 20:20	06:49 19:30	07:22 18:22	06:59 16:41	07:33 16:41
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	05:48 20:50	06:18 20:19	06:50 19:29	07:23 18:23	07:01 16:55	07:33 16:41
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:36 20:51	05:49 20:50	06:19 20:17	06:51 19:27	07:24 18:24	07:02 16:54	07:34 16:42
15	07:41 17:06	07:11 17:45	06:27 18:19	06:34 19:54	05:53 20:27	05:36 20:50	05:50 20:49	06:20 20:16	06:53 19:25	07:25 18:25	07:03 16:53	07:35 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	05:36 20:52	05:50 20:48	06:21 20:15	06:54 19:23	07:26 18:23	07:04 16:52	07:36 16:42
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29	05:36 20:52	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:26	07:06 16:51	07:36 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:57	05:50 20:30	05:37 20:53	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:26	07:07 16:50	07:37 16:43
19	07:39 17:10	07:06 17:50	06:20 18:24	06:28 19:59	05:50 20:31	05:37 20:53	05:53 20:46	06:24 20:10	06:57 19:18	07:30 18:26	07:08 16:49	07:38 16:43
20	07:38 17:12	07:04 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	07:09 16:49	07:38 16:43
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:14	07:32 18:26	07:10 16:48	07:39 16:44
22	07:37 17:14	07:01 17:54	06:15 18:27	06:23 20:02	05:47 20:34	05:37 20:54	05:56 20:44	06:27 20:05	07:00 19:13	07:33 18:26	07:12 16:47	07:39 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:26	07:13 16:47	07:40 16:45
24	07:35 17:16	06:58 17:56	06:12 18:29	06:20 20:04	05:45 20:36	05:38 20:54	05:57 20:42	06:29 20:02	07:02 19:09	07:36 18:27	07:14 16:46	07:40 16:45
25	07:34 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	05:58 20:41	06:30 20:01	07:03 19:07	07:37 18:27	07:15 16:45	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:17 20:06	05:44 20:38	05:38 20:54	05:59 20:40	06:31 19:59	07:04 19:06	07:38 18:26	07:16 16:45	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	06:00 20:39	06:33 19:57	07:05 19:04	07:39 18:26	07:17 16:44	07:41 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	05:39 20:54	06:01 20:38	06:34 19:56	07:06 19:02	07:40 18:25	07:19 16:44	07:42 16:48
29	07:31 17:23		06:03 18:34	06:13 20:10	05:42 20:40	05:39 20:54	06:02 20:37	06:35 19:54	07:07 19:00	07:41 18:25	07:20 16:43	07:42 16:49
30	07:30 17:24		06:01 18:32	06:12 20:11	05:41 20:41	05:40 20:54	06:03 20:36	06:36 19:53	07:08 18:59	07:42 18:24	07:21 16:43	07:42 16:50
31	07:29 17:25		06:00 18:31		05:41 19:37		06:04 20:35	06:37 19:51		07:11 17:10		07:42 16:50
Potential sun hours	294	295	369	400	452	456	463	430	376	344	295	284
Total, worst case		106	1751	179					1289	783		


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 (WTG causing flicker first time)	Last time (hh:mm) with flicker (WTG causing flicker last time)
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### SHADOW - Calendar

Calculation: WON018\_ShadowFlickering Shadow receptor: W - Shadow Receptor: 1.0 × 1.0 Azimuth: 80.0° 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	July	August	September	October	November	December		
1	07:43 16:51	07:28 17:27	06:51 18:02	16:53 (8) 19:38	06:58 18:24 (8)	06:10 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	17:19 (8) 17:08	06:46 16:43	
2	07:43 16:52	07:27 17:28	06:49 18:04	16:51 (8) 19:40	06:56 18:21 (8)	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	17:19 (8) 17:07	06:47 16:42	
3	07:43 16:53	07:26 17:29	06:47 18:05	16:50 (8) 19:41	06:55 18:18 (8)	06:08 20:14	05:39 20:44	05:41 20:54	06:07 20:32	06:40 19:46	07:12 18:53	17:19 (8) 17:06	06:48 16:42	
4	07:43 16:54	07:25 17:31	06:46 18:06	16:48 (8) 19:42	06:53 18:15 (8)	06:06 20:15	05:39 20:45	05:42 20:54	06:08 20:31	06:41 19:44	07:13 18:52	17:19 (8) 17:05	06:49 16:42	
5	07:43 16:55	07:24 17:32	06:44 18:07	16:46 (8) 19:43	06:51 18:00 (8)	06:05 20:16	05:38 20:46	05:42 20:53	06:09 20:29	06:42 19:42	07:14 18:50	17:20 (8) 17:03	06:51 16:42	
6	07:43 16:56	07:23 17:33	06:43 18:09	16:46 (8) 19:44	06:49 18:09 (8)	06:04 20:18	05:38 20:47	05:43 20:53	06:10 20:28	06:43 19:41	07:15 18:48	17:20 (8) 17:02	06:52 16:41	
7	07:43 16:57	07:22 17:35	06:41 18:10	16:44 (8) 19:45	06:48 18:10 (8)	06:03 20:19	05:38 20:47	05:44 20:53	06:11 20:27	06:44 19:39	8 17:56 (8) 18:04 (8)	07:16 17:21 (8)	06:53 17:01	
8	07:43 16:58	07:20 17:36	06:39 18:11	16:43 (8) 19:46	06:46 18:11 (8)	06:01 20:20	05:37 20:48	05:44 20:52	06:12 20:26	06:45 19:37	20 18:09 (8) 17:45 (8)	07:17 17:18	06:54 17:00	
9	07:42 16:59	07:19 17:37	06:38 18:12	16:43 (8) 19:47	06:44 18:12 (8)	06:00 20:21	05:37 20:49	05:45 20:52	06:14 20:24	06:46 19:36	27 18:12 (8) 18:43	07:18 18:11 (8)	06:56 16:41	
10	07:42 17:00	07:18 17:38	06:36 18:13	16:41 (8) 19:49	06:43 18:13 (8)	06:03 20:22	05:37 20:49	05:46 20:52	06:15 20:23	06:47 19:34	32 18:14 (8) 18:42	07:20 18:10 (8)	06:57 16:41	
11	07:42 17:01	07:17 17:40	06:34 18:14	16:40 (8) 19:50	06:41 18:14 (8)	06:04 20:23	05:37 20:50	05:46 20:51	06:16 20:22	06:48 19:32	36 18:16 (8) 18:40	07:21 18:08 (8)	06:58 16:41	
12	07:42 17:02	07:15 17:41	06:32 18:16	16:41 (8) 19:51	06:39 18:16 (8)	06:05 20:24	05:37 20:50	05:47 20:51	06:17 20:20	06:49 19:30	40 18:17 (8) 18:38	07:22 18:07 (8)	06:59 16:41	
13	07:41 17:03	07:14 17:42	06:31 18:17	16:40 (8) 19:52	06:38 18:17 (8)	06:06 20:25	05:37 20:51	05:48 20:50	06:18 20:19	06:50 19:29	43 18:18 (8) 18:37	07:23 18:04 (8)	07:01 16:41	
14	07:41 17:04	07:13 17:44	06:29 18:18	16:39 (8) 19:53	06:36 18:18 (8)	06:07 20:26	05:36 20:51	05:49 20:50	06:19 20:17	06:51 19:27	46 18:19 (8) 18:35	07:24 17:29 (8)	07:02 16:42	
15	07:41 17:06	07:11 17:45	06:27 18:19	16:38 (8) 19:54	06:34 18:19 (8)	06:08 20:27	05:36 20:52	05:50 20:49	06:20 20:16	06:53 19:25	48 18:20 (8) 18:33	07:25 17:30 (8)	07:03 16:42	
16	07:40 17:07	07:10 17:46	06:26 18:20	16:39 (8) 19:55	06:33 18:20 (8)	06:09 20:28	05:36 20:52	05:50 20:48	06:21 20:15	06:54 19:23	51 18:21 (8) 18:32	07:26 17:43 (8)	07:04 16:42	
17	07:40 17:08	07:09 17:48	06:24 18:21	16:38 (8) 19:56	06:31 18:21 (8)	06:10 20:29	05:36 20:52	05:51 20:48	06:22 20:13	06:55 19:22	52 18:21 (8) 18:30	07:28 17:47 (8)	07:06 16:42	
18	07:39 17:09	07:07 17:49	06:22 18:23	16:38 (8) 19:57	06:30 18:23 (8)	06:11 20:30	05:37 20:53	05:52 20:47	06:23 20:12	06:56 19:20	55 18:22 (8) 18:29	07:29 17:26 (8)	07:07 16:43	
19	07:39 17:10	07:06 17:50	06:20 18:24	16:38 (8) 19:59	06:28 18:24 (8)	06:12 20:31	05:37 20:53	05:53 20:46	06:24 20:10	06:57 19:18	56 18:22 (8) 18:27	07:30 17:26 (8)	07:08 16:43	
20	07:38 17:12	07:04 17:51	06:19 18:25	16:39 (8) 20:00	06:27 18:25 (8)	06:13 20:32	05:37 20:53	05:54 20:46	06:25 20:09	06:58 19:16	57 18:22 (8) 18:25	07:31 17:25 (8)	07:09 16:43	
21	07:37 17:13	07:03 17:53	06:17 18:26	16:38 (8) 20:01	06:25 18:26 (8)	06:14 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:14	58 18:22 (8) 18:24	07:32 17:23 (8)	07:10 16:44	
22	07:37 17:14	07:01 17:54	06:15 18:27	16:38 (8) 20:02	06:23 18:27 (8)	06:15 20:34	05:37 20:54	05:56 20:44	06:27 20:05	06:59 19:13	59 18:22 (8) 18:22	07:33 17:22 (8)	07:12 16:44	
23	07:36 17:15	07:00 17:55	06:14 18:28	16:38 (8) 20:03	06:22 18:28 (8)	06:16 20:35	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	60 18:22 (8) 18:21	07:35 17:22 (8)	07:13 16:45	
24	07:35 17:16	06:58 17:56	06:12 18:29	16:40 (8) 20:04	06:20 18:29 (8)	06:17 20:36	05:38 20:54	05:57 20:42	06:29 20:02	07:02 19:09	61 18:23 (8) 18:19	07:36 17:22 (8)	07:14 16:46	
25	07:34 17:18	06:57 17:58	17:07 (8) 18:31	06:10 18:31 (8)	06:19 18:35 (8)	06:18 20:37	05:38 20:54	05:58 20:41	06:30 20:01	07:03 19:07	61 18:23 (8) 17:18	07:37 17:21 (8)	07:15 16:46	
26	07:34 17:19	06:55 17:59	17:02 (8) 18:32	06:08 18:32 (8)	06:17 18:33 (8)	06:17 20:38	05:38 20:54	05:59 20:40	06:31 19:59	07:04 19:06	61 18:22 (8) 17:17	07:38 17:20 (8)	07:16 16:47	
27	07:33 17:20	06:54 18:00	17:24 (8) 18:33	06:07 18:33 (8)	06:16 18:32 (8)	06:16 20:39	05:39 20:54	06:00 20:39	06:33 19:58	07:05 19:04	62 18:22 (8) 17:15	07:39 17:20 (8)	07:17 16:44	
28	07:32 17:22	06:52 18:01	16:56 (8) 17:30 (8)	06:05 18:34 (8)	06:15 18:34 (8)	06:15 20:40	05:39 20:54	06:01 20:38	06:34 19:56	07:06 19:02	61 18:21 (8) 17:14	07:40 17:20 (8)	07:19 16:48	
29	07:31 17:23			07:03 18:35	06:13 18:29 (8)	06:13 20:10	05:39 20:54	06:02 20:37	06:35 19:54	07:07 19:00	61 18:21 (8) 17:12	07:41 17:19 (8)	07:20 16:43	
30	07:30 17:24			07:01 18:36	06:12 18:27 (8)	06:12 20:11	05:40 20:54	06:03 20:36	06:36 19:53	07:09 18:59	61 18:20 (8) 17:11	07:42 17:10	07:21 16:50	
31	07:29 17:25			07:00 18:37	06:11 18:26 (8)		05:41 20:42	06:04 20:35	06:37 19:51			07:43 17:10	07:42 16:50	
Potential sun hours	294	295	369	400	425	452	456	463	430	376	1176	344	295	284
Total, worst case		97	1681		125							755		

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: X - Shadow Receptor: 1.0 x 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

Table with columns for months (January-December) and rows for potential sun hours and total worst case. Includes a detailed table of shadow times (sunrise, sunset) for each day of the year.

Potential sun hours Total, worst case | 294 295 1434 369 400 452 456 463 430 376 344 861 295 1482 284 48

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

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





## SHADOW - Calendar

Calculation: WON018\_ShadowFlickering Shadow receptor: Y - Shadow Receptor: 1.0 × 1.0 Azimuth: -110.0° 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
1	07:43 16:51 47	08:35 (9) 09:22 (9)	07:28 17:27	06:51 18:03	06:58 19:38	06:10 20:12 52
2	07:43 16:52 46	08:36 (9) 09:22 (9)	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13 55
3	07:43 16:53 46	08:36 (9) 09:22 (9)	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14 56
4	07:43 16:54 46	08:37 (9) 09:23 (9)	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15 57
5	07:43 16:55 45	08:38 (9) 09:23 (9)	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17 59
6	07:43 16:56 46	08:38 (9) 09:24 (9)	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18 60
7	07:43 16:57 45	08:38 (9) 09:24 (9)	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19 62
8	07:43 16:58 44	08:39 (9) 09:23 (9)	07:20 17:36	06:39 18:11	06:46 19:46	06:01 20:20 62
9	07:42 16:59 44	08:40 (9) 09:24 (9)	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21 64
10	07:42 17:00 43	08:41 (9) 09:24 (9)	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22 64
11	07:42 17:01 43	08:41 (9) 09:24 (9)	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23 64
12	07:42 17:02 42	08:42 (9) 09:24 (9)	07:15 17:41	06:33 18:16	06:39 19:51	05:57 20:24 66
13	07:41 17:03 41	08:42 (9) 09:23 (9)	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25 66
14	07:41 17:04 41	08:43 (9) 09:24 (9)	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26 66
15	07:41 17:06 39	08:44 (9) 09:23 (9)	07:11 17:45	06:27 18:19	06:35 19:54	05:53 20:27 66
16	07:40 17:07 38	08:45 (9) 09:23 (9)	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28 67
17	07:40 17:08 37	08:46 (9) 09:23 (9)	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29 67
18	07:39 17:09 36	08:47 (9) 09:23 (9)	07:07 17:49	06:22 18:23	06:30 19:58	05:51 20:30 67
19	07:39 17:10 34	08:48 (9) 09:22 (9)	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31 67
20	07:38 17:12 32	08:49 (9) 09:21 (9)	07:04 17:51	06:19 18:25	06:27 20:00	05:49 20:32 67
21	07:37 17:13 30	08:51 (9) 09:21 (9)	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33 68
22	07:37 17:14 28	08:52 (9) 09:20 (9)	07:01 17:54	06:15 18:27	06:24 20:02	05:47 20:34 68
23	07:36 17:15 24	08:54 (9) 09:18 (9)	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35 67
24	07:35 17:17 20	08:56 (9) 09:16 (9)	06:58 17:56	06:12 18:29	06:21 20:04	05:45 20:36 67
25	07:35 17:18 16	08:59 (9) 09:15 (9)	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37 67
26	07:34 17:19 6	09:04 (9) 09:10 (9)	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38 67
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	06:16 20:08	05:43 20:39 67
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	06:15 20:09	05:42 20:40 66
29	07:31 17:23		07:03 19:35	06:13 20:10	06:13 20:10	05:42 20:41 66
30	07:30 17:24		07:01 19:36	06:12 20:11	06:12 20:11	05:41 20:41 65
31	07:29 17:26		07:00 19:37			05:41 20:42 66
Potential sun hours	294	295	369	400	452	456
Total, worst case	959			309	1988	1867

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

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

Calculation: WON018\_ShadowFlickering Shadow receptor: Y - Shadow Receptor: 1.0 × 1.0 Azimuth: -110.0° 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

	July		August		September		October		November		December	
1	05:40	06:52 (8)	06:05	06:54 (8)	06:38	07:10	06:46	07:22	08:23 (9)			
	20:54	62 07:54 (8)	20:34	65 07:59 (8)	19:49	18:57	17:08	16:43	43 09:06 (9)			
2	05:41	06:51 (8)	06:06	06:54 (8)	06:39	07:11	06:47	07:23	08:23 (9)			
	20:54	63 07:54 (8)	20:33	65 07:59 (8)	19:48	18:55	17:07	16:42	43 09:06 (9)			
3	05:41	06:52 (8)	06:07	06:55 (8)	06:40	07:12	06:48	07:24	08:23 (9)			
	20:54	63 07:55 (8)	20:32	64 07:59 (8)	19:46	18:53	17:06	16:42	44 09:07 (9)			
4	05:42	06:52 (8)	06:08	06:55 (8)	06:41	07:13	06:49	07:25	08:24 (9)			
	20:54	62 07:54 (8)	20:31	63 07:58 (8)	19:44	18:52	17:05	16:42	44 09:08 (9)			
5	05:43	06:52 (8)	06:09	06:56 (8)	06:42	07:14	06:51	07:26	08:24 (9)			
	20:53	63 07:55 (8)	20:29	62 07:58 (8)	19:43	18:50	17:03	16:42	45 09:09 (9)			
6	05:43	06:51 (8)	06:10	06:56 (8)	06:43	07:15	06:52	07:27	08:24 (9)			
	20:53	64 07:55 (8)	20:28	61 07:57 (8)	19:41	18:48	17:02	16:41	46 09:10 (9)			
7	05:44	06:52 (8)	06:12	06:57 (8)	06:44	07:16	06:53	07:28	08:25 (9)			
	20:53	64 07:56 (8)	20:27	59 07:56 (8)	19:39	18:47	17:01	16:41	45 09:10 (9)			
8	05:44	06:52 (8)	06:13	06:57 (8)	06:45	07:17	06:54	07:29	08:24 (9)			
	20:53	64 07:56 (8)	20:26	59 07:56 (8)	19:37	18:45	17:00	16:41	46 09:10 (9)			
9	05:45	06:52 (8)	06:14	06:58 (8)	06:46	07:19	06:56	07:30	08:24 (9)			
	20:52	64 07:56 (8)	20:24	57 07:55 (8)	19:36	18:43	16:59	16:41	47 09:11 (9)			
10	05:46	06:52 (8)	06:15	06:59 (8)	06:47	07:20	06:57	07:31	08:25 (9)			
	20:52	65 07:57 (8)	20:23	55 07:54 (8)	19:34	18:42	16:58	16:41	46 09:11 (9)			
11	05:47	06:52 (8)	06:16	06:59 (8)	06:48	07:21	06:58	07:32	08:25 (9)			
	20:51	65 07:57 (8)	20:22	54 07:53 (8)	19:32	18:40	16:57	16:41	47 09:12 (9)			
12	05:47	06:52 (8)	06:17	07:00 (8)	06:49	07:22	06:59	07:33	08:26 (9)			
	20:51	65 07:57 (8)	20:20	52 07:52 (8)	19:30	18:38	16:56	16:41	47 09:13 (9)			
13	05:48	06:52 (8)	06:18	07:01 (8)	06:50	07:23	07:01	07:33	08:26 (9)			
	20:50	66 07:58 (8)	20:19	49 07:50 (8)	19:29	18:37	16:55	16:42	47 09:13 (9)			
14	05:49	06:52 (8)	06:19	07:02 (8)	06:52	07:24	07:02	07:34	08:27 (9)			
	20:50	66 07:58 (8)	20:17	47 07:49 (8)	19:27	18:35	16:54	16:42	47 09:14 (9)			
15	05:50	06:52 (8)	06:20	07:04 (8)	06:53	07:25	07:03	07:35	08:27 (9)			
	20:49	67 07:59 (8)	20:16	43 07:47 (8)	19:25	18:33	16:53	16:42	47 09:14 (9)			
16	05:50	06:53 (8)	06:21	07:05 (8)	06:54	07:26	07:04	08:37 (9)	07:36	08:27 (9)		
	20:48	66 07:59 (8)	20:15	41 07:46 (8)	19:23	18:32	16:52	6 08:43 (9)	16:42	48 09:15 (9)		
17	05:51	06:52 (8)	06:22	07:07 (8)	06:55	07:28	07:06	08:32 (9)	07:36	08:28 (9)		
	20:48	67 07:59 (8)	20:13	36 07:43 (8)	19:22	18:30	16:51	16 08:48 (9)	16:42	47 09:15 (9)		
18	05:52	06:52 (8)	06:23	07:09 (8)	06:56	07:29	07:07	08:30 (9)	07:37	08:28 (9)		
	20:47	67 07:59 (8)	20:12	32 07:41 (8)	19:20	18:29	16:50	20 08:50 (9)	16:43	47 09:15 (9)		
19	05:53	06:52 (8)	06:24	07:11 (8)	06:57	07:30	07:08	08:29 (9)	07:38	08:29 (9)		
	20:46	67 07:59 (8)	20:10	27 07:38 (8)	19:18	18:27	16:49	24 08:53 (9)	16:43	47 09:16 (9)		
20	05:54	06:52 (8)	06:25	07:15 (8)	06:58	07:31	07:09	08:27 (9)	07:38	08:29 (9)		
	20:46	68 08:00 (8)	20:09	19 07:34 (8)	19:16	18:26	16:49	28 08:55 (9)	16:44	47 09:16 (9)		
21	05:55	06:53 (8)	06:26		06:59	07:32	07:10	08:26 (9)	07:39	08:30 (9)		
	20:45	67 08:00 (8)	20:07		19:15	18:24	16:48	30 08:56 (9)	16:44	47 09:17 (9)		
22	05:56	06:53 (8)	06:27		07:00	07:34	07:12	08:26 (9)	07:39	08:30 (9)		
	20:44	67 08:00 (8)	20:06		19:13	18:23	16:47	32 08:58 (9)	16:44	47 09:17 (9)		
23	05:57	06:53 (8)	06:28		07:01	07:35	07:13	08:25 (9)	07:40	08:31 (9)		
	20:43	67 08:00 (8)	20:04		19:11	18:21	16:47	34 08:59 (9)	16:45	47 09:18 (9)		
24	05:58	06:52 (8)	06:29		07:02	07:36	07:14	08:24 (9)	07:40	08:31 (9)		
	20:42	68 08:00 (8)	20:02		19:09	18:20	16:46	36 09:00 (9)	16:46	47 09:18 (9)		
25	05:58	06:52 (8)	06:30		07:03	06:37	07:15	08:24 (9)	07:41	08:32 (9)		
	20:41	68 08:00 (8)	20:01		19:07	17:18	16:45	37 09:01 (9)	16:46	47 09:19 (9)		
26	05:59	06:53 (8)	06:32		07:04	06:38	07:16	08:23 (9)	07:41	08:32 (9)		
	20:40	67 08:00 (8)	19:59		19:06	17:17	16:45	38 09:01 (9)	16:47	47 09:19 (9)		
27	06:00	06:53 (8)	06:33		07:05	06:40	07:18	08:24 (9)	07:42	08:32 (9)		
	20:39	67 08:00 (8)	19:58		19:04	17:15	16:44	39 09:03 (9)	16:47	47 09:19 (9)		
28	06:01	06:53 (8)	06:34		07:06	06:41	07:19	08:24 (9)	07:42	08:33 (9)		
	20:38	67 08:00 (8)	19:56		19:02	17:14	16:44	40 09:04 (9)	16:48	47 09:20 (9)		
29	06:02	06:53 (8)	06:35		07:07	06:42	07:20	08:23 (9)	07:42	08:34 (9)		
	20:37	67 08:00 (8)	19:54		19:00	17:12	16:43	41 09:04 (9)	16:49	47 09:21 (9)		
30	06:03	06:54 (8)	06:36		07:09	06:43	07:21	08:23 (9)	07:42	08:34 (9)		
	20:36	66 08:00 (8)	19:53		18:59	17:11	16:43	42 09:05 (9)	16:50	47 09:21 (9)		
31	06:04	06:54 (8)	06:37			06:44			07:43	08:35 (9)		
	20:35	65 07:59 (8)	19:51			17:10			16:50	46 09:21 (9)		
Potential sun hours	463		430		376	344	295	463	284	1436		
Total, worst case	2034		1010									

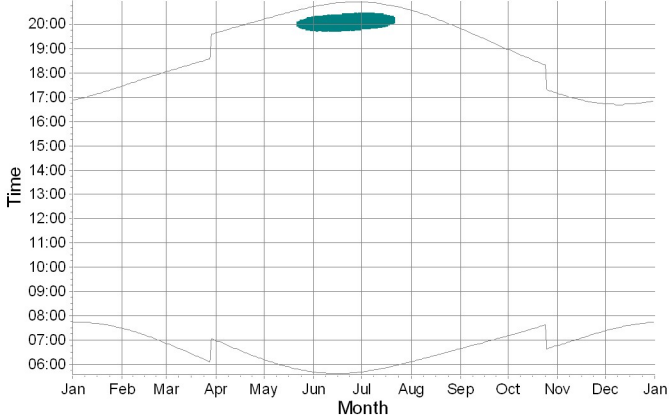
Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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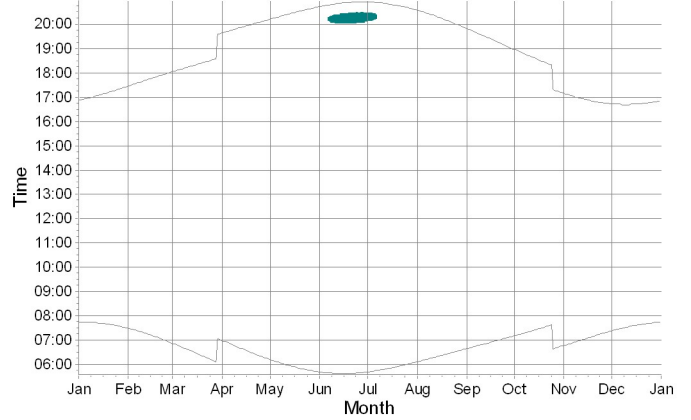
## SHADOW - Calendar, graphical

Calculation: WON018\_ShadowFlickering

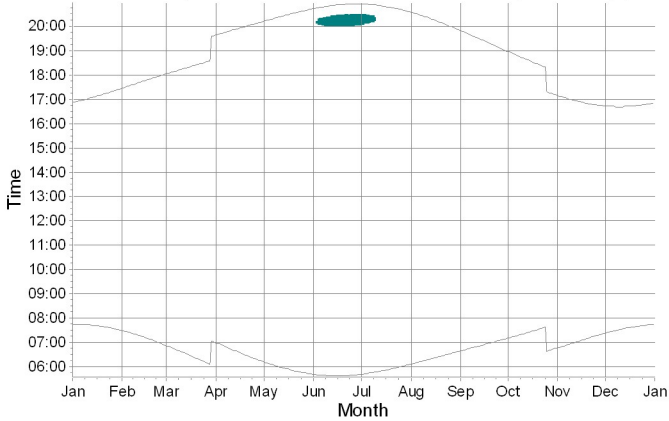
A: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (1)



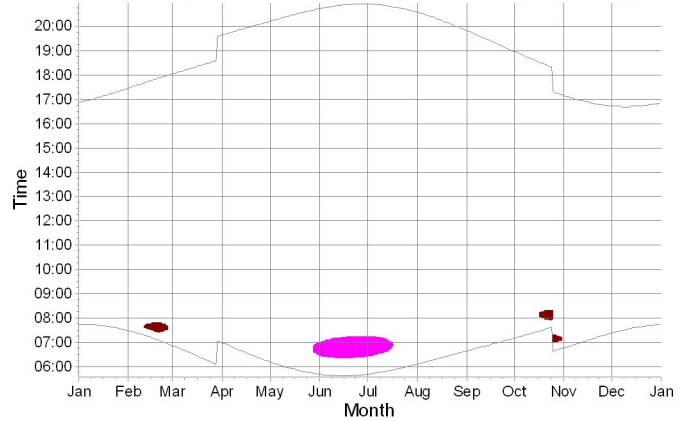
B: Shadow Receptor: 1.0 × 1.0 Azimuth: -180.0° Slope: 90.0° (2)



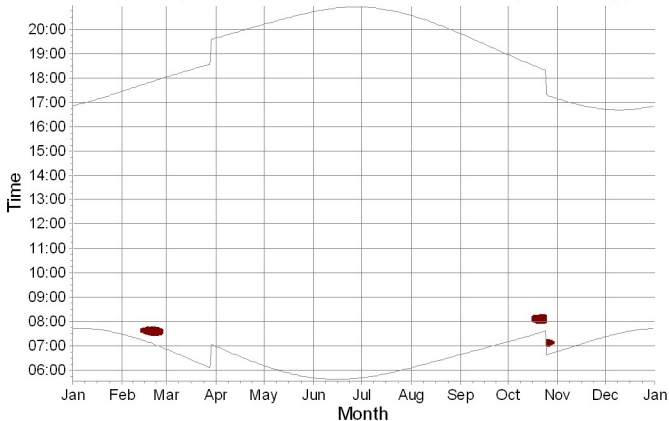
C: Shadow Receptor: 1.0 × 1.0 Azimuth: 170.0° Slope: 90.0° (3)



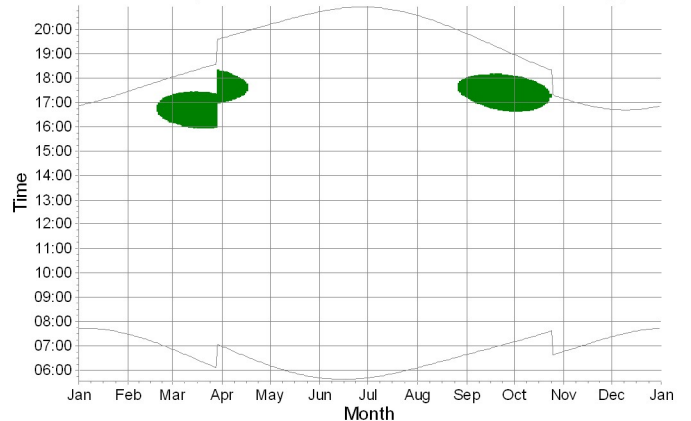
D: Shadow Receptor: 1.0 × 1.0 Azimuth: -120.0° Slope: 90.0° (4)



E: Shadow Receptor: 1.0 × 1.0 Azimuth: -120.0° Slope: 90.0° (5)



F: Shadow Receptor: 1.0 × 1.0 Azimuth: 60.0° Slope: 90.0° (6)



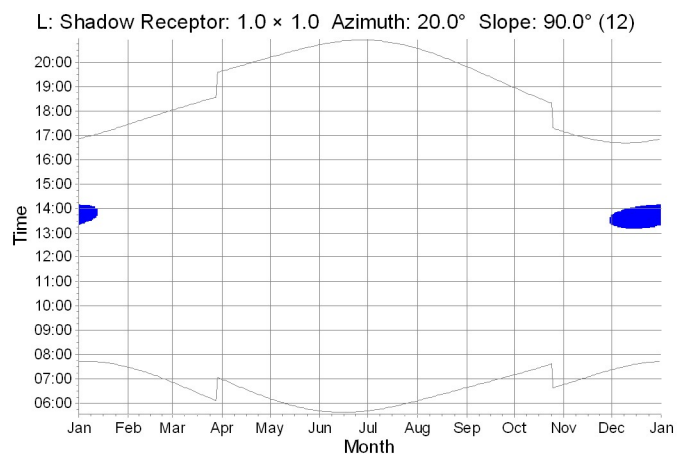
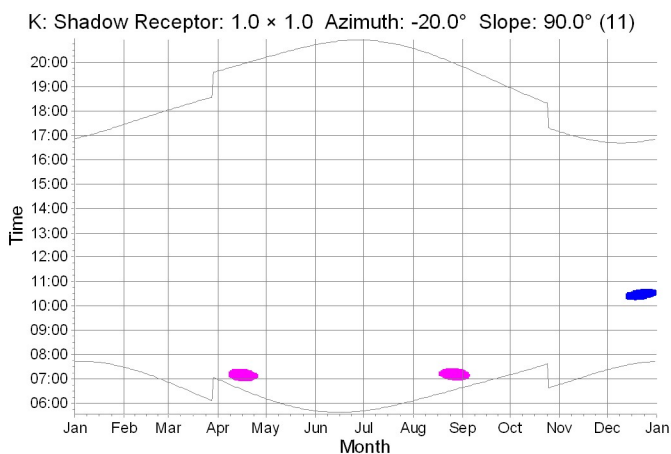
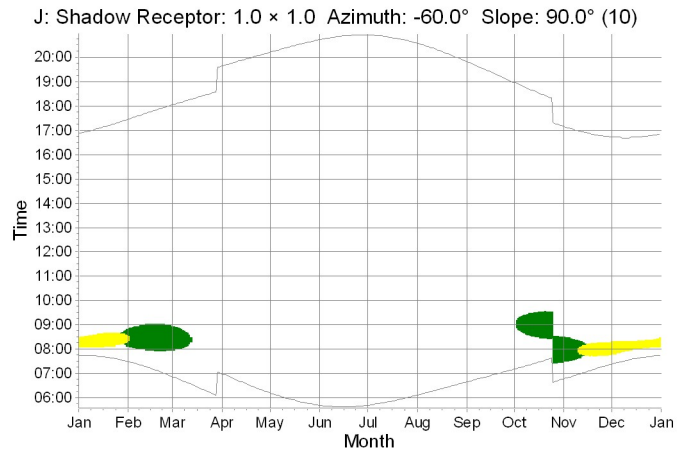
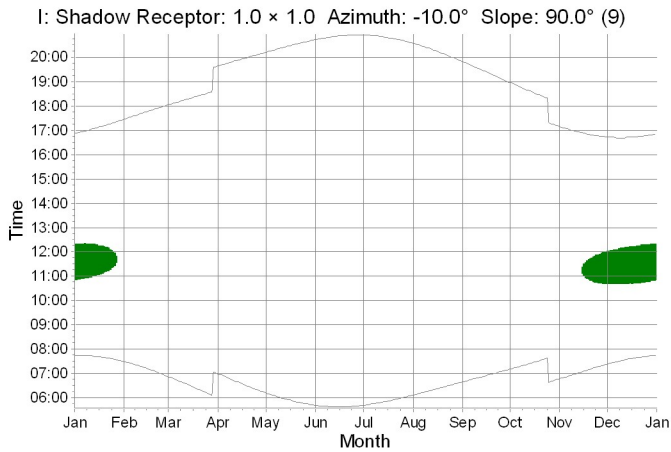
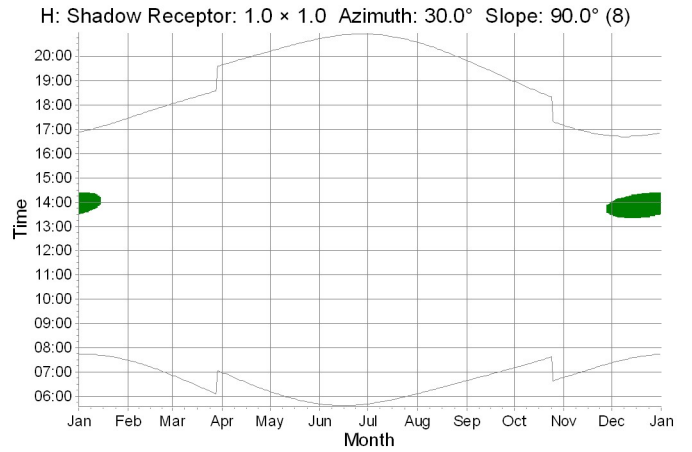
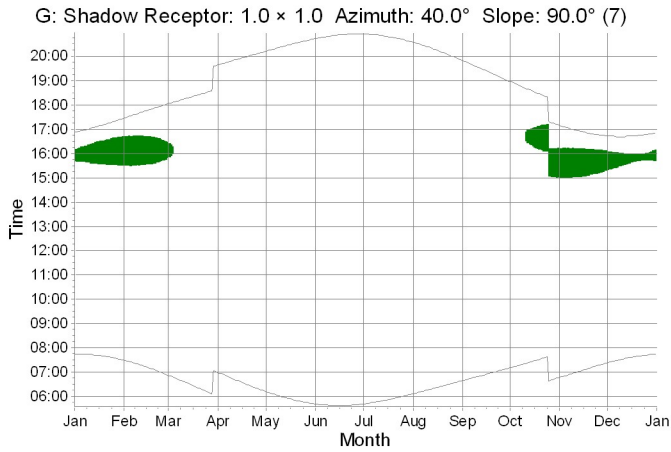
### WTGs

- 1: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (1)
- 5: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (5)

- 6: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (6)
- 8: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (8)

## SHADOW - Calendar, graphical

Calculation: WON018\_ShadowFlickering

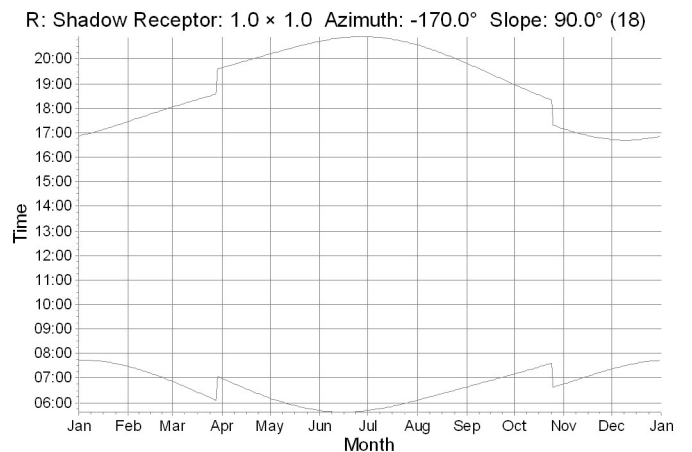
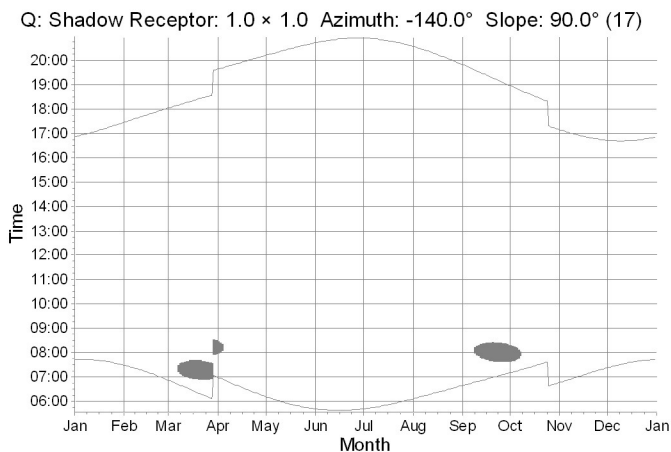
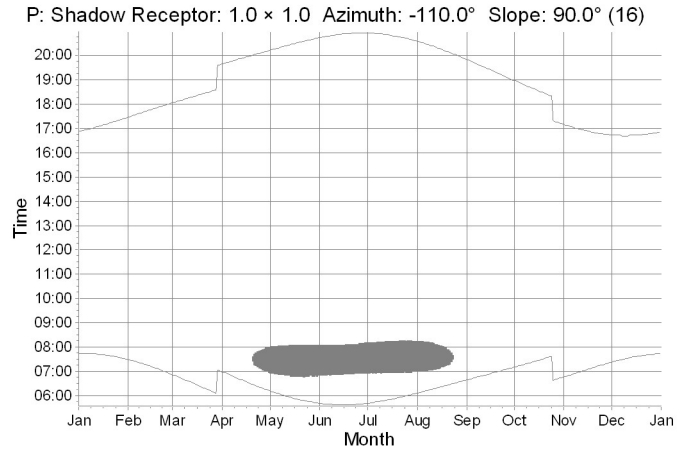
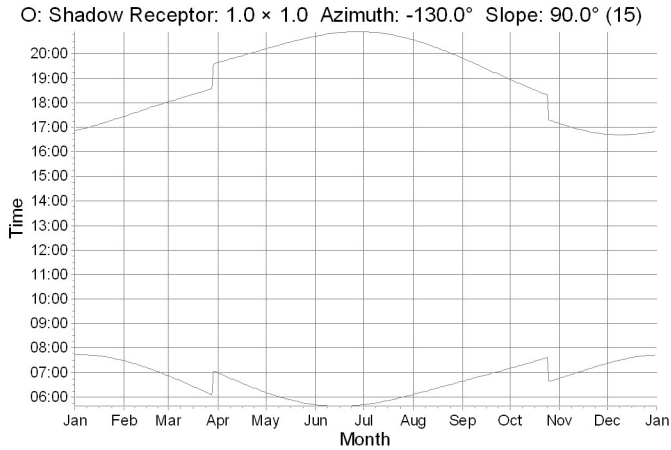
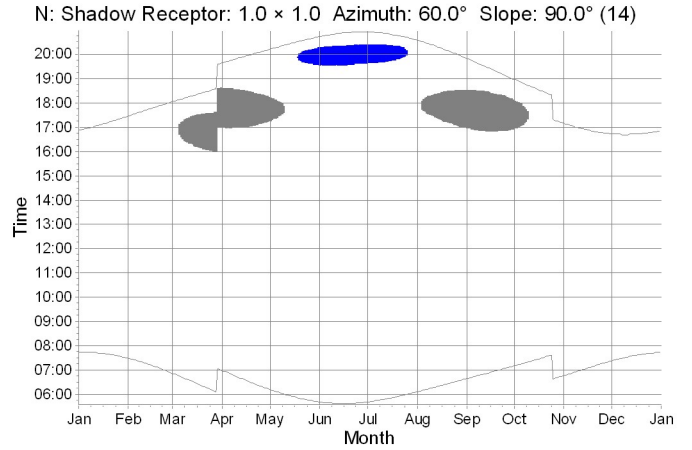
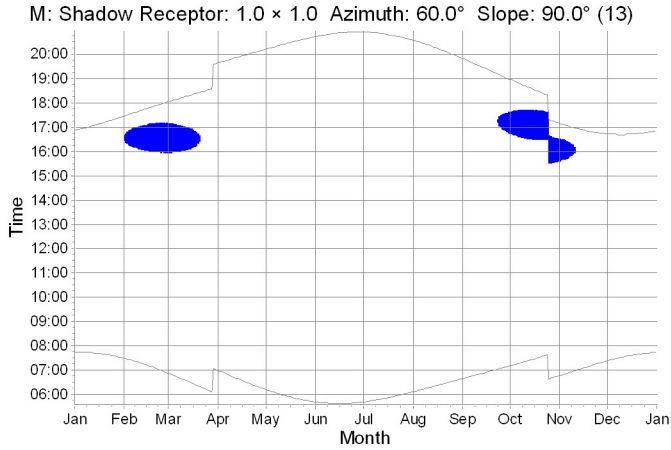


WTGs

- 1: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (1)
- 2: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (2)

- 3: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (3)
- 5: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (5)

**SHADOW - Calendar, graphical**  
Calculation: WON018\_ShadowFlickering



WTGs

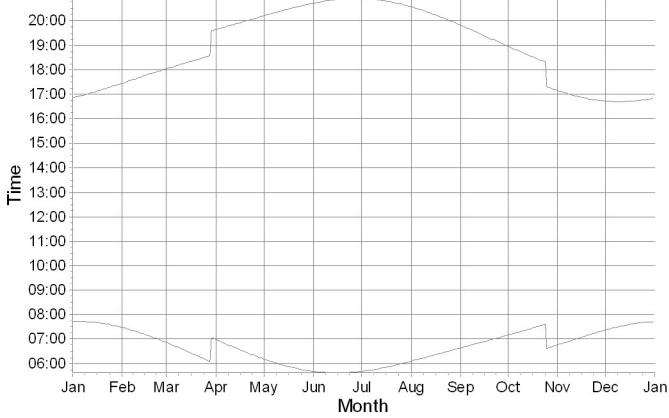
3 3: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (3)

4 4: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (4)

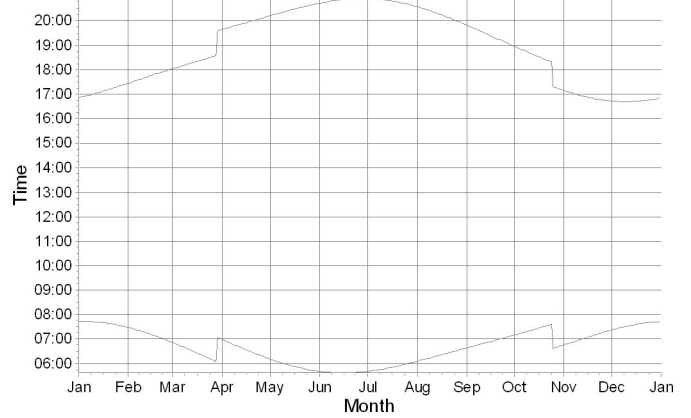
## SHADOW - Calendar, graphical

Calculation: WON018\_ShadowFlickering

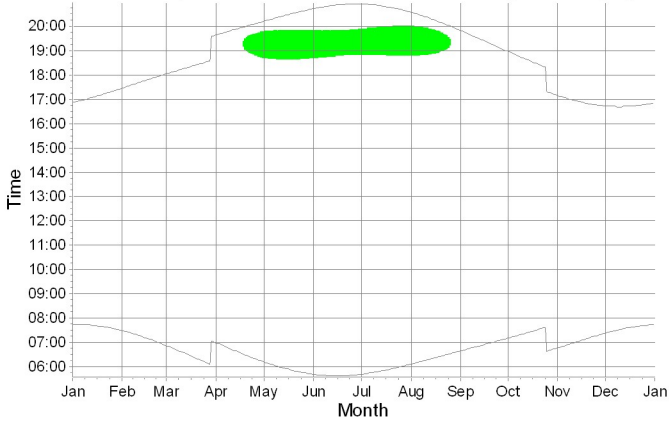
S: Shadow Receptor: 1.0 × 1.0 Azimuth: -170.0° Slope: 90.0° (19)



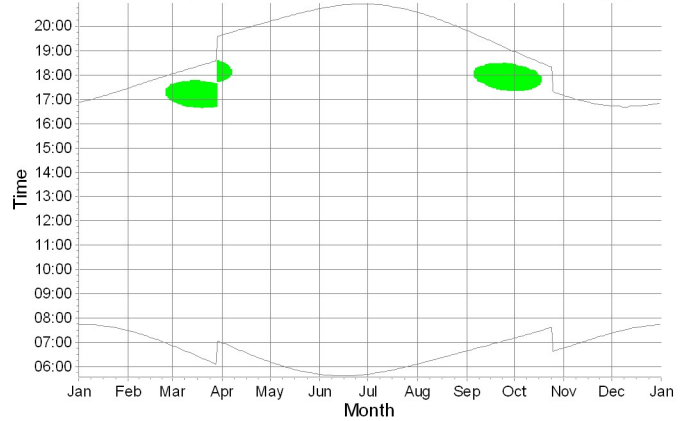
T: Shadow Receptor: 1.0 × 1.0 Azimuth: 170.0° Slope: 90.0° (20)



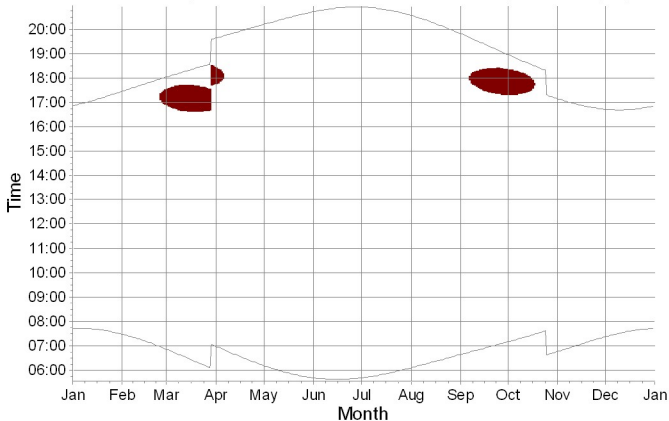
U: Shadow Receptor: 1.0 × 1.0 Azimuth: 110.0° Slope: 90.0° (21)



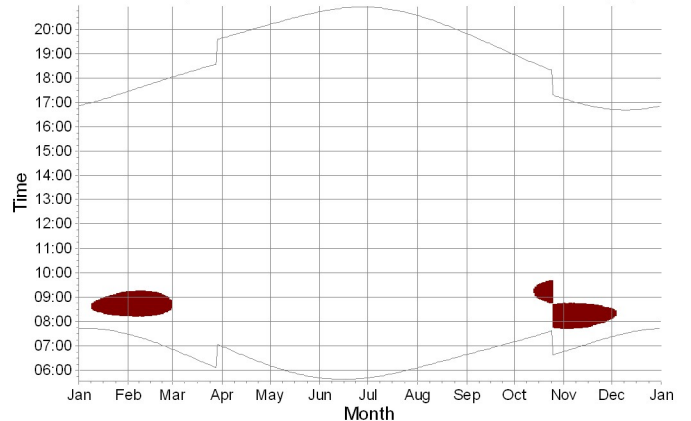
V: Shadow Receptor: 1.0 × 1.0 Azimuth: 80.0° Slope: 90.0° (22)



W: Shadow Receptor: 1.0 × 1.0 Azimuth: 80.0° Slope: 90.0° (23)



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



WTGs

8: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (8)

9: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (9)

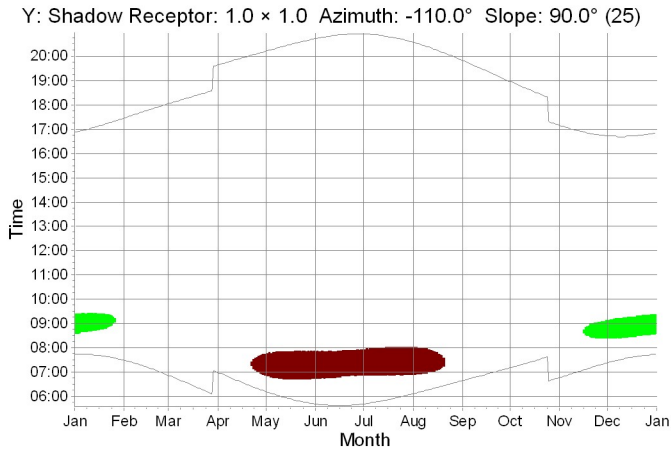


Project:  
WON018\_ShadowFlickering

Licensed user:  
Iron solar s.r.l.  
via Lanzone, 31  
IT-20122 Milano  
+393487125089  
Fabio Paccapelo / francesca.saccarola@hopegroup.it  
Calculated:  
11/07/2023 08:25/3.6.361

## SHADOW - Calendar, graphical

Calculation: WON018\_ShadowFlickering



WTGs

8: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (8)

9: VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 m) (9)

## SHADOW - Calendar per WTG

Calculation: WON018\_ShadowFlickering WTG: 1 - VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 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
1	07:43 10:51-12:18/87 15:42-16:08/26 16:52 13:31-14:22/51	07:28 08:07-08:48/41 17:27 15:31-16:40/69	06:51 07:58-08:54/56 18:03 15:52-17:18/86	06:58 17:01-18:16/75 19:39	06:11 20:12 20:43	05:40 20:43
2	07:43 10:51-12:18/87 15:41-16:09/28 16:52 13:32-14:22/50	07:27 08:06-08:50/44 17:28 15:31-16:41/70	06:49 07:59-08:53/54 18:04 15:56-17:19/83	06:56 17:02-18:14/72 19:40	06:09 20:13 20:44	05:40 20:44
3	07:43 10:52-12:18/86 15:41-16:11/30 16:53 13:33-14:22/49	07:26 08:05-08:51/46 17:30 15:31-16:41/70	06:48 07:59-08:52/53 18:05 16:01-17:20/79	06:55 17:03-18:14/71 19:41	06:08 20:15 20:45	05:39 20:45
4	07:43 10:53-12:18/85 15:41-16:12/31 16:54 13:34-14:21/47	07:25 08:04-08:52/48 17:31 15:31-16:42/71	06:46 08:00-08:50/50 18:06 16:06-17:20/74	06:53 17:04-18:12/68 19:42	06:07 20:16 20:45	05:39 20:45
5	07:43 10:54-12:18/84 15:40-16:14/34 16:55 13:36-14:21/45	07:24 08:03-08:54/51 17:32 15:30-16:41/71	06:44 08:02-08:49/47 18:08 16:06-17:22/76	06:51 17:05-18:11/66 19:43	06:05 20:17 20:46	05:39 20:46
6	07:43 10:55-12:18/83 15:40-16:15/35 16:56 13:37-14:21/44	07:23 08:02-08:54/52 17:33 15:31-16:41/70	06:43 08:02-08:47/45 18:09 16:04-17:22/78	06:50 17:06-18:09/63 19:44	06:04 20:18 20:47	05:38 20:47
7	07:43 10:56-12:19/83 15:40-16:17/37 16:57 13:39-14:21/42	07:22 08:01-08:55/54 17:35 15:31-16:42/71	06:41 08:03-08:45/42 18:10 16:03-17:22/79	06:48 17:08-18:08/60 19:45	06:03 20:19 20:48	05:38 20:48
8	07:43 10:56-12:18/82 15:38-16:17/39 16:58 13:40-14:20/40	07:21 08:01-08:56/55 17:36 15:31-16:42/71	06:39 08:06-08:43/37 18:11 16:03-17:24/81	06:46 17:09-18:06/57 19:47	06:02 20:20 20:48	05:38 20:48
9	07:43 10:57-12:18/81 15:38-16:19/41 16:59 13:42-14:19/37	07:19 08:00-08:57/57 17:37 15:32-16:42/70	06:38 08:07-08:40/33 18:12 16:02-17:24/82	06:45 17:10-18:04/54 19:48	06:00 20:21 20:49	05:37 20:49
10	07:42 10:58-12:18/80 15:38-16:20/42 17:00 13:44-14:19/35	07:18 07:59-08:57/58 17:39 15:31-16:42/71	06:36 08:09-08:37/28 18:13 16:01-17:24/83	06:43 17:12-18:03/51 19:49	05:59 20:22 20:49	05:37 20:49
11	07:42 10:58-12:17/79 15:37-16:21/44 17:01 13:45-14:17/32	07:17 07:59-08:58/59 17:40 15:32-16:42/70	06:34 08:13-08:33/20 18:15 16:00-17:24/84	06:41 17:13-18:00/47 19:50	05:58 20:23 20:50	05:37 20:50
12	07:42 11:00-12:17/77 15:37-16:23/46 17:02 13:48-14:16/28	07:16 07:58-08:59/61 17:41 15:33-16:42/69	06:33 08:19-08:26/7 18:16 16:00-17:25/85	06:40 17:15-17:58/43 19:51	05:57 20:24 20:50	05:37 20:50
13	07:42 11:01-12:17/76 15:37-16:24/47 17:03 13:52-14:14/22	07:14 07:57-08:59/62 17:43 15:32-16:41/69	06:31 15:59-17:24/85 18:17	06:38 17:18-17:56/38 19:52	05:56 20:25 20:51	05:37 20:51
14	07:41 11:02-12:16/74 15:36-16:25/49 17:05 13:55-14:11/16	07:13 07:57-09:00/63 17:44 15:33-16:41/68	06:29 15:58-17:24/86 18:18	06:36 17:20-17:52/32 19:53	05:55 20:26 20:51	05:37 20:51
15	07:41 11:04-12:16/72 17:06 15:36-16:27/51	07:12 07:57-09:00/63 17:45 15:34-16:41/67	06:28 15:59-17:25/86 18:19	06:35 17:24-17:49/25 19:54	05:54 20:27 20:52	05:37 20:52
16	07:40 11:04-12:14/70 17:07 15:35-16:27/52	07:10 07:57-09:00/63 17:46 15:34-16:40/66	06:26 15:58-17:25/87 18:20	06:33 17:29-17:44/15 19:55	05:53 20:28 20:52	05:37 20:52
17	07:40 11:06-12:14/68 17:08 15:35-16:29/54	07:09 07:57-09:00/63 17:48 15:35-16:40/65	06:24 15:58-17:24/86 18:22	06:31 19:57	05:52 20:29 20:53	05:37 20:53
18	07:39 11:07-12:13/66 17:09 15:34-16:30/56	07:08 07:56-09:00/64 17:49 15:35-16:39/64	06:22 15:57-17:24/87 18:23	06:30 19:58	05:51 20:31 20:53	05:37 20:53
19	07:39 11:09-12:11/62 17:10 15:34-16:30/56	07:06 07:56-09:00/64 17:50 15:37-16:52/75	06:21 15:58-17:24/86 18:24	06:28 19:59	05:50 20:32 20:53	05:37 20:53
20	07:38 11:11-12:10/59 17:12 15:34-16:32/58	07:05 07:56-08:59/63 17:52 15:37-16:58/81	06:19 15:57-17:24/87 18:25	06:27 20:00	05:49 20:32 20:54	05:37 20:54
21	07:38 11:13-12:09/56 17:13 15:33-16:33/60	07:03 07:56-09:00/64 17:53 15:39-17:03/84	06:17 15:57-17:23/86 18:26	06:25 20:01	05:48 20:33 20:54	05:37 20:54
22	07:37 11:14-12:07/53 17:14 15:33-16:33/60	07:02 07:56-08:59/63 17:54 15:39-17:05/86	06:15 15:57-17:23/86 18:27	06:24 20:02	05:47 20:34 20:54	05:37 20:54
23	07:36 11:17-12:04/47 17:15 15:32-16:34/62	07:00 07:56-08:59/63 17:55 15:41-17:08/87	06:14 15:58-17:23/85 18:28	06:22 20:03	05:46 20:35 20:54	05:38 20:54
24	07:35 11:20-12:02/42 17:17 15:33-16:35/62	06:59 07:56-08:58/62 17:57 15:42-17:10/88	06:12 15:58-17:22/84 18:30	06:21 20:04	05:45 20:36 20:54	05:38 20:54
25	07:35 11:23-11:59/36 17:18 15:32-16:36/64	06:57 07:57-08:58/61 17:58 15:44-17:12/88	06:10 15:58-17:21/83 18:31	06:19 20:06	05:45 20:37 20:54	05:38 20:54
26	07:34 08:20-08:32/12 15:32-16:37/65 17:19 11:27-11:55/28	06:56 07:57-08:57/60 17:59 15:45-17:14/89	06:09 15:58-17:20/82 18:32	06:18 20:07	05:44 20:38 20:55	05:38 20:55
27	07:33 08:16-08:37/21 15:32-16:37/65 17:20 11:34-11:47/13	06:54 07:57-08:56/59 18:00 15:47-17:15/88	06:07 15:59-17:20/81 18:33	06:16 20:08	05:43 20:39 20:55	05:39 20:55
28	07:32 08:14-08:40/26 17:22 15:31-16:38/67	06:52 07:58-08:55/57 18:01 15:50-17:17/87	06:05 15:59-17:19/80 18:34	06:15 20:09	05:43 20:40 20:55	05:39 20:55
29	07:31 08:12-08:42/30 17:23 15:31-16:39/68		07:03 16:59-18:18/79 19:35	06:13 20:10	05:42 20:41 20:55	05:40 20:55
30	07:30 08:10-08:44/34 17:24 15:31-16:39/68		07:02 17:00-18:17/77 19:36	06:12 20:11	05:41 20:42 20:55	05:40 20:55
31	07:29 08:08-08:46/38 17:26 15:31-16:40/69		07:00 17:01-18:17/76 19:38		05:41 20:42	
Potential sun hours	294	295	369	400	452	457
Sum of minutes with flicker	4081	3715	3031	837	0	0

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 1 - VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 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

	July	August	September	October	November	December	
1	05:40 20:54	06:05 20:34	06:38 17:12-17:59/47 19:49	07:10 16:38-18:03/85 18:57	06:46 07:29-08:27/58 17:09 15:01-16:11/70	07:22 10:42-12:00/78 15:19-16:03/44 16:43 13:28-13:59/31	
2	05:41 20:54	06:06 20:33	06:39 17:10-18:01/51 19:48	07:11 08:53-09:09/16 18:55 16:38-18:03/85	06:47 07:29-08:26/57 17:07 15:01-16:11/70	07:23 10:41-12:01/80 15:21-16:03/42 16:42 13:27-14:01/34	
3	05:42 20:54	06:08 20:32	06:40 17:08-18:02/54 19:46	07:12 08:49-09:14/25 18:54 16:38-18:02/84	06:48 07:30-08:26/56 17:06 15:01-16:12/71	07:24 10:41-12:02/81 15:22-16:03/41 16:42 13:26-14:03/37	
4	05:42 20:54	06:09 20:31	06:41 17:06-18:03/57 19:44	07:13 08:46-09:16/30 18:52 16:39-18:02/83	06:50 07:31-08:25/54 17:05 15:01-16:12/71	07:25 10:41-12:03/82 15:23-16:02/39 16:42 13:25-14:04/39	
5	05:43 20:54	06:10 20:30	06:42 17:04-18:04/60 19:43	07:14 08:43-09:19/36 18:50 16:39-18:01/82	06:51 07:32-08:24/52 17:04 15:01-16:11/70	07:26 10:41-12:04/83 15:25-16:02/37 16:42 13:24-14:06/42	
6	05:43 20:53	06:11 20:28	06:43 17:02-18:05/63 19:41	07:15 08:41-09:20/39 18:49 16:40-17:59/79	06:52 07:33-08:23/50 17:02 15:01-16:12/71	07:27 10:41-12:04/83 15:26-16:01/35 16:42 13:23-14:07/44	
7	05:44 20:53	06:12 20:27	06:44 17:00-18:06/66 19:39	07:16 08:39-09:22/43 18:47 16:40-17:58/78	06:53 07:34-08:22/48 17:01 15:01-16:11/70	07:28 10:41-12:05/84 15:27-16:01/34 16:41 13:23-14:08/45	
8	05:45 20:53	06:13 20:26	06:45 16:58-18:06/68 19:38	07:18 08:37-09:23/46 18:45 16:40-17:57/77	06:55 07:35-08:21/46 17:00 15:01-16:11/70	07:29 10:41-12:06/85 15:29-16:00/31 16:41 13:23-14:09/46	
9	05:45 20:52	06:14 20:25	06:46 16:57-18:07/70 19:36	07:19 08:35-09:24/49 18:43 16:41-17:56/75	06:56 07:37-08:20/43 16:59 15:02-16:12/70	07:30 10:41-12:07/86 15:30-16:00/30 16:41 13:22-14:11/49	
10	05:46 20:52	06:15 20:23	06:47 16:55-18:07/72 19:34	07:20 08:35-09:26/51 18:42 16:41-17:54/73	06:57 07:38-08:19/41 16:58 15:02-16:11/69	07:31 10:41-12:07/87 15:31-16:00/29 16:41 13:22-14:12/50	
11	05:47 20:51	06:16 20:22	06:49 16:54-18:08/74 19:32	07:21 08:33-09:27/54 18:40 16:32-17:54/82	06:58 07:39-08:17/38 16:57 15:02-16:11/69	07:32 10:41-12:08/87 15:32-15:58/26 16:41 13:21-14:12/51	
12	05:47 20:51	06:17 20:20	06:50 16:52-18:08/76 19:31	07:22 08:32-09:27/55 18:38 16:28-17:52/84	07:00 07:42-08:16/34 16:56 15:03-16:11/68	07:33 10:41-12:09/88 15:33-15:58/25 16:42 13:21-14:13/52	
13	05:48 20:50	06:18 20:19	06:51 16:51-18:08/77 19:29	07:23 08:31-09:28/57 18:37 16:24-17:50/86	07:01 07:44-08:14/30 16:55 15:03-16:10/67	07:34 10:41-12:09/88 15:35-15:58/23 16:42 13:21-14:14/53	
14	05:49 20:50	06:19 20:18	06:52 16:50-18:08/78 19:27	07:24 08:30-09:28/58 18:35 16:21-17:48/87	07:02 07:46-08:11/25 16:54 15:03-16:10/67	07:34 10:42-12:10/88 15:36-15:58/22 16:42 13:22-14:15/53	
15	05:50 20:49	06:20 20:16	06:53 16:48-18:08/80 19:25	07:26 08:29-09:28/59 18:34 16:18-17:47/89	07:03 07:49-08:09/20 15:05-16:10/65 16:53 11:07-11:21/14	07:35 10:43-12:11/88 15:37-15:56/19 16:42 13:22-14:16/54	
16	05:51 20:49	06:21 20:15	06:54 16:47-18:09/82 19:24	07:27 08:29-09:30/61 18:32 16:17-17:45/88	07:05 07:53-08:05/12 15:05-16:10/65 16:52 11:00-11:28/28	07:36 10:42-12:11/89 15:39-15:56/17 16:42 13:22-14:16/54	
17	05:51 20:48	06:22 20:13	06:55 16:46-18:09/83 19:22	07:28 08:28-09:30/62 18:30 16:15-17:43/88	07:06 10:56-11:32/36 16:51 15:05-16:09/64	07:37 10:43-12:12/89 15:40-15:57/17 16:43 13:22-14:17/55	
18	05:52 20:47	06:23 20:12	06:56 16:45-18:08/83 19:20	07:29 08:28-09:30/62 18:29 16:13-17:41/88	07:07 10:54-11:36/42 16:50 15:07-16:09/62	07:37 10:43-12:12/89 15:41-15:56/15 16:43 13:22-14:17/55	
19	05:53 20:47	06:24 20:10	06:57 16:45-18:09/84 19:18	07:30 08:27-09:30/63 18:27 16:11-17:38/87	07:08 10:52-11:39/47 16:50 15:07-16:09/62	07:38 10:43-12:13/90 15:42-15:56/14 16:43 13:23-14:18/55	
20	05:54 20:46	06:25 20:09	06:58 16:44-18:09/85 19:16	07:31 08:27-09:31/64 18:26 16:10-17:36/86	07:09 10:49-11:42/53 16:49 15:08-16:08/60	07:39 10:44-12:14/90 15:43-15:57/14 16:44 13:23-14:19/56	
21	05:55 20:45	06:26 20:07	06:59 16:43-18:09/86 19:15	07:33 08:27-09:30/63 18:24 16:09-17:32/83	07:11 10:48-11:44/56 16:48 15:08-16:08/60	07:39 10:44-12:14/90 15:43-15:56/13 16:44 13:23-14:19/56	
22	05:56 20:44	06:27 20:06	07:00 16:43-18:09/86 19:13	07:34 08:26-09:30/64 18:23 16:07-17:27/80	07:12 10:47-11:46/59 16:47 15:10-16:08/58	07:40 10:45-12:15/90 15:44-15:57/13 16:45 13:24-14:20/56	
23	05:57 20:43	06:28 20:04	07:01 16:42-18:08/86 19:11	07:35 08:26-09:30/64 17:13-17:18/5 18:21 16:06-17:08/62	07:13 10:46-11:48/62 16:47 15:11-16:07/56	07:40 10:45-12:15/90 15:44-15:58/14 16:45 13:24-14:20/56	
24	05:58 20:42	06:30 20:03	07:02 16:41-18:08/87 19:09	07:36 08:27-09:30/63 18:20 16:06-17:10/64	07:14 10:45-11:50/65 16:46 15:11-16:07/56	07:41 10:45-12:15/90 15:44-15:58/14 16:46 13:24-14:20/56	
25	05:59 20:42	06:31 20:01	07:03 16:41-18:07/86 19:08	07:37 07:26-08:30/64 17:18 15:05-16:10/65	07:15 10:43-11:51/68 16:45 15:12-16:06/54	07:41 10:47-12:16/89 15:45-15:59/14 16:46 13:26-14:21/55	
26	06:00 20:41	06:32 19:59	07:04 16:40-18:07/87 19:06	07:39 07:26-08:29/63 17:17 15:04-16:10/66	07:17 10:44-11:53/69 16:45 15:14-16:06/52	07:41 10:47-12:16/89 15:44-16:00/16 16:47 13:26-14:21/55	
27	06:01 20:40	06:33 17:30-17:46/16 19:58	07:05 16:40-18:06/86 19:04	07:40 07:26-08:29/63 17:15 15:03-16:10/67	07:18 10:43-11:55/72 16:44 15:15-16:06/51	07:42 10:47-12:16/89 15:44-16:01/17 16:47 13:26-14:21/55	
28	06:01 20:39	06:34 17:25-17:51/26 19:56	07:07 16:39-18:06/87 19:02	07:41 07:27-08:29/62 17:14 15:03-16:11/68	07:19 10:42-11:56/74 15:16-16:05/49 16:44 13:35-13:51/16	07:42 10:48-12:17/89 15:44-16:03/19 16:48 13:28-14:22/54	
29	06:02 20:38	06:35 17:21-17:54/33 19:54	07:08 16:39-18:05/86 19:01	07:42 07:27-08:28/61 17:13 15:02-16:11/69	07:20 10:41-11:57/76 15:17-16:04/47 16:44 13:32-13:54/22	07:42 10:49-12:17/88 15:44-16:04/20 16:49 13:28-14:22/54	
30	06:03 20:37	06:36 17:18-17:56/38 19:53	07:09 16:39-18:04/85 18:59	07:43 07:27-08:28/61 17:11 15:01-16:11/70	07:21 10:41-11:58/77 15:18-16:04/46 16:43 13:29-13:57/28	07:43 10:49-12:17/88 15:43-16:05/22 16:50 13:29-14:22/53	
31	06:04 20:35	06:37 17:15-17:58/43 19:51	 	06:45 07:28-08:28/60 17:10 15:02-16:12/70	 	07:43 10:50-12:18/88 15:43-16:07/24 16:50 13:30-14:22/52	
	Potential sun hours Sum of minutes with flicker	463 0	430 156	376 2272	344 4053	295 3508	284 4992

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 3 - VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 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	07:43 13:21-14:08/47 16:51	07:28 16:27-16:38/11 17:27	06:51 15:58-17:07/69 18:03	06:58 19:39	06:11 20:12	05:40 19:34-20:14/40 20:43
2	07:43 13:23-14:07/44 16:52	07:27 16:22-16:43/21 17:28	06:49 15:58-17:06/68 18:04	06:56 19:40	06:09 20:13	05:40 19:35-20:15/40 20:44
3	07:43 13:24-14:07/43 16:53	07:26 16:19-16:47/28 17:30	06:48 15:59-17:06/67 18:05	06:55 19:41	06:08 20:14	05:39 19:34-20:15/41 20:45
4	07:43 13:25-14:07/42 16:54	07:25 16:17-16:50/33 17:31	06:46 15:59-17:05/66 18:06	06:53 19:42	06:07 20:16	05:39 19:34-20:16/42 20:45
5	07:43 13:27-14:07/40 16:55	07:24 16:14-16:51/37 17:32	06:44 16:00-17:05/65 18:07	06:51 19:43	06:05 20:17	05:39 19:34-20:16/42 20:46
6	07:43 13:28-14:06/38 16:56	07:23 16:12-16:53/41 17:33	06:43 16:00-17:04/64 18:09	06:50 19:44	06:04 20:18	05:38 19:34-20:16/42 20:47
7	07:43 13:30-14:06/36 16:57	07:22 16:11-16:55/44 17:35	06:41 16:00-17:03/63 18:10	06:48 19:45	06:03 20:19	05:38 19:34-20:17/43 20:47
8	07:43 13:31-14:04/33 16:58	07:21 16:10-16:57/47 17:36	06:39 16:01-17:03/62 18:11	06:46 19:46	06:01 20:20	05:38 19:34-20:17/43 20:48
9	07:43 13:34-14:03/29 16:59	07:19 16:08-16:58/50 17:37	06:38 16:02-17:02/60 18:12	06:45 19:48	06:00 20:21	05:37 19:34-20:18/44 20:49
10	07:42 13:37-14:02/25 17:00	07:18 16:07-16:59/52 17:39	06:36 16:02-17:00/58 18:13	06:43 19:49	05:59 20:22	05:37 19:34-20:18/44 20:49
11	07:42 13:39-13:59/20 17:01	07:17 16:06-17:01/55 17:40	06:34 16:03-16:59/56 18:15	06:41 19:50	05:58 20:23	05:37 19:35-20:19/44 20:50
12	07:42 13:44-13:56/12 17:02	07:16 16:05-17:02/57 17:41	06:33 16:05-16:58/53 18:16	06:40 19:51	05:57 20:24	05:37 19:34-20:18/44 20:50
13	07:42 17:03	07:14 16:04-17:03/59 17:43	06:31 16:06-16:56/50 18:17	06:38 19:52	05:56 20:25	05:37 19:34-20:18/44 20:51
14	07:41 17:05	07:13 16:03-17:04/61 17:44	06:29 16:07-16:54/47 18:18	06:36 19:53	05:55 20:26	05:37 19:34-20:19/45 20:51
15	07:41 17:06	07:12 16:02-17:04/62 17:45	06:28 16:09-16:53/44 18:19	06:35 19:54	05:54 20:27	05:37 19:34-20:19/45 20:52
16	07:40 17:07	07:10 16:02-17:05/63 17:46	06:26 16:11-16:51/40 18:20	06:33 19:55	05:53 20:28	05:37 19:34-20:19/45 20:52
17	07:40 17:08	07:09 16:01-17:06/65 17:48	06:24 16:13-16:48/35 18:22	06:31 19:57	05:52 20:29	05:37 19:34-20:19/45 20:53
18	07:39 17:09	07:07 16:00-17:06/66 17:49	06:22 16:15-16:45/30 18:23	06:30 19:58	05:51 19:52-19:53/1 20:30	05:37 19:36-20:21/45 20:53
19	07:39 17:10	07:06 16:00-17:07/67 17:50	06:21 16:19-16:42/23 18:24	06:28 19:59	05:50 19:47-20:00/13 20:31	05:37 19:36-20:21/45 20:53
20	07:38 17:12	07:05 15:59-17:07/68 17:51	06:19 16:25-16:36/11 18:25	06:27 20:00	05:49 19:44-20:02/18 20:32	05:37 19:36-20:21/45 20:53
21	07:37 17:13	07:03 15:59-17:08/69 17:53	06:17 18:26	06:25 20:01	05:48 19:42-20:04/22 20:33	05:37 19:36-20:21/45 20:54
22	07:37 17:14	07:02 15:59-17:07/68 17:54	06:15 18:27	06:24 20:02	05:47 19:41-20:05/24 20:34	05:37 19:36-20:21/45 20:54
23	07:36 17:15	07:00 15:59-17:08/69 17:55	06:14 18:28	06:22 20:03	05:46 19:39-20:07/28 20:35	05:37 19:37-20:22/45 20:54
24	07:35 17:17	06:59 15:58-17:08/70 17:56	06:12 18:30	06:21 20:04	05:45 19:39-20:08/29 20:36	05:38 19:37-20:22/45 20:54
25	07:35 17:18	06:57 15:59-17:08/69 17:58	06:10 18:31	06:19 20:05	05:45 19:38-20:09/31 20:37	05:38 19:37-20:21/44 20:54
26	07:34 17:19	06:55 15:58-17:08/70 17:59	06:08 18:32	06:18 20:07	05:44 19:37-20:10/33 20:38	05:38 19:37-20:22/45 20:54
27	07:33 17:20	06:54 15:58-17:07/69 18:00	06:07 18:33	06:16 20:08	05:43 19:37-20:11/34 20:39	05:39 19:37-20:22/45 20:54
28	07:32 17:22	06:52 15:58-17:08/70 18:01	06:05 18:34	06:15 20:09	05:43 19:36-20:11/35 20:40	05:39 19:37-20:22/45 20:54
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 19:36-20:13/37 20:41	05:40 19:38-20:23/45 20:54
30	07:30 17:24		07:02 19:36	06:12 20:11	05:41 19:35-20:13/38 20:41	05:40 19:38-20:22/44 20:54
31	07:29 17:26		07:00 19:37		05:41 19:35-20:14/39 20:42	
Potential sun hours	294	295	369	400	452	456
Sum of minutes with flicker	409	1541	1031	0	382	1316

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 3 - VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 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	05:40 19:39-20:23/44 20:54	06:05 20:34 19:49	06:38 19:49	07:10 16:44-17:36/52 18:57	06:46 15:37-16:29/52 17:09	07:22 13:22-13:41/19 16:43
2	05:41 19:39-20:22/43 20:54	06:06 20:33 19:48	06:39 19:48	07:11 16:42-17:37/55 18:55	06:47 15:38-16:27/49 17:07	07:23 13:19-13:44/25 16:42
3	05:41 19:39-20:23/44 20:54	06:07 20:32 19:46	06:40 19:46	07:12 16:41-17:38/57 18:54	06:48 15:40-16:27/47 17:06	07:24 13:18-13:47/29 16:42
4	05:42 19:39-20:22/43 20:54	06:09 20:31 19:44	06:41 19:44	07:13 16:40-17:39/59 18:52	06:50 15:41-16:25/44 17:05	07:25 13:17-13:49/32 16:42
5	05:43 19:40-20:23/43 20:54	06:10 20:30 19:43	06:42 19:43	07:14 16:39-17:39/60 18:50	06:51 15:42-16:23/41 17:04	07:26 13:16-13:51/35 16:42
6	05:43 19:40-20:22/42 20:53	06:11 20:28 19:41	06:43 19:41	07:15 16:37-17:40/63 18:48	06:52 15:45-16:22/37 17:02	07:27 13:15-13:52/37 16:42
7	05:44 19:40-20:23/43 20:53	06:12 20:27 19:39	06:44 19:39	07:16 16:36-17:40/64 18:47	06:53 15:47-16:19/32 17:01	07:28 13:14-13:54/40 16:41
8	05:45 19:41-20:23/42 20:53	06:13 20:26 19:37	06:45 19:37	07:17 16:35-17:40/65 18:45	06:55 15:49-16:16/27 17:00	07:29 13:13-13:55/42 16:41
9	05:45 19:41-20:22/41 20:52	06:14 20:24 19:36	06:46 19:36	07:19 16:34-17:40/66 18:43	06:56 15:53-16:14/21 16:59	07:30 13:13-13:56/43 16:41
10	05:46 19:42-20:22/40 20:52	06:15 20:23 19:34	06:47 19:34	07:20 16:33-17:40/67 18:42	06:57 15:58-16:08/10 16:58	07:31 13:12-13:56/44 16:41
11	05:47 19:42-20:22/40 20:51	06:16 20:22 19:32	06:48 19:32	07:21 16:33-17:41/68 18:40	06:58 16:57 16:57	07:32 13:12-13:58/46 16:41
12	05:47 19:43-20:22/39 20:51	06:17 20:20 19:30	06:50 19:30	07:22 16:32-17:41/69 18:38	07:00 16:56 16:56	07:33 13:11-13:59/48 16:41
13	05:48 19:43-20:21/38 20:50	06:18 20:19 19:29	06:51 19:29	07:23 16:31-17:40/69 18:37	07:01 16:55 16:55	07:34 13:12-14:00/48 16:42 10:19-10:28/9
14	05:49 19:44-20:21/37 20:50	06:19 20:18 19:27	06:52 19:27	07:24 16:31-17:40/69 18:35	07:02 16:54 16:54	07:34 13:12-14:01/49 16:42 10:17-10:31/14
15	05:50 19:45-20:21/36 20:49	06:20 20:16 19:25	06:53 19:25	07:25 16:30-17:40/70 18:34	07:03 16:53 16:53	07:35 13:11-14:01/50 16:42 10:16-10:32/16
16	05:51 19:46-20:21/35 20:49	06:21 20:15 19:23	06:54 19:23	07:27 16:29-17:39/70 18:32	07:04 16:52 16:52	07:36 13:12-14:02/50 16:42 10:16-10:34/18
17	05:51 19:46-20:19/33 20:48	06:22 20:13 19:22	06:55 19:22	07:28 16:30-17:40/70 18:30	07:06 16:51 16:51	07:37 13:12-14:03/51 16:43 10:16-10:35/19
18	05:52 19:47-20:19/32 20:47	06:23 20:12 19:20	06:56 19:20	07:29 16:30-17:39/69 18:29	07:07 16:50 16:50	07:37 13:12-14:03/51 16:43 10:15-10:36/21
19	05:53 19:48-20:18/30 20:46	06:24 20:10 19:18	06:57 19:18	07:30 16:29-17:39/70 18:27	07:08 16:50 16:50	07:38 13:12-14:04/52 16:43 10:16-10:37/21
20	05:54 19:49-20:18/29 20:46	06:25 20:09 19:16	06:58 19:16	07:31 16:29-17:38/69 18:26	07:09 16:49 16:49	07:38 13:13-14:05/52 16:44 10:16-10:38/22
21	05:55 19:50-20:17/27 20:45	06:26 20:07 19:15	06:59 19:15	07:32 16:30-17:38/68 18:24	07:11 16:48 16:48	07:39 13:13-14:05/52 16:44 10:16-10:38/22
22	05:56 19:52-20:15/23 20:44	06:27 20:06 19:13	07:00 19:13	07:34 16:30-17:37/67 18:23	07:12 16:47 16:47	07:39 13:13-14:05/52 16:45 10:17-10:39/22
23	05:57 19:54-20:14/20 20:43	06:28 20:04 19:11	07:01 17:13-17:16/3 19:11	07:35 16:30-17:36/66 18:21	07:13 16:47 16:47	07:40 13:14-14:06/52 16:45 10:17-10:39/22
24	05:58 19:56-20:12/16 20:42	06:30 20:02 19:09	07:02 17:04-17:24/20 19:09	07:36 16:30-17:36/66 18:20	07:14 16:46 16:46	07:40 13:14-14:06/52 16:46 10:18-10:39/21
25	05:59 19:58-20:08/10 20:41	06:31 20:01 19:08	07:03 17:00-17:27/27 19:08	06:37 15:31-16:36/65 17:18	07:15 16:45 16:45	07:41 13:16-14:07/51 16:46 10:19-10:40/21
26	06:00 20:40 20:40	06:32 19:59 19:06	07:04 16:56-17:30/34 19:06	06:38 15:31-16:35/64 17:17	07:17 16:45 16:45	07:41 13:16-14:07/51 16:47 10:20-10:40/20
27	06:00 20:40 20:40	06:33 19:58 19:04	07:05 16:53-17:32/39 19:04	06:40 15:32-16:33/61 17:15	07:18 16:44 16:44	07:42 13:16-14:07/51 16:47 10:20-10:39/19
28	06:01 20:39 20:39	06:34 19:56 19:02	07:06 16:51-17:33/42 19:02	06:41 15:33-16:33/60 17:14	07:19 16:44 16:44	07:42 13:17-14:07/50 16:48 10:22-10:39/17
29	06:02 20:37 20:37	06:35 19:54 19:01	07:08 16:48-17:34/46 19:01	06:42 15:34-16:32/58 17:13	07:20 16:44 16:44	07:42 13:19-14:08/49 16:49 10:24-10:38/14
30	06:03 20:36 20:36	06:36 19:53 19:53	07:09 16:46-17:35/49 18:59	06:43 15:34-16:31/57 17:11	07:21 13:25-13:37/12 16:43	07:42 13:19-14:08/49 16:50 10:26-10:37/11
31	06:04 20:35 20:35	06:37 19:51 19:51		06:45 15:36-16:30/54 17:10		07:43 13:20-14:08/48 16:50 10:29-10:35/6
Potential sun hours	463	430	376	344	295	284
Sum of minutes with flicker	870	0	260	1987	372	1735

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 4 - VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 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	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:39	07:59-08:25/26 16:59-18:34/95	06:11 20:12
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	08:01-08:22/21 16:59-18:34/95	06:09 20:13
3	07:43 16:53	07:26 17:30	06:48 18:05	06:55 19:41	08:05-08:18/13 16:58-18:33/95	06:08 20:14
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	16:59-18:34/95	06:07 20:15
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	16:58-18:33/95	06:05 20:17
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44	16:58-18:33/95	06:04 20:18
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	07:12-07:27/15 16:32-17:13/41	06:03 20:19
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	07:09-07:31/22 16:28-17:16/48	06:01 20:20
9	07:43 16:59	07:19 17:37	06:38 18:12	06:45 19:48	07:06-07:33/27 16:26-17:19/53	06:00 20:21
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	07:04-07:34/30 16:23-17:20/57	05:59 20:22
11	07:42 17:01	07:17 17:40	06:34 18:15	06:41 19:50	07:02-07:35/33 16:20-17:22/62	05:58 20:23
12	07:42 17:02	07:16 17:41	06:33 18:16	06:40 19:51	07:01-07:37/36 16:19-17:24/65	05:57 20:24
13	07:41 17:03	07:14 17:43	06:31 18:17	06:38 19:52	06:59-07:37/38 16:17-17:25/68	05:56 20:25
14	07:41 17:05	07:13 17:44	06:29 18:18	06:36 19:53	06:58-07:38/40 16:15-17:26/71	05:55 20:26
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 19:54	06:58-07:39/41 16:13-17:27/74	05:54 20:27
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	06:56-07:39/43 16:12-17:29/77	05:53 20:28
17	07:40 17:08	07:09 17:48	06:24 18:22	06:31 19:57	06:55-07:39/44 16:10-17:30/80	05:52 20:29
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	06:55-07:38/43 16:09-17:30/81	05:51 20:30
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	06:55-07:39/44 16:08-17:32/84	05:50 20:31
20	07:38 17:12	07:05 17:51	06:19 18:25	06:27 20:00	06:54-07:38/44 16:07-17:32/85	05:49 20:32
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	06:53-07:38/45 16:06-17:32/86	05:48 20:33
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	06:53-07:37/44 16:04-17:33/89	05:47 20:34
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	06:54-07:37/43 16:04-17:34/90	05:46 20:35
24	07:35 17:17	06:59 17:56	06:12 18:30	06:21 20:04	06:53-07:36/43 16:03-17:34/91	05:45 20:36
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	06:53-07:35/42 16:02-17:34/92	05:45 20:37
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	06:53-07:34/41 16:01-17:34/93	05:44 20:38
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	06:55-07:34/39 16:01-17:35/94	05:43 20:39
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	06:55-07:32/37 16:01-17:35/94	05:43 20:40
29	07:31 17:23		07:03 19:35	06:13 20:10	07:55-08:30/35 17:00-18:34/94	05:42 20:41
30	07:30 17:24		07:02 19:36	06:12 20:11	07:56-08:28/32 16:59-18:34/95	05:41 20:41
31	07:29 17:26		07:00 19:37		07:58-08:27/29 17:00-18:35/95	05:41 20:42
Potential sun hours	294	295	369	400	452	456
Sum of minutes with flicker	0	0	2946	2999	2588	2161

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 4 - VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 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	05:40 06:56-08:08/72 20:54	06:05 07:00-08:13/73 20:34	06:38 16:58-18:30/92 19:49	07:10 07:39-08:16/37 18:57 16:57-18:04/67	06:46 17:09	07:22 16:43
2	05:41 06:56-08:08/72 20:54	06:06 07:00-08:13/73 20:33	06:39 16:57-18:29/92 19:48	07:11 07:40-08:14/34 18:55 16:58-18:01/63	06:47 17:07	07:23 16:42
3	05:41 06:57-08:09/72 20:54	06:07 07:00-08:12/72 20:32	06:40 16:57-18:29/92 19:46	07:12 07:41-08:12/31 18:54 17:00-17:59/59	06:48 17:06	07:24 16:42
4	05:42 06:56-08:09/73 20:54	06:08 07:01-08:12/71 20:31 17:45-18:03/18	06:41 16:56-18:29/93 19:44	07:13 07:43-08:11/28 18:52 17:03-17:57/54	06:49 17:05	07:25 16:42
5	05:43 06:57-08:09/72 20:54	06:10 07:01-08:11/70 20:29 17:41-18:07/26	06:42 16:55-18:29/94 19:43	07:14 07:45-08:09/24 18:50 17:05-17:55/50	06:51 17:04	07:26 16:42
6	05:43 06:56-08:09/73 20:53	06:11 07:02-08:11/69 20:28 17:38-18:10/32	06:43 16:54-18:29/95 19:41	07:15 07:47-08:05/18 18:48 17:07-17:51/44	06:52 17:02	07:27 16:42
7	05:44 06:57-08:10/73 20:53	06:12 07:02-08:10/68 20:27 17:35-18:12/37	06:44 16:54-18:28/94 19:39	07:16 07:52-08:00/8 18:47 17:10-17:47/37	06:53 17:01	07:28 16:41
8	05:45 06:57-08:11/74 20:53	06:13 07:03-08:10/67 20:26 17:33-18:14/41	06:45 16:53-18:28/95 19:37	07:17 17:14-17:43/29 18:45	06:54 17:00	07:29 16:41
9	05:45 06:56-08:10/74 20:52	06:14 07:03-08:09/66 20:24 17:31-18:15/44	06:46 07:59-08:11/12 19:36 16:52-18:27/95	07:19 17:20-17:36/16 18:43	06:56 16:59	07:30 16:41
10	05:46 06:57-08:11/74 20:52	06:15 07:04-08:08/64 20:23 17:29-18:17/48	06:47 07:54-08:14/20 19:34 16:52-18:27/95	07:20 18:42	06:57 16:58	07:31 16:41
11	05:47 06:57-08:11/74 20:51	06:16 07:05-08:07/62 20:22 17:27-18:18/51	06:48 07:52-08:17/25 19:32 16:51-18:27/96	07:21 18:40	06:58 16:57	07:32 16:41
12	05:47 06:57-08:12/75 20:51	06:17 07:05-08:06/61 20:20 17:25-18:20/55	06:49 07:49-08:18/29 19:30 16:51-18:26/95	07:22 18:38	06:59 16:56	07:33 16:41
13	05:48 06:57-08:12/75 20:50	06:18 07:06-08:05/59 20:19 17:23-18:21/58	06:51 07:47-08:19/32 19:29 16:50-18:25/95	07:23 18:37	07:01 16:55	07:34 16:42
14	05:49 06:57-08:12/75 20:50	06:19 07:07-08:04/57 20:18 17:22-18:22/60	06:52 07:46-08:20/34 19:27 16:50-18:25/95	07:24 18:35	07:02 16:54	07:34 16:42
15	05:50 06:57-08:13/76 20:49	06:20 07:08-08:02/54 20:16 17:20-18:23/63	06:53 07:44-08:21/37 19:25 16:50-18:24/94	07:25 18:33	07:03 16:53	07:35 16:42
16	05:51 06:58-08:13/75 20:49	06:21 07:10-08:01/51 20:15 17:18-18:24/66	06:54 07:43-08:22/39 19:23 16:50-18:23/93	07:27 18:32	07:04 16:52	07:36 16:42
17	05:51 06:57-08:12/75 20:48	06:22 07:11-07:59/48 20:13 17:17-18:24/67	06:55 07:42-08:22/40 19:22 16:49-18:22/93	07:28 18:30	07:06 16:51	07:36 16:43
18	05:52 06:57-08:13/76 20:47	06:23 07:12-07:57/45 20:12 17:15-18:25/70	06:56 07:41-08:22/41 19:20 16:49-18:21/92	07:29 18:29	07:07 16:50	07:37 16:43
19	05:53 06:57-08:13/76 20:46	06:24 07:14-07:55/41 20:10 17:14-18:26/72	06:57 07:40-08:23/43 19:18 16:49-18:20/91	07:30 18:27	07:08 16:50	07:38 16:43
20	05:54 06:58-08:13/75 20:46	06:25 07:16-07:52/36 20:09 17:12-18:27/75	06:58 07:40-08:24/44 19:16 16:49-18:19/90	07:31 18:26	07:09 16:49	07:38 16:44
21	05:55 06:58-08:14/76 20:45	06:26 07:19-07:49/30 20:07 17:11-18:27/76	06:59 07:39-08:23/44 19:15 16:51-18:19/88	07:32 18:24	07:11 16:48	07:39 16:44
22	05:56 06:58-08:14/76 20:44	06:27 07:23-07:44/21 20:06 17:10-18:28/78	07:00 07:39-08:23/44 19:13 16:51-18:18/87	07:34 18:23	07:12 16:47	07:39 16:45
23	05:57 06:58-08:14/76 20:43	06:28 07:30-07:37/7 20:04 17:08-18:28/80	07:01 07:38-08:23/45 19:11 16:51-18:17/86	07:35 18:21	07:13 16:47	07:40 16:45
24	05:58 06:59-08:14/75 20:42	06:29 17:07-18:28/81 20:02	07:02 07:38-08:22/44 19:09 16:51-18:16/85	07:36 18:20	07:14 16:46	07:40 16:46
25	05:59 06:58-08:13/75 20:41	06:31 17:06-18:29/83 20:01	07:03 07:38-08:22/44 19:08 16:52-18:14/82	06:37 17:18	07:15 16:45	07:41 16:46
26	06:00 06:58-08:14/76 20:40	06:32 17:05-18:29/84 19:59	07:04 07:38-08:21/43 19:06 16:52-18:13/81	06:38 17:17	07:16 16:45	07:41 16:47
27	06:00 06:58-08:14/76 20:39	06:33 17:04-18:29/85 19:58	07:05 07:38-08:20/42 19:04 16:53-18:11/78	06:40 17:15	07:18 16:44	07:42 16:47
28	06:01 06:58-08:14/76 20:38	06:34 17:02-18:29/87 19:56	07:06 07:38-08:20/42 19:02 16:54-18:09/75	06:41 17:14	07:19 16:44	07:42 16:48
29	06:02 06:59-08:13/74 20:37	06:35 17:01-18:29/88 19:54	07:08 07:38-08:18/40 19:01 16:55-18:08/73	06:42 17:13	07:20 16:44	07:42 16:49
30	06:03 06:59-08:13/74 20:36	06:36 17:00-18:30/90 19:53	07:09 07:38-08:17/39 18:59 16:56-18:06/70	06:43 17:11	07:21 16:43	07:42 16:50
31	06:04 06:59-08:13/74 20:35	06:37 16:59-18:30/91 19:51		06:45 17:10		07:43 16:50
Potential sun hours	463	430	376	344	295	284
Sum of minutes with flicker	2309	3071	3499	599	0	0

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 5 - VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 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
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:39	06:10 20:12	05:40 06:28-06:58/30 20:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 06:27-07:00/33 20:44
3	07:43 16:53	07:26 17:29	06:48 18:05	06:55 19:41	06:08 20:14	05:39 06:26-07:01/35 20:45
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 06:25-07:02/37 20:45
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 06:25-07:04/39 20:46
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44	06:04 20:18	05:38 06:24-07:04/40 20:47
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 06:23-07:05/42 20:47
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 07:05-07:17/12 19:46	06:01 20:20	05:37 06:23-07:06/43 20:48
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 07:03-07:19/16 19:48	06:00 20:21	05:37 06:23-07:07/44 20:49
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 07:02-07:21/19 19:49	05:59 20:22	05:37 06:23-07:08/45 20:49
11	07:42 17:01	07:17 17:40	06:34 18:15	06:41 07:00-07:21/21 19:50	05:58 20:23	05:37 06:22-07:08/46 20:50
12	07:42 17:02	07:16 17:41	06:33 18:16	06:39 06:58-07:21/23 19:51	05:57 20:24	05:37 06:22-07:08/46 20:50
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 06:57-07:22/25 19:52	05:56 20:25	05:37 06:22-07:09/47 20:51
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 06:56-07:22/26 19:53	05:55 20:26	05:37 06:21-07:09/48 20:51
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 06:56-07:22/26 19:54	05:54 20:27	05:36 06:21-07:10/49 20:52
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 06:56-07:22/26 19:55	05:52 20:28	05:36 06:21-07:10/49 20:52
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 06:55-07:21/26 19:56	05:51 20:29	05:37 06:21-07:11/50 20:52
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 06:56-07:21/25 19:58	05:51 20:30	05:37 06:22-07:12/50 20:53
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 06:55-07:20/25 19:59	05:50 20:31	05:37 06:22-07:12/50 20:53
20	07:38 17:12	07:04 17:51	06:19 18:25	06:27 06:56-07:19/23 20:00	05:49 20:32	05:37 06:22-07:12/50 20:53
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 06:56-07:18/22 20:01	05:48 20:33	05:37 06:22-07:12/50 20:54
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 06:58-07:17/19 20:02	05:47 20:34	05:37 06:22-07:12/50 20:54
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 06:59-07:15/16 20:03	05:46 20:35	05:37 06:23-07:13/50 20:54
24	07:35 17:17	06:59 17:56	06:12 18:29	06:21 07:01-07:13/12 20:04	05:45 20:36	05:38 06:23-07:13/50 20:54
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 07:04-07:08/4 20:05	05:45 20:37	05:38 06:23-07:13/50 20:54
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	05:38 06:23-07:12/49 20:54
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 06:24-07:13/49 20:54
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 06:36-06:49/13 20:40	05:39 06:24-07:13/49 20:54
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 06:34-06:53/19 20:41	05:39 06:25-07:13/48 20:54
30	07:30 17:24		07:01 19:36	06:12 20:11	05:41 06:31-06:55/24 20:41	05:40 06:26-07:13/47 20:54
31	07:29 17:26		07:00 19:37		05:41 06:30-06:57/27 20:42	
Potential sun hours	294	295	369	400	452	457
Sum of minutes with flicker	0	0	0	366	83	1365

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: WON018\_ShadowFlickering WTG: 5 - VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 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

	July	August	September	October	November	December
1	05:40 06:27-07:13/46 20:54	06:05 20:34	06:38 06:59-07:20/21 19:49	07:10 18:57	06:46 17:08	07:22 16:43
2	05:41 06:27-07:12/45 20:54	06:06 20:33	06:39 07:00-07:19/19 19:48	07:11 18:55	06:47 17:07	07:23 16:42
3	05:41 06:28-07:12/44 20:54	06:07 20:32	06:40 07:01-07:17/16 19:46	07:12 18:54	06:48 17:06	07:24 16:42
4	05:42 06:28-07:12/44 20:54	06:08 20:31	06:41 07:02-07:14/12 19:44	07:13 18:52	06:49 17:05	07:25 16:42
5	05:43 06:29-07:12/43 20:54	06:09 20:29	06:42 07:07-07:09/2 19:43	07:14 18:50	06:51 17:03	07:26 16:42
6	05:43 06:29-07:10/41 20:53	06:10 20:28	06:43 19:41	07:15 18:48	06:52 17:02	07:27 16:41
7	05:44 06:31-07:10/39 20:53	06:12 20:27	06:44 19:39	07:16 18:47	06:53 17:01	07:28 16:41
8	05:44 06:32-07:10/38 20:53	06:13 20:26	06:45 19:37	07:17 18:45	06:54 17:00	07:29 16:41
9	05:45 06:33-07:09/36 20:52	06:14 20:24	06:46 19:36	07:19 18:43	06:56 16:59	07:30 16:41
10	05:46 06:34-07:08/34 20:52	06:15 20:23	06:47 19:34	07:20 18:42	06:57 16:58	07:31 16:41
11	05:47 06:36-07:07/31 20:51	06:16 20:22	06:48 19:32	07:21 18:40	06:58 16:57	07:32 16:41
12	05:47 06:38-07:06/28 20:51	06:17 20:20	06:49 19:30	07:22 18:38	06:59 16:56	07:33 16:41
13	05:48 06:39-07:04/25 20:50	06:18 20:19	06:50 19:29	07:23 18:37	07:01 16:55	07:33 16:42
14	05:49 06:41-07:02/21 20:50	06:19 20:18	06:52 19:27	07:24 18:35	07:02 16:54	07:34 16:42
15	05:50 06:44-07:00/16 20:49	06:20 20:16	06:53 19:25	07:25 18:33	07:03 16:53	07:35 16:42
16	05:50 06:49-06:55/6 20:49	06:21 20:15	06:54 19:23	07:27 18:32	07:04 16:52	07:36 16:42
17	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	07:06 16:51	07:36 16:42
18	05:52 20:47	06:23 07:09-07:16/7 20:12	06:56 19:20	07:29 18:29	07:07 16:50	07:37 16:43
19	05:53 20:46	06:24 07:06-07:19/13 20:10	06:57 19:18	07:30 18:27	07:08 16:49	07:38 16:43
20	05:54 20:46	06:25 07:04-07:21/17 20:09	06:58 19:16	07:31 18:26	07:09 16:49	07:38 16:44
21	05:55 20:45	06:26 07:02-07:22/20 20:07	06:59 19:15	07:32 18:24	07:11 16:48	07:39 16:44
22	05:56 20:44	06:27 07:01-07:23/22 20:06	07:00 19:13	07:34 18:23	07:12 16:47	07:39 16:44
23	05:57 20:43	06:28 07:00-07:23/23 20:04	07:01 19:11	07:35 18:21	07:13 16:47	07:40 16:45
24	05:58 20:42	06:29 06:59-07:24/25 20:02	07:02 19:09	07:36 18:20	07:14 16:46	07:40 16:46
25	05:58 20:41	06:30 06:59-07:24/25 20:01	07:03 19:07	06:37 17:18	07:15 16:45	07:41 16:46
26	05:59 20:40	06:32 06:58-07:24/26 19:59	07:04 19:06	06:38 17:17	07:16 16:45	07:41 16:47
27	06:00 20:39	06:33 06:58-07:24/26 19:58	07:05 19:04	06:40 17:15	07:18 16:44	07:42 16:47
28	06:01 20:38	06:34 06:57-07:23/26 19:56	07:06 19:02	06:41 17:14	07:19 16:44	07:42 16:48
29	06:02 20:37	06:35 06:57-07:23/26 19:54	07:08 19:00	06:42 17:12	07:20 16:43	07:42 16:49
30	06:03 20:36	06:36 06:57-07:22/25 19:53	07:09 18:59	06:43 17:11	07:21 16:43	07:42 16:50
31	06:04 20:35	06:37 06:58-07:21/23 19:51		06:45 17:10		07:43 16:50
Potential sun hours	463	430	376	344	295	284
Sum of minutes with flicker	537	304	70	0	0	0

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 6 - VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 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	July	August	September	October	November	December	
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:39	06:10 20:12	05:40 20:43	19:44-20:17/33 20:54	05:40 20:34	19:48-20:28/40 20:34	06:05 19:49	06:38 18:57	07:10 17:08	06:46 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	19:44-20:18/34 20:54	05:41 20:33	19:48-20:28/40 20:33	06:06 19:48	06:39 18:55	07:11 17:07	06:47 16:42
3	07:43 16:53	07:26 17:29	06:48 18:05	06:55 19:41	06:08 20:14	05:39 20:45	19:43-20:18/35 20:54	05:41 20:32	19:48-20:28/40 20:32	06:07 19:46	06:40 18:54	07:12 17:06	06:48 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:16	05:39 20:45	19:44-20:19/35 20:54	05:42 20:31	19:48-20:27/39 20:31	06:08 19:44	06:41 18:52	07:13 17:05	06:50 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 20:46	19:44-20:19/35 20:54	05:43 20:30	19:49-20:27/38 20:30	06:09 19:43	06:42 18:50	07:14 17:03	06:51 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:50 19:44	06:04 20:18	05:38 20:47	19:43-20:19/36 20:53	05:43 20:28	19:49-20:26/37 20:28	06:10 19:41	06:43 18:48	07:15 17:02	06:52 16:41
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	19:43-20:20/37 20:53	05:44 20:27	19:50-20:26/36 19:39	06:12 19:39	06:44 18:47	07:16 17:01	06:53 16:41
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:37 20:48	19:43-20:21/38 20:53	05:44 20:26	19:51-20:26/35 20:26	06:13 19:37	06:45 18:45	07:17 17:00	06:55 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 19:48	06:00 20:21	05:37 20:49	19:43-20:22/39 20:52	05:45 20:24	19:50-20:25/35 20:24	06:14 19:36	06:46 18:43	07:19 16:59	06:56 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	19:44-20:23/39 20:52	05:46 20:23	19:51-20:25/34 20:23	06:15 19:34	06:47 18:42	07:20 16:58	06:57 16:41
11	07:42 17:01	07:17 17:40	06:34 18:15	06:41 19:50	05:58 20:23	05:37 20:50	19:43-20:23/40 20:51	05:47 20:22	19:52-20:25/33 20:22	06:16 19:32	06:48 18:40	07:21 16:57	06:58 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:39 19:51	05:57 20:24	05:37 20:50	19:43-20:24/41 20:51	05:47 20:20	19:52-20:24/32 20:20	06:17 19:30	06:49 18:38	07:22 16:56	06:59 16:41
13	07:42 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	19:43-20:24/41 20:50	05:48 20:19	19:53-20:24/31 20:19	06:18 19:29	06:51 18:37	07:23 16:55	07:01 16:42
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:37 20:51	19:43-20:25/42 20:50	05:49 20:18	19:54-20:24/30 20:18	06:19 19:27	06:52 18:35	07:24 16:54	07:02 16:42
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 19:54	05:54 20:27	05:36 20:52	19:43-20:25/42 20:49	05:50 20:16	19:55-20:23/28 20:16	06:20 19:25	06:53 18:33	07:25 16:53	07:03 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	05:36 20:52	19:43-20:26/43 20:49	05:50 20:15	19:56-20:23/27 20:15	06:21 19:23	06:54 18:32	07:27 16:52	07:04 16:42
17	07:40 17:08	07:09 17:48	06:24 18:22	06:31 19:57	05:51 20:29	05:37 20:53	19:43-20:26/43 20:48	05:51 20:13	19:57-20:21/24 20:13	06:22 19:22	06:55 18:30	07:28 16:51	07:06 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	05:51 20:30	05:37 20:53	19:44-20:26/42 20:47	05:52 20:12	19:58-20:20/22 20:12	06:23 19:20	06:56 18:29	07:29 16:50	07:07 16:43
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31	05:37 20:53	19:45-20:27/42 20:46	05:53 20:10	20:00-20:19/19 20:10	06:24 19:18	06:57 18:27	07:30 16:49	07:08 16:43
20	07:38 17:12	07:05 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	19:45-20:27/42 20:46	05:54 20:09	20:02-20:18/16 19:16	06:25 19:16	06:58 18:26	07:31 16:49	07:09 16:42
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	19:45-20:28/43 20:45	05:55 20:07	20:04-20:15/11 20:07	06:26 19:15	06:59 18:24	07:32 16:48	07:11 16:44
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	19:45-20:28/43 20:44	05:56 20:06	07:00-20:07/07 19:13	06:27 19:13	07:00 18:23	07:34 16:47	07:12 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	19:45-20:27/42 20:43	05:57 20:04	07:01-20:06/14 20:04	06:28 19:11	07:01 18:21	07:35 16:47	07:13 16:45
24	07:35 17:17	06:59 17:56	06:12 18:29	06:21 20:04	05:45 20:36	05:38 20:54	19:46-20:28/42 20:42	05:58 20:02	07:02-20:05/06 19:09	06:29 19:09	07:02 18:20	07:36 16:46	07:14 16:46
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	19:45-20:28/43 20:41	05:58 20:01	07:03-20:04/07 19:08	06:30 19:08	07:03 17:18	07:15 16:45	07:16 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	05:38 20:54	19:45-20:28/43 20:40	05:59 20:00	07:04-20:05/08 19:09	06:32 19:06	07:04 17:17	07:16 16:45	07:17 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	19:46-20:29/43 20:40	06:00 20:00	07:05-20:06/09 19:58	06:33 19:04	07:05 17:15	07:18 16:44	07:19 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	05:39 20:54	19:46-20:28/42 20:39	06:01 20:00	07:06-20:07/10 19:56	06:34 19:02	07:06 17:14	07:20 16:44	07:21 16:48
29	07:31 17:23	07:03 19:35	06:13 20:10	06:13 20:10	05:42 20:41	05:39 20:54	19:47-20:29/42 20:37	06:02 20:00	07:08-20:08/11 19:54	06:35 19:00	07:08 17:12	07:22 16:43	07:23 16:49
30	07:30 17:24	07:02 19:36	06:12 20:11	06:12 20:11	05:41 20:41	05:40 20:54	19:47-20:28/41 20:36	06:03 20:00	07:09-20:09/12 19:53	06:36 18:59	07:09 17:11	07:24 16:43	07:24 16:50
31	07:29 17:26	07:00 19:37	06:00 19:37	06:00 20:42	05:41 20:42	05:40 20:42	19:45-20:17/32 20:35	06:04 20:00	07:10-20:10/13 19:51	06:37 19:51	07:11 17:10	07:25 16:50	07:43 16:50
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284	
Sum of minutes with flicker	0	0	0	0	228	1203	647	0	0	0	0	0	0

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

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

### SHADOW - Calendar per WTG

Calculation: WON018\_ShadowFlickering WTG: 7 - VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 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	July	August	September	October	November	December
1	07:43 16:51	07:28 17:27	06:51 18:03	06:58 19:38	06:10 20:12	05:40 20:43	05:40 20:54	06:05 20:34	06:38 19:49	07:10 18:57	06:46 17:08	07:22 16:43
2	07:43 16:52	07:27 17:28	06:49 18:04	06:56 19:40	06:09 20:13	05:40 20:44	05:41 20:54	06:06 20:33	06:39 19:48	07:11 18:55	06:47 17:07	07:23 16:42
3	07:43 16:53	07:26 17:29	06:47 18:05	06:55 19:41	06:08 20:14	05:39 20:45	05:41 20:54	06:07 20:32	06:40 19:46	07:12 18:53	06:48 17:06	07:24 16:42
4	07:43 16:54	07:25 17:31	06:46 18:06	06:53 19:42	06:06 20:15	05:39 20:45	05:42 20:54	06:08 20:31	06:41 19:44	07:13 18:52	06:49 17:05	07:25 16:42
5	07:43 16:55	07:24 17:32	06:44 18:07	06:51 19:43	06:05 20:17	05:38 20:46	05:43 20:54	06:09 20:29	06:42 19:43	07:14 18:50	06:51 17:03	07:26 16:42
6	07:43 16:56	07:23 17:33	06:43 18:09	06:49 19:44	06:04 20:18	05:38 20:47	05:43 20:53	06:10 20:28	06:43 19:41	07:15 18:48	06:52 17:02	07:27 16:41
7	07:43 16:57	07:22 17:35	06:41 18:10	06:48 19:45	06:03 20:19	05:38 20:47	05:44 20:53	06:11 20:27	06:44 19:39	07:16 18:47	06:53 17:01	07:28 16:41
8	07:43 16:58	07:21 17:36	06:39 18:11	06:46 19:46	06:01 20:20	05:37 20:48	05:44 20:53	06:13 20:26	06:45 19:37	07:17 18:45	06:54 17:00	07:29 16:41
9	07:43 16:59	07:19 17:37	06:38 18:12	06:44 19:47	06:00 20:21	05:37 20:49	05:45 20:52	06:14 20:24	06:46 19:36	07:19 18:43	06:56 16:59	07:30 16:41
10	07:42 17:00	07:18 17:39	06:36 18:13	06:43 19:49	05:59 20:22	05:37 20:49	05:46 20:52	06:15 20:23	06:47 19:34	07:20 18:42	06:57 16:58	07:31 16:41
11	07:42 17:01	07:17 17:40	06:34 18:14	06:41 19:50	05:58 20:23	05:37 20:50	05:46 20:51	06:16 20:22	06:48 19:32	07:21 18:40	06:58 16:57	07:32 16:41
12	07:42 17:02	07:16 17:41	06:33 18:16	06:39 19:51	05:57 20:24	05:37 20:50	05:47 20:51	06:17 20:20	06:49 19:30	07:22 18:38	06:59 16:56	07:33 16:41
13	07:41 17:03	07:14 17:42	06:31 18:17	06:38 19:52	05:56 20:25	05:37 20:51	05:48 20:50	06:18 20:19	06:50 19:29	07:23 18:37	07:01 16:55	07:33 16:41
14	07:41 17:04	07:13 17:44	06:29 18:18	06:36 19:53	05:55 20:26	05:36 20:51	05:49 20:50	06:19 20:18	06:52 19:27	07:24 18:35	07:02 16:54	07:34 16:42
15	07:41 17:06	07:12 17:45	06:27 18:19	06:35 19:54	05:53 20:27	05:36 20:52	05:50 20:49	06:20 20:16	06:53 19:25	07:25 18:33	07:03 16:53	07:35 16:42
16	07:40 17:07	07:10 17:46	06:26 18:20	06:33 19:55	05:52 20:28	05:36 20:52	05:50 20:49	06:21 20:15	06:54 19:23	07:27 18:32	07:04 16:52	07:36 16:42
17	07:40 17:08	07:09 17:48	06:24 18:21	06:31 19:56	05:51 20:29	05:36 20:52	05:51 20:48	06:22 20:13	06:55 19:22	07:28 18:30	07:06 16:51	07:36 16:42
18	07:39 17:09	07:07 17:49	06:22 18:23	06:30 19:58	05:50 20:30	05:37 20:53	05:52 20:47	06:23 20:12	06:56 19:20	07:29 18:29	07:07 16:50	07:37 16:43
19	07:39 17:10	07:06 17:50	06:21 18:24	06:28 19:59	05:50 20:31	05:37 20:53	05:53 20:46	06:24 20:10	06:57 19:18	07:30 18:27	07:08 16:49	07:38 16:43
20	07:38 17:12	07:04 17:51	06:19 18:25	06:27 20:00	05:49 20:32	05:37 20:53	05:54 20:46	06:25 20:09	06:58 19:16	07:31 18:26	07:09 16:49	07:38 16:43
21	07:37 17:13	07:03 17:53	06:17 18:26	06:25 20:01	05:48 20:33	05:37 20:54	05:55 20:45	06:26 20:07	06:59 19:15	07:32 18:24	07:11 16:48	07:39 16:44
22	07:37 17:14	07:02 17:54	06:15 18:27	06:24 20:02	05:47 20:34	05:37 20:54	05:56 20:44	06:27 20:06	07:00 19:13	07:34 18:22	07:12 16:47	07:39 16:44
23	07:36 17:15	07:00 17:55	06:14 18:28	06:22 20:03	05:46 20:35	05:37 20:54	05:57 20:43	06:28 20:04	07:01 19:11	07:35 18:21	07:13 16:47	07:40 16:45
24	07:35 17:17	06:58 17:56	06:12 18:29	06:20 20:04	05:45 20:36	05:38 20:54	05:57 20:42	06:29 20:02	07:02 19:09	07:36 18:20	07:14 16:46	07:40 16:45
25	07:35 17:18	06:57 17:58	06:10 18:31	06:19 20:05	05:45 20:37	05:38 20:54	05:58 20:41	06:30 20:01	07:03 19:07	07:37 17:18	07:15 16:45	07:41 16:46
26	07:34 17:19	06:55 17:59	06:08 18:32	06:18 20:07	05:44 20:38	05:38 20:54	05:59 20:40	06:32 19:59	07:04 19:06	07:38 17:17	07:16 16:45	07:41 16:47
27	07:33 17:20	06:54 18:00	06:07 18:33	06:16 20:08	05:43 20:39	05:39 20:54	06:00 20:39	06:33 19:58	07:05 19:04	07:39 17:15	07:18 16:44	07:42 16:47
28	07:32 17:22	06:52 18:01	06:05 18:34	06:15 20:09	05:42 20:40	05:39 20:54	06:01 20:38	06:34 19:56	07:06 19:02	07:40 17:14	07:19 16:44	07:42 16:48
29	07:31 17:23		07:03 19:35	06:13 20:10	05:42 20:41	05:39 20:54	06:02 20:37	06:35 19:54	07:07 19:00	07:41 17:12	07:20 16:43	07:42 16:49
30	07:30 17:24		07:01 19:36	06:12 20:11	05:41 20:41	05:40 20:54	06:03 20:36	06:36 19:53	07:09 18:59	07:42 17:11	07:21 16:43	07:42 16:50
31	07:29 17:25		07:00 19:37		05:41 20:42		06:04 20:35	06:37 19:51		06:44 17:10		07:43 16:50
Potential sun hours	294	295	369	400	452	457	463	430	376	344	295	284
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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



## SHADOW - Calendar per WTG

Calculation: WON018\_ShadowFlickering WTG: 8 - VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 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	07:43 16:51	07:28 08:14-09:12/58 17:27	06:51 16:53-17:32/39 18:02	06:58 17:47-18:24/37 19:38	06:10 06:51-07:43/52 20:12	05:40 06:44-07:49/65 20:43	
2	07:43 16:52	07:27 08:14-09:13/59 17:28	06:49 16:51-17:33/42 18:04	06:56 17:49-18:21/32 19:40	06:09 06:50-07:45/55 20:13	05:40 06:45-07:50/65 20:44	
3	07:43 16:53	07:26 08:14-09:13/59 17:29	06:47 16:50-17:35/45 18:05	06:55 17:51-18:18/27 19:41	06:08 06:50-07:46/56 20:14	05:39 06:44-07:49/65 20:45	
4	07:43 16:54	07:25 08:13-09:13/60 17:31	06:46 16:48-17:36/48 18:06	06:53 17:55-18:15/20 19:42	06:06 06:48-07:45/57 20:15	05:39 06:45-07:49/64 20:45	
5	07:43 16:55	07:24 08:13-09:13/60 17:32	06:44 16:46-17:36/50 18:07	06:51 18:00-18:09/9 19:43	06:05 06:47-07:46/59 20:16	05:38 06:46-07:50/64 20:46	
6	07:43 16:56	07:23 08:13-09:14/61 17:33	06:43 16:46-17:38/52 18:09	06:49 18:00-18:09/9 19:44	06:04 06:47-07:47/60 20:18	05:38 06:45-07:49/64 20:47	
7	07:43 16:57	07:22 08:13-09:14/61 17:35	06:41 16:44-17:38/54 18:10	06:48 18:00-18:09/9 19:45	06:03 06:46-07:48/62 20:19	05:38 06:46-07:49/63 20:47	
8	07:43 16:58	07:20 08:14-09:14/60 17:36	06:39 16:43-17:39/56 18:11	06:46 18:00-18:09/9 19:46	06:01 06:46-07:48/62 20:20	05:37 06:46-07:49/63 20:48	
9	07:42 08:31-08:42/11 16:59	07:19 08:13-09:14/61 17:37	06:38 16:43-17:40/57 18:12	06:44 18:00-18:09/9 19:47	06:00 06:44-07:48/64 20:21	05:37 06:47-07:50/63 20:49	
10	07:42 08:29-08:45/16 17:00	07:18 08:13-09:14/61 17:39	06:36 16:41-17:40/59 18:13	06:43 18:00-18:09/9 19:49	05:59 06:44-07:48/64 20:22	05:37 06:47-07:50/63 20:49	
11	07:42 08:27-08:47/20 17:01	07:17 08:14-09:14/60 17:40 07:37-07:38/1	06:34 16:40-17:40/60 18:14	06:41 18:00-18:09/9 19:50	05:58 06:44-07:48/64 20:23	05:37 06:47-07:49/62 20:50	
12	07:42 08:26-08:50/24 17:02	07:15 08:14-09:13/59 17:41 07:36-07:42/6	06:33 16:41-17:41/60 18:16	06:39 18:00-18:09/9 19:51	05:57 06:43-07:49/66 20:24	05:37 06:47-07:49/62 20:50	
13	07:41 08:24-08:51/27 17:03	07:14 08:14-09:13/59 17:42 07:34-07:44/10	06:31 16:40-17:41/61 18:17	06:38 18:00-18:09/9 19:52	05:56 06:43-07:49/66 20:25	05:37 06:47-07:49/62 20:51	
14	07:41 08:23-08:53/30 17:04	07:13 08:15-09:13/58 17:44 07:33-07:45/12	06:29 16:39-17:40/61 18:18	06:36 18:00-18:09/9 19:53	05:55 06:43-07:49/66 20:26	05:36 06:48-07:49/61 20:51	
15	07:41 08:23-08:55/32 17:06	07:11 08:15-09:12/57 17:45 07:31-07:45/14	06:27 16:38-17:40/62 18:19	06:35 18:00-18:09/9 19:54	05:53 06:43-07:49/66 20:27	05:36 06:48-07:50/62 20:52	
16	07:40 08:22-08:56/34 17:07	07:10 08:16-09:11/55 17:46 07:30-07:46/16	06:26 16:39-17:40/61 18:20	06:33 18:00-18:09/9 19:55	05:52 06:42-07:49/67 20:28	05:36 06:48-07:50/62 20:52	
17	07:40 08:20-08:57/37 17:08	07:09 08:16-09:10/54 17:48 07:29-07:47/18	06:24 16:38-17:40/62 18:21	06:31 18:00-18:09/9 19:56	05:51 06:42-07:49/67 20:29	05:36 06:49-07:50/61 20:52	
18	07:39 08:20-08:59/39 17:09	07:07 08:17-09:10/53 17:49 07:27-07:47/20	06:22 16:38-17:39/61 18:23	06:30 18:00-18:09/9 19:58	05:50 06:42-07:49/67 20:30	05:37 06:50-07:51/61 20:53	
19	07:39 08:19-09:00/41 17:10	07:06 08:18-09:09/51 17:50 07:26-07:47/21	06:21 16:38-17:39/61 18:24	06:28 18:00-18:09/9 19:59	05:50 06:43-07:50/67 20:31	05:37 06:50-07:51/61 20:53	
20	07:38 08:18-09:01/43 17:12	07:04 08:18-09:08/50 17:51 07:25-07:46/21	06:19 16:39-17:39/60 18:25	06:27 18:00-18:09/9 20:00	05:49 06:43-07:50/67 20:32	05:37 06:50-07:51/61 20:53	
21	07:37 08:18-09:03/45 17:13	07:03 08:20-09:07/47 17:53 07:25-07:46/21	06:17 16:38-17:38/60 18:26	06:25 18:00-18:09/9 20:01	05:48 06:42-07:50/68 20:33	05:37 06:50-07:51/61 20:54	
22	07:37 08:17-09:04/47 17:14	07:01 08:20-09:05/45 17:54 07:25-07:45/20	06:15 16:38-17:37/59 18:27	06:23 07:16-07:23/7 20:02	05:47 06:42-07:50/68 20:34	05:37 06:50-07:51/61 20:54	
23	07:36 08:17-09:05/48 17:15	07:00 08:22-09:04/42 17:55 07:26-07:44/18	06:14 16:38-17:36/58 18:28	06:22 07:08-07:29/21 20:03	05:46 06:42-07:49/67 20:35	05:37 06:51-07:52/61 20:54	
24	07:35 08:16-09:06/50 17:17	06:58 08:23-09:01/38 17:56 07:27-07:43/16	06:12 16:40-17:36/56 18:29	06:20 07:05-07:33/28 20:04	05:45 06:43-07:50/67 20:36	05:38 06:51-07:52/61 20:54	
25	07:34 08:16-09:08/52 17:18	06:57 08:24-08:59/35 07:28-07:41/13 17:58 17:07-17:19/12	06:10 16:40-17:35/55 18:31	06:19 07:02-07:35/33 20:05	05:45 06:43-07:50/67 20:37	05:38 06:51-07:52/61 20:54	
26	07:34 08:16-09:08/52 17:19	06:55 08:27-08:57/30 07:31-07:39/8 17:59 17:02-17:24/22	06:08 16:40-17:33/53 18:32	06:18 07:00-07:37/37 20:06	05:44 06:42-07:49/67 20:38	05:38 06:50-07:52/62 20:54	
27	07:33 08:15-09:09/54 17:20	06:54 08:29-08:53/24 18:00 16:58-17:27/29	06:07 16:41-17:32/51 18:33	06:16 06:58-07:39/41 20:08	05:43 06:43-07:50/67 20:39	05:39 06:51-07:53/62 20:54	
28	07:32 08:15-09:10/55 17:22	06:52 08:33-08:50/17 18:01 16:56-17:30/34	06:05 16:42-17:31/49 18:34	06:15 06:56-07:40/44 20:09	05:42 06:43-07:50/67 20:40	05:39 06:51-07:52/61 20:54	
29	07:31 08:15-09:11/56 17:23		07:03 17:43-18:29/46 19:35	06:13 06:54-07:42/48 20:10	05:42 06:44-07:50/66 20:41	05:39 06:52-07:53/61 20:54	
30	07:30 08:14-09:11/57 17:24		07:01 17:44-18:27/43 19:36	06:12 06:52-07:42/50 20:11	05:41 06:44-07:49/65 20:41	05:40 06:51-07:53/62 20:54	
31	07:29 08:14-09:12/58 17:25		07:00 17:46-18:26/40 19:37		05:41 06:44-07:50/66 20:42		
	Potential sun hours Sum of minutes with flicker	294 928	295 1766	369 1681	400 434	452 1988	456 1867

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 8 - VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 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	05:40 06:52-07:54/62 20:54	06:05 06:54-07:59/65 20:34	06:38 19:49	07:10 17:19-18:19/60 18:57	06:46 07:43-08:44/61 17:08	07:22 08:08-08:29/21 16:43
2	05:41 06:51-07:54/63 20:54	06:06 06:54-07:59/65 20:33	06:39 19:48	07:11 17:19-18:19/60 18:55	06:47 07:43-08:43/60 17:07	07:23 08:11-08:27/16 16:42
3	05:41 06:52-07:55/63 20:54	06:07 06:55-07:59/64 20:32	06:40 19:46	07:12 17:19-18:18/59 18:53	06:48 07:43-08:43/60 17:06	07:24 08:14-08:25/11 16:42
4	05:42 06:52-07:54/62 20:54	06:08 06:55-07:58/63 20:31	06:41 19:44	07:13 17:19-18:17/58 18:52	06:49 07:43-08:44/61 17:05	07:25 16:42
5	05:43 06:52-07:55/63 20:53	06:09 06:56-07:58/62 20:29	06:42 19:42	07:14 17:20-18:17/57 18:50	06:51 07:43-08:44/61 17:03	07:26 16:42
6	05:43 06:51-07:55/64 20:53	06:10 06:56-07:57/61 20:28	06:43 19:41	07:15 17:20-18:16/56 18:48	06:52 07:43-08:43/60 17:02	07:27 16:41
7	05:44 06:52-07:56/64 20:53	06:11 06:57-07:56/59 20:27	06:44 19:39	17:56-18:04/8 07:16 17:21-18:14/53 18:47	06:53 07:44-08:44/60 17:01	07:28 16:41
8	05:44 06:52-07:56/64 20:52	06:13 06:57-07:56/59 20:26	06:45 19:37	17:49-18:09/20 07:17 17:21-18:13/52 18:45	06:54 07:44-08:43/59 17:00	07:29 16:41
9	05:45 06:52-07:56/64 20:52	06:14 06:58-07:55/57 20:24	06:46 19:36	17:45-18:12/27 07:18 17:22-18:11/49 18:43	06:56 07:44-08:43/59 16:59	07:30 16:41
10	05:46 06:52-07:57/65 20:52	06:15 06:59-07:54/55 20:23	06:47 19:34	17:42-18:14/32 06:47 17:23-18:10/47 18:42	06:57 07:45-08:43/58 16:58	07:31 16:41
11	05:47 06:52-07:57/65 20:51	06:16 06:59-07:53/54 20:22	06:48 19:32	17:40-18:16/36 06:48 17:24-18:08/44 18:40	06:58 07:45-08:43/58 16:57	07:32 16:41
12	05:47 06:52-07:57/65 20:51	06:17 07:00-07:52/52 20:20	06:49 19:30	17:37-18:17/40 06:49 17:26-18:07/41 18:38	06:59 07:45-08:42/57 16:56	07:33 16:41
13	05:48 06:52-07:58/66 20:50	06:18 07:01-07:50/49 20:19	06:50 19:29	17:35-18:18/43 06:50 09:10-09:18/8 18:37 17:27-18:04/37	07:01 07:47-08:42/55 16:55	07:33 16:41
14	05:49 06:52-07:58/66 20:50	06:19 07:02-07:49/47 20:17	06:51 19:27	17:33-18:19/46 06:51 09:04-09:24/20 18:35 17:29-18:02/33	07:02 07:47-08:42/55 16:54	07:34 16:42
15	05:50 06:52-07:59/67 20:49	06:20 07:04-07:47/43 20:16	06:53 19:25	17:32-18:20/48 06:53 09:00-09:27/27 18:33 17:32-17:58/26	07:03 07:47-08:41/54 16:53	07:35 16:42
16	05:50 06:53-07:59/66 20:48	06:21 07:05-07:46/41 20:15	06:54 19:23	17:30-18:21/51 06:54 08:57-09:29/32 08:01-08:11/10 18:32 17:35-17:54/19	07:04 07:49-08:41/52 16:52	07:36 16:42
17	05:51 06:52-07:59/67 20:48	06:22 07:07-07:43/36 20:13	06:55 19:22	17:29-18:21/52 06:55 08:56-09:32/36 07:59-08:14/15 18:30 17:43-17:47/4	07:06 07:49-08:41/52 16:51	07:36 16:42
18	05:52 06:52-07:59/67 20:47	06:23 07:09-07:41/32 20:12	06:56 19:20	17:27-18:22/55 06:56 08:54-09:34/40 18:29 07:58-08:15/17	07:07 07:50-08:40/50 16:50	07:37 16:43
19	05:53 06:52-07:59/67 20:46	06:24 07:11-07:38/27 20:10	06:57 19:18	17:26-18:22/56 06:57 08:52-09:35/43 18:27 07:56-08:15/19	07:08 07:52-08:40/48 16:49	07:38 16:43
20	05:54 06:52-08:00/68 20:46	06:25 07:15-07:34/19 20:09	06:58 19:16	17:25-18:22/57 06:58 08:50-09:36/46 18:26 07:55-08:16/21	07:09 07:52-08:39/47 16:49	07:38 16:43
21	05:55 06:53-08:00/67 20:45	06:26 20:07	06:59 19:14	17:24-18:22/58 06:59 08:50-09:38/48 18:24 07:56-08:17/21	07:10 07:53-08:38/45 16:48	07:39 16:44
22	05:56 06:53-08:00/67 20:44	06:27 20:05	07:00 19:13	17:23-18:22/59 07:00 08:48-09:38/50 18:22 07:55-08:17/22	07:12 07:55-08:38/43 16:47	07:39 16:44
23	05:57 06:53-08:00/67 20:43	06:28 20:04	07:01 19:11	17:22-18:22/60 07:01 08:47-09:39/52 18:21 07:56-08:17/21	07:13 07:56-08:37/41 16:47	07:40 16:45
24	05:57 06:52-08:00/68 20:42	06:29 20:02	07:02 19:09	17:22-18:23/61 07:36 08:46-09:40/54 18:20 07:57-08:16/19	07:14 07:57-08:37/40 16:46	07:40 16:45
25	05:58 06:52-08:00/68 20:41	06:30 20:01	07:03 19:07	17:22-18:23/61 06:37 07:46-08:41/55 17:18 06:59-07:17/18	07:15 07:58-08:36/38 16:45	07:41 16:46
26	05:59 06:53-08:00/67 20:40	06:31 19:59	07:04 19:06	17:21-18:22/61 06:38 07:45-08:41/56 17:17 07:00-07:16/16	07:16 07:59-08:34/35 16:45	07:41 16:47
27	06:00 06:53-08:00/67 20:39	06:33 19:58	07:05 19:04	17:20-18:22/62 06:40 07:44-08:41/57 17:15 07:01-07:15/14	07:18 08:02-08:34/32 16:44	07:41 16:47
28	06:01 06:53-08:00/67 20:38	06:34 19:56	07:06 19:02	17:20-18:21/61 06:41 07:45-08:43/58 17:14 07:03-07:15/12	07:19 08:03-08:33/30 16:44	07:42 16:48
29	06:02 06:53-08:00/67 20:37	06:35 19:54	07:07 19:00	17:20-18:21/61 06:42 07:44-08:43/59 17:12 07:04-07:13/9	07:20 08:05-08:32/27 16:43	07:42 16:49
30	06:03 06:54-08:00/66 20:36	06:36 19:53	07:09 18:59	17:19-18:20/61 06:43 07:43-08:43/60 17:11 07:05-07:11/6	07:21 08:07-08:31/24 16:43	07:42 16:50
31	06:04 06:54-07:59/65 20:35	06:37 19:51		06:44 07:43-08:43/60 17:10		07:42 16:50
Potential sun hours	463	430	376	344	295	284
Sum of minutes with flicker	2034	1010	1176	1856	1482	48

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 9 - VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 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	07:43 08:35-09:22/47 16:51	07:28 17:27	06:51 16:55-17:35/40 18:02	06:58 17:47-18:29/42 19:38	06:10 18:43-19:45/62 20:12	05:40 18:42-19:48/66 20:43
2	07:43 08:36-09:22/46 16:52	07:27 17:28	06:49 16:53-17:36/43 18:04	06:56 17:49-18:27/38 19:40	06:09 18:42-19:46/64 20:13	05:40 18:43-19:48/65 20:44
3	07:43 08:36-09:22/46 16:53	07:26 17:29	06:47 16:52-17:38/46 18:05	06:55 17:50-18:24/34 19:41	06:08 18:42-19:46/64 20:14	05:39 18:43-19:48/65 20:44
4	07:43 08:37-09:23/46 16:54	07:25 17:31	06:46 16:50-17:39/49 18:06	06:53 17:53-18:22/29 19:42	06:06 18:41-19:46/65 20:15	05:39 18:44-19:48/64 20:45
5	07:43 08:38-09:23/45 16:55	07:24 17:32	06:44 16:48-17:40/52 18:07	06:51 17:56-18:19/23 19:43	06:05 18:40-19:47/67 20:16	05:38 18:44-19:48/64 20:46
6	07:43 08:38-09:24/46 16:56	07:23 17:33	06:43 16:48-17:41/53 18:09	06:49 18:00-18:13/13 19:44	06:04 18:40-19:47/67 20:18	05:38 18:44-19:47/63 20:47
7	07:43 08:38-09:23/45 16:57	07:22 17:35	06:41 16:46-17:42/56 18:10	06:48 19:45	06:03 18:40-19:48/68 20:19	05:38 18:45-19:48/63 20:47
8	07:43 08:39-09:23/44 16:58	07:20 17:36	06:39 16:45-17:42/57 18:11	06:46 19:46	06:01 18:40-19:48/68 20:20	05:37 18:45-19:48/63 20:48
9	07:42 08:40-09:24/44 16:59	07:19 17:37	06:38 16:44-17:43/59 18:12	06:44 19:47	06:00 18:38-19:47/69 20:21	05:37 18:46-19:48/62 20:49
10	07:42 08:41-09:24/43 17:00	07:18 17:39	06:36 16:43-17:43/60 18:13	06:43 19:49	05:59 18:38-19:48/70 20:22	05:37 18:47-19:48/61 20:49
11	07:42 08:41-09:24/43 17:01	07:17 17:40	06:34 16:42-17:43/61 18:14	06:41 19:50	05:58 18:38-19:48/70 20:23	05:37 18:46-19:47/61 20:50
12	07:42 08:42-09:24/42 17:02	07:15 17:41	06:33 16:42-17:44/62 18:16	06:39 19:51	05:57 18:38-19:48/70 20:24	05:37 18:47-19:48/61 20:50
13	07:41 08:42-09:23/41 17:03	07:14 17:42	06:31 16:42-17:44/62 18:17	06:38 19:52	05:56 18:38-19:48/70 20:25	05:37 18:47-19:48/61 20:51
14	07:41 08:43-09:24/41 17:04	07:13 17:44	06:29 16:41-17:44/63 18:18	06:36 19:53	05:55 18:38-19:48/70 20:26	05:37 18:47-19:48/61 20:51
15	07:41 08:44-09:23/39 17:06	07:11 17:45	06:27 16:40-17:44/64 18:19	06:35 19:54	05:53 18:38-19:48/70 20:27	05:36 18:48-19:48/60 20:52
16	07:40 08:45-09:23/38 17:07	07:10 17:46	06:26 16:40-17:44/64 18:20	06:33 19:55	05:52 18:38-19:48/70 20:28	05:36 18:48-19:48/60 20:52
17	07:40 08:46-09:23/37 17:08	07:09 17:48	06:24 16:40-17:44/64 18:21	06:31 19:56	05:51 18:38-19:48/70 20:29	05:37 18:48-19:48/60 20:52
18	07:39 08:47-09:23/36 17:09	07:07 17:49	06:22 16:40-17:43/63 18:23	06:30 19:10-19:23/13 19:58	05:50 18:38-19:48/70 20:30	05:37 18:48-19:48/60 20:53
19	07:39 08:48-09:22/34 17:10	07:06 17:50	06:21 16:39-17:42/63 18:24	06:28 19:04-19:28/24 19:59	05:50 18:39-19:49/70 20:31	05:37 18:49-19:49/60 20:53
20	07:38 08:49-09:21/32 17:12	07:04 17:51	06:19 16:40-17:43/63 18:25	06:27 19:01-19:31/30 20:00	05:49 18:39-19:49/70 20:32	05:37 18:50-19:49/59 20:53
21	07:37 08:51-09:21/30 17:13	07:03 17:53	06:17 16:40-17:42/62 18:26	06:25 18:57-19:33/36 20:01	05:48 18:39-19:49/70 20:33	05:37 18:50-19:49/59 20:54
22	07:37 08:52-09:20/28 17:14	07:01 17:54	06:15 16:40-17:41/61 18:27	06:24 18:55-19:36/41 20:02	05:47 18:39-19:48/69 20:34	05:37 18:50-19:49/59 20:54
23	07:36 08:54-09:18/24 17:15	07:00 17:55	06:14 16:40-17:40/60 18:28	06:22 18:53-19:37/44 20:03	05:46 18:39-19:48/69 20:35	05:37 18:50-19:49/59 20:54
24	07:35 08:56-09:16/20 17:17	06:58 17:56	06:12 16:41-17:40/59 18:29	06:20 18:52-19:39/47 20:04	05:45 18:40-19:49/69 20:36	05:38 18:50-19:50/60 20:54
25	07:34 08:59-09:15/16 17:18	06:57 17:08-17:23/15 17:58	06:10 16:41-17:39/58 18:31	06:19 18:49-19:39/50 20:05	05:45 18:40-19:48/68 20:37	05:38 18:50-19:50/60 20:54
26	07:34 09:04-09:10/6 17:19	06:55 17:04-17:28/24 17:59	06:08 16:41-17:38/57 18:32	06:18 18:48-19:41/53 20:06	05:44 18:40-19:48/68 20:38	05:38 18:50-19:50/60 20:54
27	07:33 17:20	06:54 17:00-17:31/31 18:00	06:07 16:42-17:36/54 18:33	06:16 18:47-19:42/55 20:08	05:43 18:41-19:49/68 20:39	05:39 18:51-19:51/60 20:54
28	07:32 17:22	06:52 16:58-17:34/36 18:01	06:05 16:43-17:36/53 18:34	06:15 18:46-19:43/57 20:09	05:42 18:41-19:48/67 20:40	05:39 18:50-19:51/61 20:54
29	07:31 17:23		07:03 17:44-18:34/50 19:35	06:13 18:45-19:44/59 20:10	05:42 18:42-19:49/67 20:41	05:39 18:51-19:52/61 20:54
30	07:30 17:24		07:01 17:44-18:32/48 19:36	06:12 18:43-19:44/61 20:11	05:41 18:42-19:48/66 20:41	05:40 18:51-19:52/61 20:54
31	07:29 17:26		07:00 17:46-18:31/45 19:37		05:41 18:42-19:48/66 20:42	
Potential sun hours	294	295	369	400	452	456
Sum of minutes with flicker	959	106	1751	749	2111	1839

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) 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: WON018\_ShadowFlickering WTG: 9 - VESTAS V172-7.2 7200 172.0 IO! hub: 150.0 m (TOT: 236.0 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	05:40 18:51-19:53/62 20:54	06:05 18:49-19:59/70 20:34	06:38 19:49	07:10 17:21-18:23/62 18:57	06:46 17:08	07:22 08:23-09:06/43 16:43
2	05:41 18:51-19:52/61 20:54	06:06 18:49-19:59/70 20:33	06:39 19:48	07:11 17:21-18:22/61 18:55	06:47 17:07	07:23 08:23-09:06/43 16:42
3	05:41 18:51-19:53/62 20:54	06:07 18:49-19:58/69 20:32	06:40 19:46	07:12 17:21-18:21/60 18:53	06:48 17:06	07:24 08:23-09:07/44 16:42
4	05:42 18:51-19:53/62 20:54	06:08 18:49-19:58/69 20:31	06:41 19:44	07:13 17:21-18:20/59 18:52	06:49 17:05	07:25 08:24-09:08/44 16:42
5	05:43 18:51-19:54/63 20:53	06:09 18:49-19:58/69 20:29	06:42 19:42	07:14 17:22-18:20/58 18:50	06:51 17:03	07:26 08:24-09:09/45 16:42
6	05:43 18:50-19:54/64 20:53	06:10 18:49-19:57/68 20:28	06:43 17:56-18:09/13 19:41	07:15 17:22-18:19/57 18:48	06:52 17:02	07:27 08:24-09:10/46 16:41
7	05:44 18:51-19:54/63 20:53	06:11 18:50-19:57/67 20:27	06:44 17:51-18:14/23 19:39	07:16 17:23-18:18/55 18:47	06:53 17:01	07:28 08:25-09:10/45 16:41
8	05:44 18:51-19:55/64 20:52	06:13 18:50-19:56/66 20:26	06:45 17:47-18:16/29 19:37	07:17 17:23-18:16/53 18:45	06:54 17:00	07:29 08:24-09:10/46 16:41
9	05:45 18:50-19:55/65 20:52	06:14 18:50-19:55/65 20:24	06:46 17:44-18:18/34 19:36	07:18 17:24-18:15/51 18:43	06:56 16:59	07:30 08:24-09:11/47 16:41
10	05:46 18:50-19:55/65 20:52	06:15 18:51-19:55/64 20:23	06:47 17:42-18:20/38 19:34	07:20 17:25-18:13/48 18:42	06:57 16:58	07:31 08:25-09:11/46 16:41
11	05:47 18:51-19:56/65 20:51	06:16 18:51-19:54/63 20:22	06:48 17:40-18:21/41 19:32	07:21 17:26-18:11/45 18:40	06:58 16:57	07:32 08:25-09:12/47 16:41
12	05:47 18:50-19:56/66 20:51	06:17 18:52-19:53/61 20:20	06:49 17:38-18:22/44 19:30	07:22 17:28-18:10/42 18:38	06:59 16:56	07:33 08:26-09:13/47 16:41
13	05:48 18:50-19:56/66 20:50	06:18 18:52-19:52/60 20:19	06:50 17:36-18:23/47 19:29	07:23 17:29-18:08/39 18:37	07:01 16:55	07:33 08:26-09:13/47 16:42
14	05:49 18:50-19:57/67 20:50	06:19 18:53-19:51/58 20:17	06:51 17:34-18:24/50 19:27	07:24 17:31-18:05/34 18:35	07:02 16:54	07:34 08:27-09:14/47 16:42
15	05:50 18:50-19:57/67 20:49	06:20 18:54-19:50/56 20:16	06:53 17:32-18:25/53 19:25	07:25 17:34-18:02/28 18:33	07:03 16:53	07:35 08:27-09:14/47 16:42
16	05:50 18:50-19:58/68 20:48	06:21 18:54-19:49/55 20:15	06:54 17:31-18:25/54 19:23	07:26 17:37-17:58/21 18:32	07:04 08:37-08:43/6 16:52	07:36 08:27-09:15/48 16:42
17	05:51 18:49-19:57/68 20:48	06:22 18:55-19:47/52 20:13	06:55 17:30-18:26/56 19:22	07:28 17:43-17:53/10 18:30	07:06 08:32-08:48/16 16:51	07:36 08:28-09:15/47 16:42
18	05:52 18:49-19:58/69 20:47	06:23 18:56-19:46/50 20:12	06:56 17:28-18:26/58 19:20	07:29 17:44-18:26/58 18:29	07:07 08:30-08:50/20 16:50	07:37 08:28-09:15/47 16:43
19	05:53 18:49-19:58/69 20:46	06:24 18:58-19:44/46 20:10	06:57 17:27-18:26/59 19:18	07:30 17:45-18:26/59 18:27	07:08 08:29-08:53/24 16:49	07:38 08:29-09:16/47 16:43
20	05:54 18:49-19:58/69 20:46	06:25 18:59-19:42/43 20:09	06:58 17:26-18:26/60 19:16	07:31 17:46-18:26/60 18:26	07:09 08:27-08:55/28 16:49	07:38 08:29-09:16/47 16:44
21	05:55 18:49-19:59/70 20:45	06:26 19:01-19:40/39 20:07	06:59 17:25-18:26/61 19:14	07:32 17:47-18:26/61 18:24	07:10 08:26-08:56/30 16:48	07:39 08:30-09:17/47 16:44
22	05:56 18:49-19:59/70 20:44	06:27 19:03-19:38/35 20:05	07:00 17:24-18:26/62 19:13	07:33 17:48-18:26/62 18:22	07:12 08:26-08:58/32 16:47	07:39 08:30-09:17/47 16:44
23	05:57 18:49-19:59/70 20:43	06:28 19:05-19:35/30 20:04	07:01 17:23-18:26/63 19:11	07:35 17:49-18:26/63 18:21	07:13 08:25-08:59/34 16:47	07:40 08:31-09:18/47 16:45
24	05:58 18:49-19:59/70 20:42	06:29 19:08-19:31/23 20:02	07:02 17:24-18:27/63 19:09	07:36 17:50-18:27/63 18:20	07:14 08:24-09:00/36 16:46	07:40 08:31-09:18/47 16:45
25	05:58 18:49-19:59/70 20:41	06:30 19:14-19:25/11 20:01	07:03 17:23-18:27/64 19:07	07:37 17:51-18:27/64 17:18	07:15 08:24-09:01/37 16:45	07:41 08:32-09:19/47 16:46
26	05:59 18:49-19:59/70 20:40	06:32 19:15-19:26/12 19:59	07:04 17:23-18:26/63 19:06	07:38 17:52-18:26/63 17:17	07:16 08:23-09:01/38 16:45	07:41 08:32-09:19/47 16:47
27	06:00 18:49-19:59/70 20:39	06:33 19:16-19:27/13 19:58	07:05 17:22-18:26/64 19:04	07:39 17:53-18:26/64 17:15	07:18 08:24-09:03/39 16:44	07:41 08:32-09:19/47 16:47
28	06:01 18:49-19:59/70 20:38	06:34 19:17-19:28/14 19:56	07:06 17:22-18:25/63 19:02	07:40 17:54-18:25/63 17:14	07:19 08:24-09:04/40 16:44	07:42 08:33-09:20/47 16:48
29	06:02 18:49-19:59/70 20:37	06:35 19:18-19:29/15 19:54	07:07 17:21-18:25/64 19:00	07:41 17:55-18:25/64 17:12	07:20 08:23-09:04/41 16:43	07:42 08:34-09:21/47 16:49
30	06:03 18:49-19:59/70 20:36	06:36 19:19-19:30/16 19:53	07:09 17:21-18:24/63 18:59	07:42 17:56-18:24/63 17:11	07:21 08:23-09:05/42 16:43	07:42 08:34-09:21/47 16:50
31	06:04 18:49-19:59/70 20:35	06:37 19:20-19:31/17 19:51	07:10 17:20-18:23/62 18:57	07:43 17:57-18:23/62 17:10	07:22 08:23-09:06/43 16:42	07:42 08:35-09:21/46 16:50
Potential sun hours	463	430	376	344	295	284
Sum of minutes with flicker	2075	1359	1289	783	463	1436

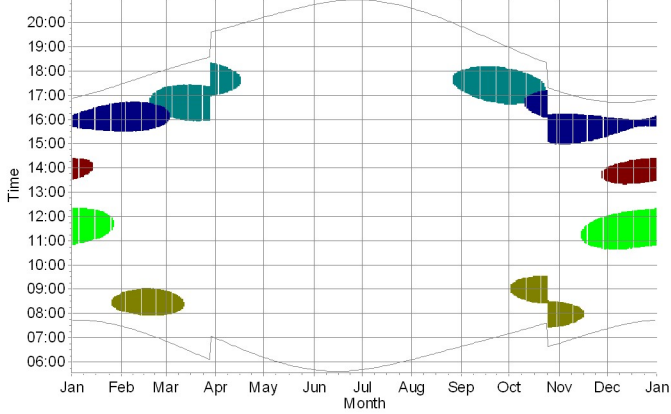
Table layout: For each day in each month the following matrix apply

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

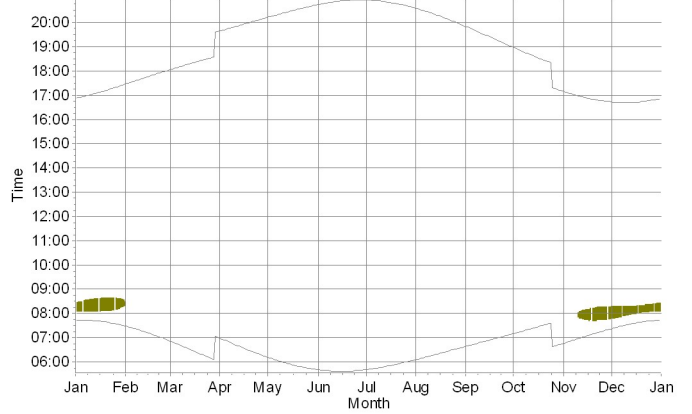
## SHADOW - Calendar per WTG, graphical

Calculation: WON018\_ShadowFlickering

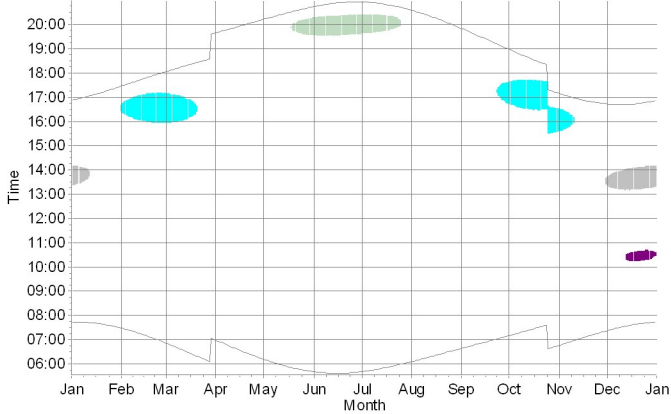
1: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (1)



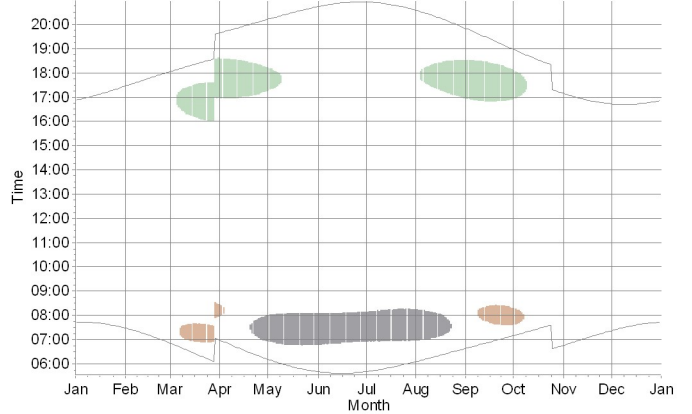
2: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (2)



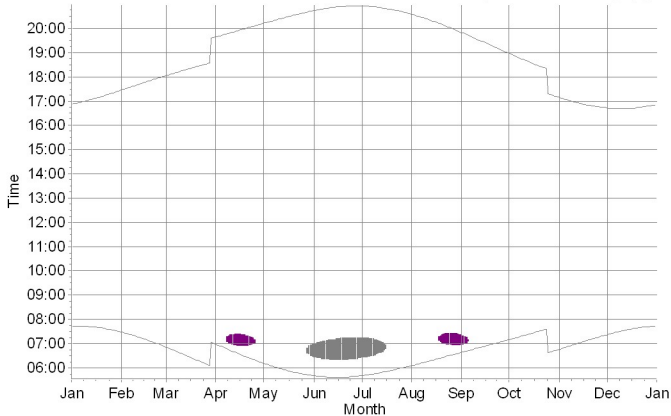
3: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (3)



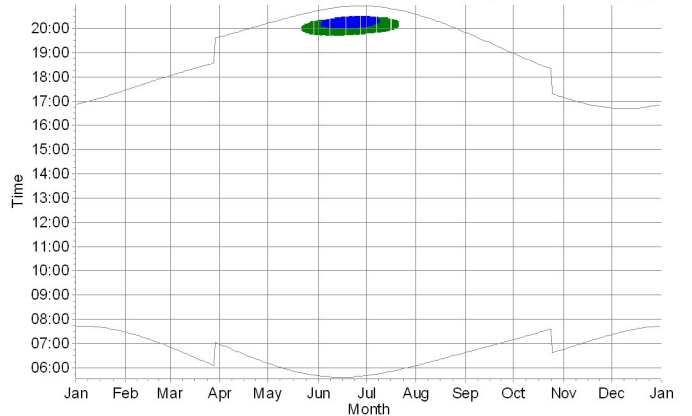
4: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (4)



5: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (5)



6: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (6)



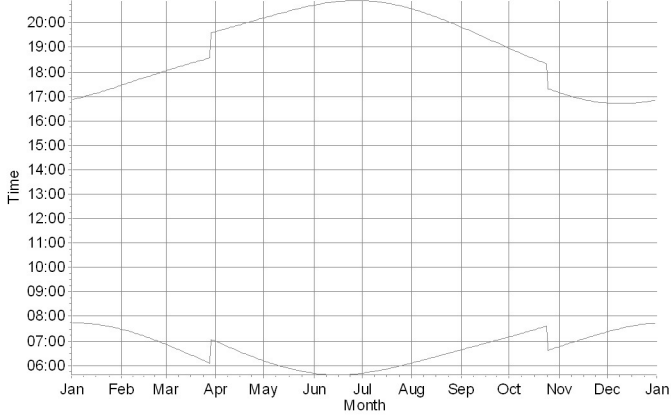
Shadow receptors

A: Shadow Receptor: 1.0 x 1.0 Azimuth: -180.0° Slope: 90.0° (1)	G: Shadow Receptor: 1.0 x 1.0 Azimuth: 40.0° Slope: 90.0° (7)	L: Shadow Receptor: 1.0 x 1.0 Azimuth: 20.0° Slope: 90.0° (12)
B: Shadow Receptor: 1.0 x 1.0 Azimuth: -180.0° Slope: 90.0° (2)	H: Shadow Receptor: 1.0 x 1.0 Azimuth: 30.0° Slope: 90.0° (8)	M: Shadow Receptor: 1.0 x 1.0 Azimuth: 60.0° Slope: 90.0° (13)
C: Shadow Receptor: 1.0 x 1.0 Azimuth: 170.0° Slope: 90.0° (3)	I: Shadow Receptor: 1.0 x 1.0 Azimuth: -10.0° Slope: 90.0° (9)	N: Shadow Receptor: 1.0 x 1.0 Azimuth: 60.0° Slope: 90.0° (14)
D: Shadow Receptor: 1.0 x 1.0 Azimuth: -120.0° Slope: 90.0° (4)	J: Shadow Receptor: 1.0 x 1.0 Azimuth: -60.0° Slope: 90.0° (10)	P: Shadow Receptor: 1.0 x 1.0 Azimuth: -110.0° Slope: 90.0° (17)
F: Shadow Receptor: 1.0 x 1.0 Azimuth: 60.0° Slope: 90.0° (6)	K: Shadow Receptor: 1.0 x 1.0 Azimuth: -20.0° Slope: 90.0° (11)	Q: Shadow Receptor: 1.0 x 1.0 Azimuth: -140.0° Slope: 90.0° (17)

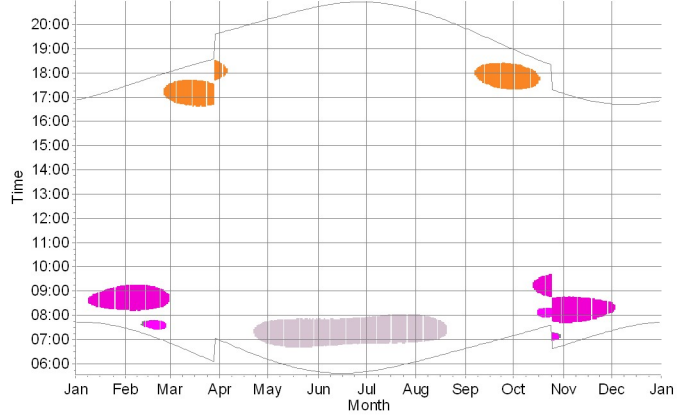
## SHADOW - Calendar per WTG, graphical

Calculation: WON018\_ShadowFlickering

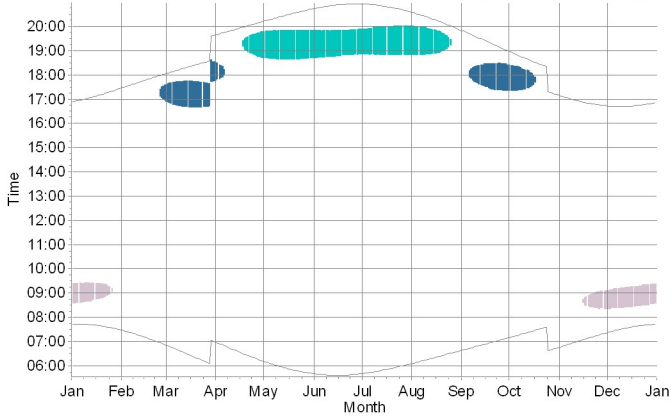
7: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (7)










8: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (8)



9: VESTAS V172-7.2 7200 172.0 !O! hub: 150.0 m (TOT: 236.0 m) (9)



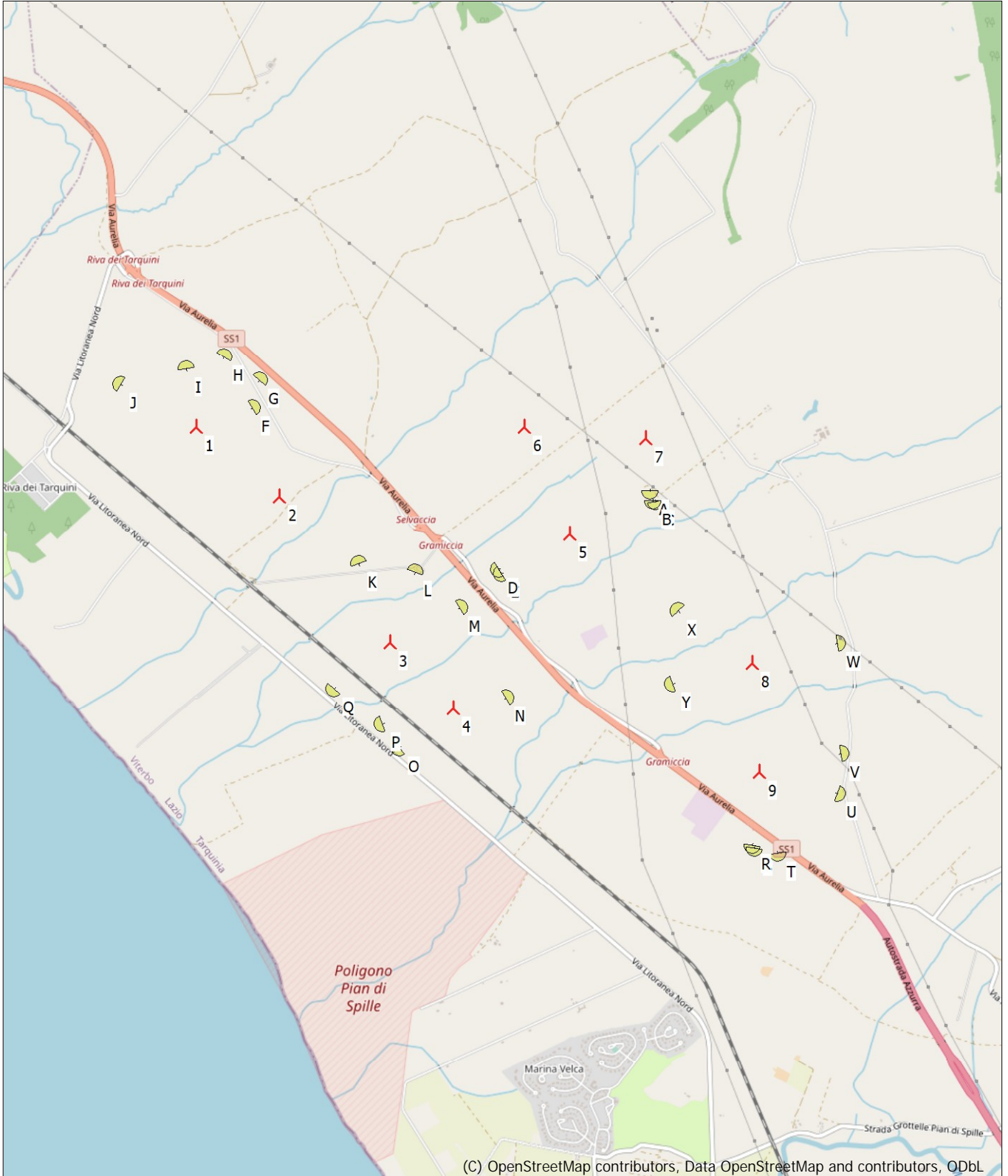
### Shadow receptors

 D: Shadow Receptor: 1.0 x 1.0 Azimuth: -120.0° Slope: 90.0° (4)	 V: Shadow Receptor: 1.0 x 1.0 Azimuth: 80.0° Slope: 90.0° (22)	 Y: Shadow Receptor: 1.0 x 1.0 Azimuth: -110.0° Slope: 90.0° (25)
 E: Shadow Receptor: 1.0 x 1.0 Azimuth: -120.0° Slope: 90.0° (5)	 W: Shadow Receptor: 1.0 x 1.0 Azimuth: 80.0° Slope: 90.0° (23)	
 U: Shadow Receptor: 1.0 x 1.0 Azimuth: 110.0° Slope: 90.0° (21)	 X: Shadow Receptor: 1.0 x 1.0 Azimuth: -40.0° Slope: 90.0° (24)	

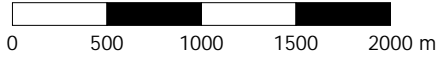


## SHADOW - Map

Calculation: WON018\_ShadowFlickering



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



Map: EMD OpenStreetMap , Print scale 1:40,000, Map center UTM (north)-WGS84 Zone: 33 East: 226,767 North: 4,687,010

- New WTG
- Shadow receptor

Flicker map level: Elevation Grid Data Object: WON018\_ShadowFlickering\_EMDGrid\_0.wpg (1)