



REGIONE SARDEGNA

Provincia di Cagliari

COMUNI DI SINNAI E MARACALAGONIS



OGGETTO

PROGETTO PER LA COSTRUZIONE ED ESERCIZIO DI UN PARCO EOLICO DELLA POTENZA DI 122,4 MW E RELATIVE OPERE DI CONNESSIONE NEI COMUNI DI SINNAI, MARACALAGONIS, QUARTUCCIU, SETTIMO SAN PIETRO E SELARGIUS (CA)

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OGGETTO DELL'ELABORATO

RELAZIONE SULL'EVOLUZIONE DELL'OMBRA - EFFETTO SHADOW FLICKERING

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A4	-	SIN	AMB	REL	071	00	SIN-AMB-REL-071_00	

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1 PREMESSA

Il presente studio ha come scopo la valutazione dell'eventuale impatto generato dallo shadow flickering relativo al progetto di realizzazione di un impianto eolico composto da 17 aerogeneratori da 7,2 MW da installare nei comuni di Sinnai e Maracalagonis (CA) con opere di connessione ricadenti nei medesimi comuni e nei comuni di Quartucciu, Settimo San Pietro e Selargius (CA) commissionato dalla società Ecowind 6 Srl.

Gli aerogeneratori saranno collegati tra di loro mediante un cavidotto interrato in media tensione che collegherà l'impianto allo stallo predisposto nella futura Sottostazione Elettrica 30/150 kV per poi collegarsi in alta tensione alla Stazione Elettrica di trasformazione (SE) di trasformazione della RTN a 380/220/150 kV di Selargius.

2 CENNI SUL FENOMENO DELLO SHADOW FLICKERING

Le turbine eoliche, come altre strutture fortemente sviluppate in altezza, proiettano un'ombra sulle aree adiacenti in presenza della luce solare diretta. Il cosiddetto fenomeno del "flickering" indica l'effetto di lampeggiamento che si verifica quando le pale del rotore in movimento "tagliano" la luce solare in maniera intermittente. Tale variazione alternata di intensità luminosa, a lungo andare, può provocare fastidio agli occupanti delle abitazioni le cui finestre risultano esposte al fenomeno stesso.

I più recenti aerogeneratori tripala operano ad una velocità di rotazione inferiore ai 35 giri al minuto, corrispondente ad una frequenza di passaggio delle pale sulla verticale inferiore a 1.75 Hz, minore, quindi, della frequenza critica di 2.5 Hz. Inoltre, i generatori di grande potenza (dal MW in su) raramente superano la velocità di rotazione di 20 giri al minuto, corrispondente a frequenze di passaggio delle pale ampiamente minori di quelle ritenute fastidiose per la maggioranza degli individui.

In generale, l'area soggetta a shadow flickering non si estende oltre i 500÷1.000 m dall'aerogeneratore e le zone maggiormente impattate ricadono generalmente entro i 300 m di distanza dalle turbine, con durata del fenomeno dell'ordine delle 300 ore all'anno.

3 NORMATIVA DI RIFERIMENTO

Dal punto di vista normativo, in Italia non esistono dei precisi limiti di tolleranza sulle ore/anno di impatto del fenomeno. Pertanto, come di consueto in questo tipo di studi, nel presente lavoro ci si riferisce alle linee guida della Germania (WEA-Schattenwurf-Hinweise), che in via cautelativa dettano come limite quello delle 30 h/anno: ogni singolo recettore sensibile che superi tale limite dovrebbe essere analizzato per ulteriori approfondimenti. Generalmente, i fattori che permettono la diminuzione o direttamente l'annullamento del fenomeno potrebbero essere la presenza di alberi interposti tra turbina e recettore e/o

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posizionamento delle abitazioni e dei propri infissi rispetto alla fonte, abitazioni poste a quote inferiori a quelle apprezzabili dal DTM (Digital Terrain Model) inserito nel codice di calcolo.

Si ribadisce tuttavia che questo tipo di limite (preso in considerazione anche in questo studio) è comunque pur sempre un limite “fittizio” e preso come riferimento di letteratura, poiché esso si riferisce ad una normativa non vigente in Italia, ove non esiste alcun riferimento legislativo che detti delle soglie alle quali attenersi.

Premesso ciò, questo studio vuole dare delle indicazioni utili a dimostrare la bontà progettuale dell’impianto, tale da evitare il manifestarsi di questo spiacevole fenomeno, anche se, come detto, il reale impatto sul benessere delle persone risulta di per sé trascurabile.

In più, il presente progetto prevede un intervento di repowering con sostituzione degli aerogeneratori esistenti e riduzione del numero delle macchine attualmente in esercizio che di per sé comporterà una riduzione di impatto consistente.

4 CALCOLO DELLO SHADOW FLICKERING

4.1 CONFIGURAZIONE D’IMPIANTO

Il progetto prevede l’installazione di:

- n° 17 aerogeneratori da 7,2 MW, modello V (Vestas) 172 – 7,2 MW con altezza al mozzo 114 m e diametro 172 m per una potenza totale pari a 122,4 MW;
- opere di fondazione degli aerogeneratori;
- n° 17 piazzole temporanee di montaggio con adiacenti piazzole di stoccaggio;
- n° 17 piazzole definitive per l’esercizio e la manutenzione degli aerogeneratori e piste di accesso;
- Cavidotto interrato in media tensione per il collegamento tra gli aerogeneratori, tra questi e la futura Sottostazione Elettrica a 30/150 kV denominata in agro del comune di Selargius (CA);
- n° 2 Cabine di raccolta ubicate in agro del comune di Sinnai (CA);
- Stazione utente di trasformazione 150/30 kV ubicata in agro di Selargius (CA);
- Connessione in antenna a 150 kV sulla esistente Stazione Elettrica di trasformazione (SE) della RTN 380/220/150 kV di “Selargius”;
- Una linea in fibra ottica che collega tra di loro gli aerogeneratori e la stazione elettrica di trasformazione per il telecontrollo del parco eolico.

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La disposizione prevista per le turbine è riportata nella tabella sottostante:

ID WTG	LONGITUDINE UTM (north)-WGS84 Zone: 32	LATITUDINE UTM (north)-WGS84 Zone: 32	QUOTA (m)	MODELLO WTG	DIAMETRO DEL ROTORE (m)	ALTEZZA ALL'HUB (m)	RPM max
1	523452	4352514	218,8	VESTAS V172-7.2	172	114	9,5
2	523252	4351806	174,2	VESTAS V172-7.2	172	114	9,5
3	522451	4351591	178	VESTAS V172-7.2	172	114	9,5
4	522666	4350409	129	VESTAS V172-7.2	172	114	9,5
5	523121	4349535	112,3	VESTAS V172-7.2	172	114	9,5
6	522160	4348954	104,9	VESTAS V172-7.2	172	114	9,5
7	521731	4350339	147,4	VESTAS V172-7.2	172	114	9,5
8	521895	4350931	148,2	VESTAS V172-7.2	172	114	9,5
9	521031	4351615	174,8	VESTAS V172-7.2	172	114	9,5
10	521184	4349977	146,3	VESTAS V172-7.2	172	114	9,5
11	521235	4349302	125	VESTAS V172-7.2	172	114	9,5
12	520407	4350784	196,6	VESTAS V172-7.2	172	114	9,5
13	520485	4351376	184	VESTAS V172-7.2	172	114	9,5
14	519172	4352122	236,6	VESTAS V172-7.2	172	114	9,5
15	520286	4350019	129,9	VESTAS V172-7.2	172	114	9,5
16	523520	4353132	295,3	VESTAS V172-7.2	172	114	9,5
17	520976	4348755	133,8	VESTAS V172-7.2	172	114	9,5

Tabella 1 : Coordinate puntuali turbine d'impianto e caratteristiche tecniche generali

4.2 METODOLOGIA DI ANALISI

La valutazione tecnica è stata 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 moltitudine di aspetti che caratterizzano le diverse fasi progettuali. Il modulo SHADOW è quello specifico per la valutazione dell'evoluzione dell'ombra e del flickering. I dati di input sono :

- modello DTM del terreno (fonte: *Project Wizard Elevation Data Grid - SRTM: Shuttle DTM 1 arc-second*) ;
- posizione degli aerogeneratori di progetto, con relativi modelli e caratteristiche dimensionali;
- posizione geografica dei recettori;
- dati meteorologici di una stazione di riferimento per il calcolo del "real case".

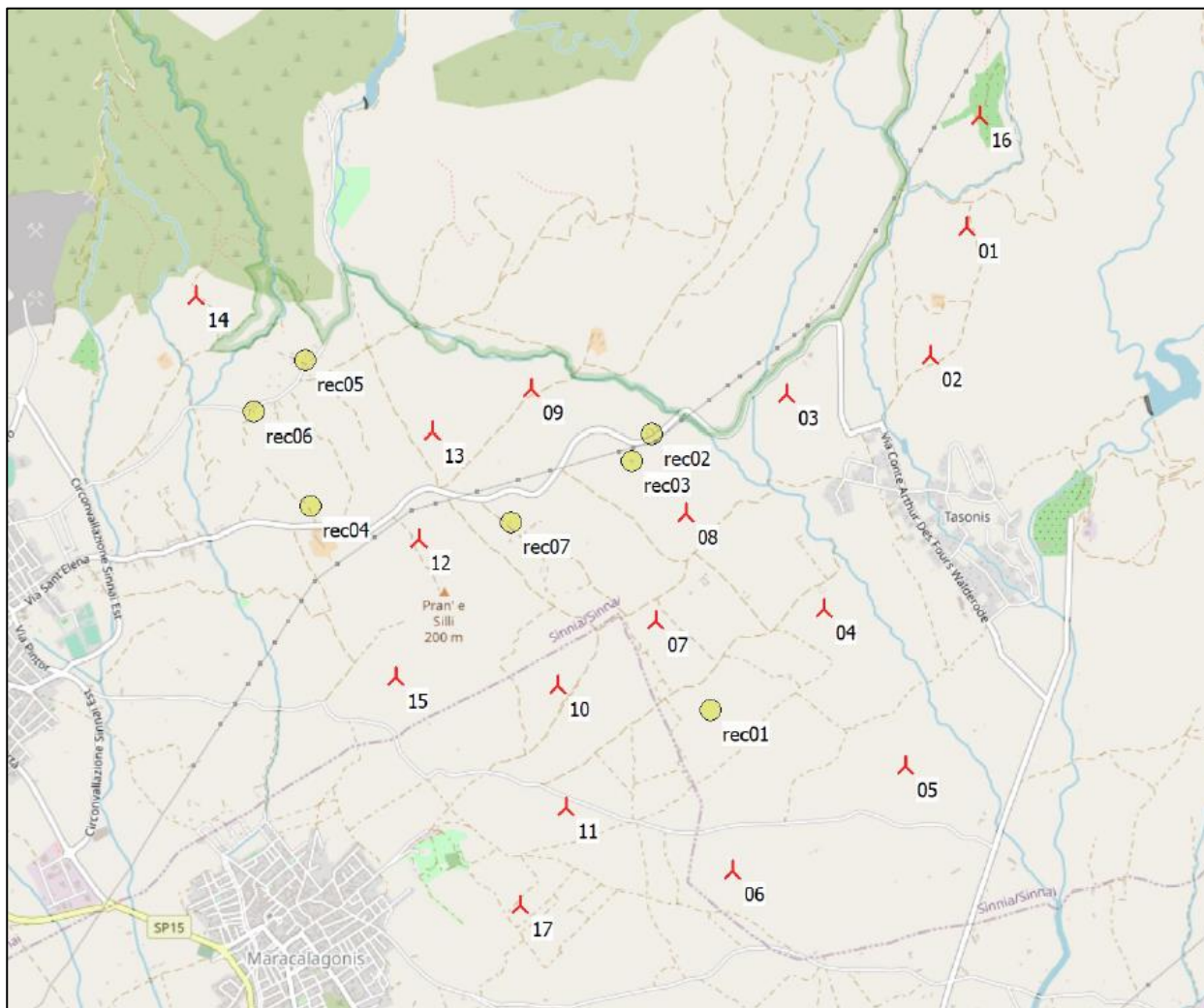


Figura 1 : Disposizione planimetrica degli aerogeneratori di progetto e dei recettori

Nel modello di calcolo dell'ombra utilizzato da windPRO 4.0® (Figura 2) i seguenti parametri definiscono la propagazione dell'ombra dietro il disco del rotore:

- Diametro del Sole, D: 1.390.000 km
- Distanza dal Sole, d: 150.000.000 km
- Angolo di attacco: 0.531 gradi

Teoricamente, ciò comporterebbe un impatto di ombra fino a 4,8 km con un rotore di 45 metri di diametro. In realtà le ombre non raggiungono mai il massimo teorico a causa delle caratteristiche ottiche dell'atmosfera. Quando il sole diventa troppo basso all'orizzonte e la distanza diventa troppo lunga, l'ombra si disperde prima che raggiunga il suolo (o il recettore). Per tale motivo il modulo SHADOW del software WindPRO assume 2 km come valore di default della distanza massima di propagazione dell'ombra.

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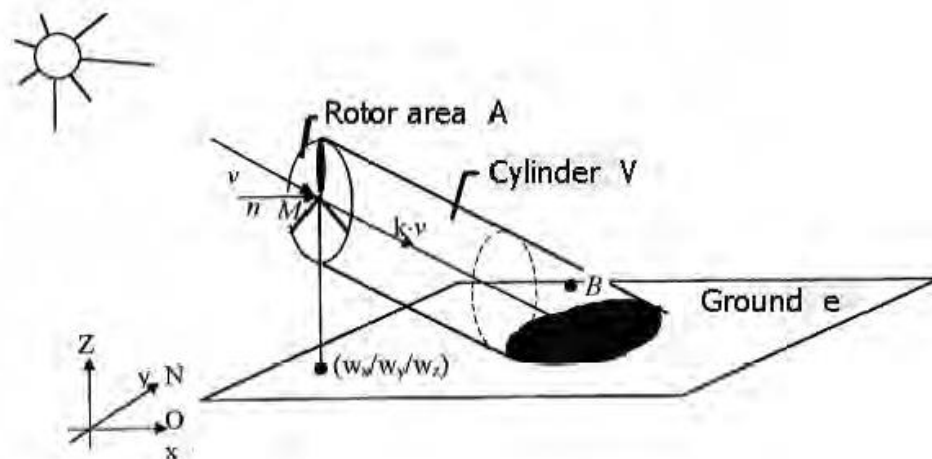


Figura 2 : Schema di calcolo del modulo Shadow

Il modulo SHADOW di WINDPRO®, nella definizione dei recettori permette di definire sia la dimensione della finestra che l'orientazione direzionale e angolare (inclinazione rispetto al piano orizzontale). Per i dettagli sullo studio dei recettori si rimanda al paragrafo 4.3.

Il modulo permette di effettuare il calcolo in due modalità definite rispettivamente “worst case” e “real case”.

Il calcolo nella modalità definita “worst case” viene effettuato nelle condizioni più sfavorevoli possibili, in quanto viene assunto che:

- il sole splende 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 direttrice sole-aerogeneratore (ovvero si assume che l'aerogeneratore “insegue” il sole);
- l'aerogeneratore è sempre operativo.

Sulla base di tali assunzioni, si evidenzia come la modalità definita “worst case” sia rappresentativa di una condizione irrealistica, e costituisca lo scenario peggiore possibile.

Il calcolo nella modalità definita “real case”, invece, consente di avvicinarsi maggiormente alle condizioni effettive e quindi al reale effetto del disturbo, in quanto permette di tener conto nei calcoli di dati statistici ricavati da una stazione anemometrica sita nella stessa area e di una stazione meteo che fornisce i dati di copertura nuvolosa della zona. In tal modo, viene ricavato un numero di ore di ombreggiamento più

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realistico poiché, a differenza del caso precedente, si tiene conto della reale presenza del sole e delle reali ore di funzionamento della turbina nell’arco di un anno anche in funzione della direzione del vento, ovvero vengono considerati tutti i fattori che influiscono sull’orientamento delle turbine rispetto al sole e dunque sull’ombra proiettata sui recettori.

Sulla base di tali assunzioni, si evidenzia come la modalità definita “real case” sia rappresentativa di una condizione di certo più realistica rispetto alla modalità “worst case”, ma comunque non ancora pienamente rappresentativa dell’effettivo fenomeno di ombreggiamento che si ottiene nella realtà, in quanto non tiene conto della presenza di eventuali ostacoli fonte di ombra (quali alberi, lampioni ecc) e in quanto soggetto anche alle assunzioni sull’esposizione dei recettori spiegate precedentemente.

Pertanto, nel corso del presente studio, qualsiasi riferimento alla dicitura “real case” dovrà considerarsi semplicemente come indicativo della modalità di calcolo del software, e sulla base delle considerazioni appena esposte, non dovrà intendersi come reale effetto del fenomeno.

Per lo studio relativo all’impianto eolico di progetto, i dati forniti per la stima delle ore di operatività degli aerogeneratori sono stati ottenuti tramite un calcolo sulla base di due dati di ingresso:

- Cut in (velocità del vento minima misurata in m/s a cui la turbina inizia a produrre energia e quindi si muove) e Cut out (soglia massima di velocità del vento, oltre la quale l’impianto si ferma) (Figura 3):

Wind Climate	DIBt S, IEC S
	PO7200
Cut-In, V_{in}	3 m/s
Cut-Out (10 min exponential avg.), V_{out}	25 m/s]
Re-Cut In (10 min exponential avg.)	23 m/s

Figura 3 : Valori di Cut in e Cut out turbine VESTAS V172-7.2

- Tabella del vento ricavata dal tool “Wind Prospecting” di WIND PRO®; tale dato è stato ricavato esattamente nel punto baricentrico dell’impianto (punto 2 della figura 4):

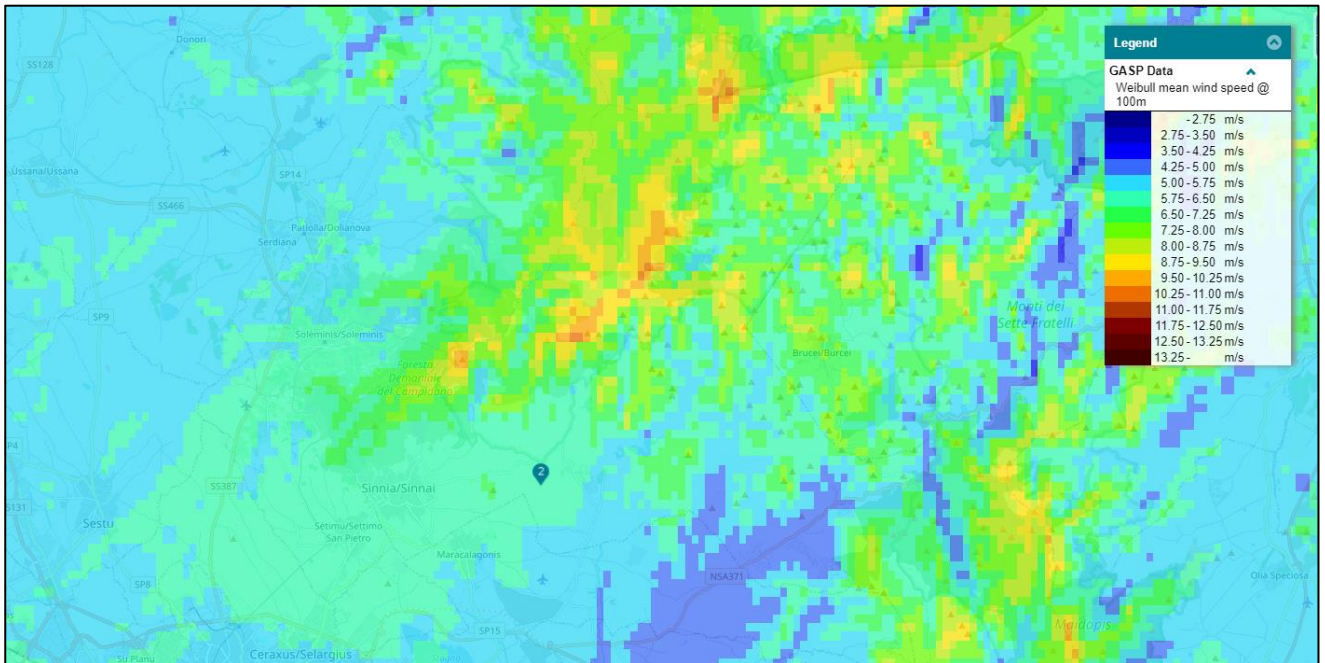


Figura 4 : Estratto mappa del vento dal tool “Wind Prospecting”

In tale punto è stata generata la tabella del vento di seguito mostrata:

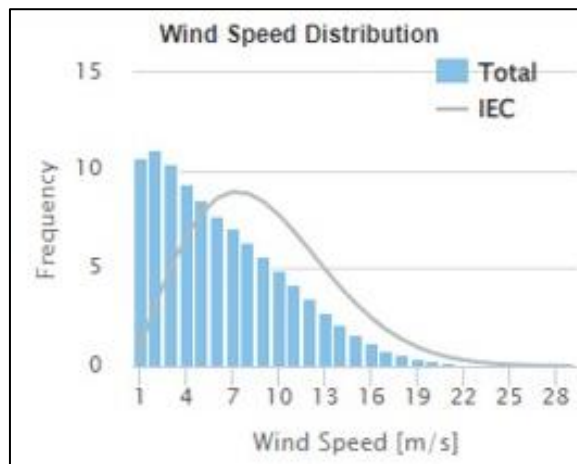


Tabella 2 : Tabella del vento dal tool “Wind Prospecting”

L’obbiettivo del calcolo, come detto, è la stima delle ore di operatività degli aerogeneratori (“ore utili”); quindi si è considerato il numero di ore di cui è composto un anno (8760 ore) ed è stato sottratto il numero di ore rispettivamente al di sotto ed al di sopra delle soglie di Cut in e Cut Out. Il risultato ottenuto è stato che gli areogeneratori saranno in movimento per 5.943 ore all’anno, pari a circa il 68 % del totale numero di ore.

Per l'indicazione, invece, della reale presenza del sole nel corso di un anno è stata considerata la stazione meteorologica di Cagliari Elmas posta a 19 km di distanza dall'impianto (Figura 5):

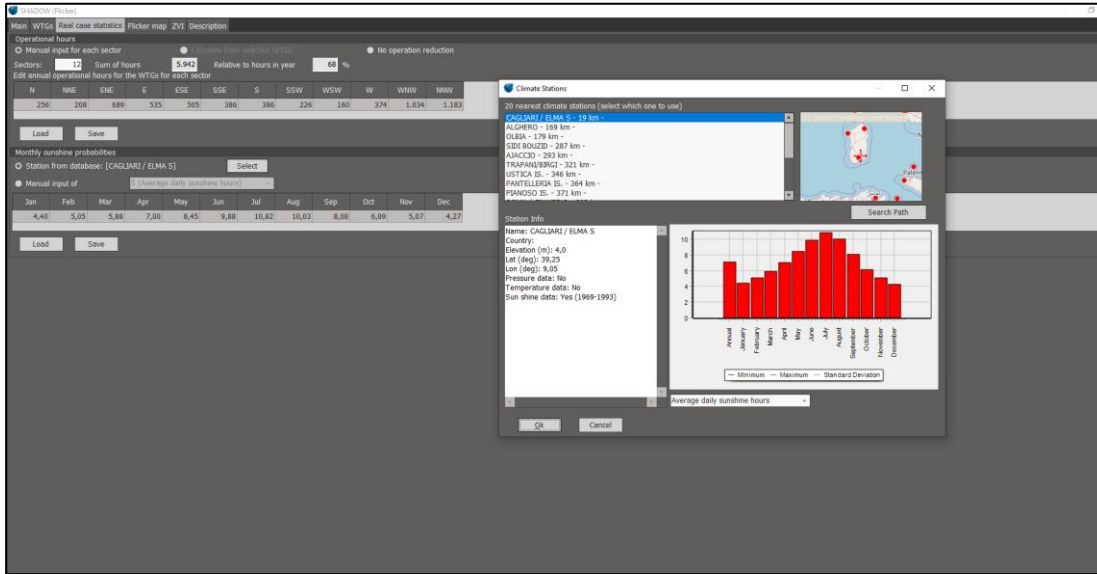


Figura 5 : Caratteristiche della stazione meteorologica di riferimento per i valori di probabilità di soleggiamento mensile per il calcolo "real case"

L'ultima sezione di WINPRO dedicata all'inserimento dei dati della simulazione, prevede la suddivisione del valore delle reali ore di movimento delle pale nei vari settori angolari di vento.

Come detto, l'analisi del vento per sezioni è stata ricavata dalla tabella di "Wind Prospecting":

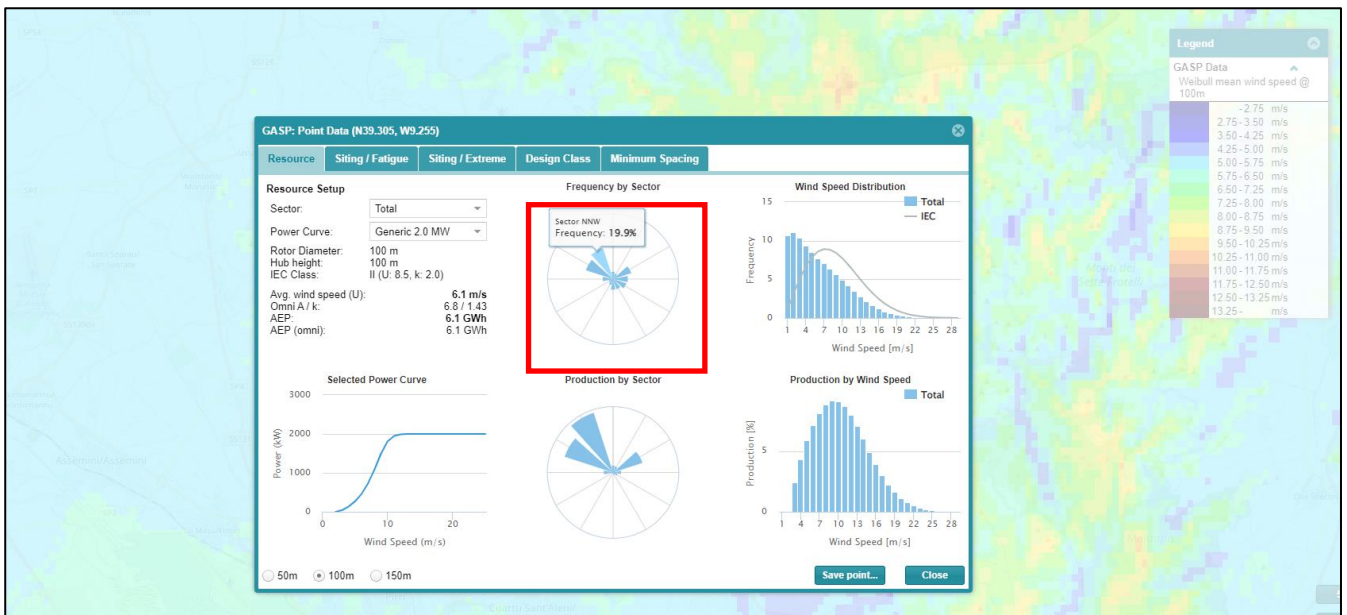


Figura 6 : Frequenza del vento per settore dal tool "Wind Prospecting"


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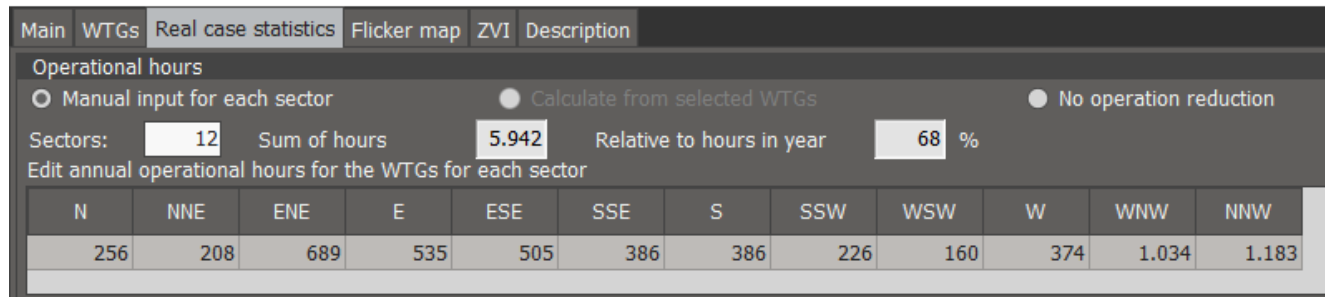
Incrociando quindi i dati delle ore utili alla frequenza del vento per settore, è stata redatta la seguente tabella:

SETTORE	FREQUENZA VENTO PER SETTORE	ORE PER SETTORE/ANNO
N	4,3%	256
NNE	3,5%	208
ENE	11,6%	689
E	9,0%	535
ESE	8,5%	505
SSE	6,5%	386
S	6,5%	386
SSW	3,8%	226
WSW	2,7%	160
W	6,3%	374
WNW	17,4%	1034
NNW	19,9%	1183

Tabella 3 : Calcolo ore utili di funzionamento per settore di vento

Tale calcolo è servito alla compilazione della seguente tabella di WINDPRO :

 SHADOW (Flicker)



The screenshot shows the 'Real case statistics' tab in the SHADOW (Flicker) software. It displays the following data:

- Operational hours: Manual input for each sector (selected), Calculate from selected WTGs, No operation reduction.
- Sectors: 12
- Sum of hours: 5.942
- Relative to hours in year: 68 %

Below the statistics is a table of operational hours per sector:

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW
256	208	689	535	505	386	386	226	160	374	1.034	1.183

Tabella 4 : Tabella WINDPRO compilata con i dati di operatività per settore di vento

4.4 INDIVIDUAZIONE E CLASSIFICAZIONE DEI RECETTORI

Ai fini della previsione degli impatti indotti sulle abitazioni dall'impianto eolico in progetto, sono stati individuati i recettori presenti nei pressi degli aerogeneratori.

La sensibilità di un recettore rispetto al fenomeno di ombreggiamento dipende, oltre che alla sua posizione, anche dall'esposizione delle sue parti vetrate (finestre o altro) rispetto alla direttrice sole-turbina: infatti, nel caso in cui un edificio non abbia alcuna finestratura sul lato esposto al fenomeno di ombreggiamento, il fastidio per gli occupanti dello stesso sarà nullo.

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Nella simulazione di WINDPRO è stato considerato il caso più cautelativo impostando i recettori in modalità serra (“green house mode”). Con questa impostazione si ipotizza che tutte le pareti siano vetrate e quindi potenzialmente esposte al fenomeno di ombreggiamento.

Inoltre, è stata trascurata la presenza di alberi o altri ostacoli che, intercettando le ombre prodotte dagli aerogeneratori, potrebbero ridurre il fenomeno.

Di seguito sono riportati i riferimenti geografici dei fabbricati con classe catastale A (sensibili) riscontrati all’interno dell’area di analisi:

ID RECETTORE	Comune	Foglio	Particella	Latitudine UTM 32 N	Longitudine UTM 32 N	Categoria	Tipologia
rec01	Sinnai (CA)	54	233	4349842	522036	A03	Abitazioni di tipo economico
rec02	Sinnai (CA)	38	199	4351366	521704	D10/A4	Abitazioni di tipo popolare
rec03	Sinnai (CA)	39	188	4351222	521595	D10/A4	Abitazioni di tipo popolare
rec04	Sinnai (CA)	37	738	4350966	519805	A3	Abitazioni di tipo economico
rec05	Sinnai (CA)	29	370	4351771	519773	A03	Abitazioni di tipo economico
rec06	Sinnai (CA)	37	719	4351484	519489	A03	Abitazioni di tipo economico
rec07	Sinnai (CA)	39	192	4350877	520923	A04	Abitazioni di tipo popolare

Tabella 5 : Tabella recettori sensibili

La posizione prevista per gli aerogeneratori e l’indicazione dei recettori sensibili sono mostrati nel seguente estratto di mappa:

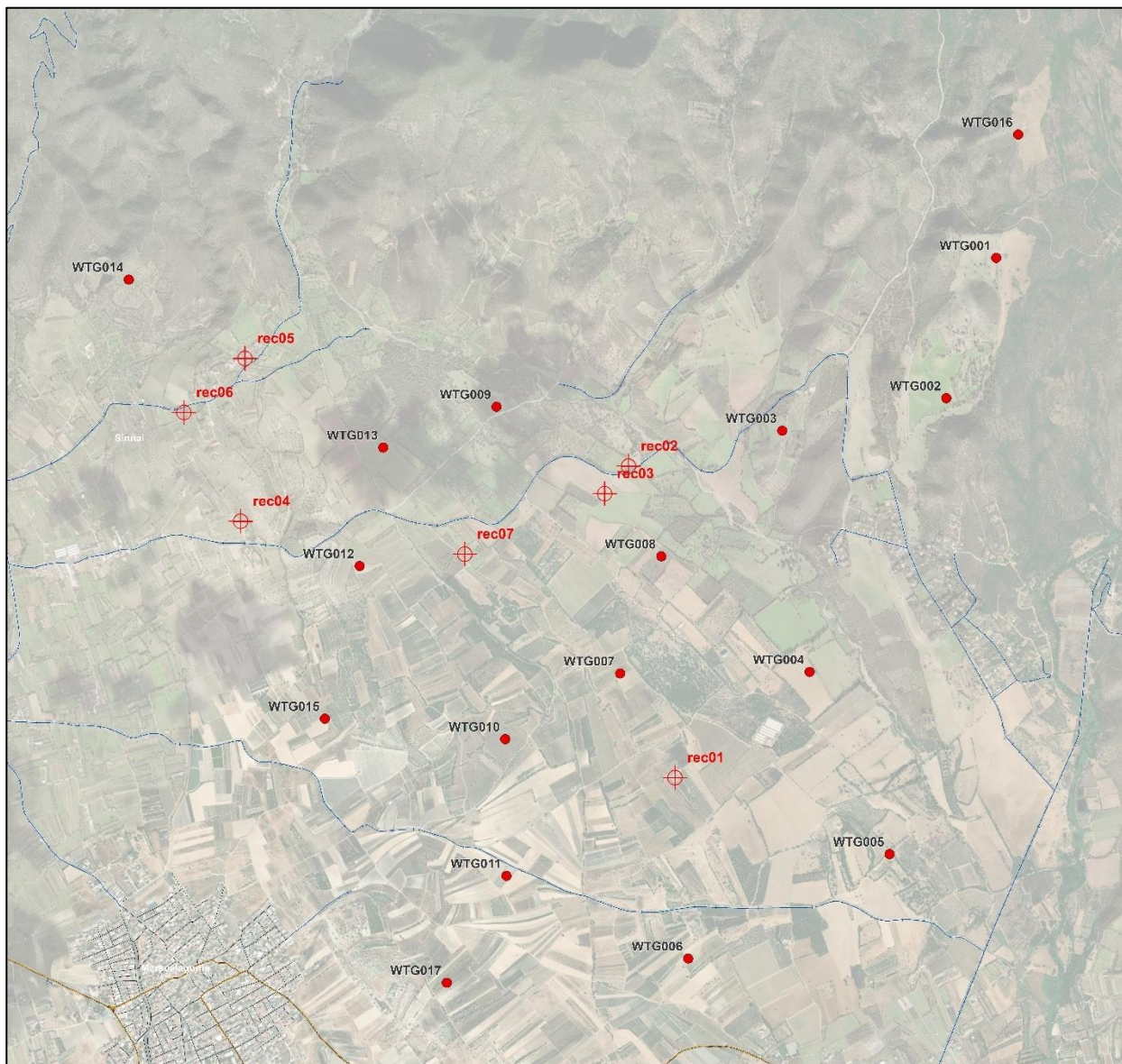


Figura 7 : Estratto di mappa con indicazione dei recettori sensibili

Committente: ECOWIND 6 S.r.l. Via Alessandro Manzoni, 30 20121 Milano (MI)	PROGETTO PER LA COSTRUZIONE ED ESERCIZIO DI UN PARCO EOLICO DELLA POTENZA DI 122,4 MW E RELATIVE OPERE DI CONNESSIONE NEI COMUNI DI SINNAI, MARACALAGONIS, QUARTUCCIU, SETTIMO SAN PIETRO E SELARGIUS (CA)	Nome del file: <p style="text-align: right;">SIN-AMB-REL-071_00</p>
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5 DESCRIZIONE DELLA STIMA DEGLI IMPATTI E REPORT WINDPRO (ALLEGATO A)

Grazie al Modulo SHADOW di WindPro è stato possibile individuare sia in forma grafica, sia in forma tabellare, l'ombreggiamento generato dagli aerogeneratori di impianto, potendo cogliere le potenziali criticità derivanti dall'installazione dell'impianto sull'area oggetto di indagine.

Le considerazioni che seguono trovano fondamento dal calcolo e dall'esame del caso "Real case", ovvero quello eseguito ponderando lo sfarfallio con le ore stimate di operatività dell'aerogeneratore, le direzioni del vento e l'eliofania rilevata (nel caso in esame, quella constatata dalla stazione di Cagliari-Elmas). Nel mondo reale, infatti, il sole non splende sempre (e di conseguenza non sempre si intercorre nella generazione del fenomeno) e la turbina non sempre è in movimento.

I calcoli effettuati ponendo alla base tali considerazioni hanno determinato che 4 recettori sensibili sui 7 presi in esame sono situati al di fuori del cono d'ombra, riportando meno di 30h/anno di ombreggiamento. Nei restanti due casi, i fabbricati presenti nell'intorno delle turbine superano le 30 h/anno; i recettori in questione sono rec02 e rec03 . Il massimo impatto potenziale può essere visualizzato nella seguente Figura 7 realizzato tramite il software WINDPRO:

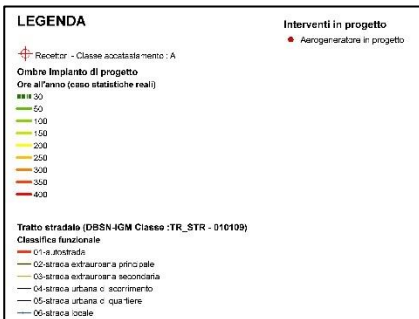
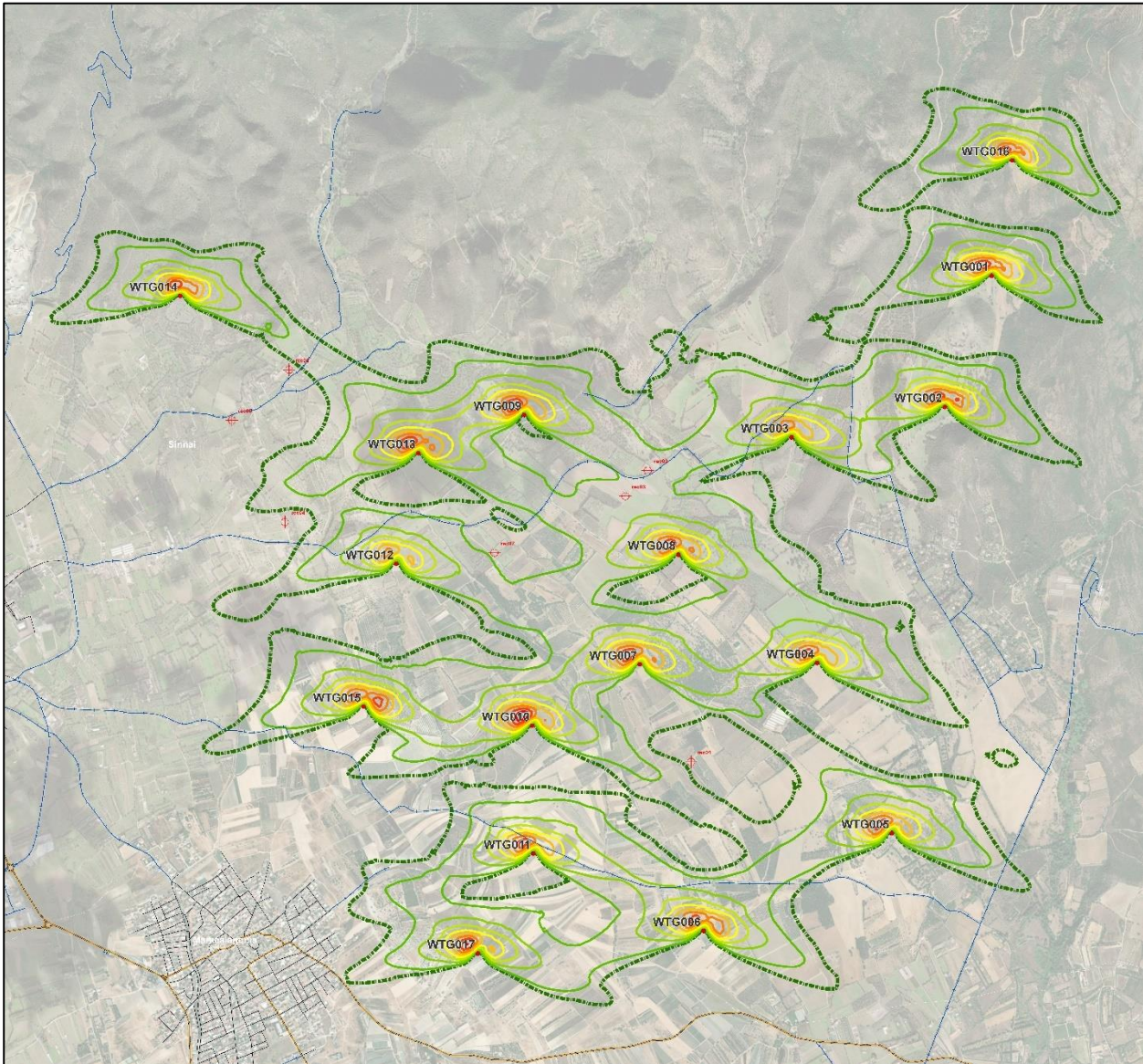


Figura 8 : Mappa shadow flickering "Real case" con indicazione recettori

Committente: ECOWIND 6 S.r.l. Via Alessandro Manzoni, 30 20121 Milano (MI)	PROGETTO PER LA COSTRUZIONE ED ESERCIZIO DI UN PARCO EOLICO DELLA POTENZA DI 122,4 MW E RELATIVE OPERE DI CONNESSIONE NEI COMUNI DI SINNAI, MARACALAGONIS, QUARTUCCIU, SETTIMO SAN PIETRO E SELARGIUS (CA)	Nome del file: <p style="text-align: right;">SIN-AMB-REL-071_00</p>
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La Tabella 6 riporta i risultati dell'effetto di ombreggiamento generato dall'impianto di progetto su ogni recettore identificato, modellati in modalità "green-house", ovvero senza indicare le dimensioni e le orientazioni delle singole finestre, ma considerando il recettore cautelativamente come se tutte le pareti esterne fossero esposte al fenomeno.

La tabella è composta dalle seguenti colonne:

- ID RECETTORE : identificativo del recettore;
- Ore all'anno di shadow flickering (ore/anno).

Il limite che si è scelto come riferimento è di 30 ore/anno (in rosso i valori oltre il limite). Per il report del calcolo effettuato si rimanda all'allegato A.

ID RECETTORE	Ore all'anno di shadow flickering (ore/anno)
rec01	27:17
rec02	64:05
rec03	70:51
rec04	24:22
rec05	15:50
rec06	17:30

Tabella 6 : N° ore all'anno di shadow flickering interferenti con recettori sensibili

Un'altra stima utile è quella riportata nella seguente tabella 7 che riporta il numero di ore che colpiscono i recettori per areogeneratore:

ID WTG	N° ore di flickering sui recettori prodotto da ciascun WTG (ore/anno)
1	0:00
2	05:26
3	34:11:00
4	04:09
5	04:10
6	00:00
7	10:30
8	45:32:00
9	39:04:00

10	15:58
11	9:36
12	55:25:00
13	32:00:00
14	00:00
15	01:39
16	00:00
17	0:00

Tabella 7 : N° ore di flickering sui recettori prodotto da ciascun WTG (ore/anno)

Tale tabella evidenzia che i contributi alle ombre sono dati dagli areogeneratori 3,8,9,12 e 13; gli altri generatori risultano quindi ininfluenti per il flickering sui recettori sensibili.

Per quanto riguarda le strade, risultano impattate unicamente strade locali a basso scorrimento e non risultano impattate strade statali e provinciali.

Come si evince dalla Figura 8, il recettore residenziale rec03 si trova entro il buffer (isolinea verdone tratteggiato) delle 30 ore/annue di effetto ombra, essendo localizzato in una posizione tale per cui, rispetto all'aerogeneratore WTG08, l'effetto di shadow flickering si manifesta durante le ore mattutine (soltanto nei mesi invernali per due ore al giorno):

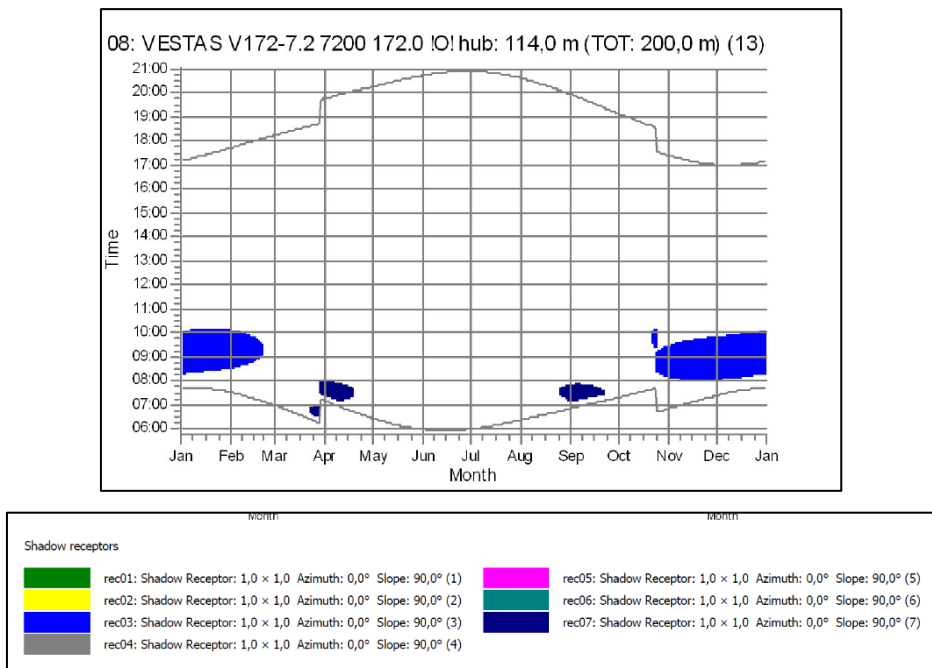


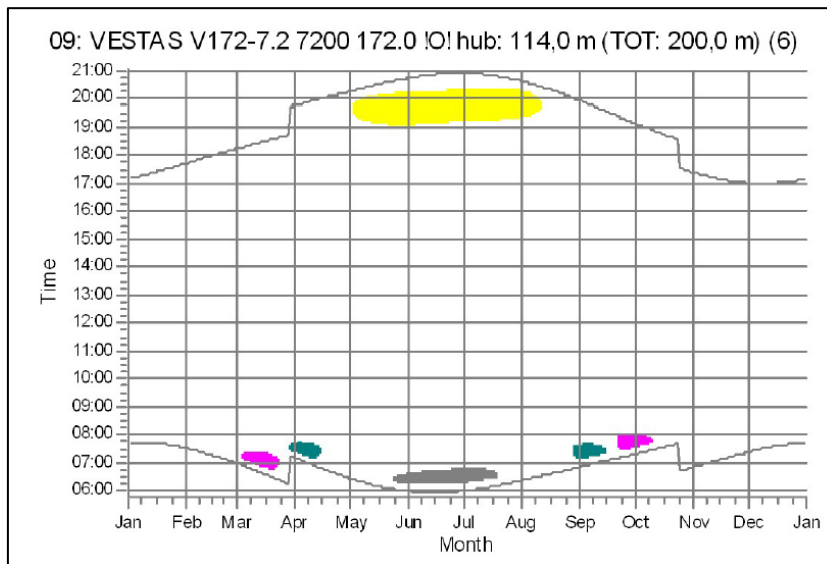
Figura 9 : Grafico ombre causate da WTG08 sui recettori

Nella seguente immagine viene mostrata l'area d'intorno del recettore 03, che appare molto alberata:



Figura 10 : Area intorno a rec03

Il recettore residenziale rec02 si trova anch'esso entro il buffer (isolinea verdone tratteggiato) delle 30 ore/annue di effetto ombra, essendo localizzato in una posizione tale per cui, rispetto all'aerogeneratore WTG09, l'effetto di shadow flickering si manifesta durante le ore serali (soltanto nei mesi estivi e solo per un'ora al giorno):










Shadow receptors	
	rec01: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (1)
	rec02: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (2)
	rec03: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (3)
	rec04: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (4)
	rec05: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5)
	rec06: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6)
	rec07: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Figura 11 : Grafico ombre causate da WTG09 sui recettori

Committente: ECOWIND 6 S.r.l. Via Alessandro Manzoni, 30 20121 Milano (MI)	PROGETTO PER LA COSTRUZIONE ED ESERCIZIO DI UN PARCO EOLICO DELLA POTENZA DI 122,4 MW E RELATIVE OPERE DI CONNESSIONE NEI COMUNI DI SINNAI, MARACALAGONIS, QUARTUCCIU, SETTIMO SAN PIETRO E SELARGIUS (CA)	Nome del file: <p style="text-align: right;">SIN-AMB-REL-071_00</p>
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Nella seguente immagine viene mostrata come l'area d'intorno del recettore 02, che appare anch'essa molto alberata a ovest dell'abitazione stessa:



Figura 12 : Area intorno a rec02

Come detto, entrambi i recettori sono classificati a livello catastale alla categoria A/4 – Abitazione di tipo popolare, per cui risulta importante valutarne l'impatto generato dall'installazione delle turbine di progetto.

Come da simulazione di WindPRO, essi subiscono l'effetto ombra per via delle "ombre lunghe" che si generano la mattina presto (rec03) e al tramonto (rec02) dall'intercetto con le pale.

È utile ricordare come la distanza tra i due recettori e l'aerogeneratore 8 sia rispettivamente 476 m (rec02) e 419 m (rec03) e quindi, come detto, poiché nella realtà le zone maggiormente impattate ricadono generalmente entro i 300 m di distanza dalle turbine, l'interferenza risulta trascurabile.

In più, come mostrato nelle precedenti immagini, si nota la notevole presenza di alberature che attorniano i terreni della zona, che inevitabilmente vengono a stretto contatto anche con le strutture esistenti.

In particolare, tutti e due gli edifici risultano molto coperti da vegetazione esistente la quale, in termini di ombreggiamento, ha un impatto notevole sulle stesse negli stessi periodi nei quali il problema di sfarfallio risulta maggiore. In tali casi, l'ombra e lo schermo offerto dalla vegetazione già esistente creano una barriera naturale nei confronti dello sfarfallio, che non va ad incidere direttamente sugli edifici e, di conseguenza, sugli infissi posizionati sulle pareti degli stessi. La situazione, pertanto, qualora accertata da appositi rilievi in fase esecutiva, non pone problemi in termini di contrasto al problema dello shadow flickering.

Inoltre va anche considerato che i più recenti aerogeneratori con rotore tripala operano con velocità inferiori ai 35 giri al minuto (rpm), corrispondenti ad una frequenza di passaggio delle pale sulla verticale inferiore a 1.7 Hz, quindi minore della frequenza critica dei 2.5Hz.

Committente: ECOWIND 6 S.r.l. Via Alessandro Manzoni, 30 20121 Milano (MI)	PROGETTO PER LA COSTRUZIONE ED ESERCIZIO DI UN PARCO EOLICO DELLA POTENZA DI 122,4 MW E RELATIVE OPERE DI CONNESSIONE NEI COMUNI DI SINNAI, MARACALAGONIS, QUARTUCCIU, SETTIMO SAN PIETRO E SELARGIUS (CA)	Nome del file: <p style="text-align: right;">SIN-AMB-REL-071_00</p>
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Nella fattispecie, gli aerogeneratori Vestas proposti nel presente progetto raggiungono una velocità di rotazione massima di 9,5 rpm, quindi ampiamente inferiore a quelle ritenute spiacevoli per l'uomo.

Nelle pagine seguenti vengono riportati i report WINDPRO della simulazione descritta (ALLEGATO A).

ALLEGATO A

REPORT SIMULAZIONE WINDPRO

SHADOW - Main Result

Assumptions for shadow calculations

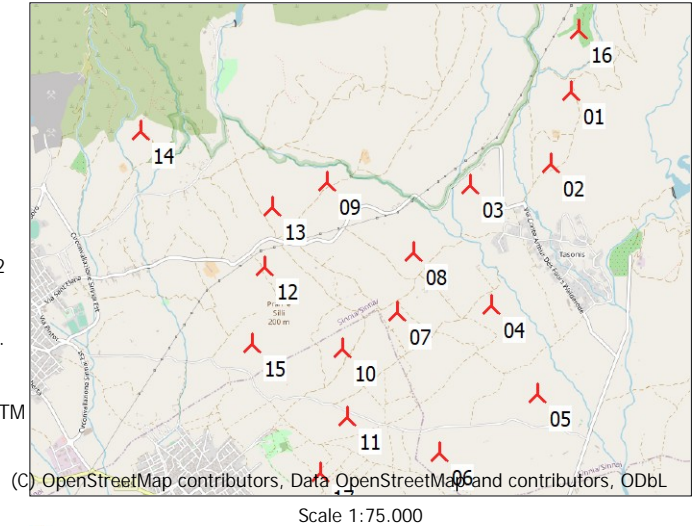
Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

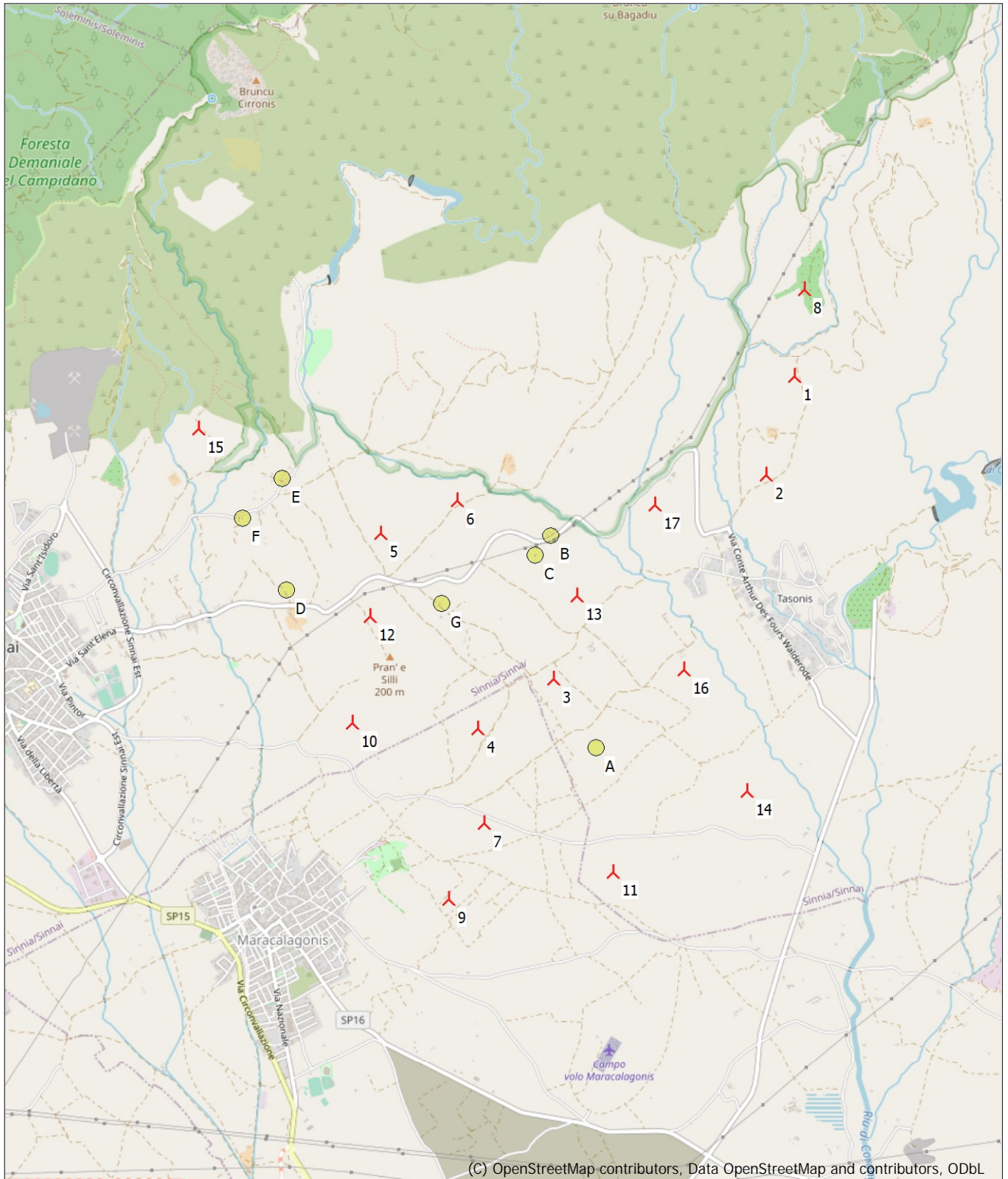
All coordinates are in
UTM (north)-WGS84 Zone: 32



WTGs

	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
01	523.452	4.352.514	218,8	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
02	523.252	4.351.806	174,2	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
03	522.451	4.351.591	178,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
04	522.666	4.350.409	129,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
05	523.121	4.349.535	112,3	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
06	522.160	4.348.954	104,9	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
07	521.731	4.350.339	147,4	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
08	521.895	4.350.931	148,2	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
09	521.031	4.351.615	174,8	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
10	521.184	4.349.977	146,3	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
11	521.235	4.349.302	125,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
12	520.407	4.350.784	196,6	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
13	520.485	4.351.376	184,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
14	519.172	4.352.122	236,6	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
15	520.286	4.350.019	129,9	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
16	523.520	4.353.132	295,3	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
17	520.976	4.348.755	133,8	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-

SHADOW - Map



0 500 1000 1500 2000 m

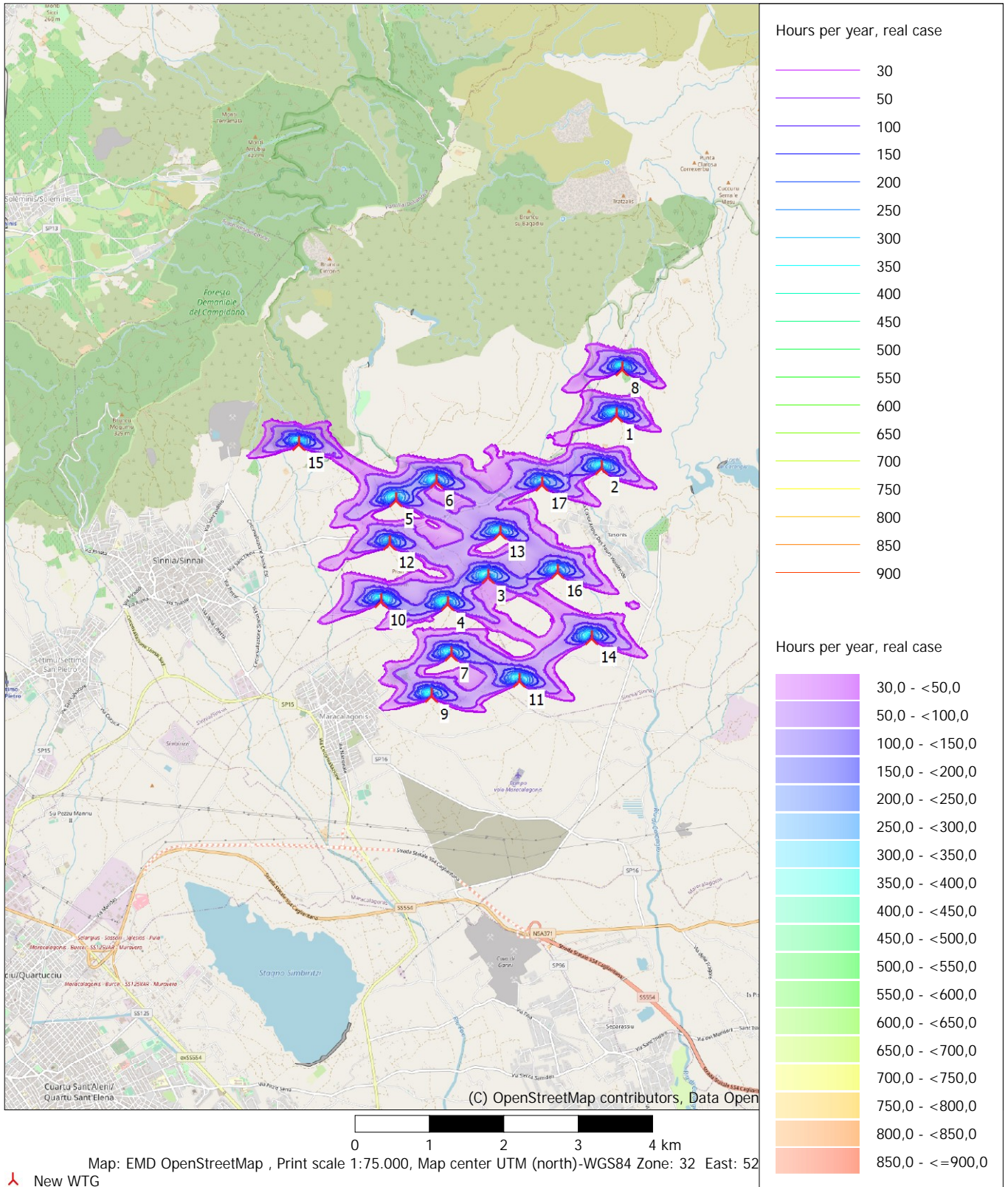
Map: EMD OpenStreetMap , Print scale 1:40.000, Map center UTM (north)-WGS84 Zone: 32 East: 521.346 North: 4.350.943

🚩 New WTG

🟡 Shadow receptor

Flicker map level: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM 1 arc-second)

SHADOW - Map



SHADOW - Main Result

Assumptions for shadow calculations

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

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

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

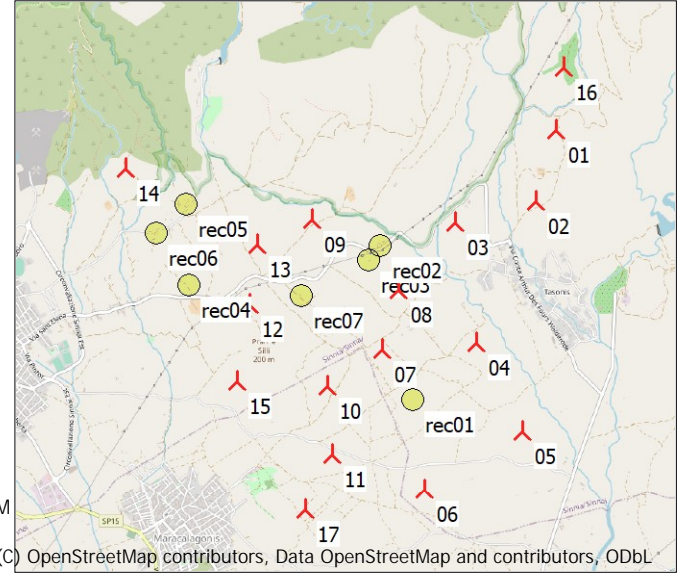
Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
Receptor grid resolution: 1,0 m

All coordinates are in
UTM (north)-WGS84 Zone: 32

WTGs

	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]
			[m]									
01	523.452	4.352.514	218,8	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
02	523.252	4.351.806	174,2	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
03	522.451	4.351.591	178,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
04	522.666	4.350.409	129,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
05	523.121	4.349.535	112,3	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
06	522.160	4.348.954	104,9	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
07	521.731	4.350.339	147,4	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
08	521.895	4.350.931	148,2	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
09	521.031	4.351.615	174,8	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
10	521.184	4.349.977	146,3	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
11	521.235	4.349.302	125,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
12	520.407	4.350.784	196,6	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
13	520.485	4.351.376	184,0	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
14	519.172	4.352.122	236,6	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
15	520.286	4.350.019	129,9	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
16	523.520	4.353.132	295,3	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-
17	520.976	4.348.755	133,8	VESTAS V172-7.2 7200 172.0 !O! h...	Yes	VESTAS	V172-7.2-7.200	7.200	172,0	114,0	1.908	-



Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
			[m]	[m]	[m]	a.g.l.	window		(ZVI) a.g.l.
						[m]	[°]		[m]
rec01	522.036	4.349.842	133,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
rec02	521.704	4.351.366	158,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
rec03	521.595	4.351.222	157,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
rec04	519.805	4.350.966	167,4	1,0	1,0	1,0	90,0	"Green house mode"	2,0
rec05	519.773	4.351.771	206,0	1,0	1,0	1,0	90,0	"Green house mode"	2,0
rec06	519.489	4.351.484	176,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0
rec07	520.923	4.350.877	172,9	1,0	1,0	1,0	90,0	"Green house mode"	2,0

SHADOW - Main Result

Calculation Results

Shadow receptor

Shadow, expected values

No.	Shadow hours per year [h/year]
rec01	27:17
rec02	64:05
rec03	70:51
rec04	24:22
rec05	15:50
rec06	17:30
rec07	47:53

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

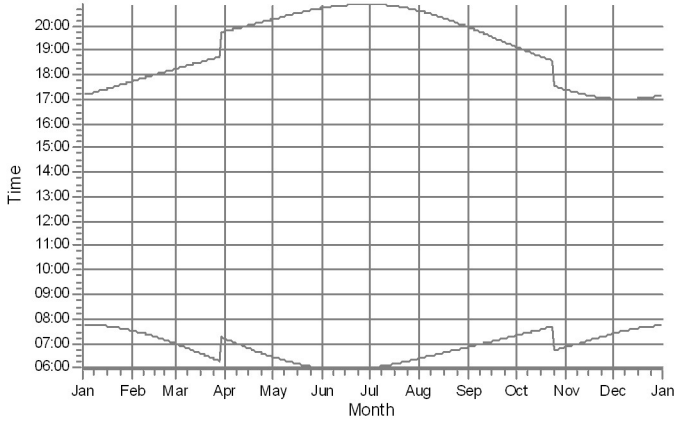
No.	Name	Expected [h/year]
01	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (1)	0:00
02	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (2)	5:26
03	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (17)	34:11
04	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (16)	4:09
05	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (14)	4:10
06	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (11)	0:00
07	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (3)	10:30
08	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (13)	45:32
09	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (6)	39:04
10	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (4)	15:58
11	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (7)	9:36
12	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (12)	55:25
13	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (5)	32:00
14	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (15)	0:00
15	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (10)	1:39
16	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (8)	0:00
17	VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (9)	0:00

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

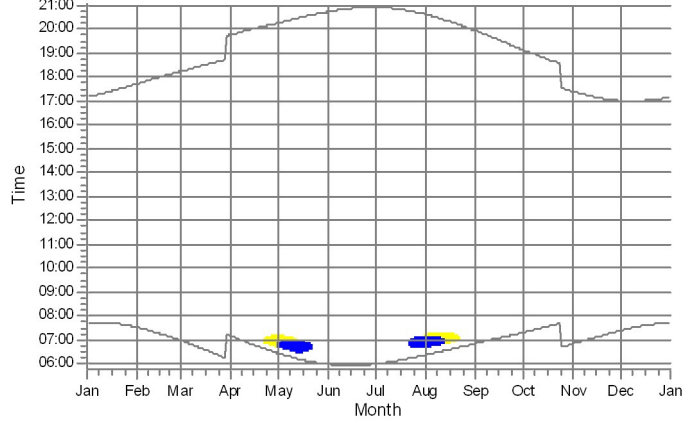
The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

SHADOW - Calendar per WTG, graphical

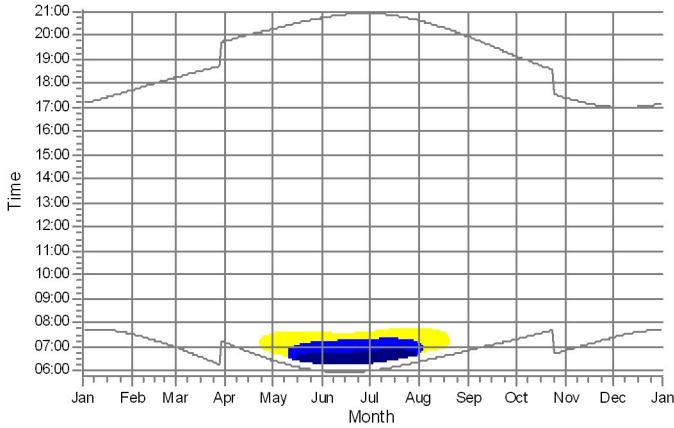
01: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (1)



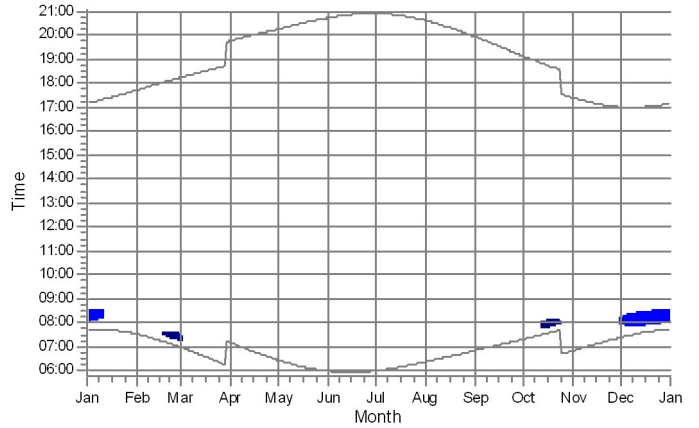
02: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (2)



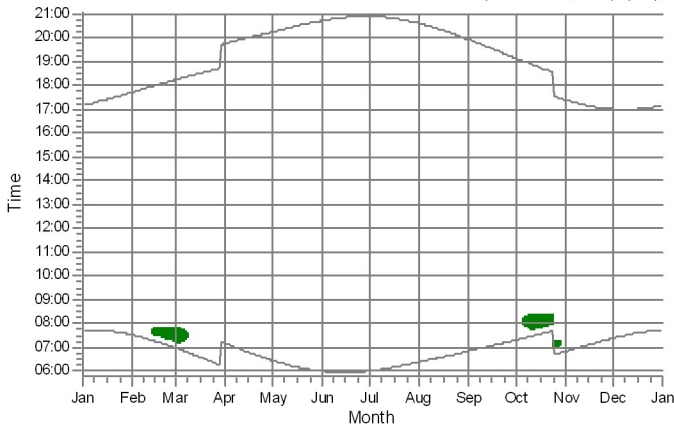
03: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (17)



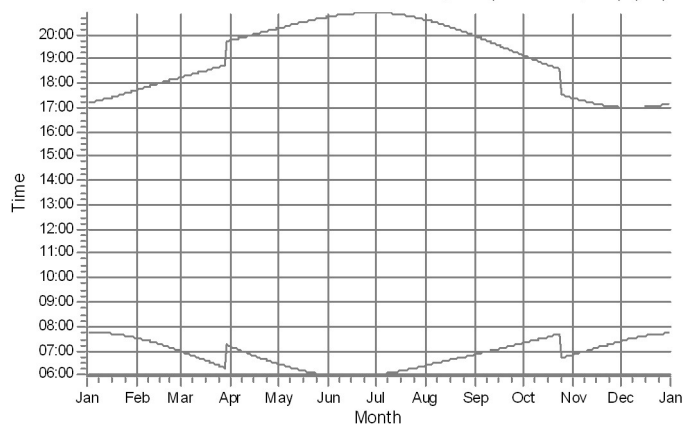
04: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (16)



05: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (14)



06: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (11)



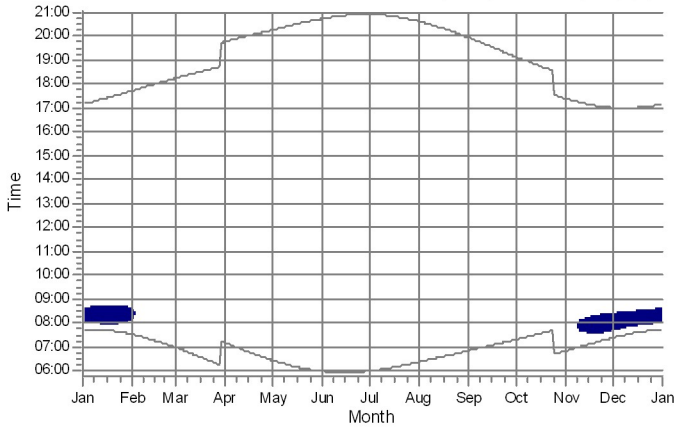
Shadow receptors

- rec01: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)
- rec02: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)

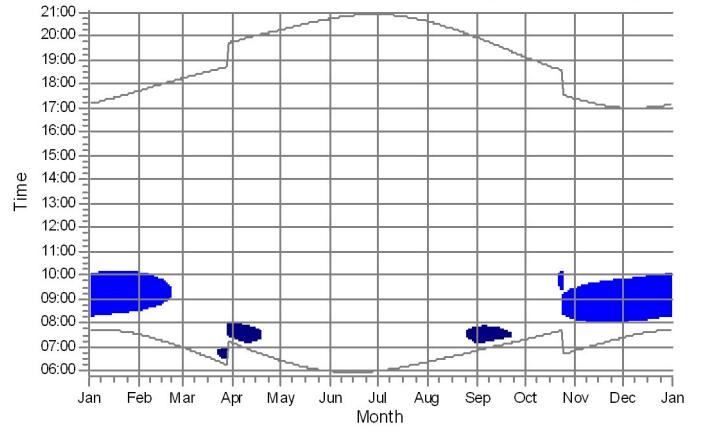
- rec03: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)
- rec07: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)

SHADOW - Calendar per WTG, graphical

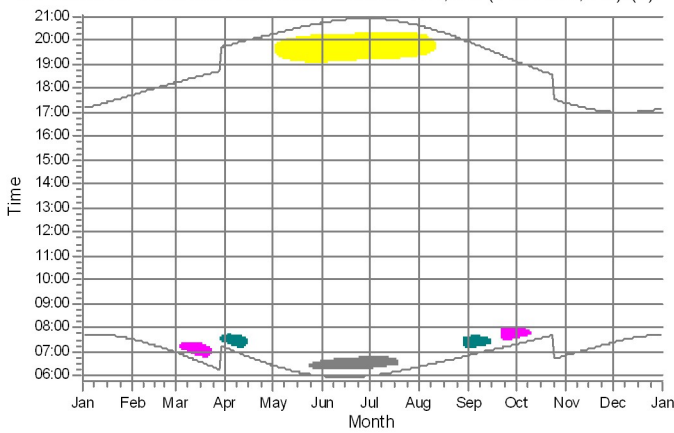
07: VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (3)



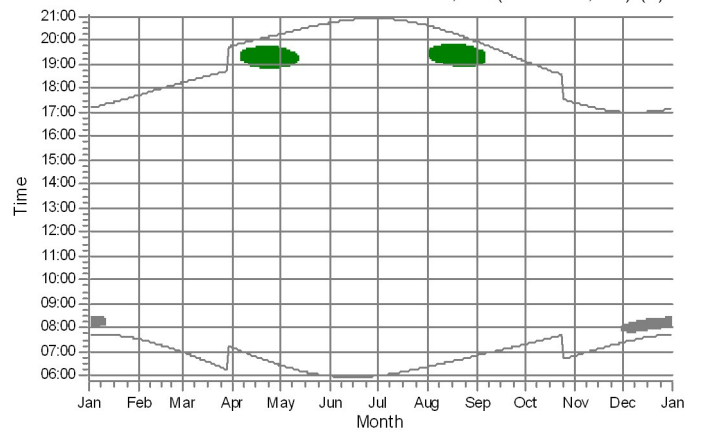
08: VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (13)



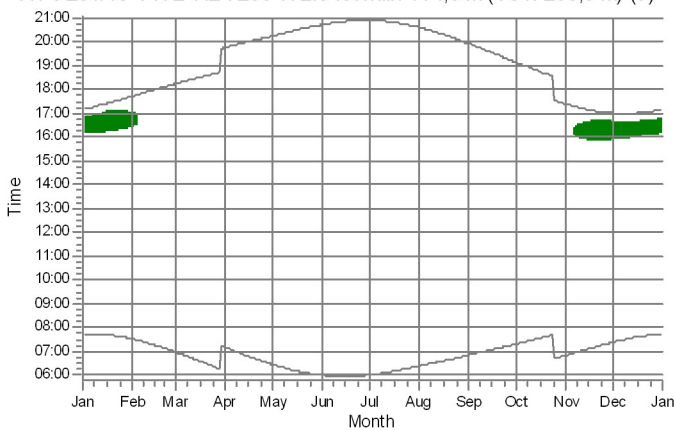
09: VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (6)



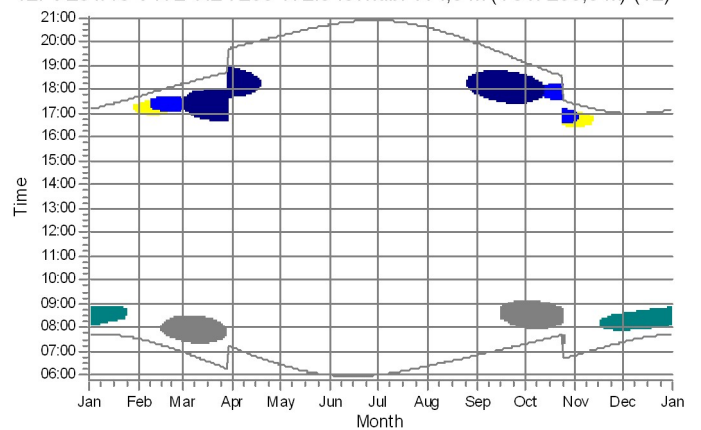
10: VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (4)










11: VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (7)



12: VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (12)

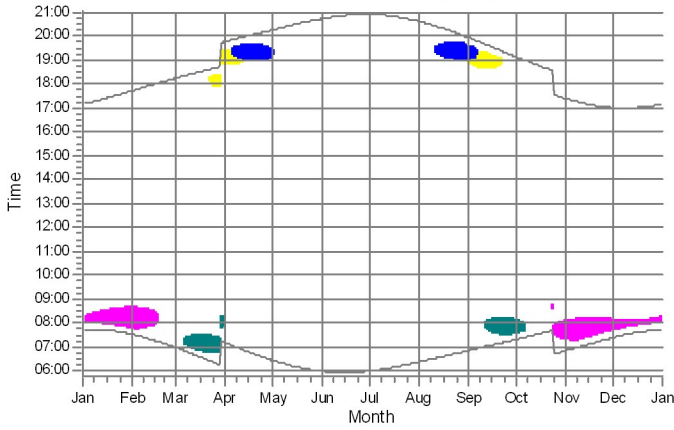


Shadow receptors

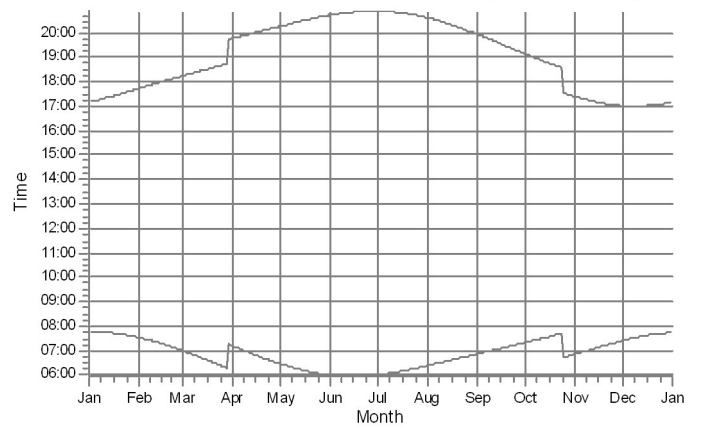
- | | | | |
|---|--|---|--|
|  | rec01: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1) |  | rec05: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5) |
|  | rec02: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2) |  | rec06: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | rec03: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3) |  | rec07: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7) |
|  | rec04: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (4) | | |

SHADOW - Calendar per WTG, graphical

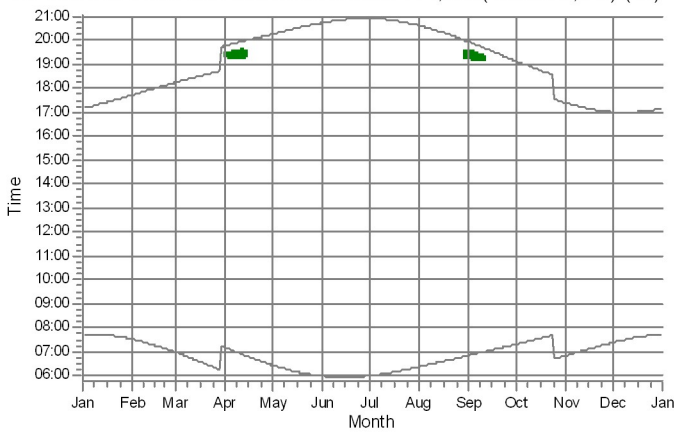
13: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (5)



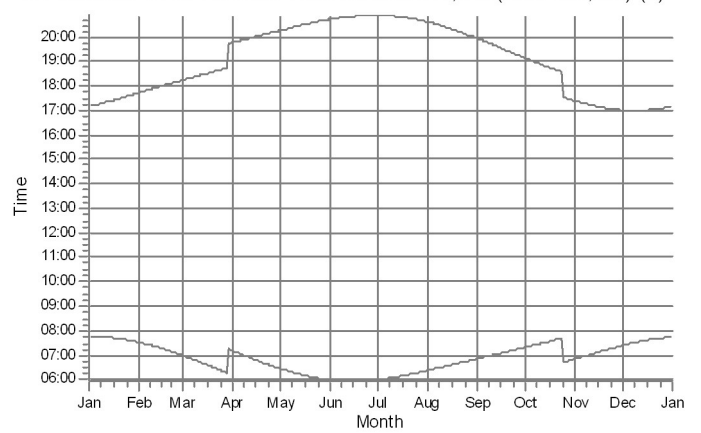
14: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (15)



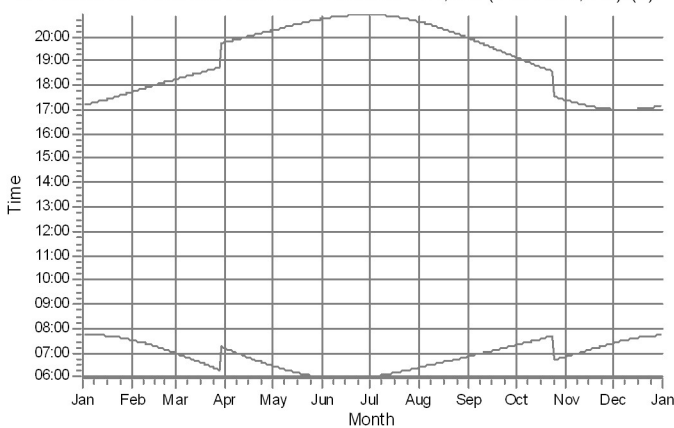
15: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (10)








16: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (8)



17: VESTAS V172-7.2 7200 172.0 IO! hub: 114,0 m (TOT: 200,0 m) (9)



Shadow receptors

- | | | | |
|---|--|---|--|
|  | rec01: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1) |  | rec05: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5) |
|  | rec02: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2) |  | rec06: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | rec03: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3) | | |

SHADOW - Calendar per WTG

WTG: 01 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (1)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43	07:31	06:58	07:09	06:26	05:59	06:00	06:22	06:51	07:19	06:50	07:23
	17:10	17:43	18:15	19:46	20:16	20:43	20:54	20:37	19:56	19:08	17:23	17:01
2	07:43	07:31	06:56	07:08	06:25	05:59	06:00	06:23	06:52	07:19	06:51	07:24
	17:11	17:44	18:16	19:47	20:17	20:44	20:54	20:36	19:54	19:06	17:22	17:01
3	07:44	07:30	06:55	07:06	06:24	05:58	06:01	06:24	06:53	07:20	06:53	07:25
	17:12	17:45	18:17	19:48	20:18	20:45	20:54	20:34	19:53	19:04	17:21	17:00
4	07:44	07:29	06:53	07:05	06:22	05:58	06:01	06:25	06:54	07:21	06:54	07:26
	17:13	17:46	18:18	19:49	20:19	20:46	20:54	20:33	19:51	19:03	17:20	17:00
5	07:44	07:28	06:52	07:03	06:21	05:58	06:02	06:26	06:55	07:22	06:55	07:27
	17:14	17:48	18:19	19:50	20:20	20:46	20:54	20:32	19:50	19:01	17:19	17:00
6	07:44	07:27	06:50	07:02	06:20	05:57	06:03	06:27	06:56	07:23	06:56	07:28
	17:15	17:49	18:20	19:51	20:21	20:47	20:53	20:31	19:48	19:00	17:18	17:00
7	07:44	07:26	06:49	07:00	06:19	05:57	06:03	06:28	06:56	07:24	06:57	07:29
	17:16	17:50	18:21	19:52	20:22	20:47	20:53	20:30	19:46	18:58	17:17	17:00
8	07:44	07:25	06:47	06:59	06:18	05:57	06:04	06:29	06:57	07:25	06:58	07:30
	17:16	17:51	18:22	19:53	20:23	20:48	20:53	20:29	19:45	18:57	17:16	17:00
9	07:43	07:24	06:46	06:57	06:17	05:57	06:04	06:30	06:58	07:26	06:59	07:31
	17:17	17:52	18:23	19:54	20:24	20:49	20:52	20:28	19:43	18:55	17:15	17:00
10	07:43	07:22	06:44	06:55	06:16	05:56	06:05	06:31	06:59	07:27	07:00	07:32
	17:18	17:54	18:24	19:55	20:25	20:49	20:52	20:27	19:42	18:53	17:14	17:00
11	07:43	07:21	06:43	06:54	06:15	05:56	06:06	06:32	07:00	07:28	07:01	07:32
	17:19	17:55	18:25	19:56	20:26	20:50	20:52	20:25	19:40	18:52	17:13	17:00
12	07:43	07:20	06:41	06:52	06:14	05:56	06:06	06:33	07:01	07:29	07:03	07:33
	17:20	17:56	18:26	19:57	20:27	20:50	20:51	20:24	19:38	18:50	17:12	17:00
13	07:43	07:19	06:40	06:51	06:13	05:56	06:07	06:33	07:02	07:30	07:04	07:34
	17:21	17:57	18:27	19:58	20:27	20:51	20:51	20:23	19:37	18:49	17:11	17:00
14	07:42	07:18	06:38	06:49	06:12	05:56	06:08	06:34	07:03	07:31	07:05	07:35
	17:23	17:58	18:28	19:59	20:28	20:51	20:50	20:21	19:35	18:47	17:10	17:01
15	07:42	07:17	06:36	06:48	06:11	05:56	06:08	06:35	07:04	07:32	07:06	07:35
	17:24	17:59	18:30	20:00	20:29	20:51	20:50	20:20	19:33	18:46	17:09	17:01
16	07:42	07:15	06:35	06:46	06:10	05:56	06:09	06:36	07:05	07:33	07:07	07:36
	17:25	18:00	18:31	20:01	20:30	20:52	20:49	20:19	19:32	18:45	17:09	17:01
17	07:41	07:14	06:33	06:45	06:09	05:56	06:10	06:37	07:06	07:34	07:08	07:37
	17:26	18:02	18:32	20:02	20:31	20:52	20:49	20:18	19:30	18:43	17:08	17:01
18	07:41	07:13	06:32	06:44	06:08	05:56	06:11	06:38	07:06	07:35	07:09	07:37
	17:27	18:03	18:33	20:03	20:32	20:53	20:48	20:16	19:29	18:42	17:07	17:02
19	07:40	07:12	06:30	06:42	06:07	05:56	06:11	06:39	07:07	07:36	07:10	07:38
	17:28	18:04	18:34	20:04	20:33	20:53	20:47	20:15	19:27	18:40	17:07	17:02
20	07:40	07:10	06:29	06:41	06:06	05:57	06:12	06:40	07:08	07:37	07:12	07:39
	17:29	18:05	18:35	20:05	20:34	20:53	20:47	20:13	19:25	18:39	17:06	17:03
21	07:39	07:09	06:27	06:39	06:06	05:57	06:13	06:41	07:09	07:38	07:13	07:39
	17:30	18:06	18:36	20:06	20:35	20:53	20:46	20:12	19:24	18:37	17:05	17:03
22	07:39	07:08	06:25	06:38	06:05	05:57	06:14	06:42	07:10	07:39	07:14	07:40
	17:31	18:07	18:37	20:07	20:36	20:54	20:45	20:11	19:22	18:36	17:05	17:04
23	07:38	07:06	06:24	06:37	06:04	05:57	06:15	06:43	07:11	07:41	07:15	07:40
	17:32	18:08	18:38	20:08	20:36	20:54	20:45	20:09	19:20	18:35	17:04	17:04
24	07:38	07:05	06:22	06:35	06:04	05:57	06:15	06:44	07:12	07:42	07:16	07:41
	17:34	18:09	18:39	20:09	20:37	20:54	20:44	20:08	19:19	18:33	17:04	17:05
25	07:37	07:03	06:21	06:34	06:03	05:58	06:16	06:45	07:13	06:43	07:17	07:41
	17:35	18:11	18:39	20:10	20:38	20:54	20:43	20:06	19:17	17:32	17:03	17:05
26	07:36	07:02	06:19	06:32	06:02	05:58	06:17	06:45	07:14	06:44	07:18	07:42
	17:36	18:12	18:40	20:11	20:39	20:54	20:42	20:05	19:16	17:31	17:03	17:06
27	07:36	07:01	06:17	06:31	06:02	05:58	06:18	06:46	07:15	06:45	07:19	07:42
	17:37	18:13	18:41	20:12	20:40	20:54	20:41	20:03	19:14	17:29	17:02	17:06
28	07:35	06:59	06:16	06:30	06:01	05:59	06:19	06:47	07:16	06:46	07:20	07:42
	17:38	18:14	18:42	20:13	20:40	20:54	20:40	20:02	19:12	17:28	17:02	17:07
29	07:34		07:14	06:29	06:01	05:59	06:20	06:48	07:17	06:47	07:21	07:43
	17:39		19:43	20:14	20:41	20:54	20:39	20:00	19:11	17:27	17:01	17:08
30	07:33		07:13	06:27	06:00	06:00	06:21	06:49	07:18	06:48	07:22	07:43
	17:41		19:44	20:15	20:42	20:54	20:39	19:59	19:09	17:26	17:01	17:09
31	07:32		07:11		06:00		06:22	06:50		06:49		07:43
	17:42		19:45		20:43		20:38	19:57		17:25		17:09
Potential sun hours	302	300	370	397	444	447	454	425	374	347	302	293
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

Project:

Progetto Ombre Sinnai

Licensed user:

PHEEDRA SRL
VIA LAGO DI NEMI 90
IT-74121 TARANTO
+393807089371
Simone Solito / s.solito@pheedra.it
Calculated:
08/03/2024 11:28/4.0.531

SHADOW - Calendar per WTG

WTG: 02 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

Table with 13 columns (months) and 31 rows (days). Columns: January, February, March, April, May, June, July, August, September, October, November, December. Rows: 1-31. Each cell contains a time range (e.g., 07:43-17:10) or a numerical value. Summary row at the bottom: Potential sun hours, Sum of minutes with flicker.

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

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

WTG: 03 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (17)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43	07:32	06:58	07:10	06:26 06:47-07:28/41	05:59 06:20-07:30/70	06:00 06:22-07:33/71	06:23 06:48-07:43/55	06:51 07:19	06:50 07:23	06:50 07:23	06:50 07:23
2	17:10	17:43	18:15	19:46	20:16	20:44	20:54	20:37	19:56	19:08	17:23	17:01
3	07:43	07:31	06:56	07:08	06:25 06:46-07:29/43	05:59 06:20-07:30/70	06:00 06:22-07:33/71	06:23 06:51-07:43/52	06:52 07:20	06:51 07:24	06:51 07:24	06:51 07:24
4	17:11	17:44	18:16	19:47	20:17	20:44	20:54	20:36	19:54	19:06	17:22	17:01
5	07:44	07:30	06:55	07:06	06:24 06:45-07:30/45	05:58 06:19-07:29/70	06:01 06:23-07:34/71	06:24 06:51-07:43/52	06:53 07:20	06:53 07:25	06:53 07:25	06:53 07:25
6	17:12	17:45	18:17	19:48	20:18	20:45	20:54	20:35	19:53	19:04	17:21	17:01
7	07:44	07:29	06:53	07:05	06:22 06:44-07:30/46	05:58 06:19-07:30/71	06:01 06:23-07:34/71	06:25 06:52-07:42/50	06:54 07:21	06:54 07:26	06:54 07:26	06:54 07:26
8	17:13	17:47	18:18	19:49	20:19	20:46	20:54	20:33	19:51	19:03	17:20	17:00
9	07:44	07:28	06:52	07:03	06:21 06:43-07:30/47	05:58 06:19-07:30/71	06:02 06:24-07:35/71	06:26 06:51-07:41/50	06:55 07:22	06:55 07:27	06:55 07:27	06:55 07:27
10	17:14	17:48	18:19	19:50	20:20	20:47	20:54	20:32	19:50	19:01	17:19	17:00
11	07:44	07:27	06:50	07:02	06:20 06:42-07:31/49	05:57 06:18-07:29/71	06:03 06:24-07:35/71	06:27 06:52-07:41/49	06:56 07:23	06:56 07:28	06:56 07:28	06:56 07:28
12	17:15	17:49	18:20	19:51	20:21	20:47	20:53	20:31	19:48	19:00	17:18	17:00
13	07:44	07:26	06:49	07:00	06:19 06:42-07:31/49	05:57 06:18-07:29/71	06:03 06:25-07:36/71	06:28 06:52-07:40/48	06:56 07:24	06:57 07:29	06:57 07:29	06:57 07:29
14	17:16	17:50	18:21	19:52	20:22	20:47	20:53	20:30	19:46	18:58	17:17	17:00
15	07:44	07:25	06:47	06:59	06:18 06:41-07:32/51	05:57 06:18-07:29/71	06:04 06:26-07:37/71	06:29 06:53-07:40/47	06:57 07:25	06:58 07:30	06:58 07:30	06:58 07:30
16	17:17	17:51	18:22	19:53	20:23	20:48	20:53	20:29	19:45	18:57	17:16	17:00
17	07:44	07:24	06:46	06:57	06:17 06:41-07:32/51	05:57 06:18-07:29/71	06:04 06:26-07:36/70	06:30 06:53-07:39/46	06:58 07:26	06:59 07:31	06:59 07:31	06:59 07:31
18	17:17	17:52	18:23	19:54	20:24	20:49	20:52	20:28	19:43	18:55	17:15	17:00
19	07:43	07:22	06:44	06:56	06:16 06:41-07:32/51	05:57 06:18-07:29/71	06:05 06:27-07:37/70	06:31 06:54-07:38/44	06:59 07:27	07:00 07:32	07:00 07:32	07:00 07:32
20	17:18	17:54	18:24	19:55	20:25	20:49	20:52	20:27	19:42	18:54	17:14	17:00
21	07:43	07:21	06:43	06:54	06:15 06:39-07:32/53	05:56 06:18-07:29/71	06:06 06:28-07:38/70	06:32 06:55-07:38/43	07:00 07:28	07:02 07:32	07:02 07:32	07:02 07:32
22	17:19	17:55	18:25	19:56	20:26	20:50	20:52	20:25	19:40	18:52	17:13	17:00
23	07:43	07:20	06:41	06:52	06:14 06:36-07:32/56	05:56 06:18-07:29/71	06:06 06:28-07:38/70	06:33 06:56-07:37/41	07:01 07:29	07:03 07:33	07:03 07:33	07:03 07:33
24	17:21	17:56	18:26	19:57	20:27	20:50	20:51	20:24	19:38	18:51	17:12	17:00
25	07:43	07:19	06:40	06:51	06:13 06:33-07:32/59	05:56 06:19-07:29/70	06:07 06:29-07:39/70	06:33 06:57-07:35/38	07:02 07:30	07:04 07:34	07:04 07:34	07:04 07:34
26	17:22	17:57	18:28	19:58	20:27	20:51	20:51	20:23	19:37	18:49	17:11	17:01
27	07:42	07:18	06:38	06:49	06:12 06:32-07:32/60	05:56 06:19-07:29/70	06:08 06:30-07:40/70	06:34 06:57-07:33/36	07:03 07:31	07:05 07:35	07:05 07:35	07:05 07:35
28	17:23	17:58	18:29	19:59	20:28	20:51	20:50	20:22	19:35	18:48	17:10	17:01
29	07:42	07:17	06:36	06:48	06:11 06:30-07:32/62	05:56 06:20-07:29/69	06:08 06:30-07:39/69	06:35 06:59-07:32/33	07:04 07:32	07:06 07:36	07:06 07:36	07:06 07:36
30	17:24	17:59	18:30	20:00	20:29	20:51	20:50	20:20	19:34	18:46	17:10	17:01
31	07:42	07:15	06:35	06:47	06:10 06:30-07:33/63	05:56 06:20-07:29/69	06:09 06:31-07:40/69	06:36 07:00-07:30/30	07:05 07:33	07:07 07:37	07:07 07:37	07:07 07:37
32	17:25	18:01	18:31	20:01	20:30	20:52	20:49	20:19	19:32	18:45	17:09	17:01
33	07:41	07:14	06:33	06:45	06:09 06:29-07:33/64	05:56 06:20-07:29/69	06:10 06:32-07:41/69	06:37 07:03-07:27/24	07:06 07:34	07:08 07:38	07:08 07:38	07:08 07:38
34	17:26	18:02	18:32	20:02	20:31	20:52	20:49	20:18	19:30	18:43	17:08	17:02
35	07:41	07:13	06:32	06:44	06:08 06:28-07:32/64	05:56 06:20-07:29/69	06:11 06:33-07:40/67	06:38 07:05-07:24/19	07:06 07:35	07:09 07:39	07:09 07:39	07:09 07:39
36	17:27	18:03	18:33	20:03	20:32	20:53	20:48	20:16	19:29	18:42	17:07	17:02
37	07:40	07:12	06:30	06:42	06:07 06:27-07:32/65	05:56 06:20-07:29/69	06:12 06:33-07:41/68	06:39 07:10-07:20/10	07:07 07:36	07:10 07:40	07:10 07:40	07:10 07:40
38	17:28	18:04	18:34	20:04	20:33	20:53	20:47	20:15	19:27	18:40	17:07	17:02
39	07:40	07:10	06:29	06:41	06:07 06:27-07:33/66	05:57 06:20-07:29/69	06:12 06:34-07:42/68	06:40 07:08	07:37 07:37	07:12 07:39	07:12 07:39	07:12 07:39
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41	07:39	07:09	06:27	06:39	06:06 06:26-07:32/66	05:57 06:20-07:29/69	06:13 06:35-07:42/67	06:41 07:09	07:38 07:38	07:13 07:39	07:13 07:39	07:13 07:39
42	17:30	18:06	18:36	20:06	20:35	20:53	20:46	20:12	19:24	18:37	17:05	17:03
43	07:39	07:08	06:25	06:38	06:05 06:25-07:32/67	05:57 06:21-07:30/69	06:14 06:36-07:43/67	06:42 07:10	07:40 07:40	07:14 07:40	07:14 07:40	07:14 07:40
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45	07:38	07:06	06:24	06:37	06:04 06:25-07:31/66	05:57 06:21-07:30/69	06:15 06:36-07:42/66	06:43 07:11	07:41 07:15	07:15 07:40	07:15 07:40	07:15 07:40
46	17:33	18:08	18:38	20:08	20:36	20:54	20:45	20:09	19:21	18:35	17:04	17:04
47	07:38	07:05	06:22	06:35 07:03-07:15/12	06:04 06:24-07:32/68	05:57 06:21-07:30/69	06:16 06:37-07:42/65	06:44 07:12	07:42 07:16	07:16 07:41	07:16 07:41	07:16 07:41
48	17:34	18:09	18:39	20:09	20:37	20:54	20:44	20:08	19:19	18:33	17:04	17:05
49	07:37	07:03	06:21	06:34 06:58-07:18/20	06:03 06:23-07:31/68	05:58 06:22-07:31/69	06:16 06:38-07:43/65	06:45 07:13	06:43 07:17	07:17 07:41	07:17 07:41	07:17 07:41
50	17:35	18:11	18:40	20:10	20:38	20:54	20:43	20:06	19:17	17:32	17:03	17:05
51	07:36	07:02	06:19	06:33 06:55-07:21/26	06:02 06:23-07:32/69	05:58 06:22-07:31/69	06:17 06:39-07:43/64	06:45 20:05	07:14 06:44	07:18 07:42	07:18 07:42	07:18 07:42
52	17:36	18:12	18:41	20:11	20:39	20:54	20:42	20:05	19:16	17:31	17:03	17:06
53	07:36	07:01	06:17	06:31 06:53-07:23/30	06:02 06:22-07:31/69	05:58 06:22-07:31/69	06:18 06:40-07:43/63	06:46 20:03	07:15 06:45	07:19 07:42	07:19 07:42	07:19 07:42
54	17:37	18:13	18:42	20:12	20:40	20:54	20:41	20:03	19:14	17:30	17:02	17:06
55	07:35	06:59	06:16	06:30 06:52-07:25/33	06:01 06:22-07:31/69	05:59 06:22-07:32/70	06:19 06:41-07:44/63	06:47 20:02	07:16 06:46	07:20 07:42	07:20 07:42	07:20 07:42
56	17:38	18:14	18:42	20:13	20:41	20:54	20:40	20:02	19:12	17:28	17:02	17:07
57	07:34	07:14	06:29 06:49-07:26/37	06:01 06:21-07:30/69	05:59 06:22-07:32/70	06:20 06:41-07:43/62	06:48 20:00	07:17 06:47	07:21 07:43	07:21 07:43	07:21 07:43	07:21 07:43
58	17:39	18:15	18:43	20:14	20:41	20:54	20:39	20:00	19:11	17:27	17:02	17:08
59	07:33	07:13	06:27 06:48-07:27/39	06:00 06:21-07:31/70	06:00 06:22-07:32/70	06:21 06:43-07:43/60	06:49 19:59	07:18 06:48	07:22 07:43	07:22 07:43	07:22 07:43	07:22 07:43
60	17:41	18:17	18:44	20:15	20:42	20:54	20:39	20:00	19:09	17:26	17:01	17:09
61	07:32	07:11	06:25	06:37 06:59-07:27/32	06:00 06:20-07:30/70	06:00 06:22-07:32/70	06:22 06:45-07:43/58	06:50 19:57	06:49 17:25	06:49 17:25	06:49 17:25	06:49 17:25
62	17:42	18:18	18:45	20:16	20:43	20:54	20:38	20:00	19:57	17:25	17:01	17:09
Potential sun hours	302	300	370	396	444	447	454	425	374	347	302	293
Sum of minutes with flicker	0	0	0	197	1836	2096	2098	767	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

WTG: 04 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (16)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43 08:07-08:32/25 17:10	07:31 17:43	06:58 07:19-07:23/4 18:15	07:10 19:46	06:26 20:16	05:59 20:43	06:00 20:54	06:23 20:37	06:51 19:56	07:19 19:08	06:50 17:23	07:23 08:02-08:09/7 17:01
2	07:43 08:08-08:32/24 17:11	07:31 17:44	06:56 18:16	07:08 19:47	06:25 20:17	05:59 20:44	06:01 20:54	06:23 20:36	06:52 19:54	07:20 19:06	06:51 17:22	07:24 08:01-08:12/11 17:01
3	07:44 08:09-08:32/23 17:12	07:30 17:45	06:55 18:17	07:06 19:48	06:24 20:18	05:58 20:45	06:01 20:54	06:24 20:34	06:53 19:53	07:20 19:04	06:53 17:21	07:25 07:59-08:14/15 17:01
4	07:44 08:10-08:32/22 17:13	07:29 17:47	06:53 18:18	07:05 19:49	06:22 20:19	05:58 20:46	06:02 20:54	06:25 20:33	06:54 19:51	07:21 19:03	06:54 17:20	07:26 07:59-08:15/16 17:00
5	07:44 08:11-08:32/21 17:14	07:28 17:48	06:52 18:19	07:03 19:50	06:21 20:20	05:58 20:46	06:02 20:53	06:26 20:32	06:55 19:50	07:22 19:01	06:55 17:19	07:27 07:58-08:16/18 17:00
6	07:44 08:12-08:32/20 17:15	07:27 17:49	06:50 18:20	07:02 19:51	06:20 20:21	05:57 20:47	06:03 20:53	06:27 20:31	06:56 19:48	07:23 19:00	06:56 17:18	07:28 07:58-08:18/20 17:00
7	07:44 08:13-08:31/18 17:16	07:26 17:50	06:49 18:21	07:00 19:52	06:19 20:22	05:57 20:47	06:03 20:53	06:28 20:30	06:56 19:46	07:24 18:58	06:57 17:17	07:29 07:58-08:19/21 17:00
8	07:44 08:15-08:31/16 17:17	07:25 17:51	06:47 18:22	06:59 19:53	06:18 20:23	05:57 20:48	06:04 20:53	06:29 20:29	06:57 19:45	07:25 18:57	06:58 17:16	07:30 07:58-08:20/22 17:00
9	07:43 08:16-08:31/15 17:18	07:24 17:52	06:46 18:23	06:57 19:54	06:17 20:24	05:57 20:49	06:04 20:52	06:30 20:28	06:58 19:43	07:26 18:55	06:59 17:15	07:31 07:58-08:21/23 17:00
10	07:43 08:17-08:29/12 17:19	07:22 17:54	06:44 18:24	06:56 19:55	06:16 20:25	05:57 20:49	06:05 20:52	06:31 20:27	06:59 19:42	07:27 18:54	07:00 17:14	07:32 07:57-08:21/24 17:00
11	07:43 08:20-08:27/7 17:20	07:21 17:55	06:43 18:25	06:54 19:56	06:15 20:26	05:56 20:50	06:06 20:52	06:32 20:25	07:00 19:40	07:28 18:52	07:01 17:13	07:32 07:57-08:22/25 17:00
12	07:43 08:21-08:27/7 17:21	07:20 17:56	06:41 18:26	06:52 19:57	06:14 20:27	05:56 20:50	06:06 20:51	06:33 20:24	07:01 19:38	07:29 18:51	07:03 17:12	07:33 07:58-08:23/25 17:00
13	07:43 08:22-08:27/7 17:22	07:19 17:57	06:40 18:28	06:51 19:58	06:13 20:27	05:56 20:51	06:07 20:51	06:34 20:23	07:02 19:37	07:30 07:50-07:59/9 18:49	07:04 17:11	07:34 07:58-08:24/26 17:00
14	07:42 08:23-08:27/7 17:23	07:18 17:58	06:38 18:29	06:49 19:59	06:12 20:28	05:56 20:51	06:08 20:50	06:34 20:21	07:03 19:35	07:31 07:51-08:01/10 18:48	07:05 17:10	07:35 07:59-08:25/26 17:00
15	07:42 08:24-08:27/7 17:24	07:17 17:59	06:36 18:30	06:48 20:00	06:11 20:29	05:56 20:51	06:08 20:50	06:35 20:20	07:04 19:34	07:32 07:52-08:02/10 18:46	07:06 17:10	07:35 07:58-08:25/27 17:00
16	07:42 08:25-08:27/7 17:25	07:15 18:01	06:35 18:31	06:47 20:01	06:10 20:30	05:56 20:52	06:09 20:49	06:36 20:19	07:05 19:32	07:33 07:53-08:03/10 18:45	07:07 17:09	07:36 07:59-08:26/27 17:00
17	07:41 08:26-08:27/7 17:26	07:14 18:02	06:33 18:32	06:45 20:02	06:09 20:31	05:56 20:52	06:10 20:49	06:37 20:18	07:34 19:30	07:34 07:54-08:04/10 18:43	07:08 17:08	07:37 08:00-08:26/26 17:00
18	07:41 08:27-08:27/7 17:27	07:13 07:32-07:33/1 18:03	06:32 18:33	06:44 20:03	06:08 20:32	05:56 20:52	06:11 20:48	06:38 20:16	07:35 19:29	07:35 07:55-08:04/9 18:42	07:09 17:07	07:37 08:00-08:26/26 17:00
19	07:40 08:28-08:27/7 17:28	07:12 07:30-07:32/2 18:04	06:30 18:34	06:42 20:04	06:07 20:33	05:56 20:53	06:12 20:47	06:39 20:15	07:36 19:27	07:36 07:56-08:04/8 18:40	07:10 17:07	07:38 08:01-08:27/26 17:00
20	07:40 08:29-08:27/7 17:29	07:10 07:29-07:33/4 18:05	06:29 18:35	06:41 20:05	06:07 20:34	05:57 20:53	06:12 20:47	06:40 20:13	07:37 19:25	07:37 07:58-08:05/7 18:39	07:12 17:06	07:39 08:01-08:27/26 17:00
21	07:39 08:30-08:27/7 17:30	07:09 07:28-07:34/6 18:06	06:27 18:36	06:39 20:06	06:06 20:35	05:57 20:53	06:13 20:46	06:41 20:12	07:38 19:24	07:38 07:59-08:04/5 18:37	07:13 17:05	07:39 08:02-08:28/26 17:00
22	07:39 08:31-08:27/7 17:31	07:08 07:26-07:33/7 18:07	06:25 18:37	06:38 20:07	06:05 20:36	05:57 20:54	06:14 20:45	06:42 20:11	07:39 19:22	08:00-08:04/4 18:36	07:14 17:05	07:40 08:02-08:28/26 17:00
23	07:38 08:32-08:27/7 17:33	07:06 07:25-07:33/8 18:08	06:24 18:38	06:37 20:08	06:04 20:36	05:57 20:54	06:15 20:45	06:43 20:09	07:11 19:21	07:41 08:01-08:03/2 18:35	07:15 17:04	07:40 08:03-08:29/26 17:00
24	07:38 08:33-08:27/7 17:34	07:05 07:24-07:33/9 18:09	06:22 18:39	06:35 20:09	06:04 20:37	05:57 20:54	06:16 20:44	06:44 20:08	07:12 19:19	07:42 08:02-08:04/4 18:33	07:16 17:04	07:41 08:03-08:29/26 17:00
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26	07:36 08:35-08:27/7 17:36	07:02 07:21-07:31/10 18:12	06:19 18:41	06:33 20:11	06:02 20:39	05:58 20:54	06:17 20:42	06:46 20:05	07:14 19:16	07:44 08:04-08:06/4 17:31	07:18 17:03	07:42 08:04-08:30/26 17:00
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28	07:35 08:37-08:27/7 17:38	06:59 07:18-07:28/10 18:14	06:16 18:42	06:30 20:13	06:01 20:40	05:59 20:54	06:19 20:40	06:47 20:02	07:16 19:12	07:46 08:06-08:08/6 17:28	07:20 17:02	07:42 08:04-08:31/27 17:00
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30	07:33 08:39-08:27/7 17:41	07:00 07:19-07:29/10 18:16	06:14 18:44	06:27 20:15	06:00 20:42	06:00 20:54	06:21 20:39	06:49 19:59	07:18 19:09	07:48 08:08-08:10/8 17:26	07:22 17:01	07:43 08:06-08:32/26 17:00
31	07:32 08:40-08:27/7 17:42	07:00 07:19-07:29/10 18:17	06:13 18:45	06:26 20:16	06:00 20:43	06:00 20:54	06:22 20:38	06:50 19:57	07:19 19:08	07:49 08:09-08:11/9 17:25	07:23 17:09	07:43 08:07-08:32/25 17:00
Potential sun hours	302	300	370	396	444	447	454	425	374	347	302	293
Sum of minutes with flicker	203	77	4	0	0	0	0	0	0	84	0	724

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

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

WTG: 05 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (14)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:43 17:10	07:31 17:43	06:58 07:16-07:47/31 18:15	07:09 19:46	06:26 20:16	05:59 20:43	06:00 20:54	06:23 20:37	06:51 19:56	07:19 19:08	06:50 17:23	07:23 17:01	
2	07:43 17:11	07:31 17:44	06:56 07:15-07:46/31 18:16	07:08 19:47	06:25 20:17	05:59 20:44	06:01 20:54	06:23 20:35	06:52 19:54	07:19 19:06	06:51 17:22	07:24 17:01	
3	07:44 17:12	07:30 17:45	06:55 07:15-07:45/30 18:17	07:06 19:48	06:24 20:18	05:58 20:45	06:01 20:54	06:24 20:34	06:53 19:53	07:20 19:04	06:52 17:21	07:25 17:01	
4	07:44 17:13	07:29 17:47	06:53 07:17-07:44/27 18:18	07:05 19:49	06:22 20:19	05:58 20:45	06:02 20:54	06:25 20:33	06:54 19:51	07:21 19:03	06:54 17:20	07:26 17:00	
5	07:44 17:14	07:28 17:48	06:52 07:18-07:42/24 18:19	07:03 19:50	06:21 20:20	05:58 20:46	06:02 20:53	06:26 20:32	06:55 19:49	07:22 19:01	06:55 17:19	07:27 17:00	
6	07:44 17:15	07:27 17:49	06:50 07:20-07:40/20 18:20	07:02 19:51	06:20 20:21	05:57 20:47	06:03 20:53	06:27 20:31	06:56 19:48	07:23 08:00-08:11/11 19:00	06:56 17:18	07:28 17:00	
7	07:44 17:16	07:26 17:50	06:49 07:22-07:37/15 18:21	07:00 19:52	06:19 20:22	05:57 20:47	06:03 20:53	06:28 20:30	06:56 19:46	07:24 07:57-08:14/17 18:58	06:57 17:17	07:29 17:00	
8	07:44 17:17	07:25 17:51	06:47 07:27-07:32/5 18:22	06:59 19:53	06:18 20:23	05:57 20:48	06:04 20:53	06:29 20:29	06:57 19:45	07:25 07:54-08:16/22 18:57	06:58 17:16	07:30 17:00	
9	07:43 17:18	07:24 17:52	06:46 18:23	06:57 19:54	06:17 20:24	05:57 20:49	06:04 20:52	06:30 20:28	06:58 19:43	07:26 07:52-08:18/26 18:55	06:59 17:15	07:31 17:00	
10	07:43 17:19	07:22 17:54	06:44 18:24	06:56 19:55	06:16 20:25	05:57 20:49	06:05 20:52	06:31 20:26	06:59 19:42	07:27 07:51-08:19/28 18:54	07:00 17:14	07:32 17:00	
11	07:43 17:20	07:21 17:55	06:43 18:25	06:54 19:56	06:15 20:26	05:56 20:50	06:06 20:52	06:32 20:25	07:00 19:40	07:28 07:49-08:20/31 18:52	07:01 17:13	07:32 17:00	
12	07:43 17:21	07:20 17:56	06:41 18:26	06:52 19:57	06:14 20:26	05:56 20:50	06:06 20:51	06:33 20:24	07:01 19:38	07:29 07:49-08:20/31 18:50	07:03 17:12	07:33 17:00	
13	07:43 17:22	07:19 17:57	06:40 18:27	06:51 19:58	06:13 20:27	05:56 20:51	06:07 20:51	06:34 20:23	07:02 19:37	07:30 07:50-08:20/30 18:49	07:04 17:11	07:34 17:01	
14	07:42 17:23	07:18 07:37-07:41/4 17:58	06:38 18:29	06:49 19:59	06:12 20:28	05:56 20:51	06:08 20:50	06:34 20:21	07:03 19:35	07:31 07:51-08:21/30 18:48	07:05 17:10	07:35 17:01	
15	07:42 17:24	07:17 07:35-07:43/8 17:59	06:36 18:30	06:48 20:00	06:11 20:29	05:56 20:51	06:08 20:50	06:35 20:20	07:04 19:33	07:32 07:52-08:21/29 18:46	07:06 17:10	07:35 17:01	
16	07:42 17:25	07:15 07:34-07:45/11 18:01	06:35 18:31	06:47 20:01	06:10 20:30	05:56 20:52	06:09 20:49	06:36 20:19	07:05 19:32	07:33 07:53-08:21/28 18:45	07:07 17:09	07:36 17:01	
17	07:41 17:26	07:14 07:33-07:46/13 18:02	06:33 18:32	06:45 20:02	06:09 20:31	05:56 20:52	06:10 20:49	06:37 20:17	07:06 19:30	07:34 07:54-08:21/27 18:43	07:08 17:08	07:37 17:02	
18	07:41 17:27	07:13 07:32-07:47/15 18:03	06:32 18:33	06:44 20:03	06:08 20:32	05:56 20:52	06:11 20:48	06:38 20:16	07:06 19:29	07:35 07:55-08:20/25 18:42	07:09 17:07	07:37 17:02	
19	07:40 17:28	07:12 07:30-07:47/17 18:04	06:30 18:34	06:42 20:04	06:07 20:33	05:56 20:53	06:12 20:47	06:39 20:15	07:07 19:27	07:36 07:56-08:20/24 18:40	07:10 17:07	07:38 17:02	
20	07:40 17:29	07:10 07:29-07:48/19 18:05	06:29 18:35	06:41 20:05	06:07 20:34	05:57 20:53	06:12 20:47	06:40 20:13	07:08 19:25	07:37 07:57-08:19/22 18:39	07:12 17:06	07:39 17:03	
21	07:39 17:30	07:09 07:28-07:49/21 18:06	06:27 18:36	06:39 20:06	06:06 20:35	05:57 20:53	06:13 20:46	06:41 20:12	07:09 19:24	07:38 07:59-08:20/21 18:37	07:13 17:05	07:39 17:03	
22	07:39 17:31	07:08 07:26-07:49/23 18:07	06:25 18:37	06:38 20:07	06:05 20:36	05:57 20:53	06:14 20:45	06:42 20:11	07:10 19:22	07:39 08:00-08:19/19 18:36	07:14 17:05	07:40 17:04	
23	07:38 17:33	07:06 07:25-07:49/24 18:08	06:24 18:38	06:37 20:08	06:04 20:36	05:57 20:54	06:15 20:45	06:43 20:09	07:11 19:20	07:41 08:01-08:18/17 18:35	07:15 17:04	07:40 17:04	
24	07:38 17:34	07:05 07:23-07:49/26 18:09	06:22 18:39	06:35 20:09	06:04 20:37	05:57 20:54	06:16 20:44	06:44 20:08	07:12 19:19	07:42 08:02-08:17/15 18:33	07:16 17:04	07:41 17:05	
25	07:37 17:35	07:03 07:22-07:49/27 18:11	06:21 18:40	06:34 20:10	06:03 20:38	05:58 20:54	06:16 20:43	06:45 20:06	07:13 19:17	06:43 07:03-07:15/12 17:32	07:17 17:03	07:41 17:05	
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27	07:36 17:37	07:01 07:19-07:48/29 18:13	06:17 18:41	06:31 20:12	06:02 20:40	05:58 20:54	06:18 20:41	06:46 20:03	07:15 19:14	06:45 07:05-07:12/7 17:30	07:19 17:02	07:42 17:07	
28	07:35 17:38	06:59 07:18-07:48/30 18:14	06:16 18:42	06:30 20:13	06:01 20:40	05:59 20:54	06:19 20:40	06:47 20:02	07:16 19:12	06:46 07:07-07:11/4 17:28	07:20 17:02	07:42 17:07	
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30	07:33 17:41		07:13 19:44	06:27 20:15	06:00 20:42	06:00 20:54	06:21 20:38	06:49 19:59	07:18 19:09	06:48 17:26	07:22 17:01	07:43 17:09	
31	07:32 17:42		07:11 19:45		06:00 20:43		06:22 20:37	06:50 19:57		06:49 17:25		07:43 17:09	
	Potential sun hours	302	300	370	396	444	447	454	425	374	347	302	293
	Sum of minutes with flicker	0	295	183	0	0	0	0	0	486	0	0	0

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

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

WTG: 06 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (11)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43 17:10	07:31 17:43	06:58 18:15	07:10 19:46	06:26 20:16	05:59 20:43	06:00 20:54	06:23 20:37	06:51 19:56	07:19 19:08	06:50 17:23	07:23 17:01
2	07:43 17:11	07:31 17:44	06:56 18:16	07:08 19:47	06:25 20:17	05:59 20:44	06:01 20:54	06:23 20:36	06:52 19:54	07:20 19:06	06:51 17:22	07:24 17:01
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4	07:44 17:13	07:29 17:47	06:53 18:18	07:05 19:49	06:23 20:19	05:58 20:46	06:02 20:54	06:25 20:33	06:54 19:51	07:21 19:03	06:54 17:20	07:26 17:00
5	07:44 17:14	07:28 17:48	06:52 18:19	07:03 19:50	06:21 20:20	05:58 20:46	06:02 20:53	06:26 20:32	06:55 19:50	07:22 19:01	06:55 17:19	07:27 17:00
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7	07:44 17:16	07:26 17:50	06:49 18:21	07:00 19:52	06:19 20:22	05:57 20:47	06:03 20:53	06:28 20:30	06:57 19:46	07:24 18:58	06:57 17:17	07:29 17:00
8	07:44 17:17	07:25 17:51	06:47 18:22	06:59 19:53	06:18 20:23	05:57 20:48	06:04 20:53	06:29 20:29	06:57 19:45	07:25 18:57	06:58 17:16	07:30 17:00
9	07:43 17:18	07:24 17:52	06:46 18:23	06:57 19:54	06:17 20:24	05:57 20:49	06:04 20:52	06:30 20:27	06:58 19:42	07:26 18:54	06:59 17:14	07:31 17:00
10	07:43 17:19	07:21 17:54	06:43 18:24	06:54 19:55	06:15 20:25	05:56 20:49	06:06 20:52	06:32 20:25	07:00 19:40	07:28 18:52	07:01 17:13	07:32 17:00
11	07:43 17:20	07:21 17:55	06:43 18:25	06:54 19:56	06:15 20:26	05:56 20:50	06:06 20:52	06:32 20:25	07:00 19:40	07:28 18:52	07:01 17:13	07:32 17:00
12	07:43 17:21	07:20 17:56	06:41 18:27	06:53 19:57	06:14 20:27	05:56 20:50	06:06 20:51	06:33 20:24	07:01 19:38	07:29 18:51	07:03 17:12	07:33 17:00
13	07:43 17:22	07:19 17:57	06:40 18:28	06:51 19:58	06:13 20:27	05:56 20:51	06:07 20:51	06:34 20:23	07:02 19:37	07:30 18:49	07:04 17:11	07:34 17:01
14	07:42 17:23	07:18 17:58	06:38 18:29	06:50 19:59	06:12 20:28	05:56 20:51	06:08 20:50	06:34 20:21	07:03 19:35	07:31 18:48	07:05 17:10	07:35 17:01
15	07:42 17:24	07:17 17:59	06:36 18:30	06:48 20:00	06:11 20:29	05:56 20:51	06:09 20:50	06:35 20:20	07:04 19:34	07:32 18:46	07:06 17:10	07:35 17:01
16	07:42 17:25	07:15 18:01	06:35 18:31	06:47 20:01	06:10 20:30	05:56 20:52	06:09 20:19	06:36 20:19	07:05 19:32	07:33 18:45	07:07 17:09	07:36 17:01
17	07:41 17:26	07:14 18:02	06:33 18:32	06:45 20:02	06:09 20:31	05:56 20:52	06:10 20:49	06:37 20:18	07:06 19:30	07:34 18:43	07:08 17:08	07:37 17:02
18	07:41 17:27	07:13 18:03	06:32 18:33	06:44 20:03	06:08 20:32	05:56 20:52	06:11 20:48	06:38 20:16	07:07 19:29	07:35 18:42	07:09 17:07	07:37 17:02
19	07:40 17:28	07:12 18:04	06:30 18:34	06:42 20:04	06:07 20:33	05:57 20:53	06:12 20:47	06:39 20:15	07:07 19:27	07:36 18:40	07:10 17:07	07:38 17:02
20	07:40 17:29	07:10 18:05	06:29 18:35	06:41 20:05	06:07 20:34	05:57 20:53	06:12 20:47	06:40 20:13	07:08 19:25	07:37 18:39	07:12 17:06	07:39 17:03
21	07:39 17:30	07:09 18:06	06:27 18:36	06:39 20:06	06:06 20:35	05:57 20:53	06:13 20:46	06:41 20:12	07:09 19:24	07:38 18:38	07:13 17:05	07:39 17:03
22	07:39 17:31	07:08 18:07	06:25 18:37	06:38 20:07	06:05 20:36	05:57 20:54	06:14 20:45	06:42 20:11	07:10 19:22	07:40 18:36	07:14 17:05	07:40 17:04
23	07:38 17:33	07:06 18:08	06:24 18:38	06:37 20:08	06:04 20:36	05:57 20:54	06:15 20:45	06:43 20:09	07:11 19:21	07:41 18:35	07:15 17:04	07:40 17:04
24	07:38 17:34	07:05 18:10	06:22 18:39	06:35 20:09	06:04 20:37	05:58 20:54	06:16 20:44	06:44 20:08	07:12 19:19	07:42 18:33	07:16 17:04	07:41 17:05
25	07:37 17:35	07:03 18:11	06:21 18:40	06:34 20:10	06:03 20:38	05:58 20:54	06:16 20:43	06:45 20:06	07:13 19:17	06:43 17:32	07:17 17:03	07:41 17:05
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27	07:36 17:37	07:01 18:13	06:17 18:42	06:31 20:12	06:02 20:40	05:58 20:54	06:18 20:41	06:46 20:03	07:15 19:14	06:45 17:30	07:19 17:02	07:42 17:07
28	07:35 17:38	06:59 18:14	06:16 18:43	06:30 20:13	06:01 20:40	05:59 20:54	06:19 20:40	06:47 20:02	07:16 19:12	06:46 17:28	07:20 17:02	07:42 17:07
29	07:34 17:40	07:03 19:43	06:21 19:43	06:34 20:14	06:03 20:41	05:58 20:54	06:16 20:39	06:45 20:00	07:13 19:11	06:43 17:27	07:17 17:02	07:41 17:08
30	07:33 17:41	07:03 19:44	06:21 19:44	06:27 20:15	06:00 20:42	06:00 20:54	06:21 20:39	06:49 19:59	07:18 19:09	06:48 17:26	07:22 17:01	07:43 17:09
31	07:32 17:42	07:02 19:45	06:19 19:45	06:33 20:15	06:02 20:43	05:58 20:54	06:17 20:38	06:46 19:57	07:14 17:25	06:44 17:25	07:18 17:03	07:42 17:09
Potential sun hours	302	300	370	396	444	447	454	425	374	347	302	293
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

WTG: 07 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (3)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43 08:05-08:35/30 17:10	07:32 08:16-08:30/14 17:43	06:58 18:15	07:10 19:46	06:26 20:16	05:59 20:44	06:00 20:54	06:23 20:37	06:51 19:56	07:19 19:08	06:50 17:23	07:23 07:46-08:21/35 17:01
2	07:43 08:05-08:35/30 17:11	07:31 08:23-08:24/1 17:44	06:56 18:16	07:08 19:47	06:25 20:17	05:59 20:44	06:01 20:54	06:23 20:36	06:52 19:54	07:20 19:06	06:51 17:22	07:24 07:47-08:22/35 17:01
3	07:44 08:05-08:36/31 17:12	07:30 17:45	06:55 18:17	07:06 19:48	06:24 20:18	05:58 20:45	06:01 20:54	06:24 20:35	06:53 19:53	07:21 19:04	06:53 17:21	07:25 07:48-08:22/34 17:01
4	07:44 08:05-08:36/31 17:13	07:29 17:47	06:53 18:18	07:05 19:49	06:23 20:19	05:58 20:46	06:02 20:54	06:25 20:33	06:54 19:51	07:21 19:03	06:54 17:20	07:26 07:49-08:22/33 17:00
5	07:44 08:05-08:37/32 17:14	07:28 17:48	06:52 18:19	07:03 19:50	06:21 20:20	05:58 20:46	06:02 20:54	06:26 20:32	06:55 19:50	07:22 19:01	06:55 17:19	07:27 07:50-08:23/33 17:00
6	07:44 08:05-08:37/32 17:15	07:27 17:49	06:50 18:20	07:02 19:51	06:20 20:21	05:57 20:47	06:03 20:53	06:27 20:31	06:56 19:48	07:23 19:00	06:56 17:18	07:28 07:51-08:23/32 17:00
7	07:44 08:05-08:38/33 17:16	07:26 17:50	06:49 18:21	07:00 19:52	06:19 20:22	05:57 20:47	06:03 20:53	06:28 20:30	06:57 19:46	07:24 18:58	06:57 17:17	07:29 07:52-08:24/32 17:00
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9	07:44 08:05-08:39/34 17:18	07:24 17:52	06:46 18:23	06:57 19:54	06:17 20:24	05:57 20:49	06:04 20:52	06:30 20:28	06:58 19:43	07:26 18:55	07:52-07:56/4 17:15	07:31 07:54-08:25/31 17:00
10	07:43 08:04-08:39/35 17:19	07:22 17:54	06:44 18:24	06:56 19:55	06:16 20:25	05:57 20:49	06:05 20:52	06:31 20:27	06:59 19:42	07:27 18:54	07:00 07:47-08:01/14 17:14	07:32 07:54-08:24/30 17:00
11	07:43 08:04-08:39/35 17:20	07:21 17:55	06:43 18:25	06:54 19:56	06:15 20:26	05:56 20:50	06:06 20:52	06:32 20:25	07:00 19:40	07:28 18:52	07:44-08:04/20 17:13	07:32 07:55-08:25/30 17:00
12	07:43 08:04-08:40/36 17:21	07:20 17:56	06:41 18:27	06:53 19:57	06:14 20:27	05:56 20:50	06:06 20:51	06:33 20:24	07:01 19:38	07:29 18:51	07:42-08:06/24 17:12	07:33 07:56-08:25/29 17:00
13	07:43 08:03-08:40/37 17:22	07:19 17:57	06:40 18:28	06:51 19:58	06:13 20:27	05:56 20:51	06:07 20:51	06:34 20:23	07:02 19:37	07:30 18:49	07:41-08:08/27 17:11	07:34 07:57-08:26/29 17:01
14	07:42 08:03-08:40/37 17:23	07:18 17:58	06:38 18:29	06:50 19:59	06:12 20:28	05:56 20:51	06:08 20:50	06:35 20:22	07:03 19:35	07:31 18:48	07:40-08:10/30 17:10	07:35 07:58-08:27/29 17:01
15	07:42 08:03-08:41/38 17:24	07:17 17:59	06:37 18:30	06:48 20:00	06:11 20:29	05:56 20:51	06:09 20:50	06:36 20:20	07:04 19:34	07:32 18:46	07:39-08:11/32 17:10	07:35 07:58-08:26/28 17:01
16	07:42 08:02-08:40/38 17:25	07:15 18:01	06:35 18:31	06:47 20:01	06:10 20:30	05:56 20:52	06:09 20:49	06:36 20:19	07:05 19:32	07:33 18:45	07:38-08:12/34 17:09	07:36 07:59-08:27/28 17:01
17	07:41 08:02-08:41/39 17:26	07:14 18:02	06:33 18:32	06:45 20:02	06:09 20:31	05:56 20:52	06:10 20:49	06:37 20:18	07:06 19:30	07:34 18:43	07:37-08:13/36 17:08	07:37 08:00-08:28/28 17:02
18	07:41 08:01-08:41/40 17:27	07:13 18:03	06:32 18:33	06:44 20:03	06:08 20:32	05:56 20:53	06:11 20:48	06:38 20:16	07:07 19:29	07:35 18:42	07:38-08:14/36 17:07	07:37 08:00-08:28/28 17:02
19	07:40 08:01-08:41/40 17:28	07:12 18:04	06:30 18:34	06:42 20:04	06:07 20:33	05:57 20:53	06:12 20:47	06:39 20:15	07:07 19:27	07:36 18:40	07:37-08:15/38 17:07	07:38 08:01-08:28/27 17:02
20	07:40 08:00-08:41/41 17:29	07:10 18:05	06:29 18:35	06:41 20:05	06:07 20:34	05:57 20:53	06:12 20:47	06:40 20:13	07:08 19:25	07:37 18:39	07:12 07:37-08:16/39 17:06	07:39 08:01-08:28/27 17:03
21	07:39 08:01-08:41/40 17:30	07:09 18:06	06:27 18:36	06:39 20:06	06:06 20:35	05:57 20:53	06:13 20:46	06:41 20:12	07:09 19:24	07:38 18:38	07:13 07:36-08:16/40 17:05	07:39 08:02-08:29/27 17:03
22	07:39 08:02-08:41/39 17:31	07:08 18:07	06:25 18:37	06:38 20:07	06:05 20:36	05:57 20:54	06:14 20:45	06:42 20:11	07:10 19:22	07:40 18:36	07:14 07:36-08:17/41 17:05	07:40 08:02-08:29/27 17:04
23	07:38 08:02-08:40/38 17:33	07:06 18:08	06:24 18:38	06:37 20:08	06:04 20:36	05:57 20:54	06:15 20:45	06:43 20:09	07:11 19:21	07:41 18:35	07:15 07:37-08:17/40 17:04	07:40 08:03-08:30/27 17:04
24	07:38 08:04-08:40/36 17:34	07:05 18:10	06:22 18:39	06:35 20:09	06:04 20:37	05:58 20:54	06:16 20:44	06:44 20:08	07:12 19:19	07:42 18:33	07:16 07:39-08:19/40 17:04	07:41 08:03-08:30/27 17:05
25	07:37 08:04-08:40/36 17:35	07:03 18:11	06:21 18:40	06:34 20:10	06:03 20:38	05:58 20:54	06:16 20:43	06:45 20:06	07:13 19:17	07:43 17:32	07:17 07:40-08:19/39 17:03	07:41 08:03-08:31/28 17:05
26	07:36 08:05-08:39/34 17:36	07:02 18:12	06:19 18:41	06:33 20:11	06:02 20:39	05:58 20:54	06:17 20:42	06:46 20:05	07:14 19:16	07:44 17:31	07:18 07:41-08:19/38 17:03	07:42 08:04-08:32/28 17:06
27	07:36 08:06-08:38/32 17:37	07:01 18:13	06:17 18:42	06:31 20:12	06:02 20:40	05:58 20:54	06:18 20:41	06:46 20:03	07:15 19:14	07:45 17:30	07:19 07:42-08:20/38 17:02	07:42 08:04-08:32/28 17:07
28	07:35 08:08-08:38/30 17:38	06:59 18:14	06:16 18:43	06:30 20:13	06:01 20:41	05:59 20:54	06:19 20:40	06:47 20:02	07:16 19:12	07:46 17:28	07:20 07:43-08:20/37 17:02	07:42 08:04-08:32/28 17:07
29	07:34 08:10-08:36/26 17:40		07:14 19:44	06:29 20:14	06:01 20:41	05:59 20:54	06:20 20:39	06:48 20:00	07:17 19:11	07:47 17:27	07:21 07:44-08:21/37 17:01	07:43 08:05-08:34/29 17:08
30	07:33 08:11-08:35/24 17:41		07:13 19:44	06:27 20:15	06:00 20:42	06:00 20:54	06:21 20:39	06:49 19:59	07:18 19:09	07:48 17:26	07:22 07:45-08:21/36 17:01	07:43 08:05-08:34/29 17:09
31	07:32 08:13-08:33/20 17:42		07:11 19:45	06:25 20:43	06:00 20:43	06:00 20:38	06:22 19:57	06:50 19:57	07:19 17:25	07:49 17:25	07:23 07:46-08:21/35 17:01	07:43 08:05-08:34/29 17:09
	Potential sun hours	302	300	370	396	444	447	454	425	374	347	302
	Sum of minutes with flicker	1057	15	0	0	0	0	0	0	0	720	916

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

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

WTG: 08 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (13)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June
1	07:43 08:22-10:01/99 17:10	07:32 08:37-10:03/86 17:43	06:58 18:15	07:10 07:28-07:56/28 19:46	06:26 20:16	05:59 20:44
2	07:43 08:22-10:01/99 17:11	07:31 08:37-10:03/86 17:44	06:56 18:16	07:08 07:26-07:55/29 19:47	06:25 20:17	05:59 20:44
3	07:44 08:22-10:02/100 17:12	07:30 08:38-10:02/84 17:45	06:55 18:17	07:06 07:24-07:54/30 19:48	06:24 20:18	05:58 20:45
4	07:44 08:23-10:02/99 17:13	07:29 08:39-10:01/82 17:47	06:53 18:18	07:05 07:23-07:55/32 19:49	06:23 20:19	05:58 20:46
5	07:44 08:23-10:02/99 17:14	07:28 08:40-10:00/80 17:48	06:52 18:19	07:03 07:21-07:54/33 19:50	06:21 20:20	05:58 20:46
6	07:44 08:24-10:03/99 17:15	07:27 08:41-09:59/78 17:49	06:50 18:20	07:02 07:20-07:54/34 19:51	06:20 20:21	05:57 20:47
7	07:44 08:24-10:03/99 17:16	07:26 08:42-09:58/76 17:50	06:49 18:21	07:00 07:18-07:53/35 19:52	06:19 20:22	05:57 20:47
8	07:44 08:25-10:04/99 17:17	07:25 08:43-09:57/74 17:51	06:47 18:22	06:59 07:17-07:53/36 19:53	06:18 20:23	05:57 20:48
9	07:44 08:25-10:05/100 17:18	07:24 08:44-09:56/72 17:52	06:46 18:23	06:57 07:15-07:51/36 19:54	06:17 20:24	05:57 20:49
10	07:43 08:25-10:04/99 17:19	07:22 08:46-09:55/69 17:54	06:44 18:24	06:56 07:15-07:51/36 19:55	06:16 20:25	05:57 20:49
11	07:43 08:26-10:05/99 17:20	07:21 08:46-09:52/66 17:55	06:43 18:25	06:54 07:15-07:49/34 19:56	06:15 20:26	05:56 20:50
12	07:43 08:26-10:05/99 17:21	07:20 08:48-09:51/63 17:56	06:41 18:27	06:53 07:16-07:48/32 19:57	06:14 20:27	05:56 20:50
13	07:43 08:26-10:05/99 17:22	07:19 08:49-09:49/60 17:57	06:40 18:28	06:51 07:16-07:46/30 19:58	06:13 20:27	05:56 20:51
14	07:42 08:27-10:05/98 17:23	07:18 08:51-09:47/56 17:58	06:38 18:29	06:50 07:18-07:45/27 19:59	06:12 20:28	05:56 20:51
15	07:42 08:28-10:06/98 17:24	07:17 08:53-09:46/53 17:59	06:37 18:30	06:48 07:19-07:42/23 20:00	06:11 20:29	05:56 20:51
16	07:42 08:28-10:06/98 17:25	07:15 08:55-09:42/47 18:01	06:35 18:31	06:47 07:22-07:40/18 20:01	06:10 20:30	05:56 20:52
17	07:41 08:29-10:06/97 17:26	07:14 08:57-09:40/43 18:02	06:33 18:32	06:45 07:24-07:36/12 20:02	06:09 20:31	05:56 20:52
18	07:41 08:28-10:06/98 17:27	07:13 09:00-09:37/37 18:03	06:32 18:33	06:44 20:03	06:08 20:32	05:56 20:53
19	07:40 08:29-10:07/98 17:28	07:12 09:03-09:32/29 18:04	06:30 18:34	06:42 20:04	06:07 20:33	05:56 20:53
20	07:40 08:30-10:06/96 17:29	07:10 09:08-09:27/19 18:05	06:29 18:35	06:41 20:05	06:07 20:34	05:57 20:53
21	07:39 08:31-10:07/96 17:30	07:09 06:27 18:06	06:27 18:36	06:39 20:06	06:06 20:35	05:57 20:53
22	07:39 08:31-10:06/95 17:31	07:08 18:07 18:07	06:25 18:37	06:38 20:07	06:05 20:36	05:57 20:54
23	07:38 08:31-10:06/95 17:33	07:06 18:08 18:08	06:24 06:42-06:47/5 18:38	06:37 20:08	06:04 20:36	05:57 20:54
24	07:38 08:32-10:07/95 17:34	07:05 18:10 18:10	06:22 06:40-06:49/9 18:39	06:35 20:09	06:04 20:37	05:57 20:54
25	07:37 08:32-10:06/94 17:35	07:03 18:11 18:11	06:21 06:39-06:51/12 18:40	06:34 20:10	06:03 20:38	05:58 20:54
26	07:36 08:33-10:06/93 17:36	07:02 18:12 18:12	06:19 06:37-06:52/15 18:41	06:33 20:11	06:02 20:39	05:58 20:54
27	07:36 08:33-10:05/92 17:37	07:01 18:13 18:13	06:17 06:36-06:54/18 18:42	06:31 20:12	06:02 20:40	05:58 20:54
28	07:35 08:34-10:06/92 17:38	06:59 18:14 18:14	06:16 06:34-06:54/20 18:43	06:30 20:13	06:01 20:41	05:59 20:54
29	07:34 08:35-10:05/90 17:40	07:34 19:44 19:44	07:14 07:32-07:54/22 19:44	06:29 20:14	06:01 20:41	05:59 20:54
30	07:33 08:35-10:05/90 17:41	07:33 19:44 19:44	07:13 07:31-07:55/24 19:44	06:27 20:15	06:00 20:42	06:00 20:54
31	07:32 08:36-10:04/88 17:42	07:32 19:45 19:45	07:11 07:29-07:55/26 19:45	06:26 20:16	06:00 20:43	06:00 20:54
Potential sun hours	302	300	370	396	444	447
Sum of minutes with flicker	2992	1260	151	505	0	0

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

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

WTG: 08 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (13)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July	August	September	October	November	December
1	06:00 20:54	06:23 20:37	06:51 07:14-07:48/34 19:56	07:19 19:08	06:50 08:14-09:24/70 17:23	07:23 08:08-09:47/99 17:01
2	06:01 20:54	06:23 20:36	06:52 07:13-07:49/36 19:54	07:20 19:06	06:51 08:13-09:25/72 17:22	07:24 08:08-09:47/99 17:01
3	06:01 20:54	06:24 20:35	06:53 07:13-07:49/36 19:53	07:21 19:04	06:53 08:13-09:27/74 17:21	07:25 08:08-09:48/100 17:01
4	06:02 20:54	06:25 20:33	06:54 07:14-07:50/36 19:51	07:21 19:03	06:54 08:12-09:28/76 17:20	07:26 08:09-09:48/99 17:00
5	06:02 20:54	06:26 20:32	06:55 07:15-07:50/35 19:50	07:22 19:01	06:55 08:11-09:29/78 17:19	07:27 08:09-09:48/99 17:00
6	06:03 20:53	06:27 20:31	06:56 07:16-07:50/34 19:48	07:23 19:00	06:56 08:10-09:30/80 17:18	07:28 08:10-09:49/99 17:00
7	06:03 20:53	06:28 20:30	06:57 07:16-07:49/33 19:46	07:24 18:58	06:57 08:09-09:31/82 17:17	07:29 08:10-09:49/99 17:00
8	06:04 20:53	06:29 20:29	06:57 07:17-07:49/32 19:45	07:25 18:57	06:58 08:09-09:33/84 17:16	07:30 08:11-09:50/99 17:00
9	06:04 20:52	06:30 20:28	06:58 07:18-07:49/31 19:43	07:26 18:55	06:59 08:08-09:34/86 17:15	07:31 08:11-09:51/100 17:00
10	06:05 20:52	06:31 20:27	06:59 07:19-07:48/29 19:42	07:27 18:54	07:00 08:08-09:34/86 17:14	07:32 08:11-09:50/99 17:00
11	06:06 20:52	06:32 20:25	07:00 07:20-07:48/28 19:40	07:28 18:52	07:02 08:07-09:35/88 17:13	07:32 08:12-09:51/99 17:00
12	06:06 20:51	06:33 20:24	07:01 07:21-07:47/26 19:38	07:29 18:51	07:03 08:06-09:36/90 17:12	07:33 08:12-09:51/99 17:00
13	06:07 20:51	06:34 20:23	07:02 07:22-07:46/24 19:37	07:30 18:49	07:04 08:07-09:37/90 17:11	07:34 08:13-09:52/99 17:01
14	06:08 20:50	06:34 20:22	07:03 07:23-07:45/22 19:35	07:31 18:48	07:05 08:06-09:38/92 17:10	07:35 08:14-09:53/99 17:01
15	06:09 20:50	06:35 20:20	07:04 07:23-07:43/20 19:34	07:32 18:46	07:06 08:06-09:38/92 17:10	07:35 08:13-09:53/100 17:01
16	06:09 20:49	06:36 20:19	07:05 07:24-07:42/18 19:32	07:33 18:45	07:07 08:06-09:39/93 17:09	07:36 08:14-09:53/99 17:01
17	06:10 20:49	06:37 20:18	07:06 07:25-07:41/16 19:30	07:34 18:43	07:08 08:05-09:39/94 17:08	07:37 08:15-09:54/99 17:02
18	06:11 20:48	06:38 20:16	07:07 07:26-07:39/13 19:29	07:35 18:42	07:09 08:06-09:41/95 17:07	07:37 08:15-09:54/99 17:02
19	06:12 20:47	06:39 20:15	07:07 07:27-07:37/10 19:27	07:36 18:40	07:10 08:06-09:41/95 17:07	07:38 08:16-09:55/99 17:02
20	06:12 20:47	06:40 20:13	07:08 07:28-07:34/6 19:25	07:37 18:39	07:12 08:06-09:41/95 17:06	07:39 08:16-09:55/99 17:03
21	06:13 20:46	06:41 20:12	07:09 07:29-07:30/1 19:24	07:38 18:38	07:13 08:06-09:42/96 17:05	07:39 08:17-09:56/99 17:03
22	06:14 20:45	06:42 20:11	07:10 19:22	07:40 09:37-09:59/22 18:36	07:14 08:06-09:42/96 17:05	07:40 08:17-09:56/99 17:04
23	06:15 20:45	06:43 20:09	07:11 19:21	07:41 09:33-10:04/31 18:35	07:15 08:06-09:43/97 17:04	07:40 08:18-09:57/99 17:04
24	06:16 20:44	06:44 20:08	07:12 19:19	07:42 09:29-10:07/38 18:33	07:16 08:07-09:44/97 17:04	07:41 08:18-09:57/99 17:05
25	06:16 20:43	06:45 20:06	07:13 19:17	06:43 08:26-09:10/44 17:32	07:17 08:07-09:44/97 17:03	07:41 08:18-09:57/99 17:05
26	06:17 20:42	06:46 07:27-07:39/12 20:05	07:14 19:16	06:44 08:24-09:13/49 17:31	07:18 08:07-09:45/98 17:03	07:42 08:19-09:58/99 17:06
27	06:18 20:41	06:46 07:23-07:42/19 20:03	07:15 19:14	06:45 08:22-09:15/53 17:30	07:19 08:07-09:45/98 17:02	07:42 08:19-09:58/99 17:07
28	06:19 20:40	06:47 07:21-07:44/23 20:02	07:16 19:12	06:46 08:21-09:18/57 17:28	07:20 08:07-09:46/99 17:02	07:42 08:19-09:59/100 17:07
29	06:20 20:40	06:48 07:19-07:46/27 20:00	07:17 19:11	06:47 08:19-09:19/60 17:27	07:21 08:07-09:46/99 17:02	07:43 08:21-10:00/99 17:08
30	06:21 20:39	06:49 07:17-07:47/30 19:59	07:18 19:09	06:48 08:17-09:21/64 17:26	07:22 08:07-09:46/99 17:01	07:43 08:21-10:00/99 17:09
31	06:22 20:38	06:50 07:15-07:47/32 19:57		06:49 08:16-09:22/66 17:25		07:43 08:21-10:00/99 17:09
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	0	143	520	484	2688	3073

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

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

WTG: 09 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (6)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June
1	07:43 17:10	07:32 17:43	06:58 18:15	07:10 19:46	07:28-07:39/11 20:16	06:26 20:16
2	07:44 17:11	07:31 17:44	06:56 18:16	07:08 19:47	07:26-07:39/13 20:17	06:25 20:17
3	07:44 17:12	07:30 17:45	06:55 18:17	07:06 19:48	07:25-07:40/15 20:18	06:24 20:18
4	07:44 17:13	07:29 17:47	06:53 18:18	07:05 19:49	07:23-07:39/16 20:19	06:23 20:19
5	07:44 17:14	07:28 17:48	06:52 18:19	07:03 19:50	07:21-07:39/18 20:20	06:21 20:20
6	07:44 17:15	07:27 17:49	06:50 18:20	07:02 19:51	07:20-07:39/19 20:21	06:20 20:21
7	07:44 17:16	07:26 17:50	06:49 18:21	07:00 19:52	07:18-07:38/20 20:22	06:19 20:22
8	07:44 17:17	07:25 17:51	06:47 18:22	06:59 19:53	07:17-07:38/21 20:23	06:18 20:23
9	07:44 17:18	07:24 17:52	06:46 18:23	06:57 19:54	07:15-07:37/22 20:24	06:17 20:24
10	07:43 17:19	07:23 17:54	06:44 18:24	06:56 19:55	07:14-07:36/22 20:25	06:16 20:25
11	07:43 17:20	07:21 17:55	06:43 18:26	06:54 19:56	07:15-07:34/19 20:26	06:15 20:26
12	07:43 17:21	07:20 17:56	06:41 18:27	06:53 19:57	07:16-07:33/17 20:27	06:14 20:27
13	07:43 17:22	07:19 17:57	06:40 18:28	06:51 19:58	07:18-07:30/12 20:28	06:13 20:28
14	07:43 17:23	07:18 17:58	06:38 18:29	06:50 19:59	07:22-07:26/4 20:28	06:12 20:28
15	07:42 17:24	07:17 17:59	06:37 18:30	06:48 20:00	19:13-20:03/50 20:29	06:11 20:29
16	07:42 17:25	07:15 18:01	06:35 18:31	06:47 20:01	19:14-20:05/51 20:30	06:10 20:30
17	07:41 17:26	07:14 18:02	06:33 18:32	06:45 20:02	19:13-20:05/52 20:31	06:09 20:31
18	07:41 17:27	07:13 18:03	06:32 18:33	06:44 20:03	19:12-20:05/53 20:32	06:08 20:32
19	07:41 17:28	07:12 18:04	06:30 18:34	06:42 20:04	19:12-20:06/54 20:33	06:07 20:33
20	07:40 17:29	07:10 18:05	06:29 18:35	06:41 20:05	19:12-20:07/55 20:34	06:07 20:34
21	07:40 17:30	07:09 18:06	06:27 18:36	06:39 20:06	19:12-20:07/55 20:35	06:06 20:35
22	07:39 17:31	07:08 18:07	06:25 18:37	06:38 20:07	19:11-20:07/56 20:36	06:05 20:36
23	07:38 17:33	07:06 18:08	06:24 18:38	06:37 20:08	19:11-20:07/56 20:37	06:04 20:37
24	07:38 17:34	07:05 18:10	06:22 18:39	06:35 20:09	19:11-20:08/57 20:37	06:04 20:37
25	07:37 17:35	07:04 18:11	06:21 18:40	06:34 20:10	06:23-06:24/1 20:38	06:03 20:38
26	07:36 17:36	07:02 18:12	06:19 18:41	06:33 20:11	06:23-06:27/4 20:39	06:02 20:39
27	07:36 17:37	07:01 18:13	06:18 18:42	06:31 20:12	06:22-06:28/6 20:40	06:02 20:40
28	07:35 17:38	06:59 18:14	06:16 18:43	06:30 20:13	06:22-06:30/8 20:41	06:01 20:41
29	07:34 17:40		07:14 19:44	07:32-07:34/2 20:14	06:21-06:31/10 20:41	06:01 20:41
30	07:33 17:41		07:13 19:45	07:31-07:37/6 20:15	06:21-06:32/11 20:42	06:00 20:42
31	07:32 17:42		07:11 19:46	07:29-07:38/9 20:16	06:20-06:32/12 20:43	06:00 20:43
Potential sun hours	302	300	370	396	444	447
Sum of minutes with flicker	0	0	314	229	1426	2344

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

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

WTG: 09 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (6)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July		August		September		October		November		December	
1	06:00	06:22-06:43/21	06:23	19:27-20:12/45	06:51	07:14-07:33/19	07:19	07:38-07:57/19	06:50	07:23	07:01	17:01
	20:54	19:18-20:16/58	20:37		19:56		19:08		17:23		17:01	
2	06:01	06:22-06:42/20	06:23	19:28-20:11/43	06:52	07:12-07:34/22	07:20	07:39-07:57/18	06:52	07:24	07:01	17:01
	20:54	19:17-20:15/58	20:36		19:54		19:06		17:22		17:01	
3	06:01	06:23-06:43/20	06:24	19:29-20:10/41	06:53	07:13-07:35/22	07:21	07:40-07:56/16	06:53	07:25	07:01	17:01
	20:54	19:18-20:16/58	20:35		19:53		19:05		17:21		17:01	
4	06:02	06:23-06:42/19	06:25	19:30-20:09/39	06:54	07:14-07:35/21	07:22	07:41-07:56/15	06:54	07:26	07:01	17:00
	20:54	19:18-20:16/58	20:34		19:51		19:03		17:20		17:00	
5	06:02	06:24-06:43/19	06:26	19:30-20:07/37	06:55	07:15-07:35/20	07:22	07:42-07:55/13	06:55	07:27	07:01	17:00
	20:54	19:18-20:16/58	20:32		19:50		19:01		17:19		17:00	
6	06:03	06:25-06:43/18	06:27	19:32-20:05/33	06:56	07:16-07:35/19	07:23	07:43-07:54/11	06:56	07:28	07:01	17:00
	20:53	19:18-20:16/58	20:31		19:48		19:00		17:18		17:00	
7	06:03	06:25-06:42/17	06:28	19:34-20:03/29	06:57	07:17-07:35/18	07:24	07:44-07:53/9	06:57	07:29	07:01	17:00
	20:53	19:19-20:17/58	20:30		19:46		18:58		17:17		17:00	
8	06:04	06:26-06:43/17	06:29	19:36-20:01/25	06:57	07:17-07:34/17	07:25	07:45-07:51/6	06:58	07:30	07:01	17:00
	20:53	19:19-20:17/58	20:29		19:45		18:57		17:16		17:00	
9	06:04	06:26-06:42/16	06:30	19:39-19:58/19	06:58	07:18-07:33/15	07:26	07:46-07:49/3	06:59	07:31	07:01	17:00
	20:53	19:19-20:17/58	20:28		19:43		18:55		17:15		17:00	
10	06:05	06:27-06:42/15	06:31	19:44-19:53/9	06:59	07:19-07:32/13	07:27		07:00	07:32	07:01	17:00
	20:52	19:19-20:17/58	20:27		19:42		18:54		17:14		17:00	
11	06:06	06:28-06:42/14	06:32		07:00	07:20-07:31/11	07:28		07:02	07:32	07:01	17:00
	20:52	19:20-20:18/58	20:25		19:40		18:52		17:13		17:00	
12	06:06	06:28-06:41/13	06:33		07:01	07:21-07:30/9	07:29		07:03	07:33	07:01	17:00
	20:51	19:19-20:17/58	20:24		19:38		18:51		17:12		17:00	
13	06:07	06:29-06:41/12	06:34		07:02	07:22-07:28/6	07:30		07:04	07:34	07:01	17:01
	20:51	19:20-20:18/58	20:23		19:37		18:49		17:11		17:01	
14	06:08	06:30-06:41/11	06:34		07:03	07:23-07:26/3	07:31		07:05	07:35	07:01	17:01
	20:50	19:20-20:18/58	20:22		19:35		18:48		17:10		17:01	
15	06:09	06:30-06:39/9	06:35		07:04		07:32		07:06	07:36	07:01	17:01
	20:50	19:20-20:17/57	20:20		19:34		18:46		17:10		17:01	
16	06:09	06:31-06:38/7	06:36		07:05		07:33		07:07	07:36	07:01	17:01
	20:49	19:20-20:18/58	20:19		19:32		18:45		17:09		17:01	
17	06:10	06:32-06:37/5	06:37		07:06		07:34		07:08	07:37	07:01	17:02
	20:49	19:20-20:18/58	20:18		19:30		18:43		17:08		17:02	
18	06:11	06:33-06:36/3	06:38		07:07		07:35		07:09	07:38	07:01	17:02
	20:48	19:20-20:17/57	20:16		19:29		18:42		17:07		17:02	
19	06:12	19:20-20:17/57	06:39		07:07		07:36		07:11	07:38	07:01	17:02
	20:48		20:15		19:27		18:40		17:07		17:02	
20	06:12	19:21-20:17/56	06:40		07:08		07:37		07:12	07:39	07:01	17:03
	20:47		20:14		19:25		18:39		17:06		17:03	
21	06:13	19:21-20:17/56	06:41		07:09		07:39		07:13	07:39	07:01	17:03
	20:46		20:12		19:24		18:38		17:05		17:03	
22	06:14	19:22-20:17/55	06:42		07:10	07:39-07:51/12	07:40		07:14	07:40	07:01	17:04
	20:45		20:11		19:22		18:36		17:05		17:04	
23	06:15	19:21-20:16/55	06:43		07:11	07:36-07:54/18	07:41		07:15	07:40	07:01	17:04
	20:45		20:09		19:21		18:35		17:04		17:04	
24	06:16	19:22-20:16/54	06:44		07:12	07:34-07:55/21	07:42		07:16	07:41	07:01	17:05
	20:44		20:08		19:19		18:33		17:04		17:05	
25	06:16	19:22-20:16/54	06:45		07:13	07:33-07:57/24	06:43		07:17	07:41	07:01	17:05
	20:43		20:06		19:17		17:32		17:03		17:05	
26	06:17	19:23-20:16/53	06:46		07:14	07:33-07:56/23	06:44		07:18	07:42	07:01	17:06
	20:42		20:05		19:16		17:31		17:03		17:06	
27	06:18	19:24-20:16/52	06:46		07:15	07:34-07:57/23	06:45		07:19	07:42	07:01	17:07
	20:41		20:03		19:14		17:30		17:02		17:07	
28	06:19	19:24-20:15/51	06:47		07:16	07:35-07:57/22	06:46		07:20	07:42	07:01	17:07
	20:40		20:02		19:12		17:28		17:02		17:07	
29	06:20	19:24-20:14/50	06:48	07:23-07:27/4	07:17	07:36-07:57/21	06:47		07:21	07:43	07:01	17:08
	20:40		20:00		19:11		17:27		17:02		17:08	
30	06:21	19:25-20:13/48	06:49	07:19-07:31/12	07:18	07:37-07:57/20	06:48		07:22	07:43	07:01	17:09
	20:39		19:59		19:09		17:26		17:01		17:09	
31	06:22	19:26-20:13/47	06:50	07:15-07:32/17			06:49			07:43	07:01	17:09
	20:38		19:57				17:25				17:09	
Potential sun hours	454		425		374		347		302		293	
Sum of minutes with flicker	1986		353		399		110		0		0	

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

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

WTG: 10 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (4)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June
1	07:43 08:05-08:23/18 17:10	07:32 17:43 17:43	06:58 18:15 18:15	07:10 19:46 19:46	06:26 18:57-19:37/40 20:16	05:59 20:44 20:44
2	07:43 08:05-08:24/19 17:11	07:31 17:44 17:44	06:56 18:16 18:16	07:08 19:47 19:47	06:25 18:58-19:37/39 20:17	05:59 20:44 20:44
3	07:44 08:05-08:24/19 17:12	07:30 17:45 17:45	06:55 18:17 18:17	07:06 19:48 19:48	06:24 18:59-19:36/37 20:18	05:58 20:45 20:45
4	07:44 08:05-08:24/19 17:13	07:29 17:47 17:47	06:53 18:18 18:18	07:05 19:49 19:49	06:23 18:59-19:34/35 20:19	05:58 20:46 20:46
5	07:44 08:06-08:24/18 17:14	07:28 17:48 17:48	06:52 18:19 18:19	07:03 19:50 19:50	06:21 19:00-19:33/33 20:20	05:58 20:46 20:46
6	07:44 08:07-08:24/17 17:15	07:27 17:49 17:49	06:50 18:20 18:20	07:02 19:51 19:51	06:20 19:01-19:32/31 20:21	05:57 20:47 20:47
7	07:44 08:08-08:24/16 17:16	07:26 17:50 17:50	06:49 18:21 18:21	07:00 19:52 19:52	06:19 19:02-19:30/28 20:22	05:57 20:47 20:47
8	07:44 08:10-08:23/13 17:17	07:25 17:51 17:51	06:47 18:22 18:22	06:59 19:53 19:53	06:18 19:04-19:29/25 20:23	05:57 20:48 20:48
9	07:44 08:11-08:23/12 17:18	07:24 17:53 17:53	06:46 18:23 18:23	06:57 19:54 19:54	06:17 19:06-19:27/21 20:24	05:57 20:49 20:49
10	07:43 08:12-08:21/9 17:19	07:23 17:54 17:54	06:44 18:24 18:24	06:56 19:55 19:55	06:16 19:08-19:24/16 20:25	05:57 20:49 20:49
11	07:43 08:15-08:19/4 17:20	07:21 17:55 17:55	06:43 18:26 18:26	06:54 19:56 19:56	06:15 19:12-19:20/8 20:26	05:57 20:50 20:50
12	07:43 17:21 17:21	07:20 17:56 17:56	06:41 18:27 18:27	06:53 19:57 19:57	06:14 19:03-19:36/33 20:27	05:56 20:50 20:50
13	07:43 17:22 17:22	07:19 17:57 17:57	06:40 18:28 18:28	06:51 19:58 19:58	06:13 19:01-19:37/36 20:28	05:56 20:51 20:51
14	07:42 17:23 17:23	07:18 17:58 17:58	06:38 18:29 18:29	06:50 19:59 19:59	06:12 19:00-19:38/38 20:28	05:56 20:51 20:51
15	07:42 17:24 17:24	07:17 17:59 17:59	06:37 18:30 18:30	06:48 20:00 20:00	06:11 18:59-19:39/40 20:29	05:56 20:51 20:51
16	07:42 17:25 17:25	07:15 18:01 18:01	06:35 18:31 18:31	06:47 20:01 20:01	06:10 18:58-19:40/42 20:30	05:56 20:52 20:52
17	07:41 17:26 17:26	07:14 18:02 18:02	06:33 18:32 18:32	06:45 20:02 20:02	06:09 18:57-19:40/43 20:31	05:56 20:52 20:52
18	07:41 17:27 17:27	07:13 18:03 18:03	06:32 18:33 18:33	06:44 20:03 20:03	06:08 18:57-19:42/45 20:32	05:56 20:53 20:53
19	07:40 17:28 17:28	07:12 18:04 18:04	06:30 18:34 18:34	06:42 20:04 20:04	06:07 18:56-19:41/45 20:33	05:57 20:53 20:53
20	07:40 17:29 17:29	07:10 18:05 18:05	06:29 18:35 18:35	06:41 20:05 20:05	06:07 18:56-19:42/46 20:34	05:57 20:53 20:53
21	07:39 17:30 17:30	07:09 18:06 18:06	06:27 18:36 18:36	06:39 20:06 20:06	06:06 18:56-19:42/46 20:35	05:57 20:53 20:53
22	07:39 17:31 17:31	07:08 18:07 18:07	06:25 18:37 18:37	06:38 20:07 20:07	06:05 18:55-19:41/46 20:36	05:57 20:54 20:54
23	07:38 17:33 17:33	07:06 18:08 18:08	06:24 18:38 18:38	06:37 20:08 20:08	06:04 18:55-19:41/46 20:36	05:57 20:54 20:54
24	07:38 17:34 17:34	07:05 18:10 18:10	06:22 18:39 18:39	06:35 20:09 20:09	06:04 18:55-19:41/46 20:37	05:58 20:54 20:54
25	07:37 17:35 17:35	07:03 18:11 18:11	06:21 18:40 18:40	06:34 20:10 20:10	06:03 18:55-19:40/45 20:38	05:58 20:54 20:54
26	07:36 17:36 17:36	07:02 18:12 18:12	06:19 18:41 18:41	06:33 20:11 20:11	06:02 18:55-19:40/45 20:39	05:58 20:54 20:54
27	07:36 17:37 17:37	07:01 18:13 18:13	06:18 18:42 18:42	06:31 20:12 20:12	06:02 18:55-19:40/45 20:40	05:58 20:54 20:54
28	07:35 17:38 17:38	06:59 18:14 18:14	06:16 18:43 18:43	06:30 20:13 20:13	06:01 18:56-19:40/44 20:41	05:59 20:54 20:54
29	07:34 17:40 17:40		07:14 19:44 19:44	06:29 20:14 20:14	06:01 18:56-19:38/42 20:41	05:59 20:54 20:54
30	07:33 17:41 17:41		07:13 19:45 19:45	06:27 20:15 20:15	06:00 18:56-19:38/42 20:42	06:00 20:54 20:54
31	07:32 17:42 17:42		07:11 19:45 19:45		06:00 20:43 20:43	
Potential sun hours	302	300	370	396	444	447
Sum of minutes with flicker	164	0	0	933	313	0

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

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

WTG: 10 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (4)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July	August	September	October	November	December
1	06:00 20:54	06:23 20:37	06:51 19:03-19:34/31 19:56	07:19 19:08	06:50 17:23	07:23 07:58-08:01/3 17:01
2	06:01 20:54	06:24 19:21-19:33/12 20:36	06:52 19:05-19:32/27 19:54	07:20 19:06	06:51 17:22	07:24 07:55-08:04/9 17:01
3	06:01 20:54	06:24 19:18-19:36/18 20:35	06:53 19:06-19:31/25 19:53	07:21 19:05	06:53 17:21	07:25 07:54-08:06/12 17:01
4	06:02 20:54	06:25 19:16-19:38/22 20:33	06:54 19:09-19:30/21 19:51	07:22 19:03	06:54 17:20	07:26 07:54-08:07/13 17:00
5	06:02 20:54	06:26 19:13-19:39/26 20:32	06:55 19:12-19:26/14 19:50	07:22 19:01	06:55 17:19	07:27 07:53-08:08/15 17:00
6	06:03 20:53	06:27 19:12-19:40/28 20:31	06:56 19:48	07:23 19:00	06:56 17:18	07:28 07:53-08:10/17 17:00
7	06:03 20:53	06:28 19:10-19:42/32 20:30	06:57 19:46	07:24 18:58	06:57 17:17	07:29 07:53-08:11/18 17:00
8	06:04 20:53	06:29 19:09-19:43/34 20:29	06:57 19:45	07:25 18:57	06:58 17:16	07:30 07:53-08:12/19 17:00
9	06:04 20:52	06:30 19:08-19:44/36 20:28	06:58 19:43	07:26 18:55	06:59 17:15	07:31 07:54-08:13/19 17:00
10	06:05 20:52	06:31 19:07-19:45/38 20:27	06:59 19:42	07:27 18:54	07:00 17:14	07:32 07:55-08:14/19 17:00
11	06:06 20:52	06:32 19:06-19:45/39 20:25	07:00 19:40	07:28 18:52	07:02 17:13	07:32 07:55-08:13/18 17:00
12	06:06 20:51	06:33 19:05-19:46/41 20:24	07:01 19:38	07:29 18:51	07:03 17:12	07:33 07:56-08:14/18 17:00
13	06:07 20:51	06:34 19:05-19:47/42 20:23	07:02 19:37	07:30 18:49	07:04 17:11	07:34 07:57-08:15/18 17:01
14	06:08 20:50	06:35 19:03-19:46/43 20:22	07:03 19:35	07:31 18:48	07:05 17:10	07:35 07:58-08:16/18 17:01
15	06:09 20:50	06:35 19:03-19:46/43 20:20	07:04 19:34	07:32 18:46	07:06 17:10	07:35 07:58-08:16/18 17:01
16	06:09 20:49	06:36 19:02-19:47/45 20:19	07:05 19:32	07:33 18:45	07:07 17:09	07:36 07:59-08:17/18 17:01
17	06:10 20:49	06:37 19:02-19:47/45 20:18	07:06 19:30	07:34 18:43	07:08 17:08	07:37 08:00-08:18/18 17:02
18	06:11 20:48	06:38 19:01-19:47/46 20:16	07:07 19:29	07:35 18:42	07:09 17:07	07:38 08:00-08:18/18 17:02
19	06:12 20:47	06:39 19:01-19:47/46 20:15	07:07 19:27	07:36 18:40	07:11 17:07	07:38 08:01-08:19/18 17:02
20	06:12 20:47	06:40 19:01-19:47/46 20:13	07:08 19:25	07:37 18:39	07:12 17:06	07:39 08:01-08:19/18 17:03
21	06:13 20:46	06:41 19:01-19:47/46 20:12	07:09 19:24	07:39 18:38	07:13 17:05	07:39 08:02-08:20/18 17:03
22	06:14 20:45	06:42 19:00-19:46/46 20:11	07:10 19:22	07:40 18:36	07:14 17:05	07:40 08:02-08:20/18 17:04
23	06:15 20:45	06:43 19:00-19:45/45 20:09	07:11 19:21	07:41 18:35	07:15 17:04	07:40 08:03-08:21/18 17:04
24	06:16 20:44	06:44 19:00-19:45/45 20:08	07:12 19:19	07:42 18:33	07:16 17:04	07:41 08:03-08:21/18 17:05
25	06:17 20:43	06:45 19:00-19:44/44 20:06	07:13 19:17	06:43 17:32	07:17 17:03	07:41 08:04-08:22/18 17:05
26	06:17 20:42	06:46 19:00-19:43/43 20:05	07:14 19:16	06:44 17:31	07:18 17:03	07:42 08:04-08:22/18 17:06
27	06:18 20:41	06:46 19:00-19:42/42 20:03	07:15 19:14	06:45 17:30	07:19 17:02	07:42 08:04-08:22/18 17:07
28	06:19 20:40	06:47 19:01-19:40/39 20:02	07:16 19:12	06:46 17:28	07:20 17:02	07:42 08:04-08:22/18 17:07
29	06:20 20:40	06:48 19:01-19:39/38 20:00	07:17 19:11	06:47 17:27	07:21 17:02	07:43 08:05-08:23/18 17:08
30	06:21 20:39	06:49 19:01-19:37/36 19:59	07:18 19:09	06:48 17:26	07:22 17:01	07:43 08:05-08:23/18 17:09
31	06:22 20:38	06:50 19:02-19:35/33 19:57		06:49 17:25		07:43 08:05-08:23/18 17:09
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	0	1139	118	0	0	522

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

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

WTG: 11 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (7)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43 16:14-16:45/31	07:32 16:32-16:58/26	06:58	07:10	06:26	05:59	06:00	06:23	06:51	07:19	06:50	07:23 15:59-16:37/38
	17:10	17:43	18:15	19:46	20:16	20:44	20:54	20:37	19:56	19:08	17:23	17:01
2	07:43 16:14-16:46/32	07:31 16:34-16:57/23	06:56	07:08	06:25	05:59	06:01	06:24	06:52	07:20	06:51	07:24 16:00-16:37/37
	17:11	17:44	18:16	19:47	20:17	20:44	20:54	20:36	19:54	19:06	17:22	17:01
3	07:44 16:15-16:47/32	07:30 16:36-16:55/19	06:55	07:06	06:24	05:58	06:01	06:24	06:53	07:21	06:53	07:25 16:00-16:36/36
	17:12	17:45	18:17	19:48	20:18	20:45	20:54	20:35	19:53	19:05	17:21	17:01
4	07:44 16:15-16:48/33	07:29 16:40-16:51/11	06:53	07:05	06:23	05:58	06:02	06:25	06:54	07:21	06:54	07:26 16:00-16:36/36
	17:13	17:47	18:18	19:49	20:19	20:46	20:54	20:33	19:51	19:03	17:20	17:00
5	07:44 16:15-16:49/34	07:28	06:52	07:03	06:21	05:58	06:02	06:26	06:55	07:22	06:55	07:27 16:01-16:36/35
	17:14	17:48	18:19	19:50	20:20	20:46	20:54	20:32	19:50	19:01	17:19	17:00
6	07:44 16:16-16:50/34	07:27	06:50	07:02	06:20	05:58	06:03	06:27	06:56	07:23	06:56	07:28 16:02-16:36/34
	17:15	17:49	18:20	19:51	20:21	20:47	20:53	20:31	19:48	19:00	17:18	17:00
7	07:44 16:16-16:51/35	07:26	06:49	07:00	06:19	05:57	06:03	06:28	06:57	07:24	06:57 16:09-16:22/13	07:29 16:02-16:36/34
	17:16	17:50	18:21	19:52	20:22	20:47	20:53	20:30	19:46	18:58	17:17	17:00
8	07:44 16:16-16:52/36	07:25	06:47	06:59	06:18	05:57	06:04	06:29	06:57	07:25	06:58 16:07-16:26/19	07:30 16:03-16:36/33
	17:17	17:51	18:22	19:53	20:23	20:48	20:53	20:29	19:45	18:57	17:16	17:00
9	07:44 16:16-16:52/36	07:24	06:46	06:57	06:17	05:57	06:05	06:30	06:58	07:26	06:59 16:05-16:28/23	07:31 16:04-16:36/32
	17:18	17:53	18:23	19:54	20:24	20:49	20:52	20:28	19:43	18:55	17:15	17:00
10	07:43 16:16-16:53/37	07:22	06:44	06:56	06:16	05:57	06:05	06:31	06:59	07:27	07:00 16:03-16:29/26	07:32 16:03-16:35/32
	17:19	17:54	18:24	19:55	20:25	20:49	20:52	20:27	19:42	18:54	17:14	17:00
11	07:43 16:17-16:55/38	07:21	06:43	06:54	06:15	05:57	06:06	06:32	07:00	07:28	07:02 16:01-16:31/30	07:32 16:04-16:35/31
	17:20	17:55	18:26	19:56	20:26	20:50	20:52	20:25	19:40	18:52	17:13	17:00
12	07:43 16:18-16:56/38	07:20	06:41	06:53	06:14	05:56	06:06	06:33	07:01	07:29	07:03 16:00-16:32/32	07:33 16:05-16:36/31
	17:21	17:56	18:27	19:57	20:27	20:50	20:51	20:24	19:38	18:51	17:12	17:00
13	07:43 16:17-16:56/39	07:19	06:40	06:51	06:13	05:56	06:07	06:34	07:02	07:30	07:04 16:00-16:34/34	07:34 16:06-16:36/30
	17:22	17:57	18:28	19:58	20:27	20:51	20:51	20:23	19:37	18:49	17:11	17:01
14	07:42 16:18-16:58/40	07:18	06:38	06:50	06:12	05:56	06:08	06:35	07:03	07:31	07:05 15:59-16:34/35	07:35 16:06-16:36/30
	17:23	17:58	18:29	19:59	20:28	20:51	20:50	20:22	19:35	18:48	17:10	17:01
15	07:42 16:19-16:59/40	07:17	06:37	06:48	06:11	05:56	06:09	06:35	07:04	07:32	07:06 15:58-16:35/37	07:35 16:06-16:36/30
	17:24	17:59	18:30	20:00	20:29	20:51	20:50	20:20	19:34	18:46	17:10	17:01
16	07:42 16:19-17:00/41	07:15	06:35	06:47	06:10	05:56	06:09	06:36	07:05	07:33	07:07 15:58-16:36/38	07:36 16:07-16:37/30
	17:25	18:01	18:31	20:01	20:30	20:52	20:49	20:19	19:32	18:45	17:09	17:01
17	07:41 16:20-17:02/42	07:14	06:33	06:45	06:09	05:56	06:10	06:37	07:06	07:34	07:08 15:57-16:36/39	07:37 16:07-16:36/29
	17:26	18:02	18:32	20:02	20:31	20:52	20:49	20:18	19:30	18:43	17:08	17:02
18	07:41 16:19-17:02/43	07:13	06:32	06:44	06:08	05:56	06:11	06:38	07:07	07:35	07:09 15:58-16:38/40	07:37 16:08-16:37/29
	17:27	18:03	18:33	20:03	20:32	20:53	20:48	20:16	19:29	18:42	17:07	17:02
19	07:40 16:20-17:04/44	07:12	06:30	06:42	06:07	05:57	06:12	06:39	07:07	07:36	07:10 15:57-16:38/41	07:38 16:09-16:38/29
	17:28	18:04	18:34	20:04	20:33	20:53	20:47	20:15	19:27	18:40	17:07	17:02
20	07:40 16:21-17:03/42	07:10	06:29	06:41	06:07	05:57	06:12	06:40	07:08	07:37	07:12 15:57-16:39/42	07:39 16:09-16:38/29
	17:29	18:05	18:35	20:05	20:34	20:53	20:47	20:13	19:25	18:39	17:06	17:03
21	07:39 16:22-17:04/42	07:09	06:27	06:39	06:06	05:57	06:13	06:41	07:09	07:39	07:13 15:57-16:39/42	07:39 16:10-16:38/28
	17:30	18:06	18:36	20:06	20:35	20:53	20:46	20:12	19:24	18:38	17:05	17:03
22	07:39 16:22-17:04/42	07:08	06:25	06:38	06:05	05:57	06:14	06:42	07:10	07:40	07:14 15:57-16:39/42	07:40 16:10-16:38/28
	17:31	18:07	18:37	20:07	20:36	20:54	20:45	20:11	19:22	18:36	17:05	17:04
23	07:38 16:22-17:03/41	07:06	06:24	06:37	06:04	05:57	06:15	06:43	07:11	07:41	07:15 15:57-16:40/43	07:40 16:11-16:40/29
	17:33	18:08	18:38	20:08	20:36	20:54	20:45	20:09	19:21	18:35	17:04	17:04
24	07:38 16:24-17:04/40	07:05	06:22	06:35	06:04	05:58	06:16	06:44	07:12	07:42	07:16 15:57-16:39/42	07:41 16:11-16:40/29
	17:34	18:10	18:39	20:09	20:37	20:54	20:44	20:08	19:19	18:34	17:04	17:05
25	07:37 16:24-17:03/39	07:03	06:21	06:34	06:03	05:58	06:17	06:45	07:13	06:43	07:17 15:58-16:40/42	07:41 16:11-16:40/29
	17:35	18:11	18:40	20:10	20:38	20:54	20:43	20:06	19:17	17:32	17:03	17:05
26	07:36 16:25-17:03/38	07:02	06:19	06:33	06:02	05:58	06:17	06:46	07:14	06:44	07:18 15:58-16:39/41	07:42 16:12-16:41/29
	17:36	18:12	18:41	20:11	20:39	20:54	20:42	20:05	19:16	17:31	17:03	17:06
27	07:36 16:25-17:02/37	07:01	06:18	06:31	06:02	05:59	06:18	06:47	07:15	06:45	07:19 15:58-16:39/41	07:42 16:12-16:41/29
	17:37	18:13	18:42	20:12	20:40	20:54	20:41	20:03	19:14	17:30	17:02	17:07
28	07:35 16:26-17:01/35	06:59	06:16	06:30	06:01	05:59	06:19	06:47	07:16	06:46	07:20 15:58-16:38/40	07:42 16:12-16:42/30
	17:38	18:14	18:43	20:13	20:41	20:54	20:40	20:02	19:12	17:28	17:02	17:07
29	07:34 16:28-17:02/34		07:14	06:29	06:01	05:59	06:20	06:48	07:17	06:47	07:21 15:58-16:38/40	07:43 16:12-16:42/30
	17:40		19:44	20:14	20:41	20:54	20:39	20:00	19:11	17:27	17:02	17:08
30	07:33 16:29-17:01/32		07:13	06:27	06:00	06:00	06:21	06:49	07:18	06:48	07:22 15:59-16:37/38	07:43 16:14-16:44/30
	17:41		19:45	20:15	20:42	20:54	20:39	19:59	19:09	17:26	17:01	17:09
31	07:32 16:31-17:00/29		07:11		06:00		06:22	06:50		06:49		07:43 16:14-16:44/30
	17:42		19:45		20:43		20:38	19:57		17:25		17:09
Potential sun hours	302	300	370	396	444	447	454	425	374	347	302	293
Sum of minutes with flicker	1156	79	0	0	0	0	0	0	0	0	860	966

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

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

WTG: 12 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (12)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June
1	07:43 08:10-08:47/37 17:10	07:32 17:06-17:20/14 17:43	06:58 07:29-08:26/57 18:15 17:14-17:31/17	07:10 17:45-18:52/67 19:47	06:26 20:16 20:44	05:59 20:44
2	07:44 08:11-08:48/37 17:11	07:31 17:05-17:21/16 17:44	06:56 17:15-17:35/20 18:16 07:29-08:27/58	07:08 17:45-18:50/65 19:48	06:25 20:17 20:44	05:59 20:44
3	07:44 08:11-08:48/37 17:12	07:30 17:03-17:22/19 17:45	06:55 17:10-17:39/29 18:17 07:27-08:26/59	07:06 17:45-18:49/64 19:48	06:24 20:18 20:45	05:58 20:45
4	07:44 08:12-08:48/36 17:13	07:29 17:03-17:24/21 17:47	06:53 17:07-17:42/35 18:18 07:27-08:27/60	07:05 17:46-18:49/63 19:49	06:23 20:19 20:46	05:58 20:46
5	07:44 08:12-08:49/37 17:14	07:28 17:02-17:25/23 17:48	06:52 17:04-17:44/40 18:19 07:26-08:27/61	07:03 17:46-18:47/61 19:50	06:21 20:20 20:46	05:58 20:46
6	07:44 08:13-08:49/36 17:15	07:27 17:02-17:26/24 17:49	06:50 17:02-17:47/45 18:20 07:26-08:27/61	07:02 17:47-18:47/60 19:51	06:20 20:21 20:47	05:58 20:47
7	07:44 08:13-08:49/36 17:16	07:26 17:01-17:28/27 17:50	06:49 16:59-17:48/49 18:21 07:25-08:27/62	07:00 17:48-18:45/57 19:52	06:19 20:22 20:48	05:57 20:48
8	07:44 08:14-08:50/36 17:17	07:25 17:01-17:29/28 17:51	06:47 16:58-17:50/52 18:22 07:26-08:27/61	06:59 17:49-18:44/55 19:53	06:18 20:23 20:48	05:57 20:48
9	07:44 08:15-08:50/35 17:18	07:24 17:01-17:30/29 17:53	06:46 16:56-17:51/55 18:23 07:25-08:26/61	06:57 17:50-18:42/52 19:54	06:17 20:24 20:49	05:57 20:49
10	07:43 08:15-08:50/35 17:19	07:23 17:01-17:31/30 17:54	06:44 16:55-17:52/57 18:25 07:25-08:26/61	06:56 17:52-18:41/49 19:55	06:16 20:25 20:49	05:57 20:49
11	07:43 08:16-08:50/34 17:20	07:21 17:00-17:32/32 17:55	06:43 16:53-17:53/60 18:26 07:25-08:25/60	06:54 17:52-18:39/47 19:56	06:15 20:26 20:50	05:57 20:50
12	07:43 08:17-08:50/33 17:21	07:20 17:01-17:34/33 17:56	06:41 16:52-17:54/62 18:27 07:25-08:25/60	06:53 17:55-18:37/42 19:57	06:14 20:27 20:50	05:56 20:50
13	07:43 08:18-08:51/33 17:22	07:19 17:01-17:35/34 17:57	06:40 16:51-17:54/63 18:28 07:25-08:24/59	06:51 17:56-18:34/38 19:58	06:13 20:28 20:51	05:56 20:51
14	07:43 08:18-08:50/32 17:23	07:18 17:02-17:36/34 17:58	06:38 16:49-17:54/65 18:29 07:25-08:23/58	06:50 17:58-18:32/34 19:59	06:12 20:28 20:51	05:56 20:51
15	07:42 08:19-08:50/31 17:24	07:17 17:03-17:38/35 17:59	06:37 16:49-17:56/67 18:30 07:26-08:22/56	06:48 18:00-18:29/29 20:00	06:11 20:29 20:52	05:56 20:52
16	07:42 08:19-08:50/31 17:25	07:15 07:58-08:00/2 18:01 17:03-17:38/35	06:35 16:48-17:55/67 18:31 07:25-08:21/56	06:47 18:04-18:26/22 20:01	06:10 20:30 20:52	05:56 20:52
17	07:41 08:21-08:50/29 17:26	07:14 07:50-08:08/18 18:02 17:04-17:39/35	06:33 16:47-17:56/69 18:32 07:26-08:20/54	06:45 18:09-18:20/11 20:02	06:09 20:31 20:52	05:56 20:52
18	07:41 08:21-08:49/28 17:27	07:13 07:46-08:12/26 18:03 17:06-17:39/33	06:32 16:46-17:56/70 18:33 07:27-08:19/52	06:44 20:03 20:03	06:08 20:32 20:53	05:56 20:53
19	07:41 08:23-08:49/26 17:28	07:12 07:43-08:14/31 18:04 17:07-17:39/32	06:30 16:45-17:56/71 18:34 07:27-08:17/50	06:42 20:04 20:04	06:07 20:33 20:53	05:57 20:53
20	07:40 08:24-08:48/24 17:29	07:10 07:41-08:17/36 18:05 17:08-17:39/31	06:29 16:45-17:57/72 18:35 07:28-08:16/48	06:41 20:05 20:05	06:07 20:34 20:53	05:57 20:53
21	07:40 08:26-08:47/21 17:30	07:09 07:39-08:19/40 18:06 17:08-17:39/31	06:27 16:44-17:56/72 18:36 07:29-08:14/45	06:39 20:06 20:06	06:06 20:35 20:53	05:57 20:53
22	07:39 08:27-08:46/19 17:31	07:08 07:37-08:20/43 18:07 17:07-17:39/32	06:25 16:45-17:57/72 18:37 07:30-08:13/43	06:38 20:07 20:07	06:05 20:36 20:54	05:57 20:54
23	07:38 08:29-08:44/15 17:33	07:06 07:36-08:22/46 18:08 17:08-17:38/30	06:24 16:44-17:56/72 18:38 07:31-08:10/39	06:37 20:08 20:08	06:04 20:37 20:54	05:57 20:54
24	07:38 08:33-08:42/9 17:34	07:05 07:35-08:23/48 18:10 17:09-17:38/29	06:22 16:43-17:55/72 18:39 07:32-08:08/36	06:35 20:09 20:09	06:04 20:37 20:54	05:58 20:54
25	07:37 17:35	07:04 07:33-08:24/51 18:11 17:09-17:37/28	06:21 16:44-17:56/72 18:40 07:35-08:06/31	06:34 20:10 20:10	06:03 20:38 20:54	05:58 20:54
26	07:36 17:36	07:02 07:32-08:25/53 18:12 17:10-17:36/26	06:19 16:43-17:55/72 18:41 07:37-08:02/25	06:33 20:11 20:11	06:02 20:39 20:54	05:58 20:54
27	07:36 17:37	07:01 07:31-08:25/54 18:13 17:11-17:34/23	06:18 16:44-17:55/71 18:42 07:41-07:58/17	06:31 20:12 20:12	06:02 20:40 20:54	05:59 20:54
28	07:35 17:38	06:59 07:30-08:26/56 18:14 17:12-17:33/21	06:16 16:43-17:54/71 18:43	06:30 20:13 20:13	06:01 20:41 20:54	05:59 20:54
29	07:34 17:40		07:14 17:43-18:53/70 19:44	06:29 20:14 20:14	06:01 20:41 20:54	05:59 20:54
30	07:33 17:12-17:16/4 17:41		07:13 17:44-18:53/69 19:45	06:27 20:15 20:15	06:00 20:42 20:54	06:00 20:54
31	07:32 17:08-17:19/11 17:42		07:11 17:44-18:52/68 19:46		06:00 20:43 20:43	
Potential sun hours	302	300	370	396	444	447
Sum of minutes with flicker	742	1289	3236	816	0	0

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

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

WTG: 12 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (12)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July	August	September	October	November	December
1	06:00 20:54	06:23 20:37	06:51 17:51-18:38/47 19:56	07:19 17:30-18:33/63 19:08 08:04-09:03/59	06:50 16:30-16:59/29 17:24	07:23 07:58-08:32/34 17:01
2	06:01 20:54	06:24 20:36	06:52 17:50-18:39/49 19:54	07:20 17:31-18:32/61 19:06 08:03-09:04/61	06:52 16:30-16:58/28 17:22	07:24 07:58-08:33/35 17:01
3	06:01 20:54	06:24 20:35	06:53 17:48-18:40/52 19:53	07:21 17:32-18:30/58 19:05 08:03-09:04/61	06:53 16:31-16:59/28 17:21	07:25 07:58-08:33/35 17:01
4	06:02 20:54	06:25 20:34	06:54 17:46-18:41/55 19:51	07:22 17:33-18:29/56 19:03 08:03-09:04/61	06:54 16:31-16:57/26 17:20	07:26 07:58-08:34/36 17:00
5	06:02 20:54	06:26 20:32	06:55 17:45-18:42/57 19:50	07:23 17:34-18:27/53 19:01 08:02-09:03/61	06:55 16:31-16:56/25 17:19	07:27 07:58-08:34/36 17:00
6	06:03 20:53	06:27 20:31	06:56 17:44-18:43/59 19:48	07:23 17:35-18:25/50 19:00 08:02-09:03/61	06:56 16:32-16:55/23 17:18	07:28 07:59-08:35/36 17:00
7	06:03 20:53	06:28 20:30	06:57 17:41-18:42/61 19:46	07:24 17:37-18:23/46 18:58 08:02-09:03/61	06:57 16:33-16:53/20 17:17	07:29 07:59-08:36/37 17:00
8	06:04 20:53	06:29 20:29	06:57 17:40-18:43/63 19:45	07:25 17:38-18:21/43 18:57 08:02-09:02/60	06:58 16:34-16:53/19 17:16	07:30 08:00-08:36/36 17:00
9	06:05 20:53	06:30 20:28	06:58 17:39-18:43/64 19:43	07:23 17:40-18:18/38 18:55 08:02-09:02/60	06:59 16:36-16:52/16 17:15	07:31 08:00-08:37/37 17:00
10	06:05 20:52	06:31 20:27	06:59 17:38-18:44/66 19:42	07:27 17:43-18:15/32 18:54 08:02-09:01/59	07:00 16:37-16:51/14 17:14	07:32 08:01-08:38/37 17:00
11	06:06 20:52	06:32 20:25	07:00 17:37-18:44/67 19:40	07:28 17:46-18:11/25 18:52 08:02-09:01/59	07:02 16:39-16:49/10 17:13	07:32 08:00-08:37/37 17:00
12	06:06 20:51	06:33 20:24	07:01 17:36-18:44/68 19:38	07:29 17:49-18:06/17 18:51 08:02-09:00/58	07:03 16:43-16:47/4 17:12	07:33 08:01-08:38/37 17:00
13	06:07 20:51	06:34 20:23	07:02 17:35-18:44/69 19:37	07:30 08:03-08:59/56 18:49 17:46-18:05/19	07:04 17:11	07:34 08:02-08:39/37 17:01
14	06:08 20:50	06:35 20:22	07:03 17:34-18:44/70 19:35	07:31 08:03-08:58/55 18:48 17:44-18:06/22	07:05 17:10	07:35 08:02-08:39/37 17:01
15	06:09 20:50	06:35 20:20	07:04 17:33-18:43/70 19:34	07:32 08:04-08:57/53 18:46 17:43-18:07/24	07:06 17:10	07:36 08:02-08:39/37 17:01
16	06:09 20:49	06:36 20:19	07:05 17:32-18:43/71 19:32 08:30-08:46/16	07:33 08:04-08:56/52 18:45 17:41-18:08/27	07:07 17:09	07:36 08:03-08:40/37 17:01
17	06:10 20:49	06:37 20:18	07:06 17:32-18:43/71 19:30 08:26-08:50/24	07:34 08:05-08:55/50 18:43 17:40-18:09/29	07:08 17:08	07:37 08:04-08:41/37 17:02
18	06:11 20:48	06:38 20:16	07:07 17:31-18:43/72 19:29 08:23-08:52/29	07:35 08:06-08:53/47 18:42 17:39-18:09/30	07:09 08:07-08:16/9 17:07	07:38 08:03-08:41/38 17:02
19	06:12 20:48	06:39 20:15	07:08 17:31-18:43/72 19:27 08:20-08:54/34	07:36 08:07-08:52/45 18:40 17:39-18:09/30	07:11 08:04-08:19/15 17:07	07:38 08:04-08:42/38 17:02
20	06:12 20:47	06:40 20:14	07:08 17:30-18:42/72 19:25 08:18-08:56/38	07:38 08:09-08:51/42 18:39 17:39-18:10/31	07:12 08:02-08:21/19 17:06	07:39 08:04-08:41/37 17:03
21	06:13 20:46	06:41 20:12	07:09 17:30-18:42/72 19:24 08:16-08:58/42	07:39 08:10-08:49/39 18:38 17:38-18:10/32	07:13 08:01-08:22/21 17:05	07:39 08:05-08:42/37 17:03
22	06:14 20:45	06:42 20:11	07:10 17:30-18:42/72 19:22 08:14-08:59/45	07:40 08:12-08:47/35 18:36 17:38-18:10/32	07:14 08:00-08:24/24 17:05	07:40 08:05-08:42/37 17:04
23	06:15 20:45	06:43 20:09	07:11 17:30-18:41/71 19:21 08:13-09:00/47	07:41 08:14-08:44/30 18:35 17:37-18:09/32	07:15 07:59-08:25/26 17:04	07:40 08:06-08:43/37 17:04
24	06:16 20:44	06:44 20:08	07:12 17:30-18:40/70 19:19 08:11-09:01/50	07:42 08:17-08:41/24 18:34 17:35-18:09/34	07:16 07:59-08:27/28 17:04	07:41 08:06-08:43/37 17:05
25	06:17 20:43	06:45 20:06	07:13 17:29-18:39/70 19:17 08:10-09:02/52	06:43 07:21-07:37/16 17:32 16:34-17:08/34	07:17 07:59-08:28/29 17:03	07:41 08:07-08:45/38 17:05
26	06:17 20:42	06:46 18:11-18:23/12 20:05	07:14 17:29-18:38/69 19:16 08:08-09:02/54	06:44 16:33-17:08/35 17:31	07:18 07:58-08:29/31 17:03	07:42 08:08-08:45/37 17:06
27	06:18 20:41	06:47 18:05-18:28/23 20:03	07:15 17:29-18:37/68 19:14 08:07-09:02/55	06:45 16:32-17:06/34 17:30	07:19 07:58-08:29/31 17:02	07:42 08:08-08:45/37 17:07
28	06:19 20:40	06:47 18:02-18:31/29 20:02	07:16 17:29-18:36/67 19:13 08:06-09:03/57	06:46 16:32-17:06/34 17:28	07:20 07:58-08:30/32 17:02	07:42 08:08-08:45/37 17:07
29	06:20 20:40	06:48 17:59-18:34/35 20:00	07:17 17:29-18:35/66 19:11 08:05-09:03/58	06:47 16:31-17:04/33 17:27	07:21 07:58-08:31/33 17:02	07:43 08:09-08:46/37 17:08
30	06:21 20:39	06:49 17:57-18:35/38 19:59	07:18 17:30-18:34/64 19:09 08:05-09:03/58	06:48 16:31-17:03/32 17:26	07:22 07:58-08:31/33 17:01	07:43 08:09-08:47/38 17:09
31	06:22 20:38	06:50 17:53-18:36/43 19:57		06:49 16:30-17:02/32 17:25		07:43 08:10-08:47/37 17:09
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	0	180	2623	2383	573	1140

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

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

WTG: 13 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (5)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June
1	07:43 08:05-08:15/10 17:10	07:32 07:51-08:38/47 17:43	06:58 18:15	07:10 18:53-19:25/32 19:47	06:26 19:16-19:21/5 20:16	05:59 20:44
2	07:44 08:05-08:16/11 17:11	07:31 07:50-08:38/48 17:44	06:56 18:16	07:08 18:52-19:24/32 19:48	06:25 20:17	05:59 20:44
3	07:44 08:05-08:17/12 17:12	07:30 07:49-08:38/49 17:45	06:55 18:17	07:06 18:52-19:23/31 19:48	06:24 20:18	05:58 20:45
4	07:44 08:05-08:18/13 17:13	07:29 07:49-08:38/49 17:47	06:53 18:18	07:05 18:52-19:23/31 19:49	06:23 20:19	05:58 20:46
5	07:44 08:05-08:20/15 17:14	07:28 07:49-08:37/48 17:48	06:52 18:19	07:03 18:52-19:22/30 19:50	06:21 20:20	05:58 20:46
6	07:44 08:05-08:21/16 17:15	07:27 07:50-08:37/47 17:49	06:50 18:20	07:02 18:53-19:28/35 19:51	06:20 20:21	05:57 20:47
7	07:44 08:05-08:22/17 17:16	07:26 07:51-08:36/45 17:50	06:49 07:07-07:16/9 18:21	07:00 18:53-19:31/38 19:52	06:19 20:22	05:57 20:48
8	07:44 08:05-08:23/18 17:17	07:25 07:51-08:36/45 17:51	06:47 07:06-07:21/15 18:22	06:59 18:54-19:33/39 19:53	06:18 20:23	05:57 20:48
9	07:44 08:05-08:24/19 17:18	07:24 07:52-08:35/43 17:53	06:46 07:04-07:22/18 18:23	06:57 18:55-19:33/38 19:54	06:17 20:24	05:57 20:49
10	07:43 08:04-08:25/21 17:19	07:23 07:53-08:35/42 17:54	06:44 07:03-07:25/22 18:25	06:56 18:57-19:35/38 19:55	06:16 20:25	05:57 20:49
11	07:43 08:04-08:26/22 17:20	07:21 07:54-08:33/39 17:55	06:43 07:01-07:25/24 18:26	06:54 18:59-19:35/36 19:56	06:15 20:26	05:57 20:50
12	07:43 08:04-08:27/23 17:21	07:20 07:55-08:32/37 17:56	06:41 07:00-07:27/27 18:27	06:53 19:07-19:36/29 19:57	06:14 20:27	05:56 20:50
13	07:43 08:04-08:28/24 17:22	07:19 07:56-08:31/35 17:57	06:40 06:58-07:27/29 18:28	06:51 19:05-19:37/32 19:58	06:13 20:28	05:56 20:51
14	07:43 08:03-08:29/26 17:23	07:18 07:58-08:29/31 17:58	06:38 06:56-07:27/31 18:29	06:50 19:05-19:38/33 19:59	06:12 20:29	05:56 20:51
15	07:42 08:03-08:30/27 17:24	07:17 08:00-08:27/27 17:59	06:37 06:55-07:28/33 18:30	06:48 19:04-19:38/34 20:00	06:11 20:29	05:56 20:52
16	07:42 08:02-08:30/28 17:25	07:15 08:02-08:24/22 18:01	06:35 06:53-07:28/35 18:31	06:47 19:03-19:39/36 20:01	06:10 20:30	05:56 20:52
17	07:41 08:02-08:32/30 17:26	07:14 08:06-08:21/15 18:02	06:33 06:52-07:28/36 18:32	06:45 19:02-19:38/36 20:02	06:09 20:31	05:56 20:52
18	07:41 08:01-08:32/31 17:27	07:13 18:03	06:32 06:50-07:28/38 18:33	06:44 19:03-19:38/35 20:03	06:08 20:32	05:56 20:53
19	07:41 08:01-08:33/32 17:28	07:12 18:04	06:30 06:48-07:27/39 18:34	06:42 19:02-19:37/35 20:04	06:07 20:33	05:57 20:53
20	07:40 08:00-08:33/33 17:29	07:10 18:05	06:29 06:48-07:27/39 18:35	06:41 19:02-19:37/35 20:05	06:07 20:34	05:57 20:53
21	07:40 08:00-08:35/35 17:30	07:09 18:06	06:27 06:48-07:26/38 18:36	06:39 19:03-19:37/34 20:06	06:06 20:35	05:57 20:53
22	07:39 07:59-08:35/36 17:31	07:08 18:07	06:25 06:48-07:26/38 18:37 18:10-18:15/5	06:38 19:02-19:36/34 20:07	06:05 20:36	05:57 20:54
23	07:38 07:58-08:35/37 17:33	07:06 18:08	06:24 06:48-07:25/37 18:38 18:04-18:17/13	06:37 19:03-19:36/33 20:08	06:04 20:37	05:57 20:54
24	07:38 07:58-08:36/38 17:34	07:05 18:10	06:22 06:48-07:24/36 18:39 18:01-18:18/17	06:35 19:04-19:35/31 20:09	06:04 20:37	05:58 20:54
25	07:37 07:57-08:36/39 17:35	07:04 18:11	06:21 06:49-07:23/34 18:40 17:59-18:19/20	06:34 19:04-19:33/29 20:10	06:03 20:38	05:58 20:54
26	07:36 07:56-08:37/41 17:36	07:02 18:12	06:19 06:49-07:22/33 18:41 17:57-18:20/23	06:33 19:05-19:32/27 20:11	06:02 20:39	05:58 20:54
27	07:36 07:55-08:37/42 17:37	07:01 18:13	06:18 06:51-07:21/30 18:42 17:57-18:21/24	06:31 19:06-19:31/25 20:12	06:02 20:40	05:58 20:54
28	07:35 07:55-08:38/43 17:38	06:59 18:14	06:16 06:52-07:18/26 18:43 17:55-18:22/27	06:30 19:08-19:30/22 20:13	06:01 20:41	05:59 20:54
29	07:34 07:54-08:38/44 17:40		07:14 07:53-08:16/23 19:44 18:54-19:23/29	06:29 19:09-19:27/18 20:14	06:01 20:41	05:59 20:54
30	07:33 07:53-08:38/45 17:41		07:13 07:55-08:14/19 19:45 18:54-19:24/30	06:27 19:11-19:25/14 20:15	06:00 20:42	06:00 20:54
31	07:32 07:52-08:38/46 17:42		07:11 07:58-08:09/11 19:46 18:53-19:25/32		06:00 20:43	
Potential sun hours	302	300	370	396	444	447
Sum of minutes with flicker	874	669	940	952	5	0

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

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

WTG: 13 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (5)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July	August	September	October	November	December
1	06:00 20:54	06:23 20:37	06:51 18:58-19:34/36 19:56	07:19 07:38-08:06/28 19:08	06:50 07:22-08:04/42 17:24	07:23 07:46-08:08/22 17:01
2	06:01 20:54	06:24 20:36	06:52 18:55-19:32/37 19:54	07:20 07:39-08:04/25 19:06	06:52 07:22-08:05/43 17:22	07:24 07:47-08:08/21 17:01
3	06:01 20:54	06:24 20:35	06:53 18:53-19:31/38 19:53	07:21 07:40-08:03/23 19:05	06:53 07:21-08:06/45 17:21	07:25 07:48-08:07/19 17:01
4	06:02 20:54	06:25 20:34	06:54 18:52-19:30/38 19:51	07:22 07:41-08:01/20 19:03	06:54 07:20-08:06/46 17:20	07:26 07:49-08:07/18 17:00
5	06:02 20:54	06:26 20:32	06:55 18:50-19:28/38 19:50	07:23 07:42-07:58/16 19:01	06:55 07:20-08:07/47 17:19	07:27 07:50-08:07/17 17:00
6	06:03 20:53	06:27 20:31	06:56 18:49-19:24/35 19:48	07:23 07:43-07:55/12 19:00	06:56 07:19-08:07/48 17:18	07:28 07:51-08:07/16 17:00
7	06:03 20:53	06:28 20:30	06:57 18:47-19:17/30 19:46	07:24 18:58 18:58	06:57 07:18-08:07/49 17:17	07:29 07:52-08:07/15 17:00
8	06:04 20:53	06:29 20:29	06:57 18:46-19:17/31 19:45	07:25 18:57 18:57	06:58 07:20-08:09/49 17:16	07:30 07:53-08:07/14 17:00
9	06:04 20:53	06:30 20:28	06:58 18:46-19:18/32 19:43	07:26 18:55 18:55	06:59 07:21-08:09/48 17:15	07:31 07:54-08:06/12 17:00
10	06:05 20:52	06:31 20:27	06:59 18:45-19:17/32 19:42	07:27 18:54 18:54	07:00 07:22-08:09/47 17:14	07:32 07:55-08:06/11 17:00
11	06:06 20:52	06:32 20:25	07:00 18:45-19:17/32 19:40	07:28 18:52 18:52	07:02 07:23-08:09/46 17:13	07:33 07:55-08:05/10 17:00
12	06:06 20:51	06:33 19:23-19:31/8 20:24	07:01 07:51-08:01/10 19:38	07:29 18:45-19:17/32 18:51	07:03 07:24-08:09/45 17:12	07:33 07:56-08:05/9 17:00
13	06:07 20:51	06:34 19:19-19:34/15 20:23	07:02 07:47-08:04/17 19:37	07:30 18:45-19:15/30 18:49	07:04 07:26-08:10/44 17:11	07:34 07:57-08:06/9 17:01
14	06:08 20:50	06:35 19:16-19:36/20 20:22	07:03 07:44-08:07/23 19:35	07:31 18:45-19:14/29 18:48	07:05 07:27-08:10/43 17:10	07:35 07:58-08:06/8 17:01
15	06:09 20:50	06:35 19:14-19:37/23 20:20	07:04 07:42-08:08/26 19:34	07:32 18:44-19:11/27 18:46	07:06 07:28-08:10/42 17:10	07:36 07:58-08:05/7 17:01
16	06:09 20:49	06:36 19:13-19:38/25 20:19	07:05 07:39-08:09/30 19:32	07:33 18:45-19:10/25 18:45	07:07 07:29-08:10/41 17:09	07:36 07:59-08:05/6 17:01
17	06:10 20:49	06:37 19:12-19:39/27 20:18	07:06 07:38-08:10/32 19:30	07:34 18:45-19:08/23 18:43	07:08 07:30-08:09/39 17:08	07:37 08:00-08:06/6 17:02
18	06:11 20:48	06:38 19:10-19:40/30 20:16	07:07 07:37-08:10/33 19:29	07:35 18:46-19:07/21 18:42	07:09 07:32-08:10/38 17:07	07:38 08:00-08:05/5 17:02
19	06:12 20:48	06:39 19:10-19:41/31 20:15	07:08 07:36-08:11/35 19:27	07:36 18:48-19:05/17 18:40	07:11 07:33-08:10/37 17:07	07:38 08:01-08:06/5 17:02
20	06:12 20:47	06:40 19:09-19:41/32 20:14	07:08 07:35-08:11/36 19:25	07:38 18:50-19:04/14 18:39	07:12 07:34-08:10/36 17:06	07:39 08:01-08:06/5 17:03
21	06:13 20:46	06:41 19:08-19:42/34 20:12	07:09 07:34-08:12/38 19:24	07:39 18:53-19:02/9 18:38	07:13 07:35-08:10/35 17:05	07:39 08:02-08:06/4 17:03
22	06:14 20:45	06:42 19:07-19:41/34 20:11	07:10 07:33-08:12/39 19:22	07:40 18:36 18:36	07:14 07:36-08:09/33 17:05	07:40 08:02-08:06/4 17:04
23	06:15 20:45	06:43 19:06-19:41/35 20:09	07:11 07:33-08:12/39 19:21	07:41 18:35 18:35	07:15 07:37-08:09/32 17:04	07:40 08:03-08:07/4 17:04
24	06:16 20:44	06:44 19:06-19:41/35 20:08	07:12 07:32-08:12/40 19:19	07:42 08:40-08:46/6 18:34	07:16 07:39-08:10/31 17:04	07:41 08:03-08:08/5 17:05
25	06:17 20:43	06:45 19:06-19:41/35 20:06	07:13 07:33-08:11/38 19:17	06:43 07:34-07:52/18 17:32	07:17 07:40-08:10/30 17:03	07:41 08:04-08:09/5 17:05
26	06:17 20:42	06:46 19:05-19:41/36 20:05	07:14 07:33-08:10/37 19:16	06:44 07:31-07:55/24 17:31	07:18 07:41-08:09/28 17:03	07:42 08:04-08:09/5 17:06
27	06:18 20:41	06:47 19:05-19:41/36 20:03	07:15 07:34-08:09/35 19:14	06:45 07:29-07:57/28 17:30	07:19 07:42-08:09/27 17:02	07:42 08:04-08:10/6 17:07
28	06:19 20:40	06:47 19:05-19:40/35 20:02	07:16 07:35-08:09/34 19:13	06:46 07:28-07:59/31 17:28	07:20 07:43-08:09/26 17:02	07:42 08:04-08:11/7 17:07
29	06:20 20:40	06:48 19:06-19:39/33 20:00	07:17 07:36-08:08/32 19:11	06:47 07:26-08:01/35 17:27	07:21 07:44-08:08/24 17:02	07:43 08:05-08:12/7 17:08
30	06:21 20:39	06:49 19:05-19:37/32 19:59	07:18 07:37-08:07/30 19:09	06:48 07:24-08:02/38 17:26	07:22 07:45-08:08/23 17:01	07:43 08:05-08:13/8 17:09
31	06:22 20:38	06:50 19:05-19:35/30 19:57		06:49 07:23-08:03/40 17:25		07:43 08:05-08:14/9 17:09
Potential sun hours	454	425	374	347	302	293
Sum of minutes with flicker	0	586	1210	344	1164	299

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

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

WTG: 14 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (15)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:44 17:10	07:32 17:43	06:58 18:15	07:10 19:47	06:26 20:16	05:59 20:44	06:00 20:54	06:23 20:37	06:51 19:56	07:19 19:08	06:50 17:24	07:23 17:01
2	07:44 17:11	07:31 17:44	06:56 18:16	07:08 19:48	06:25 20:17	05:59 20:44	06:01 20:54	06:24 20:36	06:52 19:54	07:20 19:06	06:52 17:22	07:24 17:01
3	07:44 17:12	07:30 17:46	06:55 18:17	07:07 19:49	06:24 20:18	05:58 20:45	06:01 20:54	06:24 20:35	06:53 19:53	07:21 19:05	06:53 17:21	07:25 17:01
4	07:44 17:13	07:29 17:47	06:53 18:18	07:05 19:50	06:23 20:19	05:58 20:46	06:02 20:54	06:25 20:34	06:54 19:51	07:22 19:03	06:54 17:20	07:26 17:00
5	07:44 17:14	07:28 17:48	06:52 18:19	07:03 19:51	06:21 20:20	05:58 20:46	06:02 20:54	06:26 20:33	06:55 19:50	07:23 19:01	06:55 17:19	07:27 17:00
6	07:44 17:15	07:27 17:49	06:51 18:20	07:02 19:51	06:20 20:21	05:58 20:47	06:03 20:53	06:27 20:31	06:56 19:48	07:24 19:00	06:56 17:18	07:28 17:00
7	07:44 17:16	07:26 17:50	06:49 18:21	07:00 19:52	06:19 20:22	05:57 20:48	06:03 20:53	06:28 20:30	06:57 19:47	07:25 18:58	06:57 17:17	07:29 17:00
8	07:44 17:17	07:25 17:51	06:47 18:22	06:59 19:53	06:18 20:23	05:57 20:48	06:04 20:53	06:29 20:29	06:58 19:45	07:25 18:57	06:58 17:16	07:30 17:00
9	07:44 17:18	07:24 17:53	06:46 18:24	06:57 19:54	06:17 20:24	05:57 20:49	06:05 20:53	06:30 20:28	06:58 19:43	07:26 18:55	06:59 17:15	07:31 17:00
10	07:44 17:19	07:23 17:54	06:44 18:25	06:56 19:55	06:16 20:25	05:57 20:49	06:05 20:52	06:31 20:27	06:59 19:42	07:27 18:54	07:01 17:14	07:32 17:00
11	07:43 17:20	07:22 17:55	06:43 18:26	06:54 19:56	06:15 20:26	05:57 20:50	06:06 20:52	06:32 20:25	07:00 19:40	07:28 18:52	07:02 17:13	07:33 17:00
12	07:43 17:21	07:20 17:56	06:41 18:27	06:53 19:57	06:14 20:27	05:56 20:50	06:06 20:51	06:33 20:24	07:01 19:39	07:29 18:51	07:03 17:12	07:33 17:00
13	07:43 17:22	07:19 17:57	06:40 18:28	06:51 19:58	06:13 20:28	05:56 20:51	06:07 20:51	06:34 20:23	07:02 19:37	07:30 18:49	07:04 17:11	07:34 17:01
14	07:43 17:23	07:18 17:58	06:38 18:29	06:50 19:59	06:12 20:29	05:56 20:51	06:08 20:51	06:35 20:22	07:03 19:35	07:31 18:48	07:05 17:10	07:35 17:01
15	07:42 17:24	07:17 18:00	06:37 18:30	06:48 20:00	06:11 20:30	05:56 20:52	06:09 20:50	06:35 20:20	07:04 19:34	07:32 18:46	07:06 17:10	07:36 17:01
16	07:42 17:25	07:16 18:01	06:35 18:31	06:47 20:01	06:10 20:30	05:56 20:52	06:09 20:19	06:36 20:19	07:05 19:32	07:33 18:45	07:07 17:09	07:36 17:01
17	07:42 17:26	07:14 18:02	06:33 18:32	06:45 20:02	06:09 20:31	05:56 20:52	06:10 20:49	06:37 20:18	07:06 19:30	07:34 18:43	07:08 17:08	07:37 17:02
18	07:41 17:27	07:13 18:03	06:32 18:33	06:44 20:03	06:08 20:32	05:56 20:53	06:11 20:48	06:38 20:16	07:07 19:29	07:36 18:42	07:10 17:07	07:38 17:02
19	07:41 17:28	07:12 18:04	06:30 18:34	06:42 20:04	06:07 20:33	05:57 20:53	06:12 20:48	06:39 20:15	07:08 19:27	07:37 18:40	07:11 17:07	07:38 17:02
20	07:40 17:29	07:10 18:05	06:29 18:35	06:41 20:05	06:07 20:34	05:57 20:53	06:12 20:47	06:40 20:14	07:08 19:26	07:38 18:39	07:12 17:06	07:39 17:03
21	07:40 17:30	07:09 18:06	06:27 18:36	06:39 20:06	06:06 20:35	05:57 20:54	06:13 20:46	06:41 20:12	07:09 19:24	07:39 18:38	07:13 17:05	07:39 17:03
22	07:39 17:32	07:08 18:07	06:26 18:37	06:38 20:07	06:05 20:36	05:57 20:54	06:14 20:46	06:42 20:11	07:10 19:22	07:40 18:36	07:14 17:05	07:40 17:04
23	07:38 17:33	07:06 18:09	06:24 18:38	06:37 20:08	06:04 20:37	05:57 20:54	06:15 20:45	06:43 20:09	07:11 19:21	07:41 18:35	07:15 17:04	07:40 17:04
24	07:38 17:34	07:05 18:10	06:22 18:39	06:35 20:09	06:04 20:37	05:58 20:54	06:16 20:44	06:44 20:08	07:12 19:19	07:42 18:34	07:16 17:04	07:41 17:05
25	07:37 17:35	07:04 18:11	06:21 18:40	06:34 20:10	06:03 20:38	05:58 20:54	06:17 20:43	06:45 20:06	07:13 19:17	06:43 17:32	07:17 17:03	07:41 17:05
26	07:36 17:36	07:02 18:12	06:19 18:41	06:33 20:11	06:02 20:39	05:58 20:54	06:17 20:42	06:46 20:05	07:14 19:16	06:44 17:31	07:18 17:03	07:42 17:06
27	07:36 17:37	07:01 18:13	06:18 18:42	06:31 20:12	06:02 20:40	05:59 20:54	06:18 20:41	06:47 20:04	07:15 19:14	06:45 17:30	07:19 17:02	07:42 17:07
28	07:35 17:38	06:59 18:14	06:16 18:43	06:30 20:13	06:01 20:41	05:59 20:54	06:19 20:41	06:47 20:02	07:16 19:13	06:46 17:28	07:20 17:02	07:42 17:07
29	07:34 17:40	07:04 19:44	06:21 19:44	06:34 20:14	06:03 20:41	05:58 20:54	06:17 20:40	06:45 20:01	07:13 19:11	06:43 17:27	07:17 17:02	07:41 17:08
30	07:33 17:41	07:03 19:45	06:13 19:45	06:27 20:15	06:00 20:42	06:00 20:54	06:21 20:39	06:49 19:59	07:18 19:09	06:48 17:26	07:22 17:01	07:43 17:09
31	07:33 17:42	07:03 19:46	06:11 19:46	06:27 20:43	06:00 20:43	06:00 20:54	06:21 20:38	06:49 19:57	07:18 17:25	06:48 17:25	07:22 17:03	07:43 17:09
Potential sun hours	302	300	370	397	444	447	454	425	374	347	302	293
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

Project:

Progetto Ombre Sinnai

Licensed user:

PHEEDRA SRL

VIA LAGO DI NEMI 90

IT-74121 TARANTO

+393807089371

Simone Solito / s.solito@pheedra.it

Calculated:

08/03/2024 11:28/4.0.531

SHADOW - Calendar per WTG

WTG: 15 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (10)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:43 17:11	07:32 17:43	06:58 18:15	07:10 19:47	19:25-19:26/1 20:16	06:26 20:44	05:59 20:54	06:00 20:37	06:23 20:37	06:51 19:56	19:17-19:34/17 19:08	06:50 17:24	07:23 17:01
2	07:44 17:11	07:31 17:44	06:56 18:16	07:08 19:48	19:22-19:27/5 20:17	06:25 20:44	05:59 20:54	06:01 20:36	06:24 20:36	06:52 19:54	19:16-19:32/16 19:06	06:52 17:22	07:24 17:01
3	07:44 17:12	07:30 17:45	06:55 18:17	07:06 19:48	19:20-19:27/7 20:24	06:24 20:45	05:59 20:54	06:01 20:35	06:24 20:35	06:53 19:53	19:15-19:31/16 19:05	06:53 17:21	07:25 17:01
4	07:44 17:13	07:29 17:47	06:53 18:18	07:05 19:49	19:20-19:29/9 20:19	06:23 20:46	05:58 20:54	06:02 20:34	06:25 20:34	06:54 19:51	19:15-19:30/15 19:03	06:54 17:20	07:26 17:00
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6	07:44 17:15	07:27 17:49	06:50 18:20	07:02 19:51	19:18-19:31/13 20:21	06:20 20:47	05:58 20:53	06:03 20:31	06:27 20:31	06:56 19:48	19:14-19:27/13 19:00	06:56 17:18	07:28 17:00
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11	07:43 17:20	07:21 17:55	06:43 18:26	06:54 19:56	19:18-19:35/17 20:26	06:15 20:50	05:57 20:52	06:06 20:25	06:32 20:25	07:00 19:40	19:17-19:18/1 18:52	07:28 17:13	07:32 17:00
12	07:43 17:21	07:20 17:56	06:41 18:27	06:53 19:57	19:19-19:36/17 20:27	06:14 20:50	05:56 20:51	06:07 20:24	06:33 20:24	07:01 19:38	07:29 18:51	07:03 17:12	07:33 17:00
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15	07:42 17:24	07:17 17:59	06:37 18:30	06:48 20:00	20:29	06:11	05:56	06:09	06:35	07:04	07:32	07:06	07:36
16	07:42 17:25	07:15 18:01	06:35 18:31	06:47 20:01	20:30	06:10	05:56	06:09	06:36	07:05	07:33	07:07	07:36
17	07:41 17:26	07:14 18:02	06:33 18:32	06:45 20:02	20:30	06:09	05:56	06:10	06:37	07:06	07:34	07:08	07:37
18	07:41 17:27	07:13 18:03	06:32 18:33	06:44 20:03	20:31	06:08	05:56	06:11	06:38	07:07	07:35	07:09	07:38
19	07:41 17:28	07:12 18:04	06:30 18:34	06:42 20:04	20:32	06:07	05:57	06:12	06:39	07:08	07:36	07:11	07:38
20	07:40 17:29	07:10 18:05	06:29 18:35	06:41 20:05	20:33	06:07	05:57	06:12	06:40	07:08	07:38	07:12	07:39
21	07:40 17:30	07:09 18:06	06:27 18:36	06:39 20:06	20:34	06:07	05:57	06:12	06:40	07:08	07:38	07:12	07:39
22	07:39 17:31	07:08 18:07	06:26 18:37	06:38 20:07	20:35	06:06	05:57	06:13	06:41	07:09	07:39	07:13	07:39
23	07:39 17:32	07:08 18:07	06:26 18:37	06:38 20:07	20:35	06:06	05:57	06:13	06:41	07:09	07:39	07:13	07:39
24	07:38 17:33	07:07 18:08	06:24 18:38	06:37 20:08	20:36	06:05	05:57	06:14	06:42	07:10	07:40	07:14	07:40
25	07:38 17:34	07:05 18:10	06:22 18:39	06:35 20:09	20:37	06:04	05:58	06:16	06:44	07:12	07:42	07:16	07:41
26	07:37 17:35	07:04 18:11	06:21 18:40	06:34 20:10	20:37	06:03	05:58	06:17	06:45	07:13	07:43	07:17	07:41
27	07:36 17:36	07:02 18:12	06:19 18:41	06:33 20:11	20:38	06:02	05:58	06:17	06:46	07:14	07:44	07:18	07:42
28	07:36 17:37	07:01 18:13	06:18 18:42	06:31 20:12	20:39	06:02	05:59	06:18	06:47	07:15	07:45	07:19	07:42
29	07:35 17:38	06:59 18:14	06:16 18:43	06:30 20:13	20:40	06:01	05:59	06:19	06:47	07:16	07:46	07:20	07:42
30	07:34 17:40	07:34 18:14	07:14 18:43	06:29 20:13	20:41	06:01	05:59	06:20	06:48	07:17	07:47	07:21	07:43
31	07:33 17:41	07:33 18:13	07:13 18:42	06:27 20:14	20:42	06:00	06:00	06:21	06:49	07:18	07:48	07:22	07:43
Potential sun hours	302	300	370	396	444	447	454	425	374	374	347	302	293
Sum of minutes with flicker	0	0	0	165	0	0	0	41	124	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

WTG: 16 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (8)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43	07:31	06:58	07:09	06:26	05:59	06:00	06:22	06:51	07:19	06:50	07:23
	17:10	17:43	18:15	19:46	20:16	20:44	20:54	20:37	19:56	19:08	17:23	17:01
2	07:43	07:31	06:56	07:08	06:25	05:59	06:00	06:23	06:52	07:19	06:51	07:24
	17:11	17:44	18:16	19:47	20:17	20:44	20:54	20:36	19:54	19:06	17:22	17:01
3	07:44	07:30	06:55	07:06	06:24	05:58	06:01	06:24	06:53	07:20	06:53	07:25
	17:12	17:45	18:17	19:48	20:18	20:45	20:54	20:34	19:53	19:04	17:21	17:00
4	07:44	07:29	06:53	07:05	06:22	05:58	06:01	06:25	06:54	07:21	06:54	07:26
	17:13	17:46	18:18	19:49	20:19	20:46	20:54	20:33	19:51	19:03	17:20	17:00
5	07:44	07:28	06:52	07:03	06:21	05:58	06:02	06:26	06:55	07:22	06:55	07:27
	17:14	17:48	18:19	19:50	20:20	20:46	20:54	20:32	19:50	19:01	17:19	17:00
6	07:44	07:27	06:50	07:02	06:20	05:57	06:02	06:27	06:56	07:23	06:56	07:28
	17:15	17:49	18:20	19:51	20:21	20:47	20:53	20:31	19:48	19:00	17:18	17:00
7	07:44	07:26	06:49	07:00	06:19	05:57	06:03	06:28	06:56	07:24	06:57	07:29
	17:15	17:50	18:21	19:52	20:22	20:47	20:53	20:30	19:46	18:58	17:17	17:00
8	07:44	07:25	06:47	06:59	06:18	05:57	06:04	06:29	06:57	07:25	06:58	07:30
	17:16	17:51	18:22	19:53	20:23	20:48	20:53	20:29	19:45	18:57	17:16	17:00
9	07:43	07:24	06:46	06:57	06:17	05:57	06:04	06:30	06:58	07:26	06:59	07:31
	17:17	17:52	18:23	19:54	20:24	20:49	20:52	20:28	19:43	18:55	17:15	17:00
10	07:43	07:22	06:44	06:55	06:16	05:56	06:05	06:31	06:59	07:27	07:00	07:32
	17:18	17:54	18:24	19:55	20:25	20:49	20:52	20:27	19:42	18:53	17:14	17:00
11	07:43	07:21	06:43	06:54	06:15	05:56	06:06	06:32	07:00	07:28	07:01	07:32
	17:19	17:55	18:25	19:56	20:26	20:50	20:52	20:25	19:40	18:52	17:13	17:00
12	07:43	07:20	06:41	06:52	06:14	05:56	06:06	06:32	07:01	07:29	07:03	07:33
	17:20	17:56	18:26	19:57	20:27	20:50	20:51	20:24	19:38	18:50	17:12	17:00
13	07:43	07:19	06:40	06:51	06:13	05:56	06:07	06:33	07:02	07:30	07:04	07:34
	17:21	17:57	18:27	19:58	20:27	20:51	20:51	20:23	19:37	18:49	17:11	17:00
14	07:42	07:18	06:38	06:49	06:12	05:56	06:08	06:34	07:03	07:31	07:05	07:35
	17:22	17:58	18:28	19:59	20:28	20:51	20:50	20:21	19:35	18:47	17:10	17:01
15	07:42	07:17	06:36	06:48	06:11	05:56	06:08	06:35	07:04	07:32	07:06	07:35
	17:24	17:59	18:29	20:00	20:29	20:51	20:50	20:20	19:33	18:46	17:09	17:01
16	07:42	07:15	06:35	06:46	06:10	05:56	06:09	06:36	07:05	07:33	07:07	07:36
	17:25	18:00	18:31	20:01	20:30	20:52	20:49	20:19	19:32	18:45	17:09	17:01
17	07:41	07:14	06:33	06:45	06:09	05:56	06:10	06:37	07:06	07:34	07:08	07:37
	17:26	18:02	18:32	20:02	20:31	20:52	20:49	20:18	19:30	18:43	17:08	17:01
18	07:41	07:13	06:32	06:44	06:08	05:56	06:11	06:38	07:06	07:35	07:09	07:37
	17:27	18:03	18:33	20:03	20:32	20:53	20:48	20:16	19:29	18:42	17:07	17:02
19	07:40	07:12	06:30	06:42	06:07	05:56	06:11	06:39	07:07	07:36	07:10	07:38
	17:28	18:04	18:34	20:04	20:33	20:53	20:47	20:15	19:27	18:40	17:06	17:02
20	07:40	07:10	06:29	06:41	06:06	05:56	06:12	06:40	07:08	07:37	07:12	07:39
	17:29	18:05	18:35	20:05	20:34	20:53	20:47	20:13	19:25	18:39	17:06	17:03
21	07:39	07:09	06:27	06:39	06:06	05:57	06:13	06:41	07:09	07:38	07:13	07:39
	17:30	18:06	18:36	20:06	20:35	20:53	20:46	20:12	19:24	18:37	17:05	17:03
22	07:39	07:08	06:25	06:38	06:05	05:57	06:14	06:42	07:10	07:39	07:14	07:40
	17:31	18:07	18:37	20:07	20:36	20:54	20:45	20:11	19:22	18:36	17:05	17:04
23	07:38	07:06	06:24	06:37	06:04	05:57	06:15	06:43	07:11	07:41	07:15	07:40
	17:32	18:08	18:38	20:08	20:36	20:54	20:45	20:09	19:20	18:35	17:04	17:04
24	07:38	07:05	06:22	06:35	06:04	05:57	06:15	06:44	07:12	07:42	07:16	07:41
	17:34	18:09	18:39	20:09	20:37	20:54	20:44	20:08	19:19	18:33	17:04	17:05
25	07:37	07:03	06:21	06:34	06:03	05:58	06:16	06:45	07:13	06:43	07:17	07:41
	17:35	18:11	18:39	20:10	20:38	20:54	20:43	20:06	19:17	17:32	17:03	17:05
26	07:36	07:02	06:19	06:32	06:02	05:58	06:17	06:45	07:14	06:44	07:18	07:42
	17:36	18:12	18:40	20:11	20:39	20:54	20:42	20:05	19:16	17:31	17:03	17:06
27	07:36	07:01	06:17	06:31	06:02	05:58	06:18	06:46	07:15	06:45	07:19	07:42
	17:37	18:13	18:41	20:12	20:40	20:54	20:41	20:03	19:14	17:29	17:02	17:06
28	07:35	06:59	06:16	06:30	06:01	05:59	06:19	06:47	07:16	06:46	07:20	07:42
	17:38	18:14	18:42	20:13	20:41	20:54	20:40	20:02	19:12	17:28	17:02	17:07
29	07:34		07:14	06:29	06:01	05:59	06:20	06:48	07:17	06:47	07:21	07:43
	17:39		19:43	20:14	20:41	20:54	20:39	20:00	19:11	17:27	17:01	17:08
30	07:33		07:13	06:27	06:00	05:59	06:21	06:49	07:18	06:48	07:22	07:43
	17:41		19:44	20:15	20:42	20:54	20:39	19:59	19:09	17:26	17:01	17:08
31	07:32		07:11		06:00		06:22	06:50		06:49		07:43
	17:42		19:45		20:43		20:38	19:57		17:25		17:09
Potential sun hours	302	300	370	397	444	447	454	425	374	347	302	293
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

WTG: 17 - VESTAS V172-7.2 7200 172.0 !O! hub: 114,0 m (TOT: 200,0 m) (9)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
4,40 5,05 5,88 7,00 8,45 9,88 10,82 10,03 8,08 6,09 5,07 4,27

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
256 208 689 535 505 386 386 226 160 374 1.034 1.183 5.942

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:43 17:11	07:32 17:43	06:58 18:15	07:10 19:46	06:26 20:16	05:59 20:44	06:00 20:54	06:23 20:37	06:51 19:56	07:19 19:08	06:50 17:24	07:23 17:01
2	07:43 17:11	07:31 17:44	06:56 18:16	07:08 19:47	06:25 20:17	05:59 20:44	06:01 20:54	06:24 20:36	06:52 19:54	07:20 19:06	06:51 17:22	07:24 17:01
3	07:44 17:12	07:30 17:45	06:55 18:17	07:06 19:48	06:24 20:18	05:59 20:45	06:01 20:54	06:24 20:35	06:53 19:53	07:21 19:05	06:53 17:21	07:25 17:01
4	07:44 17:13	07:29 17:47	06:53 18:18	07:05 19:49	06:23 20:19	05:58 20:46	06:02 20:54	06:25 20:33	06:54 19:51	07:22 19:03	06:54 17:20	07:26 17:00
5	07:44 17:14	07:28 17:48	06:52 18:19	07:03 19:50	06:21 20:20	05:58 20:46	06:02 20:54	06:26 20:32	06:55 19:50	07:22 19:01	06:55 17:19	07:27 17:00
6	07:44 17:15	07:27 17:49	06:50 18:20	07:02 19:51	06:20 20:21	05:58 20:47	06:03 20:53	06:27 20:31	06:56 19:48	07:23 19:00	06:56 17:18	07:28 17:00
7	07:44 17:16	07:26 17:50	06:49 18:21	07:00 19:52	06:19 20:22	05:57 20:47	06:03 20:53	06:28 20:30	06:57 19:46	07:24 18:58	06:57 17:17	07:29 17:00
8	07:44 17:17	07:25 17:51	06:47 18:22	06:59 19:53	06:18 20:23	05:57 20:48	06:04 20:53	06:29 20:29	06:57 19:45	07:25 18:57	06:58 17:16	07:30 17:00
9	07:44 17:18	07:24 17:53	06:46 18:23	06:57 19:54	06:17 20:24	05:57 20:49	06:05 20:52	06:30 20:27	06:58 19:42	07:26 18:54	06:59 17:14	07:31 17:00
10	07:43 17:19	07:23 17:54	06:44 18:25	06:56 19:55	06:16 20:25	05:57 20:49	06:05 20:52	06:31 20:27	06:59 19:42	07:27 18:54	07:00 17:14	07:32 17:00
11	07:43 17:20	07:21 17:55	06:43 18:26	06:54 19:56	06:15 20:26	05:57 20:50	06:06 20:52	06:32 20:25	07:00 19:40	07:28 18:52	07:02 17:13	07:32 17:00
12	07:43 17:21	07:20 17:56	06:41 18:27	06:53 19:57	06:14 20:27	05:56 20:50	06:07 20:51	06:33 20:24	07:01 19:38	07:29 18:51	07:03 17:12	07:33 17:00
13	07:43 17:22	07:19 17:57	06:40 18:28	06:51 19:58	06:13 20:27	05:56 20:51	06:07 20:51	06:34 20:23	07:02 19:37	07:30 18:49	07:04 17:11	07:34 17:01
14	07:42 17:23	07:18 17:58	06:38 18:29	06:50 19:59	06:12 20:28	05:56 20:51	06:08 20:50	06:35 20:22	07:03 19:35	07:31 18:48	07:05 17:10	07:35 17:01
15	07:42 17:24	07:17 17:59	06:37 18:30	06:48 20:00	06:11 20:29	05:56 20:51	06:09 20:50	06:35 20:20	07:04 19:34	07:32 18:46	07:06 17:10	07:35 17:01
16	07:42 17:25	07:15 18:01	06:35 18:31	06:47 20:01	06:10 20:30	05:56 20:52	06:09 20:19	06:36 20:19	07:05 19:32	07:33 18:45	07:07 17:09	07:36 17:01
17	07:41 17:26	07:14 18:02	06:33 18:32	06:45 20:02	06:09 20:31	05:56 20:52	06:10 20:49	06:37 20:18	07:06 19:30	07:34 18:43	07:08 17:08	07:37 17:02
18	07:41 17:27	07:13 18:03	06:32 18:33	06:44 20:03	06:08 20:32	05:56 20:53	06:11 20:48	06:38 20:16	07:07 19:29	07:35 18:42	07:09 17:07	07:37 17:02
19	07:40 17:28	07:12 18:04	06:30 18:34	06:42 20:04	06:07 20:33	05:57 20:53	06:12 20:47	06:39 20:15	07:07 19:27	07:36 18:40	07:10 17:07	07:38 17:02
20	07:40 17:29	07:10 18:05	06:29 18:35	06:41 20:05	06:07 20:34	05:57 20:53	06:12 20:47	06:40 20:13	07:08 19:25	07:37 18:39	07:12 17:06	07:39 17:03
21	07:39 17:30	07:09 18:06	06:27 18:36	06:39 20:06	06:06 20:35	05:57 20:53	06:13 20:46	06:41 20:12	07:09 19:24	07:39 18:38	07:13 17:05	07:39 17:03
22	07:39 17:32	07:08 18:07	06:25 18:37	06:38 20:07	06:05 20:36	05:57 20:54	06:14 20:45	06:42 20:11	07:10 19:22	07:40 18:36	07:14 17:04	07:40 17:04
23	07:38 17:33	07:06 18:08	06:24 18:38	06:37 20:08	06:04 20:36	05:57 20:54	06:15 20:45	06:43 20:09	07:11 19:21	07:41 18:35	07:15 17:04	07:40 17:04
24	07:38 17:34	07:05 18:10	06:22 18:39	06:35 20:09	06:04 20:37	05:58 20:54	06:16 20:44	06:44 20:08	07:12 19:19	07:42 18:34	07:16 17:04	07:41 17:05
25	07:37 17:35	07:03 18:11	06:21 18:40	06:34 20:10	06:03 20:38	05:58 20:54	06:17 20:43	06:45 20:06	07:13 19:17	06:43 17:32	07:17 17:03	07:41 17:05
26	07:36 17:36	07:02 18:12	06:19 18:41	06:33 20:11	06:02 20:39	05:58 20:54	06:17 20:42	06:46 20:05	07:14 19:16	06:44 17:31	07:18 17:03	07:42 17:06
27	07:36 17:37	07:01 18:13	06:18 18:42	06:31 20:12	06:02 20:40	05:59 20:54	06:18 20:41	06:47 20:03	07:15 19:14	06:45 17:30	07:19 17:02	07:42 17:07
28	07:35 17:38	06:59 18:14	06:16 18:43	06:30 20:13	06:01 20:41	05:59 20:54	06:19 20:40	06:47 20:02	07:16 19:12	06:46 17:28	07:20 17:02	07:42 17:07
29	07:34 17:40	07:03 19:44	06:21 19:44	06:34 20:14	06:03 20:41	05:58 20:54	06:17 20:39	06:45 20:00	07:13 19:11	06:43 17:27	07:17 17:02	07:41 17:08
30	07:33 17:41	07:03 19:45	06:21 19:45	06:27 20:15	06:00 20:42	06:00 20:54	06:21 20:39	06:49 19:59	07:18 19:09	06:48 17:26	07:22 17:01	07:43 17:09
31	07:32 17:42	07:02 19:46	06:19 19:46	06:33 20:15	06:02 20:43	05:58 20:54	06:17 20:38	06:46 19:57	07:14 19:09	06:44 17:25	07:18 17:03	07:42 17:09
Potential sun hours	302	300	370	396	444	447	454	425	374	347	302	293
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

Shadow receptor: rec01 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January		February		March		April		May		June					
1	07:43	16:14 (11)	07:31	16:32 (11)	06:58	07:16 (05)	07:10	19:25 (15)	06:26	18:57 (10)	05:59					
	17:10	31	16:45 (11)	17:43	26	16:58 (11)	18:15	31	07:47 (05)	19:46	1	19:26 (15)	20:16	40	19:37 (10)	20:43
2	07:43	16:14 (11)	07:31	16:34 (11)	06:56	07:15 (05)	07:08	19:22 (15)	06:25	18:58 (10)	05:59					
	17:11	32	16:46 (11)	17:44	23	16:57 (11)	18:16	31	07:46 (05)	19:47	5	19:27 (15)	20:17	39	19:37 (10)	20:44
3	07:44	16:15 (11)	07:30	16:36 (11)	06:55	07:15 (05)	07:06	19:20 (15)	06:24	18:59 (10)	05:58					
	17:12	32	16:47 (11)	17:45	19	16:55 (11)	18:17	30	07:45 (05)	19:48	7	19:27 (15)	20:18	37	19:36 (10)	20:45
4	07:44	16:15 (11)	07:29	16:40 (11)	06:53	07:17 (05)	07:05	19:20 (15)	06:23	18:59 (10)	05:58					
	17:13	33	16:48 (11)	17:47	11	16:51 (11)	18:18	27	07:44 (05)	19:49	9	19:29 (15)	20:19	35	19:34 (10)	20:46
5	07:44	16:15 (11)	07:28	16:52	06:52	07:18 (05)	07:03	19:18 (15)	06:21	19:00 (10)	05:58					
	17:14	34	16:49 (11)	17:48	18:19	24	07:42 (05)	19:50	11	19:29 (15)	20:20	33	19:33 (10)	20:46		
6	07:44	16:16 (11)	07:27	16:50	06:50	07:20 (05)	07:02	19:18 (15)	06:20	19:01 (10)	05:57					
	17:15	34	16:50 (11)	17:49	18:20	20	07:40 (05)	19:51	13	19:31 (15)	20:21	31	19:32 (10)	20:47		
7	07:44	16:16 (11)	07:26	16:49	06:49	07:22 (05)	07:00	19:15 (10)	06:19	19:02 (10)	05:57					
	17:16	35	16:51 (11)	17:50	18:21	15	07:37 (05)	19:52	16	19:31 (15)	20:22	28	19:30 (10)	20:47		
8	07:44	16:16 (11)	07:25	16:47	06:47	07:27 (05)	06:59	19:12 (10)	06:18	19:04 (10)	05:57					
	17:17	36	16:52 (11)	17:51	18:22	5	07:32 (05)	19:53	21	19:33 (10)	20:23	25	19:29 (10)	20:48		
9	07:43	16:16 (11)	07:24	16:46	06:46	07:18 (05)	06:57	19:08 (10)	06:17	19:06 (10)	05:57					
	17:18	36	16:52 (11)	17:52	18:23	19:54	25	19:33 (10)	20:24	21	19:27 (10)	20:49				
10	07:43	16:16 (11)	07:22	16:44	06:44	06:56	19:07 (10)	06:16	19:08 (10)	05:57						
	17:19	37	16:53 (11)	17:54	18:24	19:55	28	19:35 (10)	20:25	16	19:24 (10)	20:49				
11	07:43	16:17 (11)	07:21	16:43	06:43	06:54	19:04 (10)	06:15	19:12 (10)	05:56						
	17:20	38	16:55 (11)	17:55	18:25	19:56	31	19:35 (10)	20:26	8	19:20 (10)	20:50				
12	07:43	16:18 (11)	07:20	16:41	06:41	06:53	19:03 (10)	06:14	19:03 (10)	05:56						
	17:21	38	16:56 (11)	17:56	18:27	19:57	33	19:36 (10)	20:27	20:50						
13	07:43	16:17 (11)	07:19	16:40	06:40	06:51	19:01 (10)	06:13	19:01 (10)	05:56						
	17:22	39	16:56 (11)	17:57	18:28	19:58	36	19:37 (10)	20:27	20:51						
14	07:42	16:18 (11)	07:18	07:37 (05)	06:38	06:50	19:00 (10)	06:12	19:00 (10)	05:56						
	17:23	40	16:58 (11)	17:58	18:29	19:59	38	19:38 (10)	20:28	20:51						
15	07:42	16:19 (11)	07:17	07:35 (05)	06:37	06:48	18:59 (10)	06:11	18:59 (10)	05:56						
	17:24	40	16:59 (11)	17:59	8	07:43 (05)	18:30	20:00	40	19:39 (10)	20:29	20:51				
16	07:42	16:19 (11)	07:15	07:34 (05)	06:35	06:47	18:58 (10)	06:10	18:58 (10)	05:56						
	17:25	41	17:00 (11)	18:01	11	07:45 (05)	18:31	20:01	42	19:40 (10)	20:30	20:52				
17	07:41	16:20 (11)	07:14	07:33 (05)	06:33	06:45	18:57 (10)	06:09	18:57 (10)	05:56						
	17:26	42	17:02 (11)	18:02	13	07:46 (05)	18:32	20:02	43	19:40 (10)	20:31	20:52				
18	07:41	16:19 (11)	07:13	07:32 (05)	06:32	06:44	18:57 (10)	06:08	18:57 (10)	05:56						
	17:27	43	17:02 (11)	18:03	15	07:47 (05)	18:33	20:03	45	19:42 (10)	20:32	20:53				
19	07:40	16:20 (11)	07:12	07:30 (05)	06:30	06:42	18:56 (10)	06:07	18:56 (10)	05:57						
	17:28	44	17:04 (11)	18:04	17	07:47 (05)	18:34	20:04	45	19:41 (10)	20:33	20:53				
20	07:40	16:21 (11)	07:10	07:29 (05)	06:29	06:41	18:56 (10)	06:07	18:56 (10)	05:57						
	17:29	42	17:03 (11)	18:05	19	07:48 (05)	18:35	20:05	46	19:42 (10)	20:34	20:53				
21	07:39	16:22 (11)	07:09	07:28 (05)	06:27	06:39	18:56 (10)	06:06	18:56 (10)	05:57						
	17:30	42	17:04 (11)	18:06	21	07:49 (05)	18:36	20:06	46	19:42 (10)	20:35	20:53				
22	07:39	16:22 (11)	07:08	07:26 (05)	06:25	06:38	18:55 (10)	06:05	18:55 (10)	05:57						
	17:31	42	17:04 (11)	18:07	23	07:49 (05)	18:37	20:07	46	19:41 (10)	20:36	20:54				
23	07:38	16:22 (11)	07:06	07:25 (05)	06:24	06:37	18:55 (10)	06:04	18:55 (10)	05:57						
	17:33	41	17:03 (11)	18:08	24	07:49 (05)	18:38	20:08	46	19:41 (10)	20:36	20:54				
24	07:38	16:24 (11)	07:05	07:23 (05)	06:22	06:35	18:55 (10)	06:04	18:55 (10)	05:58						
	17:34	40	17:04 (11)	18:10	26	07:49 (05)	18:39	20:09	46	19:41 (10)	20:37	20:54				
25	07:37	16:24 (11)	07:03	07:22 (05)	06:21	06:34	18:55 (10)	06:03	18:55 (10)	05:58						
	17:35	39	17:03 (11)	18:11	27	07:49 (05)	18:40	20:10	45	19:40 (10)	20:38	20:54				
26	07:36	16:25 (11)	07:02	07:21 (05)	06:19	06:33	18:55 (10)	06:02	18:55 (10)	05:58						
	17:36	38	17:03 (11)	18:12	28	07:49 (05)	18:41	20:11	45	19:40 (10)	20:39	20:54				
27	07:36	16:25 (11)	07:01	07:19 (05)	06:17	06:31	18:55 (10)	06:02	18:55 (10)	05:58						
	17:37	37	17:02 (11)	18:13	29	07:48 (05)	18:42	20:12	45	19:40 (10)	20:40	20:54				
28	07:35	16:26 (11)	06:59	07:18 (05)	06:16	06:30	18:56 (10)	06:01	18:56 (10)	05:59						
	17:38	35	17:01 (11)	18:14	30	07:48 (05)	18:43	20:13	44	19:40 (10)	20:40	20:54				
29	07:34	16:28 (11)		07:14	19:43	06:29	18:56 (10)	06:01	18:56 (10)	05:59						
	17:40	34	17:02 (11)		19:43	20:14	19:38 (10)	20:41	19:38 (10)	20:41	20:54					
30	07:33	16:29 (11)		07:13	19:44	06:27	18:56 (10)	06:00	18:56 (10)	06:00	06:00					
	17:41	32	17:01 (11)		19:44	20:15	19:38 (10)	20:42	19:38 (10)	20:42	20:54					
31	07:32	16:31 (11)		07:11	19:45			06:00								
	17:42	29	17:00 (11)		19:45			20:43								
Potential sun hours	302		300		370		396		444			447				
Total, worst case	1156		374		183		982		313							
Sun reduction	0,45		0,47		0,49		0,53		0,59							
Oper. time red.	0,68		0,68		0,68		0,68		0,68							
Wind dir. red.	0,60		0,71		0,75		0,75		0,75							
Total reduction	0,18		0,23		0,25		0,26		0,29							
Total, real	208		84		45		260		92							

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

Shadow receptor: rec02 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July		August		September		October		November		December	
1	06:00	06:54 (03)	06:23	06:51 (03)	06:51	18:58 (13)	07:19	06:50	16:30 (12)	07:23		
	20:54	97 20:16 (09)	20:37	97 20:12 (09)	19:56	13 19:11 (13)	19:08	17:23	29 16:59 (12)	17:01		
2	06:01	06:53 (03)	06:23	06:51 (03)	06:52	18:55 (13)	07:20	06:51	16:30 (12)	07:24		
	20:54	98 20:15 (09)	20:36	95 20:11 (09)	19:54	18 19:13 (13)	19:06	17:22	28 16:58 (12)	17:01		
3	06:01	06:54 (03)	06:24	06:51 (03)	06:53	18:53 (13)	07:21	06:53	16:31 (12)	07:25		
	20:54	98 20:16 (09)	20:35	93 20:10 (09)	19:53	22 19:15 (13)	19:04	17:21	28 16:59 (12)	17:01		
4	06:02	06:53 (03)	06:25	06:52 (03)	06:54	18:52 (13)	07:21	06:54	16:31 (12)	07:26		
	20:54	99 20:16 (09)	20:33	89 20:09 (09)	19:51	24 19:16 (13)	19:03	17:20	26 16:57 (12)	17:00		
5	06:02	06:54 (03)	06:26	06:51 (03)	06:55	18:50 (13)	07:22	06:55	16:31 (12)	07:27		
	20:54	99 20:16 (09)	20:32	87 20:07 (09)	19:50	27 19:17 (13)	19:01	17:19	25 16:56 (12)	17:00		
6	06:03	06:53 (03)	06:27	06:52 (03)	06:56	18:49 (13)	07:23	06:56	16:32 (12)	07:28		
	20:53	100 20:16 (09)	20:31	82 20:05 (09)	19:48	29 19:18 (13)	19:00	17:18	23 16:55 (12)	17:00		
7	06:03	06:53 (03)	06:28	06:51 (02)	06:57	18:47 (13)	07:24	06:57	16:33 (12)	07:29		
	20:53	101 20:17 (09)	20:30	78 20:03 (09)	19:46	30 19:17 (13)	18:58	17:17	20 16:53 (12)	17:00		
8	06:04	06:53 (03)	06:29	06:50 (02)	06:57	18:46 (13)	07:25	06:58	16:34 (12)	07:30		
	20:53	102 20:17 (09)	20:29	75 20:01 (09)	19:45	31 19:17 (13)	18:57	17:16	19 16:53 (12)	17:00		
9	06:04	06:53 (03)	06:30	06:51 (02)	06:58	18:46 (13)	07:26	06:59	16:36 (12)	07:31		
	20:52	101 20:17 (09)	20:28	67 19:58 (09)	19:43	32 19:18 (13)	18:55	17:15	16 16:52 (12)	17:00		
10	06:05	06:53 (03)	06:31	06:52 (02)	06:59	18:45 (13)	07:27	07:00	16:37 (12)	07:32		
	20:52	102 20:17 (09)	20:27	55 19:53 (09)	19:42	32 19:17 (13)	18:54	17:14	14 16:51 (12)	17:00		
11	06:06	06:53 (03)	06:32	06:53 (02)	07:00	18:45 (13)	07:28	07:02	16:39 (12)	07:32		
	20:52	103 20:18 (09)	20:25	45 07:38 (03)	19:40	32 19:17 (13)	18:52	17:13	10 16:49 (12)	17:00		
12	06:06	06:52 (03)	06:33	06:54 (02)	07:01	18:45 (13)	07:29	07:03	16:43 (12)	07:33		
	20:51	104 20:17 (09)	20:24	43 07:37 (03)	19:38	32 19:17 (13)	18:51	17:12	4 16:47 (12)	17:00		
13	06:07	06:52 (03)	06:34	06:55 (02)	07:02	18:45 (13)	07:30	07:04		07:34		
	20:51	105 20:18 (09)	20:23	40 07:35 (03)	19:37	30 19:15 (13)	18:49	17:11		17:01		
14	06:08	06:52 (03)	06:34	06:55 (02)	07:03	18:45 (13)	07:31	07:05		07:35		
	20:50	106 20:18 (09)	20:22	38 07:33 (03)	19:35	29 19:14 (13)	18:48	17:10		17:01		
15	06:09	06:52 (03)	06:35	06:56 (02)	07:04	18:44 (13)	07:32	07:06		07:36		
	20:50	104 20:17 (09)	20:20	36 07:32 (03)	19:34	27 19:11 (13)	18:46	17:10		17:01		
16	06:09	06:52 (03)	06:36	06:57 (02)	07:05	18:45 (13)	07:33	07:07		07:36		
	20:49	106 20:18 (09)	20:19	33 07:30 (03)	19:32	25 19:10 (13)	18:45	17:09		17:01		
17	06:10	06:52 (03)	06:37	06:58 (02)	07:06	18:45 (13)	07:34	07:08		07:37		
	20:49	107 20:18 (09)	20:18	29 07:27 (03)	19:30	23 19:08 (13)	18:43	17:08		17:02		
18	06:11	06:51 (03)	06:38	06:59 (02)	07:07	18:46 (13)	07:35	07:09		07:38		
	20:48	106 20:17 (09)	20:16	25 07:24 (03)	19:29	21 19:07 (13)	18:42	17:07		17:02		
19	06:12	06:51 (03)	06:39	07:00 (02)	07:07	18:48 (13)	07:36	07:11		07:38		
	20:47	107 20:17 (09)	20:15	19 07:20 (03)	19:27	17 19:05 (13)	18:40	17:07		17:02		
20	06:12	06:51 (03)	06:40	07:01 (02)	07:08	18:50 (13)	07:37	07:12		07:39		
	20:47	107 20:17 (09)	20:13	6 07:07 (02)	19:25	14 19:04 (13)	18:39	17:06		17:03		
21	06:13	06:51 (03)	06:41	07:02 (02)	07:09	18:53 (13)	07:39	07:13		07:39		
	20:46	107 20:17 (09)	20:12	3 07:05 (02)	19:24	9 19:02 (13)	18:38	17:05		17:03		
22	06:14	06:51 (03)	06:42		07:10		07:40	07:14		07:40		
	20:45	107 20:17 (09)	20:11		19:22		18:36	11 17:51 (12)	17:05	17:04		
23	06:15	06:50 (03)	06:43		07:11		07:41	17:37 (12)	07:15	07:40		
	20:45	107 20:16 (09)	20:09		19:21		18:35	16 17:53 (12)	17:04	17:04		
24	06:16	06:50 (03)	06:44		07:12		07:42	17:35 (12)	07:16	07:41		
	20:44	106 20:16 (09)	20:08		19:19		18:33	20 17:55 (12)	17:04	17:05		
25	06:16	06:51 (03)	06:45		07:13		06:43	16:34 (12)	07:17	07:41		
	20:43	106 20:16 (09)	20:06		19:17		17:32	22 16:56 (12)	17:03	17:05		
26	06:17	06:51 (03)	06:46		07:14		06:44	16:33 (12)	07:18	07:42		
	20:42	105 20:16 (09)	20:05		19:16		17:31	24 16:57 (12)	17:03	17:06		
27	06:18	06:51 (03)	06:46		07:15		06:45	16:32 (12)	07:19	07:42		
	20:41	104 20:16 (09)	20:03		19:14		17:30	25 16:57 (12)	17:02	17:07		
28	06:19	06:51 (03)	06:47		07:16		06:46	16:32 (12)	07:20	07:42		
	20:40	104 20:15 (09)	20:02		19:12		17:28	27 16:59 (12)	17:02	17:07		
29	06:20	06:50 (03)	06:48		07:17		06:47	16:31 (12)	07:21	07:43		
	20:40	103 20:14 (09)	20:00		19:11		17:27	28 16:59 (12)	17:02	17:08		
30	06:21	06:50 (03)	06:49		07:18		06:48	16:31 (12)	07:22	07:43		
	20:39	101 20:13 (09)	19:59		19:09		17:26	28 16:59 (12)	17:01	17:09		
31	06:22	06:51 (03)	06:50				06:49	16:30 (12)		07:43		
	20:38	99 20:13 (09)	19:57				17:25	29 16:59 (12)		17:09		
Potential sun hours	454		425		374		347		302		293	
Total, worst case	3201		1135		517		230		242			
Sun reduction	0,74		0,73		0,65		0,54		0,50			
Oper. time red.	0,68		0,68		0,68		0,68		0,68			
Wind dir. red.	0,71		0,69		0,73		0,64		0,64			
Total reduction	0,36		0,34		0,32		0,24		0,22			
Total, real	1141		386		166		54		53			

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

Shadow receptor: rec03 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January		February		March		April		May		June						
1	07:43	08:07 (04)	07:32	08:37 (08)	06:58	17:14 (12)	07:10	06:26	06:45 (02)	05:59	06:23 (03)						
	17:10	114	10:01 (08)	17:43	86	10:03 (08)	18:15	17	17:31 (12)	19:46	20:16	9	19:21 (13)	20:44	45	07:08 (03)	
2	07:44	08:08 (04)	07:31	08:37 (08)	06:56	17:17 (12)	07:08	06:25	06:44 (02)	05:59	06:24 (03)						
	17:11	113	10:01 (08)	17:44	86	10:03 (08)	18:16	11	17:28 (12)	19:47	20:17	7	06:51 (02)	20:44	45	07:09 (03)	
3	07:44	08:09 (04)	07:30	08:38 (08)	06:55		07:06	06:24	06:43 (02)	05:58	06:23 (03)						
	17:12	113	10:02 (08)	17:45	84	10:02 (08)	18:17		19:48	20:18	9	06:52 (02)	20:45	45	07:08 (03)		
4	07:44	08:10 (04)	07:29	08:39 (08)	06:53		07:05	06:23	06:41 (02)	05:58	06:23 (03)						
	17:13	112	10:02 (08)	17:47	82	10:01 (08)	18:18		19:49	20:19	11	06:52 (02)	20:46	46	07:09 (03)		
5	07:44	08:11 (04)	07:28	08:40 (08)	06:52		07:03	06:21	06:40 (02)	05:58	06:24 (03)						
	17:14	111	10:02 (08)	17:48	80	10:00 (08)	18:19		19:50	20:20	13	06:53 (02)	20:46	45	07:09 (03)		
6	07:44	08:12 (04)	07:27	08:41 (08)	06:50		07:02	19:20 (13)	06:20	06:39 (02)	05:57	06:23 (03)					
	17:15	111	10:03 (08)	17:49	78	09:59 (08)	18:20		19:51	8	19:28 (13)	20:21	14	06:53 (02)	20:47	46	07:09 (03)
7	07:44	08:13 (04)	07:26	08:42 (08)	06:49		07:00	19:15 (13)	06:19	06:38 (02)	05:57	06:24 (03)					
	17:16	110	10:03 (08)	17:50	76	09:58 (08)	18:21		19:52	16	19:31 (13)	20:22	16	06:54 (02)	20:47	45	07:09 (03)
8	07:44	08:15 (04)	07:25	08:43 (08)	06:47		06:59	19:13 (13)	06:18	06:37 (02)	05:57	06:24 (03)					
	17:17	109	10:04 (08)	17:51	74	09:57 (08)	18:22		19:53	20	19:33 (13)	20:23	17	06:54 (02)	20:48	45	07:09 (03)
9	07:44	08:16 (04)	07:24	08:44 (08)	06:46		06:57	19:10 (13)	06:17	06:36 (02)	05:57	06:24 (03)					
	17:18	109	10:05 (08)	17:52	78	17:27 (12)	18:23		19:54	23	19:33 (13)	20:24	18	06:54 (02)	20:49	46	07:10 (03)
10	07:43	08:17 (04)	07:23	08:46 (08)	06:44		06:56	19:09 (13)	06:16	06:35 (02)	05:57	06:24 (03)					
	17:19	107	10:04 (08)	17:54	83	17:31 (12)	18:24		19:55	26	19:35 (13)	20:25	19	06:54 (02)	20:49	46	07:10 (03)
11	07:43	08:20 (04)	07:21	08:46 (08)	06:43		06:54	19:07 (13)	06:15	06:34 (02)	05:56	06:25 (03)					
	17:20	105	10:05 (08)	17:55	84	17:32 (12)	18:26		19:56	28	19:35 (13)	20:26	20	06:54 (02)	20:50	45	07:10 (03)
12	07:43	08:26 (08)	07:20	08:48 (08)	06:41		06:53	19:07 (13)	06:14	06:33 (02)	05:56	06:25 (03)					
	17:21	99	10:05 (08)	17:56	85	17:34 (12)	18:27		19:57	29	19:36 (13)	20:27	20	06:53 (02)	20:50	46	07:11 (03)
13	07:43	08:26 (08)	07:19	08:49 (08)	06:40		06:51	19:05 (13)	06:13	06:32 (02)	05:56	06:25 (03)					
	17:22	99	10:05 (08)	17:57	84	17:35 (12)	18:28		19:58	32	19:37 (13)	20:28	23	06:55 (03)	20:51	46	07:11 (03)
14	07:42	08:27 (08)	07:18	08:51 (08)	06:38		06:50	19:05 (13)	06:12	06:31 (02)	05:56	06:25 (03)					
	17:23	98	10:05 (08)	17:58	81	17:36 (12)	18:29		19:59	33	19:38 (13)	20:28	25	06:56 (03)	20:51	46	07:11 (03)
15	07:42	08:28 (08)	07:17	08:53 (08)	06:37		06:48	19:04 (13)	06:11	06:30 (03)	05:56	06:26 (03)					
	17:24	98	10:06 (08)	17:59	81	17:38 (12)	18:30		20:00	34	19:38 (13)	20:29	28	06:58 (03)	20:51	45	07:11 (03)
16	07:42	08:28 (08)	07:15	08:55 (08)	06:35		06:47	19:03 (13)	06:10	06:30 (03)	05:56	06:26 (03)					
	17:25	98	10:06 (08)	18:01	76	17:38 (12)	18:31		20:01	36	19:39 (13)	20:30	30	07:00 (03)	20:52	45	07:11 (03)
17	07:41	08:29 (08)	07:14	08:57 (08)	06:33		06:45	19:02 (13)	06:09	06:29 (03)	05:56	06:26 (03)					
	17:26	97	10:06 (08)	18:02	74	17:39 (12)	18:32		20:02	36	19:38 (13)	20:31	32	07:01 (03)	20:52	45	07:11 (03)
18	07:41	08:28 (08)	07:13	09:00 (08)	06:32		06:44	19:03 (13)	06:08	06:28 (03)	05:56	06:26 (03)					
	17:27	98	10:06 (08)	18:03	68	17:39 (12)	18:33		20:03	35	19:38 (13)	20:32	33	07:01 (03)	20:53	45	07:11 (03)
19	07:41	08:29 (08)	07:12	09:03 (08)	06:30		06:42	19:02 (13)	06:07	06:27 (03)	05:57	06:26 (03)					
	17:28	98	10:07 (08)	18:04	61	17:39 (12)	18:34		20:04	35	19:37 (13)	20:33	35	07:02 (03)	20:53	46	07:12 (03)
20	07:40	08:30 (08)	07:10	09:08 (08)	06:29		06:41	19:02 (13)	06:07	06:27 (03)	05:57	06:26 (03)					
	17:29	96	10:06 (08)	18:05	50	17:39 (12)	18:35		20:05	35	19:37 (13)	20:34	36	07:03 (03)	20:53	46	07:12 (03)
21	07:39	08:31 (08)	07:09	17:08 (12)	06:27		06:39	19:03 (13)	06:06	06:26 (03)	05:57	06:26 (03)					
	17:30	96	10:07 (08)	18:06	31	17:39 (12)	18:36		20:06	34	19:37 (13)	20:35	38	07:04 (03)	20:53	46	07:12 (03)
22	07:39	08:31 (08)	07:08	17:07 (12)	06:25		06:38	19:02 (13)	06:05	06:25 (03)	05:57	06:27 (03)					
	17:31	95	10:06 (08)	18:07	32	17:39 (12)	18:37		20:07	34	19:36 (13)	20:36	39	07:04 (03)	20:54	46	07:13 (03)
23	07:38	08:31 (08)	07:06	17:08 (12)	06:24		06:37	19:03 (13)	06:04	06:25 (03)	05:57	06:27 (03)					
	17:33	95	10:06 (08)	18:08	30	17:38 (12)	18:38		20:08	33	19:36 (13)	20:36	40	07:05 (03)	20:54	46	07:13 (03)
24	07:38	08:32 (08)	07:05	17:09 (12)	06:22		06:35	19:04 (13)	06:04	06:24 (03)	05:58	06:27 (03)					
	17:34	95	10:07 (08)	18:10	29	17:38 (12)	18:39		20:09	31	19:35 (13)	20:37	41	07:05 (03)	20:54	46	07:13 (03)
25	07:37	08:32 (08)	07:03	17:09 (12)	06:21		06:34	19:04 (13)	06:03	06:24 (03)	05:58	06:28 (03)					
	17:35	94	10:06 (08)	18:11	28	17:37 (12)	18:40		20:10	29	19:33 (13)	20:38	41	07:05 (03)	20:54	45	07:13 (03)
26	07:36	08:33 (08)	07:02	17:10 (12)	06:19		06:33	19:05 (13)	06:02	06:24 (03)	05:58	06:28 (03)					
	17:36	93	10:06 (08)	18:12	26	17:36 (12)	18:41		20:11	27	19:32 (13)	20:39	42	07:06 (03)	20:54	45	07:13 (03)
27	07:36	08:33 (08)	07:01	17:11 (12)	06:17		06:31	19:06 (13)	06:02	06:23 (03)	05:58	06:28 (03)					
	17:37	92	10:05 (08)	18:13	23	17:34 (12)	18:42		20:12	25	19:31 (13)	20:40	43	07:06 (03)	20:54	45	07:13 (03)
28	07:35	08:34 (08)	06:59	17:12 (12)	06:16		06:30	19:08 (13)	06:01	06:24 (03)	05:59	06:29 (03)					
	17:38	92	10:06 (08)	18:14	21	17:33 (12)	18:43		20:13	22	19:30 (13)	20:41	43	07:07 (03)	20:54	45	07:14 (03)
29	07:34	08:35 (08)		07:14			07:14		06:29	19:09 (13)	06:01	06:23 (03)	05:59	06:28 (03)			
	17:40	90	10:05 (08)				19:44		20:14	18	19:27 (13)	20:41	44	07:07 (03)	20:54	46	07:14 (03)
30	07:33	08:35 (08)		07:13			07:13		06:27	19:11 (13)	06:00	06:23 (03)	06:00	06:28 (03)			
	17:41	90	10:05 (08)				19:45		20:15	14	19:25 (13)	20:42	45	07:08 (03)	20:54	46	07:14 (03)
31	07:32	08:36 (08)		07:11			07:11				06:00	06:23 (03)					
	17:42	88	10:04 (08)				19:45				20:43	44	07:07 (03)				
Potential sun hours	302		300		370		396		444		447						
Total, worst case	3115		1771		28		693		875		1365						
Sun reduction	0,45		0,47		0,49		0,53		0,59		0,66						
Oper. time red.	0,68		0,68		0,68		0,68		0,68		0,68						
Wind dir. red.	0,70		0,69		0,66		0,75		0,65		0,65						
Total reduction	0,22		0,22		0,22		0,27		0,26		0,29						
Total, real	671		391		6		186		229		398						

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

Shadow receptor: rec03 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July			August			September			October			November			December			
1	06:00			06:29 (03)	06:23		06:44 (02)	06:51		19:06 (13)	07:19		06:50			08:14 (08)	07:23		08:02 (04)
	20:54	45	07:14 (03)	20:37	20	07:04 (02)	19:56	28	19:34 (13)	19:08		17:23	83	16:59 (12)	17:01	105	09:47 (08)		
2	06:01			06:29 (03)	06:23		06:45 (02)	06:52		19:07 (13)	07:20		06:51			08:13 (08)	07:24		08:01 (04)
	20:54	45	07:14 (03)	20:36	19	07:04 (02)	19:54	25	19:32 (13)	19:06		17:22	75	16:54 (12)	17:01	106	09:47 (08)		
3	06:01			06:29 (03)	06:24		06:46 (02)	06:53		19:08 (13)	07:21		06:53			08:13 (08)	07:25		07:59 (04)
	20:54	46	07:15 (03)	20:35	18	07:04 (02)	19:53	23	19:31 (13)	19:04		17:21	74	09:27 (08)	17:01	109	09:48 (08)		
4	06:02			06:29 (03)	06:25		06:47 (02)	06:54		19:10 (13)	07:21		06:54			08:12 (08)	07:26		07:59 (04)
	20:54	46	07:15 (03)	20:33	17	07:04 (02)	19:51	20	19:30 (13)	19:03		17:20	76	09:28 (08)	17:00	109	09:48 (08)		
5	06:02			06:30 (03)	06:26		06:47 (02)	06:55		19:12 (13)	07:22		06:55			08:11 (08)	07:27		07:58 (04)
	20:54	45	07:15 (03)	20:32	16	07:03 (02)	19:50	16	19:28 (13)	19:01		17:19	78	09:29 (08)	17:00	110	09:48 (08)		
6	06:03			06:29 (03)	06:27		06:48 (02)	06:56		19:16 (13)	07:23		06:56			08:10 (08)	07:28		07:58 (04)
	20:53	46	07:15 (03)	20:31	15	07:03 (02)	19:48	8	19:24 (13)	19:00		17:18	80	09:30 (08)	17:00	111	09:49 (08)		
7	06:03			06:30 (03)	06:28		06:49 (02)	06:57			07:24		06:57			08:09 (08)	07:29		07:58 (04)
	20:53	45	07:15 (03)	20:30	14	07:03 (02)	19:46			18:58		17:17	82	09:31 (08)	17:00	111	09:49 (08)		
8	06:04			06:31 (03)	06:29		06:50 (02)	06:57			07:25		06:58			08:09 (08)	07:30		07:58 (04)
	20:53	45	07:16 (03)	20:29	12	07:02 (02)	19:45			18:57		17:16	84	09:33 (08)	17:00	112	09:50 (08)		
9	06:04			06:30 (03)	06:30		06:51 (02)	06:58			07:26		06:59			08:08 (08)	07:31		07:58 (04)
	20:52	45	07:15 (03)	20:28	10	07:01 (02)	19:43			18:55		17:15	86	09:34 (08)	17:00	113	09:51 (08)		
10	06:05			06:31 (03)	06:31		06:52 (02)	06:59			07:27		07:00			08:08 (08)	07:32		07:57 (04)
	20:52	45	07:16 (03)	20:27	8	07:00 (02)	19:42			18:54		17:14	86	09:34 (08)	17:00	113	09:50 (08)		
11	06:06			06:31 (03)	06:32		06:53 (02)	07:00			07:28		17:54 (12)		07:02	08:07 (08)	07:32		07:57 (04)
	20:52	45	07:16 (03)	20:25	6	06:59 (02)	19:40			18:52	4	17:58 (12)	17:13	88	09:35 (08)	17:00	114	09:51 (08)	
12	06:06			06:31 (03)	06:33		06:54 (02)	07:01			07:29		17:49 (12)		07:03	08:06 (08)	07:33		07:58 (04)
	20:51	45	07:16 (03)	20:24	11	19:31 (13)	19:38			18:51	14	18:03 (12)	17:12	90	09:36 (08)	17:00	113	09:51 (08)	
13	06:07			06:32 (03)	06:34		19:19 (13)	07:02			07:30		17:46 (12)		07:04	08:07 (08)	07:34		07:58 (04)
	20:51	44	07:16 (03)	20:23	15	19:34 (13)	19:37			18:49	19	18:05 (12)	17:11	90	09:37 (08)	17:01	114	09:52 (08)	
14	06:08			06:32 (03)	06:34		19:16 (13)	07:03			07:31		17:44 (12)		07:05	08:06 (08)	07:35		07:59 (04)
	20:50	44	07:16 (03)	20:22	20	19:36 (13)	19:35			18:48	22	18:06 (12)	17:10	92	09:38 (08)	17:01	114	09:53 (08)	
15	06:09			06:32 (03)	06:35		19:14 (13)	07:04			07:32		17:43 (12)		07:06	08:06 (08)	07:36		07:58 (04)
	20:50	43	07:15 (03)	20:20	23	19:37 (13)	19:34			18:46	24	18:07 (12)	17:10	92	09:38 (08)	17:01	115	09:53 (08)	
16	06:09			06:32 (03)	06:36		19:13 (13)	07:05			07:33		17:41 (12)		07:07	08:06 (08)	07:36		07:59 (04)
	20:49	44	07:16 (03)	20:19	25	19:38 (13)	19:32			18:45	27	18:08 (12)	17:09	93	09:39 (08)	17:01	114	09:53 (08)	
17	06:10			06:33 (03)	06:37		19:12 (13)	07:06			07:34		17:40 (12)		07:08	08:05 (08)	07:37		08:00 (04)
	20:49	43	07:16 (03)	20:18	27	19:39 (13)	19:30			18:43	29	18:09 (12)	17:08	94	09:39 (08)	17:02	114	09:54 (08)	
18	06:11			06:33 (03)	06:38		19:10 (13)	07:07			07:35		17:39 (12)		07:09	08:06 (08)	07:38		08:00 (04)
	20:48	42	07:15 (03)	20:16	30	19:40 (13)	19:29			18:42	30	18:09 (12)	17:07	95	09:41 (08)	17:02	114	09:54 (08)	
19	06:12			06:33 (03)	06:39		19:10 (13)	07:07			07:36		17:39 (12)		07:11	08:06 (08)	07:38		08:01 (04)
	20:47	42	07:15 (03)	20:15	31	19:41 (13)	19:27			18:40	30	18:09 (12)	17:07	95	09:41 (08)	17:02	114	09:55 (08)	
20	06:12			06:34 (03)	06:40		19:09 (13)	07:08			07:37		17:39 (12)		07:12	08:06 (08)	07:39		08:01 (04)
	20:47	41	07:15 (03)	20:13	32	19:41 (13)	19:25			18:39	31	18:10 (12)	17:06	95	09:41 (08)	17:03	114	09:55 (08)	
21	06:13			06:35 (03)	06:41		19:08 (13)	07:09			07:39		17:38 (12)		07:13	08:06 (08)	07:39		08:02 (04)
	20:46	40	07:15 (03)	20:12	34	19:42 (13)	19:24			18:38	32	18:10 (12)	17:05	96	09:42 (08)	17:03	114	09:56 (08)	
22	06:14			06:36 (03)	06:42		19:07 (13)	07:10			07:40		17:43 (12)		07:14	08:06 (08)	07:40		08:02 (04)
	20:45	38	07:14 (03)	20:11	34	19:41 (13)	19:22			18:36	54	18:10 (12)	17:05	96	09:42 (08)	17:04	114	09:56 (08)	
23	06:15			06:36 (03)	06:43		19:06 (13)	07:11			07:41		17:43 (12)		07:15	08:06 (08)	07:40		08:03 (04)
	20:45	37	07:13 (03)	20:09	35	19:41 (13)	19:21			18:35	62	18:09 (12)	17:04	97	09:43 (08)	17:04	114	09:57 (08)	
24	06:16			06:37 (03)	06:44		19:06 (13)	07:12			07:42		17:42 (12)		07:16	08:07 (08)	07:41		08:03 (04)
	20:44	36	07:13 (03)	20:08	35	19:41 (13)	19:19			18:33	69	18:09 (12)	17:04	97	09:44 (08)	17:05	114	09:57 (08)	
25	06:16			06:38 (03)	06:45		19:06 (13)	07:13			06:43		17:41 (12)		07:17	08:07 (08)	07:41		08:03 (04)
	20:43	34	07:12 (03)	20:06	35	19:41 (13)	19:17			17:32	74	17:08 (12)	17:03	97	09:44 (08)	17:05	114	09:57 (08)	
26	06:17			06:39 (03)	06:46		19:05 (13)	07:14			06:44		17:40 (12)		07:18	08:07 (08)	07:42		08:04 (04)
	20:42	33	07:12 (03)	20:05	36	19:41 (13)	19:16			17:31	79	17:08 (12)	17:03	98	09:45 (08)	17:06	114	09:58 (08)	
27	06:18			06:40 (03)	06:46		19:05 (13)	07:15			06:45		17:40 (12)		07:19	08:07 (08)	07:42		08:04 (04)
	20:41	31	07:11 (03)	20:03	36	19:41 (13)	19:14			17:30	80	17:06 (12)	17:02	98	09:45 (08)	17:07	114	09:58 (08)	
28	06:19			06:41 (03)	06:47		19:05 (13)	07:16			06:46		17:40 (12)		07:20	08:07 (08)	07:42		08:04 (04)
	20:40	29	07:10 (03)	20:02	35	19:40 (13)	19:12			17:28	82	17:06 (12)	17:02	99	09:46 (08)	17:07	115	09:59 (08)	
29	06:20			06:41 (03)	06:48		19:06 (13)	07:17			06:47		17:40 (12)		07:21	08:07 (08)	07:43		08:06 (04)
	20:40	27	07:08 (03)	20:00	33	19:39 (13)	19:11			17:27	83	17:04 (12)	17:02	99	09:46 (08)	17:08	114	10:00 (08)	
30	06:21			06:42 (02)	06:49		19:05 (13)	07:18			06:48		17:41 (12)		07:22	08:07 (08)	07:43		08:06 (04)
	20:39	24	07:06 (03)	19:59	32	19:37 (13)	19:09			17:26	84	17:03 (12)	17:01	99	09:46 (08)	17:09	114	10:00 (08)	
31	06:22			06:43 (02)	06:50		19:05 (13)			06:49		17:41 (12)				07:43			08:07 (04)
	20:38	21	07:04 (03)	19:57	30	19:35 (13)				17:25	84	17:02 (12)				17:09	113	10:00 (08)	
Potential sun hours	454			425		374				347			302			293			
Total, worst case	1236			744		120				1013			2704			3493			
Sun reduction	0,74																		

SHADOW - Calendar

Shadow receptor: rec04 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (4)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January		February		March		April		May		June			
1	07:43	08:05 (10)	07:32		06:58	07:29 (12)	07:10	06:26		05:59		06:20 (09)		
	17:10	18	08:23 (10)	17:43	18:15	57	08:26 (12)	19:47	20:16	20:44	14	06:34 (09)		
2	07:44	08:05 (10)	07:31		06:56	07:29 (12)	07:08	06:25		05:59		06:20 (09)		
	17:11	19	08:24 (10)	17:44	18:16	58	08:27 (12)	19:48	20:17	20:44	15	06:35 (09)		
3	07:44	08:05 (10)	07:30		06:55	07:27 (12)	07:06	06:24		05:59		06:19 (09)		
	17:12	19	08:24 (10)	17:46	18:17	59	08:26 (12)	19:49	20:18	20:45	16	06:35 (09)		
4	07:44	08:05 (10)	07:29		06:53	07:27 (12)	07:05	06:23		05:58		06:19 (09)		
	17:13	19	08:24 (10)	17:47	18:18	60	08:27 (12)	19:49	20:19	20:46	16	06:35 (09)		
5	07:44	08:06 (10)	07:28		06:52	07:26 (12)	07:03	06:21		05:58		06:19 (09)		
	17:14	18	08:24 (10)	17:48	18:19	61	08:27 (12)	19:50	20:20	20:46	17	06:36 (09)		
6	07:44	08:07 (10)	07:27		06:50	07:26 (12)	07:02	06:20		05:58		06:19 (09)		
	17:15	17	08:24 (10)	17:49	18:20	61	08:27 (12)	19:51	20:21	20:47	18	06:37 (09)		
7	07:44	08:08 (10)	07:26		06:49	07:25 (12)	07:00	06:19		05:57		06:18 (09)		
	17:16	16	08:24 (10)	17:50	18:21	62	08:27 (12)	19:52	20:22	20:48	18	06:36 (09)		
8	07:44	08:10 (10)	07:25		06:47	07:26 (12)	06:59	06:18		05:57		06:18 (09)		
	17:17	13	08:23 (10)	17:51	18:22	61	08:27 (12)	19:53	20:23	20:48	19	06:37 (09)		
9	07:44	08:11 (10)	07:24		06:46	07:25 (12)	06:57	06:17		05:57		06:18 (09)		
	17:18	12	08:23 (10)	17:53	18:24	61	08:26 (12)	19:54	20:24	20:49	20	06:38 (09)		
10	07:43	08:12 (10)	07:23		06:44	07:25 (12)	06:56	06:16		05:57		06:18 (09)		
	17:19	9	08:21 (10)	17:54	18:25	61	08:26 (12)	19:55	20:25	20:49	20	06:38 (09)		
11	07:43	08:15 (10)	07:21		06:43	07:25 (12)	06:54	06:15		05:57		06:18 (09)		
	17:20	4	08:19 (10)	17:55	18:26	60	08:25 (12)	19:56	20:26	20:50	20	06:38 (09)		
12	07:43		07:20		06:41	07:25 (12)	06:53	06:14		05:56		06:18 (09)		
	17:21		17:56		18:27	60	08:25 (12)	19:57	20:27	20:50	21	06:39 (09)		
13	07:43		07:19		06:40	07:25 (12)	06:51	06:13		05:56		06:18 (09)		
	17:22		17:57		18:28	59	08:24 (12)	19:58	20:28	20:51	21	06:39 (09)		
14	07:43		07:18		06:38	07:25 (12)	06:50	06:12		05:56		06:18 (09)		
	17:23		17:58		18:29	58	08:23 (12)	19:59	20:29	20:51	21	06:39 (09)		
15	07:42		07:17		06:37	07:26 (12)	06:48	06:11		05:56		06:18 (09)		
	17:24		17:59		18:30	56	08:22 (12)	20:00	20:29	20:52	22	06:40 (09)		
16	07:42		07:15	07:58 (12)	06:35	07:25 (12)	06:47	06:10		05:56		06:18 (09)		
	17:25		18:01	2	08:00 (12)	18:31	08:21 (12)	20:01	20:30	20:52	22	06:40 (09)		
17	07:41		07:14		06:33	07:26 (12)	06:45	06:09		05:56		06:18 (09)		
	17:26		18:02	18	08:08 (12)	18:32	08:20 (12)	20:02	20:31	20:52	22	06:40 (09)		
18	07:41		07:13		06:32	07:27 (12)	06:44	06:08		05:56		06:18 (09)		
	17:27		18:03	26	08:12 (12)	18:33	08:19 (12)	20:03	20:32	20:53	22	06:40 (09)		
19	07:41		07:12		06:30	07:27 (12)	06:42	06:07		05:57		06:18 (09)		
	17:28		18:04	31	08:14 (12)	18:34	08:17 (12)	20:04	20:33	20:53	22	06:40 (09)		
20	07:40		07:10		06:29	07:41 (12)	06:41	06:07		05:57		06:18 (09)		
	17:29		18:05	36	08:17 (12)	18:35	08:16 (12)	20:05	20:34	20:53	22	06:40 (09)		
21	07:40		07:09		06:27	07:39 (12)	06:39	06:06		05:57		06:19 (09)		
	17:30		18:06	40	08:19 (12)	18:36	08:14 (12)	20:06	20:35	20:53	22	06:41 (09)		
22	07:39		07:08		06:26	07:37 (12)	06:38	06:05		05:57		06:19 (09)		
	17:32		18:07	43	08:20 (12)	18:37	08:13 (12)	20:07	20:36	20:54	22	06:41 (09)		
23	07:38		07:06		06:24	07:36 (12)	06:37	06:04		05:57		06:19 (09)		
	17:33		18:09	46	08:22 (12)	18:38	08:10 (12)	20:08	20:37	20:54	22	06:41 (09)		
24	07:38		07:05		06:22	07:35 (12)	06:35	06:04		05:58		06:19 (09)		
	17:34		18:10	48	08:23 (12)	18:39	08:08 (12)	20:09	20:37	20:54	22	06:41 (09)		
25	07:37		07:04		06:21	07:33 (12)	06:34	06:03	06:23 (09)	05:58		06:20 (09)		
	17:35		18:11	51	08:24 (12)	18:40	08:06 (12)	20:10	20:38	1	06:24 (09)	20:54	22	06:42 (09)
26	07:36		07:02		06:19	07:32 (12)	06:33	06:02	06:23 (09)	05:58		06:20 (09)		
	17:36		18:12	53	08:25 (12)	18:41	08:02 (12)	20:11	20:39	4	06:27 (09)	20:54	22	06:42 (09)
27	07:36		07:01		06:18	07:31 (12)	06:31	06:02	06:22 (09)	05:59		06:20 (09)		
	17:37		18:13	54	08:25 (12)	18:42	07:58 (12)	20:12	20:40	6	06:28 (09)	20:54	22	06:42 (09)
28	07:35		06:59		06:16	07:30 (12)	06:30	06:01	06:22 (09)	05:59		06:21 (09)		
	17:38		18:14	56	08:26 (12)	18:43		20:13	20:41	8	06:30 (09)	20:54	22	06:43 (09)
29	07:34				07:14		06:29	06:01	06:21 (09)	05:59		06:21 (09)		
	17:40				19:44		20:14	20:41	10	06:31 (09)	20:54	21	06:42 (09)	
30	07:33				07:13		06:27	06:00	06:21 (09)	06:00		06:22 (09)		
	17:41				19:45		20:15	20:42	11	06:32 (09)	20:54	21	06:43 (09)	
31	07:32				07:11			06:00	06:20 (09)					
	17:42				19:46			20:43	12	06:32 (09)				
Potential sun hours	302		300		370		396	444		447				
Total, worst case		164		504		1390			52			606		
Sun reduction		0,45		0,47		0,49			0,59			0,66		
Oper. time red.		0,68		0,68		0,68			0,68			0,68		
Wind dir. red.		0,73		0,75		0,75			0,63			0,63		
Total reduction		0,23		0,24		0,25			0,25			0,28		
Total, real		37		121		350			13			172		

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

Shadow receptor: rec04 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (4)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July	August	September	October	November	December				
1	06:00	06:22 (09)	06:23	06:51	07:19	08:04 (12)	06:50	07:23	07:58 (10)	
	20:54	21 06:43 (09)	20:37	19:56	19:08	59 09:03 (12)	17:24	17:01	3 08:01 (10)	
2	06:01	06:22 (09)	06:24	06:52	07:20	08:03 (12)	06:52	07:24	07:55 (10)	
	20:54	20 06:42 (09)	20:36	19:54	19:06	61 09:04 (12)	17:22	17:01	9 08:04 (10)	
3	06:01	06:23 (09)	06:24	06:53	07:21	08:03 (12)	06:53	07:25	07:54 (10)	
	20:54	20 06:43 (09)	20:35	19:53	19:05	61 09:04 (12)	17:21	17:01	12 08:06 (10)	
4	06:02	06:23 (09)	06:25	06:54	07:22	08:03 (12)	06:54	07:26	07:54 (10)	
	20:54	19 06:42 (09)	20:34	19:51	19:03	61 09:04 (12)	17:20	17:00	13 08:07 (10)	
5	06:02	06:24 (09)	06:26	06:55	07:23	08:02 (12)	06:55	07:27	07:53 (10)	
	20:54	19 06:43 (09)	20:32	19:50	19:01	61 09:03 (12)	17:19	17:00	15 08:08 (10)	
6	06:03	06:25 (09)	06:27	06:56	07:23	08:02 (12)	06:56	07:28	07:53 (10)	
	20:53	18 06:43 (09)	20:31	19:48	19:00	61 09:03 (12)	17:18	17:00	17 08:10 (10)	
7	06:03	06:25 (09)	06:28	06:57	07:24	08:02 (12)	06:57	07:29	07:53 (10)	
	20:53	17 06:42 (09)	20:30	19:47	18:58	61 09:03 (12)	17:17	17:00	18 08:11 (10)	
8	06:04	06:26 (09)	06:29	06:58	07:25	08:02 (12)	06:58	07:30	07:53 (10)	
	20:53	17 06:43 (09)	20:29	19:45	18:57	60 09:02 (12)	17:16	17:00	19 08:12 (10)	
9	06:05	06:26 (09)	06:30	06:58	07:26	08:02 (12)	06:59	07:31	07:54 (10)	
	20:53	16 06:42 (09)	20:28	19:43	18:55	60 09:02 (12)	17:15	17:00	19 08:13 (10)	
10	06:05	06:27 (09)	06:31	06:59	07:27	08:02 (12)	07:01	07:32	07:55 (10)	
	20:52	15 06:42 (09)	20:27	19:42	18:54	59 09:01 (12)	17:14	17:00	19 08:14 (10)	
11	06:06	06:28 (09)	06:32	07:00	07:28	08:02 (12)	07:02	07:33	07:55 (10)	
	20:52	14 06:42 (09)	20:25	19:40	18:52	59 09:01 (12)	17:13	17:00	18 08:13 (10)	
12	06:06	06:28 (09)	06:33	07:01	07:29	08:02 (12)	07:03	07:33	07:56 (10)	
	20:51	13 06:41 (09)	20:24	19:38	18:51	58 09:00 (12)	17:12	17:00	18 08:14 (10)	
13	06:07	06:29 (09)	06:34	07:02	07:30	08:03 (12)	07:04	07:34	07:57 (10)	
	20:51	12 06:41 (09)	20:23	19:37	18:49	56 08:59 (12)	17:11	17:01	18 08:15 (10)	
14	06:08	06:30 (09)	06:35	07:03	07:31	08:03 (12)	07:05	07:35	07:58 (10)	
	20:50	11 06:41 (09)	20:22	19:35	18:48	55 08:58 (12)	17:10	17:01	18 08:16 (10)	
15	06:09	06:30 (09)	06:35	07:04	07:32	08:04 (12)	07:06	07:36	07:58 (10)	
	20:50	9 06:39 (09)	20:20	19:34	18:46	53 08:57 (12)	17:10	17:01	18 08:16 (10)	
16	06:09	06:31 (09)	06:36	07:05	07:33	08:04 (12)	07:07	07:36	07:59 (10)	
	20:49	7 06:38 (09)	20:19	19:32	16 08:46 (12)	18:45	52 08:56 (12)	17:09	17:01	18 08:17 (10)
17	06:10	06:32 (09)	06:37	07:06	07:34	08:05 (12)	07:08	07:37	08:00 (10)	
	20:49	5 06:37 (09)	20:18	19:30	24 08:50 (12)	18:43	50 08:55 (12)	17:08	17:02	18 08:18 (10)
18	06:11	06:33 (09)	06:38	07:07	07:35	08:06 (12)	07:09	07:38	08:00 (10)	
	20:48	3 06:36 (09)	20:16	19:29	29 08:52 (12)	18:42	47 08:53 (12)	17:07	17:02	18 08:18 (10)
19	06:12	06:39	07:08	07:08	07:37	08:07 (12)	07:11	07:38	08:01 (10)	
	20:48	20:15	19:27	34 08:54 (12)	18:40	45 08:52 (12)	17:07	17:02	18 08:19 (10)	
20	06:12	06:40	07:08	07:08	07:38	08:09 (12)	07:12	07:39	08:01 (10)	
	20:47	20:14	19:26	38 08:56 (12)	18:39	42 08:51 (12)	17:06	17:03	18 08:19 (10)	
21	06:13	06:41	07:09	07:09	07:39	08:10 (12)	07:13	07:39	08:02 (10)	
	20:46	20:12	19:24	42 08:58 (12)	18:38	39 08:49 (12)	17:05	17:03	18 08:20 (10)	
22	06:14	06:42	07:10	07:10	07:40	08:12 (12)	07:14	07:40	08:02 (10)	
	20:45	20:11	19:22	45 08:59 (12)	18:36	35 08:47 (12)	17:05	17:04	18 08:20 (10)	
23	06:15	06:43	07:11	07:11	07:41	08:14 (12)	07:15	07:40	08:03 (10)	
	20:45	20:09	19:21	47 09:00 (12)	18:35	30 08:44 (12)	17:04	17:04	18 08:21 (10)	
24	06:16	06:44	07:12	07:12	07:42	08:17 (12)	07:16	07:41	08:03 (10)	
	20:44	20:08	19:19	50 09:01 (12)	18:34	24 08:41 (12)	17:04	17:05	18 08:21 (10)	
25	06:17	06:45	07:13	07:13	07:43	07:21 (12)	07:17	07:41	08:04 (10)	
	20:43	20:06	19:17	52 09:02 (12)	17:32	16 07:37 (12)	17:03	17:05	18 08:22 (10)	
26	06:17	06:46	07:14	07:14	07:44	08:08 (12)	07:18	07:42	08:04 (10)	
	20:42	20:05	19:16	54 09:02 (12)	17:31	17:03	17:06	17:06	18 08:22 (10)	
27	06:18	06:47	07:15	07:15	07:45	08:07 (12)	07:19	07:42	08:04 (10)	
	20:41	20:03	19:14	55 09:02 (12)	17:30	17:02	17:07	17:07	18 08:22 (10)	
28	06:19	06:47	07:16	07:16	07:46	08:06 (12)	07:20	07:42	08:04 (10)	
	20:41	20:02	19:13	57 09:03 (12)	17:28	17:02	17:07	17:07	18 08:22 (10)	
29	06:20	06:48	07:17	07:17	07:47	08:05 (12)	07:21	07:43	08:05 (10)	
	20:40	20:00	19:11	58 09:03 (12)	17:27	17:02	17:08	17:08	18 08:23 (10)	
30	06:21	06:49	07:18	07:18	07:48	08:05 (12)	07:22	07:43	08:05 (10)	
	20:39	19:59	19:09	58 09:03 (12)	17:26	17:01	17:09	17:09	18 08:23 (10)	
31	06:22	06:50	07:19	07:19	07:49	08:06 (12)	07:23	07:43	08:05 (10)	
	20:38	19:57	19:06	57 09:04 (12)	17:25	17:02	17:09	17:09	18 08:23 (10)	
Potential sun hours	454	425	374	347	302	293				
Total, worst case	256		659		1265			522		
Sun reduction	0,74		0,65		0,54			0,45		
Oper. time red.	0,68		0,68		0,68			0,68		
Wind dir. red.	0,63		0,75		0,75			0,73		
Total reduction	0,32		0,33		0,28			0,23		
Total, real	81		218		352			118		

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

Shadow receptor: rec05 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January		February		March		April	May	June
1	07:43	08:05 (13)	07:32	07:51 (13)	06:58		07:10	06:26	05:59
	17:10	10 08:15 (13)	17:43	47 08:38 (13)	18:15		19:47	20:16	20:44
2	07:44	08:05 (13)	07:31	07:50 (13)	06:56		07:08	06:25	05:59
	17:11	11 08:16 (13)	17:44	48 08:38 (13)	18:16		19:48	20:17	20:44
3	07:44	08:05 (13)	07:30	07:49 (13)	06:55		07:06	06:24	05:58
	17:12	12 08:17 (13)	17:45	49 08:38 (13)	18:17		19:49	20:18	20:45
4	07:44	08:05 (13)	07:29	07:49 (13)	06:53		07:12 (09)	07:05	06:23
	17:13	13 08:18 (13)	17:47	49 08:38 (13)	18:18	1	07:13 (09)	19:50	20:19
5	07:44	08:05 (13)	07:28	07:49 (13)	06:52		07:10 (09)	07:03	06:21
	17:14	15 08:20 (13)	17:48	48 08:37 (13)	18:19	5	07:15 (09)	19:50	20:20
6	07:44	08:05 (13)	07:27	07:50 (13)	06:50		07:09 (09)	07:02	06:20
	17:15	16 08:21 (13)	17:49	47 08:37 (13)	18:20	7	07:16 (09)	19:51	20:21
7	07:44	08:05 (13)	07:26	07:51 (13)	06:49		07:07 (09)	07:00	06:19
	17:16	17 08:22 (13)	17:50	45 08:36 (13)	18:21	10	07:17 (09)	19:52	20:22
8	07:44	08:05 (13)	07:25	07:51 (13)	06:47		07:06 (09)	06:59	06:18
	17:17	18 08:23 (13)	17:51	45 08:36 (13)	18:22	12	07:18 (09)	19:53	20:23
9	07:44	08:05 (13)	07:24	07:52 (13)	06:46		07:04 (09)	06:57	06:17
	17:18	19 08:24 (13)	17:53	43 08:35 (13)	18:24	14	07:18 (09)	19:54	20:24
10	07:43	08:04 (13)	07:23	07:53 (13)	06:44		07:03 (09)	06:56	06:16
	17:19	21 08:25 (13)	17:54	42 08:35 (13)	18:25	16	07:19 (09)	19:55	20:25
11	07:43	08:04 (13)	07:21	07:54 (13)	06:43		07:01 (09)	06:54	06:15
	17:20	22 08:26 (13)	17:55	39 08:33 (13)	18:26	17	07:18 (09)	19:56	20:26
12	07:43	08:04 (13)	07:20	07:55 (13)	06:41		07:00 (09)	06:53	06:14
	17:21	23 08:27 (13)	17:56	37 08:32 (13)	18:27	19	07:19 (09)	19:57	20:27
13	07:43	08:04 (13)	07:19	07:56 (13)	06:40		06:58 (09)	06:51	06:13
	17:22	24 08:28 (13)	17:57	35 08:31 (13)	18:28	20	07:18 (09)	19:58	20:28
14	07:43	08:03 (13)	07:18	07:58 (13)	06:38		06:56 (09)	06:50	06:12
	17:23	26 08:29 (13)	17:58	31 08:29 (13)	18:29	21	07:17 (09)	19:59	20:29
15	07:42	08:03 (13)	07:17	08:00 (13)	06:37		06:55 (09)	06:48	06:11
	17:24	27 08:30 (13)	17:59	27 08:27 (13)	18:30	22	07:17 (09)	20:00	20:29
16	07:42	08:02 (13)	07:16	08:02 (13)	06:35		06:53 (09)	06:47	06:10
	17:25	28 08:30 (13)	18:01	22 08:24 (13)	18:31	23	07:16 (09)	20:01	20:30
17	07:41	08:02 (13)	07:14	08:06 (13)	06:33		06:52 (09)	06:45	06:09
	17:26	30 08:32 (13)	18:02	15 08:21 (13)	18:32	23	07:15 (09)	20:02	20:31
18	07:41	08:01 (13)	07:13		06:32		06:50 (09)	06:44	06:08
	17:27	31 08:32 (13)	18:03		18:33	24	07:14 (09)	20:03	20:32
19	07:41	08:01 (13)	07:12		06:30		06:49 (09)	06:42	06:07
	17:28	32 08:33 (13)	18:04		18:34	23	07:12 (09)	20:04	20:33
20	07:40	08:00 (13)	07:10		06:29		06:51 (09)	06:41	06:07
	17:29	33 08:33 (13)	18:05		18:35	19	07:10 (09)	20:05	20:34
21	07:40	08:00 (13)	07:09		06:27		06:52 (09)	06:39	06:06
	17:30	35 08:35 (13)	18:06		18:36	15	07:07 (09)	20:06	20:35
22	07:39	07:59 (13)	07:08		06:26		06:57 (09)	06:38	06:05
	17:32	36 08:35 (13)	18:07		18:37	6	07:03 (09)	20:07	20:36
23	07:38	07:58 (13)	07:06		06:24		06:37	06:04	06:07
	17:33	37 08:35 (13)	18:08		18:38	23	07:12 (09)	20:08	20:37
24	07:38	07:58 (13)	07:05		06:22		06:35	06:04	06:05
	17:34	38 08:36 (13)	18:10		18:39		20:09	20:37	20:54
25	07:37	07:57 (13)	07:04		06:21		06:34	06:03	06:03
	17:35	39 08:36 (13)	18:11		18:40		20:10	20:38	20:54
26	07:36	07:56 (13)	07:02		06:19		06:33	06:02	06:02
	17:36	41 08:37 (13)	18:12		18:41		20:11	20:39	20:54
27	07:36	07:55 (13)	07:01		06:18		06:31	06:02	06:02
	17:37	42 08:37 (13)	18:13		18:42		20:12	20:40	20:54
28	07:35	07:55 (13)	06:59		06:16		06:30	06:01	06:01
	17:38	43 08:38 (13)	18:14		18:43		20:13	20:41	20:54
29	07:34	07:54 (13)			07:14		06:29	06:01	06:01
	17:40	44 08:38 (13)			19:44		20:14	20:41	20:54
30	07:33	07:53 (13)			07:13		06:27	06:00	06:00
	17:41	45 08:38 (13)			19:45		20:15	20:42	20:54
31	07:33	07:52 (13)			07:11			06:00	
	17:42	46 08:38 (13)			19:46			20:43	
Potential sun hours	302		300		370		396	444	447
Total, worst case	874		669		297				
Sun reduction	0,45		0,47		0,49				
Oper. time red.	0,68		0,68		0,68				
Wind dir. red.	0,75		0,75		0,75				
Total reduction	0,23		0,24		0,25				
Total, real	200		160		74				

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

Shadow receptor: rec05 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July	August	September	October	November	December
1	06:00	06:23	06:51	07:19	07:38 (09)	07:23
	20:54	20:37	19:56	19:08	19	08:08 (13)
2	06:01	06:24	06:52	07:20	07:39 (09)	07:24
	20:54	20:36	19:54	19:06	18	08:08 (13)
3	06:01	06:24	06:53	07:21	07:40 (09)	07:25
	20:54	20:35	19:53	19:05	16	08:07 (13)
4	06:02	06:25	06:54	07:22	07:41 (09)	07:26
	20:54	20:34	19:51	19:03	15	08:07 (13)
5	06:02	06:26	06:55	07:23	07:42 (09)	07:27
	20:54	20:32	19:50	19:01	13	08:07 (13)
6	06:03	06:27	06:56	07:24	07:43 (09)	07:28
	20:53	20:31	19:48	19:00	11	08:07 (13)
7	06:03	06:28	06:57	07:24	07:44 (09)	07:29
	20:53	20:30	19:47	18:58	9	08:07 (13)
8	06:04	06:29	06:58	07:25	07:45 (09)	07:30
	20:53	20:29	19:45	18:57	6	08:07 (13)
9	06:05	06:30	06:58	07:26	07:46 (09)	07:31
	20:53	20:28	19:43	18:55	3	08:06 (13)
10	06:05	06:31	06:59	07:27	07:01	07:32
	20:52	20:27	19:42	18:54	47	08:06 (13)
11	06:06	06:32	07:00	07:28	07:02	07:33
	20:52	20:25	19:40	18:52	46	08:05 (13)
12	06:06	06:33	07:01	07:29	07:03	07:33
	20:51	20:24	19:39	18:51	45	08:05 (13)
13	06:07	06:34	07:02	07:30	07:04	07:34
	20:51	20:23	19:37	18:49	44	08:06 (13)
14	06:08	06:35	07:03	07:31	07:05	07:35
	20:50	20:22	19:35	18:48	43	08:06 (13)
15	06:09	06:35	07:04	07:32	07:06	07:36
	20:50	20:20	19:34	18:46	42	08:05 (13)
16	06:09	06:36	07:05	07:33	07:07	07:36
	20:49	20:19	19:32	18:45	41	08:05 (13)
17	06:10	06:37	07:06	07:34	07:08	07:37
	20:49	20:18	19:30	18:43	39	08:06 (13)
18	06:11	06:38	07:07	07:35	07:09	07:38
	20:48	20:16	19:29	18:42	38	08:05 (13)
19	06:12	06:39	07:08	07:37	07:11	07:38
	20:48	20:15	19:27	18:40	37	08:06 (13)
20	06:12	06:40	07:08	07:38	07:12	07:39
	20:47	20:14	19:26	18:39	36	08:06 (13)
21	06:13	06:41	07:09	07:39	07:13	07:39
	20:46	20:12	19:24	18:38	35	08:06 (13)
22	06:14	06:42	07:10	07:40	07:14	07:40
	20:45	20:11	19:22	18:36	33	08:06 (13)
23	06:15	06:43	07:11	07:41	07:15	07:40
	20:45	20:09	19:21	18:35	32	08:07 (13)
24	06:16	06:44	07:12	07:42	07:16	07:41
	20:44	20:08	19:19	18:34	6	08:08 (13)
25	06:17	06:45	07:13	06:43	07:17	07:41
	20:43	20:06	19:17	18:32	18	08:09 (13)
26	06:17	06:46	07:14	06:44	07:18	07:42
	20:42	20:05	19:16	17:31	24	08:09 (13)
27	06:18	06:47	07:15	06:45	07:19	07:42
	20:41	20:03	19:14	17:30	28	08:09 (13)
28	06:19	06:47	07:16	06:46	07:20	07:42
	20:41	20:02	19:13	17:28	31	08:09 (13)
29	06:20	06:48	07:17	06:47	07:21	07:43
	20:40	20:00	19:11	17:27	35	08:08 (13)
30	06:21	06:49	07:18	06:48	07:22	07:43
	20:39	19:59	19:09	17:26	38	08:08 (13)
31	06:22	06:50	07:19	06:49	07:23 (13)	07:43
	20:38	19:57	19:08	17:25	40	08:08 (13)
Potential sun hours	454	425	374	347	302	293
Total, worst case			184	330	1164	299
Sun reduction			0,65	0,54	0,50	0,45
Oper. time red.			0,68	0,68	0,68	0,68
Wind dir. red.			0,75	0,75	0,75	0,75
Total reduction			0,33	0,28	0,26	0,23
Total, real			60	91	297	68

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

Shadow receptor: rec06 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January		February		March		April		May		June			
1	07:43		08:10 (12)	07:32		06:58		07:10		07:28 (09)	06:26	05:59		
	17:11	37	08:47 (12)	17:43		18:15		19:47	11	07:39 (09)	20:16	20:44		
2	07:44		08:11 (12)	07:31		06:56		07:08		07:26 (09)	06:25	05:59		
	17:11	37	08:48 (12)	17:44		18:16		19:48	13	07:39 (09)	20:17	20:44		
3	07:44		08:11 (12)	07:30		06:55		07:06		07:25 (09)	06:24	05:59		
	17:12	37	08:48 (12)	17:46		18:17		19:49	15	07:40 (09)	20:18	20:45		
4	07:44		08:12 (12)	07:29		06:53		07:05		07:23 (09)	06:23	05:58		
	17:13	36	08:48 (12)	17:47		18:18		19:50	16	07:39 (09)	20:19	20:46		
5	07:44		08:12 (12)	07:28		06:52		07:03		07:21 (09)	06:21	05:58		
	17:14	37	08:49 (12)	17:48		18:19		19:50	18	07:39 (09)	20:20	20:46		
6	07:44		08:13 (12)	07:27		06:50		07:02		07:20 (09)	06:20	05:58		
	17:15	36	08:49 (12)	17:49		18:20		19:51	19	07:39 (09)	20:21	20:47		
7	07:44		08:13 (12)	07:26		06:49		07:07 (13)		07:18 (09)	06:19	05:57		
	17:16	36	08:49 (12)	17:50		18:21	9	07:16 (13)	19:52	20	07:38 (09)	20:22	20:48	
8	07:44		08:14 (12)	07:25		06:47		07:06 (13)		06:59		06:18	05:57	
	17:17	36	08:50 (12)	17:51		18:22	15	07:21 (13)	19:53	21	07:38 (09)	20:23	20:48	
9	07:44		08:15 (12)	07:24		06:46		07:04 (13)		06:57		07:15 (09)	06:17	05:57
	17:18	35	08:50 (12)	17:53		18:24	18	07:22 (13)	19:54	22	07:37 (09)	20:24	20:49	
10	07:44		08:15 (12)	07:23		06:44		07:03 (13)		06:56		07:14 (09)	06:16	05:57
	17:19	35	08:50 (12)	17:54		18:25	22	07:25 (13)	19:55	22	07:36 (09)	20:25	20:49	
11	07:43		08:16 (12)	07:21		06:43		07:01 (13)		06:54		07:15 (09)	06:15	05:57
	17:20	34	08:50 (12)	17:55		18:26	24	07:25 (13)	19:56	19	07:34 (09)	20:26	20:50	
12	07:43		08:17 (12)	07:20		06:41		07:00 (13)		06:53		07:16 (09)	06:14	05:56
	17:21	33	08:50 (12)	17:56		18:27	27	07:27 (13)	19:57	17	07:33 (09)	20:27	20:50	
13	07:43		08:18 (12)	07:19		06:40		06:58 (13)		06:51		07:18 (09)	06:13	05:56
	17:22	33	08:51 (12)	17:57		18:28	29	07:27 (13)	19:58	12	07:30 (09)	20:28	20:51	
14	07:43		08:18 (12)	07:18		06:38		06:56 (13)		06:50		07:22 (09)	06:12	05:56
	17:23	32	08:50 (12)	17:58		18:29	31	07:27 (13)	19:59	4	07:26 (09)	20:29	20:51	
15	07:42		08:19 (12)	07:17		06:37		06:55 (13)		06:48		06:11	05:56	
	17:24	31	08:50 (12)	18:00		18:30	33	07:28 (13)	20:00		20:29	20:52		
16	07:42		08:19 (12)	07:16		06:35		06:53 (13)		06:47		06:10	05:56	
	17:25	31	08:50 (12)	18:01		18:31	35	07:28 (13)	20:01		20:30	20:52		
17	07:41		08:21 (12)	07:14		06:33		06:52 (13)		06:45		06:09	05:56	
	17:26	29	08:50 (12)	18:02		18:32	36	07:28 (13)	20:02		20:31	20:52		
18	07:41		08:21 (12)	07:13		06:32		06:50 (13)		06:44		06:08	05:56	
	17:27	28	08:49 (12)	18:03		18:33	38	07:28 (13)	20:03		20:32	20:53		
19	07:41		08:23 (12)	07:12		06:30		06:48 (13)		06:42		06:07	05:57	
	17:28	26	08:49 (12)	18:04		18:34	39	07:27 (13)	20:04		20:33	20:53		
20	07:40		08:24 (12)	07:10		06:29		06:48 (13)		06:41		06:07	05:57	
	17:29	24	08:48 (12)	18:05		18:35	39	07:27 (13)	20:05		20:34	20:53		
21	07:40		08:26 (12)	07:09		06:27		06:48 (13)		06:39		06:06	05:57	
	17:30	21	08:47 (12)	18:06		18:36	38	07:26 (13)	20:06		20:35	20:53		
22	07:39		08:27 (12)	07:08		06:26		06:48 (13)		06:38		06:05	05:57	
	17:32	19	08:46 (12)	18:07		18:37	38	07:26 (13)	20:07		20:36	20:54		
23	07:38		08:29 (12)	07:06		06:24		06:48 (13)		06:37		06:04	05:57	
	17:33	15	08:44 (12)	18:09		18:38	37	07:25 (13)	20:08		20:37	20:54		
24	07:38		08:33 (12)	07:05		06:22		06:48 (13)		06:35		06:04	05:58	
	17:34	9	08:42 (12)	18:10		18:39	36	07:24 (13)	20:09		20:37	20:54		
25	07:37			07:04		06:21		06:49 (13)		06:34		06:03	05:58	
	17:35			18:11		18:40	34	07:23 (13)	20:10		20:38	20:54		
26	07:36			07:02		06:19		06:49 (13)		06:33		06:02	05:58	
	17:36			18:12		18:41	33	07:22 (13)	20:11		20:39	20:54		
27	07:36			07:01		06:18		06:51 (13)		06:31		06:02	05:59	
	17:37			18:13		18:42	30	07:21 (13)	20:12		20:40	20:54		
28	07:35			06:59		06:16		06:52 (13)		06:30		06:01	05:59	
	17:38			18:14		18:43	26	07:18 (13)	20:13		20:41	20:54		
29	07:34					07:14		07:32 (09)		06:29		06:01	05:59	
	17:40					19:44	25	08:16 (13)	20:14		20:41	20:54		
30	07:33					07:13		07:31 (09)		06:27		06:00	06:00	
	17:41					19:45	25	08:14 (13)	20:15		20:42	20:54		
31	07:33					07:11		07:29 (09)				06:00		
	17:42					19:46	20	08:09 (13)				20:43		
Potential sun hours	302		300	370			396		444		447			
Total, worst case		727				737			229					
Sun reduction		0,45				0,49			0,53					
Oper. time red.		0,68				0,68			0,68					
Wind dir. red.		0,73				0,74			0,72					
Total reduction		0,22				0,25			0,26					
Total, real		162				183			59					

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

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

SHADOW - Calendar

Shadow receptor: rec07 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	January		February		March		April		May		June						
1	07:43	08:05 (07)	07:32	08:16 (07)	06:58	07:19 (04)	07:10	07:28 (08)	06:26		05:59	06:20 (03)					
	17:10	30	08:35 (07)	17:43	14	08:30 (07)	18:15	4	07:23 (04)	19:46	95	18:52 (12)	20:16	20:44	20	06:40 (03)	
2	07:44	08:05 (07)	07:31	08:23 (07)	06:56	17:15 (12)	07:08	07:26 (08)	06:25		05:59	06:20 (03)					
	17:11	30	08:35 (07)	17:44	1	08:24 (07)	18:16	20	17:35 (12)	19:47	94	18:50 (12)	20:17	20:44	20	06:40 (03)	
3	07:44	08:05 (07)	07:30		06:55	17:10 (12)	07:06	07:24 (08)	06:24		05:58	06:19 (03)					
	17:12	31	08:36 (07)	17:45		18:17	29	17:39 (12)	19:48	94	18:49 (12)	20:18	20:45	20	06:39 (03)		
4	07:44	08:05 (07)	07:29		06:53	17:07 (12)	07:05	07:23 (08)	06:23		05:58	06:19 (03)					
	17:13	31	08:36 (07)	17:47		18:18	35	17:42 (12)	19:49	95	18:49 (12)	20:19	20:46	21	06:40 (03)		
5	07:44	08:05 (07)	07:28		06:52	17:04 (12)	07:03	07:21 (08)	06:21		05:58	06:19 (03)					
	17:14	32	08:37 (07)	17:48		18:19	40	17:44 (12)	19:50	94	18:47 (12)	20:20	20:46	21	06:40 (03)		
6	07:44	08:05 (07)	07:27		06:50	17:02 (12)	07:02	07:20 (08)	06:20		05:57	06:18 (03)					
	17:15	32	08:37 (07)	17:49		18:20	45	17:47 (12)	19:51	94	18:47 (12)	20:21	20:47	21	06:39 (03)		
7	07:44	08:05 (07)	07:26		06:49	16:59 (12)	07:00	07:18 (08)	06:19		05:57	06:18 (03)					
	17:16	33	08:38 (07)	17:50		18:21	49	17:48 (12)	19:52	92	18:45 (12)	20:22	20:48	22	06:40 (03)		
8	07:44	08:05 (07)	07:25		06:47	16:58 (12)	06:59	07:17 (08)	06:18		05:57	06:18 (03)					
	17:17	33	08:38 (07)	17:51		18:22	52	17:50 (12)	19:53	91	18:44 (12)	20:23	20:48	22	06:40 (03)		
9	07:44	08:05 (07)	07:24		06:46	16:56 (12)	06:57	07:15 (08)	06:17		05:57	06:18 (03)					
	17:18	34	08:39 (07)	17:53		18:23	55	17:51 (12)	19:54	88	18:42 (12)	20:24	20:49	22	06:40 (03)		
10	07:43	08:04 (07)	07:23		06:44	16:55 (12)	06:56	07:15 (08)	06:16		05:57	06:18 (03)					
	17:19	35	08:39 (07)	17:54		18:24	57	17:52 (12)	19:55	85	18:41 (12)	20:25	20:49	22	06:40 (03)		
11	07:43	08:04 (07)	07:21		06:43	16:53 (12)	06:54	07:15 (08)	06:15		05:57	06:18 (03)					
	17:20	35	08:39 (07)	17:55		18:26	60	17:53 (12)	19:56	81	18:39 (12)	20:26	20:50	22	06:40 (03)		
12	07:43	08:04 (07)	07:20		06:41	16:52 (12)	06:53	07:16 (08)	06:14		05:56	06:18 (03)					
	17:21	36	08:40 (07)	17:56		18:27	62	17:54 (12)	19:57	74	18:37 (12)	20:27	20:50	22	06:40 (03)		
13	07:43	08:03 (07)	07:19		06:40	16:51 (12)	06:51	07:16 (08)	06:13		05:56	06:19 (03)					
	17:22	37	08:40 (07)	17:57		18:28	63	17:54 (12)	19:58	68	18:34 (12)	20:28	20:51	21	06:40 (03)		
14	07:42	08:03 (07)	07:18		06:38	16:49 (12)	06:50	07:18 (08)	06:12		05:56	06:19 (03)					
	17:23	37	08:40 (07)	17:58		18:29	65	17:54 (12)	19:59	61	18:32 (12)	20:28	20:51	21	06:40 (03)		
15	07:42	08:03 (07)	07:17		06:37	16:49 (12)	06:48	07:19 (08)	06:11		05:56	06:20 (03)					
	17:24	38	08:41 (07)	17:59		18:30	67	17:56 (12)	20:00	52	18:29 (12)	20:29	20:52	20	06:40 (03)		
16	07:42	08:02 (07)	07:15		06:35	16:48 (12)	06:47	07:22 (08)	06:10		06:30 (03)	05:56	06:20 (03)				
	17:25	38	08:40 (07)	18:01		18:31	67	17:55 (12)	20:01	40	18:26 (12)	20:30	2	06:32 (03)	20:52	20	06:40 (03)
17	07:41	08:02 (07)	07:14		06:33	16:47 (12)	06:45	07:24 (08)	06:09		06:29 (03)	05:56	06:20 (03)				
	17:26	39	08:41 (07)	18:02		18:32	69	17:56 (12)	20:02	23	18:20 (12)	20:31	5	06:34 (03)	20:52	20	06:40 (03)
18	07:41	08:01 (07)	07:13		06:32	16:46 (12)	06:44	06:08	06:28 (03)	05:56	06:28 (03)	05:56	06:20 (03)				
	17:27	40	08:41 (07)	18:03	1	07:32 (04)	18:33	70	17:56 (12)	20:03	20:32	6	06:34 (03)	20:53	20	06:40 (03)	
19	07:41	08:01 (07)	07:12		06:30	16:45 (12)	06:42	06:07	06:27 (03)	05:57	06:27 (03)	05:57	06:20 (03)				
	17:28	40	08:41 (07)	18:04	2	07:32 (04)	18:34	71	17:56 (12)	20:04	20:33	8	06:35 (03)	20:53	20	06:40 (03)	
20	07:40	08:00 (07)	07:10		06:29	16:45 (12)	06:41	06:07	06:27 (03)	05:57	06:27 (03)	05:57	06:20 (03)				
	17:29	41	08:41 (07)	18:05	4	07:33 (04)	18:35	72	17:57 (12)	20:05	20:34	10	06:37 (03)	20:53	21	06:41 (03)	
21	07:39	08:01 (07)	07:09		06:27	16:44 (12)	06:39	06:06	06:26 (03)	05:57	06:26 (03)	05:57	06:20 (03)				
	17:30	40	08:41 (07)	18:06	6	07:34 (04)	18:36	72	17:56 (12)	20:06	20:35	11	06:37 (03)	20:53	21	06:41 (03)	
22	07:39	08:02 (07)	07:08		06:25	16:45 (12)	06:38	06:05	06:25 (03)	05:57	06:25 (03)	05:57	06:21 (03)				
	17:31	39	08:41 (07)	18:07	7	07:33 (04)	18:37	72	17:57 (12)	20:07	20:36	12	06:37 (03)	20:54	21	06:42 (03)	
23	07:38	08:02 (07)	07:06		06:24	16:42 (08)	06:37	06:04	06:25 (03)	05:57	06:24 (03)	05:57	06:21 (03)				
	17:33	38	08:40 (07)	18:08	8	07:33 (04)	18:38	77	17:56 (12)	20:08	20:36	13	06:38 (03)	20:54	20	06:41 (03)	
24	07:38	08:04 (07)	07:05		06:22	16:40 (08)	06:35	06:04	06:24 (03)	05:58	06:24 (03)	05:58	06:21 (03)				
	17:34	36	08:40 (07)	18:10	9	07:33 (04)	18:39	81	17:55 (12)	20:09	20:37	14	06:38 (03)	20:54	20	06:41 (03)	
25	07:37	08:04 (07)	07:04		06:21	16:39 (08)	06:34	06:03	06:23 (03)	05:58	06:23 (03)	05:58	06:22 (03)				
	17:35	36	08:40 (07)	18:11	10	07:32 (04)	18:40	84	17:56 (12)	20:10	20:38	15	06:38 (03)	20:54	20	06:42 (03)	
26	07:36	08:05 (07)	07:02		06:19	16:37 (08)	06:33	06:02	06:23 (03)	05:58	06:23 (03)	05:58	06:22 (03)				
	17:36	34	08:39 (07)	18:12	10	07:31 (04)	18:41	87	17:55 (12)	20:11	20:39	16	06:39 (03)	20:54	20	06:42 (03)	
27	07:36	08:06 (07)	07:01		06:18	16:36 (08)	06:31	06:02	06:22 (03)	05:58	06:22 (03)	05:58	06:22 (03)				
	17:37	32	08:38 (07)	18:13	10	07:29 (04)	18:42	89	17:55 (12)	20:12	20:40	17	06:39 (03)	20:54	20	06:42 (03)	
28	07:35	08:08 (07)	06:59		06:16	16:34 (08)	06:30	06:01	06:22 (03)	05:59	06:22 (03)	05:59	06:22 (03)				
	17:38	30	08:38 (07)	18:14	10	07:28 (04)	18:43	91	17:54 (12)	20:13	20:41	17	06:39 (03)	20:54	21	06:43 (03)	
29	07:34	08:10 (07)			07:14	16:32 (08)	06:29	06:01	06:21 (03)	05:59	06:21 (03)	05:59	06:22 (03)				
	17:40	26	08:36 (07)		19:44	18:53 (12)	20:14	20:41	18	06:39 (03)	20:54	21	06:43 (03)				
30	07:33	08:11 (07)			07:13	17:31 (08)	06:27	06:00	06:21 (03)	06:00	06:21 (03)	06:00	06:22 (03)				
	17:41	24	08:35 (07)		19:45	18:53 (12)	20:15	20:42	19	06:40 (03)	20:54	21	06:43 (03)				
31	07:32	08:13 (07)			07:11	17:29 (08)		06:00	06:20 (03)		06:20 (03)						
	17:42	20	08:33 (07)		19:46	18:52 (12)		20:43	19	06:39 (03)							
Potential sun hours	302		300		370		396		444		447		623				
Total, worst case	1057		92		1984		1321		202		623		623				
Sun reduction	0,45		0,47		0,49		0,53		0,59		0,66		0,66				
Oper. time red.	0,68		0,68		0,68		0,68		0,68		0,68		0,68				
Wind dir. red.	0,74		0,74		0,70		0,71		0,64		0,64		0,64				
Total reduction	0,23		0,24		0,23		0,25		0,26		0,29		0,29				
Total, real	240		22		464		336		52		180		180				

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

Shadow receptor: rec07 - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [CAGLIARI / ELMA S]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,40	5,05	5,88	7,00	8,45	9,88	10,82	10,03	8,08	6,09	5,07	4,27

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
256	208	689	535	505	386	386	226	160	374	1.034	1.183	5.942

	July		August		September		October		November		December	
1	06:00	06:22 (03)	06:23	06:51	07:14 (08)	07:19	17:30 (12)	06:50	07:23	07:46 (07)		
	20:54	22 06:44 (03)	20:37	19:56	81 18:38 (12)	19:08	63 18:33 (12)	17:23	17:01	35 08:21 (07)		
2	06:01	06:22 (03)	06:24	06:52	07:13 (08)	07:20	17:31 (12)	06:52	07:24	07:47 (07)		
	20:54	22 06:44 (03)	20:36	19:54	85 18:39 (12)	19:06	61 18:32 (12)	17:22	17:01	35 08:22 (07)		
3	06:01	06:23 (03)	06:24	06:53	07:13 (08)	07:21	17:32 (12)	06:53	07:25	07:48 (07)		
	20:54	22 06:45 (03)	20:35	19:53	88 18:40 (12)	19:05	58 18:30 (12)	17:21	17:01	34 08:22 (07)		
4	06:02	06:23 (03)	06:25	06:54	07:14 (08)	07:22	17:33 (12)	06:54	07:26	07:49 (07)		
	20:54	22 06:45 (03)	20:33	19:51	91 18:41 (12)	19:03	56 18:29 (12)	17:20	17:00	33 08:22 (07)		
5	06:02	06:24 (03)	06:26	06:55	07:15 (08)	07:22	17:34 (12)	06:55	07:27	07:50 (07)		
	20:54	22 06:46 (03)	20:32	19:50	92 18:42 (12)	19:01	53 18:27 (12)	17:19	17:00	33 08:23 (07)		
6	06:03	06:24 (03)	06:27	06:56	07:16 (08)	07:23	17:35 (12)	06:56	07:28	07:51 (07)		
	20:53	21 06:45 (03)	20:31	19:48	93 18:43 (12)	19:00	50 18:25 (12)	17:18	17:00	32 08:23 (07)		
7	06:03	06:25 (03)	06:28	06:57	07:16 (08)	07:24	17:37 (12)	06:57	07:29	07:52 (07)		
	20:53	21 06:46 (03)	20:30	19:46	94 18:42 (12)	18:58	46 18:23 (12)	17:17	17:00	32 08:24 (07)		
8	06:04	06:26 (03)	06:29	06:57	07:17 (08)	07:25	17:38 (12)	06:58	07:30	07:53 (07)		
	20:53	21 06:47 (03)	20:29	19:45	95 18:43 (12)	18:57	43 18:21 (12)	17:16	17:00	31 08:24 (07)		
9	06:04	06:26 (03)	06:30	06:58	07:18 (08)	07:26	17:40 (12)	06:59	07:31	07:54 (07)		
	20:52	21 06:47 (03)	20:28	19:43	95 18:43 (12)	18:55	38 18:18 (12)	17:15	4 07:56 (07)	17:00	31 08:25 (07)	
10	06:05	06:27 (03)	06:31	06:59	07:19 (08)	07:27	17:43 (12)	07:00	07:32	07:54 (07)		
	20:52	20 06:47 (03)	20:27	19:42	95 18:44 (12)	18:54	32 18:15 (12)	17:14	14 08:01 (07)	17:00	30 08:24 (07)	
11	06:06	06:28 (03)	06:32	07:00	07:20 (08)	07:28	17:46 (12)	07:02	07:33	07:55 (07)		
	20:52	20 06:48 (03)	20:25	19:40	95 18:44 (12)	18:52	25 18:11 (12)	17:13	20 08:04 (07)	17:00	30 08:25 (07)	
12	06:06	06:28 (03)	06:33	07:01	07:21 (08)	07:29	17:51 (12)	07:03	07:34	07:56 (07)		
	20:51	19 06:47 (03)	20:24	19:38	94 18:44 (12)	18:51	15 18:06 (12)	17:12	24 08:06 (07)	17:00	29 08:25 (07)	
13	06:07	06:29 (03)	06:34	07:02	07:22 (08)	07:30	17:50 (12)	07:04	07:34	07:57 (07)		
	20:51	19 06:48 (03)	20:23	19:37	93 18:44 (12)	18:49	9 07:59 (04)	17:11	27 08:08 (07)	17:01	29 08:26 (07)	
14	06:08	06:30 (03)	06:35	07:03	07:23 (08)	07:31	17:52 (12)	07:05	07:35	07:58 (07)		
	20:50	18 06:48 (03)	20:22	19:35	92 18:44 (12)	18:48	10 08:01 (04)	17:10	30 08:10 (07)	17:01	29 08:27 (07)	
15	06:09	06:30 (03)	06:35	07:04	07:23 (08)	07:32	17:52 (12)	07:06	07:36	07:58 (07)		
	20:50	18 06:48 (03)	20:20	19:34	90 18:43 (12)	18:46	10 08:02 (04)	17:10	32 08:11 (07)	17:01	28 08:26 (07)	
16	06:09	06:31 (03)	06:36	07:05	07:24 (08)	07:33	17:53 (12)	07:07	07:36	07:59 (07)		
	20:49	17 06:48 (03)	20:19	19:32	89 18:43 (12)	18:45	10 08:03 (04)	17:09	34 08:12 (07)	17:01	28 08:27 (07)	
17	06:10	06:32 (03)	06:37	07:06	07:25 (08)	07:34	17:54 (12)	07:08	07:37	08:00 (07)		
	20:49	16 06:48 (03)	20:18	19:30	87 18:43 (12)	18:43	10 08:04 (04)	17:08	36 08:13 (07)	17:02	28 08:28 (07)	
18	06:11	06:33 (03)	06:38	07:07	07:26 (08)	07:35	17:55 (12)	07:09	07:38	08:00 (07)		
	20:48	16 06:49 (03)	20:16	19:29	85 18:43 (12)	18:42	9 08:04 (04)	17:07	36 08:14 (07)	17:02	28 08:28 (07)	
19	06:12	06:33 (03)	06:39	07:07	07:27 (08)	07:36	17:56 (12)	07:11	07:37	08:01 (07)		
	20:48	15 06:48 (03)	20:15	19:27	82 18:43 (12)	18:40	8 08:04 (04)	17:07	38 08:15 (07)	17:02	27 08:28 (07)	
20	06:12	06:34 (03)	06:40	07:08	07:28 (08)	07:37	17:58 (12)	07:12	07:37	08:01 (07)		
	20:47	14 06:48 (03)	20:14	19:25	78 18:42 (12)	18:39	7 08:05 (04)	17:06	39 08:16 (07)	17:03	27 08:28 (07)	
21	06:13	06:35 (03)	06:41	07:09	07:29 (08)	07:39	17:59 (12)	07:13	07:36	08:02 (07)		
	20:46	13 06:48 (03)	20:12	19:24	73 18:42 (12)	18:38	5 08:04 (04)	17:05	40 08:16 (07)	17:03	27 08:29 (07)	
22	06:14	06:36 (03)	06:42	07:10	17:30 (12)	07:40	17:00 (04)	07:14	07:36	07:40		
	20:45	12 06:48 (03)	20:11	19:22	72 18:42 (12)	18:36	4 08:04 (04)	17:05	41 08:17 (07)	17:04	27 08:29 (07)	
23	06:15	06:36 (03)	06:43	07:11	17:30 (12)	07:41	08:01 (04)	07:15	07:37	07:40		
	20:45	10 06:46 (03)	20:09	19:21	71 18:41 (12)	18:35	2 08:03 (04)	17:04	40 08:17 (07)	17:04	27 08:30 (07)	
24	06:16	06:37 (03)	06:44	07:12	17:30 (12)	07:42		07:16	07:39	07:41		
	20:44	9 06:46 (03)	20:08	19:19	70 18:40 (12)	18:33		17:04	40 08:19 (07)	17:05	27 08:30 (07)	
25	06:16	06:38 (03)	06:45	07:13	17:29 (12)	06:43		07:17	07:40	07:41		
	20:43	7 06:45 (03)	20:06	19:17	70 18:39 (12)	17:32		17:03	39 08:19 (07)	17:05	28 08:31 (07)	
26	06:17	06:39 (03)	06:46	07:14	17:29 (12)	06:44		07:18	07:41	07:42		
	20:42	6 06:45 (03)	20:05	24 18:23 (12)	19:16	69 18:38 (12)	17:31	17:03	38 08:19 (07)	17:06	28 08:32 (07)	
27	06:18	06:40 (03)	06:46	07:15	17:29 (12)	06:45		07:19	07:42	07:42		
	20:41	4 06:44 (03)	20:03	42 18:28 (12)	19:14	68 18:37 (12)	17:30	17:02	38 08:20 (07)	17:07	28 08:32 (07)	
28	06:19	06:41 (03)	06:47	07:16	17:29 (12)	06:46		07:20	07:43	07:42		
	20:40	1 06:42 (03)	20:02	52 18:31 (12)	19:12	67 18:36 (12)	17:28	17:02	37 08:20 (07)	17:07	28 08:32 (07)	
29	06:20		06:48	07:17	17:29 (12)	06:47		07:21	07:44	07:43		
	20:40		20:00	62 18:34 (12)	19:11	66 18:35 (12)	17:27	17:02	37 08:21 (07)	17:08	29 08:34 (07)	
30	06:21		06:49	07:18	17:30 (12)	06:48		07:22	07:45	07:43		
	20:39		19:59	68 18:35 (12)	19:09	64 18:34 (12)	17:26	17:01	36 08:21 (07)	17:09	29 08:34 (07)	
31	06:22		06:50	07:19	17:31 (12)	06:49			07:43	07:43		
	20:38		19:57	75 18:36 (12)		17:25			17:09	29 08:34 (07)		
Potential sun hours	454		425		374		347		302		293	
Total, worst case		448		323		2484		624		720		916
Sun reduction		0,74		0,73		0,65		0,54		0,50		0,45
Oper. time red.		0,68		0,68		0,68		0,68		0,68		0,68
Wind dir. red.		0,64		0,71		0,70		0,74		0,74		0,74
Total reduction		0,32		0,35		0,31		0,25		0,25		0,23
Total, real		144		114		768		182				208

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)