

REGIONE SARDEGNA
Provincia di Sassari
Comune di Ossi

**PROGETTO DEFINITIVO PER LA REALIZZAZIONE DI UN
IMPIANTO EOLICO DA 31 MW E DELLE OPERE DI
CONNESSIONE ALLA RTN NEL COMUNE DI OSSI**

ELABORATO		STUDIO DEGLI EFFETTI DI SHADOW FLICKERING		
A.14				
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1 Criteri generali di analisi e valutazione

Il presente elaborato, facente parte integrante dello Studio di impatto ambientale allegato al progetto del parco eolico in Comune di Ossi (SS) proposto dalla GRV WIND SARDEGNA 3 S.r.l.– Gruppo GR Value, esamina compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) sui potenziali ricettori individuati nell'area interessata dal proposto impianto, entro una distanza indicativa di 1000 metri dagli aerogeneratori.

A tal fine, nel seguito, si farà riferimento alla ricognizione sugli edifici esistenti eseguita nell'ambito dello studio del layout di impianto e dell'analisi ambientale, i cui risultati sono riepilogati in opportune "schede fabbricati" all'interno di apposito report allegato al progetto del parco eolico (Elaborato DC_WOSS20_A09 - Report dei fabbricati censiti in prossimità del parco eolico).

Sotto il profilo metodologico, il documento è strutturato in una sezione introduttiva atta a descrivere la natura del fenomeno dell'ombreggiamento intermittente e le ipotesi alla base dei calcoli previsionali, eseguiti a mezzo di specifico software specialistico.

2 Descrizione del fenomeno

Un ostacolo solido opaco posto tra il sole e il terreno genera un'ombra. Generalmente se l'ostacolo è fermo, l'ombra si proietta al suolo seguendo le regole del movimento relativo del sole sull'orizzonte. Le dimensioni dell'ombra proiettata sono funzione inversa dell'angolo che i raggi del sole formano sull'orizzonte per cui si ha la massima dimensione (elongazione sul terreno) dell'ombra all'alba ed al tramonto con il minimo quando il sole raggiunge la massima altezza (mezzogiorno).

Anche gli aerogeneratori durante il giorno proiettano un'ombra che in parte è fissa (torre e navicella) e in parte è mobile (pale del rotore).

Se l'ombra del rotore invece che sul terreno si proietta sulle aperture di un fabbricato può venirsi a creare l'effetto di ombra intermittente o *shadow flickering* (sfarfallio dell'ombra); in talune circostanze, tale fenomeno di pulsazioni "luce – ombra" può potenzialmente essere all'origine di un disturbo alle normali attività che possono svolgersi all'interno dell'ambiente abitativo.

Il fenomeno si verifica durante il giorno in presenza di cielo sereno ed in assenza di ostacoli naturali, quali vegetazione, alberi, muri ecc., e con le turbine in movimento.

Per le ragioni anzidette, a distanze turbine-ricettore superiori a circa 300 metri solitamente il fenomeno di *shadow flickering* si manifesta all'alba o al tramonto, allorquando le ombre proiettate sono sufficientemente lunghe. Per le stesse ragioni il tremolio dell'ombra è un fenomeno particolarmente avvertito nelle regioni del nord Europa (Germania, Danimarca, ecc.) piuttosto che alle latitudini del Mediterraneo.

L'intensità del *shadow flickering* è definita come la differenza in luminosità, in un determinato sito, in presenza ed assenza di un'ombra.

Di seguito si riassumono alcuni aspetti caratteristici del fenomeno:

- la pala delle turbine eoliche è stretta in corrispondenza dell'estremità più esterna ed assume progressivamente maggiore larghezza verso la giunzione con il mozzo. Quando una turbina è posizionata sufficientemente vicino ad un ricettore, cosicché la porzione più larga della pala oscura una porzione maggiore del campo visivo (o meglio del disco solare), l'intensità di *shadow flickering* aumenterà. A distanze maggiori l'intensità del fenomeno sarà minore in quanto le pale copriranno una porzione inferiore del disco solare;
- l'intensità del *shadow flickering* è più bassa quando l'ombra che intercetta un ricettore si origina dall'estremità esterna del rotore (minore spessore della pala). L'intensità aumenterà allorché l'ombra si muove lungo lo sviluppo della pala fino ad arrivare ad un massimo in corrispondenza del mozzo; a tal punto l'intensità diminuisce quando l'ombra si sposta verso l'estremità della pala opposta;
- bassi impatti da *shadow flickering* sono generalmente indicativi di grandi distanze tra turbine e ricettore e ombre incidenti originate dalle estremità del rotore;
- situazioni di precaria visibilità determineranno modeste intensità di *S. flickering*;
- a distanze ancora maggiori le ombre proiettate risulteranno "fuori-fuoco". Ciò non è causa di un'intensità inferiore del *shadow flickering* ma contribuisce a rendere meno distinto il fenomeno;
- all'interno di un ambiente ben illuminato le ombre svaniscono. Conseguentemente l'accensione di luci in un ambiente riduce l'incidenza del *shadow flickering*;
- schermare una finestra (con tende o quant'altro) previene il fenomeno;
- schermare un edificio (ad esempio con alberature) può rappresentare una misura di mitigazione per prevenire il fenomeno.

La frequenza di pulsazione del tremolio dell'ombra è proporzionale alla velocità di rotazione del rotore. La tipica frequenza di passo fra le pale del rotore (tripala) è compresa tra 0.6 ed 1 Hz (velocità con cui le pale passano attraverso una posizione specifica).

Nel caso specifico, considerando un rotore del diametro indicativo di 162 metri con una velocità massima nominale di rotazione di circa 12 RPM si avrà una frequenza di passo pari a circa 0,6 Hz. Tali frequenze di oscillazione luminosa sono prive di rischi significativi per la salute.

Ricerche finalizzate alla definizione di relazioni cause-effetto tra fenomeni stroboscopici ed attacchi epilettici (Graham e Pamela Harding della *Aston University* e Arnold Wilkins della *University of Essex*) attestano che, al fine di escludere rischi sulla salute, le turbine eoliche dovrebbero ruotare a velocità superiori a 60 RPM (velocità di passo superiori a 3 Hz). Peraltro, non può disconoscersi come il fenomeno del *shadow flickering* possa talvolta costituire, in particolari situazioni, un disturbo per i ricettori più esposti.

Per analizzare i risultati e quindi definire l'effettiva portata del disturbo, è dunque fondamentale conoscere l'esatta destinazione del fabbricato ricettore. Nel seguito saranno considerati potenziali ricettori i soli edifici che, sulla base

delle informazioni disponibili e delle verifiche condotte in sito, potrebbero prudenzialmente ricondursi alla fattispecie di “ambienti abitativi”.

3 Individuazione dei ricettori

Per le finalità del presente studio, con l'intento di descrivere la procedura di individuazione dei potenziali edifici sensibili (o ricettori) del proposto impianto eolico, si ritiene opportuno richiamare i contenuti della D.G.R. RAS n. 59/90 del 2020 e s.m.i. (*Indicazione per la realizzazione di impianti eolici in Sardegna*) e segnatamente il punto 4.3.3 “*Distanze di rispetto dagli insediamenti rurali*”.

“Al fine di limitare gli impatti visivi, acustici e di ombreggiamento, ogni singolo aerogeneratore dovrà rispettare una distanza pari a:

- *300 metri da corpi aziendali ad utilizzazione agro-pastorale in cui sia accertata la presenza continuativa di personale in orario diurno (h. 6.00 – h. 22.00);*
- *500 metri da corpi aziendali ad utilizzazione agro-pastorale in cui sia accertata la presenza continuativa di personale in orario notturno (h. 22.00 – 6.00), o case rurali ad utilizzazione residenziale di carattere stagionale;*
- *500 metri da nuclei e case sparse nell'agro, destinati ad uso residenziale, così come definiti all'art. 82 delle NTA del PPR.”*

Secondo tale impostazione, pertanto, possono individuarsi le seguenti categorie di edifici:

Cat. 1 - nuclei e case sparse nell'agro, destinati ad uso residenziale, così come definiti all'art. 82 delle NTA del PPR;

Cat. 2a - corpi aziendali ad utilizzazione agro-pastorale in cui sia accertata la presenza continuativa di personale in orario notturno;

Cat. 2b - corpi aziendali ad utilizzazione agro-pastorale in cui sia accertata la presenza continuativa di personale in orario diurno;

Cat. 3 - fabbricati ad utilizzazione agro-pastorale con presenza discontinua di personale;

Cat. 4 - fabbricati di supporto alle attività agricole (ricoveri, depositi, stalle);

Cat. 5 - ruderi/fabbricati in abbandono;

Muovendo da tale classificazione, al fine di procedere all'individuazione di potenziali ricettori nelle aree più direttamente interessate dalle installazioni eoliche, ricomprese entro una distanza massima di 1000 m dalle postazioni di macchina, si è proceduto ad una individuazione complessiva dei fabbricati con l'ausilio della cartografia ufficiale di riferimento (Carta Tecnica Regionale in scala 1:10.000). Successivamente ne è stata verificata l'effettiva esistenza e consistenza dall'esame di foto aeree e satellitari nonché attraverso specifici sopralluoghi sul campo. In tal modo sono state acquisite le necessarie informazioni preliminari sulle caratteristiche tipologico-costruttive e le condizioni di utilizzo degli edifici. Per completezza di analisi sono stati inclusi nel censimento anche quei fabbricati che, in modo manifesto, non presentavano caratteristiche di potenziali ambienti abitativi (p.e. ruderi

o depositi). A valle di tali riscontri, è stata inoltre accertata la categoria catastale di appartenenza degli edifici, laddove disponibile.

L'Elaborato DC_WOSS20_A09 (Report dei Fabbricati censiti in prossimità del Parco Eolico) riporta l'individuazione dei fabbricati censiti in accordo con la metodologia precedentemente indicata. Nel Report è contenuto inoltre lo stralcio della ripresa aerea zenitale, la categoria catastale di appartenenza ed una fotografia prospettica dei fabbricati censiti.

Il censimento ha condotto ad individuare n. 141 edifici, o complessi di fabbricati agricoli; tra questi è stata riscontrata la prevalente presenza di corpi edilizi a servizio di attività dei settori terziario e commerciale, come: negozi e botteghe, magazzini e locali di deposito (categoria catastale prevalente C2 - Magazzini e locali di deposito, con 22 edifici). La frequentazione di tali edifici è saltuaria e, in prossimità dell'area di impianto, principalmente legata alle esigenze di conduzione dei fondi agricoli. È stata inoltre verificata la presenza di: 10 edifici con categoria catastale A (abitazioni), un agriturismo (ascritto al catasto come D10) e 10 fabbricati con categoria catastale D (9 di categoria D10, Fabbricati per funzioni produttive connesse alle attività agricole e uno con categoria D1, opificio). I restanti edifici individuati al momento della ricognizione dei fabbricati entro i 1000 metri dai WTG in progetto, non sono accatastati come Fabbricati quindi la loro destinazione catastale riportata nel "Report dei Fabbricati censiti in prossimità del Parco Eolico" è quella del "Catasto Terreni".

Dalle ricerche condotte si è pervenuti a selezionare dapprima, gli edifici che in catasto risultavano classificati come A2 (Abitazioni di tipo civile) e A3 (Abitazioni di tipo economico) assumendo prudenzialmente una presenza continuativa di persone in periodo diurno e notturno. Alla tipologia di edifici di Categoria 1 (*nuclei e case sparse nell'agro, destinati ad uso residenziale, così come definiti all'art. 82 delle NTA del PPR*) è stato ricondotto, inoltre, il fabbricato F154 accatastato come D10 (Fabbricati per funzioni produttive connesse alle attività agricole), avendone accertato la destinazione ad agriturismo.

L'insieme di ricettori di interesse (Tabella 3.1) è stato integrato, infine, da 6 ulteriori fabbricati che, per caratteristiche tipologico-costruttive dell'edificio o per manifeste condizioni d'uso (edifici della limitrofa area estrattiva), suggerissero una possibile frequentazione di persone nel periodo diurno, ancorché discontinua. Tali fabbricati sono stati pertanto ricondotti alla Categoria 3.

La Tabella 3.1 riporta per ciascun ricettore individuato le relative coordinate, secondo il sistema Gauss Boaga, e la categoria Catastale di appartenenza.

Tabella 3.1: Fabbricati con destinazione catastale abitativa esposti al potenziale disturbo da shadow flickering

Fabbricato	Comune	GB Est	GB Nord	Distanza dal più prossimo WTG [m]	Categoria Catasto Fabbricati
F04	OSSI	1466941	4501887	911 (WTG02)	A2
F06	OSSI	1467093	4501808	835 (WTG02)	A3
F09	OSSI	1466986	4501684	706 (WTG02)	A2
F12	OSSI	1467036	4501536	559 (WTG02)	A3
F21	OSSI	1466362	4501630	913 (WTG02)	A3
F25	OSSI	1466221	4500809	800 (WTG02)	C1
F33	OSSI	1466610	4500248	829 (WTG02)	Seminativo
F35	OSSI	1466737	4500133	885 (WTG02)	C2
F59	CARGEGHE	1467500	4501769	896 (WTG02)	A3
F84	OSSI	1467409	4500611	548 (WTG02)	A3
F96	FLORINAS	1468792	4500350	509 (WTG05)	A3
F100	OSSI	1468302	4499628	277 (WTG04)	D10
F117	OSSI	1467197	4499654	698 (WTG03)	A3
F119	OSSI	1466959	4499642	820 (WTG03)	D10
F125	OSSI	1467033	4499280	524 (WTG03)	A3
F138	OSSI	1468540	4498739	842 (WTG04)	D1
F154	OSSI	1466861	4498596	642 (WTG01)	D10

4 Ipotesi alla base del calcolo e soglie di riferimento

L'analisi dell'effetto di shadow flickering è stata condotta con l'utilizzo del modulo SHADOW del software WindPro 3.4. Il programma esegue una simulazione completa del percorso del sole durante un intero anno.

I calcoli possono essere eseguiti secondo due scenari: lo scenario peggiore (*worst case*) e il caso reale (*real case*).

Nello scenario *worst case* nessuno, tra i fattori di influenza indicati al capitolo 2 è contemplato nei calcoli del modello di simulazione. In situazioni di cielo coperto o calma di vento, o in caso di direzione del vento tale da porre il piano del rotore in posizione parallela rispetto alla linea sole-ricettore, la WTG non produrrà ombra intermittente, ma il suo contributo teorico è comunque computato dal *software*.

Conseguentemente, nello scenario peggiore, è altamente verosimile che i ricettori considerati saranno soggetti ad un impatto da *shadow flickering* significativamente inferiore a quello ipotizzato dal modello.

Nello scenario *real case*, il software può tenere conto delle reali **condizioni di funzionamento degli aerogeneratori** (in termini di ore di funzionamento attese per ogni settore angolare di provenienza del vento) nonché delle condizioni di **Eliofania**, ossia di durata media del soleggiamento della specifica zona di studio.

Peraltro, in entrambi gli scenari di calcolo, se la simulazione contempla l'effetto dell'orografia sulla propagazione dell'ombra, la stessa ignora l'azione schermante "sito-specifica" esercitata dai manufatti e dalle alberature. In altre parole, il calcolo è sempre conservativo e rappresenta quindi il massimo rischio potenziale di disturbo.

In definitiva, affinché il fenomeno dell'ombra intermittente possa costituire un disturbo per i soggetti più sensibili dovrebbero verificarsi simultaneamente le seguenti circostanze:

- il vento deve soffiare ad una velocità superiore a 3 m/s (velocità di *cut-in* del rotore);
- presenza di luminosità solare diretta;
- l'osservatore deve risultare sufficientemente vicino alla sorgente di *shadow flickering*;
- il ricettore deve essere effettivamente esposto al campo di luce tremolante;
- l'illuminazione dell'ambiente residenziale deve essere bassa;
- il contrasto tra luci ed ombre deve essere alto;
- non devono essere presenti schermature che ostacolano la propagazione dell'ombra (come tendaggi o alberature);
- gli individui potenzialmente soggetti ad un impatto da *shadow flickering* dovrebbero permanere esposti alla luce tremolante per un tempo sufficiente ad avvertire fastidio.

Per le finalità del presente studio, in assenza di una specifica disciplina normativa nazionale o regionale, si è fatto riferimento alle linee guida elaborate dal Gruppo Federale tedesco di Controllo delle Emissioni (*Bund-/Länder-Arbeitsgemeinschaft für Immissionsschutz - LAI*) – aggiornamento 2020.

Per la valutazione degli effetti del tremolio dell'ombra, peraltro, lo stesso legislatore tedesco non ha finora emanato, né risulta che sia in procinto di emanare, norme giuridicamente vincolanti.

Secondo le richiamate linee guida, affinché il fenomeno di ombreggiamento sia significativo dovrebbero essere simultaneamente verificate le seguenti circostanze

- L'angolo del sole sopra l'orizzonte deve essere almeno 3° ;
- l'ingombro della pala della turbina eolica deve coprire almeno il 20% del disco solare.

Il massimo ombreggiamento su un edificio secondo tali linee-guida è stabilito in:

- 30 ore di ombreggiamento annuale;
- 30 minuti di ombreggiamento giornaliero.

In tali archi temporali (30 ore/anno e 30 minuti/giorno), trattandosi di un disturbo effettivamente avvertito dagli occupanti l'edificio, dovrebbero risultare simultaneamente verificate le seguenti condizioni:

- gli ambienti esposti all'ombreggiamento sono occupati;
- gli occupanti sono svegli.

Considerata l'esigua probabilità che si verifichino contemporaneamente tutte le condizioni precedentemente illustrate per l'intera durata del fenomeno, ne deriva che il risultato del calcolo rappresenta comunque una stima prudenziale dell'impatto.

La Figura 4.1 e la Figura 4.2 mostrano i parametri necessari al modello utilizzato dal modulo SHADOW per valutare l'impatto del tremolio dell'ombra.

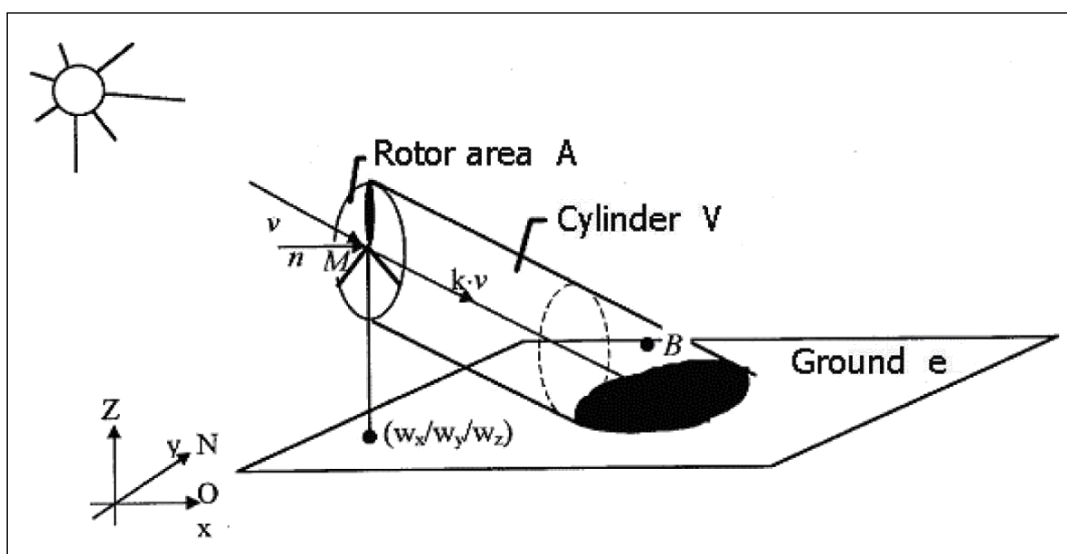


Figura 4.1: Rappresentazione schematica della proiezione dell'ombra del rotore.

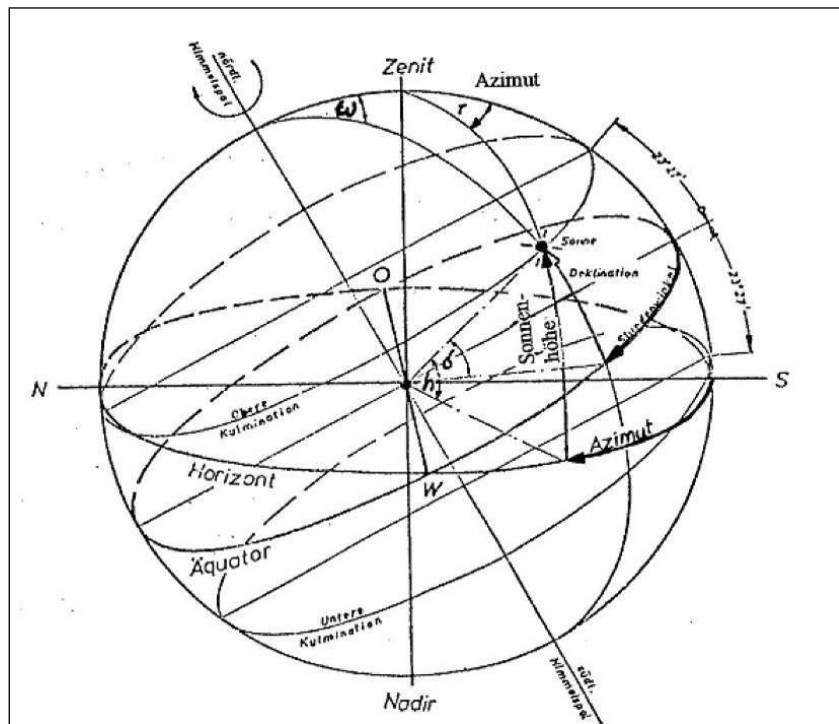


Figura 4.2: Schema dei moti terrestri e parametri di calcolo.

4.1 Lo scenario peggiore (*worst case*)

Questi calcoli sono basati sullo scenario più conservativo (ombra massima astronomica, ossia basata sulla posizione del sole rispetto alle WTG). Se il cielo è coperto o c'è calma di vento, o la direzione del vento è tale da porre il piano del rotore in posizione parallela rispetto alla linea sole-edificio, la WTG non produrrà ombra, ma la sua influenza apparirà comunque nei calcoli. In altre parole, il calcolo descrive lo scenario peggiore possibile, e rappresenta quindi il massimo rischio potenziale di impatto. Per ciascun ricettore il software produce un calendario che indica i giorni ed i periodi di tempo in cui l'ombra sarà presente.

4.2 Lo scenario reale (*real case*)

Oltre al calcolo che contempla le ore di "ombra massima astronomica" (detta anche ombra peggiore), il software WINDPRO consente di configurare i parametri statistici per calcolare l'"ombra meteorologica probabile" (detta anche ombra reale). In particolare, possono essere configurati due parametri statistici:

1. Statistica delle ore di funzionamento. È il periodo in cui le turbine saranno operative per ciascuna direzione di provenienza del vento nel corso dell'anno.
2. Statistica dell'eliofania. È la percentuale di ore di sole durante il dì (dall'alba al tramonto). Questa varia notevolmente da luogo a luogo, e si rende opportuno utilizzare, pertanto, una statistica proveniente da stazioni di misura vicine al sito.

WindPRO combina ZVI ed il calcolo dell'ombra in modo da escludere il contributo delle turbine non visibili dai recettori. Questo vale anche per la mappa dell'ombra, in cui saranno incluse solo le WTG visibili da ciascun punto di griglia.

Ai fini del calcolo del tremolio dell'ombra il software di simulazione considera i seguenti parametri:

- diametro del sole, D (1.390.000 km);
- distanza Terra-Sole, d (150.000.000 km);
- angolo di attacco (3°);
- coordinate geografiche e altitudine delle turbine in progetto;
- altezza al mozzo (125 m) e diametro del rotore (162 m);
- coordinate dei recettori;
- recettori considerati in modalità "serra", assumendo che vengano interessati dal fenomeno di shadow-flickering indipendentemente dall'orientamento delle finestre (ipotesi conservativa);
- modello digitale del terreno;
- eliofania del sito;
- statistica delle ore di funzionamento degli aerogeneratori in funzione delle frequenze di provenienza del vento su 12 quadranti convenzionali;
- modello di calcolo della simulazione, che tiene conto sia dell'orbita terrestre rispetto al Sole (rivoluzione), sia della rotazione rispetto al proprio asse.

5 Risultati

Il risultato dei calcoli è reso disponibile dal programma di simulazione (*Windpro*) sotto diversi formati:

- Tabellare, (calendario per ciascun ricettore) nel quale per ogni giorno dell'anno sono indicate le ore di luce e l'intervallo di tempo di esposizione all'ombra con l'orario in cui si verifica il fenomeno;
- Grafico, (per ciascun ricettore) nel quale vengono rappresentati i periodi dell'anno in cui si verifica il fenomeno, l'orario e le turbine responsabili dell'ombra;
- grafico globale, con la rappresentazione di isolinee rappresentanti l'incidenza dell'ombra espressa in ore/anno.

Con riferimento allo Scenario di progetto, le isolinee d'ombra sono state rappresentate su specifica tavola grafica, in scala adeguata alla dimensione territoriale da rappresentare, per facilitarne la lettura. La tavola è stata realizzata, pertanto, su base cartografica in scala 1:10.000 (Elaborato DW_WOSS20_A25).

I risultati forniti dal modello di calcolo consentono di valutare approssimativamente sia l'impatto puntuale sul singolo ricettore, sia l'impatto distribuito sul territorio (movimento e persistenza dell'ombra).

Nello specifico, all'interno degli allegati report di calcolo sono indicati, per il singolo ricettore, i valori totali di interferenza da *shadow flickering* (espressi in h/anno), il numero di giorni in cui si verifica l'interferenza ed infine la durata massima per singolo giorno.

I risultati numerici delle simulazioni modellistiche, condotti con riferimento a ciascuno scenario di calcolo (*worst e real case*), sono riportati in Appendice.

6 Analisi dei risultati

La Tabella 6.1 riepiloga, per ciascun ricettore considerato, le risultanze del calcolo modellistico espresse come valori totali di interferenza da *shadow flickering* (SF_T) in h/anno, numero di giorni in cui si verifica l'interferenza potenziale ed infine durata massima per singolo giorno nello scenario worst case.

Tabella 6.1 – Risultati dei calcoli di ombreggiamento intermittente presso i ricettori considerati

Fabbricato	Cat. Catastale	Destinazione presunta (Ex DGR 59/90)	WTG SF	WTG più prossimo	Distanza WTG più prossimo [m]	h/anno SF Worst Case	h/giorno SF Worst Case	h/anno SF Real Case
F04	A2	Cat.1		WTG02	911	0:00:00	0:00:00	0:00:00
F06	A3	Cat.1		WTG02	835	0:00:00	0:00:00	0:00:00
F09	A2	Cat.1		WTG02	706	0:00:00	0:00:00	0:00:00
F100	D10	Cat.3	W3, W4	WTG02	559	311:06:00	1:46:00	98:08:00
F117	A3	Cat.1	W3, W4	WTG02	913	22:20:00	0:31:00	5:09:00
F119	D10	Cat.3	W3, W4	WTG02	800	63:27:00	0:48:00	12:45:00
F12	A3	Cat.1		WTG02	829	0:00:00	0:00:00	0:00:00
F125	A3	Cat.1	W1, W3, W4	WTG02	885	94:03:00	1:04:00	25:03:00
F138	D1	Cat.3	W1, W3	WTG02	896	20:45:00	0:22:00	6:52:00
F154	D10	Cat.1	W1	WTG02	548	20:22:00	0:36:00	6:33:00
F21	A3	Cat.1	W2	WTG05	509	53:38:00	0:43:00	10:01:00
F25	C1	Cat.3	W1	WTG04	277	50:24:00	0:48:00	17:43:00
F33	Seminativo	Cat.3		WTG03	698	0:00:00	0:00:00	0:00:00
F35	C2	Cat.3		WTG03	820	0:00:00	0:00:00	0:00:00
F59	A3	Cat.1	W2	WTG03	524	1:09:00	0:08:00	0:14:00
F84	A3	Cat.1	W5	WTG04	842	4:21:00	0:11:00	1:07:00
F96	A3	Cat.1	W5, W2	WTG01	642	90:49:00	1:11:00	28:28:00

Nota: il software di simulazione non fornisce nello scenario reale il risultato dettagliato delle ore massime di ombreggiamento giornaliero, a causa dell'elevata incertezza del dato legata alla concomitanza di numerosi fattori (effettivo contrasto luci-ombre ed effettivo funzionamento degli aerogeneratori nel breve periodo).

Come si può osservare dall'esame della Tabella 6.1, l'incidenza dell'ombreggiamento intermittente presso i ricettori considerati nello "scenario reale" è sempre al disotto del valore guida di 30 h/anno con la sola eccezione del fabbricato F100, interessato dalla proiezione dell'ombra per una durata stimata in 98 h/anno.

Approfondendo l'analisi sulle caratteristiche del fenomeno *shadow flickering* presso il ricettore potenzialmente più esposto si ritiene opportuno formulare le seguenti considerazioni:

- Il ricettore F100 è un edificio ad un unico piano con altezza indicativa delle aperture fenestrate di 1.20 dal piano del terreno;
- i report del programma di simulazione (vedasi anche la Figura 6.1) mostrano come il potenziale impatto da SF per il ricettore F100 sia attribuibile prevalentemente all'aerogeneratore W4, posto a est del fabbricato a una distanza di circa 280 m;
- il principale fenomeno di ombreggiamento attribuibile all'aerogeneratore W4 sarà limitato al periodo da aprile a settembre ed interesserà le ore mattutine (indicativamente dalle 8:30 alle 10:30) con una persistenza massima giornaliera di circa un'ora e mezza;
- la proiezione dell'ombra dell'aerogeneratore W4, a cui è principalmente attribuibile il fenomeno di ombreggiamento, interesserà le aperture fenestrate del fabbricato ubicate sul lato est dell'edificio;
- Le caratteristiche tipologico-costruttive del fabbricato, come si evince dall'esame della Figura 6.3, lasciano presumere che gli ambienti con più alta probabilità di permanenza di persone nel periodo diurno sia riferibile alla porzione ovest del fabbricato, interessata in misura marginale dal fenomeno da novembre a gennaio nelle ore serali;
- trattandosi di un fabbricato di supporto alle attività agricole, con attività lavorativa svolgentesi prevalentemente all'esterno negli orari di maggiore esposizione al fenomeno (ossia la mattina dei periodi estivo e primaverile), è ragionevole assumere che la probabilità che gli occupanti l'edificio siano effettivamente presenti negli ambienti oggetto di maggiore ombreggiamento (ossia sul lato est) nelle fasce orarie indicate sia verosimilmente bassa.

Per quanto sopra, è ragionevole affermare che l'effettivo potenziale disturbo da *shadow flickering* risulterà estremamente più contenuto di quello prospettato dal software di simulazione, tali da potersi ricondurre ai predetti "valori guida" e da non arrecare apprezzabili disturbi agli occupanti l'edificio in esame.

Ad ogni buon conto, laddove durante la fase operativa dell'impianto dovesse essere avvertito un effettivo disturbo da parte degli occupanti l'edificio, saranno attuate – a cura e spese della società proponente - efficaci misure di mitigazione quali la creazione di una alberatura schermante sul lato est dell'edificio.

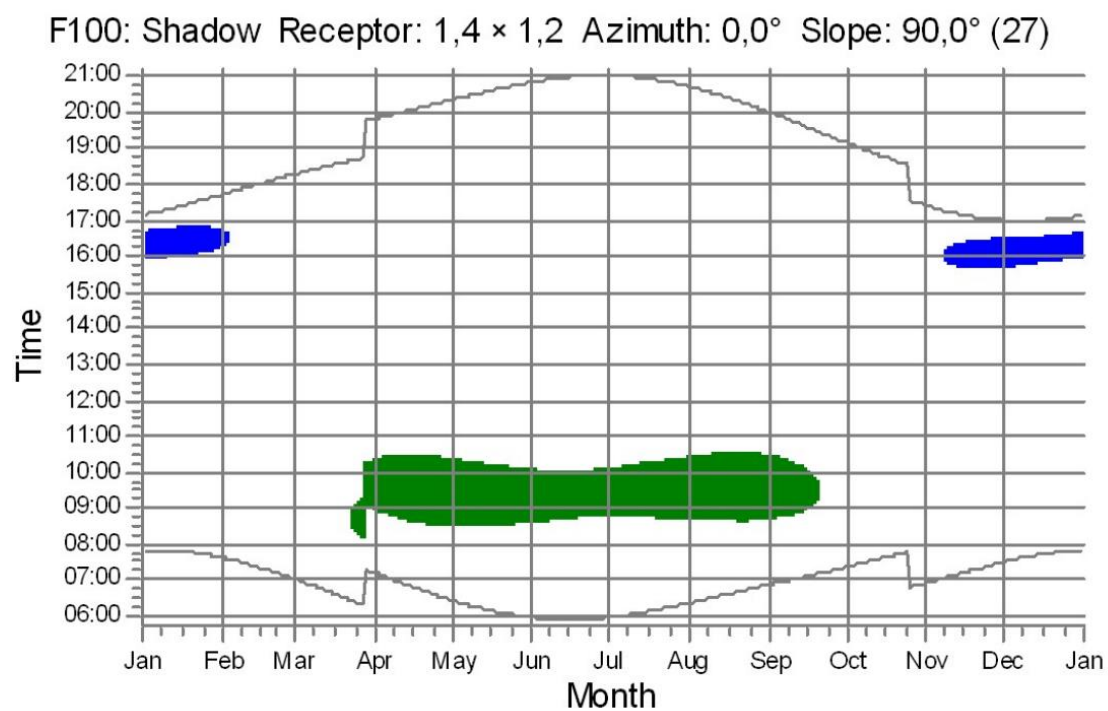


Figura 6.1 – Calendario grafico dell'ombra presso il ricettore F100 nello "scenario reale"



Figura 6.2 – Vista zenitale dell'edificio F100



Figura 6.3 – Edificio F100 (vista ovest)

7 Conclusioni

Il documento ha esaminato compiutamente il potenziale disturbo da ombreggiamento intermittente (*shadow flickering*) in corrispondenza dei più prossimi fabbricati presenti nell'area interessata dal proposto parco eolico, entro una distanza indicativa di 1000 metri dagli aerogeneratori in progetto. L'individuazione dei ricettori ha fatto riferimento alla ricognizione sugli edifici esistenti eseguita nell'ambito della definizione del layout di impianto e dell'analisi ambientale, i cui risultati sono riepilogati in opportune "schede fabbricati" all'interno di apposito report allegato alla documentazione progettuale.

Ai fini della verifica circa l'esposizione all'ombra intermittente (*shadow flickering*) si sono presi in considerazione n. 10 fabbricati catastalmente classificati tra le Categorie A2 e A3 (abitazioni di tipo civile e abitazioni di tipo economico), un agriturismo (F154) classificato in catasto come D10 (Fabbricati per funzioni produttive connesse alle attività agricole) e altri 6 fabbricati che, per caratteristiche tipologico-costruttive dell'edificio o per manifeste condizioni d'uso (edifici della limitrofa area estrattiva), suggerissero una possibile frequentazione di persone nel periodo diurno, ancorché discontinua.

Per le finalità del presente studio, in assenza di una specifica disciplina normativa nazionale o regionale, si è fatto riferimento alle linee guida elaborate dal Gruppo Federale tedesco di Controllo delle Emissioni (*Bund-/Länder-Arbeitsgemeinschaft für Immissionsschutz - LAI*) – aggiornamento 2020.

Relativamente allo Scenario "*real case*" (scenario in cui si configura l'"ombra meteorologica probabile"), la soglia limite di riferimento delle 30 h/anno è sempre al di sotto del valore guida di 30 h/anno con la sola eccezione del fabbricato F100, interessato dalla proiezione dell'ombra per una durata stimata in 98 h/anno.

Le simulazioni condotte attraverso il modulo SHADOW del software specialistico WindPro hanno evidenziato come la principale influenza rispetto al fenomeno dell'ombreggiamento è attribuibile all'aerogeneratore W4; questo sarà limitato al periodo da aprile a settembre ed interesserà le ore mattutine (indicativamente dalle 8:30 alle 10:30) con una persistenza massima giornaliera di circa un'ora e mezza.

Trattandosi di un fabbricato di supporto alle attività agricole, con attività lavorativa svolgentesi prevalentemente all'esterno negli orari di maggiore esposizione al fenomeno (ossia la mattina dei periodi estivo e primaverile), è ragionevole assumere che la probabilità che gli occupanti l'edificio siano effettivamente presenti negli ambienti oggetto di maggiore ombreggiamento (ossia sul lato est) nelle fasce orarie indicate sia verosimilmente bassa.

Per quanto sopra, è ragionevole affermare che l'effettivo potenziale disturbo da *shadow flickering* risulterà estremamente più contenuto di quello prospettato dal software di simulazione, tale da potersi ricondurre ai predetti "valori guida" e da non arrecare apprezzabili disturbi agli occupanti l'edificio.

Peraltro, laddove durante la fase operativa dell'impianto dovesse essere avvertito un effettivo disturbo da parte degli occupanti l'edificio, saranno attuate – a cura e spese della società proponente - efficaci misure di mitigazione quali la creazione di una alberatura schermante sul lato est dell'edificio.

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Main Result

Calculation: Copy of Progetto_worst case

Assumptions for shadow calculations

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Please look in WTG table

Minimum sun height over horizon for influence

3 °

Day step for calculation

1 days

Time step for calculation

1 minutes

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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

Height contours used: Height Contours: CONTOURLINE_Layout_GRVDEP_Ossi

Obstacles used in calculation

Eye height for map: 1,5 m

Grid resolution: 1,0 m

Topographic shadow included in calculation

All coordinates are in

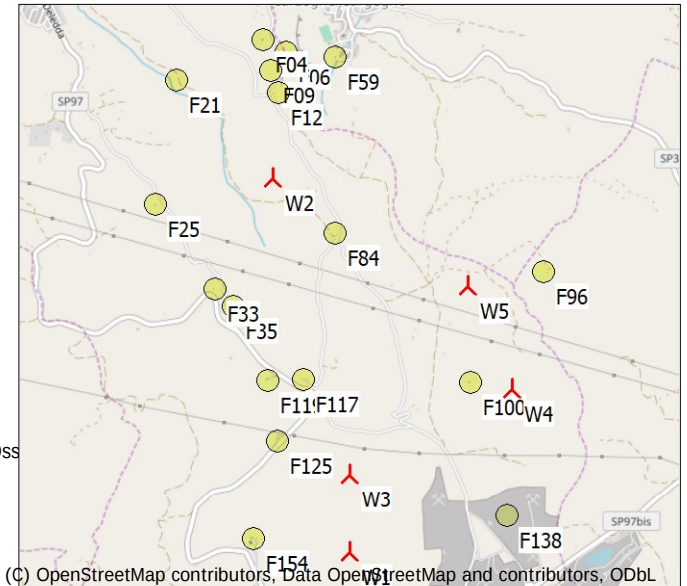
Italian Gauss-Boaga west-ROMA40 (IT-peninsular <±4m)

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.				Calculation distance [m]	RPM [RPM]
			[m]								
W1	1.467.497	4.498.511	451,9	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W2	1.467.002	4.500.978	470,0	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W3	1.467.498	4.499.024	452,9	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W4	1.468.574	4.499.580	493,1	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W5	1.468.291	4.500.259	480,4	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0

Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
						a.g.l.	window		(ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
F04	1.466.941	4.501.887	437,1	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F06	1.467.093	4.501.808	440,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F09	1.466.986	4.501.684	450,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F100	1.468.302	4.499.628	431,9	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F117	1.467.197	4.499.654	376,9	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F119	1.466.959	4.499.642	366,1	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F12	1.467.036	4.501.536	435,3	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F125	1.467.025	4.499.250	351,4	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F138	1.468.540	4.498.739	360,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F154	1.466.861	4.498.596	352,9	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F21	1.466.362	4.501.630	370,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F25	1.466.221	4.500.809	470,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F33	1.466.610	4.500.248	405,7	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F35	1.466.737	4.500.133	417,7	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F59	1.467.416	4.501.772	340,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F84	1.467.409	4.500.611	485,1	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F96	1.468.792	4.500.350	480,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4



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

Scale 1:50.000

New WTG

Shadow receptor

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Main Result

Calculation: Copy of Progetto_worst case

Calculation Results

Shadow receptor

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
F04	0:00	0	0:00
F06	0:00	0	0:00
F09	0:00	0	0:00
F100	311:06	266	1:46
F117	22:20	66	0:31
F119	63:27	109	0:48
F12	0:00	0	0:00
F125	94:03	158	1:04
F138	20:45	96	0:22
F154	20:22	52	0:36
F21	53:38	86	0:43
F25	50:24	83	0:48
F33	0:00	0	0:00
F35	0:00	0	0:00
F59	1:09	10	0:08
F84	4:21	33	0:11
F96	90:49	126	1:11

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

No.	Name	Worst case [h/year]
W1	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)	36:59
W2	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)	111:05
W3	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)	203:59
W4	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)	285:40
W5	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)	89:16

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.

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F04 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (12)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	17:24	17:24	17:00
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31
	17:10	17:44	18:18	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:22	17:00
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:07	17:21	16:59
4	07:50	07:34	06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33
	17:11	17:46	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59
7	07:50	07:31	06:52	07:02	06:19	05:55	06:02	06:28	06:58	07:28	07:02	07:36
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37
	17:16	17:53	18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	16:59
10	07:50	07:27	06:47	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	07:38
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:32	07:02	07:32	07:07	07:39
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:32	07:03	07:33	07:08	07:40
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59
13	07:49	07:24	06:43	06:52	06:12	05:54	06:06	06:33	07:04	07:34	07:09	07:41
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59
14	07:49	07:23	06:41	06:51	06:11	05:54	06:06	06:34	07:05	07:35	07:11	07:41
	17:21	17:59	18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	16:59
15	07:48	07:21	06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	07:42
	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	16:59
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43
	17:24	18:01	18:33	20:06	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00
17	07:48	07:19	06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	07:44
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:23	19:33	18:44	17:07	17:00
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:18	07:45
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46
	17:29	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02
22	07:45	07:12	06:28	06:38	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03
24	07:44	07:09	06:25	06:36	06:02	05:56	06:15	06:44	07:15	07:46	07:22	07:48
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	06:47	07:23	07:48
	17:34	18:12	18:43	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	06:48	07:24	07:48
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	06:49	07:25	07:49
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05
28	07:41	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	06:51	07:26	07:49
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	06:52	07:28	07:49
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:27	17:00	17:06
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	06:53	07:29	07:50
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07
31	07:38		07:13		05:58		06:21	06:51		06:54		07:50
	17:42		19:49		20:49		20:43	20:01		17:25		17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F06 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (13)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:17	07:10 19:51	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:22	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:07	06:58 17:21	07:32 16:59
4	07:50 17:11	07:34 17:46	06:57 18:20	07:06 19:53	06:22 20:24	05:56 20:52	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	05:56 20:54	06:01 21:00	06:27 20:37	06:57 19:52	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	05:55 20:54	06:02 21:00	06:28 20:36	06:58 19:50	07:28 19:00	07:02 17:17	07:36 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	05:55 20:55	06:02 21:00	06:29 20:34	06:59 19:48	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	05:55 20:56	06:03 20:59	06:30 20:33	07:00 19:47	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:47 18:26	06:57 19:59	06:15 20:30	05:55 20:56	06:03 20:59	06:31 20:32	07:01 19:45	07:31 18:55	07:06 17:14	07:38 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	06:14 20:31	05:55 20:57	06:04 20:58	06:32 20:31	07:02 19:43	07:32 18:54	07:07 17:13	07:39 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	06:13 20:32	05:55 20:57	06:05 20:58	06:32 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	06:12 20:33	05:54 20:58	06:06 20:57	06:33 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 16:59
14	07:49 17:21	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	05:54 20:58	06:06 20:57	06:34 20:27	07:05 19:38	07:35 18:49	07:11 17:10	07:41 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	06:10 20:35	05:54 20:58	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 16:59
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:06	06:09 20:36	05:54 20:59	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 17:00
17	07:48 17:25	07:19 18:02	06:36 18:34	06:46 20:07	06:08 20:37	05:54 20:59	06:09 20:55	06:37 20:23	07:08 19:33	07:38 18:44	07:14 17:07	07:44 17:00
18	07:47 17:26	07:17 18:04	06:34 18:35	06:44 20:08	06:07 20:38	05:55 21:00	06:09 20:55	06:38 20:21	07:09 19:32	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	05:55 21:00	06:10 20:54	06:39 20:20	07:10 19:30	07:40 18:41	07:16 17:06	07:45 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	06:06 20:40	05:55 21:00	06:11 20:53	06:40 20:18	07:11 19:28	07:42 18:40	07:18 17:05	07:45 17:01
21	07:45 17:29	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	05:55 21:00	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:38 20:12	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:47 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:02 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 17:03
25	07:43 17:34	07:07 18:12	06:23 18:43	06:34 20:15	06:02 20:45	05:56 21:01	06:15 20:49	06:45 20:11	07:16 19:20	07:47 17:33	07:23 17:02	07:48 17:04
26	07:42 17:35	07:06 18:13	06:21 18:44	06:33 20:16	06:01 20:45	05:56 21:01	06:16 20:48	06:46 20:09	07:17 19:18	07:48 17:31	07:24 17:02	07:48 17:04
27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	05:57 21:01	06:17 20:47	06:47 20:08	07:18 19:16	07:49 17:30	07:25 17:01	07:49 17:05
28	07:40 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	05:57 21:01	06:18 20:46	06:48 20:06	07:19 19:15	07:50 17:29	07:26 17:01	07:49 17:06
29	07:40 17:39		07:16 19:47	06:29 20:19	05:59 20:48	05:57 21:01	06:19 20:45	06:49 20:05	07:20 19:13	06:52 17:27	07:28 17:00	07:49 17:06
30	07:39 17:40		07:15 19:48	06:27 20:20	05:59 20:49	05:58 21:01	06:20 20:44	06:50 20:03	07:21 19:11	06:53 17:26	07:29 17:00	07:50 17:07
31	07:38 17:42		07:13 19:49		05:58 20:49		06:21 20:43	06:51 20:01		06:54 17:25		07:50 17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F09 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (14)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:22	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:07	06:58 17:21	07:32 16:59
4	07:50 17:11	07:34 17:46	06:57 18:20	07:06 19:53	06:22 20:24	05:56 20:52	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	05:56 20:54	06:01 21:00	06:27 20:37	06:57 19:52	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	05:55 20:54	06:02 21:00	06:28 20:36	06:58 19:50	07:28 19:00	07:02 17:17	07:36 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	05:55 20:55	06:02 21:00	06:29 20:34	06:59 19:48	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	05:55 20:56	06:03 20:59	06:30 20:33	07:00 19:47	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:47 18:26	06:57 19:59	06:15 20:30	05:55 20:56	06:03 20:59	06:31 20:32	07:01 19:45	07:31 18:55	07:06 17:14	07:38 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	06:14 20:31	05:55 20:57	06:04 20:58	06:32 20:31	07:02 19:43	07:32 18:54	07:07 17:13	07:39 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	06:13 20:32	05:55 20:57	06:05 20:58	06:32 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	06:12 20:33	05:54 20:58	06:06 20:57	06:33 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 16:59
14	07:49 17:21	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	05:54 20:58	06:06 20:57	06:34 20:27	07:05 19:38	07:35 18:49	07:11 17:10	07:41 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	06:10 20:35	05:54 20:58	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 16:59
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:06	06:09 20:36	05:54 20:59	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 17:00
17	07:48 17:25	07:19 18:02	06:36 18:34	06:46 20:07	06:08 20:37	05:54 20:59	06:09 20:55	06:37 20:23	07:08 19:33	07:38 18:44	07:14 17:07	07:44 17:00
18	07:47 17:26	07:17 18:04	06:34 18:35	06:44 20:08	06:07 20:38	05:55 21:00	06:09 20:55	06:38 20:21	07:09 19:32	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	05:55 21:00	06:10 20:54	06:39 20:20	07:10 19:30	07:40 18:41	07:16 17:06	07:45 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	06:06 20:40	05:55 21:00	06:11 20:53	06:40 20:18	07:11 19:28	07:42 18:40	07:18 17:05	07:45 17:01
21	07:45 17:29	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	05:55 21:00	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:38 20:12	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:47 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:02 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 17:03
25	07:43 17:34	07:07 18:12	06:23 18:43	06:34 20:15	06:02 20:45	05:56 21:01	06:15 20:49	06:45 20:11	07:16 19:20	07:47 17:33	07:23 17:02	07:48 17:04
26	07:42 17:35	07:06 18:13	06:21 18:44	06:33 20:16	06:01 20:45	05:56 21:01	06:16 20:48	06:46 20:09	07:17 19:18	07:48 17:31	07:24 17:02	07:48 17:04
27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	05:57 21:01	06:17 20:47	06:47 20:08	07:18 19:16	07:49 17:30	07:25 17:01	07:49 17:05
28	07:41 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	05:57 21:01	06:18 20:46	06:48 20:06	07:19 19:15	07:50 17:29	07:26 17:01	07:49 17:06
29	07:40 17:39		07:16 19:47	06:29 20:19	05:59 20:48	05:57 21:01	06:19 20:45	06:49 20:05	07:20 19:13	07:51 17:27	07:28 17:00	07:49 17:06
30	07:39 17:40		07:15 19:48	06:27 20:20	05:59 20:49	05:58 21:01	06:20 20:44	06:50 20:03	07:21 19:11	07:52 17:26	07:29 17:00	07:50 17:07
31	07:38 17:42		07:13 19:49		05:58 20:49		06:21 20:43	06:51 20:01		07:25 17:25		07:50 17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F100 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (27)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

January		February		March		April		May		June	
1	07:50	16:01 (W3)	07:37	16:21 (W3)	07:01	07:11	09:03 (W4)	06:26	08:34 (W4)	05:58	08:41 (W4)
2	07:50	16:01 (W3)	07:36	16:24 (W3)	07:00	19:50	10:18 (W4)	20:21	10:18 (W4)	20:50	10:01 (W4)
3	07:50	16:01 (W3)	07:35	16:36 (W3)	18:17	07:10	09:00 (W4)	06:25	08:34 (W4)	05:57	08:41 (W4)
4	07:50	16:01 (W3)	07:34	16:36 (W3)	18:17	19:51	10:19 (W4)	20:22	10:18 (W4)	20:51	10:01 (W4)
5	07:50	16:01 (W3)	07:33	16:36 (W3)	18:17	07:08	08:58 (W4)	06:24	08:34 (W4)	05:57	08:41 (W4)
6	07:50	16:01 (W3)	07:32	16:36 (W3)	18:17	19:52	10:20 (W4)	20:23	10:17 (W4)	20:52	10:00 (W4)
7	07:50	16:01 (W3)	07:31	16:36 (W3)	18:17	07:06	08:57 (W4)	06:22	08:34 (W4)	05:56	08:42 (W4)
8	07:50	16:01 (W3)	07:30	16:36 (W3)	18:17	19:53	10:21 (W4)	20:24	10:17 (W4)	20:52	10:00 (W4)
9	07:50	16:01 (W3)	07:29	16:36 (W3)	18:17	07:05	08:55 (W4)	06:21	08:33 (W4)	05:56	08:43 (W4)
10	07:50	16:01 (W3)	07:28	16:36 (W3)	18:17	19:54	10:22 (W4)	20:25	10:15 (W4)	20:53	10:00 (W4)
11	07:50	16:01 (W3)	07:27	16:36 (W3)	18:17	07:03	08:54 (W4)	06:20	08:33 (W4)	05:56	08:42 (W4)
12	07:50	16:01 (W3)	07:26	16:36 (W3)	18:17	19:55	10:23 (W4)	20:26	10:15 (W4)	20:54	10:00 (W4)
13	07:50	16:01 (W3)	07:25	16:36 (W3)	18:17	07:02	08:52 (W4)	06:19	08:33 (W4)	05:55	08:43 (W4)
14	07:50	16:01 (W3)	07:24	16:36 (W3)	18:17	19:56	10:23 (W4)	20:27	10:14 (W4)	20:54	10:00 (W4)
15	07:50	16:01 (W3)	07:23	16:36 (W3)	18:17	07:00	08:50 (W4)	06:18	08:34 (W4)	05:55	08:44 (W4)
16	07:50	16:01 (W3)	07:22	16:36 (W3)	18:17	19:57	10:24 (W4)	20:28	10:14 (W4)	20:55	10:00 (W4)
17	07:50	16:01 (W3)	07:21	16:36 (W3)	18:17	06:58	08:49 (W4)	06:16	08:34 (W4)	05:55	08:44 (W4)
18	07:50	16:01 (W3)	07:20	16:36 (W3)	18:17	19:58	10:25 (W4)	20:29	10:13 (W4)	20:55	10:00 (W4)
19	07:50	16:01 (W3)	07:19	16:36 (W3)	18:17	06:57	08:48 (W4)	06:15	08:34 (W4)	05:55	08:45 (W4)
20	07:50	16:01 (W3)	07:18	16:36 (W3)	18:17	19:59	10:24 (W4)	20:30	10:12 (W4)	20:56	10:00 (W4)
21	07:50	16:01 (W3)	07:17	16:36 (W3)	18:17	06:55	08:47 (W4)	06:14	08:34 (W4)	05:55	08:45 (W4)
22	07:50	16:01 (W3)	07:16	16:36 (W3)	18:17	20:00	10:25 (W4)	20:31	10:12 (W4)	20:56	10:00 (W4)
23	07:50	16:01 (W3)	07:15	16:36 (W3)	18:17	06:54	08:45 (W4)	06:13	08:34 (W4)	05:55	08:45 (W4)
24	07:50	16:01 (W3)	07:14	16:36 (W3)	18:17	20:01	10:25 (W4)	20:32	10:11 (W4)	20:57	10:00 (W4)
25	07:50	16:01 (W3)	07:13	16:36 (W3)	18:17	06:52	08:45 (W4)	06:12	08:34 (W4)	05:54	08:45 (W4)
26	07:50	16:01 (W3)	07:12	16:36 (W3)	18:17	20:02	10:26 (W4)	20:33	10:10 (W4)	20:57	10:00 (W4)
27	07:50	16:01 (W3)	07:11	16:36 (W3)	18:17	06:50	08:43 (W4)	06:11	08:34 (W4)	05:54	08:45 (W4)
28	07:50	16:01 (W3)	07:10	16:36 (W3)	18:17	20:03	10:25 (W4)	20:34	10:10 (W4)	20:58	10:00 (W4)
29	07:50	16:01 (W3)	07:09	16:36 (W3)	18:17	06:49	08:42 (W4)	06:10	08:34 (W4)	05:54	08:46 (W4)
30	07:50	16:01 (W3)	07:08	16:36 (W3)	18:17	20:04	10:25 (W4)	20:35	10:09 (W4)	20:58	10:00 (W4)
31	07:50	16:01 (W3)	07:07	16:36 (W3)	18:17	06:47	08:42 (W4)	06:09	08:35 (W4)	05:54	08:46 (W4)
Potential sun hours	299	298	30	370	411	398	2955	447	451	2213	
Total, worst case	1116	30	411	2955	2893	451	2213				

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F100 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (27)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

July		August		September		October		November		December	
1	05:58	08:49 (W4)	06:22	08:45 (W4)	06:52	08:46 (W4)	07:21	06:55		07:30	15:46 (W3)
	21:01	74	10:03 (W4)	20:42	97	10:22 (W4)	20:00	98	10:24 (W4)	19:10	17:24
2	05:59	08:49 (W4)	06:23	08:45 (W4)	06:53	08:47 (W4)	07:23	06:56		07:31	15:46 (W3)
	21:01	74	10:03 (W4)	20:41	98	10:23 (W4)	19:58	96	10:23 (W4)	19:08	17:22
3	05:59	08:49 (W4)	06:24	08:44 (W4)	06:54	08:47 (W4)	07:24	06:57		07:32	15:47 (W3)
	21:01	75	10:04 (W4)	20:40	99	10:23 (W4)	19:57	96	10:23 (W4)	19:06	17:21
4	06:00	08:49 (W4)	06:25	08:44 (W4)	06:55	08:48 (W4)	07:25	06:59		07:33	15:47 (W3)
	21:01	75	10:04 (W4)	20:39	100	10:22 (W4)	19:55	94	10:22 (W4)	19:05	17:20
5	06:00	08:49 (W4)	06:26	08:43 (W4)	06:56	08:48 (W4)	07:26	07:00		07:34	15:48 (W3)
	21:00	76	10:05 (W4)	20:38	101	10:24 (W4)	19:53	91	10:19 (W4)	19:03	17:19
6	06:01	08:49 (W4)	06:27	08:43 (W4)	06:57	08:49 (W4)	07:27	07:01		07:35	15:48 (W3)
	21:00	76	10:05 (W4)	20:37	101	10:24 (W4)	19:52	89	10:18 (W4)	19:02	17:18
7	06:02	08:49 (W4)	06:28	08:43 (W4)	06:58	08:50 (W4)	07:28	07:02		07:35	15:49 (W3)
	21:00	77	10:06 (W4)	20:36	102	10:25 (W4)	19:50	87	10:17 (W4)	19:00	17:17
8	06:02	08:49 (W4)	06:29	08:43 (W4)	06:59	08:51 (W4)	07:29	07:03		07:36	15:50 (W3)
	20:59	78	10:07 (W4)	20:34	102	10:25 (W4)	19:48	84	10:15 (W4)	18:58	17:16
9	06:03	08:49 (W4)	06:30	08:43 (W4)	07:00	08:52 (W4)	07:30	07:05		15:55 (W3)	07:37
	20:59	78	10:07 (W4)	20:33	103	10:26 (W4)	19:47	82	10:14 (W4)	18:57	17:15
10	06:03	08:49 (W4)	06:31	08:43 (W4)	07:01	08:53 (W4)	07:31	07:06		15:52 (W3)	07:38
	20:59	79	10:08 (W4)	20:32	103	10:26 (W4)	19:45	79	10:12 (W4)	18:55	17:14
11	06:04	08:49 (W4)	06:31	08:43 (W4)	07:02	08:55 (W4)	07:32	07:07		15:50 (W3)	07:39
	20:58	80	10:09 (W4)	20:31	104	10:27 (W4)	19:43	75	10:10 (W4)	18:54	17:13
12	06:05	08:48 (W4)	06:32	08:43 (W4)	07:03	08:56 (W4)	07:33	07:08		15:48 (W3)	07:40
	20:58	81	10:09 (W4)	20:29	104	10:27 (W4)	19:42	72	10:08 (W4)	18:52	17:12
13	06:06	08:48 (W4)	06:33	08:43 (W4)	07:04	08:58 (W4)	07:34	07:09		15:48 (W3)	07:41
	20:57	82	10:10 (W4)	20:28	104	10:27 (W4)	19:40	68	10:06 (W4)	18:50	17:11
14	06:06	08:48 (W4)	06:34	08:43 (W4)	07:05	09:00 (W4)	07:35	07:10		15:47 (W3)	07:41
	20:57	83	10:11 (W4)	20:27	105	10:28 (W4)	19:38	63	10:03 (W4)	18:49	17:10
15	06:07	08:48 (W4)	06:35	08:43 (W4)	07:06	09:02 (W4)	07:36	07:12		15:46 (W3)	07:42
	20:56	82	10:10 (W4)	20:25	105	10:28 (W4)	19:37	59	10:01 (W4)	18:47	17:09
16	06:08	08:48 (W4)	06:36	08:43 (W4)	07:07	09:05 (W4)	07:37	07:13		15:45 (W3)	07:43
	20:56	83	10:11 (W4)	20:24	105	10:28 (W4)	19:35	52	09:57 (W4)	18:46	17:08
17	06:09	08:48 (W4)	06:37	08:43 (W4)	07:08	09:08 (W4)	07:38	07:14		15:45 (W3)	07:43
	20:55	84	10:12 (W4)	20:22	105	10:28 (W4)	19:33	46	09:54 (W4)	18:44	17:07
18	06:09	08:48 (W4)	06:38	08:43 (W4)	07:09	09:12 (W4)	07:39	07:15		15:44 (W3)	07:44
	20:54	85	10:13 (W4)	20:21	106	10:29 (W4)	19:32	37	09:49 (W4)	18:43	17:07
19	06:10	08:48 (W4)	06:39	08:43 (W4)	07:10	09:17 (W4)	07:40	07:16		15:44 (W3)	07:45
	20:54	86	10:14 (W4)	20:20	106	10:29 (W4)	19:30	26	09:43 (W4)	18:41	17:06
20	06:11	08:47 (W4)	06:40	08:42 (W4)	07:11	07:42	07:17	07:17		15:43 (W3)	07:45
	20:53	87	10:14 (W4)	20:18	106	10:28 (W4)	19:28			18:40	17:05
21	06:12	08:47 (W4)	06:41	08:42 (W4)	07:12	07:43	07:19	07:19		15:43 (W3)	07:46
	20:52	88	10:15 (W4)	20:17	106	10:28 (W4)	19:27			18:38	17:05
22	06:13	08:47 (W4)	06:42	08:42 (W4)	07:13	07:44	07:20	07:20		15:44 (W3)	07:46
	20:52	88	10:15 (W4)	20:15	106	10:28 (W4)	19:25			18:37	17:04
23	06:14	08:47 (W4)	06:43	08:42 (W4)	07:14	07:45	07:21	07:21		15:44 (W3)	07:47
	20:51	89	10:16 (W4)	20:14	106	10:28 (W4)	19:23			18:36	17:03
24	06:15	08:46 (W4)	06:44	08:43 (W4)	07:14	07:46	07:22	07:22		15:44 (W3)	07:47
	20:50	91	10:17 (W4)	20:12	105	10:28 (W4)	19:21			18:34	17:03
25	06:15	08:46 (W4)	06:45	08:43 (W4)	07:15	06:47	07:23	07:23		15:44 (W3)	07:48
	20:49	92	10:18 (W4)	20:11	105	10:28 (W4)	19:20			17:33	17:02
26	06:16	08:45 (W4)	06:46	08:43 (W4)	07:16	06:48	07:24	07:24		15:44 (W3)	07:48
	20:48	93	10:18 (W4)	20:09	104	10:27 (W4)	19:18			17:31	17:02
27	06:17	08:45 (W4)	06:47	08:44 (W4)	07:17	06:49	07:25	07:25		15:45 (W3)	07:49
	20:47	93	10:18 (W4)	20:08	103	10:27 (W4)	19:16			17:30	17:01
28	06:18	08:45 (W4)	06:48	08:44 (W4)	07:18	06:51	07:26	07:26		15:45 (W3)	07:49
	20:46	94	10:19 (W4)	20:06	103	10:27 (W4)	19:15			17:29	17:01
29	06:19	08:45 (W4)	06:49	08:44 (W4)	07:19	06:52	07:27	07:27		15:45 (W3)	07:49
	20:45	95	10:20 (W4)	20:05	102	10:26 (W4)	19:13			17:27	17:00
30	06:20	08:45 (W4)	06:50	08:45 (W4)	07:20	06:53	07:28	07:28		15:46 (W3)	07:49
	20:44	96	10:21 (W4)	20:03	101	10:26 (W4)	19:11			17:26	17:00
31	06:21	08:45 (W4)	06:51	08:45 (W4)		06:54				06:54	
	20:43	96	10:21 (W4)	20:01	100	10:25 (W4)				17:25	
Potential sun hours		458		427		375			346		299
Total, worst case		2610		3197		1394			728		1119

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F117 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (21)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

January		February		March	April		May		June
1	07:50	10:21 (W3)	07:37	07:02	07:11	07:56 (W4)	06:26	05:58	
	17:09	10:44 (W3)	17:43	18:16	19:50	08:20 (W4)	20:21	20:50	
2	07:50	10:22 (W3)	07:36	07:00	07:10	07:53 (W4)	06:25	05:57	
	17:10	10:43 (W3)	17:44	18:18	19:51	08:19 (W4)	20:22	20:51	
3	07:50	10:24 (W3)	07:35	06:58	07:08	07:53 (W4)	06:24	05:57	
	17:11	10:43 (W3)	17:45	18:19	19:52	08:18 (W4)	20:23	20:52	
4	07:50	10:25 (W3)	07:34	06:57	07:06	07:54 (W4)	06:22	05:56	
	17:12	10:41 (W3)	17:47	18:20	19:53	08:18 (W4)	20:24	20:52	
5	07:50	10:28 (W3)	07:33	06:55	07:05	07:54 (W4)	06:21	05:56	
	17:12	10:40 (W3)	17:48	18:21	19:54	08:16 (W4)	20:25	20:53	
6	07:50	10:32 (W3)	07:32	06:54	07:03	07:55 (W4)	06:20	05:56	
	17:13	10:37 (W3)	17:49	18:22	19:55	08:15 (W4)	20:26	20:54	
7	07:50		07:31	06:52	07:02	07:56 (W4)	06:19	05:56	
	17:14		17:50	18:23	19:56	08:13 (W4)	20:27	20:54	
8	07:50		07:30	06:51	07:00	07:58 (W4)	06:18	05:55	
	17:15		17:51	18:24	19:57	08:10 (W4)	20:28	20:55	
9	07:50		07:29	06:49	06:58	08:02 (W4)	06:16	05:55	
	17:16		17:53	18:25	19:58	08:06 (W4)	20:29	20:55	
10	07:50		07:27	06:47	06:57		06:15	05:55	
	17:17		17:54	18:26	19:59		20:30	20:56	
11	07:50		07:26	06:46	06:55		06:14	05:55	
	17:18		17:55	18:28	20:00		20:31	20:57	
12	07:49		07:25	06:44	06:54		06:13	05:55	
	17:19		17:56	18:29	20:01		20:32	20:57	
13	07:49		07:24	06:43	06:52		06:12	05:55	
	17:20		17:58	18:30	20:02		20:33	20:58	
14	07:49		07:23	06:41	06:51		06:11	05:54	
	17:22		17:59	18:31	20:03		20:34	20:58	
15	07:48		07:21	06:39	06:49		06:10	05:54	
	17:23		18:00	18:32	20:04		20:35	20:58	
16	07:48		07:20	06:38	06:47		06:09	05:54	
	17:24		18:01	18:33	20:05		20:36	20:59	
17	07:47		07:19	06:36	06:46		06:08	05:55	
	17:25		18:02	18:34	20:07		20:37	20:59	
18	07:47		07:17	06:34	06:44		06:07	05:55	
	17:26		18:04	18:35	20:08		20:38	20:59	
19	07:47		07:16	06:33	06:43		06:06	05:55	
	17:27		18:05	18:36	20:09		20:39	21:00	
20	07:46		07:15	06:31	06:41		06:06	05:55	
	17:28		18:06	18:37	20:10		20:40	21:00	
21	07:45		07:13	06:30	06:40		06:05	05:55	
	17:29		18:07	18:38	20:11		20:41	21:00	
22	07:45		07:12	06:28	06:39		06:04	05:55	
	17:31		18:08	18:39	20:12		20:42	21:01	
23	07:44		07:10	06:26	06:37		06:03	05:55	
	17:32		18:09	18:40	20:13		20:43	21:01	
24	07:43		07:09	06:25	07:14 (W4)	06:36	06:02	05:56	
	17:33		18:11	18:41	2	07:16 (W4)	20:14	21:01	
25	07:43		07:07	06:23	07:11 (W4)	06:34	06:02	05:56	
	17:34		18:12	18:42	7	07:18 (W4)	20:15	21:01	
26	07:42		07:06	06:21	07:09 (W4)	06:33	06:01	05:56	
	17:35		18:13	18:44	10	07:19 (W4)	20:16	21:01	
27	07:41		07:05	06:20	07:07 (W4)	06:31	06:00	05:57	
	17:37		18:14	18:45	13	07:20 (W4)	20:17	21:01	
28	07:40		07:03	06:18	07:03 (W4)	06:30	06:00	05:57	
	17:38		18:15	18:46	17	07:20 (W4)	20:18	21:01	
29	07:40			07:16	08:02 (W4)	06:29	05:59	05:57	
	17:39			19:47	19	08:21 (W4)	20:19	21:01	
30	07:39			07:15	08:00 (W4)	06:27	05:59	05:58	
	17:40			19:48	20	08:20 (W4)	20:20	21:01	
31	07:38			07:13	07:57 (W4)		05:58		
	17:42			19:49	23	08:20 (W4)	20:49		
Potential sun hours	299		298	370	398		447	451	
Total, worst case	96			111	174				

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)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F117 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (21)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September		October	November	December
1	05:58 21:01	06:22 20:42	06:52 20:00		07:22 19:10	06:55 17:24	07:30 17:00
2	05:59 21:01	06:23 20:41	06:53 19:58		07:23 19:08	06:56 17:23	07:31 17:00
3	05:59 21:01	06:24 20:40	06:54 19:57	4	08:00 (W4) 08:04 (W4)	07:24 17:21	07:32 16:59
4	06:00 21:01	06:25 20:39	06:55 19:55	12	07:56 (W4) 08:08 (W4)	07:25 19:05	07:33 16:59
5	06:00 21:00	06:26 20:38	06:56 19:53	17	07:52 (W4) 08:09 (W4)	07:26 19:03	07:34 16:59
6	06:01 21:00	06:27 20:37	06:57 19:52	20	07:50 (W4) 08:10 (W4)	07:27 19:02	07:35 16:59
7	06:02 21:00	06:28 20:36	06:58 19:50	22	07:49 (W4) 08:11 (W4)	07:28 19:00	07:35 16:59
8	06:02 21:00	06:29 20:34	06:59 19:48	24	07:48 (W4) 08:12 (W4)	07:29 18:58	07:36 16:59
9	06:03 20:59	06:30 20:33	07:00 19:47	25	07:47 (W4) 08:12 (W4)	07:30 18:57	07:37 16:59
10	06:04 20:59	06:31 20:32	07:01 19:45	26	07:46 (W4) 08:12 (W4)	07:31 18:55	07:38 16:59
11	06:04 20:58	06:32 20:31	07:02 19:43	24	07:48 (W4) 08:12 (W4)	07:32 18:54	07:39 16:59
12	06:05 20:58	06:33 20:29	07:03 19:42	23	07:49 (W4) 08:12 (W4)	07:33 18:52	07:40 16:59
13	06:06 20:57	06:34 20:28	07:04 19:40	21	07:51 (W4) 08:12 (W4)	07:34 18:50	07:41 16:59
14	06:06 20:57	06:34 20:27	07:05 19:38	19	07:52 (W4) 08:11 (W4)	07:35 18:49	07:41 16:59
15	06:07 20:56	06:35 20:25	07:06 19:37	17	07:53 (W4) 08:10 (W4)	07:36 18:47	07:42 16:59
16	06:08 20:56	06:36 20:24	07:07 19:35	13	07:56 (W4) 08:09 (W4)	07:37 18:46	07:43 17:00
17	06:09 20:55	06:37 20:22	07:08 19:33	11	07:57 (W4) 08:08 (W4)	07:38 18:44	07:44 17:00
18	06:09 20:55	06:38 20:21	07:09 19:32	7	07:59 (W4) 08:06 (W4)	07:39 18:43	07:44 17:00
19	06:10 20:54	06:39 20:20	07:10 19:30	3	08:01 (W4) 08:04 (W4)	07:40 18:41	07:45 17:01
20	06:11 20:53	06:40 20:18	07:11 19:28		07:42 18:40	07:17 17:05	07:45 17:01
21	06:12 20:52	06:41 20:17	07:12 19:27		07:43 18:38	07:19 17:05	07:46 17:02
22	06:13 20:52	06:42 20:15	07:13 19:25		07:44 18:37	07:20 17:04	07:46 17:02
23	06:14 20:51	06:43 20:14	07:14 19:23		07:45 18:36	07:21 17:03	07:47 17:03
24	06:15 20:50	06:44 20:12	07:15 19:22		07:46 18:34	07:22 17:03	07:47 17:03
25	06:15 20:49	06:45 20:11	07:16 19:20		06:47 17:33	07:23 17:02	07:48 17:04
26	06:16 20:48	06:46 20:09	07:17 19:18		06:48 17:31	07:24 17:02	07:48 17:04
27	06:17 20:47	06:47 20:08	07:18 19:16		06:49 17:30	07:25 17:01	07:49 17:05
28	06:18 20:46	06:48 20:06	07:19 19:15		06:51 17:29	07:26 17:01	07:49 17:06
29	06:19 20:45	06:49 20:05	07:20 19:13		06:52 17:28	07:27 17:00	07:49 17:06
30	06:20 20:44	06:50 20:03	07:21 19:11		06:53 17:26	07:29 17:00	07:49 17:07
31	06:21 20:43	06:51 20:01			06:54 17:25		07:50 17:08
Potential sun hours	458	427	375		346	299	289
Total, worst case			288				671

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F119 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (28)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

January			February			March			April			May			June		
1	07:50		09:08 (W3)	07:37	07:02				07:11		07:50 (W4)	06:26		05:58			
	17:09	47	09:55 (W3)	17:43	18:16				19:50	23	08:13 (W4)	20:21		20:50			
2	07:50		09:08 (W3)	07:36	07:00				07:10		07:50 (W4)	06:25		05:57			
	17:10	48	09:56 (W3)	17:44	18:18				19:51	22	08:12 (W4)	20:22		20:51			
3	07:50		09:08 (W3)	07:35	06:58				07:08		07:49 (W4)	06:24		05:57			
	17:11	48	09:56 (W3)	17:45	18:19				19:52	22	08:11 (W4)	20:23		20:52			
4	07:50		09:09 (W3)	07:34	06:57				07:06		07:50 (W4)	06:22		05:57			
	17:12	48	09:57 (W3)	17:47	18:20				19:53	20	08:10 (W4)	20:24		20:52			
5	07:50		09:10 (W3)	07:33	06:55				07:05		07:51 (W4)	06:21		05:56			
	17:12	47	09:57 (W3)	17:48	18:21				19:54	17	08:08 (W4)	20:25		20:53			
6	07:50		09:10 (W3)	07:32	06:54				07:03		07:53 (W4)	06:20		05:56			
	17:13	48	09:58 (W3)	17:49	18:22				19:55	14	08:07 (W4)	20:26		20:54			
7	07:50		09:11 (W3)	07:31	06:52				07:02		07:54 (W4)	06:19		05:56			
	17:14	47	09:58 (W3)	17:50	18:23				19:56	10	08:04 (W4)	20:27		20:54			
8	07:50		09:11 (W3)	07:30	06:51				07:00			06:18		05:55			
	17:15	48	09:59 (W3)	17:51	18:24				19:57			20:28		20:55			
9	07:50		09:12 (W3)	07:29	06:49				06:58			06:16		05:55			
	17:16	47	09:59 (W3)	17:53	18:25				19:58			20:29		20:55			
10	07:50		09:12 (W3)	07:27	06:47				06:57			06:15		05:55			
	17:17	47	09:59 (W3)	17:54	18:26				19:59			20:30		20:56			
11	07:50		09:13 (W3)	07:26	06:46				06:55			06:14		05:55			
	17:18	46	09:59 (W3)	17:55	18:28				20:00			20:31		20:57			
12	07:49		09:14 (W3)	07:25	06:44				06:54			06:13		05:55			
	17:19	46	10:00 (W3)	17:56	18:29				20:01			20:32		20:57			
13	07:49		09:14 (W3)	07:24	06:43				06:52			06:12		05:55			
	17:20	45	09:59 (W3)	17:58	18:30				20:02			20:33		20:58			
14	07:49		09:15 (W3)	07:23	06:41				06:51			06:11		05:54			
	17:22	45	10:00 (W3)	17:59	18:31				20:03			20:34		20:58			
15	07:48		09:15 (W3)	07:21	06:39				06:49			06:10		05:54			
	17:23	44	09:59 (W3)	18:00	18:32				20:04			20:35		20:58			
16	07:48		09:16 (W3)	07:20	06:38				06:47			06:09		05:54			
	17:24	43	09:59 (W3)	18:01	18:33				20:05			20:36		20:59			
17	07:48		09:16 (W3)	07:19	06:36				06:46			06:08		05:55			
	17:25	43	09:59 (W3)	18:02	18:34				20:07			20:37		20:59			
18	07:47		09:17 (W3)	07:17	06:34				06:44			06:07		05:55			
	17:26	42	09:59 (W3)	18:04	18:35				20:08			20:38		21:00			
19	07:47		09:18 (W3)	07:16	06:33				06:43			06:06		05:55			
	17:27	41	09:59 (W3)	18:05	18:36				20:09			20:39		21:00			
20	07:46		09:19 (W3)	07:15	06:31				06:41			06:06		05:55			
	17:28	40	09:59 (W3)	18:06	18:37				20:10			20:40		21:00			
21	07:45		09:20 (W3)	07:13	06:30				06:40			06:05		05:55			
	17:30	38	09:58 (W3)	18:07	18:38				20:11			20:41		21:00			
22	07:45		09:20 (W3)	07:12	06:28				06:39			06:04		05:55			
	17:31	37	09:57 (W3)	18:08	18:39				20:12			20:42		21:01			
23	07:44		09:22 (W3)	07:10	06:26				06:37			06:03		05:55			
	17:32	35	09:57 (W3)	18:09	18:40				20:13			20:43		21:01			
24	07:43		09:23 (W3)	07:09	06:25				06:36			06:02		05:56			
	17:33	33	09:56 (W3)	18:11	18:41				20:14			20:44		21:01			
25	07:43		09:24 (W3)	07:07	06:23			07:02 (W4)	06:34			06:02		05:56			
	17:34	31	09:55 (W3)	18:12	18:43	7	07:09 (W4)	20:15				20:45		21:01			
26	07:42		09:25 (W3)	07:06	06:21		07:01 (W4)	06:33				06:01		05:56			
	17:35	29	09:54 (W3)	18:13	18:44	10	07:11 (W4)	20:16				20:45		21:01			
27	07:41		09:27 (W3)	07:05	06:20		06:58 (W4)	06:31				06:00		05:57			
	17:37	25	09:52 (W3)	18:14	18:45	14	07:12 (W4)	20:17				20:46		21:01			
28	07:40		09:30 (W3)	07:03	06:18		06:56 (W4)	06:30				06:00		05:57			
	17:38	21	09:51 (W3)	18:15	18:46	16	07:12 (W4)	20:18				20:47		21:01			
29	07:40		09:32 (W3)		07:16		07:54 (W4)	06:29				05:59		05:57			
	17:39	16	09:48 (W3)		19:47	19	08:13 (W4)	20:19				20:48		21:01			
30	07:39		09:37 (W3)		07:15		07:51 (W4)	06:27				05:59		05:58			
	17:40	7	09:44 (W3)		19:48	22	08:13 (W4)	20:20				20:49		21:01			
31	07:38				07:13		07:50 (W4)					05:58					
	17:42				19:49	23	08:13 (W4)					20:49					
Potential sun hours	299			298	370			398				447		451			
Total, worst case	1182				111			128									

Table 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)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F119 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (28)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September		October	November		December	
1	05:58	06:22	06:52		07:22	06:55		07:30	08:55 (W3)
	21:01	20:42	20:00		19:10	17:24		17:00	46 09:41 (W3)
2	05:59	06:23	06:53		07:23	06:56		07:31	08:55 (W3)
	21:01	20:41	19:58		19:08	17:23		17:00	47 09:42 (W3)
3	05:59	06:24	06:54		07:24	06:58		07:32	08:55 (W3)
	21:01	20:40	19:57		19:07	17:21		16:59	47 09:42 (W3)
4	06:00	06:25	06:55		07:25	06:59		07:33	08:55 (W3)
	21:01	20:39	19:55		19:05	17:20		16:59	48 09:43 (W3)
5	06:00	06:26	06:56	07:51 (W4)	07:26	07:00		07:34	08:56 (W3)
	21:00	20:38	19:53	10 08:01 (W4)	19:03	17:19		16:59	47 09:43 (W3)
6	06:01	06:27	06:57	07:48 (W4)	07:27	07:01		07:35	08:56 (W3)
	21:00	20:37	19:52	14 08:02 (W4)	19:02	17:18		16:59	48 09:44 (W3)
7	06:02	06:28	06:58	07:46 (W4)	07:28	07:02		07:35	08:57 (W3)
	21:00	20:36	19:50	17 08:03 (W4)	19:00	17:17		16:59	47 09:44 (W3)
8	06:02	06:29	06:59	07:45 (W4)	07:29	07:03		07:36	08:57 (W3)
	21:00	20:34	19:48	19 08:04 (W4)	18:58	17:16		16:59	48 09:45 (W3)
9	06:03	06:30	07:00	07:44 (W4)	07:30	07:05		07:37	08:58 (W3)
	20:59	20:33	19:47	21 08:05 (W4)	18:57	17:15		16:59	47 09:45 (W3)
10	06:04	06:31	07:01	07:43 (W4)	07:31	07:06		07:38	08:58 (W3)
	20:59	20:32	19:45	22 08:05 (W4)	18:55	17:14		16:59	48 09:46 (W3)
11	06:04	06:32	07:02	07:42 (W4)	07:32	07:07		07:39	08:58 (W3)
	20:58	20:31	19:43	23 08:05 (W4)	18:54	17:13		16:59	48 09:46 (W3)
12	06:05	06:33	07:03	07:42 (W4)	07:33	07:08	09:07 (W3)	07:40	08:58 (W3)
	20:58	20:29	19:42	23 08:05 (W4)	18:52	17:12	8 09:15 (W3)	16:59	48 09:46 (W3)
13	06:06	06:34	07:04	07:42 (W4)	07:34	07:09	09:04 (W3)	07:41	08:59 (W3)
	20:57	20:28	19:40	22 08:04 (W4)	18:50	17:11	17 09:21 (W3)	16:59	48 09:47 (W3)
14	06:06	06:34	07:05	07:44 (W4)	07:35	07:10	09:02 (W3)	07:41	09:00 (W3)
	20:57	20:27	19:38	20 08:04 (W4)	18:49	17:10	21 09:23 (W3)	16:59	48 09:48 (W3)
15	06:07	06:35	07:06	07:46 (W4)	07:36	07:12	09:00 (W3)	07:42	09:00 (W3)
	20:56	20:25	19:37	17 08:03 (W4)	18:47	17:09	25 09:25 (W3)	17:00	48 09:48 (W3)
16	06:08	06:36	07:07	07:47 (W4)	07:37	07:13	08:58 (W3)	07:43	09:00 (W3)
	20:56	20:24	19:35	15 08:02 (W4)	18:46	17:08	29 09:27 (W3)	17:00	48 09:48 (W3)
17	06:09	06:37	07:08	07:49 (W4)	07:38	07:14	08:58 (W3)	07:44	09:01 (W3)
	20:55	20:22	19:33	11 08:00 (W4)	18:44	17:07	31 09:29 (W3)	17:00	48 09:49 (W3)
18	06:09	06:38	07:09	07:50 (W4)	07:39	07:15	08:57 (W3)	07:44	09:01 (W3)
	20:55	20:21	19:32	8 07:58 (W4)	18:43	17:07	33 09:30 (W3)	17:00	48 09:49 (W3)
19	06:10	06:39	07:10	07:51 (W4)	07:40	07:16	08:56 (W3)	07:45	09:02 (W3)
	20:54	20:20	19:30	3 07:54 (W4)	18:41	17:06	35 09:31 (W3)	17:01	48 09:50 (W3)
20	06:11	06:40	07:11		07:42	07:17	08:55 (W3)	07:45	09:03 (W3)
	20:53	20:18	19:28		18:40	17:05	37 09:32 (W3)	17:01	48 09:51 (W3)
21	06:12	06:41	07:12		07:43	07:19	08:56 (W3)	07:46	09:03 (W3)
	20:52	20:17	19:27		18:38	17:05	38 09:34 (W3)	17:02	47 09:50 (W3)
22	06:13	06:42	07:13		07:44	07:20	08:55 (W3)	07:46	09:04 (W3)
	20:52	20:15	19:25		18:37	17:04	40 09:35 (W3)	17:02	47 09:51 (W3)
23	06:14	06:43	07:14		07:45	07:21	08:55 (W3)	07:47	09:04 (W3)
	20:51	20:14	19:23		18:36	17:03	41 09:36 (W3)	17:03	48 09:52 (W3)
24	06:15	06:44	07:15		07:46	07:22	08:54 (W3)	07:47	09:04 (W3)
	20:50	20:12	19:22		18:34	17:03	42 09:36 (W3)	17:03	48 09:52 (W3)
25	06:15	06:45	07:16		06:47	07:23	08:54 (W3)	07:48	09:05 (W3)
	20:49	20:11	19:20		17:33	17:02	43 09:37 (W3)	17:04	48 09:53 (W3)
26	06:16	06:46	07:17		06:48	07:24	08:54 (W3)	07:48	09:05 (W3)
	20:48	20:09	19:18		17:31	17:02	43 09:37 (W3)	17:04	48 09:53 (W3)
27	06:17	06:47	07:18		06:49	07:25	08:55 (W3)	07:49	09:05 (W3)
	20:47	20:08	19:16		17:30	17:01	44 09:39 (W3)	17:05	48 09:53 (W3)
28	06:18	06:48	07:19		06:51	07:26	08:55 (W3)	07:49	09:06 (W3)
	20:46	20:06	19:15		17:29	17:01	45 09:40 (W3)	17:06	48 09:54 (W3)
29	06:19	06:49	07:20		06:52	07:27	08:55 (W3)	07:49	09:07 (W3)
	20:45	20:05	19:13		17:28	17:00	45 09:40 (W3)	17:06	47 09:54 (W3)
30	06:20	06:50	07:21		06:53	07:29	08:55 (W3)	07:49	09:07 (W3)
	20:44	20:03	19:11		17:26	17:00	46 09:41 (W3)	17:07	48 09:55 (W3)
31	06:21	06:51			06:54			07:50	09:07 (W3)
	20:43	20:01			17:25			17:08	48 09:55 (W3)
Potential sun hours	458	427	375		346	299		289	1478
Total, worst case			245			663			

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F12 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (15)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:22	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:07	06:58 17:21	07:32 16:59
4	07:50 17:11	07:34 17:46	06:57 18:20	07:06 19:53	06:22 20:24	05:56 20:52	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	05:56 20:54	06:01 21:00	06:27 20:37	06:57 19:52	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	05:55 20:54	06:02 21:00	06:28 20:36	06:58 19:50	07:28 19:00	07:02 17:17	07:36 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	05:55 20:55	06:02 21:00	06:29 20:34	06:59 19:48	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	05:55 20:56	06:03 20:59	06:30 20:33	07:00 19:47	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:47 18:26	06:57 19:59	06:15 20:30	05:55 20:56	06:03 20:59	06:31 20:32	07:01 19:45	07:31 18:55	07:06 17:14	07:38 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	06:14 20:31	05:55 20:57	06:04 20:58	06:32 20:31	07:02 19:43	07:32 18:54	07:07 17:13	07:39 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	06:13 20:32	05:55 20:57	06:05 20:58	06:32 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	06:12 20:33	05:54 20:58	06:06 20:57	06:33 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 16:59
14	07:49 17:21	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	05:54 20:58	06:06 20:57	06:34 20:27	07:05 19:38	07:35 18:49	07:11 17:10	07:41 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	06:10 20:35	05:54 20:58	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 16:59
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:06	06:09 20:36	05:54 20:59	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 17:00
17	07:48 17:25	07:19 18:02	06:36 18:34	06:46 20:07	06:08 20:37	05:54 20:59	06:09 20:55	06:37 20:23	07:08 19:33	07:38 18:44	07:14 17:07	07:44 17:00
18	07:47 17:26	07:17 18:04	06:34 18:35	06:44 20:08	06:07 20:38	05:55 21:00	06:09 20:55	06:38 20:21	07:09 19:32	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	05:55 21:00	06:10 20:54	06:39 20:20	07:10 19:30	07:40 18:41	07:16 17:06	07:45 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	06:06 20:40	05:55 21:00	06:11 20:53	06:40 20:18	07:11 19:28	07:42 18:40	07:17 17:05	07:45 17:01
21	07:45 17:29	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	05:55 21:00	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:38 20:12	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:47 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:02 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 17:03
25	07:43 17:34	07:07 18:12	06:23 18:43	06:34 20:15	06:02 20:45	05:56 21:01	06:15 20:49	06:45 20:11	07:16 19:20	07:47 17:33	07:23 17:02	07:48 17:04
26	07:42 17:35	07:06 18:13	06:21 18:44	06:33 20:16	06:01 20:45	05:56 21:01	06:16 20:48	06:46 20:09	07:17 19:18	07:48 17:31	07:24 17:02	07:48 17:04
27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	05:57 21:01	06:17 20:47	06:47 20:08	07:18 19:16	07:49 17:30	07:25 17:01	07:49 17:05
28	07:40 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	05:57 21:01	06:18 20:46	06:48 20:06	07:19 19:15	07:50 17:29	07:26 17:01	07:49 17:06
29	07:40 17:39		07:16 19:47	06:29 20:19	05:59 20:48	05:57 21:01	06:19 20:45	06:49 20:05	07:20 19:13	07:51 17:27	07:28 17:00	07:49 17:06
30	07:39 17:40		07:15 19:48	06:27 20:20	05:59 20:49	05:58 21:01	06:20 20:44	06:50 20:03	07:21 19:11	07:52 17:26	07:29 17:00	07:50 17:07
31	07:38 17:42		07:13 19:49		05:58 20:49		06:21 20:43	06:51 20:01		06:54 17:25		07:50 17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F125 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (22)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

January		February		March		April		May		June	
1	07:50	09:50 (W1)	07:37	07:02	08:28 (W3)	07:11	09:27 (W3)	06:26	07:08 (W4)	05:58	
	17:09	24 10:14 (W1)	17:43	18:16	50 09:18 (W3)	19:50	27 09:54 (W3)	20:21	23 07:31 (W4)	20:50	
2	07:50	09:51 (W1)	07:36	07:00	08:28 (W3)	07:10	09:29 (W3)	06:25	07:07 (W4)	05:57	
	17:10	23 10:14 (W1)	17:44	18:18	51 09:19 (W3)	19:51	21 09:50 (W3)	20:22	24 07:31 (W4)	20:51	
3	07:50	09:52 (W1)	07:35	06:58	08:26 (W3)	07:08	09:33 (W3)	06:24	07:07 (W4)	05:57	
	17:11	21 10:13 (W1)	17:45	18:19	54 09:20 (W3)	19:52	12 09:45 (W3)	20:23	24 07:31 (W4)	20:52	
4	07:50	09:53 (W1)	07:34	06:57	08:25 (W3)	07:06		06:22	07:07 (W4)	05:57	
	17:12	20 10:13 (W1)	17:47	18:20	56 09:21 (W3)	19:53		20:24	24 07:31 (W4)	20:52	
5	07:50	09:55 (W1)	07:33	06:55	08:24 (W3)	07:05		06:21	07:08 (W4)	05:56	
	17:12	17 10:12 (W1)	17:48	18:21	57 09:21 (W3)	19:54		20:25	23 07:31 (W4)	20:53	
6	07:50	09:56 (W1)	07:32	06:54	08:23 (W3)	07:03		06:20	07:07 (W4)	05:56	
	17:13	16 10:12 (W1)	17:49	18:22	59 09:22 (W3)	19:55		20:26	22 07:29 (W4)	20:54	
7	07:50	09:59 (W1)	07:31	06:52	08:22 (W3)	07:02		06:19	07:08 (W4)	05:56	
	17:14	11 10:10 (W1)	17:50	18:23	60 09:22 (W3)	19:56		20:27	21 07:29 (W4)	20:54	
8	07:50	10:02 (W1)	07:30	06:51	08:21 (W3)	07:00		06:18	07:08 (W4)	05:55	
	17:15	6 10:08 (W1)	17:51	18:24	61 09:22 (W3)	19:57		20:28	20 07:28 (W4)	20:55	
9	07:50		07:29	06:49	08:20 (W3)	06:58		06:16	07:09 (W4)	05:55	
	17:16		17:53	18:25	63 09:23 (W3)	19:58		20:29	18 07:27 (W4)	20:55	
10	07:50		07:27	06:47	08:19 (W3)	06:57		06:15	07:10 (W4)	05:55	
	17:17		17:54	18:26	63 09:22 (W3)	19:59		20:30	16 07:26 (W4)	20:56	
11	07:50		07:26	06:46	08:19 (W3)	06:55		06:14	07:12 (W4)	05:55	
	17:18		17:55	18:28	64 09:23 (W3)	20:00		20:31	13 07:25 (W4)	20:57	
12	07:49		07:25	06:44	08:19 (W3)	06:54		06:13	07:14 (W4)	05:55	
	17:19		17:56	18:29	63 09:22 (W3)	20:01		20:32	9 07:23 (W4)	20:57	
13	07:49		07:24	06:43	08:18 (W3)	06:52		06:12		05:55	
	17:20		17:58	18:30	63 09:21 (W3)	20:02		20:33		20:58	
14	07:49		07:23	06:41	08:18 (W3)	06:51		06:11		05:54	
	17:22		17:59	18:31	63 09:21 (W3)	20:03		20:34		20:58	
15	07:48		07:21	06:39	08:17 (W3)	06:49		06:10		05:54	
	17:23		18:00	18:32	64 09:21 (W3)	20:04		20:35		20:58	
16	07:48		07:20	06:38	08:17 (W3)	06:47		06:09		05:54	
	17:24		18:01	18:33	63 09:20 (W3)	20:05		20:36		20:59	
17	07:47		07:19	06:36	08:17 (W3)	06:46		06:08		05:55	
	17:25		18:02	18:34	63 09:20 (W3)	20:07		20:37		20:59	
18	07:47		07:17	06:34	08:17 (W3)	06:44		06:07		05:55	
	17:26		18:04	18:35	61 09:18 (W3)	20:08		20:38		20:59	
19	07:47		07:16	06:33	08:16 (W3)	06:43		06:06		05:55	
	17:27		18:05	18:36	61 09:17 (W3)	20:09		20:39		21:00	
20	07:46		07:15	06:31	08:17 (W3)	06:41		06:06		05:55	
	17:28		18:06	18:37	60 09:17 (W3)	20:10		20:40		21:00	
21	07:45		07:13	06:30	08:17 (W3)	06:40		06:05		05:55	
	17:30		18:07	18:38	58 09:15 (W3)	20:11		20:41		21:00	
22	07:45		07:12	06:28	08:17 (W3)	06:39		06:04		05:55	
	17:31		18:08	18:39	57 09:14 (W3)	20:12		20:42		21:01	
23	07:44		07:10	06:26	08:18 (W3)	06:37		06:03		05:55	
	17:32		18:09	18:40	55 09:13 (W3)	20:13		20:43		21:01	
24	07:43		07:09	06:25	08:18 (W3)	06:36		06:03		05:56	
	17:33		18:11	18:41	53 09:11 (W3)	20:14	10 07:25 (W4)	20:44		21:01	
25	07:43		07:07	06:23	08:18 (W3)	06:34		06:02		05:56	
	17:34		18:12	18:42	51 09:09 (W3)	20:15	15 07:28 (W4)	20:44		21:01	
26	07:42		07:06	06:21	08:19 (W3)	06:33		06:01		05:56	
	17:35		18:13	18:44	49 09:08 (W3)	20:16	17 07:29 (W4)	20:45		21:01	
27	07:41		07:05	06:20	08:20 (W3)	06:31		06:00		05:57	
	17:37		18:14	18:45	46 09:06 (W3)	20:17	20 07:30 (W4)	20:46		21:01	
28	07:40		07:03	06:18	08:20 (W3)	06:30		06:00		05:57	
	17:38		18:15	18:46	44 09:04 (W3)	20:18	20 07:30 (W4)	20:47		21:01	
29	07:40			07:16	09:22 (W3)	06:29		05:59		05:57	
	17:39			19:47	41 10:03 (W3)	20:19	21 07:31 (W4)	20:48		21:01	
30	07:39			07:15	09:23 (W3)	06:27		05:59		05:58	
	17:40			19:48	37 10:00 (W3)	20:20	23 07:32 (W4)	20:49		21:01	
31	07:38			07:13	09:24 (W3)			05:58			
	17:42			19:49	33 09:57 (W3)			20:49			
Potential sun hours	299		298	370		398		447		451	
Total, worst case	138		234	1723		186		237			

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F125 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (22)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	07:23 (W4) 07:34 (W4)	06:52 20:00	07:22 19:10	08:57 (W3) 10:01 (W3)
2	05:59 21:01	06:23 20:41	07:22 (W4) 07:36 (W4)	06:53 19:58	07:23 19:08	08:57 (W3) 10:00 (W3)
3	05:59 21:01	06:24 20:40	07:20 (W4) 07:37 (W4)	06:54 19:57	07:24 19:07	08:57 (W3) 10:00 (W3)
4	06:00 21:01	06:25 20:39	07:20 (W4) 07:38 (W4)	06:55 19:55	07:25 19:05	08:58 (W3) 10:00 (W3)
5	06:00 21:00	06:26 20:38	07:19 (W4) 07:39 (W4)	06:56 19:53	07:26 19:03	08:58 (W3) 10:00 (W3)
6	06:01 21:00	06:27 20:37	07:17 (W4) 07:39 (W4)	06:57 19:52	07:27 19:02	08:58 (W3) 09:59 (W3)
7	06:02 21:00	06:28 20:36	07:17 (W4) 07:39 (W4)	06:58 19:50	07:28 19:00	08:59 (W3) 09:58 (W3)
8	06:02 21:00	06:29 20:34	07:16 (W4) 07:40 (W4)	06:59 19:48	07:29 18:58	08:59 (W3) 09:57 (W3)
9	06:03 20:59	06:30 20:33	07:16 (W4) 07:40 (W4)	07:00 19:47	07:30 18:57	08:59 (W3) 09:56 (W3)
10	06:04 20:59	06:31 20:32	07:16 (W4) 07:40 (W4)	07:01 19:45	07:31 18:55	09:00 (W3) 09:55 (W3)
11	06:04 20:58	06:32 20:31	07:16 (W4) 07:40 (W4)	07:02 19:43	07:32 18:54	09:01 (W3) 09:54 (W3)
12	06:05 20:58	06:33 20:29	07:17 (W4) 07:40 (W4)	07:03 19:42	07:33 18:52	09:01 (W3) 09:52 (W3)
13	06:06 20:57	06:34 20:28	07:17 (W4) 07:39 (W4)	07:04 19:40	07:34 18:50	09:02 (W3) 09:51 (W3)
14	06:06 20:57	06:34 20:27	07:18 (W4) 07:39 (W4)	07:05 19:38	07:35 18:49	09:04 (W3) 09:49 (W3)
15	06:07 20:56	06:35 20:25	07:17 (W4) 07:38 (W4)	07:06 19:37	07:36 18:47	09:05 (W3) 09:47 (W3)
16	06:08 20:56	06:36 20:24	07:18 (W4) 07:37 (W4)	07:07 19:35	07:37 18:46	09:08 (W3) 09:46 (W3)
17	06:09 20:55	06:37 20:22	07:19 (W4) 07:36 (W4)	07:08 19:33	07:38 18:44	09:09 (W3) 09:43 (W3)
18	06:09 20:55	06:38 20:21	07:20 (W4) 07:34 (W4)	07:09 19:32	07:39 18:43	09:12 (W3) 09:40 (W3)
19	06:10 20:54	06:39 20:20	07:22 (W4) 07:32 (W4)	07:10 19:30	07:40 18:41	09:15 (W3) 09:36 (W3)
20	06:11 20:53	06:40 20:18	07:11 19:28	07:11 19:28	07:42 18:40	09:21 (W3) 09:30 (W3)
21	06:12 20:52	06:41 20:17	07:12 19:27	07:12 19:27	07:43 18:38	09:30 (W3) 10:00 (W3)
22	06:13 20:52	06:42 20:15	07:13 19:25	07:13 19:25	07:44 18:37	10:00 (W3) 09:02 (W3)
23	06:14 20:51	06:43 20:14	07:14 19:23	07:14 19:23	07:45 18:36	09:02 (W3) 10:01 (W3)
24	06:15 20:50	06:44 20:12	07:15 19:22	07:15 19:22	07:46 18:34	09:00 (W3) 10:00 (W3)
25	06:15 20:49	06:45 20:11	07:16 19:20	07:16 19:20	07:47 18:33	08:59 (W3) 10:01 (W3)
26	06:16 20:48	06:46 20:09	07:17 19:18	07:17 19:18	07:48 18:31	08:59 (W3) 10:01 (W3)
27	06:17 20:47	06:47 20:08	07:18 19:16	07:18 19:16	07:49 18:30	08:58 (W3) 10:01 (W3)
28	06:18 20:46	06:48 20:06	07:19 19:15	07:19 19:15	07:51 18:29	08:58 (W3) 10:01 (W3)
29	06:19 20:45	06:49 20:05	07:20 19:13	07:20 19:13	07:52 18:28	08:57 (W3) 10:01 (W3)
30	06:20 20:44	06:50 20:03	07:21 19:11	07:21 19:11	07:53 18:26	08:57 (W3) 10:01 (W3)
31	06:21 20:43	06:51 20:01	07:22 (W4) 07:31 (W4)	07:22 (W4) 07:31 (W4)	07:54 17:25	08:58 (W3) 10:02 (W3)
Potential sun hours	458	427	375	346	299	289
Total, worst case	5	367	1076	974	703	703

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F138 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (23)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March		April	May		June	
1	07:50	07:37	07:01		07:11	06:26		05:58	19:16 (W3)
	17:09	17:43	18:16		19:50	20:21		20:50	21
2	07:50	07:36	07:00		07:10	06:25		05:57	19:18 (W3)
	17:10	17:44	18:17		19:51	20:22		20:51	20
3	07:50	07:35	06:58		07:08	06:24		05:57	19:18 (W3)
	17:11	17:45	18:19		19:52	20:23		20:52	19
4	07:50	07:34	06:57		07:06	06:22		05:56	19:19 (W3)
	17:11	17:46	18:20		19:53	20:24		20:52	17
5	07:50	07:33	06:55		07:05	06:21	19:11 (W3)	05:56	19:21 (W3)
	17:12	17:48	18:21		19:54	20:25	1	19:12 (W3)	15
6	07:50	07:32	06:54		07:03	06:20		19:10 (W3)	19:21 (W3)
	17:13	17:49	18:22		19:55	20:26	3	19:13 (W3)	13
7	07:50	07:31	06:52		07:02	06:19		19:09 (W3)	19:23 (W3)
	17:14	17:50	18:23		19:56	20:27	5	19:14 (W3)	10
8	07:50	07:30	06:51		07:00	06:18		19:09 (W3)	19:25 (W3)
	17:15	17:51	18:24		19:57	20:28	6	19:15 (W3)	7
9	07:50	07:28	06:49		06:58	06:16		19:09 (W3)	19:27 (W3)
	17:16	17:53	18:25		19:58	20:29	7	19:16 (W3)	3
10	07:50	07:27	06:47		06:57	06:15		19:08 (W3)	05:55
	17:17	17:54	18:26		19:59	20:30	9	19:17 (W3)	20:56
11	07:49	07:26	06:46		06:55	06:14		19:08 (W3)	05:55
	17:18	17:55	18:27		20:00	20:31	10	19:18 (W3)	20:56
12	07:49	07:25	06:44		06:54	06:13		19:08 (W3)	05:55
	17:19	17:56	18:29		20:01	20:32	11	19:19 (W3)	20:57
13	07:49	07:24	06:43		06:52	06:12		19:08 (W3)	05:54
	17:20	17:57	18:30		20:02	20:33	12	19:20 (W3)	20:57
14	07:49	07:22	06:41		06:50	06:11		19:08 (W3)	05:54
	17:21	17:59	18:31		20:03	20:34	14	19:22 (W3)	20:58
15	07:48	07:21	06:39	17:11 (W1)	06:49	06:10		19:07 (W3)	05:54
	17:23	18:00	18:32	1	17:12 (W1)	20:04	16	19:23 (W3)	20:58
16	07:48	07:20	06:38	17:10 (W1)	06:47	06:09		19:07 (W3)	05:54
	17:24	18:01	18:33	4	17:14 (W1)	20:05	17	19:24 (W3)	20:59
17	07:47	07:19	06:36	17:11 (W1)	06:46	06:08		19:07 (W3)	05:54
	17:25	18:02	18:34	5	17:16 (W1)	20:06	18	19:25 (W3)	20:59
18	07:47	07:17	06:34	17:10 (W1)	06:44	06:07		19:09 (W3)	05:55
	17:26	18:04	18:35	6	17:16 (W1)	20:07	18	19:27 (W3)	20:59
19	07:46	07:16	06:33	17:10 (W1)	06:43	06:06		19:09 (W3)	05:55
	17:27	18:05	18:36	7	17:17 (W1)	20:09	18	19:27 (W3)	21:00
20	07:46	07:14	06:31	17:11 (W1)	06:41	06:06		19:09 (W3)	05:55
	17:28	18:06	18:37	8	17:19 (W1)	20:10	19	19:28 (W3)	21:00
21	07:45	07:13	06:29	17:12 (W1)	06:40	06:05		19:09 (W3)	05:55
	17:29	18:07	18:38	7	17:19 (W1)	20:11	19	19:28 (W3)	21:00
22	07:45	07:12	06:28	17:12 (W1)	06:38	06:04		19:10 (W3)	05:55
	17:31	18:08	18:39	8	17:20 (W1)	20:12	20	19:30 (W3)	21:00
23	07:44	07:10	06:26	17:14 (W1)	06:37	06:03		19:10 (W3)	05:55
	17:32	18:09	18:40	9	17:23 (W1)	20:13	21	19:31 (W3)	21:01
24	07:43	07:09	06:24	17:15 (W1)	06:36	06:02		19:10 (W3)	05:56
	17:33	18:11	18:41	9	17:24 (W1)	20:14	21	19:31 (W3)	21:01
25	07:43	07:07	06:23	17:17 (W1)	06:34	06:02		19:12 (W3)	05:56
	17:34	18:12	18:42	7	17:24 (W1)	20:15	20	19:32 (W3)	21:01
26	07:42	07:06	06:21	17:21 (W1)	06:33	06:01		19:12 (W3)	05:56
	17:35	18:13	18:43	5	17:26 (W1)	20:16	21	19:33 (W3)	21:01
27	07:41	07:04	06:20		06:31	06:00		19:12 (W3)	05:57
	17:37	18:14	18:45		20:17	20:46	21	19:33 (W3)	21:01
28	07:40	07:03	06:18		06:30	06:00		19:13 (W3)	05:57
	17:38	18:15	18:46		20:18	20:47	22	19:35 (W3)	21:01
29	07:40		07:16		06:29	05:59		19:13 (W3)	05:57
	17:39		19:47		20:19	20:48	22	19:35 (W3)	21:01
30	07:39		07:15		06:27	05:59		19:15 (W3)	05:58
	17:40		19:48		20:20	20:49	21	19:36 (W3)	21:01
31	07:38		07:13			05:58		19:15 (W3)	
	17:42		19:49			20:49	21	19:36 (W3)	
Potential sun hours	299	298	370		398	447		451	125
Total, worst case			76			413			

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F138 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (23)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

July		August		September		October	November	December
1	05:58	06:22		19:18 (W3)	06:52	07:21	06:55	07:30
	21:01	20:42	12	19:30 (W3)	20:00	19:10	17:24	17:00
2	05:59	06:23		19:19 (W3)	06:53	07:22	06:56	07:31
	21:01	20:41	10	19:29 (W3)	19:58	19:08	17:22	17:00
3	05:59	06:24		19:19 (W3)	06:54	07:24	06:57	07:32
	21:01	20:40	9	19:28 (W3)	19:57	19:06	17:21	16:59
4	06:00	19:30 (W3) 06:25		19:19 (W3)	06:55	07:25	06:59	07:33
	21:00	19:37 (W3) 20:39	8	19:27 (W3)	19:55	19:05	17:20	16:59
5	06:00	19:29 (W3) 06:26		19:19 (W3)	06:56	07:26	07:00	07:34
	21:00	19:39 (W3) 20:38	6	19:25 (W3)	19:53	19:03	17:19	16:59
6	06:01	19:28 (W3) 06:27		19:19 (W3)	06:57	07:27	07:01	07:34
	21:00	19:40 (W3) 20:37	5	19:24 (W3)	19:52	19:02	17:18	16:59
7	06:02	19:27 (W3) 06:28		19:20 (W3)	06:58	07:28	07:02	07:35
	21:00	19:41 (W3) 20:35	3	19:23 (W3)	19:50	19:00	17:17	16:59
8	06:02	19:27 (W3) 06:29		19:21 (W3)	06:59	07:29	07:03	07:36
	20:59	19:43 (W3) 20:34	1	19:22 (W3)	19:48	18:58	17:16	16:59
9	06:03	19:25 (W3) 06:30			07:00	07:30	07:04	07:37
	20:59	19:43 (W3) 20:33			19:47	18:57	17:15	16:59
10	06:03	19:25 (W3) 06:31			07:01	07:31	07:06	07:38
	20:59	19:45 (W3) 20:32			19:45	18:55	17:14	16:59
11	06:04	19:25 (W3) 06:32			07:02	07:32	07:07	07:39
	20:58	19:46 (W3) 20:30			19:43	18:54	17:13	16:59
12	06:05	19:24 (W3) 06:32			07:03	07:33	07:08	07:40
	20:58	19:45 (W3) 20:29			19:42	18:52	17:12	16:59
13	06:06	19:23 (W3) 06:33			07:04	07:34	07:09	07:41
	20:57	19:45 (W3) 20:28			19:40	18:50	17:11	16:59
14	06:06	19:23 (W3) 06:34			07:05	07:35	07:10	07:41
	20:57	19:44 (W3) 20:27			19:38	18:49	17:10	16:59
15	06:07	19:22 (W3) 06:35			07:06	07:36	07:12	07:42
	20:56	19:43 (W3) 20:25			19:37	18:47	17:09	16:59
16	06:08	19:22 (W3) 06:36			07:07	07:37	07:13	07:43
	20:56	19:43 (W3) 20:24			19:35	18:46	17:08	17:00
17	06:09	19:21 (W3) 06:37			07:08	18:10 (W1) 07:38	07:14	07:43
	20:55	19:43 (W3) 20:22		5	18:15 (W1) 18:44	18:44	17:07	17:00
18	06:09	19:21 (W3) 06:38			07:09	18:05 (W1) 07:39	07:15	07:44
	20:54	19:42 (W3) 20:21		8	18:13 (W1) 18:43	18:43	17:07	17:00
19	06:10	19:21 (W3) 06:39			07:10	18:03 (W1) 07:40	07:16	07:45
	20:54	19:42 (W3) 20:20		8	18:11 (W1) 18:41	18:41	17:06	17:01
20	06:11	19:20 (W3) 06:40			07:11	18:00 (W1) 07:41	07:17	07:45
	20:53	19:40 (W3) 20:18		9	18:09 (W1) 18:40	18:40	17:05	17:01
21	06:12	19:20 (W3) 06:41			07:12	17:58 (W1) 07:43	07:19	07:46
	20:52	19:40 (W3) 20:17		8	18:06 (W1) 18:38	18:38	17:05	17:02
22	06:13	19:19 (W3) 06:42			07:13	17:56 (W1) 07:44	07:20	07:46
	20:52	19:39 (W3) 20:15		8	18:04 (W1) 18:37	18:37	17:04	17:02
23	06:14	19:19 (W3) 06:43			07:13	17:55 (W1) 07:45	07:21	07:47
	20:51	19:39 (W3) 20:14		8	18:03 (W1) 18:36	18:36	17:03	17:03
24	06:15	19:19 (W3) 06:44			07:14	17:54 (W1) 07:46	07:22	07:47
	20:50	19:38 (W3) 20:12		7	18:01 (W1) 18:34	18:34	17:03	17:03
25	06:15	19:19 (W3) 06:45			07:15	17:53 (W1) 06:47	07:23	07:48
	20:49	19:37 (W3) 20:11		6	17:59 (W1) 17:33	17:33	17:02	17:04
26	06:16	19:18 (W3) 06:46			07:16	17:52 (W1) 06:48	07:24	07:48
	20:48	19:36 (W3) 20:09		6	17:58 (W1) 17:31	17:31	17:02	17:04
27	06:17	19:18 (W3) 06:47			07:17	17:52 (W1) 06:49	07:25	07:49
	20:47	19:35 (W3) 20:08		4	17:56 (W1) 17:30	17:30	17:01	17:05
28	06:18	19:18 (W3) 06:48			07:18	17:51 (W1) 06:50	07:26	07:49
	20:46	19:34 (W3) 20:06		3	17:54 (W1) 17:29	17:29	17:01	17:06
29	06:19	19:18 (W3) 06:49			07:19	06:52	07:27	07:49
	20:45	19:33 (W3) 20:04			19:13	17:27	17:00	17:06
30	06:20	19:18 (W3) 06:50			07:20	06:53	07:28	07:49
	20:44	19:33 (W3) 20:03			19:11	17:26	17:00	17:07
31	06:21	19:18 (W3) 06:51				06:54		07:50
	20:43	19:30 (W3) 20:01				17:25		17:08
Potential sun hours	458	427		375		346	299	289
Total, worst case	497		54	80				

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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Via Santa Margherita 4
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Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F154 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (24)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	09:10 (W1) 09:12 (W1)	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	08:41 (W1) 09:08 (W1)	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	09:08 (W1) 09:12 (W1)	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	08:43 (W1) 09:08 (W1)	07:23 19:08	06:56 17:23	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	09:05 (W1) 09:12 (W1)	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	08:45 (W1) 09:08 (W1)	07:24 19:07	06:58 17:21	07:32 16:59
4	07:50 17:12	07:34 17:47	06:57 18:20	07:06 19:53	09:03 (W1) 09:12 (W1)	06:22 20:24	05:57 20:52	06:00 21:01	06:25 20:39	06:55 19:55	08:48 (W1) 09:08 (W1)	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	09:00 (W1) 09:12 (W1)	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	08:51 (W1) 09:08 (W1)	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	08:57 (W1) 09:12 (W1)	06:20 20:26	05:56 20:54	06:01 21:00	06:27 20:37	06:57 19:52	08:52 (W1) 09:07 (W1)	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	08:54 (W1) 09:11 (W1)	06:19 20:27	05:56 20:54	06:02 21:00	06:28 20:36	06:58 19:50	08:55 (W1) 09:07 (W1)	07:28 19:00	07:02 17:17	07:35 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	08:50 (W1) 09:10 (W1)	06:18 20:28	05:55 20:55	06:02 20:59	06:29 20:34	06:59 19:48	08:57 (W1) 09:06 (W1)	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	08:47 (W1) 09:10 (W1)	06:16 20:29	05:55 20:55	06:03 20:59	06:30 20:33	07:00 19:47	08:59 (W1) 09:06 (W1)	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:47 18:26	06:57 19:59	08:44 (W1) 09:09 (W1)	06:15 20:30	05:55 20:56	06:04 20:59	06:31 20:32	07:01 19:45	09:01 (W1) 09:05 (W1)	07:31 18:55	07:06 17:14	07:38 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	08:42 (W1) 09:09 (W1)	06:14 20:31	05:55 20:57	06:04 20:58	06:32 20:31	07:02 19:43	09:02 (W1) 09:04 (W1)	07:32 18:54	07:07 17:13	07:39 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	08:40 (W1) 09:08 (W1)	06:13 20:32	05:55 20:57	06:05 20:58	06:33 20:29	07:03 19:42	09:03 (W1) 09:05 (W1)	07:33 18:52	07:08 17:12	07:40 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	08:38 (W1) 09:07 (W1)	06:12 20:33	05:55 20:58	06:06 20:57	06:34 20:28	07:04 19:40	09:04 (W1) 09:05 (W1)	07:34 18:50	07:09 17:11	07:41 16:59
14	07:49 17:22	07:23 17:59	06:41 18:31	06:51 20:03	08:35 (W1) 09:06 (W1)	06:11 20:34	05:55 20:58	06:06 20:57	06:35 20:27	07:05 19:38	09:05 (W1) 09:06 (W1)	07:35 18:49	07:10 17:10	07:41 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	08:34 (W1) 09:06 (W1)	06:10 20:35	05:55 20:58	06:07 20:56	06:35 20:25	07:06 19:37	09:06 (W1) 09:05 (W1)	07:36 18:47	07:12 17:09	07:42 17:00
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:05	08:31 (W1) 09:04 (W1)	06:09 20:36	05:55 20:59	06:08 20:56	06:36 20:24	07:07 19:35	09:07 (W1) 09:04 (W1)	07:37 18:46	07:13 17:08	07:43 17:00
17	07:47 17:25	07:19 18:02	06:36 18:34	06:46 20:07	08:29 (W1) 09:03 (W1)	06:08 20:37	05:55 20:59	06:09 20:55	06:37 20:22	07:08 19:33	09:08 (W1) 09:03 (W1)	07:38 18:44	07:14 17:07	07:43 17:00
18	07:47 17:26	07:17 18:04	06:34 18:35	06:44 20:08	08:27 (W1) 09:01 (W1)	06:07 20:38	05:55 20:59	06:10 20:55	06:38 20:21	07:09 19:32	09:09 (W1) 09:04 (W1)	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	08:25 (W1) 09:00 (W1)	06:06 20:39	05:55 21:00	06:10 20:54	06:39 20:20	07:10 19:30	09:10 (W1) 09:05 (W1)	07:40 18:41	07:16 17:06	07:45 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	08:22 (W1) 09:00 (W1)	06:06 20:40	05:55 21:00	06:11 20:53	06:40 20:18	07:11 19:28	09:11 (W1) 09:06 (W1)	07:41 18:40	07:17 17:05	07:45 17:01
21	07:45 17:30	07:13 18:07	06:30 18:38	06:40 20:11	08:21 (W1) 09:00 (W1)	06:05 20:41	05:55 21:00	06:12 20:52	06:41 20:17	07:12 19:27	09:12 (W1) 09:07 (W1)	07:42 18:38	07:19 17:05	07:46 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:39 20:12	08:22 (W1) 09:01 (W1)	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	09:13 (W1) 09:08 (W1)	07:43 18:37	07:20 17:04	07:46 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	08:24 (W1) 09:03 (W1)	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	09:14 (W1) 09:09 (W1)	07:44 18:36	07:21 17:03	07:47 17:03
24	07:43 17:33	07:09 18:11	06:25 18:41	06:36 20:14	08:25 (W1) 09:04 (W1)	06:03 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	09:15 (W1) 09:10 (W1)	07:45 18:34	07:22 17:03	07:47 17:03
25	07:43 17:34	07:07 18:12	06:23 18:43	06:34 20:15	08:28 (W1) 09:07 (W1)	06:02 20:44	05:56 21:01	06:15 20:49	06:45 20:11	07:16 19:20	09:16 (W1) 09:11 (W1)	07:46 18:33	07:23 17:02	07:48 17:04
26	07:42 17:36	07:06 18:13	06:21 18:44	06:33 20:16	08:31 (W1) 09:10 (W1)	06:01 20:45	05:56 21:01	06:16 20:48	06:46 20:09	07:17 19:18	09:17 (W1) 09:12 (W1)	07:47 18:32	07:24 17:02	07:48 17:04
27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	08:44 (W1) 09:11 (W1)	06:01 20:46	05:57 21:01	06:17 20:47	06:47 20:08	07:18 19:16	09:18 (W1) 09:13 (W1)	07:48 18:31	07:25 17:01	07:49 17:05
28	07:40 17:38	07:03 18:15	06:18 18:46	06:30 20:18	09:00 (W1) 09:12 (W1)	06:00 20:47	05:57 21:01	06:18 20:46	06:48 20:06	07:19 19:15	09:19 (W1) 09:14 (W1)	07:49 18:30	07:26 17:01	07:49 17:06
29	07:40 17:39	07:02 18:16	06:16 18:47	06:29 20:19	09:01 (W1) 09:13 (W1)	05:59 20:48	05:57 21:01	06:19 20:45	06:49 20:05	07:20 19:13	09:20 (W1) 09:15 (W1)	07:50 18:29	07:27 17:01	07:49 17:06
30	07:39 17:40	07:01 18:17	06:15 18:48	06:27 20:20	09:02 (W1) 09:14 (W1)	05:58 20:49	05:58 21:01	06:20 20:44	06:50 20:03	07:21 19:11	09:21 (W1) 09:16 (W1)	07:51 18:28	07:28 17:01	07:49 17:06
31	07:38 17:42	07:00 18:18	06:13 18:49	06:25 20:21	09:03 (W1) 09:15 (W1)	05:57 20:50	05:59 21:01	06:21 20:43	06:51 20:01	07:22 19:10	09:22 (W1) 09:17 (W1)	07:52 18:27	07:29 17:01	07:50 17:07
Potential sun hours	299	298	370	398	608	447	451	458	427	375	346	299	289	
Total, worst case									453	161				

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F21 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (16)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December			
1	07:50	08:58 (W2)	07:37	09:20 (W2)	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30	08:43 (W2)
	17:09	41 09:39 (W2)	17:43	15 09:35 (W2)	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00	43 09:26 (W2)
2	07:50	08:58 (W2)	07:36	09:26 (W2)	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31	08:44 (W2)
	17:10	41 09:39 (W2)	17:44	4 09:30 (W2)	18:18	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:23	17:00	42 09:26 (W2)
3	07:50	08:58 (W2)	07:35		06:59	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32	08:44 (W2)
	17:11	42 09:40 (W2)	17:45		18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:07	17:21	16:59	43 09:27 (W2)
4	07:50	08:59 (W2)	07:34		06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33	08:45 (W2)
	17:12	41 09:40 (W2)	17:47		18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59	42 09:27 (W2)
5	07:50	08:59 (W2)	07:33		06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34	08:45 (W2)
	17:12	42 09:41 (W2)	17:48		18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59	42 09:27 (W2)
6	07:50	09:00 (W2)	07:32		06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35	08:46 (W2)
	17:13	42 09:42 (W2)	17:49		18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59	42 09:28 (W2)
7	07:50	09:00 (W2)	07:31		06:52	07:02	06:19	05:56	06:02	06:28	06:58	07:28	07:02	07:36	08:46 (W2)
	17:14	42 09:42 (W2)	17:50		18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59	42 09:28 (W2)
8	07:50	09:01 (W2)	07:30		06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36	08:47 (W2)
	17:15	42 09:43 (W2)	17:51		18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59	42 09:29 (W2)
9	07:50	09:01 (W2)	07:29		06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37	08:47 (W2)
	17:16	43 09:44 (W2)	17:53		18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	6 09:02 (W2)	42 09:29 (W2)
10	07:50	09:01 (W2)	07:27		06:48	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	08:51 (W2)	07:38 08:48 (W2)
	17:17	42 09:43 (W2)	17:54		18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	15 09:06 (W2)	41 09:29 (W2)
11	07:50	09:01 (W2)	07:26		06:46	06:55	06:14	05:55	06:04	06:32	07:02	07:32	07:07	09:09 (W2)	07:39 08:49 (W2)
	17:18	43 09:44 (W2)	17:55		18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	20 09:09 (W2)	41 09:30 (W2)
12	07:49	09:02 (W2)	07:25		06:45	06:54	06:13	05:55	06:05	06:33	07:03	07:33	07:08	08:47 (W2)	07:40 08:47 (W2)
	17:19	43 09:45 (W2)	17:56		18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	23 09:10 (W2)	42 09:30 (W2)
13	07:49	09:02 (W2)	07:24		06:43	06:52	06:12	05:55	06:06	06:34	07:04	07:34	07:09	08:46 (W2)	07:41 08:49 (W2)
	17:20	42 09:44 (W2)	17:58		18:30	20:02	20:33	20:58	20:58	20:28	19:40	18:50	17:11	27 09:13 (W2)	41 09:30 (W2)
14	07:49	09:03 (W2)	07:23		06:41	06:51	06:11	05:54	06:06	06:34	07:05	07:35	07:11	28 08:45 (W2)	41 08:50 (W2)
	17:22	42 09:45 (W2)	17:59		18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	29 09:14 (W2)	41 09:31 (W2)
15	07:48	09:04 (W2)	07:21		06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	30 08:44 (W2)	41 08:51 (W2)
	17:23	42 09:46 (W2)	18:00		18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	31 09:15 (W2)	40 09:31 (W2)
16	07:48	09:03 (W2)	07:20		06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	32 08:43 (W2)	40 08:51 (W2)
	17:24	42 09:45 (W2)	18:01		18:33	20:06	20:36	20:59	20:56	20:24	19:35	18:46	17:08	33 09:16 (W2)	40 09:31 (W2)
17	07:48	09:04 (W2)	07:19		06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	34 08:43 (W2)	40 08:52 (W2)
	17:25	42 09:46 (W2)	18:02		18:34	20:07	20:37	20:59	20:55	20:23	19:33	18:44	17:07	35 09:18 (W2)	40 09:32 (W2)
18	07:47	09:05 (W2)	07:17		06:35	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	36 08:42 (W2)	40 08:52 (W2)
	17:26	41 09:46 (W2)	18:04		18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	37 09:19 (W2)	41 09:33 (W2)
19	07:47	09:05 (W2)	07:16		06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:41	07:16	38 08:42 (W2)	41 08:52 (W2)
	17:27	40 09:45 (W2)	18:05		18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	37 09:19 (W2)	40 09:32 (W2)
20	07:46	09:06 (W2)	07:15		06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:18	39 08:42 (W2)	40 08:53 (W2)
	17:28	40 09:46 (W2)	18:06		18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	38 09:20 (W2)	40 09:33 (W2)
21	07:45	09:06 (W2)	07:13		06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	40 08:42 (W2)	40 08:53 (W2)
	17:29	39 09:45 (W2)	18:07		18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	39 09:21 (W2)	40 09:33 (W2)
22	07:45	09:06 (W2)	07:12		06:28	06:39	06:04	05:55	06:13	06:42	07:13	07:44	07:20	40 08:42 (W2)	40 08:54 (W2)
	17:31	39 09:45 (W2)	18:08		18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	40 09:22 (W2)	40 09:34 (W2)
23	07:44	09:08 (W2)	07:10		06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	41 08:42 (W2)	40 08:54 (W2)
	17:32	37 09:45 (W2)	18:09		18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	40 09:22 (W2)	40 09:34 (W2)
24	07:44	09:09 (W2)	07:09		06:25	06:36	06:02	05:56	06:15	06:44	07:15	07:46	07:22	41 08:42 (W2)	40 08:54 (W2)
	17:33	36 09:45 (W2)	18:11		18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	41 09:23 (W2)	40 09:34 (W2)
25	07:43	09:09 (W2)	07:08		06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	42 08:41 (W2)	40 08:55 (W2)
	17:34	35 09:44 (W2)	18:12		06:21	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	42 09:23 (W2)	41 09:35 (W2)
26	07:42	09:10 (W2)	07:06		06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	43 08:43 (W2)	40 08:55 (W2)
	17:35	33 09:43 (W2)	18:13		18:44	20:16	20:46	21:01	20:48	20:09	19:18	17:31	17:02	41 09:24 (W2)	41 09:36 (W2)
27	07:41	09:12 (W2)	07:05		06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	42 08:43 (W2)	40 08:56 (W2)
	17:37	31 09:43 (W2)	18:14		18:45	20:17	20:46	21:01	20:47	20:08	19:17	17:30	17:01	42 09:25 (W2)	40 09:36 (W2)
28	07:41	09:13 (W2)	07:03		06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:27	43 08:43 (W2)	40 08:57 (W2)
	17:38	29 09:42 (W2)	18:15		18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	42 09:25 (W2)	40 09:37 (W2)
29	07:40	09:14 (W2)			07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	43 08:43 (W2)	40 08:57 (W2)
	17:39	27 09:41 (W2)			19:47	20:19	20:48	21:01	20:46	20:05	19:13	17:28	17:00	42 09:25 (W2)	41 09:38 (W2)
30	07:39	09:16 (W2)			07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	44 08:43 (W2)	40 08:57 (W2)
	17:40	23 09:39 (W2)			19:48	20:20	20:49	21:01	20:45	20:03	19:12	17:26	17:00	43 09:26 (W2)	41 09:38 (W2)
31	07:38	09:18 (W2)			07:13		05:58		06:21	06:51		07:25		07:50	08:57 (W2)
	17:42	20 09:38 (W2)			19:49		20:49		20:43	20:01		17:25		17:08	41 09:38 (W2)
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	743	1272		
Total, worst case	1184	19													

Table 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)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F25 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (17)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	06:52 (W2) 20:50	05:58 21:01	05:58 21:01	06:22 20:42	07:05 (W2) 20:00	07:22 19:10	06:55 17:24
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	06:25 20:22	06:52 (W2) 20:51	05:59 21:01	05:59 21:01	06:23 20:41	07:05 (W2) 19:58	07:23 19:08	06:56 17:23
3	07:50 17:11	07:35 17:45	06:59 18:19	07:08 19:52	06:24 20:23	06:52 (W2) 20:52	05:59 21:01	05:59 21:01	06:24 20:40	07:04 (W2) 19:57	07:24 19:07	06:58 17:21
4	07:50 17:12	07:34 17:47	06:57 18:20	07:06 19:53	06:22 20:24	06:53 (W2) 20:52	05:57 21:01	05:57 21:01	06:25 20:39	07:04 (W2) 19:55	07:25 19:05	06:59 17:20
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	06:53 (W2) 20:53	05:56 21:00	05:56 21:00	06:26 20:38	07:03 (W2) 19:53	07:26 19:03	07:00 17:19
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	06:52 (W2) 20:54	05:56 21:00	05:56 21:00	06:27 20:37	07:02 (W2) 19:52	07:27 19:02	07:01 17:18
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	06:52 (W2) 20:54	05:56 21:00	05:56 21:00	06:28 20:36	07:02 (W2) 19:50	07:28 19:00	07:02 17:17
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	06:53 (W2) 20:55	05:55 21:00	05:55 21:00	06:29 20:34	07:01 (W2) 19:48	07:29 18:58	07:03 17:16
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	06:53 (W2) 20:56	05:55 20:59	05:55 20:59	06:30 20:33	07:01 (W2) 19:47	07:30 18:57	07:05 17:15
10	07:50 17:17	07:27 17:54	06:48 18:26	06:57 19:59	06:15 20:30	06:54 (W2) 20:56	05:55 20:59	05:55 20:59	06:31 20:32	07:01 (W2) 19:45	07:31 18:55	07:06 17:14
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	06:14 20:31	06:54 (W2) 20:57	05:55 20:58	05:55 20:58	06:32 20:31	07:01 (W2) 19:43	07:32 18:54	07:07 17:13
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	06:13 20:32	06:55 (W2) 20:57	05:55 20:58	05:55 20:58	06:33 20:29	07:01 (W2) 19:42	07:33 18:52	07:08 17:12
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	06:12 20:33	06:55 (W2) 20:58	05:55 20:58	05:55 20:58	06:34 20:28	07:01 (W2) 19:40	07:34 18:50	07:09 17:11
14	07:49 17:22	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	06:56 (W2) 20:58	05:56 20:57	05:56 20:57	06:35 20:27	07:01 (W2) 19:38	07:35 18:49	07:11 17:10
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	06:10 20:35	06:57 (W2) 20:58	05:54 20:56	05:54 20:56	06:36 20:25	07:01 (W2) 19:37	07:36 18:47	07:12 17:09
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:06	06:09 20:36	06:57 (W2) 20:59	05:54 20:56	05:54 20:56	06:36 20:24	07:01 (W2) 19:35	07:37 18:46	07:13 17:08
17	07:48 17:25	07:19 18:02	06:36 18:34	06:46 20:07	06:08 20:37	06:58 (W2) 20:59	05:55 20:55	05:55 20:55	06:37 20:23	07:01 (W2) 19:33	07:38 18:44	07:14 17:07
18	07:47 17:26	07:17 18:04	06:35 18:35	06:44 20:08	06:07 20:38	07:00 (W2) 21:00	05:55 20:55	05:55 20:55	06:38 20:21	07:02 (W2) 19:32	07:39 18:43	07:15 17:07
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	07:01 (W2) 21:00	05:55 20:54	05:55 20:54	06:39 20:20	07:02 (W2) 19:30	07:41 18:41	07:16 17:06
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	06:06 20:40	07:02 (W2) 21:00	05:55 20:53	05:55 20:53	06:40 20:18	07:03 (W2) 19:28	07:42 18:40	07:18 17:05
21	07:45 17:30	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	07:03 (W2) 21:00	05:55 20:52	05:55 20:52	06:41 20:17	07:03 (W2) 19:27	07:43 18:38	07:19 17:05
22	07:45 17:31	07:12 18:08	06:28 18:39	06:39 20:12	06:04 20:42	07:06 (W2) 21:01	05:55 20:52	05:55 20:52	06:42 20:15	07:03 (W2) 19:25	07:44 18:37	07:20 17:04
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24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:03 20:44	07:10 (W2) 21:01	05:56 20:50	05:56 20:50	06:44 20:12	07:05 (W2) 19:22	07:46 18:34	07:22 17:03
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27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	07:13 (W2) 21:01	05:57 20:47	05:57 20:47	06:47 20:08	07:09 (W2) 19:17	07:49 17:30	07:25 17:01
28	07:41 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	07:14 (W2) 21:01	05:57 20:46	05:57 20:46	06:48 20:06	07:10 (W2) 19:15	07:51 17:29	07:26 17:01
29	07:40 17:39	07:02 18:16	06:16 18:47	06:29 20:19	05:59 20:48	07:15 (W2) 21:01	05:57 20:46	05:57 20:46	06:49 20:05	07:11 (W2) 19:13	07:52 17:28	07:27 17:01
30	07:39 17:40	07:01 18:15	06:15 18:48	06:27 20:20	05:59 20:49	07:16 (W2) 21:01	05:58 20:45	05:58 20:45	06:50 20:03	07:12 (W2) 19:12	07:53 17:26	07:28 17:00
31	07:38 17:42	07:00 18:14	06:13 18:46	06:25 20:21	05:58 20:49	07:17 (W2) 21:01	05:58 20:43	05:58 20:43	06:51 20:01	07:13 (W2) 19:11	07:54 17:25	07:29 17:00
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case				624	879		357	1164				

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F33 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (25)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:23	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:07	06:58 17:21	07:32 16:59
4	07:50 17:12	07:34 17:47	06:57 18:20	07:06 19:53	06:22 20:24	05:57 20:52	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	05:56 20:54	06:01 21:00	06:27 20:37	06:57 19:52	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	05:56 20:54	06:02 21:00	06:28 20:36	06:58 19:50	07:28 19:00	07:02 17:17	07:36 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	05:55 20:55	06:02 21:00	06:29 20:34	06:59 19:48	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	05:55 20:55	06:03 20:59	06:30 20:33	07:00 19:47	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:48 18:26	06:57 19:59	06:15 20:30	05:55 20:56	06:04 20:59	06:31 20:32	07:01 19:45	07:31 18:55	07:06 17:14	07:38 16:59
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14	07:49 17:22	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	05:54 20:58	06:06 20:57	06:35 20:27	07:05 19:38	07:35 18:49	07:10 17:10	07:41 16:59
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18	07:47 17:26	07:17 18:04	06:34 18:35	06:44 20:08	06:07 20:38	05:55 21:00	06:09 20:55	06:38 20:21	07:09 19:32	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	05:55 21:00	06:10 20:54	06:39 20:20	07:10 19:30	07:40 18:41	07:16 17:06	07:45 17:01
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21	07:45 17:30	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	05:55 21:00	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:39 20:12	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:47 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:02 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 17:03
25	07:43 17:34	07:07 18:12	06:23 18:43	06:34 20:15	06:02 20:45	05:56 21:01	06:15 20:49	06:45 20:11	07:16 19:20	07:47 17:33	07:23 17:02	07:48 17:04
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27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	05:57 21:01	06:17 20:47	06:47 20:08	07:18 19:17	07:49 17:30	07:25 17:01	07:49 17:05
28	07:40 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	05:57 21:01	06:18 20:46	06:48 20:06	07:19 19:15	07:50 17:29	07:26 17:01	07:49 17:06
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31	07:38 17:42		07:13 19:49		05:58 20:49		06:21 20:43	06:51 20:01		06:54 17:25		07:50 17:08
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F35 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (26)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:23	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:07	06:58 17:21	07:32 16:59
4	07:50 17:12	07:34 17:47	06:57 18:20	07:06 19:53	06:22 20:24	05:57 20:52	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59
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22	07:45 17:31	07:12 18:08	06:28 18:39	06:39 20:12	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:47 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:02 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 17:03
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31	07:38 17:42		07:13 19:49		05:58 20:49		06:21 20:43	06:51 20:01		07:25 17:25		07:50 17:08
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F59 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (18)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30	
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00	
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31	
	17:10	17:44	18:17	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:22	16:59	
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32	
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:06	17:21	16:59	
4	07:50	07:34	06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33	
	17:11	17:46	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59	
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34	
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59	
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35	
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59	
7	07:50	07:31	06:52	07:02	06:19	05:55	06:02	06:28	06:58	07:28	07:02	07:36	
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59	
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36	
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59	
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37	
	17:16	17:53	18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	16:59	
10	07:50	07:27	06:47	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	07:38	
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59	
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:31	07:02	07:32	07:07	07:39	
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59	
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:32	07:03	07:33	07:08	07:40	
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59	
13	07:49	07:24	06:43	06:52	06:12	05:54	06:06	06:33	07:04	07:34	07:09	07:41	
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59	
14	07:49	07:23	06:41	06:50	06:11	05:54	06:06	06:34	07:05	07:35	07:10	07:41	
	17:21	17:59	18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	16:59	
15	07:48	07:21	06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	07:42	
	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	16:59	
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43	
	17:24	18:01	18:33	20:05	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00	
17	07:48	07:19	06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	07:44	14:21 (W2)
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:22	19:33	18:44	17:07	17:00	3 14:24 (W2)
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44	14:20 (W2)
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00	6 14:26 (W2)
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45	14:19 (W2)
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01	8 14:27 (W2)
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:17	07:45	14:20 (W2)
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01	8 14:28 (W2)
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46	14:20 (W2)
	17:29	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02	8 14:28 (W2)
22	07:45	07:12	06:28	06:38	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47	14:21 (W2)
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02	8 14:29 (W2)
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47	14:21 (W2)
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03	8 14:29 (W2)
24	07:44	07:09	06:25	06:36	06:02	05:56	06:14	06:44	07:15	07:46	07:22	07:47	14:21 (W2)
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03	8 14:29 (W2)
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	07:48	14:23 (W2)
	17:34	18:12	18:42	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04	7 14:30 (W2)
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	07:48	14:24 (W2)
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04	5 14:29 (W2)
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	07:49	
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05	
28	07:40	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:26	07:49	
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06	
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	07:49	
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:27	17:00	17:06	
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	07:50	
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07	
31	07:38		07:13		05:58		06:21	06:51		07:53		07:50	
	17:42		19:49		20:49		20:43	20:01		17:25		17:08	
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289	69
Total, worst case													

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F84 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (19)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:58 (W5) 19:50	07:11 20:21	06:26 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:17	07:57 (W5) 19:51	07:10 20:22	06:25 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:22	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:55 (W5) 19:52	07:08 20:23	06:24 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:06	06:58 17:21	07:32 16:59
4	07:50 17:11	07:34 17:46	06:57 18:20	07:54 (W5) 19:53	07:06 20:24	06:22 20:52	05:56 21:01	06:00 20:39	06:25 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:59 (W5) 19:54	07:05 20:25	06:21 20:53	05:56 21:00	06:00 20:38	06:26 19:53	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:59 (W5) 19:55	07:03 20:26	06:20 20:54	05:56 21:00	06:01 20:37	06:27 19:52	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:59 (W5) 19:56	07:02 20:27	06:19 20:54	05:56 21:00	06:02 20:36	06:28 19:50	07:28 19:00	07:02 17:17	07:36 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:59 (W5) 19:57	07:00 20:28	06:18 20:55	05:55 21:00	06:02 20:34	06:29 19:48	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	07:59 (W5) 19:58	06:58 20:29	06:16 20:55	05:55 20:59	06:03 20:33	06:30 19:47	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:47 18:26	07:59 (W5) 19:59	06:57 20:30	06:15 20:56	05:55 20:59	06:03 20:32	06:31 19:45	07:31 18:55	07:06 17:14	07:38 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	07:59 (W5) 20:00	06:55 20:31	06:14 20:57	05:55 20:58	06:04 20:31	06:32 19:43	07:32 18:54	07:07 17:13	07:39 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	07:59 (W5) 20:01	06:54 20:32	06:13 20:57	05:55 20:58	06:05 20:29	06:32 19:42	07:33 18:52	07:08 17:12	07:40 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	07:59 (W5) 20:02	06:52 20:33	06:12 20:58	05:54 20:57	06:06 20:28	06:33 19:40	07:34 18:50	07:09 17:11	07:41 16:59
14	07:49 17:22	07:23 17:59	06:41 18:31	07:59 (W5) 20:03	06:51 20:34	06:11 20:58	05:54 20:57	06:06 20:27	06:34 19:38	07:35 18:49	07:10 17:10	07:41 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	07:59 (W5) 20:04	06:49 20:35	06:10 20:58	05:54 20:56	06:07 20:25	06:35 19:37	07:36 18:47	07:12 17:09	07:42 16:59
16	07:48 17:24	07:20 18:01	06:38 18:33	07:59 (W5) 20:05	06:47 20:36	06:09 20:59	05:54 20:56	06:08 20:24	06:36 19:35	07:37 18:46	07:13 17:08	07:43 17:00
17	07:48 17:25	07:19 18:02	06:36 18:34	07:59 (W5) 20:06	06:46 20:37	06:08 20:59	05:54 20:55	06:09 20:22	06:37 19:33	07:38 18:44	07:14 17:07	07:44 17:00
18	07:47 17:26	07:17 18:04	06:34 18:35	07:59 (W5) 20:07	06:44 20:38	06:07 21:00	05:55 20:55	06:09 20:21	06:38 19:32	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	07:59 (W5) 20:08	06:43 20:39	06:06 21:00	05:55 20:54	06:10 20:20	06:39 19:30	07:40 18:41	07:16 17:06	07:45 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	07:59 (W5) 20:09	06:41 20:40	06:06 21:00	05:55 20:53	06:11 20:18	06:40 19:28	07:41 18:40	07:17 17:05	07:46 17:01
21	07:45 17:29	07:13 18:07	06:30 18:38	07:59 (W5) 20:10	06:40 20:41	06:05 21:00	05:55 20:52	06:12 20:17	06:41 19:27	07:42 18:38	07:18 17:02	07:47 17:00
22	07:45 17:31	07:12 18:08	06:28 18:39	07:59 (W5) 20:11	06:38 20:42	06:04 21:01	05:55 20:52	06:13 20:15	06:42 19:25	07:43 18:37	07:19 17:04	07:48 17:00
23	07:44 17:32	07:10 18:09	06:26 18:40	07:59 (W5) 20:12	06:37 20:43	06:03 21:01	05:55 20:51	06:14 20:14	06:43 19:23	07:44 18:36	07:20 17:03	07:49 17:00
24	07:43 17:33	07:09 18:11	06:25 18:41	07:59 (W5) 20:13	06:36 20:44	06:02 21:01	05:56 20:50	06:15 20:12	06:44 19:22	07:45 18:34	07:21 17:03	07:50 17:00
25	07:43 17:34	07:07 18:12	06:23 18:42	07:59 (W5) 20:14	06:34 20:45	06:02 21:01	05:56 20:49	06:15 20:11	06:45 19:20	07:46 18:33	07:22 17:02	07:51 17:00
26	07:42 17:35	07:06 18:13	06:21 18:44	07:59 (W5) 20:15	06:33 20:46	06:01 21:01	05:56 20:48	06:16 20:09	06:46 19:18	07:47 18:31	07:23 17:02	07:52 17:00
27	07:41 17:37	07:05 18:14	06:20 18:45	07:59 (W5) 20:16	06:31 20:47	06:00 21:01	05:57 20:47	06:17 20:08	06:47 19:16	07:48 18:30	07:24 17:01	07:53 17:00
28	07:40 17:38	07:03 18:15	06:18 18:46	07:59 (W5) 20:17	06:30 20:48	06:00 21:01	05:57 20:46	06:18 20:06	06:48 19:15	07:49 18:29	07:25 17:01	07:54 17:00
29	07:40 17:39		07:16 19:47		06:29 20:49	05:59 21:01	05:57 20:45	06:19 20:05	06:50 19:13	07:50 18:27	07:26 17:00	07:55 17:00
30	07:39 17:40		07:15 19:48		06:27 20:20	05:58 20:49	05:58 21:01	06:20 20:44	06:50 19:11	07:51 18:26	07:27 17:00	07:56 17:00
31	07:38 17:42		07:13 19:49			05:58 20:49		06:21 20:43		06:51 17:25		07:57 17:00
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case		95	35							131		

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F96 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (20)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

January			February			March			April			May			June		
1	07:50	07:37	07:01	19	17:19 (W5)	07:11	64	17:50 (W5)	06:26	4	19:54 (W2)	05:58					
	17:09	17:43	18:16			19:50			20:21		19:58 (W2)	20:50					
2	07:50	07:36	07:00	28	17:15 (W5)	07:10	62	17:51 (W5)	06:25	6	19:53 (W2)	05:57					
	17:10	17:44	18:17			19:51			20:22		19:59 (W2)	20:51					
3	07:50	07:35	06:58	35	17:11 (W5)	07:08	60	17:51 (W5)	06:23	7	19:53 (W2)	05:57					
	17:11	17:45	18:19			19:52			20:23		20:00 (W2)	20:52					
4	07:50	07:34	06:57	39	17:09 (W5)	07:06	59	17:52 (W5)	06:22	10	19:52 (W2)	05:56					
	17:11	17:46	18:20			19:53			20:24		20:02 (W2)	20:52					
5	07:50	07:33	06:55	44	17:06 (W5)	07:05	56	17:53 (W5)	06:21	11	19:51 (W2)	05:56					
	17:12	17:48	18:21			19:54			20:25		20:02 (W2)	20:53					
6	07:50	07:32	06:54	47	17:05 (W5)	07:03	54	17:54 (W5)	06:20	12	19:51 (W2)	05:56					
	17:13	17:49	18:22			19:55			20:26		20:03 (W2)	20:54					
7	07:50	07:31	06:52	50	17:03 (W5)	07:02	52	17:55 (W5)	06:19	13	19:51 (W2)	05:55					
	17:14	17:50	18:23			19:56			20:27		20:04 (W2)	20:54					
8	07:50	07:30	06:51	53	17:01 (W5)	07:00	49	17:56 (W5)	06:17	14	19:51 (W2)	05:55					
	17:15	17:51	18:24			19:57			20:28		20:05 (W2)	20:55					
9	07:50	07:28	06:49	56	17:00 (W5)	06:58	45	17:58 (W5)	06:16	14	19:52 (W2)	05:55					
	17:16	17:53	18:25			19:58			20:29		20:06 (W2)	20:55					
10	07:50	07:27	06:47	58	16:58 (W5)	06:57	42	17:59 (W5)	06:15	15	19:52 (W2)	05:55					
	17:17	17:54	18:26			19:59			20:30		20:07 (W2)	20:56					
11	07:49	07:26	06:46	61	16:56 (W5)	06:55	38	18:01 (W5)	06:14	15	19:53 (W2)	05:55					
	17:18	17:55	18:27			20:00			20:31		20:08 (W2)	20:56					
12	07:49	07:25	06:44	62	16:56 (W5)	06:54	33	18:03 (W5)	06:13	16	19:53 (W2)	05:55					
	17:19	17:56	18:29			20:01			20:32		20:09 (W2)	20:57					
13	07:49	07:24	06:43	64	16:54 (W5)	06:52	28	18:05 (W5)	06:12	15	19:54 (W2)	05:54					
	17:20	17:57	18:30			20:02			20:33		20:09 (W2)	20:57					
14	07:49	07:22	06:41	65	16:54 (W5)	06:50	22	18:08 (W5)	06:11	13	19:55 (W2)	05:54					
	17:21	17:59	18:31			20:03			20:34		20:08 (W2)	20:58					
15	07:48	07:21	06:39	67	16:53 (W5)	06:49	11	18:13 (W5)	06:10	9	19:57 (W2)	05:54					
	17:23	18:00	18:32			20:04			20:35		20:06 (W2)	20:58					
16	07:48	07:20	06:38	67	16:52 (W5)	06:47			06:09	3	20:00 (W2)	05:54					
	17:24	18:01	18:33			20:05			20:36		20:03 (W2)	20:59					
17	07:47	07:19	06:36	68	16:52 (W5)	06:46			06:08			05:54					
	17:25	18:02	18:34			20:06			20:37			20:59					
18	07:47	07:17	06:34	69	16:51 (W5)	06:44			06:07			05:54					
	17:26	18:03	18:35			20:07			20:38			20:59					
19	07:46	07:16	06:33	70	16:50 (W5)	06:43			06:06			05:55					
	17:27	18:05	18:36			20:09			20:39			21:00					
20	07:46	07:15	06:31	70	16:50 (W5)	06:41			06:06			05:55					
	17:28	18:06	18:37			20:10			20:40			21:00					
21	07:45	07:13	06:29	71	16:49 (W5)	06:40			06:05			05:55					
	17:29	18:07	18:38			20:11			20:41			21:00					
22	07:45	07:12	06:28	70	16:49 (W5)	06:38			06:04			05:55					
	17:31	18:08	18:39			20:12			20:42			21:00					
23	07:44	07:10	06:26	71	16:49 (W5)	06:37			06:03			05:55					
	17:32	18:09	18:40			20:13			20:43			21:01					
24	07:43	07:09	06:24	70	16:49 (W5)	06:36			06:02			05:56					
	17:33	18:11	18:41			20:14			20:44			21:01					
25	07:43	07:07	06:23	70	16:48 (W5)	06:34			06:02			05:56					
	17:34	18:12	18:42			20:15			20:44			21:01					
26	07:42	07:06	06:21	70	16:49 (W5)	06:33			06:01			05:56					
	17:35	18:13	18:43			20:16			20:45			21:01					
27	07:41	07:04	06:20	69	16:49 (W5)	06:31			06:00			05:57					
	17:37	18:14	18:45			20:17			20:46			21:01					
28	07:40	07:03	06:18	69	16:48 (W5)	06:30			06:00			05:57					
	17:38	18:15	18:46			20:18			20:47			21:01					
29	07:40		07:16	68	17:57 (W5)	06:29			05:59			05:57					
	17:39		19:47			20:19			20:48			21:01					
30	07:39		07:15	67	17:49 (W5)	06:27	2	19:55 (W2)	05:59			05:58					
	17:40		19:48			20:20			20:49			21:01					
31	07:38		07:13	65	17:49 (W5)				05:58								
	17:41		19:49			18:54 (W5)			20:49								
Potential sun hours	299	298	370	398	677	177	451										
Total, worst case			1852														

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar

Calculation: Copy of Progetto_worst caseShadow receptor: F96 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (20)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

July		August		September		October		November		December	
1	05:58	06:22	20:04 (W2)	06:52	18:00 (W5)	07:21	17:34 (W5)	06:55	07:30		
	21:01	20:42	15	20:19 (W2)	20:00	38	18:38 (W5)	19:10	63	18:37 (W5)	17:24
2	05:59	06:23	20:03 (W2)	06:53	17:58 (W5)	07:22	17:34 (W5)	06:56	07:31		
	21:01	20:41	15	20:18 (W2)	19:58	42	18:40 (W5)	19:08	62	18:36 (W5)	17:22
3	05:59	06:24	20:03 (W2)	06:54	17:56 (W5)	07:24	17:35 (W5)	06:57	07:32		
	21:01	20:40	14	20:17 (W2)	19:57	45	18:41 (W5)	19:06	59	18:34 (W5)	17:21
4	06:00	06:25	20:01 (W2)	06:55	17:53 (W5)	07:25	17:36 (W5)	06:59	07:33		
	21:01	20:39	14	20:15 (W2)	19:55	49	18:42 (W5)	19:05	57	18:33 (W5)	17:20
5	06:00	06:26	20:01 (W2)	06:56	17:51 (W5)	07:26	17:37 (W5)	07:00	07:34		
	21:00	20:38	13	20:14 (W2)	19:53	52	18:43 (W5)	19:03	54	18:31 (W5)	17:19
6	06:01	06:27	20:01 (W2)	06:57	17:49 (W5)	07:27	17:39 (W5)	07:01	07:34		
	21:00	20:37	12	20:13 (W2)	19:52	54	18:43 (W5)	19:02	52	18:31 (W5)	17:18
7	06:01	06:28	20:01 (W2)	06:58	17:48 (W5)	07:28	17:40 (W5)	07:02	07:35		
	21:00	20:35	11	20:12 (W2)	19:50	56	18:44 (W5)	19:00	49	18:29 (W5)	17:17
8	06:02	06:29	20:01 (W2)	06:59	17:46 (W5)	07:29	17:41 (W5)	07:03	07:36		
	20:59	20:34	10	20:11 (W2)	19:48	59	18:45 (W5)	18:58	46	18:27 (W5)	17:16
9	06:03	06:30	20:01 (W2)	07:00	17:45 (W5)	07:30	17:43 (W5)	07:05	07:37		
	20:59	20:33	9	20:10 (W2)	19:47	60	18:45 (W5)	18:57	41	18:24 (W5)	17:15
10	06:03	06:30	20:02 (W2)	07:01	17:44 (W5)	07:31	17:45 (W5)	07:06	07:38		
	20:59	20:32	7	20:09 (W2)	19:45	62	18:46 (W5)	18:55	37	18:22 (W5)	17:14
11	06:04	06:31	20:02 (W2)	07:02	17:43 (W5)	07:32	17:47 (W5)	07:07	07:39		
	20:58	20:31	6	20:08 (W2)	19:43	63	18:46 (W5)	18:54	32	18:19 (W5)	17:13
12	06:05	06:32	20:03 (W2)	07:03	17:42 (W5)	07:33	17:50 (W5)	07:08	07:40		
	20:58	20:29	3	20:06 (W2)	19:42	65	18:47 (W5)	18:52	25	18:15 (W5)	17:12
13	06:06	06:33		07:04	17:41 (W5)	07:34	17:56 (W5)	07:09	07:41		
	20:57	20:28		19:40	18:47 (W5)	18:50	13	18:09 (W5)	17:11	16:59	
14	06:06	06:34		07:05	17:40 (W5)	07:35		07:10	07:41		
	20:57	20:27		19:38	18:47 (W5)	18:49		17:10	16:59		
15	06:07	06:35		07:06	17:39 (W5)	07:36		07:12	07:42		
	20:56	20:25		19:37	18:47 (W5)	18:47		17:09	16:59		
16	06:08	06:36		07:07	17:38 (W5)	07:37		07:13	07:43		
	20:56	20:24		19:35	18:47 (W5)	18:46		17:08	17:00		
17	06:09	06:37		07:08	17:37 (W5)	07:38		07:14	07:43		
	20:55	20:22		19:33	18:47 (W5)	18:44		17:07	17:00		
18	06:09	06:38		07:09	17:37 (W5)	07:39		07:15	07:44		
	20:54	20:21		19:32	18:47 (W5)	18:43		17:07	17:00		
19	06:10	06:39		07:10	17:36 (W5)	07:40		07:16	07:45		
	20:54	20:20		19:30	18:46 (W5)	18:41		17:06	17:01		
20	06:11	06:40		07:11	17:36 (W5)	07:41		07:17	07:45		
	20:53	20:18		19:28	18:46 (W5)	18:40		17:05	17:01		
21	06:12	06:41		07:12	17:34 (W5)	07:43		07:19	07:46		
	20:52	20:17		19:27	18:45 (W5)	18:38		17:04	17:02		
22	06:13	06:42		07:12	17:34 (W5)	07:44		07:20	07:46		
	20:52	20:15		19:25	18:44 (W5)	18:37		17:04	17:02		
23	06:14	06:43		07:13	17:33 (W5)	07:45		07:21	07:47		
	20:51	20:14		19:23	18:44 (W5)	18:36		17:03	17:03		
24	06:14	06:44		07:14	17:33 (W5)	07:46		07:22	07:47		
	20:50	20:12		19:21	18:43 (W5)	18:34		17:03	17:03		
25	06:15	06:45		07:15	17:33 (W5)	06:47		07:23	07:48		
	20:49	20:11		19:20	18:43 (W5)	17:33		17:02	17:04		
26	06:16	06:46		07:16	17:33 (W5)	06:48		07:24	07:48		
	20:48	20:09		19:18	18:42 (W5)	17:31		17:02	17:04		
27	06:17	06:47		07:17	17:33 (W5)	06:49		07:25	07:49		
	20:47	20:08		19:16	18:41 (W5)	17:30		17:01	17:05		
28	06:18	20:09 (W2)	06:48	18:15 (W5)	07:18	17:33 (W5)	06:50	07:26	07:49		
	20:46	6	20:15 (W2)	20:06	11	18:26 (W5)	19:15	67	18:40 (W5)	17:29	
29	06:19	20:07 (W2)	06:49	18:09 (W5)	07:19	17:33 (W5)	06:52	07:27	07:49		
	20:45	10	20:17 (W2)	20:04	22	18:31 (W5)	19:13	66	18:39 (W5)	17:27	
30	06:20	20:05 (W2)	06:50	18:05 (W5)	07:20	17:34 (W5)	06:53	07:28	07:49		
	20:44	14	20:19 (W2)	20:03	29	18:34 (W5)	19:11	64	18:38 (W5)	17:26	
31	06:21	20:04 (W2)	06:51	18:02 (W5)		06:54			07:50		
	20:43	16	20:20 (W2)	20:01	35	18:37 (W5)	17:25		17:08		
Potential sun hours	458		427		375		346		299		289
Total, worst case	46		226		1881		590				

Table 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)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

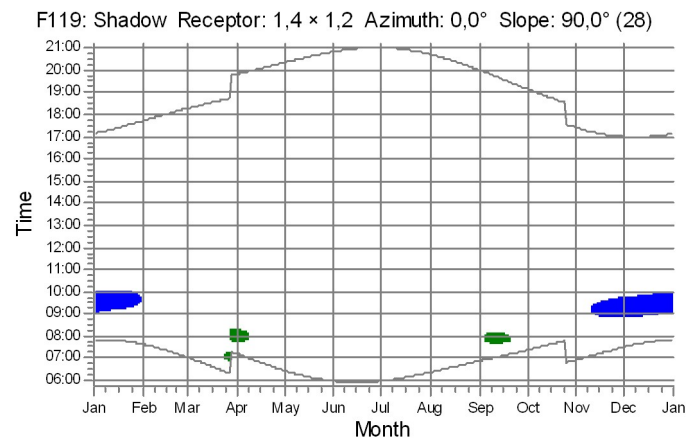
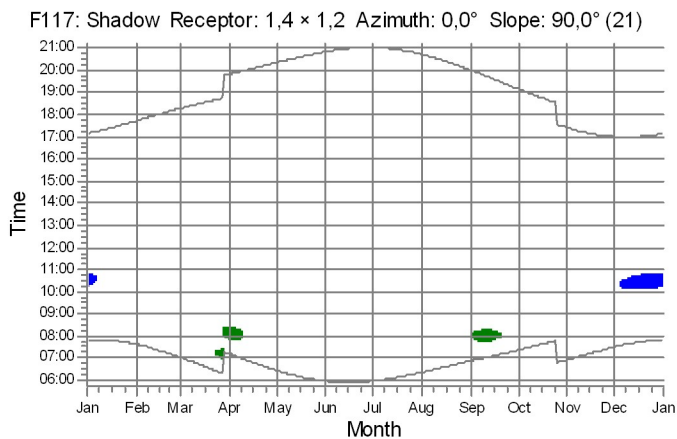
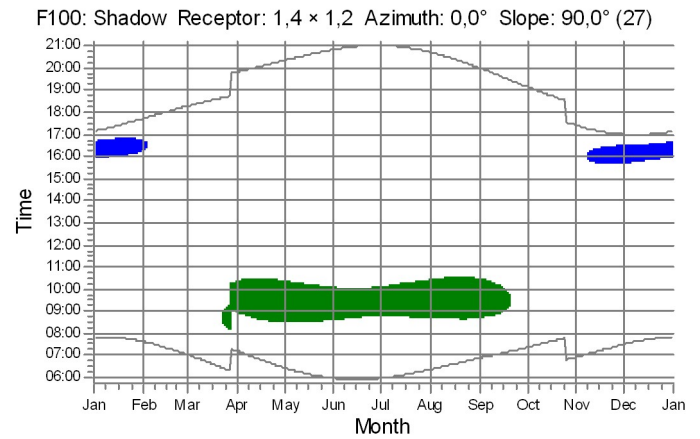
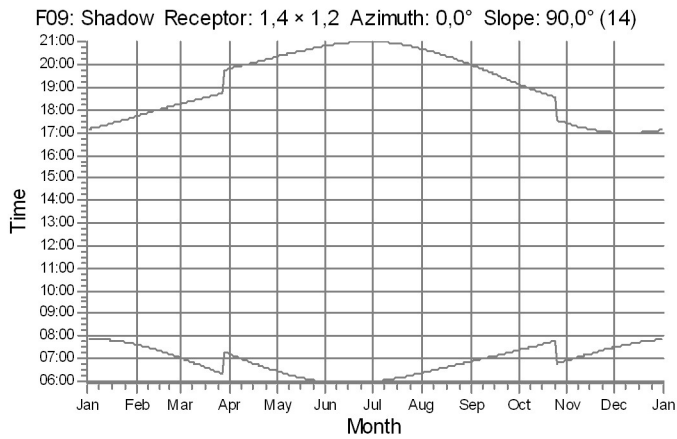
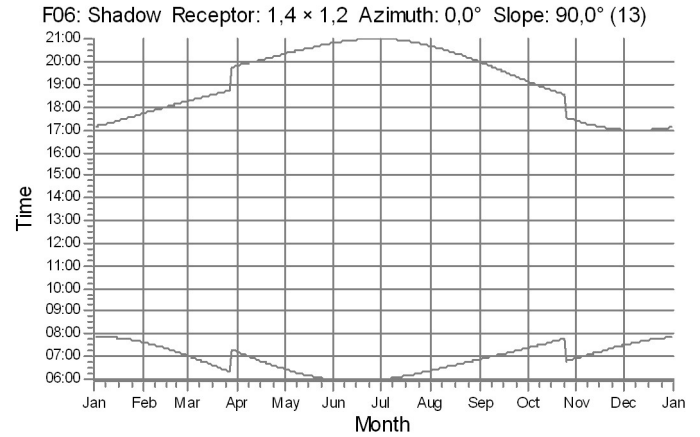
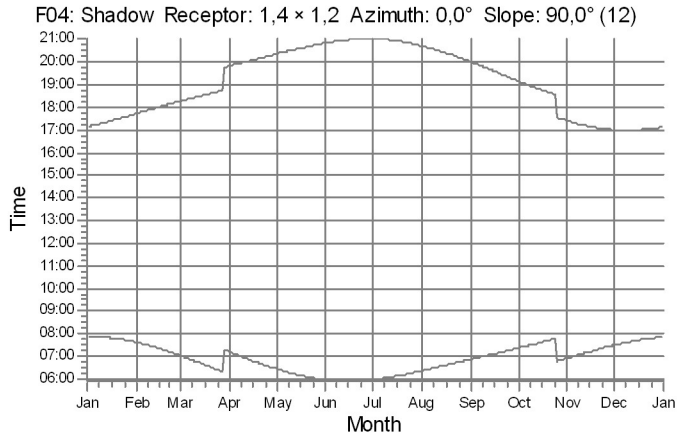
Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar, graphical

Calculation: Copy of Progetto_worst case



WTGs



W4: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)

W3: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

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+39 070 658297

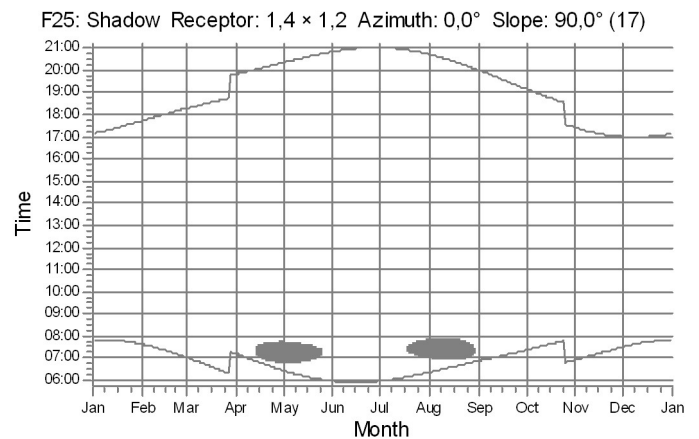
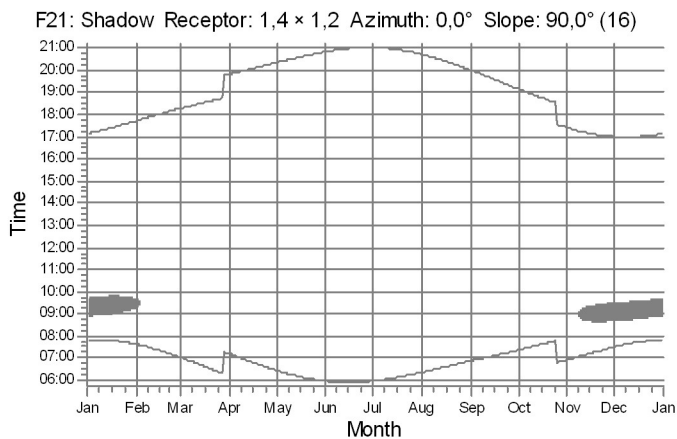
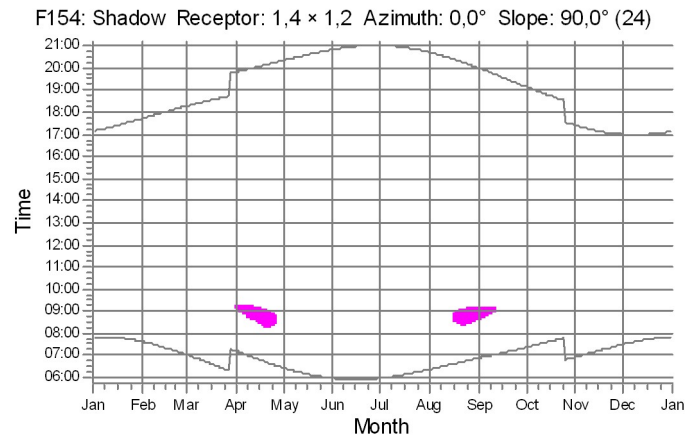
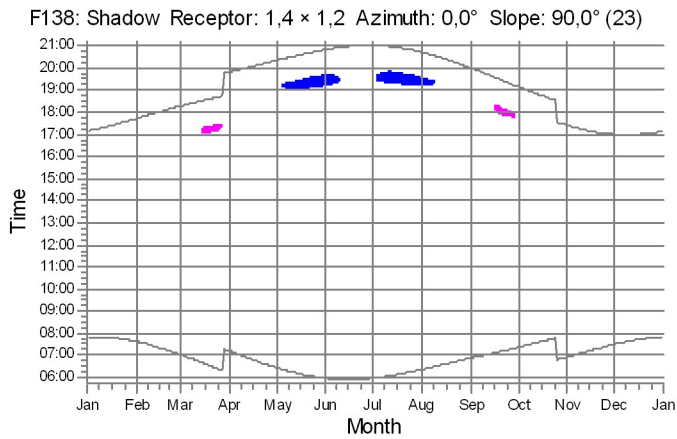
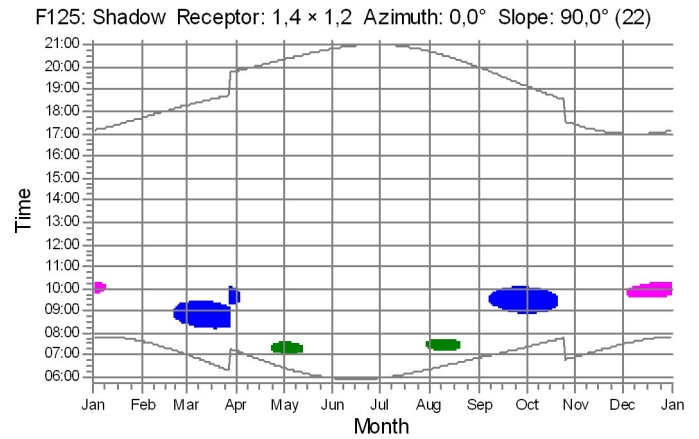
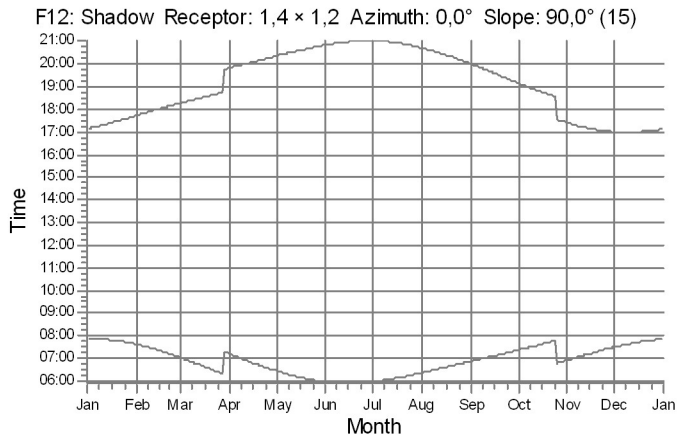
Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar, graphical

Calculation: Copy of Progetto_worst case



WTGs



W4: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)

W3: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)

W2: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)

W1: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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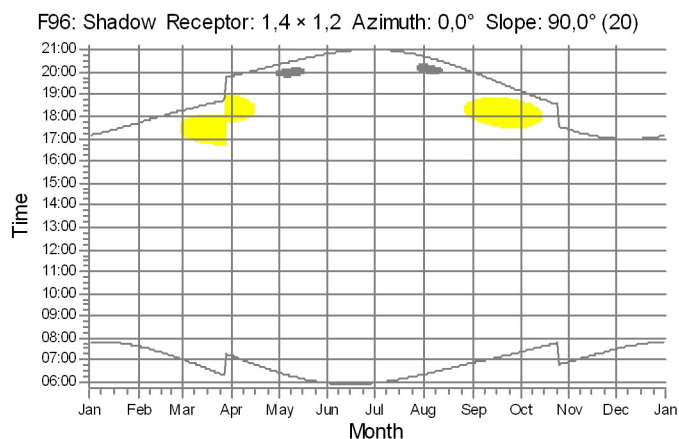
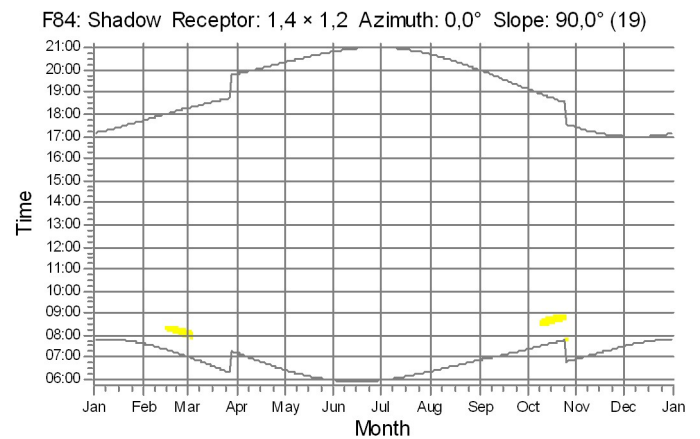
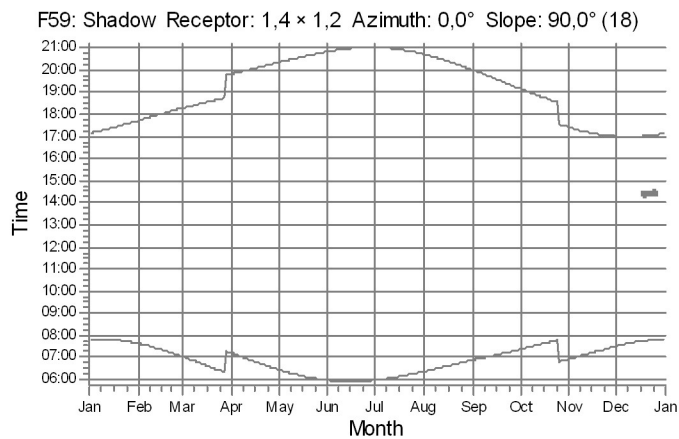
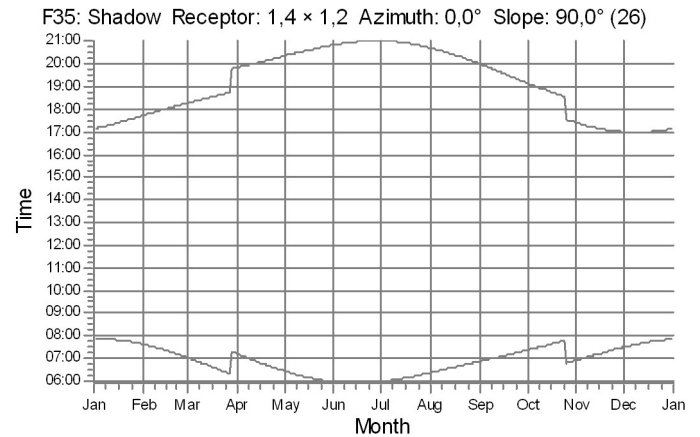
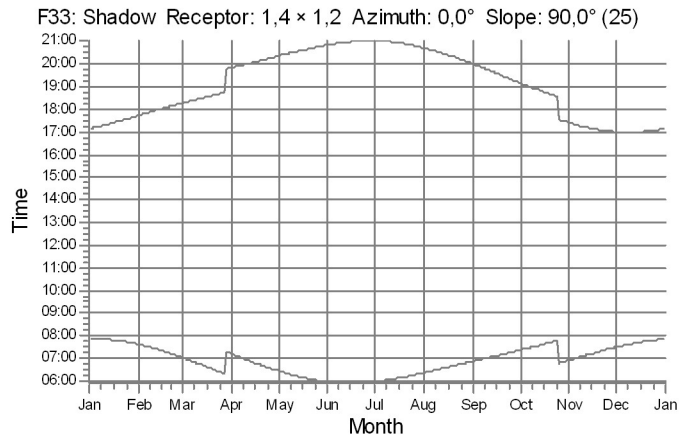
Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:44/3.4.415

SHADOW - Calendar, graphical

Calculation: Copy of Progetto_worst case



WTGs



W5: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)

W2: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W1 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)

Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	07:50 09:50-10:14/24 17:09	07:37 17:43 18:16	07:01 18:16	07:11 09:10-09:12/2 19:50	06:26 20:21 20:50	05:58 20:50
2	07:50 09:51-10:14/23 17:10	07:36 17:44 18:18	07:00 18:18	07:10 09:08-09:12/4 19:51	06:25 20:22 20:51	05:57 20:51
3	07:50 09:52-10:13/21 17:11	07:35 17:45 18:19	06:58 18:19	07:08 09:05-09:12/7 19:52	06:24 20:23 20:52	05:57 20:52
4	07:50 09:53-10:13/20 17:12	07:34 17:47 18:20	06:57 18:20	07:06 09:03-09:12/9 19:53	06:22 20:24 20:52	05:57 20:52
5	07:50 09:55-10:12/17 17:12	07:33 17:48 18:21	06:55 18:21	07:05 09:00-09:12/12 19:54	06:21 20:25 20:53	05:56 20:53
6	07:50 09:56-10:12/16 17:13	07:32 17:49 18:22	06:54 18:22	07:03 08:57-09:12/15 19:55	06:20 20:26 20:54	05:56 20:54
7	07:50 09:59-10:10/11 17:14	07:31 17:50 18:23	06:52 18:23	07:02 08:54-09:11/17 19:56	06:19 20:27 20:54	05:56 20:54
8	07:50 10:02-10:08/6 17:15	07:30 17:51 18:24	06:51 18:24	07:00 08:50-09:10/20 19:57	06:18 20:28 20:55	05:55 20:55
9	07:50 17:16	07:29 17:53 18:25	06:49 18:25	06:58 08:47-09:10/23 19:58	06:16 20:29 20:55	05:55 20:55
10	07:50 17:17	07:27 17:54 18:26	06:47 18:26	06:57 08:44-09:09/25 19:59	06:15 20:30 20:56	05:55 20:56
11	07:49 17:18	07:26 17:55 18:28	06:46 18:28	06:55 08:42-09:09/27 20:00	06:14 20:31 20:56	05:55 20:56
12	07:49 17:19	07:25 17:56 18:29	06:44 18:29	06:54 08:40-09:08/28 20:01	06:13 20:32 20:57	05:55 20:57
13	07:49 17:20	07:24 17:58 18:30	06:43 18:30	06:52 08:38-09:07/29 20:02	06:12 20:33 20:57	05:55 20:57
14	07:49 17:22	07:22 17:59 18:31	06:41 18:31	06:51 08:35-09:06/31 20:03	06:11 20:34 20:58	05:54 20:58
15	07:48 17:23	07:21 18:00 18:32	06:39 17:11-17:12/1 18:32	06:49 08:34-09:06/32 20:04	06:10 20:35 20:58	05:54 20:58
16	07:48 17:24	07:20 18:01 18:33	06:38 17:10-17:14/4 18:33	06:47 08:31-09:04/33 20:05	06:09 20:36 20:59	05:54 20:59
17	07:47 17:25	07:19 18:02 18:34	06:36 17:11-17:16/5 18:34	06:46 08:29-09:03/34 20:06	06:08 20:37 20:59	05:55 20:59
18	07:47 17:26	07:17 18:04 18:35	06:34 17:10-17:16/6 18:35	06:44 08:27-09:01/34 20:08	06:07 20:38 20:59	05:55 20:59
19	07:46 17:27	07:16 18:05 18:36	06:33 17:10-17:17/7 18:36	06:43 08:25-09:00/35 20:09	06:06 20:39 21:00	05:55 21:00
20	07:46 17:28	07:15 18:06 18:37	06:31 17:11-17:19/8 18:37	06:41 08:22-08:58/36 20:10	06:06 20:40 21:00	05:55 21:00
21	07:45 17:30	07:13 18:07 18:38	06:29 17:12-17:19/7 18:38	06:40 08:21-08:57/36 20:11	06:05 20:41 21:00	05:55 21:00
22	07:45 17:31	07:12 18:08 18:39	06:28 17:12-17:20/8 18:39	06:39 08:22-08:55/33 20:12	06:04 20:42 21:00	05:55 21:00
23	07:44 17:32	07:10 18:09 18:40	06:26 17:14-17:23/9 18:40	06:37 08:24-08:53/29 20:13	06:03 20:43 21:01	05:55 21:01
24	07:43 17:33	07:09 18:11 18:41	06:25 17:15-17:24/9 18:41	06:36 08:25-08:50/25 20:14	06:02 20:44 21:01	05:56 21:01
25	07:43 17:34	07:07 18:12 18:42	06:23 17:17-17:24/7 18:42	06:34 08:28-08:47/19 20:15	06:02 20:44 21:01	05:56 21:01
26	07:42 17:35	07:06 18:13 18:44	06:21 17:21-17:26/5 18:44	06:33 08:31-08:44/13 20:16	06:01 20:45 21:01	05:56 21:01
27	07:41 17:37	07:04 18:14 18:45	06:20 18:45	06:31 20:17	06:00 20:46 21:01	05:57 21:01
28	07:40 17:38	07:03 18:15 18:46	06:18 18:46	06:30 20:18	06:00 20:47 21:01	05:57 21:01
29	07:40 17:39		07:16 19:47	06:29 20:19	05:59 20:48 21:01	05:57 21:01
30	07:39 17:40		07:15 19:48	06:27 20:20	05:59 20:49 21:01	05:58 21:01
31	07:38 17:42		07:13 19:49		05:58 20:49	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	138	0	76	608	0	0

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W1 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)

Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	06:52 08:41-09:08/27 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	05:59 21:01	06:23 20:41	06:53 08:43-09:08/25 19:58	07:23 19:08	06:56 17:23	07:31 17:00
3	05:59 21:01	06:24 20:40	06:54 08:45-09:08/23 19:57	07:24 19:06	06:57 17:21	07:32 16:59
4	06:00 21:01	06:25 20:39	06:55 08:48-09:08/20 19:55	07:25 19:05	06:59 17:20	07:33 09:47-09:51/4 16:59
5	06:00 21:00	06:26 20:38	06:56 08:51-09:08/17 19:53	07:26 19:03	07:00 17:19	07:34 09:44-09:55/11 16:59
6	06:01 21:00	06:27 20:37	06:57 08:52-09:07/15 19:52	07:27 19:02	07:01 17:18	07:35 09:43-09:57/14 16:59
7	06:02 21:00	06:28 20:36	06:58 08:55-09:07/12 19:50	07:28 19:00	07:02 17:17	07:35 09:42-09:59/17 16:59
8	06:02 20:59	06:29 20:34	06:59 08:57-09:06/9 19:48	07:29 18:58	07:03 17:16	07:36 09:41-10:01/20 16:59
9	06:03 20:59	06:30 20:33	07:00 08:59-09:06/7 19:47	07:30 18:57	07:05 17:15	07:37 09:41-10:02/21 16:59
10	06:04 20:59	06:31 20:32	07:01 09:01-09:05/4 19:45	07:31 18:55	07:06 17:14	07:38 09:41-10:04/23 16:59
11	06:04 20:58	06:32 20:31	07:02 09:02-09:04/2 19:43	07:32 18:54	07:07 17:13	07:39 09:40-10:04/24 16:59
12	06:05 20:58	06:33 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 09:40-10:05/25 16:59
13	06:06 20:57	06:34 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 09:40-10:06/26 16:59
14	06:06 20:57	06:34 20:27	07:05 19:38	07:35 18:49	07:10 17:10	07:41 09:40-10:08/28 16:59
15	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 09:41-10:09/28 17:00
16	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 09:40-10:09/29 17:00
17	06:09 20:55	06:37 08:37-08:51/14 20:22	07:08 18:10-18:15/5 19:33	07:38 18:44	07:14 17:07	07:43 09:41-10:10/29 17:00
18	06:09 20:54	06:38 08:34-08:55/21 20:21	07:09 18:05-18:13/8 19:32	07:39 18:43	07:15 17:07	07:44 09:41-10:10/29 17:00
19	06:10 20:54	06:39 08:31-08:57/26 20:20	07:10 18:03-18:11/8 19:30	07:40 18:41	07:16 17:06	07:45 09:41-10:11/30 17:01
20	06:11 20:53	06:40 08:29-08:59/30 20:18	07:11 18:00-18:09/9 19:28	07:42 18:40	07:17 17:05	07:45 09:42-10:12/30 17:01
21	06:12 20:52	06:41 08:27-09:01/34 20:17	07:12 17:58-18:06/8 19:27	07:43 18:38	07:19 17:05	07:46 09:42-10:12/30 17:02
22	06:13 20:52	06:42 08:25-09:01/36 20:15	07:13 17:56-18:04/8 19:25	07:44 18:37	07:20 17:04	07:46 09:43-10:13/30 17:02
23	06:14 20:51	06:43 08:26-09:02/36 20:14	07:14 17:55-18:03/8 19:23	07:45 18:36	07:21 17:03	07:47 09:43-10:13/30 17:03
24	06:15 20:50	06:44 08:28-09:03/35 20:12	07:15 17:54-18:01/7 19:22	07:46 18:34	07:22 17:03	07:47 09:43-10:13/30 17:03
25	06:15 20:49	06:45 08:30-09:04/34 20:11	07:16 17:53-17:59/6 19:20	06:47 17:33	07:23 17:02	07:48 09:45-10:14/29 17:04
26	06:16 20:48	06:46 08:31-09:05/34 20:09	07:17 17:52-17:58/6 19:18	06:48 17:31	07:24 17:02	07:48 09:45-10:14/29 17:04
27	06:17 20:47	06:47 08:33-09:06/33 20:08	07:18 17:52-17:56/4 19:16	06:49 17:30	07:25 17:01	07:49 09:45-10:14/29 17:05
28	06:18 20:46	06:48 08:35-09:07/32 20:06	07:19 17:51-17:54/3 19:15	06:51 17:29	07:26 17:01	07:49 09:47-10:15/28 17:06
29	06:19 20:45	06:49 08:36-09:07/31 20:05	07:20 19:13	06:52 17:28	07:27 17:00	07:49 09:47-10:15/28 17:06
30	06:20 20:44	06:50 08:38-09:07/29 20:03	07:21 19:11	06:53 17:26	07:29 17:00	07:49 09:48-10:15/27 17:07
31	06:21 20:43	06:51 08:40-09:08/28 20:01		06:54 17:25		07:50 09:49-10:14/25 17:08
Potential sun hours	458	427	375	346	299	703
Sum of minutes with flicker	0	453	241	0	0	703

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W2 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	07:50 08:58-09:39/41 17:09	07:37 09:20-09:35/15 17:43	07:02 07:11 18:16	07:11 07:50 19:50	06:26 19:54-19:58/4 20:21 06:52-07:40/48	05:58 20:50
2	07:50 08:58-09:39/41 17:10	07:36 09:26-09:30/4 17:44	07:00 07:10 18:18	07:10 07:51 19:51	06:25 19:53-19:59/6 20:22 06:52-07:40/48	05:57 20:51
3	07:50 08:58-09:40/42 17:11	07:35 07:45 17:45	06:58 07:08 18:19	07:08 07:52 19:52	06:24 19:53-20:00/7 20:23 06:52-07:40/48	05:57 20:52
4	07:50 08:59-09:40/41 17:11	07:34 07:46 17:46	06:57 07:06 18:20	07:06 07:53 19:53	06:22 19:52-20:02/10 20:24 06:53-07:40/47	05:56 20:52
5	07:50 08:59-09:41/42 17:12	07:33 07:48 17:48	06:55 07:05 18:21	07:05 07:54 19:54	06:21 19:51-20:02/11 20:25 06:53-07:40/47	05:56 20:53
6	07:50 09:00-09:42/42 17:13	07:32 07:49 17:49	06:54 07:03 18:22	07:03 07:55 19:55	06:20 19:51-20:03/12 20:26 06:52-07:38/46	05:56 20:54
7	07:50 09:00-09:42/42 17:14	07:31 07:50 17:50	06:52 07:02 18:23	07:02 07:56 19:56	06:19 19:51-20:04/13 20:27 06:52-07:38/46	05:56 20:54
8	07:50 09:01-09:43/42 17:15	07:30 07:51 17:51	06:51 07:00 18:24	07:00 07:57 19:57	06:18 19:51-20:05/14 20:28 06:53-07:38/45	05:55 20:55
9	07:50 09:01-09:44/43 17:16	07:29 07:53 17:53	06:49 06:58 18:25	06:58 07:58 19:58	06:16 19:52-20:06/14 20:29 06:53-07:37/44	05:55 20:56
10	07:50 09:01-09:43/42 17:17	07:27 07:54 17:54	06:47 06:57 18:26	06:57 07:59 19:59	06:15 19:52-20:07/15 20:30 06:54-07:37/43	05:55 20:56
11	07:50 09:01-09:44/43 17:18	07:26 07:55 17:55	06:46 06:55 18:28	06:55 20:00 20:00	06:14 19:53-20:08/15 20:31 06:54-07:36/42	05:55 20:57
12	07:49 09:02-09:45/43 17:19	07:25 07:56 17:56	06:44 06:54 18:29	06:54 20:01 20:01	06:13 19:53-20:09/16 20:32 06:55-07:35/40	05:55 20:57
13	07:49 09:02-09:44/42 17:20	07:24 07:58 17:58	06:43 06:52 18:30	06:52 20:02 20:02	06:12 19:54-20:09/15 20:33 06:55-07:35/40	05:54 20:58
14	07:49 09:03-09:45/42 17:22	07:23 07:59 17:59	06:41 06:51 18:31	06:51 07:17-07:23/6 20:03	06:11 19:55-20:08/13 20:34 06:56-07:34/38	05:54 20:58
15	07:48 09:04-09:46/42 17:23	07:21 08:00 18:00	06:39 06:49 18:32	06:49 07:11-07:29/18 20:04	06:10 19:57-20:06/9 20:35 06:57-07:33/36	05:54 20:58
16	07:48 09:03-09:45/42 17:24	07:20 18:01 18:01	06:38 06:47 18:33	06:47 07:08-07:31/23 20:05	06:09 20:00-20:03/3 20:36 06:57-07:32/35	05:54 20:59
17	07:48 09:04-09:46/42 17:25	07:19 18:02 18:02	06:36 06:46 18:34	06:46 07:06-07:34/28 20:07	06:08 06:58-07:31/33 20:37	05:54 20:59
18	07:47 09:05-09:46/41 17:26	07:17 18:04 18:04	06:34 06:44 18:35	06:44 07:03-07:35/32 20:08	06:07 07:00-07:31/31 20:38	05:55 21:00
19	07:47 09:05-09:45/40 17:27	07:16 18:05 18:05	06:33 06:43 18:36	06:43 07:02-07:36/34 20:09	06:06 07:01-07:29/28 20:39	05:55 21:00
20	07:46 09:06-09:46/40 17:28	07:15 18:06 18:06	06:31 06:41 18:37	06:41 07:00-07:37/37 20:10	06:06 07:02-07:28/26 20:40	05:55 21:00
21	07:45 09:06-09:45/39 17:29	07:13 18:07 18:07	06:30 06:40 18:38	06:40 06:59-07:38/39 20:11	06:05 07:03-07:26/23 20:41	05:55 21:00
22	07:45 09:06-09:45/39 17:31	07:12 18:08 18:08	06:28 06:38 18:39	06:38 06:57-07:38/41 20:12	06:04 07:06-07:25/19 20:42	05:55 21:01
23	07:44 09:08-09:45/37 17:32	07:10 18:09 18:09	06:26 06:37 18:40	06:37 06:57-07:39/42 20:13	06:03 07:07-07:23/16 20:43	05:55 21:01
24	07:44 09:09-09:45/36 17:33	07:09 18:11 18:11	06:25 06:36 18:41	06:36 06:55-07:39/44 20:14	06:02 07:10-07:20/10 20:44	05:56 21:01
25	07:43 09:09-09:44/35 17:34	07:07 18:12 18:12	06:23 06:34 18:43	06:34 06:55-07:40/45 20:15	06:02 20:45 20:45	05:56 21:01
26	07:42 09:10-09:43/33 17:35	07:06 18:13 18:13	06:21 06:33 18:44	06:33 06:55-07:40/45 20:16	06:01 20:45 20:45	05:56 21:01
27	07:41 09:12-09:43/31 17:37	07:05 18:14 18:14	06:20 06:31 18:45	06:31 06:53-07:40/47 20:17	06:00 20:46 20:46	05:57 21:01
28	07:40 09:13-09:42/29 17:38	07:03 18:15 18:15	06:18 06:30 18:46	06:30 06:53-07:40/47 20:18	06:00 20:47 20:47	05:57 21:01
29	07:40 09:14-09:41/27 17:39		07:16 06:29 19:47	06:29 06:53-07:41/48 20:19	05:59 20:48 20:48	05:57 21:01
30	07:39 09:16-09:39/23 17:40		07:15 06:27 19:48	06:27 19:55-19:57/2 20:20	05:59 20:49 20:49	05:58 21:01
31	07:38 09:18-09:38/20 17:42		07:13 19:49 19:49		05:58 20:49 20:49	
Potential sun hours	298	298	370	398	447	451
Sum of minutes with flicker	1184	19	0	626	1056	0

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W2 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)

Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:04-20:19/15 20:42 07:05-07:46/41	06:52 20:00	07:22 19:10	06:55 17:24	07:30 08:43-09:26/43 17:00
2	05:59 21:01	06:23 20:03-20:18/15 20:41 07:05-07:47/42	06:53 19:58	07:23 19:08	06:56 17:23	07:31 08:44-09:26/42 17:00
3	05:59 21:01	06:24 20:03-20:17/14 20:40 07:04-07:48/44	06:54 19:57	07:24 19:07	06:58 17:21	07:32 08:44-09:27/43 16:59
4	06:00 21:01	06:25 20:01-20:15/14 20:39 07:04-07:48/44	06:55 19:55	07:25 19:05	06:59 17:20	07:33 08:45-09:27/42 16:59
5	06:00 21:00	06:26 20:01-20:14/13 20:38 07:03-07:48/45	06:56 19:53	07:26 19:03	07:00 17:19	07:34 08:45-09:27/42 16:59
6	06:01 21:00	06:27 20:01-20:13/12 20:37 07:02-07:48/46	06:57 19:52	07:27 19:02	07:01 17:18	07:35 08:46-09:28/42 16:59
7	06:02 21:00	06:28 20:01-20:12/11 20:36 07:02-07:48/46	06:58 19:50	07:28 19:00	07:02 17:17	07:36 08:46-09:28/42 16:59
8	06:02 21:00	06:29 20:01-20:11/10 20:34 07:01-07:48/47	06:59 19:48	07:29 18:58	07:03 17:16	07:36 08:47-09:29/42 16:59
9	06:03 20:59	06:30 20:01-20:10/9 20:33 07:01-07:49/48	07:00 19:47	07:30 18:57	07:05 08:56-09:02/6 17:15	07:37 08:47-09:29/42 16:59
10	06:03 20:59	06:31 20:02-20:09/7 20:32 07:01-07:49/48	07:01 19:45	07:31 18:55	07:06 08:51-09:06/15 17:14	07:38 08:48-09:29/41 16:59
11	06:04 20:58	06:32 20:02-20:08/6 20:31 07:01-07:49/48	07:02 19:43	07:32 18:54	07:07 08:49-09:09/20 17:13	07:39 08:49-09:30/41 16:59
12	06:05 20:58	06:33 20:03-20:06/3 20:29 07:01-07:49/48	07:03 19:42	07:33 18:52	07:08 08:47-09:10/23 17:12	07:40 08:48-09:30/42 16:59
13	06:06 20:57	06:33 07:01-07:48/47 20:28	07:04 19:40	07:34 18:50	07:09 08:46-09:13/27 17:11	07:41 08:49-09:30/41 16:59
14	06:06 20:57	06:34 07:01-07:48/47 20:27	07:05 19:38	07:35 18:49	07:10 08:45-09:14/29 17:10	07:41 08:50-09:31/41 16:59
15	06:07 20:56	06:35 07:01-07:48/47 20:25	07:06 19:37	07:36 18:47	07:12 08:44-09:15/31 17:09	07:42 08:51-09:31/40 16:59
16	06:08 20:56	06:36 07:01-07:47/46 20:24	07:07 19:35	07:37 18:46	07:13 08:43-09:16/33 17:08	07:43 08:51-09:31/40 17:00
17	06:09 20:55	06:37 07:01-07:47/46 20:23	07:08 19:33	07:38 18:44	07:14 08:43-09:18/35 17:07	07:44 14:21-14:24/3 17:00 08:52-09:32/40
18	06:09 20:55	06:38 07:02-07:46/44 20:21	07:09 19:32	07:39 18:43	07:15 08:42-09:19/37 17:07	07:44 14:20-14:26/6 17:00 08:52-09:33/41
19	06:10 20:54	06:39 07:02-07:46/44 20:20	07:10 19:30	07:40 18:41	07:16 08:42-09:19/37 17:06	07:45 14:19-14:27/8 17:01 08:52-09:32/40
20	06:11 20:53	06:40 07:03-07:45/42 20:18	07:11 19:28	07:42 18:40	07:17 08:42-09:20/38 17:05	07:45 14:20-14:28/8 17:01 08:53-09:33/40
21	06:12 20:52	06:41 07:03-07:44/41 20:17	07:12 19:27	07:43 18:38	07:19 08:42-09:21/39 17:05	07:46 14:20-14:28/8 17:02 08:53-09:33/40
22	06:13 20:52	06:42 07:03-07:42/39 20:15	07:13 19:25	07:44 18:37	07:20 08:42-09:22/40 17:04	07:47 14:21-14:29/8 17:02 08:54-09:34/40
23	06:14 20:51	06:43 07:04-07:41/37 20:14	07:14 19:23	07:45 18:36	07:21 08:42-09:22/40 17:03	07:47 14:21-14:29/8 17:03 08:54-09:34/40
24	06:15 20:50	06:44 07:05-07:39/34 20:12	07:15 19:22	07:46 18:34	07:22 08:42-09:23/41 17:03	07:47 14:21-14:29/8 17:03 08:54-09:34/40
25	06:15 20:49	06:45 07:06-07:37/31 20:11	07:16 19:20	07:47 17:33	07:23 08:41-09:23/42 17:02	07:48 14:23-14:30/7 17:04 08:55-09:36/41
26	06:16 20:48	06:46 07:08-07:35/27 20:09	07:17 19:18	07:48 17:31	07:24 08:43-09:24/41 17:02	07:48 14:24-14:29/5 17:04 08:55-09:36/41
27	06:17 20:47	06:47 07:10-07:33/23 20:08	07:18 19:16	07:49 17:30	07:25 08:43-09:25/42 17:01	07:49 08:56-09:36/40 17:05
28	06:18 20:46	06:48 07:13-07:30/17 20:06	07:19 19:15	06:51 17:29	07:26 08:43-09:25/42 17:01	07:49 08:57-09:37/40 17:06
29	06:19 20:45	06:49 07:18-07:23/5 20:05	07:20 19:13	06:52 17:27	07:28 08:43-09:25/42 17:00	07:49 08:57-09:38/41 17:06
30	06:20 20:44	06:50 07:06-07:45/39 20:03	07:21 19:11	06:53 17:26	07:29 08:43-09:26/43 17:00	07:50 08:57-09:38/41 17:07
31	06:21 20:43	06:51 07:06-07:46/40 20:01		06:54 17:25		07:50 08:57-09:38/41 17:08
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	403	1293	0	0	743	1341

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W3 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	07:50 09:08-09:55/47 16:01-16:37/36 17:09 10:21-10:44/23	07:37 16:21-16:39/18 17:43	07:01 08:28-09:18/50 18:16	07:11 09:27-09:54/27 19:50	06:26 20:21	05:58 19:16-19:37/21 20:50
2	07:50 09:08-09:56/48 16:01-16:38/37 17:10 10:22-10:43/21	07:36 16:24-16:36/12 17:44	07:00 08:28-09:19/51 18:17	07:10 09:29-09:50/21 19:51	06:25 20:22	05:57 19:18-19:38/20 20:51
3	07:50 09:08-09:56/48 16:01-16:38/37 17:11 10:24-10:43/19	07:35 17:45	06:58 08:26-09:20/54 18:19	07:08 09:33-09:45/12 19:52	06:24 20:23	05:57 19:18-19:37/19 20:52
4	07:50 09:09-09:57/48 16:01-16:39/38 17:12 10:25-10:41/16	07:34 17:46	06:57 08:25-09:21/56 18:20	07:06 19:53	06:22 20:24	05:56 19:19-19:36/17 20:52
5	07:50 09:10-09:57/47 16:02-16:40/38 17:12 10:28-10:40/12	07:33 17:48	06:55 08:24-09:21/57 18:21	07:05 19:54	06:21 19:11-19:12/1 20:25	05:56 19:21-19:36/15 20:53
6	07:50 09:10-09:58/48 16:02-16:40/38 17:13 10:32-10:37/5	07:32 17:49	06:54 08:23-09:22/59 18:22	07:03 19:55	06:20 19:10-19:13/3 20:26	05:56 19:21-19:34/13 20:54
7	07:50 09:11-09:58/47 17:14 16:03-16:41/38	07:31 17:50	06:52 08:22-09:22/60 18:23	07:02 19:56	06:19 19:09-19:14/5 20:27	05:56 19:23-19:33/10 20:54
8	07:50 09:11-09:59/48 17:15 16:03-16:42/39	07:30 17:51	06:51 08:21-09:22/61 18:24	07:00 19:57	06:18 19:09-19:15/6 20:28	05:55 19:25-19:32/7 20:55
9	07:50 09:12-09:59/47 17:16 16:03-16:41/38	07:29 17:53	06:49 08:20-09:23/63 18:25	06:58 19:58	06:16 19:09-19:16/7 20:29	05:55 19:27-19:30/3 20:55
10	07:50 09:12-09:59/47 17:17 16:03-16:42/39	07:27 17:54	06:47 08:19-09:22/63 18:26	06:57 19:59	06:15 19:08-19:17/9 20:30	05:55 20:56
11	07:50 09:13-09:59/46 17:18 16:04-16:43/39	07:26 17:55	06:46 08:19-09:23/64 18:28	06:55 20:00	06:14 19:08-19:18/10 20:31	05:55 20:57
12	07:49 09:14-10:00/46 17:19 16:04-16:44/40	07:25 17:56	06:44 08:19-09:22/63 18:29	06:54 20:01	06:13 19:08-19:19/11 20:32	05:55 20:57
13	07:49 09:14-09:59/45 17:20 16:04-16:44/40	07:24 17:58	06:43 08:18-09:21/63 18:30	06:52 20:02	06:12 19:08-19:20/12 20:33	05:55 20:57
14	07:49 09:15-10:00/45 17:22 16:05-16:44/39	07:22 17:59	06:41 08:18-09:21/63 18:31	06:51 20:03	06:11 19:08-19:22/14 20:34	05:54 20:58
15	07:48 09:15-09:59/44 17:23 16:05-16:44/39	07:21 18:00	06:39 08:17-09:21/64 18:32	06:49 20:04	06:10 19:07-19:23/16 20:35	05:54 20:58
16	07:48 09:16-09:59/43 17:24 16:06-16:45/39	07:20 18:01	06:38 08:17-09:20/63 18:33	06:47 20:05	06:09 19:07-19:24/17 20:36	05:54 20:59
17	07:47 09:16-09:59/43 17:25 16:06-16:45/39	07:19 18:02	06:36 08:17-09:20/63 18:34	06:46 20:06	06:08 19:07-19:25/18 20:37	05:55 20:59
18	07:47 09:17-09:59/42 17:26 16:07-16:46/39	07:17 18:04	06:34 08:17-09:18/61 18:35	06:44 20:08	06:07 19:09-19:27/18 20:38	05:55 20:59
19	07:46 09:18-09:59/41 17:27 16:07-16:45/38	07:16 18:05	06:33 08:16-09:17/61 18:36	06:43 20:09	06:06 19:09-19:27/18 20:39	05:55 21:00
20	07:46 09:19-09:59/40 17:28 16:08-16:46/38	07:15 18:06	06:31 08:17-09:17/60 18:37	06:41 20:10	06:06 19:09-19:28/19 20:40	05:55 21:00
21	07:45 09:20-09:58/38 17:29 16:08-16:46/38	07:13 18:07	06:29 08:17-09:15/58 18:38	06:40 20:11	06:05 19:09-19:28/19 20:41	05:55 21:00
22	07:45 09:20-09:57/37 17:31 16:08-16:45/37	07:12 08:48-09:02/14 18:08	06:28 08:17-09:14/57 18:39	06:38 20:12	06:04 19:10-19:30/20 20:42	05:55 21:00
23	07:44 09:22-09:57/35 17:32 16:10-16:46/36	07:10 08:42-09:06/24 18:09	06:26 08:18-09:13/55 18:40	06:37 20:13	06:03 19:10-19:31/21 20:43	05:55 21:01
24	07:43 09:23-09:56/33 17:33 16:10-16:46/36	07:09 08:39-09:10/31 18:11	06:25 08:18-09:11/53 18:41	06:36 20:14	06:02 19:10-19:31/21 20:44	05:56 21:01
25	07:43 09:24-09:55/31 17:34 16:11-16:45/34	07:07 08:36-09:12/36 18:12	06:23 08:18-09:09/51 18:42	06:34 20:15	06:02 19:12-19:32/20 20:44	05:56 21:01
26	07:42 09:25-09:54/29 17:35 16:12-16:45/33	07:06 08:34-09:14/40 18:13	06:21 08:19-09:08/49 18:44	06:33 20:16	06:01 19:12-19:33/21 20:45	05:56 21:01
27	07:41 09:27-09:52/25 17:37 16:13-16:44/31	07:04 08:32-09:15/43 18:14	06:20 08:20-09:06/46 18:45	06:31 20:17	06:00 19:12-19:33/21 20:46	05:57 21:01
28	07:40 09:30-09:51/21 17:38 16:15-16:44/29	07:03 08:31-09:17/46 18:15	06:18 08:20-09:04/44 18:46	06:30 20:18	06:00 19:13-19:35/22 20:47	05:57 21:01
29	07:40 09:32-09:48/16 17:39 16:16-16:43/27		07:16 09:22-10:03/41 19:47	06:29 20:19	05:59 19:13-19:35/22 20:48	05:57 21:01
30	07:39 09:37-09:44/7 17:40 16:17-16:42/25		07:15 09:23-10:00/37 19:48	06:27 20:20	05:59 19:15-19:36/21 20:49	05:58 21:01
31	07:38 16:19-16:41/22 17:42		07:13 09:24-09:57/33 19:49		05:58 19:15-19:36/21 20:49	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	2394	264	1723	60	413	125

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W3 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)
Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:58 21:01	06:22 19:18-19:30/12 20:42	06:52 20:00	07:22 08:57-10:01/64 19:10	06:55 17:24	07:30 08:55-09:41/46 17:00 15:46-16:25/39
2	05:59 21:01	06:23 19:19-19:29/10 20:39	06:53 19:58	07:23 08:57-10:00/63 19:08	06:56 17:23	07:31 08:55-09:42/47 17:00 15:46-16:25/39
3	05:59 21:01	06:24 19:19-19:28/9 20:40	06:54 19:57	07:24 08:57-10:00/63 19:06	06:57 17:21	07:32 08:55-09:42/47 16:59 15:47-16:26/39
4	06:00 19:30-19:37/7 21:01	06:25 19:19-19:27/8 20:39	06:55 19:55	07:25 08:58-10:00/62 19:05	06:59 17:20	07:33 08:55-09:43/48 16:59 15:47-16:26/39
5	06:00 19:29-19:39/10 21:00	06:26 19:19-19:25/6 20:38	06:56 19:53	07:26 08:58-10:00/62 19:03	07:00 17:19	07:34 08:56-09:43/47 16:59 15:48-16:26/38
6	06:01 19:28-19:40/12 21:00	06:27 19:19-19:24/5 20:37	06:57 19:52	07:27 08:58-09:59/61 19:02	07:01 17:18	07:35 08:56-09:44/48 15:48-16:26/38 16:59 10:18-10:22/4
7	06:02 19:27-19:41/14 21:00	06:28 19:20-19:23/3 20:36	06:58 19:50	07:28 08:59-09:58/59 19:00	07:02 17:17	07:35 08:57-09:44/47 15:49-16:27/38 16:59 10:15-10:27/12
8	06:02 19:27-19:43/16 20:59	06:29 19:21-19:22/1 20:34	06:59 19:48	07:29 08:59-09:57/58 18:58	07:03 17:16	07:36 08:57-09:45/48 15:50-16:27/37 16:59 10:14-10:29/15
9	06:03 19:25-19:43/18 20:59	06:30 20:33	07:00 09:28-09:38/10 19:47	07:30 08:59-09:56/57 18:57	07:05 15:55-16:07/12 17:15	07:37 08:58-09:45/47 15:50-16:27/37 16:59 10:13-10:31/18
10	06:04 19:25-19:45/20 20:59	06:31 20:32	07:01 09:22-09:43/21 19:45	07:31 09:00-09:55/55 18:55	07:06 15:52-16:10/18 17:14	07:38 08:58-09:46/48 15:51-16:28/37 16:59 10:12-10:33/21
11	06:04 19:25-19:46/21 20:58	06:32 20:31	07:02 09:19-09:46/27 19:43	07:32 09:01-09:54/53 18:54	07:07 15:50-16:12/22 17:13	07:39 08:58-09:46/48 15:51-16:27/36 16:59 10:11-10:34/23
12	06:05 19:24-19:45/21 20:58	06:33 20:29	07:03 09:16-09:49/33 19:42	07:33 09:01-09:52/51 18:52	07:08 09:07-09:15/8 17:12	07:40 08:58-09:46/48 15:51-16:28/37 16:59 10:11-10:35/24
13	06:06 19:23-19:45/22 20:57	06:34 20:28	07:04 09:14-09:51/37 19:40	07:34 09:02-09:51/49 18:50	07:09 09:04-09:21/17 17:11	07:41 08:59-09:47/48 15:52-16:28/36 16:59 10:11-10:37/26
14	06:06 19:23-19:44/21 20:57	06:34 20:27	07:05 09:12-09:52/40 19:38	07:35 09:04-09:49/45 18:49	07:10 09:02-09:23/21 17:10	07:41 09:00-09:48/48 15:53-16:29/36 16:59 10:11-10:38/27
15	06:07 19:22-19:43/21 20:56	06:35 20:25	07:06 09:11-09:54/43 19:37	07:36 09:05-09:47/42 18:47	07:12 09:00-09:25/25 17:09	07:42 09:00-09:48/48 15:53-16:28/35 16:59 10:11-10:39/28
16	06:08 19:22-19:43/21 20:56	06:36 20:24	07:07 09:09-09:55/46 19:35	07:37 09:08-09:46/38 18:46	07:13 08:58-09:27/29 17:08	07:43 09:00-09:48/48 15:54-16:29/35 17:00 10:11-10:40/29
17	06:09 19:21-19:43/22 20:55	06:37 20:22	07:08 09:08-09:56/48 19:33	07:38 09:09-09:43/34 18:44	07:14 08:58-09:29/31 17:07	07:43 09:01-09:49/48 15:55-16:30/35 17:00 10:11-10:41/30
18	06:09 19:21-19:42/21 20:54	06:38 20:21	07:09 09:06-09:57/51 19:32	07:39 09:12-09:40/28 18:43	07:15 08:57-09:30/33 17:07	07:44 09:01-09:49/48 15:55-16:30/35 17:00 10:11-10:41/30
19	06:10 19:21-19:42/21 20:54	06:39 20:20	07:10 09:05-09:58/53 19:30	07:40 09:15-09:36/21 18:41	07:16 15:44-16:20/36 17:06	07:45 09:02-09:50/48 15:56-16:30/34 17:01 10:11-10:42/31
20	06:11 19:20-19:40/20 20:53	06:40 20:18	07:11 09:04-09:59/55 19:28	07:42 09:21-09:30/9 18:40	07:17 08:55-09:32/37 17:05	07:45 09:03-09:51/48 15:57-16:31/34 17:01 10:12-10:43/31
21	06:12 19:20-19:40/20 20:52	06:41 20:17	07:12 09:03-10:00/57 19:27	07:43 18:38	07:19 08:56-09:34/38 17:05	07:46 09:03-09:50/47 15:57-16:31/34 17:02 10:12-10:43/31
22	06:13 19:19-19:39/20 20:52	06:42 20:15	07:13 09:02-10:00/58 19:25	07:44 18:37	07:20 08:55-09:35/40 17:04	07:46 09:04-09:51/47 15:56-16:31/35 17:02 10:13-10:44/31
23	06:14 19:19-19:39/20 20:51	06:43 20:14	07:14 09:02-10:01/59 19:23	07:45 18:36	07:21 08:55-09:36/41 17:03	07:47 09:04-09:52/48 15:58-16:32/34 17:03 10:13-10:44/31
24	06:15 19:19-19:38/19 20:50	06:44 20:12	07:15 09:00-10:00/60 19:22	07:46 18:34	07:22 08:54-09:36/42 17:03	07:47 09:04-09:52/48 15:58-16:32/34 17:03 10:13-10:44/31
25	06:15 19:19-19:37/18 20:49	06:45 20:11	07:16 08:59-10:01/62 19:20	06:47 17:33	07:23 08:54-09:37/43 17:02	07:48 09:05-09:53/48 15:59-16:33/34 17:04 10:15-10:45/30
26	06:16 19:18-19:36/18 20:48	06:46 20:09	07:17 08:59-10:01/62 19:18	06:48 17:31	07:24 08:54-09:37/43 17:02	07:48 09:05-09:53/48 15:59-16:34/35 17:04 10:15-10:45/30
27	06:17 19:18-19:35/17 20:47	06:47 20:08	07:18 08:58-10:01/63 19:16	06:49 17:30	07:25 08:55-09:39/44 17:01	07:49 09:05-09:53/48 15:59-16:34/35 17:05 10:15-10:45/30
28	06:18 19:18-19:34/16 20:46	06:48 20:06	07:19 08:58-10:01/63 19:15	06:51 17:29	07:26 08:55-09:40/45 17:01	07:49 09:06-09:54/48 16:00-16:35/35 17:06 10:17-10:45/28
29	06:19 19:18-19:33/15 20:45	06:49 20:05	07:20 08:57-10:01/64 19:13	06:52 17:27	07:27 08:55-09:40/45 17:00	07:49 09:07-09:54/47 16:00-16:36/36 17:06 10:18-10:45/27
30	06:20 19:32-19:33/1 20:44	06:50 20:03	07:21 08:57-10:01/64 19:11	06:53 17:26	07:29 08:55-09:41/46 17:00	07:49 09:07-09:55/48 16:00-16:36/36 17:07 10:18-10:45/27
31	06:21 19:18-19:30/12 20:43	06:51 20:01		06:54 17:25		07:50 09:07-09:55/48 16:00-16:37/37 17:08 10:19-10:45/26
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	497	54	1076	974	1391	3268

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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Via Santa Margherita 4
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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W4 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)

Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January			February			March			April			May			June		
1	07:50	17:09	07:01	07:37	17:43	07:16	07:01	18:16	07:01	07:11	07:50-08:20/30	06:26	07:08-07:31/23	05:58	08:41-10:01/80	05:58	08:41-10:01/80	05:58
2	07:50	17:10	07:00	07:36	17:44	06:58	07:00	18:17	07:00	07:10	07:50-08:19/29	06:25	07:07-07:31/24	05:57	08:41-10:01/80	05:57	08:41-10:01/80	05:57
3	07:50	17:11	06:58	07:35	17:45	06:57	06:58	18:18	06:58	07:08	07:49-08:18/29	06:24	07:07-07:31/24	05:57	08:41-10:00/79	05:57	08:41-10:00/79	05:57
4	07:50	17:11	06:57	07:34	17:46	06:55	06:57	18:20	06:57	07:06	07:50-08:18/28	06:22	07:07-07:31/24	05:56	08:42-10:00/78	05:56	08:42-10:00/78	05:56
5	07:50	17:12	06:55	07:33	17:48	06:54	06:55	18:21	06:55	07:05	07:51-08:16/25	06:21	07:08-07:31/23	05:56	08:43-10:00/77	05:56	08:43-10:00/77	05:56
6	07:50	17:13	06:54	07:32	17:49	06:52	06:54	18:22	06:54	07:03	07:53-08:15/22	06:20	07:07-07:29/22	05:56	08:42-09:59/77	05:56	08:42-09:59/77	05:56
7	07:50	17:14	06:52	07:31	17:50	06:51	06:52	18:23	06:52	07:02	07:54-08:13/19	06:19	07:08-07:29/21	05:55	08:43-09:59/76	05:55	08:43-09:59/76	05:55
8	07:50	17:15	06:51	07:30	17:51	06:49	06:51	18:24	06:51	07:00	07:58-08:10/12	06:18	07:08-07:28/20	05:55	08:44-09:59/75	05:55	08:44-09:59/75	05:55
9	07:50	17:16	06:49	07:28	17:53	06:47	06:49	18:25	06:49	06:58	08:02-08:06/4	06:16	07:09-07:27/18	05:55	08:44-09:59/75	05:55	08:44-09:59/75	05:55
10	07:50	17:17	06:47	07:27	17:54	06:46	06:47	18:26	06:47	06:57	08:48-10:24/96	06:15	07:10-07:26/16	05:55	08:45-09:59/74	05:55	08:45-09:59/74	05:55
11	07:49	17:18	06:46	07:26	17:55	06:44	06:46	18:27	06:46	06:55	08:47-10:25/98	06:14	07:12-07:25/13	05:55	08:45-09:59/74	05:55	08:45-09:59/74	05:55
12	07:49	17:19	06:44	07:25	17:56	06:43	06:44	18:29	06:44	06:54	08:45-10:25/100	06:13	07:14-07:23/9	05:55	08:45-09:58/73	05:55	08:45-09:58/73	05:55
13	07:49	17:20	06:43	07:24	17:57	06:41	06:43	18:30	06:43	06:52	08:45-10:26/101	06:12	08:34-10:10/96	05:54	08:45-09:58/73	05:54	08:45-09:58/73	05:54
14	07:49	17:21	06:41	07:22	17:59	06:39	06:41	18:31	06:41	06:50	08:43-10:25/102	06:11	08:34-10:10/96	05:54	08:45-09:58/73	05:54	08:45-09:58/73	05:54
15	07:48	17:23	06:39	07:21	18:00	06:38	06:39	18:32	06:39	06:49	08:42-10:25/103	06:10	08:34-10:09/95	05:54	08:46-09:58/72	05:54	08:46-09:58/72	05:54
16	07:48	17:24	06:38	07:20	18:01	06:36	06:38	18:33	06:38	06:47	08:42-10:25/103	06:09	08:35-10:08/93	05:54	08:46-09:58/72	05:54	08:46-09:58/72	05:54
17	07:47	17:25	06:36	07:19	18:02	06:34	06:36	18:34	06:36	06:46	08:40-10:24/104	06:08	08:35-10:08/93	05:54	08:47-09:59/72	05:54	08:47-09:59/72	05:54
18	07:47	17:26	06:34	07:17	18:03	06:33	06:34	18:35	06:34	06:44	08:40-10:25/105	06:07	08:36-10:08/92	05:55	08:47-09:59/72	05:55	08:47-09:59/72	05:55
19	07:46	17:27	06:33	07:16	18:05	06:31	06:33	18:36	06:33	06:43	08:40-10:25/105	06:06	08:36-10:07/91	05:55	08:48-09:59/71	05:55	08:48-09:59/71	05:55
20	07:46	17:28	06:31	07:15	18:06	06:29	06:31	18:37	06:31	06:41	08:39-10:24/105	06:06	08:36-10:06/90	05:55	08:48-09:59/71	05:55	08:48-09:59/71	05:55
21	07:45	17:29	06:29	07:13	18:07	06:28	06:29	18:38	06:29	06:40	08:38-10:24/106	06:05	08:36-10:05/89	05:55	08:48-09:59/71	05:55	08:48-09:59/71	05:55
22	07:45	17:31	06:28	07:12	18:08	06:26	06:28	18:39	06:28	06:38	08:37-10:23/106	06:04	08:37-10:06/89	05:55	08:48-09:59/71	05:55	08:48-09:59/71	05:55
23	07:44	17:32	06:26	07:10	18:09	06:24	06:26	18:40	06:26	06:37	08:37-10:23/106	06:03	08:37-10:05/88	05:55	08:49-10:00/71	05:55	08:49-10:00/71	05:55
24	07:43	17:33	06:24	07:09	18:11	06:23	06:24	18:41	06:24	06:36	07:15-07:25/10	06:02	08:37-10:04/87	05:56	08:48-10:00/72	05:56	08:48-10:00/72	05:56
25	07:43	17:34	06:23	07:07	18:12	06:21	06:23	18:42	06:23	06:34	07:13-07:28/15	06:02	08:38-10:04/86	05:56	08:48-10:00/72	05:56	08:48-10:00/72	05:56
26	07:42	17:35	06:21	07:06	18:13	06:20	06:21	18:43	06:21	06:33	07:12-07:29/17	06:01	08:38-10:03/85	05:56	08:49-10:01/72	05:56	08:49-10:01/72	05:56
27	07:41	17:37	06:20	07:04	18:14	06:18	06:20	18:44	06:20	06:31	07:10-07:30/20	06:00	08:38-10:02/84	05:57	08:49-10:01/72	05:57	08:49-10:01/72	05:57
28	07:40	17:38	06:18	07:03	18:15	06:17	06:18	18:45	06:18	06:30	07:10-07:30/20	06:00	08:39-10:02/83	05:57	08:49-10:01/72	05:57	08:49-10:01/72	05:57
29	07:40	17:39	06:17	07:02	18:16	06:16	06:17	18:46	06:17	06:29	07:10-07:31/21	05:59	08:39-10:01/82	05:57	08:49-10:02/73	05:57	08:49-10:02/73	05:57
30	07:39	17:40	06:16	07:01	18:17	06:15	06:16	18:47	06:16	06:27	07:09-07:32/23	05:59	08:40-10:02/82	05:58	08:49-10:02/73	05:58	08:49-10:02/73	05:58
31	07:38	17:42	06:15	07:00	18:18	06:14	06:15	18:48	06:15	06:20	08:34-10:19/105	05:58	08:40-10:01/81	05:58	08:49-10:02/73	05:58	08:49-10:02/73	05:58
Potential sun hours	299	298	297	298	297	296	297	296	297	398	3279	447	3130	451	2213			
Sum of minutes with flicker	0	0	577	0	0	577	0	577	0	398	3279	447	3130	451	2213			

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst caseWTG: W4 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)

Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:58 08:49-10:03/74 21:01	06:22 07:23-07:34/11 20:42 08:45-10:22/97	06:52 08:46-10:24/98 20:00	07:21 19:10	06:55 17:24	07:30 17:00
2	05:59 08:49-10:03/74 21:01	06:23 07:22-07:36/14 20:41 08:45-10:23/98	06:53 08:47-10:23/96 19:58	07:22 19:08	06:56 17:22	07:31 16:59
3	05:59 08:49-10:04/75 21:01	06:24 07:20-07:37/17 20:40 08:44-10:23/99	06:54 08:00-08:04/4 19:57 08:47-10:23/96	07:24 19:06	06:57 17:21	07:32 16:59
4	06:00 08:49-10:04/75 21:01	06:25 07:20-07:38/18 20:39 08:44-10:24/100	06:55 07:56-08:08/12 19:55 08:48-10:22/94	07:25 19:05	06:59 17:20	07:33 16:59
5	06:00 08:49-10:05/76 21:00	06:26 07:19-07:39/20 20:38 08:43-10:24/101	06:56 07:51-08:09/18 19:53 08:48-10:19/91	07:26 19:03	07:00 17:19	07:34 16:59
6	06:01 08:49-10:05/76 21:00	06:27 07:17-07:39/22 20:37 08:43-10:24/101	06:57 07:48-08:10/22 19:52 08:49-10:18/89	07:27 19:02	07:01 17:18	07:34 16:59
7	06:02 08:49-10:06/77 21:00	06:28 07:17-07:39/22 20:35 08:43-10:25/102	06:58 07:46-08:11/25 19:50 08:50-10:17/87	07:28 19:00	07:02 17:17	07:35 16:59
8	06:02 08:49-10:07/78 20:59	06:29 07:16-07:40/24 20:34 08:43-10:25/102	06:59 07:45-08:12/27 19:48 08:51-10:15/84	07:29 18:58	07:03 17:16	07:36 16:59
9	06:03 08:49-10:07/78 20:59	06:30 07:16-07:40/24 20:33 08:43-10:26/103	07:00 07:42-08:12/28 19:47 08:52-10:14/82	07:30 18:57	07:04 17:15	07:37 16:59
10	06:03 08:49-10:08/79 20:59	06:31 07:16-07:40/24 20:32 08:43-10:26/103	07:01 07:43-08:12/29 19:45 08:53-10:12/79	07:31 18:55	07:06 17:14	07:38 16:59
11	06:04 08:49-10:09/80 20:58	06:31 07:16-07:40/24 20:30 08:43-10:27/104	07:02 07:42-08:12/30 19:43 08:55-10:10/75	07:32 18:54	07:07 17:13	07:39 16:59
12	06:05 08:48-10:09/81 20:58	06:32 07:17-07:40/23 20:29 08:43-10:27/104	07:03 07:42-08:12/30 19:42 08:56-10:08/72	07:33 18:52	07:08 17:12	07:40 16:59
13	06:06 08:48-10:10/82 20:57	06:33 07:17-07:39/22 20:28 08:43-10:27/104	07:04 07:42-08:12/30 19:40 08:58-10:06/68	07:34 18:50	07:09 17:11	07:41 16:59
14	06:06 08:48-10:11/83 20:57	06:34 07:18-07:39/21 20:27 08:43-10:28/105	07:05 07:44-08:11/27 19:38 09:00-10:03/63	07:35 18:49	07:10 17:10	07:41 16:59
15	06:07 08:48-10:10/82 20:56	06:35 07:17-07:38/21 20:25 08:43-10:28/105	07:06 07:46-08:10/24 19:37 09:02-10:01/59	07:36 18:47	07:12 17:09	07:42 16:59
16	06:08 08:48-10:11/83 20:56	06:36 07:18-07:37/19 20:24 08:43-10:28/105	07:07 07:47-08:09/22 19:35 09:05-09:57/52	07:37 18:46	07:13 17:08	07:43 17:00
17	06:09 08:48-10:12/84 20:55	06:37 07:19-07:36/17 20:22 08:43-10:28/105	07:08 07:49-08:08/19 19:33 09:08-09:54/46	07:38 18:44	07:14 17:07	07:43 17:00
18	06:09 08:48-10:13/85 20:54	06:38 07:20-07:34/14 20:21 08:43-10:29/106	07:09 07:50-07:58/8 09:12-09:49/37 19:32 07:59-08:06/7	07:39 18:43	07:15 17:07	07:44 17:00
19	06:10 08:48-10:14/86 20:54	06:39 07:22-07:32/10 20:20 08:43-10:29/106	07:10 07:51-07:54/3 09:17-09:43/26 19:30 08:01-08:04/3	07:40 18:41	07:16 17:06	07:45 17:01
20	06:11 08:47-10:14/87 20:53	06:40 08:42-10:28/106 20:18	07:11 19:28	07:41 18:40	07:17 17:05	07:45 17:01
21	06:12 08:47-10:15/88 20:52	06:41 08:42-10:28/106 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 17:02
22	06:13 08:47-10:15/88 20:52	06:42 08:42-10:28/106 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:46 17:02
23	06:14 08:47-10:16/89 20:51	06:43 08:42-10:28/106 20:14	07:13 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	06:14 08:46-10:17/91 20:50	06:44 08:43-10:28/105 20:12	07:14 19:21	07:46 18:34	07:22 17:03	07:47 17:03
25	06:15 08:46-10:18/92 20:49	06:45 08:43-10:28/105 20:11	07:15 19:20	06:47 17:33	07:23 17:02	07:48 17:04
26	06:16 08:45-10:18/93 20:48	06:46 08:43-10:27/104 20:09	07:16 19:18	06:48 17:31	07:24 17:02	07:48 17:04
27	06:17 08:45-10:18/93 20:47	06:47 08:44-10:27/103 20:08	07:17 19:16	06:49 17:30	07:25 17:01	07:49 17:05
28	06:18 08:45-10:19/94 20:46	06:48 08:44-10:27/103 20:06	07:18 19:15	06:50 17:29	07:26 17:01	07:49 17:06
29	06:19 08:45-10:20/95 20:45	06:49 08:44-10:26/102 20:04	07:19 19:13	06:52 17:27	07:27 17:00	07:49 17:06
30	06:20 08:45-10:21/96 20:44	06:50 08:45-10:26/101 20:03	07:20 19:11	06:53 17:26	07:28 17:00	07:49 17:07
31	06:21 07:26-07:31/5 20:43	06:51 08:45-10:25/100 20:01		06:54 17:25		07:50 17:08
Potential sun hours	458	427	375	346	299	0
Sum of minutes with flicker	2615	3564	1762	0	0	0

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W5 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)

Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	07:50 17:09	07:37 17:43	07:01 17:19-17:38/19 18:16 07:58-08:09/11	07:11 17:50-18:54/64 19:50	06:26 20:21	05:58 20:50
2	07:50 17:10	07:36 17:44	07:00 17:15-17:43/28 18:17 07:57-08:07/10	07:10 17:51-18:53/62 19:51	06:25 20:22	05:57 20:51
3	07:50 17:11	07:35 17:45	06:58 17:11-17:46/35 18:19 07:55-08:04/9	07:08 17:51-18:51/60 19:52	06:24 20:23	05:57 20:52
4	07:50 17:11	07:34 17:46	06:57 17:09-17:48/39 18:20 07:54-07:59/5	07:06 17:52-18:51/59 19:53	06:22 20:24	05:56 20:52
5	07:50 17:12	07:33 17:48	06:55 17:06-17:50/44 18:21	07:05 17:53-18:49/56 19:54	06:21 20:25	05:56 20:53
6	07:50 17:13	07:32 17:49	06:54 17:05-17:52/47 18:22	07:03 17:54-18:48/54 19:55	06:20 20:26	05:56 20:54
7	07:50 17:14	07:31 17:50	06:52 17:03-17:53/50 18:23	07:02 17:55-18:47/52 19:56	06:19 20:27	05:55 20:54
8	07:50 17:15	07:30 17:51	06:51 17:01-17:54/53 18:24	07:00 17:56-18:45/49 19:57	06:18 20:28	05:55 20:55
9	07:50 17:16	07:29 17:53	06:49 17:00-17:56/56 18:25	06:58 17:58-18:43/45 19:58	06:16 20:29	05:55 20:55
10	07:50 17:17	07:27 17:54	06:47 16:58-17:56/58 18:26	06:57 17:59-18:41/42 19:59	06:15 20:30	05:55 20:56
11	07:50 17:18	07:26 17:55	06:46 16:56-17:57/61 18:27	06:55 18:01-18:39/38 20:00	06:14 20:31	05:55 20:57
12	07:49 17:19	07:25 17:56	06:44 16:56-17:58/62 18:29	06:54 18:03-18:36/33 20:01	06:13 20:32	05:55 20:57
13	07:49 17:20	07:24 17:57	06:43 16:54-17:58/64 18:30	06:52 18:05-18:33/28 20:02	06:12 20:33	05:54 20:57
14	07:49 17:21	07:22 17:59	06:41 16:54-17:59/65 18:31	06:50 18:08-18:30/22 20:03	06:11 20:34	05:54 20:58
15	07:48 17:23	07:21 18:00	06:39 16:53-18:00/67 18:32	06:49 18:13-18:24/11 20:04	06:10 20:35	05:54 20:58
16	07:48 17:24	07:20 08:17-08:18/1 18:01	06:38 16:52-17:59/67 18:33	06:47 20:05	06:09 20:36	05:54 20:59
17	07:47 17:25	07:19 08:16-08:18/2 18:02	06:36 16:52-18:00/68 18:34	06:46 20:06	06:08 20:37	05:54 20:59
18	07:47 17:26	07:17 08:14-08:18/4 18:03	06:34 16:51-18:00/69 18:35	06:44 20:08	06:07 20:38	05:55 20:59
19	07:46 17:27	07:16 08:13-08:18/5 18:05	06:33 16:50-18:00/70 18:36	06:43 20:09	06:06 20:39	05:55 21:00
20	07:46 17:28	07:15 08:12-08:18/6 18:06	06:31 16:50-18:00/70 18:37	06:41 20:10	06:06 20:40	05:55 21:00
21	07:45 17:29	07:13 08:10-08:17/7 18:07	06:29 16:49-18:00/71 18:38	06:40 20:11	06:05 20:41	05:55 21:00
22	07:45 17:31	07:12 08:09-08:17/8 18:08	06:28 16:49-17:59/70 18:39	06:38 20:12	06:04 20:42	05:55 21:00
23	07:44 17:32	07:10 08:07-08:16/9 18:09	06:26 16:49-18:00/71 18:40	06:37 20:13	06:03 20:43	05:55 21:01
24	07:43 17:33	07:09 08:06-08:16/10 18:11	06:24 16:49-17:59/70 18:41	06:36 20:14	06:02 20:44	05:56 21:01
25	07:43 17:34	07:07 08:04-08:14/10 18:12	06:23 16:48-17:58/70 18:42	06:34 20:15	06:02 20:44	05:56 21:01
26	07:42 17:35	07:06 08:03-08:14/11 18:13	06:21 16:49-17:59/70 18:43	06:33 20:16	06:01 20:45	05:56 21:01
27	07:41 17:37	07:04 08:01-08:12/11 18:14	06:20 16:49-17:58/69 18:45	06:31 20:17	06:00 20:46	05:57 21:01
28	07:40 17:38	07:03 08:00-08:11/11 18:15	06:18 16:48-17:57/69 18:46	06:30 20:18	06:00 20:47	05:57 21:01
29	07:40 17:39		07:16 17:49-18:57/68 19:47	06:29 20:19	05:59 20:48	05:57 21:01
30	07:39 17:40		07:15 17:49-18:56/67 19:48	06:27 20:20	05:59 20:49	05:58 21:01
31	07:38 17:42		07:13 17:49-18:54/65 19:49		05:58 20:49	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	0	95	1887	675	0	0

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Calendar per WTG

Calculation: Copy of Progetto_worst case WTG: W5 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)

Assumptions for shadow calculations

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

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

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	06:52 18:00-18:38/38 20:00	07:21 17:34-18:37/63 19:10	06:55 17:24	07:30 17:00
2	05:59 21:01	06:23 20:41	06:53 17:58-18:40/42 19:58	07:23 17:34-18:36/62 19:08	06:56 17:22	07:31 16:59
3	05:59 21:01	06:24 20:40	06:54 17:56-18:41/45 19:57	07:24 17:35-18:34/59 19:06	06:57 17:21	07:32 16:59
4	06:00 21:01	06:25 20:39	06:55 17:53-18:42/49 19:55	07:25 17:36-18:33/57 19:05	06:59 17:20	07:33 16:59
5	06:00 21:00	06:26 20:38	06:56 17:51-18:43/52 19:53	07:26 17:37-18:31/54 19:03	07:00 17:19	07:34 16:59
6	06:01 21:00	06:27 20:37	06:57 17:49-18:43/54 19:52	07:27 17:39-18:31/52 19:02	07:01 17:18	07:35 16:59
7	06:02 21:00	06:28 20:36	06:58 17:48-18:44/56 19:50	07:28 17:40-18:29/49 19:00	07:02 17:17	07:35 16:59
8	06:02 20:59	06:29 20:34	06:59 17:46-18:45/59 19:48	07:29 17:41-18:27/46 18:58	07:03 17:16	07:36 16:59
9	06:03 20:59	06:30 20:33	07:00 17:45-18:45/60 19:47	07:30 17:43-18:24/41 18:57	07:05 17:15	07:37 16:59
10	06:03 20:59	06:31 20:32	07:01 17:44-18:46/62 19:45	07:31 17:45-18:22/37 18:55	07:06 17:14	07:38 16:59
11	06:04 20:58	06:31 20:31	07:02 17:43-18:46/63 19:43	07:32 17:47-18:19/32 18:54	07:07 17:13	07:39 16:59
12	06:05 20:58	06:32 20:29	07:03 17:42-18:47/65 19:42	07:33 17:50-18:15/25 18:52	07:08 17:12	07:40 16:59
13	06:06 20:57	06:33 20:28	07:04 17:41-18:47/66 19:40	07:34 17:56-18:09/13 18:50	07:09 17:11	07:41 16:59
14	06:06 20:57	06:34 20:27	07:05 17:40-18:47/67 19:38	07:35 08:33-08:44/11 18:49	07:10 17:10	07:41 16:59
15	06:07 20:56	06:35 20:25	07:06 17:39-18:47/68 19:37	07:36 08:34-08:45/11 18:47	07:12 17:09	07:42 16:59
16	06:08 20:56	06:36 20:24	07:07 17:38-18:47/69 19:35	07:37 08:36-08:47/11 18:46	07:13 17:08	07:43 17:00
17	06:09 20:55	06:37 20:22	07:08 17:37-18:47/70 19:33	07:38 08:37-08:47/10 18:44	07:14 17:07	07:43 17:00
18	06:09 20:54	06:38 20:21	07:09 17:37-18:47/70 19:32	07:39 08:38-08:48/10 18:43	07:15 17:07	07:44 17:00
19	06:10 20:54	06:39 20:20	07:10 17:36-18:46/70 19:30	07:40 08:39-08:48/9 18:41	07:16 17:06	07:45 17:01
20	06:11 20:53	06:40 20:18	07:11 17:36-18:46/70 19:28	07:42 08:40-08:48/8 18:40	07:17 17:05	07:45 17:01
21	06:12 20:52	06:41 20:17	07:12 17:34-18:45/71 19:27	07:43 08:41-08:48/7 18:38	07:19 17:04	07:46 17:02
22	06:13 20:52	06:42 20:15	07:13 17:34-18:44/70 19:25	07:44 08:42-08:48/6 18:37	07:20 17:04	07:46 17:02
23	06:14 20:51	06:43 20:14	07:14 17:33-18:44/71 19:23	07:45 08:44-08:48/4 18:36	07:21 17:03	07:47 17:03
24	06:14 20:50	06:44 20:12	07:14 17:33-18:43/70 19:21	07:46 08:45-08:48/3 18:34	07:22 17:03	07:47 17:03
25	06:15 20:49	06:45 20:11	07:15 17:33-18:43/70 19:20	06:47 07:46-07:48/2 17:33	07:23 17:02	07:48 17:04
26	06:16 20:48	06:46 20:09	07:16 17:33-18:42/69 19:18	06:48 17:31	07:24 17:02	07:48 17:04
27	06:17 20:47	06:47 20:08	07:17 17:33-18:41/68 19:16	06:49 17:30	07:25 17:01	07:49 17:05
28	06:18 20:46	06:48 20:06	07:18 17:33-18:40/67 19:15	06:51 17:29	07:26 17:01	07:49 17:06
29	06:19 20:45	06:49 20:05	07:19 17:33-18:39/66 19:13	06:52 17:27	07:27 17:00	07:49 17:06
30	06:20 20:44	06:50 20:03	07:20 17:34-18:38/64 19:11	06:53 17:26	07:29 17:00	07:49 17:07
31	06:21 20:43	06:51 20:01	18:02-18:37/35	06:54 17:25		07:50 17:08
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	0	97	1881	721	0	0

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

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

SCENARIO "WORST CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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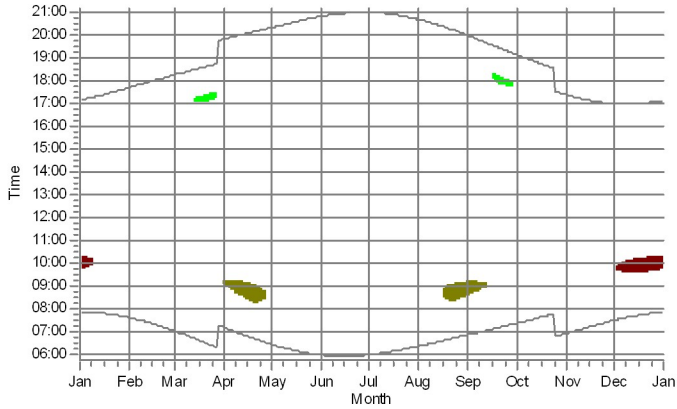
Calculated:

24/05/2021 15:44/3.4.415

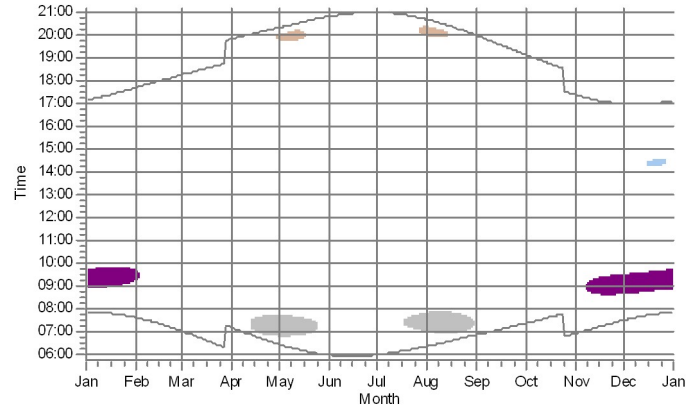
SHADOW - Calendar per WTG, graphical

Calculation: Copy of Progetto_worst case

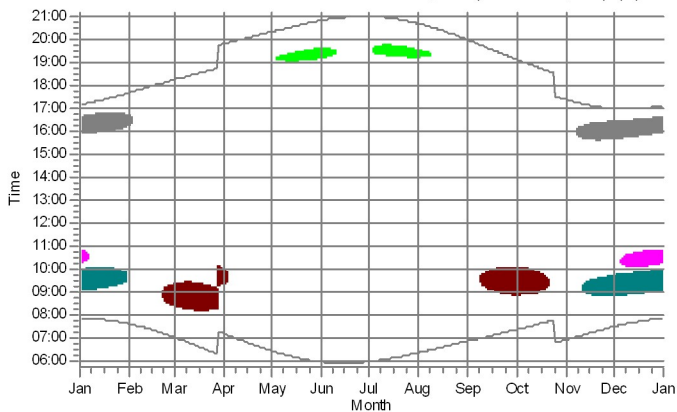
W1: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)



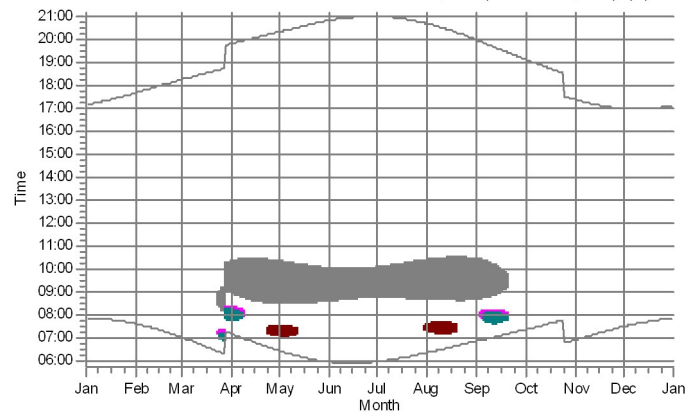
W2: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)



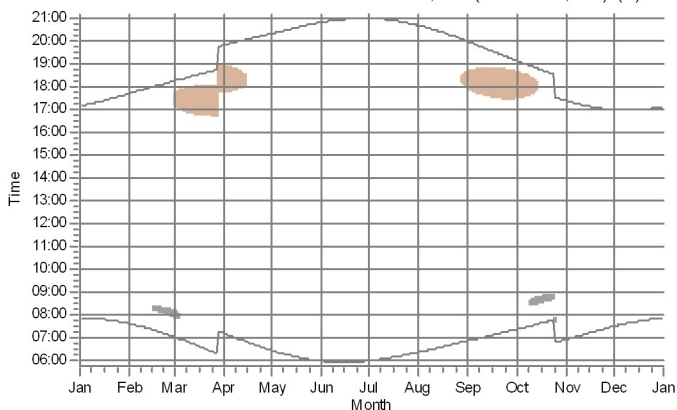
W3: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)



W4: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)



W5: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)



Shadow receptors

F100: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (27)
F117: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (21)
F119: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (28)
F125: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (22)
F138: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (23)
F154: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (24)

F21: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (16)
F25: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (17)
F59: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (18)
F84: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (19)
F96: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (20)

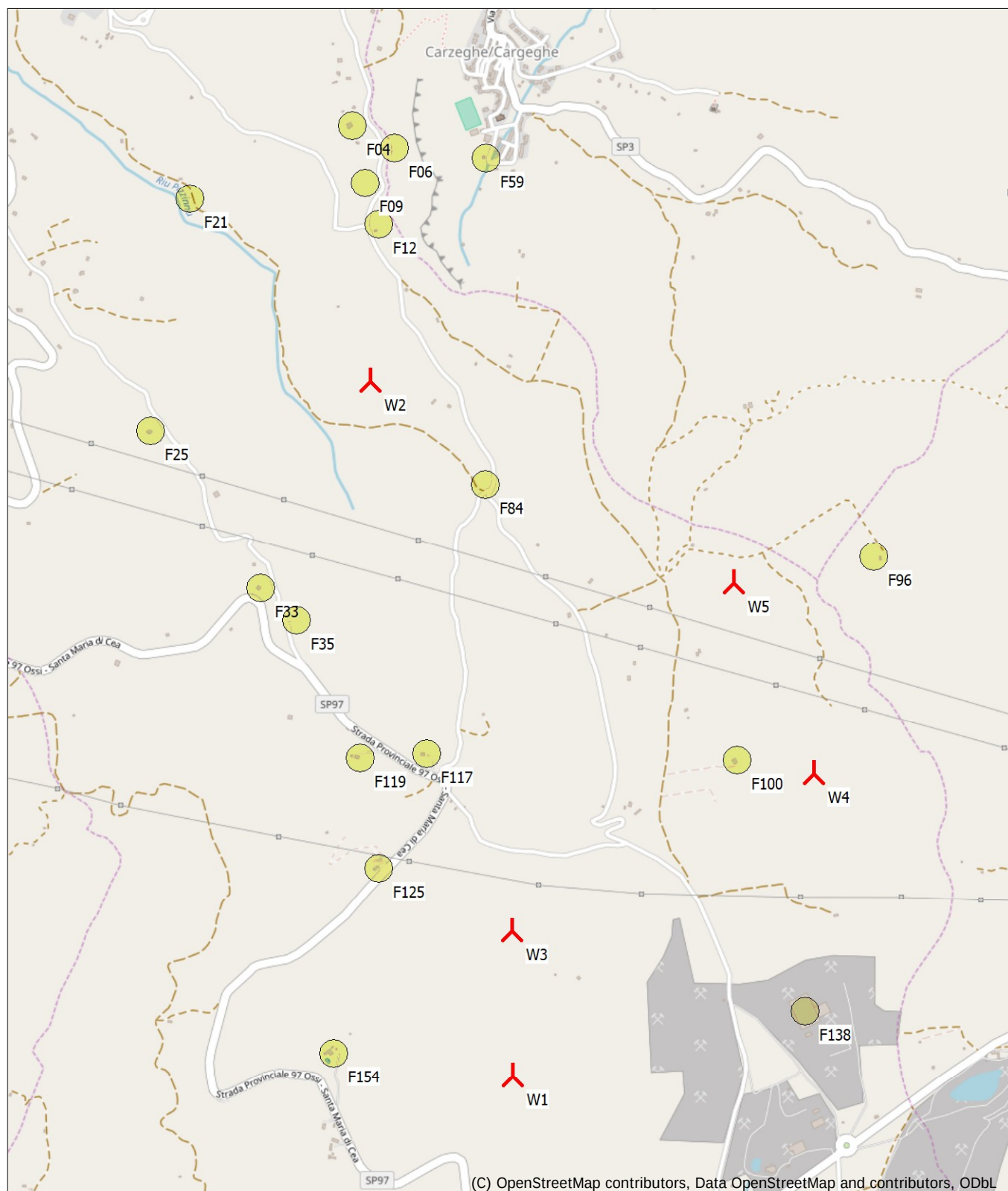
SCENARIO "WORST CASE"

Project:
Layout_GRVDEP_Ossi

Licensed user:
I.A.T. Consulenza e progetti S.r.l.
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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:44/3.4.415

SHADOW - Map

Calculation: Copy of Progetto_worst case



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

0 250 500 750 1000m

Map: EMD OpenStreetMap, Print scale 1:20.000, Map center Italian Gauss-Boaga west-ROMA40 (IT-peninsular $\leq \pm 4m$) East: 1.467.506 North: 4.500.199
New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Layout_GRVDEP_Ossi_1.wpo (1)

windPRO 3.4.415 by EMD International A/S, Tel. +45 96 35 44 44, www.emd.dk, windpro@emd.dk

24/05/2021 15:45 / 40

windPRO

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Main Result

Calculation: Progetto_real case_max minutes per shadow day

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) [ALGHERO]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
160	379	487	423	372	261	434	671	794	1.104	1.108	478	6.671

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

Height contours used: Height Contours: CONTOURLINE_Layout_GRVDEP_Ossi

Obstacles used in calculation

Eye height for map: 1,5 m

Grid resolution: 1,0 m

Topographic shadow included in calculation

All coordinates are in

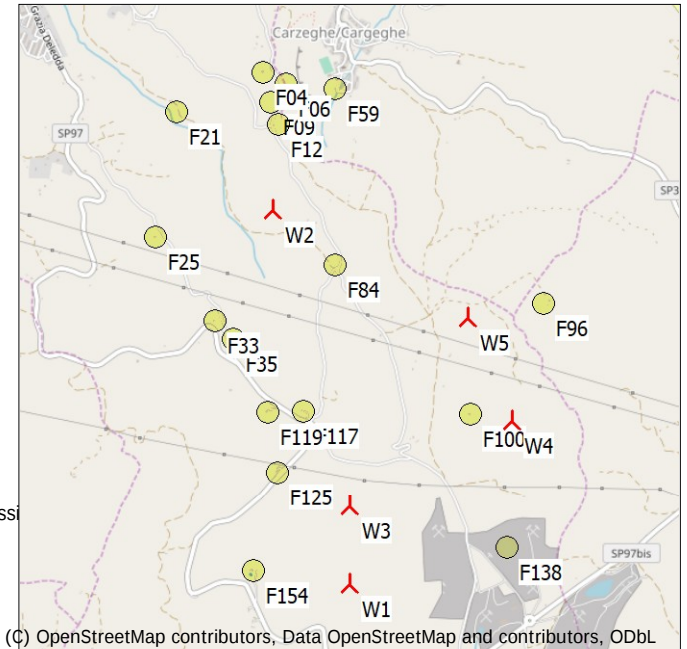
Italian Gauss-Boaga west-ROMA40 (IT-peninsular <±4m)

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact. Type-generator				Calculation distance [m]	RPM [RPM]
			[m]								
W1	1.467.497	4.498.511	451,9	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W2	1.467.002	4.500.978	470,0	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W3	1.467.498	4.499.024	452,9	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W4	1.468.574	4.499.580	493,1	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0
W5	1.468.291	4.500.259	480,4	VESTAS V162 6000 162,0 !O! hu...Yes	VESTAS	V162-6.000	6.000	162,0	125,0	2.044	0,0

Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
						a.g.l.	window		(ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
F04	1.466.941	4.501.887	437,1	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F06	1.467.093	4.501.808	440,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F09	1.466.986	4.501.684	450,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F100	1.468.302	4.499.628	431,9	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F117	1.467.197	4.499.654	376,9	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F119	1.466.959	4.499.642	366,1	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F12	1.467.036	4.501.536	435,3	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F125	1.467.025	4.499.250	351,4	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F138	1.468.540	4.498.739	360,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F154	1.466.861	4.498.596	352,9	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F21	1.466.362	4.501.630	370,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F25	1.466.221	4.500.809	470,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F33	1.466.610	4.500.248	405,7	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F35	1.466.737	4.500.133	417,7	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F59	1.467.416	4.501.772	340,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F84	1.467.409	4.500.611	485,1	1,4	1,2	1,2	90,0	"Green house mode"	2,4
F96	1.468.792	4.500.350	480,0	1,4	1,2	1,2	90,0	"Green house mode"	2,4



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

New WTG

Scale 1:50.000

Shadow receptor

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Main Result

Calculation: Progetto_real case_max minutes per shadow day

Calculation Results

Shadow receptor

Shadow, expected values

No. Shadow hours

per year

[h/year]

F04	0:00
F06	0:00
F09	0:00
F100	98:08
F117	5:09
F119	12:45
F12	0:00
F125	25:03
F138	6:52
F154	6:33
F21	10:01
F25	17:43
F33	0:00
F35	0:00
F59	0:14
F84	1:07
F96	28:28

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

No.	Name	Worst case [h/year]	Expected [h/year]
W1	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)	36:59	9:55
W2	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)	111:05	29:53
W3	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)	203:59	48:38
W4	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)	285:40	94:27
W5	VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)	89:16	27:40

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F04 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (12)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31
	17:10	17:44	18:18	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:22	17:00
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:07	17:21	16:59
4	07:50	07:34	06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33
	17:11	17:46	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59
7	07:50	07:31	06:52	07:02	06:19	05:55	06:02	06:28	06:58	07:28	07:02	07:36
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37
	17:16	17:53	18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	16:59
10	07:50	07:27	06:47	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	07:38
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:32	07:02	07:32	07:07	07:39
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:32	07:03	07:33	07:08	07:40
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59
13	07:49	07:24	06:43	06:52	06:12	05:54	06:06	06:33	07:04	07:34	07:09	07:41
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59
14	07:49	07:23	06:41	06:51	06:11	05:54	06:06	06:34	07:05	07:35	07:11	07:41
	17:21	17:59	18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	16:59
15	07:48	07:21	06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	07:42
	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	16:59
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43
	17:24	18:01	18:33	20:06	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00
17	07:48	07:19	06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	07:44
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:23	19:33	18:44	17:07	17:00
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:18	07:45
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46
	17:29	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02
22	07:45	07:12	06:28	06:38	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03
24	07:44	07:09	06:25	06:36	06:02	05:56	06:15	06:44	07:15	07:46	07:22	07:48
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	07:48
	17:34	18:12	18:43	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	07:48
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	07:49
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05
28	07:41	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:26	07:49
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	07:49
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:27	17:00	17:06
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	07:50
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07
31	07:38		07:13		05:58		06:21	06:51		07:53		07:50
	17:42		19:49		20:49		20:43	20:01		17:25		17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

Day in month	Sun rise (hh:mm)	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)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F06 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (13)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31
	17:10	17:44	18:17	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:22	17:00
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:07	17:21	16:59
4	07:50	07:34	06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33
	17:11	17:46	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59
7	07:50	07:31	06:52	07:02	06:19	05:55	06:02	06:28	06:58	07:28	07:02	07:36
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37
	17:16	17:53	18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	16:59
10	07:50	07:27	06:47	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	07:38
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:32	07:02	07:32	07:07	07:39
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:32	07:03	07:33	07:08	07:40
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59
13	07:49	07:24	06:43	06:52	06:12	05:54	06:06	06:33	07:04	07:34	07:09	07:41
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59
14	07:49	07:23	06:41	06:51	06:11	05:54	06:06	06:34	07:05	07:35	07:11	07:41
	17:21	17:59	18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	16:59
15	07:48	07:21	06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	07:42
	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	16:59
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43
	17:24	18:01	18:33	20:06	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00
17	07:48	07:19	06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	07:44
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:23	19:33	18:44	17:07	17:00
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:18	07:45
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46
	17:29	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02
22	07:45	07:12	06:28	06:38	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03
24	07:44	07:09	06:25	06:36	06:02	05:56	06:15	06:44	07:15	07:46	07:22	07:47
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	07:48
	17:34	18:12	18:43	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	07:48
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	07:49
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05
28	07:40	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:26	07:49
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	07:49
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:27	17:00	17:06
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	07:50
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07
31	07:38		07:13		05:58		06:21	06:51		07:53		07:50
	17:42		19:49		20:49		20:43	20:01		17:25		17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

Day in month	Sun rise (hh:mm)	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)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F09 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (14)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31
	17:10	17:44	18:18	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:22	17:00
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:07	17:21	16:59
4	07:50	07:34	06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33
	17:11	17:46	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59
7	07:50	07:31	06:52	07:02	06:19	05:55	06:02	06:28	06:58	07:28	07:02	07:36
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37
	17:16	17:53	18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	16:59
10	07:50	07:27	06:47	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	07:38
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:32	07:02	07:32	07:07	07:39
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:32	07:03	07:33	07:08	07:40
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59
13	07:49	07:24	06:43	06:52	06:12	05:54	06:06	06:33	07:04	07:34	07:09	07:41
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59
14	07:49	07:23	06:41	06:51	06:11	05:54	06:06	06:34	07:05	07:35	07:11	07:41
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	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	16:59
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43
	17:24	18:01	18:33	20:06	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00
17	07:48	07:19	06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	07:44
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:23	19:33	18:44	17:07	17:00
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:18	07:45
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46
	17:29	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02
22	07:45	07:12	06:28	06:38	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03
24	07:44	07:09	06:25	06:36	06:02	05:56	06:15	06:44	07:15	07:46	07:22	07:47
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	07:48
	17:34	18:12	18:43	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	07:48
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	07:49
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05
28	07:41	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:26	07:49
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	07:49
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:27	17:00	17:06
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	07:50
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07
31	07:38		07:13		05:58		06:21	06:51		07:53		07:50
	17:42		19:49		20:49		20:43	20:01		17:25		17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

Day in month	Sun rise (hh:mm)	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)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F100 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (27)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

January		February		March		April		May		June	
1	07:50	16:01 (W3)	07:37	16:21 (W3)	07:01	07:11	09:03 (W4)	06:26	08:34 (W4)	05:58	08:41 (W4)
2	07:50	16:01 (W3)	07:36	16:24 (W3)	07:00	07:10	09:00 (W4)	06:25	08:34 (W4)	05:57	08:41 (W4)
3	07:50	16:01 (W3)	07:35	16:36 (W3)	06:58	07:08	08:58 (W4)	06:24	08:34 (W4)	05:57	08:41 (W4)
4	07:50	16:01 (W3)	07:34	16:40 (W3)	06:57	07:06	08:57 (W4)	06:22	08:34 (W4)	05:56	08:42 (W4)
5	07:50	16:02 (W3)	07:33	16:40 (W3)	06:55	07:05	08:55 (W4)	06:21	08:33 (W4)	05:56	08:43 (W4)
6	07:50	16:02 (W3)	07:32	16:40 (W3)	06:54	07:03	08:54 (W4)	06:20	08:33 (W4)	05:56	08:42 (W4)
7	07:50	16:03 (W3)	07:31	16:41 (W3)	06:52	07:02	08:52 (W4)	06:19	08:33 (W4)	05:55	08:43 (W4)
8	07:50	16:03 (W3)	07:30	16:41 (W3)	06:51	07:00	08:50 (W4)	06:18	08:34 (W4)	05:55	08:44 (W4)
9	07:50	16:03 (W3)	07:29	16:42 (W3)	06:49	06:58	08:49 (W4)	06:16	08:34 (W4)	05:55	08:44 (W4)
10	07:50	16:03 (W3)	07:27	16:42 (W3)	06:47	06:57	08:48 (W4)	06:15	08:34 (W4)	05:55	08:45 (W4)
11	07:49	16:04 (W3)	07:26	16:42 (W3)	06:46	06:55	08:47 (W4)	06:14	08:34 (W4)	05:55	08:45 (W4)
12	07:49	16:04 (W3)	07:25	16:43 (W3)	06:44	06:54	08:45 (W4)	06:13	08:34 (W4)	05:55	08:45 (W4)
13	07:49	16:04 (W3)	07:24	16:44 (W3)	06:43	06:52	08:45 (W4)	06:12	08:34 (W4)	05:54	08:45 (W4)
14	07:49	16:05 (W3)	07:22	16:44 (W3)	06:41	06:50	08:43 (W4)	06:11	08:34 (W4)	05:54	08:45 (W4)
15	07:48	16:05 (W3)	07:21	16:44 (W3)	06:39	06:49	08:42 (W4)	06:10	08:34 (W4)	05:54	08:46 (W4)
16	07:48	16:06 (W3)	07:20	16:44 (W3)	06:38	06:47	08:42 (W4)	06:09	08:35 (W4)	05:54	08:46 (W4)
17	07:47	16:06 (W3)	07:19	16:45 (W3)	06:36	06:46	08:40 (W4)	06:08	08:35 (W4)	05:54	08:47 (W4)
18	07:47	16:07 (W3)	07:17	16:45 (W3)	06:34	06:44	08:40 (W4)	06:07	08:36 (W4)	05:55	08:47 (W4)
19	07:46	16:07 (W3)	07:16	16:46 (W3)	06:33	06:43	08:40 (W4)	06:06	08:36 (W4)	05:55	08:48 (W4)
20	07:46	16:08 (W3)	07:15	16:46 (W3)	06:31	06:41	08:39 (W4)	06:06	08:36 (W4)	05:55	08:48 (W4)
21	07:45	16:08 (W3)	07:13	16:45 (W3)	06:29	06:40	08:38 (W4)	06:05	08:36 (W4)	05:55	08:48 (W4)
22	07:45	16:08 (W3)	07:12	16:46 (W3)	06:28	06:38	08:37 (W4)	06:04	08:37 (W4)	05:55	08:48 (W4)
23	07:44	16:10 (W3)	07:10	16:45 (W3)	06:26	06:37	08:37 (W4)	06:03	08:37 (W4)	05:55	08:49 (W4)
24	07:43	16:11 (W3)	07:09	16:46 (W3)	06:24	06:36	08:36 (W4)	06:02	08:37 (W4)	05:56	08:48 (W4)
25	07:43	16:11 (W3)	07:07	16:46 (W3)	06:23	06:35	08:35 (W4)	06:01	08:38 (W4)	05:56	08:49 (W4)
26	07:42	16:12 (W3)	07:06	16:45 (W3)	06:21	06:33	08:34 (W4)	06:00	08:38 (W4)	05:56	08:49 (W4)
27	07:41	16:13 (W3)	07:04	16:45 (W3)	06:20	06:32	08:33 (W4)	05:59	08:39 (W4)	05:57	08:49 (W4)
28	07:40	16:15 (W3)	07:03	16:44 (W3)	06:18	06:30	08:32 (W4)	05:58	08:40 (W4)	05:57	08:49 (W4)
29	07:40	16:16 (W3)	07:02	16:44 (W3)	06:16	06:28	08:31 (W4)	05:57	08:40 (W4)	05:56	08:49 (W4)
30	07:39	16:17 (W3)	07:01	16:44 (W3)	06:15	06:27	08:30 (W4)	05:56	08:40 (W4)	05:55	08:49 (W4)
31	07:38	16:19 (W3)	07:00	16:42 (W3)	06:13	06:25	08:29 (W4)	05:54	08:40 (W4)	05:53	08:49 (W4)
Potential sun hours	299	298	370	398	447	451	2213	0,66	0,76	0,68	0,34
Total, worst case	1116	30	411	2955	2893	2213	0,66	0,76	0,68	0,34	758
Sun reduction	0,40	0,45	0,49	0,52	0,57	0,66	0,66	0,76	0,68	0,34	758
Oper. time red.	0,76	0,76	0,76	0,76	0,76	0,68	0,68	0,30	0,30	0,34	758
Wind dir. red.	0,71	0,71	0,68	0,68	0,68	0,68	0,68	0,30	0,30	0,34	758
Total reduction	0,22	0,24	0,25	0,27	0,30	0,34	0,34	0,30	0,30	0,34	758
Total, real	242	7	104	800	859	758	758	758	758	758	758

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F100 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (27)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July			August			September			October		November		December		
1	05:58		08:49 (W4)	06:22		08:45 (W4)	06:52		08:46 (W4)	07:21	06:55		07:30		15:46 (W3)	
	21:01	74	10:03 (W4)	20:42	97	10:22 (W4)	20:00	98	10:24 (W4)	19:10	17:24		17:00	39	16:25 (W3)	
2	05:59		08:49 (W4)	06:23		08:45 (W4)	06:53		08:47 (W4)	07:23	06:56		07:31		15:46 (W3)	
	21:01	74	10:03 (W4)	20:41	98	10:23 (W4)	19:58	96	10:23 (W4)	19:08	17:22		17:00	39	16:25 (W3)	
3	05:59		08:49 (W4)	06:24		08:44 (W4)	06:54		08:47 (W4)	07:24	06:57		07:32		15:47 (W3)	
	21:01	75	10:04 (W4)	20:40	99	10:23 (W4)	19:57	96	10:23 (W4)	19:06	17:21		16:59	39	16:26 (W3)	
4	06:00		08:49 (W4)	06:25		08:44 (W4)	06:55		08:48 (W4)	07:25	06:59		07:33		15:47 (W3)	
	21:01	75	10:04 (W4)	20:39	100	10:24 (W4)	19:55	94	10:22 (W4)	19:05	17:20		16:59	39	16:26 (W3)	
5	06:00		08:49 (W4)	06:26		08:43 (W4)	06:56		08:48 (W4)	07:26	07:00		07:34		15:48 (W3)	
	21:00	76	10:05 (W4)	20:38	101	10:24 (W4)	19:53	91	10:19 (W4)	19:03	17:19		16:59	38	16:26 (W3)	
6	06:01		08:49 (W4)	06:27		08:43 (W4)	06:57		08:49 (W4)	07:27	07:01		07:35		15:48 (W3)	
	21:00	76	10:05 (W4)	20:37	101	10:24 (W4)	19:52	89	10:18 (W4)	19:02	17:18		16:59	38	16:26 (W3)	
7	06:02		08:49 (W4)	06:28		08:43 (W4)	06:58		08:50 (W4)	07:28	07:02		07:35		15:49 (W3)	
	21:00	77	10:06 (W4)	20:36	102	10:25 (W4)	19:50	87	10:17 (W4)	19:00	17:17		16:59	38	16:27 (W3)	
8	06:02		08:49 (W4)	06:29		08:43 (W4)	06:59		08:51 (W4)	07:29	07:03		07:36		15:50 (W3)	
	20:59	78	10:07 (W4)	20:34	102	10:25 (W4)	19:48	84	10:15 (W4)	18:58	17:16		16:59	37	16:27 (W3)	
9	06:03		08:49 (W4)	06:30		08:43 (W4)	07:00		08:52 (W4)	07:30	07:05	15:55 (W3)	07:37		15:50 (W3)	
	20:59	78	10:07 (W4)	20:33	103	10:26 (W4)	19:47	82	10:14 (W4)	18:57	17:15	12	16:07 (W3)	16:59	37	16:27 (W3)
10	06:03		08:49 (W4)	06:31		08:43 (W4)	07:01		08:53 (W4)	07:31	07:06		15:52 (W3)	07:38		15:51 (W3)
	20:59	79	10:08 (W4)	20:32	103	10:26 (W4)	19:45	79	10:12 (W4)	18:55	17:14	18	16:10 (W3)	16:59	37	16:28 (W3)
11	06:04		08:49 (W4)	06:31		08:43 (W4)	07:02		08:55 (W4)	07:32	07:07		15:50 (W3)	07:39		15:51 (W3)
	20:58	80	10:09 (W4)	20:31	104	10:27 (W4)	19:43	75	10:10 (W4)	18:54	17:13	22	16:12 (W3)	16:59	36	16:27 (W3)
12	06:05		08:48 (W4)	06:32		08:43 (W4)	07:03		08:56 (W4)	07:33	07:08		15:48 (W3)	07:40		15:51 (W3)
	20:58	81	10:09 (W4)	20:29	104	10:27 (W4)	19:42	72	10:08 (W4)	18:52	17:12	25	16:13 (W3)	16:59	37	16:28 (W3)
13	06:06		08:48 (W4)	06:33		08:43 (W4)	07:04		08:58 (W4)	07:34	07:09		15:48 (W3)	07:41		15:52 (W3)
	20:57	82	10:10 (W4)	20:28	104	10:27 (W4)	19:40	68	10:06 (W4)	18:50	17:11	27	16:15 (W3)	16:59	36	16:28 (W3)
14	06:06		08:48 (W4)	06:34		08:43 (W4)	07:05		09:00 (W4)	07:35	07:10		15:47 (W3)	07:41		15:53 (W3)
	20:57	83	10:11 (W4)	20:27	105	10:28 (W4)	19:38	63	10:03 (W4)	18:49	17:10	29	16:16 (W3)	16:59	36	16:29 (W3)
15	06:07		08:48 (W4)	06:35		08:43 (W4)	07:06		09:02 (W4)	07:36	07:12		15:46 (W3)	07:42		15:53 (W3)
	20:56	82	10:10 (W4)	20:25	105	10:28 (W4)	19:37	59	10:01 (W4)	18:47	17:09	31	16:17 (W3)	16:59	35	16:28 (W3)
16	06:08		08:48 (W4)	06:36		08:43 (W4)	07:07		09:05 (W4)	07:37	07:13		15:45 (W3)	07:43		15:54 (W3)
	20:56	83	10:11 (W4)	20:24	105	10:28 (W4)	19:35	52	09:57 (W4)	18:46	17:08	33	16:18 (W3)	17:00	35	16:29 (W3)
17	06:09		08:48 (W4)	06:37		08:43 (W4)	07:08		09:08 (W4)	07:38	07:14		15:45 (W3)	07:43		15:55 (W3)
	20:55	84	10:12 (W4)	20:22	105	10:28 (W4)	19:33	46	09:54 (W4)	18:44	17:07	34	16:19 (W3)	17:00	35	16:30 (W3)
18	06:09		08:48 (W4)	06:38		08:43 (W4)	07:09		09:12 (W4)	07:39	07:15		15:44 (W3)	07:44		15:55 (W3)
	20:54	85	10:13 (W4)	20:21	106	10:29 (W4)	19:32	37	09:49 (W4)	18:43	17:07	36	16:20 (W3)	17:00	35	16:30 (W3)
19	06:10		08:48 (W4)	06:39		08:43 (W4)	07:10		09:17 (W4)	07:40	07:16		15:44 (W3)	07:45		15:56 (W3)
	20:54	86	10:14 (W4)	20:20	106	10:29 (W4)	19:30	26	09:43 (W4)	18:41	17:06	36	16:20 (W3)	17:01	34	16:30 (W3)
20	06:11		08:47 (W4)	06:40		08:42 (W4)	07:11		07:42	07:17	07:17		15:43 (W3)	07:45		15:57 (W3)
	20:53	87	10:14 (W4)	20:18	106	10:28 (W4)	19:28		18:40	17:05	37	16:20 (W3)	17:01	34	16:31 (W3)	
21	06:12		08:47 (W4)	06:41		08:42 (W4)	07:12		07:43	07:19	07:19		15:43 (W3)	07:46		15:57 (W3)
	20:52	88	10:15 (W4)	20:17	106	10:28 (W4)	19:27		18:38	17:05	38	16:21 (W3)	17:02	34	16:31 (W3)	
22	06:13		08:47 (W4)	06:42		08:42 (W4)	07:13		07:44	07:20	07:20		15:44 (W3)	07:46		15:56 (W3)
	20:52	88	10:15 (W4)	20:15	106	10:28 (W4)	19:25		18:37	17:04	38	16:22 (W3)	17:02	35	16:31 (W3)	
23	06:14		08:47 (W4)	06:43		08:42 (W4)	07:14		07:45	07:21	07:21		15:44 (W3)	07:47		15:58 (W3)
	20:51	89	10:16 (W4)	20:14	106	10:28 (W4)	19:23		18:36	17:03	38	16:22 (W3)	17:03	34	16:32 (W3)	
24	06:15		08:46 (W4)	06:44		08:43 (W4)	07:14		07:46	07:22	07:22		15:44 (W3)	07:47		15:58 (W3)
	20:50	91	10:17 (W4)	20:12	105	10:28 (W4)	19:21		18:34	17:03	39	16:23 (W3)	17:03	34	16:32 (W3)	
25	06:15		08:46 (W4)	06:45		08:43 (W4)	07:15		06:47	07:23	07:23		15:44 (W3)	07:48		15:59 (W3)
	20:49	92	10:18 (W4)	20:11	105	10:28 (W4)	19:20		17:33	17:02	39	16:23 (W3)	17:04	34	16:33 (W3)	
26	06:16		08:45 (W4)	06:46		08:43 (W4)	07:16		06:48	07:24	07:24		15:44 (W3)	07:48		15:59 (W3)
	20:48	93	10:18 (W4)	20:09	104	10:27 (W4)	19:18		17:31	17:02	39	16:23 (W3)	17:04	35	16:34 (W3)	
27	06:17		08:45 (W4)	06:47		08:44 (W4)	07:17		06:49	07:25	07:25		15:45 (W3)	07:49		15:59 (W3)
	20:47	93	10:18 (W4)	20:08	103	10:27 (W4)	19:16		17:30	17:01	39	16:24 (W3)	17:05	35	16:34 (W3)	
28	06:18		08:45 (W4)	06:48		08:44 (W4)	07:18		06:51	07:26	07:26		15:45 (W3)	07:49		16:00 (W3)
	20:46	94	10:19 (W4)	20:06	103	10:27 (W4)	19:15		17:29	17:01	39	16:24 (W3)	17:06	35	16:35 (W3)	
29	06:19		08:45 (W4)	06:49		08:44 (W4)	07:19		06:52	07:27	07:27		15:45 (W3)	07:49		16:00 (W3)
	20:45	95	10:20 (W4)	20:05	102	10:26 (W4)	19:13		17:27	17:00	40	16:25 (W3)	17:06	36	16:36 (W3)	
30	06:20		08:45 (W4)	06:50		08:45 (W4)	07:20		06:53	07:28	07:28		15:46 (W3)	07:49		16:00 (W3)
	20:44	96	10:21 (W4)	20:03	101	10:26 (W4)	19:11		17:26	17:00	39	16:25 (W3)	17:07	36	16:36 (W3)	
31	06:21		08:45 (W4)	06:51		08:45 (W4)			06:54				07:50		16:00 (W3)	
	20:43	96	10:21 (W4)	20:01	100	10:25 (W4)			17:25				17:08	37	16:37 (W3)	
Potential sun hours	458			427		375			346		299		289			
Total, worst case		2610			3197		1394				728			1119		
Sun reduction		0,74			0,72		0,65				0,48			0,42		
Oper. time red.		0,76			0,76		0,76				0,76			0,76		
Wind dir. red.		0,68			0,68		0,68				0,71			0,71		
Total reduction		0,38			0,37		0,34				0,26			0,23		
Total, real		1002			1196		472				192			256		

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F117 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (21) Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

January			February			March			April			May			June		
1	07:50		10:21 (W3)	07:37	07:02				07:11		07:56 (W4)	06:26	05:58				
	17:09	23	10:44 (W3)	17:43	18:16				19:50	24	08:20 (W4)	20:21	20:50				
2	07:50		10:22 (W3)	07:36	07:00				07:10		07:53 (W4)	06:25	05:57				
	17:10	21	10:43 (W3)	17:44	18:18				19:51	26	08:19 (W4)	20:22	20:51				
3	07:50		10:24 (W3)	07:35	06:58				07:08		07:53 (W4)	06:24	05:57				
	17:11	19	10:43 (W3)	17:45	18:19				19:52	25	08:18 (W4)	20:23	20:52				
4	07:50		10:25 (W3)	07:34	06:57				07:06		07:54 (W4)	06:22	05:56				
	17:12	16	10:41 (W3)	17:47	18:20				19:53	24	08:18 (W4)	20:24	20:52				
5	07:50		10:28 (W3)	07:33	06:55				07:05		07:54 (W4)	06:21	05:56				
	17:12	12	10:40 (W3)	17:48	18:21				19:54	22	08:16 (W4)	20:25	20:53				
6	07:50		10:32 (W3)	07:32	06:54				07:03		07:55 (W4)	06:20	05:56				
	17:13	5	10:37 (W3)	17:49	18:22				19:55	20	08:15 (W4)	20:26	20:54				
7	07:50			07:31	06:52				07:02		07:56 (W4)	06:19	05:56				
	17:14			17:50	18:23				19:56	17	08:13 (W4)	20:27	20:54				
8	07:50			07:30	06:51				07:00		07:58 (W4)	06:18	05:55				
	17:15			17:51	18:24				19:57	12	08:10 (W4)	20:28	20:55				
9	07:50			07:29	06:49				06:58		08:02 (W4)	06:16	05:55				
	17:16			17:53	18:25				19:58	4	08:06 (W4)	20:29	20:55				
10	07:50			07:27	06:47				06:57			06:15	05:55				
	17:17			17:54	18:26				19:59			20:30	20:56				
11	07:50			07:26	06:46				06:55			06:14	05:55				
	17:18			17:55	18:28				20:00			20:31	20:57				
12	07:49			07:25	06:44				06:54			06:13	05:55				
	17:19			17:56	18:29				20:01			20:32	20:57				
13	07:49			07:24	06:43				06:52			06:12	05:55				
	17:20			17:58	18:30				20:02			20:33	20:58				
14	07:49			07:23	06:41				06:51			06:11	05:54				
	17:22			17:59	18:31				20:03			20:34	20:58				
15	07:48			07:21	06:39				06:49			06:10	05:54				
	17:23			18:00	18:32				20:04			20:35	20:58				
16	07:48			07:20	06:38				06:47			06:09	05:54				
	17:24			18:01	18:33				20:05			20:36	20:59				
17	07:47			07:19	06:36				06:46			06:08	05:55				
	17:25			18:02	18:34				20:07			20:37	20:59				
18	07:47			07:17	06:34				06:44			06:07	05:55				
	17:26			18:04	18:35				20:08			20:38	20:59				
19	07:47			07:16	06:33				06:43			06:06	05:55				
	17:27			18:05	18:36				20:09			20:39	21:00				
20	07:46			07:15	06:31				06:41			06:06	05:55				
	17:28			18:06	18:37				20:10			20:40	21:00				
21	07:45			07:13	06:30				06:40			06:05	05:55				
	17:29			18:07	18:38				20:11			20:41	21:00				
22	07:45			07:12	06:28				06:39			06:04	05:55				
	17:31			18:08	18:39				20:12			20:42	21:01				
23	07:44			07:10	06:26				06:37			06:03	05:55				
	17:32			18:09	18:40				20:13			20:43	21:01				
24	07:43			07:09	06:25			07:14 (W4)	06:36			06:02	05:56				
	17:33			18:11	18:41	2		07:16 (W4)	20:14			20:44	21:01				
25	07:43			07:07	06:23			07:11 (W4)	06:34			06:02	05:56				
	17:34			18:12	18:42	7		07:18 (W4)	20:15			20:44	21:01				
26	07:42			07:06	06:21			07:09 (W4)	06:33			06:01	05:56				
	17:35			18:13	18:44	10		07:19 (W4)	20:16			20:45	21:01				
27	07:41			07:05	06:20			07:07 (W4)	06:31			06:00	05:57				
	17:37			18:14	18:45	13		07:20 (W4)	20:17			20:46	21:01				
28	07:40			07:03	06:18			07:03 (W4)	06:30			06:00	05:57				
	17:38			18:15	18:46	17		07:20 (W4)	20:18			20:47	21:01				
29	07:40				07:16			08:02 (W4)	06:29			05:59	05:57				
	17:39				19:47	19		08:21 (W4)	20:19			20:48	21:01				
30	07:39				07:15			08:00 (W4)	06:27			05:59	05:58				
	17:40				19:48	20		08:20 (W4)	20:20			20:49	21:01				
31	07:38				07:13			07:57 (W4)				05:58					
	17:42				19:49	23		08:20 (W4)				20:49					
Potential sun hours	299			298	370			398				447	451				
Total, worst case	96				111			174									
Sun reduction	0,40				0,49			0,52									
Oper. time red.	0,76				0,76			0,76									
Wind dir. red.	0,56				0,71			0,71									
Total reduction	0,17				0,26			0,27									
Total, real	16				28			48									

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F117 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (21)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:23	07:31 17:00
3	05:59 21:01	06:24 20:40	06:54 19:57	08:00 (W4) 08:04 (W4)	07:24 19:07	06:58 17:21
4	06:00 21:01	06:25 20:39	06:55 19:55	07:56 (W4) 08:08 (W4)	07:25 19:05	06:59 17:20
5	06:00 21:00	06:26 20:38	06:56 19:53	07:52 (W4) 08:09 (W4)	07:26 19:03	07:00 17:19
6	06:01 21:00	06:27 20:37	06:57 19:52	07:50 (W4) 08:10 (W4)	07:27 19:02	07:01 17:18
7	06:02 21:00	06:28 20:36	06:58 19:50	07:49 (W4) 08:11 (W4)	07:28 19:00	07:02 17:17
8	06:02 21:00	06:29 20:34	06:59 19:48	07:48 (W4) 08:12 (W4)	07:29 18:58	07:03 17:16
9	06:03 20:59	06:30 20:33	07:00 19:47	07:47 (W4) 08:12 (W4)	07:30 18:57	07:05 17:15
10	06:04 20:59	06:31 20:32	07:01 19:45	07:46 (W4) 08:12 (W4)	07:31 18:55	07:06 17:14
11	06:04 20:58	06:32 20:31	07:02 19:43	07:48 (W4) 08:12 (W4)	07:32 18:54	07:07 17:13
12	06:05 20:58	06:33 20:29	07:03 19:42	07:49 (W4) 08:12 (W4)	07:33 18:52	07:08 17:12
13	06:06 20:57	06:34 20:28	07:04 19:40	07:51 (W4) 08:12 (W4)	07:34 18:50	07:09 17:11
14	06:06 20:57	06:34 20:27	07:05 19:38	07:52 (W4) 08:11 (W4)	07:35 18:49	07:10 17:10
15	06:07 20:56	06:35 20:25	07:06 19:37	07:53 (W4) 08:10 (W4)	07:36 18:47	07:12 17:09
16	06:08 20:56	06:36 20:24	07:07 19:35	07:56 (W4) 08:09 (W4)	07:37 18:46	07:13 17:08
17	06:09 20:55	06:37 20:22	07:08 19:33	07:57 (W4) 08:08 (W4)	07:38 18:44	07:14 17:07
18	06:09 20:55	06:38 20:21	07:09 19:32	07:59 (W4) 08:06 (W4)	07:39 18:43	07:15 17:07
19	06:10 20:54	06:39 20:20	07:10 19:30	08:01 (W4) 08:04 (W4)	07:40 18:41	07:16 17:06
20	06:11 20:53	06:40 20:18	07:11 19:28	07:42 18:40	17:06 17:05	17:01 17:01
21	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	17:19 17:05	17:06 17:02
22	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	17:20 17:04	17:06 17:02
23	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	17:21 17:03	17:07 17:03
24	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	17:22 17:03	17:07 17:03
25	06:15 20:49	06:45 20:11	07:16 19:20	06:47 17:33	17:23 17:02	17:08 17:04
26	06:16 20:48	06:46 20:09	07:17 19:18	06:48 17:31	17:24 17:02	17:08 17:04
27	06:17 20:47	06:47 20:08	07:18 19:16	06:49 17:30	17:25 17:01	17:09 17:05
28	06:18 20:46	06:48 20:06	07:19 19:15	06:51 17:29	17:26 17:01	17:09 17:06
29	06:19 20:45	06:49 20:05	07:20 19:13	06:52 17:28	17:27 17:00	17:09 17:06
30	06:20 20:44	06:50 20:03	07:21 19:11	06:53 17:26	17:29 17:00	17:09 17:07
31	06:21 20:43	06:51 20:01		06:54 17:25		17:09 17:08
Potential sun hours	458	427	375	346	299	289
Total, worst case			288			671
Sun reduction			0,65			0,42
Oper. time red.			0,76			0,76
Wind dir. red.			0,71			0,56
Total reduction			0,34			0,18
Total, real			99			118

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F119 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (28)
 Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

January			February			March			April			May			June		
1	07:50		09:08 (W3)	07:37	07:02				07:11		07:50 (W4)	06:26	05:58				
	17:09	47	09:55 (W3)	17:43	18:16				19:50	23	08:13 (W4)	20:21	20:50				
2	07:50		09:08 (W3)	07:36	07:00				07:10		07:50 (W4)	06:25	05:57				
	17:10	48	09:56 (W3)	17:44	18:18				19:51	22	08:12 (W4)	20:22	20:51				
3	07:50		09:08 (W3)	07:35	06:58				07:08		07:49 (W4)	06:24	05:57				
	17:11	48	09:56 (W3)	17:45	18:19				19:52	22	08:11 (W4)	20:23	20:52				
4	07:50		09:09 (W3)	07:34	06:57				07:06		07:50 (W4)	06:22	05:57				
	17:12	48	09:57 (W3)	17:47	18:20				19:53	20	08:10 (W4)	20:24	20:52				
5	07:50		09:10 (W3)	07:33	06:55				07:05		07:51 (W4)	06:21	05:56				
	17:12	47	09:57 (W3)	17:48	18:21				19:54	17	08:08 (W4)	20:25	20:53				
6	07:50		09:10 (W3)	07:32	06:54				07:03		07:53 (W4)	06:20	05:56				
	17:13	48	09:58 (W3)	17:49	18:22				19:55	14	08:07 (W4)	20:26	20:54				
7	07:50		09:11 (W3)	07:31	06:52				07:02		07:54 (W4)	06:19	05:56				
	17:14	47	09:58 (W3)	17:50	18:23				19:56	10	08:04 (W4)	20:27	20:54				
8	07:50		09:11 (W3)	07:30	06:51				07:00			06:18	05:55				
	17:15	48	09:59 (W3)	17:51	18:24				19:57			20:28	20:55				
9	07:50		09:12 (W3)	07:29	06:49				06:58			06:16	05:55				
	17:16	47	09:59 (W3)	17:53	18:25				19:58			20:29	20:55				
10	07:50		09:12 (W3)	07:27	06:47				06:57			06:15	05:55				
	17:17	47	09:59 (W3)	17:54	18:26				19:59			20:30	20:56				
11	07:50		09:13 (W3)	07:26	06:46				06:55			06:14	05:55				
	17:18	46	09:59 (W3)	17:55	18:28				20:00			20:31	20:57				
12	07:49		09:14 (W3)	07:25	06:44				06:54			06:13	05:55				
	17:19	46	10:00 (W3)	17:56	18:29				20:01			20:32	20:57				
13	07:49		09:14 (W3)	07:24	06:43				06:52			06:12	05:55				
	17:20	45	09:59 (W3)	17:58	18:30				20:02			20:33	20:58				
14	07:49		09:15 (W3)	07:23	06:41				06:51			06:11	05:54				
	17:22	45	10:00 (W3)	17:59	18:31				20:03			20:34	20:58				
15	07:48		09:15 (W3)	07:21	06:39				06:49			06:10	05:54				
	17:23	44	09:59 (W3)	18:00	18:32				20:04			20:35	20:58				
16	07:48		09:16 (W3)	07:20	06:38				06:47			06:09	05:54				
	17:24	43	09:59 (W3)	18:01	18:33				20:05			20:36	20:59				
17	07:48		09:16 (W3)	07:19	06:36				06:46			06:08	05:55				
	17:25	43	09:59 (W3)	18:02	18:34				20:07			20:37	20:59				
18	07:47		09:17 (W3)	07:17	06:34				06:44			06:07	05:55				
	17:26	42	09:59 (W3)	18:04	18:35				20:08			20:38	21:00				
19	07:47		09:18 (W3)	07:16	06:33				06:43			06:06	05:55				
	17:27	41	09:59 (W3)	18:05	18:36				20:09			20:39	21:00				
20	07:46		09:19 (W3)	07:15	06:31				06:41			06:06	05:55				
	17:28	40	09:59 (W3)	18:06	18:37				20:10			20:40	21:00				
21	07:45		09:20 (W3)	07:13	06:30				06:40			06:05	05:55				
	17:30	38	09:58 (W3)	18:07	18:38				20:11			20:41	21:00				
22	07:45		09:20 (W3)	07:12	06:28				06:39			06:04	05:55				
	17:31	37	09:57 (W3)	18:08	18:39				20:12			20:42	21:01				
23	07:44		09:22 (W3)	07:10	06:26				06:37			06:03	05:55				
	17:32	35	09:57 (W3)	18:09	18:40				20:13			20:43	21:01				
24	07:43		09:23 (W3)	07:09	06:25				06:36			06:02	05:56				
	17:33	33	09:56 (W3)	18:11	18:41				20:14			20:44	21:01				
25	07:43		09:24 (W3)	07:07	06:23			07:02 (W4)	06:34			06:02	05:56				
	17:34	31	09:55 (W3)	18:12	18:43	7		07:09 (W4)	20:15			20:45	21:01				
26	07:42		09:25 (W3)	07:06	06:21			07:01 (W4)	06:33			06:01	05:56				
	17:35	29	09:54 (W3)	18:13	18:44	10		07:11 (W4)	20:16			20:45	21:01				
27	07:41		09:27 (W3)	07:05	06:20			06:58 (W4)	06:31			06:00	05:57				
	17:37	25	09:52 (W3)	18:14	18:45	14		07:12 (W4)	20:17			20:46	21:01				
28	07:40		09:30 (W3)	07:03	06:18			06:56 (W4)	06:30			06:00	05:57				
	17:38	21	09:51 (W3)	18:15	18:46	16		07:12 (W4)	20:18			20:47	21:01				
29	07:40		09:32 (W3)		07:16			07:54 (W4)	06:29			05:59	05:57				
	17:39	16	09:48 (W3)		19:47	19		08:13 (W4)	20:19			20:48	21:01				
30	07:39		09:37 (W3)		07:15			07:51 (W4)	06:27			05:59	05:58				
	17:40	7	09:44 (W3)		19:48	22		08:13 (W4)	20:20			20:49	21:01				
31	07:38				07:13			07:50 (W4)				05:58					
	17:42				19:49	23		08:13 (W4)				20:49					
Potential sun hours	299			298	370				398			447	451				
Total, worst case	1182				111				128								
Sun reduction	0,40				0,49				0,52								
Oper. time red.	0,76				0,76				0,76								
Wind dir. red.	0,58				0,71				0,71								
Total reduction	0,17				0,26				0,28								
Total, real	206				29				36								

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
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+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F119 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (28)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00 46 08:55 (W3) 09:41 (W3)
2	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:23	07:31 17:00 47 08:55 (W3) 09:42 (W3)
3	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:07	06:58 17:21	07:32 16:59 47 08:55 (W3) 09:42 (W3)
4	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59 48 08:55 (W3) 09:43 (W3)
5	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59 47 08:56 (W3) 09:43 (W3)
6	06:01 21:00	06:27 20:37	06:57 19:52	07:27 19:02	07:01 17:18	07:35 16:59 48 08:56 (W3) 09:44 (W3)
7	06:02 21:00	06:28 20:36	06:58 19:50	07:28 19:00	07:02 17:17	07:35 16:59 47 08:57 (W3) 09:44 (W3)
8	06:02 21:00	06:29 20:34	06:59 19:48	07:29 18:58	07:03 17:16	07:36 16:59 48 08:57 (W3) 09:45 (W3)
9	06:03 20:59	06:30 20:33	07:00 19:47	07:30 18:57	07:05 17:15	07:37 16:59 47 08:58 (W3) 09:45 (W3)
10	06:04 20:59	06:31 20:32	07:01 19:45	07:31 18:55	07:06 17:14	07:38 16:59 48 08:58 (W3) 09:46 (W3)
11	06:04 20:58	06:32 20:31	07:02 19:43	07:32 18:54	07:07 17:13	07:39 16:59 48 08:58 (W3) 09:46 (W3)
12	06:05 20:58	06:33 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 16:59 48 08:58 (W3) 09:46 (W3)
13	06:06 20:57	06:34 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 16:59 48 08:59 (W3) 09:47 (W3)
14	06:06 20:57	06:34 20:27	07:05 19:38	07:35 18:49	07:10 17:10	07:41 16:59 48 09:00 (W3) 09:48 (W3)
15	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 16:59 48 09:00 (W3) 09:48 (W3)
16	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 16:59 48 09:00 (W3) 09:48 (W3)
17	06:09 20:55	06:37 20:22	07:08 19:33	07:38 18:44	07:14 17:07	07:44 16:59 48 09:01 (W3) 09:49 (W3)
18	06:09 20:55	06:38 20:21	07:09 19:32	07:39 18:43	07:15 17:07	07:44 16:59 48 09:01 (W3) 09:49 (W3)
19	06:10 20:54	06:39 20:20	07:10 19:30	07:40 18:41	07:16 17:06	07:45 16:59 48 09:02 (W3) 09:50 (W3)
20	06:11 20:53	06:40 20:18	07:11 19:28	07:42 18:40	07:17 17:05	07:45 16:59 48 09:03 (W3) 09:51 (W3)
21	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 16:59 47 09:03 (W3) 09:50 (W3)
22	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:46 16:59 47 09:04 (W3) 09:51 (W3)
23	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 16:59 48 09:04 (W3) 09:52 (W3)
24	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 16:59 48 09:04 (W3) 09:52 (W3)
25	06:15 20:49	06:45 20:11	07:16 19:20	07:47 18:33	07:23 17:02	07:48 16:59 48 09:05 (W3) 09:53 (W3)
26	06:16 20:48	06:46 20:09	07:17 19:18	07:48 18:31	07:24 17:02	07:48 16:59 48 09:05 (W3) 09:53 (W3)
27	06:17 20:47	06:47 20:08	07:18 19:16	07:49 18:30	07:25 17:01	07:49 16:59 48 09:05 (W3) 09:53 (W3)
28	06:18 20:46	06:48 20:06	07:19 19:15	07:50 18:29	07:26 17:01	07:49 16:59 48 09:06 (W3) 09:54 (W3)
29	06:19 20:45	06:49 20:05	07:20 19:13	07:51 18:28	07:27 17:00	07:49 16:59 47 09:07 (W3) 09:54 (W3)
30	06:20 20:44	06:50 20:03	07:21 19:11	07:52 18:26	07:29 17:00	07:49 16:59 48 09:07 (W3) 09:55 (W3)
31	06:21 20:43	06:51 20:01		07:53 18:25		07:50 16:59 48 09:07 (W3) 09:55 (W3)
Potential sun hours	458	427	375	346	299	289
Total, worst case			245		663	1478
Sun reduction			0,65		0,48	0,42
Oper. time red.			0,76		0,76	0,76
Wind dir. red.			0,71		0,58	0,58
Total reduction			0,35		0,21	0,18
Total, real			85		140	270

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F12 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (15)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31
	17:10	17:44	18:18	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:22	17:00
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:07	17:21	16:59
4	07:50	07:34	06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33
	17:11	17:46	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59
7	07:50	07:31	06:52	07:02	06:19	05:55	06:02	06:28	06:58	07:28	07:02	07:36
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37
	17:16	17:53	18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	16:59
10	07:50	07:27	06:47	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	07:38
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:32	07:02	07:32	07:07	07:39
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:32	07:03	07:33	07:08	07:40
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59
13	07:49	07:24	06:43	06:52	06:12	05:54	06:06	06:33	07:04	07:34	07:09	07:41
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59
14	07:49	07:23	06:41	06:51	06:11	05:54	06:06	06:34	07:05	07:35	07:11	07:41
	17:21	17:59	18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	16:59
15	07:48	07:21	06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	07:42
	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	16:59
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43
	17:24	18:01	18:33	20:06	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00
17	07:48	07:19	06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	07:44
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:23	19:33	18:44	17:07	17:00
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:17	07:45
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46
	17:29	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02
22	07:45	07:12	06:28	06:38	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03
24	07:44	07:09	06:25	06:36	06:02	05:56	06:15	06:44	07:15	07:46	07:22	07:47
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	07:48
	17:34	18:12	18:43	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	07:48
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	07:49
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05
28	07:40	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:26	07:49
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	07:49
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:27	17:00	17:06
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	07:50
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07
31	07:38		07:13		05:58		06:21	06:51		07:53		07:50
	17:42		19:49		20:49		20:43	20:01		17:25		17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

Day in month	Sun rise (hh:mm)	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)
	Minutes with flicker		

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

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Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F125 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (22)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

January		February		March		April		May		June	
1	07:50	09:50 (W1)	07:37	07:02	08:28 (W3)	07:11	09:27 (W3)	06:26	07:08 (W4)	05:58	
2	07:09	10:14 (W1)	17:43	18:16	09:18 (W3)	19:50	09:54 (W3)	20:21	07:31 (W4)	20:50	
3	07:50	09:51 (W1)	07:36	07:00	08:28 (W3)	07:10	09:29 (W3)	06:25	07:07 (W4)	05:57	
4	07:50	09:53 (W1)	07:34	18:18	09:19 (W3)	19:51	09:50 (W3)	20:22	07:31 (W4)	20:51	
5	07:50	09:52 (W1)	07:35	06:58	08:26 (W3)	07:08	09:33 (W3)	06:24	07:07 (W4)	05:57	
6	07:50	09:53 (W1)	07:34	18:19	09:20 (W3)	19:52	09:45 (W3)	20:23	07:31 (W4)	20:52	
7	07:50	09:53 (W1)	07:34	06:57	08:25 (W3)	07:06		06:22	07:07 (W4)	05:57	
8	07:50	09:53 (W1)	07:34	18:20	09:21 (W3)	19:53		20:24	07:31 (W4)	20:52	
9	07:50	09:55 (W1)	07:33	06:55	08:24 (W3)	07:05		06:21	07:08 (W4)	05:56	
10	07:50	09:55 (W1)	07:33	18:21	09:21 (W3)	19:54		20:25	07:31 (W4)	20:53	
11	07:50	09:56 (W1)	07:32	06:54	08:23 (W3)	07:03		06:20	07:07 (W4)	05:56	
12	07:50	09:56 (W1)	07:32	18:22	09:22 (W3)	19:55		20:26	07:29 (W4)	20:54	
13	07:50	09:59 (W1)	07:31	06:52	08:22 (W3)	07:02		06:19	07:08 (W4)	05:56	
14	07:50	10:10 (W1)	17:50	18:23	09:22 (W3)	19:56		20:27	07:29 (W4)	20:54	
15	07:50	10:02 (W1)	07:30	06:51	08:21 (W3)	07:00		06:18	07:08 (W4)	05:55	
16	07:50	10:08 (W1)	17:51	18:24	09:22 (W3)	19:57		20:28	07:28 (W4)	20:55	
17	07:50		07:29	06:49	08:20 (W3)	06:58		06:16	07:09 (W4)	05:55	
18	07:50		17:53	18:25	09:23 (W3)	19:58		20:29	07:27 (W4)	20:55	
19	07:50		07:27	06:47	08:19 (W3)	06:57		06:15	07:10 (W4)	05:55	
20	07:50		17:54	18:26	09:22 (W3)	19:59		20:30	07:26 (W4)	20:56	
21	07:50		07:26	06:46	08:19 (W3)	06:55		06:14	07:12 (W4)	05:55	
22	07:50		17:55	18:28	09:23 (W3)	20:00		20:31	07:25 (W4)	20:57	
23	07:50		07:25	06:44	08:19 (W3)	06:54		06:13	07:14 (W4)	05:55	
24	07:50		17:56	18:29	09:22 (W3)	20:01		20:32	07:23 (W4)	20:57	
25	07:50		07:24	06:43	08:18 (W3)	06:52		06:12		05:55	
26	07:50		17:58	18:30	09:21 (W3)	20:02		20:33		20:58	
27	07:50		07:23	06:41	08:18 (W3)	06:51		06:11		05:54	
28	07:50		17:59	18:31	09:21 (W3)	20:03		20:34		20:58	
29	07:50		07:21	06:39	08:17 (W3)	06:49		06:10		05:54	
30	07:50		18:00	18:32	09:21 (W3)	20:04		20:35		20:58	
31	07:50		07:20	06:38	08:17 (W3)	06:47		06:09		05:54	
32	07:50		18:01	18:33	09:20 (W3)	20:05		20:36		20:59	
33	07:50		07:19	06:36	08:17 (W3)	06:46		06:08		05:55	
34	07:50		18:02	18:34	09:20 (W3)	20:07		20:37		20:59	
35	07:50		07:17	06:34	08:17 (W3)	06:44		06:07		05:55	
36	07:50		18:04	18:35	09:18 (W3)	20:08		20:38		20:59	
37	07:50		07:16	06:33	08:16 (W3)	06:43		06:06		05:55	
38	07:50		18:05	18:36	09:17 (W3)	20:09		20:39		21:00	
39	07:50		07:15	06:31	08:17 (W3)	06:41		06:06		05:55	
40	07:50		18:06	18:37	09:17 (W3)	20:10		20:40		21:00	
41	07:50		07:13	06:30	08:17 (W3)	06:40		06:05		05:55	
42	07:50		18:07	18:38	09:15 (W3)	20:11		20:41		21:00	
43	07:50		07:12	06:28	08:17 (W3)	06:39		06:04		05:55	
44	07:50		18:08	18:39	09:14 (W3)	20:12		20:42		21:01	
45	07:50		07:10	06:26	08:18 (W3)	06:37		06:03		05:55	
46	07:50		18:09	18:40	09:13 (W3)	20:13		20:43		21:01	
47	07:50		07:09	06:25	08:18 (W3)	06:36		06:03		05:56	
48	07:50		18:11	18:41	09:11 (W3)	20:14		20:44		21:01	
49	07:50		07:07	06:23	08:18 (W3)	06:34		06:02		05:56	
50	07:50		18:12	18:42	09:09 (W3)	20:15		20:44		21:01	
51	07:50		07:06	06:21	08:19 (W3)	06:33		06:01		05:56	
52	07:50		18:13	18:44	09:08 (W3)	20:16		20:45		21:01	
53	07:50		07:05	06:20	08:20 (W3)	06:31		06:00		05:57	
54	07:50		18:14	18:45	09:06 (W3)	20:17		20:46		21:01	
55	07:50		07:03	06:18	08:20 (W3)	06:30		06:00		05:57	
56	07:50		18:15	18:46	09:04 (W3)	20:18		20:47		21:01	
57	07:50			07:16	09:22 (W3)	06:29		07:10 (W4)		05:57	
58	07:50			19:47	10:03 (W3)	20:19		07:31 (W4)		21:01	
59	07:50			07:15	09:23 (W3)	06:27		07:09 (W4)		05:58	
60	07:50			19:48	10:00 (W3)	20:20		07:32 (W4)		21:01	
61	07:50			07:13	09:24 (W3)			05:58			
62	07:50			19:49	09:57 (W3)			20:49			
Potential sun hours	299		298	370		398		447		451	
Total, worst case	138		234	1723		186		237			
Sun reduction	0,40		0,45	0,49		0,52		0,57			
Oper. time red.	0,76		0,76	0,76		0,76		0,76			
Wind dir. red.	0,57		0,65	0,65		0,70		0,72			
Total reduction	0,17		0,22	0,24		0,28		0,31			
Total, real	24		51	410		51		74			

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F125 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (22)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	07:23 (W4) 06:52	07:22 19:10	08:57 (W3) 10:01 (W3)	06:55 17:24
2	05:59 21:01	06:23 20:41	07:22 (W4) 06:53	07:23 19:08	08:57 (W3) 10:00 (W3)	06:56 17:23
3	05:59 21:01	06:24 20:40	07:20 (W4) 06:54	07:24 19:07	08:57 (W3) 10:00 (W3)	06:58 17:21
4	06:00 21:01	06:25 20:39	07:20 (W4) 06:55	07:25 19:05	08:58 (W3) 10:00 (W3)	06:59 17:20
5	06:00 21:00	06:26 20:38	07:19 (W4) 06:56	07:26 19:03	08:58 (W3) 10:00 (W3)	07:00 17:19
6	06:01 21:00	06:27 20:37	07:17 (W4) 06:57	07:27 19:02	08:58 (W3) 09:59 (W3)	07:01 17:18
7	06:02 21:00	06:28 20:36	07:17 (W4) 06:58	07:28 19:00	08:59 (W3) 09:58 (W3)	07:02 17:17
8	06:02 21:00	06:29 20:34	07:16 (W4) 06:59	07:29 18:58	08:59 (W3) 09:57 (W3)	07:03 17:16
9	06:03 20:59	06:30 20:33	07:16 (W4) 07:00	09:28 (W3) 09:38 (W3)	08:59 (W3) 09:56 (W3)	07:05 17:15
10	06:04 20:59	06:31 20:32	07:16 (W4) 07:01	09:22 (W3) 09:43 (W3)	09:00 (W3) 09:55 (W3)	07:06 17:14
11	06:04 20:58	06:32 20:31	07:16 (W4) 07:02	09:19 (W3) 09:46 (W3)	09:01 (W3) 09:54 (W3)	07:07 17:13
12	06:05 20:58	06:33 20:29	07:17 (W4) 07:03	09:16 (W3) 09:49 (W3)	09:01 (W3) 09:52 (W3)	07:08 17:12
13	06:06 20:57	06:34 20:28	07:17 (W4) 07:04	09:14 (W3) 09:51 (W3)	09:02 (W3) 09:51 (W3)	07:09 17:11
14	06:06 20:57	06:34 20:27	07:18 (W4) 07:05	09:12 (W3) 09:52 (W3)	09:04 (W3) 09:49 (W3)	07:10 17:10
15	06:07 20:56	06:35 20:25	07:17 (W4) 07:06	09:11 (W3) 09:54 (W3)	09:05 (W3) 09:47 (W3)	07:12 17:09
16	06:08 20:56	06:36 20:24	07:18 (W4) 07:07	09:09 (W3) 09:55 (W3)	09:08 (W3) 09:46 (W3)	07:13 17:08
17	06:09 20:55	06:37 20:22	07:19 (W4) 07:08	09:08 (W3) 09:56 (W3)	09:09 (W3) 09:43 (W3)	07:14 17:07
18	06:09 20:55	06:38 20:21	07:20 (W4) 07:09	09:06 (W3) 09:57 (W3)	09:12 (W3) 09:40 (W3)	07:15 17:07
19	06:10 20:54	06:39 20:20	07:22 (W4) 07:10	09:05 (W3) 09:58 (W3)	09:15 (W3) 09:36 (W3)	07:16 17:06
20	06:11 20:53	06:40 20:18	07:32 (W4) 07:11	09:04 (W3) 09:59 (W3)	09:21 (W3) 09:30 (W3)	07:17 17:05
21	06:12 20:52	06:41 20:17	07:12 19:27	09:03 (W3) 10:00 (W3)	07:19 17:05	07:46 17:02
22	06:13 20:52	06:42 20:15	07:13 19:25	09:02 (W3) 10:00 (W3)	07:20 17:04	07:46 17:02
23	06:14 20:51	06:43 20:14	07:14 19:23	09:02 (W3) 10:01 (W3)	07:21 17:03	07:47 17:03
24	06:15 20:50	06:44 20:12	07:15 19:22	09:00 (W3) 10:00 (W3)	07:22 17:03	07:47 17:03
25	06:15 20:49	06:45 20:11	07:16 19:20	08:59 (W3) 10:01 (W3)	07:23 17:02	07:48 17:04
26	06:16 20:48	06:46 20:09	07:17 19:18	08:59 (W3) 10:01 (W3)	07:24 17:02	07:48 17:04
27	06:17 20:47	06:47 20:08	07:18 19:16	08:58 (W3) 10:01 (W3)	07:25 17:01	07:49 17:05
28	06:18 20:46	06:48 20:06	07:19 19:15	08:58 (W3) 10:01 (W3)	07:26 17:01	07:49 17:06
29	06:19 20:45	06:49 20:05	07:20 19:13	08:57 (W3) 10:01 (W3)	07:27 17:01	07:49 17:06
30	06:20 20:44	06:50 20:03	07:21 19:11	08:57 (W3) 10:01 (W3)	07:29 17:00	07:49 17:07
31	06:21 20:43	07:26 (W4) 07:31 (W4)	06:51 20:01	06:54 17:25	07:50 17:08	09:49 (W1) 10:14 (W1)
Potential sun hours	458	5	427	375	299	289
Total, worst case	5		367	1076	974	703
Sun reduction	0,74		0,72	0,65	0,57	0,42
Oper. time red.	0,76		0,76	0,76	0,76	0,76
Wind dir. red.	0,72		0,72	0,65	0,65	0,57
Total reduction	0,40		0,39	0,32	0,28	0,18
Total, real	2		145	344	274	128

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F138 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (23)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March		April	May		June
1	07:50 17:09	07:37 17:43	07:01 18:16		07:11 19:50	06:26 20:21		05:58 20:50
2	07:50 17:10	07:36 17:44	07:00 18:17		07:10 19:51	06:25 20:22	21	19:16 (W3) 19:37 (W3)
3	07:50 17:11	07:35 17:45	06:58 18:19		07:08 19:52	06:24 20:23	20	19:18 (W3) 19:38 (W3)
4	07:50 17:11	07:34 17:46	06:57 18:20		07:06 19:53	06:22 20:24	19	19:18 (W3) 19:37 (W3)
5	07:50 17:12	07:33 17:48	06:55 18:21		07:05 19:54	06:21 20:25	17	19:19 (W3) 19:36 (W3)
6	07:50 17:13	07:32 17:49	06:54 18:22		07:03 19:55	06:20 20:26	15	19:21 (W3) 19:36 (W3)
7	07:50 17:14	07:31 17:50	06:52 18:23		07:02 19:56	06:19 20:27	13	19:21 (W3) 19:34 (W3)
8	07:50 17:15	07:30 17:51	06:51 18:24		07:00 19:57	06:18 20:28	10	19:23 (W3) 19:33 (W3)
9	07:50 17:16	07:28 17:53	06:49 18:25		06:58 19:58	06:16 20:29	7	19:25 (W3) 19:32 (W3)
10	07:50 17:17	07:27 17:54	06:47 18:26		06:57 19:59	06:15 20:30	3	19:27 (W3) 19:30 (W3)
11	07:49 17:18	07:26 17:55	06:46 18:27		06:55 20:00	06:14 20:31	9	19:08 (W3) 19:18 (W3)
12	07:49 17:19	07:25 17:56	06:44 18:29		06:54 20:01	06:13 20:32	10	19:08 (W3) 19:18 (W3)
13	07:49 17:20	07:24 17:57	06:43 18:30		06:52 20:02	06:12 20:33	11	19:08 (W3) 19:20 (W3)
14	07:49 17:21	07:22 17:59	06:41 18:31		06:50 20:03	06:11 20:34	12	19:08 (W3) 19:22 (W3)
15	07:48 17:23	07:21 18:00	06:39 18:32	17:11 (W1)	06:49 20:04	06:10 20:35	14	19:07 (W3) 19:23 (W3)
16	07:48 17:24	07:20 18:01	06:38 18:33	17:10 (W1)	06:47 20:05	06:09 20:36	16	19:07 (W3) 19:24 (W3)
17	07:47 17:25	07:19 18:02	06:36 18:34	17:11 (W1)	06:46 20:06	06:08 20:37	17	19:07 (W3) 19:25 (W3)
18	07:47 17:26	07:17 18:04	06:34 18:35	17:10 (W1)	06:44 20:07	06:07 20:38	18	19:09 (W3) 19:27 (W3)
19	07:46 17:27	07:16 18:05	06:33 18:36	17:10 (W1)	06:43 20:09	06:06 20:39	18	19:09 (W3) 19:27 (W3)
20	07:46 17:28	07:14 18:06	06:31 18:37	17:11 (W1)	06:41 20:10	06:06 20:40	18	19:09 (W3) 19:28 (W3)
21	07:45 17:29	07:13 18:07	06:29 18:38	17:12 (W1)	06:40 20:11	06:05 20:41	19	19:09 (W3) 19:28 (W3)
22	07:45 17:31	07:12 18:08	06:28 18:39	17:12 (W1)	06:38 20:12	06:04 20:42	19	19:10 (W3) 19:30 (W3)
23	07:44 17:32	07:10 18:09	06:26 18:40	17:14 (W1)	06:37 20:13	06:03 20:43	20	19:10 (W3) 19:31 (W3)
24	07:43 17:33	07:09 18:11	06:24 18:41	17:15 (W1)	06:36 20:14	06:02 20:44	21	19:10 (W3) 19:31 (W3)
25	07:43 17:34	07:07 18:12	06:23 18:42	17:17 (W1)	06:34 20:15	06:02 20:44	21	19:12 (W3) 19:32 (W3)
26	07:42 17:35	07:06 18:13	06:21 18:43	17:24 (W1)	06:33 20:16	06:01 20:45	20	19:12 (W3) 19:33 (W3)
27	07:41 17:37	07:04 18:14	06:20 18:45	17:26 (W1)	06:31 20:17	06:00 20:46	21	19:12 (W3) 19:33 (W3)
28	07:40 17:38	07:03 18:15	06:18 18:46		06:30 20:18	06:00 20:47	21	19:13 (W3) 19:35 (W3)
29	07:40 17:39		07:16 19:47		06:29 20:19	05:59 20:48	22	19:13 (W3) 19:35 (W3)
30	07:39 17:40		07:15 19:48		06:27 20:20	05:59 20:49	22	19:15 (W3) 19:36 (W3)
31	07:38 17:42		07:13 19:49			05:58 20:49	21	19:15 (W3) 19:36 (W3)
Potential sun hours	299	298	370		398	447		451
Total, worst case			76			413		125
Sun reduction			0,49			0,57		0,66
Oper. time red.			0,76			0,76		0,76
Wind dir. red.			0,72			0,66		0,66
Total reduction			0,27			0,29		0,33
Total, real			20			118		41

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F138 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (23)
 Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

July		August		September		October	November	December
1	05:58	06:22	12	19:18 (W3)	06:52	07:21	06:55	07:30
	21:01	20:42		19:30 (W3)	20:00	19:10	17:24	17:00
2	05:59	06:23	10	19:19 (W3)	06:53	07:22	06:56	07:31
	21:01	20:41		19:29 (W3)	19:58	19:08	17:22	17:00
3	05:59	06:24	9	19:19 (W3)	06:54	07:24	06:57	07:32
	21:01	20:40		19:28 (W3)	19:57	19:06	17:21	16:59
4	06:00	19:30 (W3) 06:25	8	19:19 (W3)	06:55	07:25	06:59	07:33
	21:00	19:37 (W3) 20:39		19:27 (W3)	19:55	19:05	17:20	16:59
5	06:00	19:29 (W3) 06:26	6	19:19 (W3)	06:56	07:26	07:00	07:34
	21:00	19:39 (W3) 20:38		19:25 (W3)	19:53	19:03	17:19	16:59
6	06:01	19:28 (W3) 06:27	5	19:19 (W3)	06:57	07:27	07:01	07:34
	21:00	19:40 (W3) 20:37		19:24 (W3)	19:52	19:02	17:18	16:59
7	06:02	19:27 (W3) 06:28	3	19:20 (W3)	06:58	07:28	07:02	07:35
	21:00	19:41 (W3) 20:35		19:23 (W3)	19:50	19:00	17:17	16:59
8	06:02	19:27 (W3) 06:29	1	19:21 (W3)	06:59	07:29	07:03	07:36
	20:59	19:43 (W3) 20:34		19:22 (W3)	19:48	18:58	17:16	16:59
9	06:03	19:25 (W3) 06:30			07:00	07:30	07:04	07:37
	20:59	19:43 (W3) 20:33			19:47	18:57	17:15	16:59
10	06:03	19:25 (W3) 06:31			07:01	07:31	07:06	07:38
	20:59	19:45 (W3) 20:32			19:45	18:55	17:14	16:59
11	06:04	19:25 (W3) 06:32			07:02	07:32	07:07	07:39
	20:58	19:46 (W3) 20:30			19:43	18:54	17:13	16:59
12	06:05	19:24 (W3) 06:32			07:03	07:33	07:08	07:40
	20:58	19:45 (W3) 20:29			19:42	18:52	17:12	16:59
13	06:06	19:23 (W3) 06:33			07:04	07:34	07:09	07:41
	20:57	19:45 (W3) 20:28			19:40	18:50	17:11	16:59
14	06:06	19:23 (W3) 06:34			07:05	07:35	07:10	07:41
	20:57	19:44 (W3) 20:27			19:38	18:49	17:10	16:59
15	06:07	19:22 (W3) 06:35			07:06	07:36	07:12	07:42
	20:56	19:43 (W3) 20:25			19:37	18:47	17:09	16:59
16	06:08	19:22 (W3) 06:36			07:07	07:37	07:13	07:43
	20:56	19:43 (W3) 20:24			19:35	18:46	17:08	17:00
17	06:09	19:21 (W3) 06:37			07:08	18:10 (W1) 07:38	07:14	07:43
	20:55	19:43 (W3) 20:22			19:33	18:15 (W1) 18:44	17:07	17:00
18	06:09	19:21 (W3) 06:38			07:09	18:05 (W1) 07:39	07:15	07:44
	20:54	19:42 (W3) 20:21			19:32	18:13 (W1) 18:43	17:07	17:00
19	06:10	19:21 (W3) 06:39			07:10	18:03 (W1) 07:40	07:16	07:45
	20:54	19:42 (W3) 20:20			19:30	18:11 (W1) 18:41	17:06	17:01
20	06:11	19:20 (W3) 06:40			07:11	18:00 (W1) 07:41	07:17	07:45
	20:53	19:40 (W3) 20:18			19:28	18:09 (W1) 18:40	17:05	17:01
21	06:12	19:20 (W3) 06:41			07:12	17:58 (W1) 07:43	07:19	07:46
	20:52	19:40 (W3) 20:17			19:27	18:06 (W1) 18:38	17:05	17:02
22	06:13	19:19 (W3) 06:42			07:13	17:56 (W1) 07:44	07:20	07:46
	20:52	19:39 (W3) 20:15			19:25	18:04 (W1) 18:37	17:04	17:02
23	06:14	19:19 (W3) 06:43			07:13	17:55 (W1) 07:45	07:21	07:47
	20:51	19:39 (W3) 20:14			19:23	18:03 (W1) 18:36	17:03	17:03
24	06:15	19:19 (W3) 06:44			07:14	17:54 (W1) 07:46	07:22	07:47
	20:50	19:38 (W3) 20:12			19:21	18:01 (W1) 18:34	17:03	17:03
25	06:15	19:19 (W3) 06:45			07:15	17:53 (W1) 06:47	07:23	07:48
	20:49	19:37 (W3) 20:11			19:20	17:59 (W1) 17:33	17:02	17:04
26	06:16	19:18 (W3) 06:46			07:16	17:52 (W1) 06:48	07:24	07:48
	20:48	19:36 (W3) 20:09			19:18	17:58 (W1) 17:31	17:02	17:04
27	06:17	19:18 (W3) 06:47			07:17	17:52 (W1) 06:49	07:25	07:49
	20:47	19:35 (W3) 20:08			19:16	17:56 (W1) 17:30	17:01	17:05
28	06:18	19:18 (W3) 06:48			07:18	17:51 (W1) 06:50	07:26	07:49
	20:46	19:34 (W3) 20:06			19:15	17:54 (W1) 17:29	17:01	17:06
29	06:19	19:18 (W3) 06:49			07:19	06:52	07:27	07:49
	20:45	19:33 (W3) 20:04			19:13	17:27	17:00	17:06
30	06:20	19:18 (W3) 06:50			07:20	06:53	07:28	07:49
	20:44	19:33 (W3) 20:03			19:11	17:26	17:00	17:07
31	06:21	19:18 (W3) 06:51				06:54		07:50
	20:43	19:30 (W3) 20:01				17:25		17:08
Potential sun hours	458	427		375		346	299	289
Total, worst case	497	54		80				
Sun reduction	0,74	0,72		0,65				
Oper. time red.	0,76	0,76		0,76				
Wind dir. red.	0,66	0,66		0,72				
Total reduction	0,37	0,36		0,36				
Total, real	184	19		29				

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F154 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (24)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1 07:50 07:37 07:02 07:11 09:10 (W1) 06:26 05:58 05:58 06:22 06:52 08:41 (W1) 07:22 06:55 07:30												
17:09 17:43 18:16 19:50 2 09:12 (W1) 20:21 20:50 21:01 20:42 20:00 27 09:08 (W1) 19:10 17:24 17:00												
2 07:50 07:36 07:00 07:10 09:08 (W1) 06:25 05:57 05:59 06:23 06:53 08:43 (W1) 07:23 06:56 07:31												
17:10 17:44 18:18 19:51 4 09:12 (W1) 20:22 20:51 21:01 20:41 19:58 25 09:08 (W1) 19:08 17:23 17:00												
3 07:50 07:35 06:58 07:08 09:05 (W1) 06:24 05:57 05:59 06:24 06:54 08:45 (W1) 07:24 06:58 07:32												
17:11 17:45 18:19 19:52 7 09:12 (W1) 20:23 20:52 21:01 20:40 19:57 23 09:08 (W1) 19:07 17:21 16:59												
4 07:50 07:34 06:57 07:06 09:03 (W1) 06:22 05:57 06:00 06:25 06:55 08:48 (W1) 07:25 06:59 07:33												
17:12 17:47 18:20 19:53 9 09:12 (W1) 20:24 20:52 21:01 20:39 19:55 20 09:08 (W1) 19:05 17:20 16:59												
5 07:50 07:33 06:55 07:05 09:00 (W1) 06:21 05:56 06:00 06:26 06:56 08:51 (W1) 07:26 07:00 07:34												
17:12 17:48 18:21 19:54 12 09:12 (W1) 20:25 20:53 21:00 20:38 19:53 17 09:08 (W1) 19:03 17:19 16:59												
6 07:50 07:32 06:54 07:03 08:57 (W1) 06:20 05:56 06:01 06:27 06:57 08:52 (W1) 07:27 07:01 07:35												
17:13 17:49 18:22 19:55 15 09:12 (W1) 20:26 20:54 21:00 20:37 19:52 15 09:07 (W1) 19:02 17:18 16:59												
7 07:50 07:31 06:52 07:02 08:54 (W1) 06:19 05:56 06:02 06:28 06:58 08:55 (W1) 07:28 07:02 07:35												
17:14 17:50 18:23 19:56 17 09:11 (W1) 20:27 20:54 21:00 20:36 19:50 12 09:07 (W1) 19:00 17:17 16:59												
8 07:50 07:30 06:51 07:00 08:50 (W1) 06:18 05:55 06:02 06:29 06:59 08:57 (W1) 07:29 07:03 07:36												
17:15 17:51 18:24 19:57 20 09:10 (W1) 20:28 20:55 20:59 20:34 19:48 9 09:06 (W1) 18:58 17:16 16:59												
9 07:50 07:29 06:49 06:58 08:47 (W1) 06:16 05:55 06:03 06:30 07:00 08:59 (W1) 07:30 07:05 07:37												
17:16 17:53 18:25 19:58 23 09:10 (W1) 20:29 20:55 20:59 20:33 19:47 7 09:06 (W1) 18:57 17:15 16:59												
10 07:50 07:27 06:47 06:57 08:44 (W1) 06:15 05:55 06:04 06:31 07:01 09:01 (W1) 07:31 07:06 07:38												
17:17 17:54 18:26 19:59 25 09:09 (W1) 20:30 20:56 20:59 20:32 19:45 4 09:05 (W1) 18:55 17:14 16:59												
11 07:50 07:26 06:46 06:55 08:42 (W1) 06:14 05:55 06:04 06:32 07:02 09:02 (W1) 07:32 07:07 07:39												
17:18 17:55 18:28 20:00 27 09:09 (W1) 20:31 20:57 20:58 20:31 19:43 2 09:04 (W1) 18:54 17:13 16:59												
12 07:49 07:25 06:44 06:54 08:40 (W1) 06:13 05:55 06:05 06:33 07:03 09:03 (W1) 07:33 07:08 07:40												
17:19 17:56 18:29 20:01 28 09:08 (W1) 20:32 20:57 20:58 20:29 19:42 18:52 17:12 16:59												
13 07:49 07:24 06:43 06:52 08:38 (W1) 06:12 05:55 06:06 06:34 07:04 09:04 (W1) 07:34 07:09 07:41												
17:20 17:58 18:30 20:02 29 09:07 (W1) 20:33 20:58 20:57 20:28 19:40 18:50 17:11 16:59												
14 07:49 07:23 06:41 06:51 08:35 (W1) 06:11 05:55 06:06 06:35 07:05 09:05 (W1) 07:35 07:10 07:41												
17:22 17:59 18:31 20:03 31 09:06 (W1) 20:34 20:58 20:57 20:27 19:38 18:49 17:10 16:59												
15 07:48 07:21 06:39 06:49 08:34 (W1) 06:10 05:55 06:07 06:35 07:06 09:06 (W1) 07:36 07:12 07:42												
17:23 18:00 18:32 20:04 32 09:06 (W1) 20:35 20:58 20:56 20:25 19:37 18:47 17:09 17:00												
16 07:48 07:20 06:38 06:47 08:31 (W1) 06:09 05:55 06:08 06:36 07:07 09:07 (W1) 07:37 07:13 07:43												
17:24 18:01 18:33 20:05 33 09:04 (W1) 20:36 20:59 20:56 20:24 19:35 18:46 17:08 17:00												
17 07:47 07:19 06:36 06:46 08:29 (W1) 06:08 05:55 06:09 06:37 07:08 09:08 (W1) 07:38 07:14 07:43												
17:25 18:02 18:34 20:07 34 09:03 (W1) 20:37 20:59 20:55 20:22 14 08:37 (W1) 07:08 18:44 17:07 17:00												
18 07:47 07:17 06:34 06:44 08:27 (W1) 06:07 05:55 06:10 06:38 07:09 09:09 (W1) 07:39 07:15 07:44												
17:26 18:04 18:35 20:08 34 09:01 (W1) 20:38 20:59 20:55 20:21 21 08:55 (W1) 19:32 18:43 17:07 17:00												
19 07:47 07:16 06:33 06:43 08:25 (W1) 06:06 05:55 06:10 06:39 07:10 09:10 (W1) 07:40 07:16 07:45												
17:27 18:05 18:36 20:09 35 09:00 (W1) 20:39 21:00 20:54 20:20 26 08:57 (W1) 19:30 18:41 17:06 17:01												
20 07:46 07:15 06:31 06:41 08:22 (W1) 06:06 05:55 06:11 06:40 07:11 09:11 (W1) 07:41 07:17 07:46												
17:28 18:06 18:37 20:10 36 08:58 (W1) 20:40 21:00 20:53 20:18 30 08:59 (W1) 19:28 18:40 17:05 17:01												
21 07:45 07:13 06:30 06:40 08:21 (W1) 06:05 05:55 06:12 06:41 07:12 09:12 (W1) 07:42 07:18 07:46												
17:30 18:07 18:38 20:11 36 08:57 (W1) 20:41 21:00 20:52 20:17 34 09:01 (W1) 19:27 18:38 17:05 17:02												
22 07:45 07:12 06:28 06:39 08:22 (W1) 06:04 05:55 06:13 06:42 07:13 09:13 (W1) 07:43 07:19 07:46												
17:31 18:08 18:39 20:12 33 08:55 (W1) 20:42 21:01 20:52 20:15 36 09:01 (W1) 19:25 18:37 17:04 17:02												
23 07:44 07:10 06:26 06:37 08:24 (W1) 06:03 05:55 06:14 06:43 07:14 09:14 (W1) 07:44 07:20 07:47												
17:32 18:09 18:40 20:13 29 08:53 (W1) 20:43 21:01 20:51 20:14 36 09:02 (W1) 19:23 18:36 17:03 17:03												
24 07:43 07:09 06:25 06:36 08:25 (W1) 06:03 05:56 06:15 06:44 07:15 09:15 (W1) 07:45 07:21 07:47												
17:33 18:11 18:41 20:14 25 08:50 (W1) 20:44 21:01 20:50 20:12 35 09:03 (W1) 19:22 18:34 17:03 17:03												
25 07:43 07:07 06:23 06:34 08:28 (W1) 06:02 05:56 06:15 06:45 07:16 09:16 (W1) 07:46 07:22 07:47												
17:34 18:12 18:43 20:15 19 08:47 (W1) 20:44 21:01 20:49 20:11 34 09:04 (W1) 19:20 17:33 17:02 17:04												
26 07:42 07:06 06:21 06:33 08:31 (W1) 06:01 05:56 06:16 06:46 07:17 09:17 (W1) 07:47 07:23 07:48												
17:36 18:13 18:44 20:16 13 08:44 (W1) 20:45 21:01 20:48 20:09 34 09:05 (W1) 19:18 17:31 17:02 17:04												
27 07:41 07:05 06:20 06:31 06:01 05:57 06:17 06:47 07:18 09:18 (W1) 07:48 07:24 07:49												
17:37 18:14 18:45 20:17 20:46 21:01 20:47 20:08 33 09:06 (W1) 19:16 17:30 17:01 17:05												
28 07:40 07:03 06:18 06:30 06:00 05:57 06:18 06:48 07:19 09:19 (W1) 07:49 07:25 07:49												
17:38 18:15 18:46 20:18 20:47 21:01 20:46 20:06 32 09:07 (W1) 19:15 17:29 17:01 17:06												
29 07:40 07:16 06:29 06:39 05:59 05:57 06:19 06:49 07:20 09:20 (W1) 07:50 07:26 07:49												
17:39 18:17 18:48 20:19 20:48 21:01 20:45 20:05 31 09:07 (W1) 19:13 17:28 17:01 17:06												
30 07:39 07:15 06:27 06:37 05:59 05:58 06:20 06:50 07:21 09:21 (W1) 07:51 07:27 07:49												
17:40 18:18 18:49 20:20 20:49 21:01 20:44 20:03 29 09:07 (W1) 19:11 17:26 17:00 17:07												
31 07:38 07:13 06:26 06:36 05:58 05:57 06:19 06:49 07:22 09:22 (W1) 07:52 07:28 07:50												
17:42 18:19 18:50 20:21 20:49 21:01 20:43 20:01 28 09:08 (W1) 19:12 17:25 17:01 17:08												
Potential sun hours 299 298 370 398 447 451 458 427 375 346 299 289												
Total, worst case 608												
Sun reduction 0,52												
Oper. time red. 0,76												
Wind dir. red. 0,69												
Total reduction 0,27												
Total, real 167												

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F21 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (16)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
160	379	487	423	372	261	434	671	794	1.104	1.108	478	6.671

January		February		March		April		May		June		July		August		September		October		November		December	
1	07:50	08:58 (W2)	07:37	09:20 (W2)	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55			07:30		08:43 (W2)					
2	07:50	08:58 (W2)	07:36	09:35 (W2)	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24			17:00		09:26 (W2)		43		09:26 (W2)	
3	07:50	08:58 (W2)	07:35	09:30 (W2)	18:18	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:23			17:00		08:44 (W2)		42		09:26 (W2)	
4	07:50	08:58 (W2)	07:34			18:19	19:52	20:23	20:52	21:01	20:40	19:57	17:21			16:59		08:45 (W2)		43		09:27 (W2)	
5	07:50	08:59 (W2)	07:33			18:20	19:53	20:24	20:52	21:01	20:39	19:55	17:20			16:59		08:45 (W2)		42		09:27 (W2)	
6	07:50	08:59 (W2)	07:32			18:21	19:54	20:25	20:53	21:00	20:38	19:53	17:19			16:59		08:45 (W2)		42		09:27 (W2)	
7	07:50	08:59 (W2)	07:31			18:22	19:55	20:26	20:54	21:00	20:37	19:52	17:18			16:59		08:46 (W2)		42		09:28 (W2)	
8	07:50	08:59 (W2)	07:30			18:23	19:56	20:27	20:54	21:00	20:36	19:50	17:17			16:59		08:46 (W2)		42		09:28 (W2)	
9	07:50	08:59 (W2)	07:29			18:24	19:57	20:28	20:55	21:00	20:34	19:48	17:16			16:59		08:47 (W2)		42		09:29 (W2)	
10	07:50	08:59 (W2)	07:28			18:25	19:58	20:29	20:56	20:59	20:33	19:47	17:15			16:59		08:47 (W2)		42		09:29 (W2)	
11	07:50	08:59 (W2)	07:27			18:26	19:59	20:30	20:56	20:59	20:32	19:45	17:14			16:59		08:48 (W2)		41		09:29 (W2)	
12	07:50	08:59 (W2)	07:26			18:27	20:00	20:31	20:57	20:58	20:31	19:43	17:13			16:59		08:49 (W2)		41		09:30 (W2)	
13	07:50	08:59 (W2)	07:25			18:28	20:01	20:32	20:57	20:58	20:29	19:42	17:12			16:59		08:49 (W2)		42		09:30 (W2)	
14	07:50	08:59 (W2)	07:24			18:29	20:02	20:33	20:58	20:58	20:28	19:40	17:11			16:59		08:49 (W2)		41		09:30 (W2)	
15	07:50	08:59 (W2)	07:23			18:30	20:03	20:34	20:58	20:57	20:27	19:38	17:10			16:59		08:50 (W2)		41		09:31 (W2)	
16	07:50	08:59 (W2)	07:22			18:31	20:04	20:35	20:58	20:56	20:25	19:37	17:09			16:59		08:51 (W2)		40		09:31 (W2)	
17	07:50	08:59 (W2)	07:21			18:32	20:05	20:36	20:58	20:56	20:24	19:35	17:08			16:59		08:51 (W2)		40		09:31 (W2)	
18	07:50	08:59 (W2)	07:20			18:33	20:06	20:37	20:59	20:56	20:24	19:35	17:08			16:59		08:52 (W2)		40		09:32 (W2)	
19	07:50	08:59 (W2)	07:19			18:34	20:07	20:38	20:59	20:55	20:23	19:33	17:07			16:59		08:52 (W2)		40		09:32 (W2)	
20	07:50	08:59 (W2)	07:18			18:35	20:08	20:39	20:59	20:55	20:21	19:32	17:06			16:59		08:53 (W2)		41		09:33 (W2)	
21	07:50	08:59 (W2)	07:17			18:36	20:09	20:40	20:59	20:54	20:20	19:30	17:05			16:59		08:53 (W2)		40		09:33 (W2)	
22	07:50	08:59 (W2)	07:16			18:37	20:10	20:41	20:59	20:53	20:18	19:28	17:04			16:59		08:54 (W2)		40		09:34 (W2)	
23	07:50	08:59 (W2)	07:15			18:38	20:11	20:42	20:59	20:52	20:17	19:27	17:03			16:59		08:54 (W2)		40		09:34 (W2)	
24	07:50	08:59 (W2)	07:14			18:39	20:12	20:43	20:59	20:51	20:16	19:26	17:02			16:59		08:55 (W2)		40		09:35 (W2)	
25	07:50	08:59 (W2)	07:13			18:40	20:13	20:44	20:59	20:50	20:15	19:25	17:01			16:59		08:55 (W2)		40		09:35 (W2)	
26	07:50	08:59 (W2)	07:12			18:41	20:14	20:45	20:59	20:50	20:14	19:24	17:00			16:59		08:56 (W2)		41		09:36 (W2)	
27	07:50	08:59 (W2)	07:11			18:42	20:15	20:46	20:59	20:51	20:13	19:23	17:00			16:59		08:56 (W2)		41		09:36 (W2)	
28	07:50	08:59 (W2)	07:10			18:43	20:16	20:47	20:59	20:52	20:12	19:22	17:00			16:59		08:57 (W2)		41		09:37 (W2)	
29	07:50	08:59 (W2)	07:09			18:44	20:17	20:48	20:59	20:53	20:11	19:21	17:00			16:59		08:57 (W2)		41		09:38 (W2)	
30	07:50	08:59 (W2)	07:08			18:45	20:18	20:49	20:59	20:54	20:10	19:20	17:00			16:59		08:58 (W2)		41		09:38 (W2)	
31	07:50	08:59 (W2)	07:07			18:46	20:19	20:50	20:59	20:55	20:09	19:19	17:00			16:59		08:58 (W2)		41		09:38 (W2)	
Potential sun hours	298		298			370	398	447	451	458	427	375	346			299		743				1272	
Total, worst case	1184																	0,48				0,42	
Sun reduction	0,40																	0,76				0,76	
Oper. time red.	0,76																	0,57				0,57	
Wind dir. red.	0,57																	0,21				0,18	
Total reduction	0,17																	0,15				0,15	
Total, real	207																	157				234	

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)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F25 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (17)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	06:52 (W2) 20:21	05:58 21:01	06:22 20:42	07:05 (W2) 20:00	06:52 19:10	07:22 17:24	06:55 17:00
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	06:25 20:22	06:52 (W2) 20:21	05:57 21:01	06:23 20:41	07:05 (W2) 19:58	06:53 19:08	07:23 17:24	06:56 17:23
3	07:50 17:11	07:35 17:45	06:59 18:19	07:08 19:52	06:24 20:23	06:52 (W2) 20:22	05:57 21:01	06:24 20:40	07:04 (W2) 19:57	06:54 19:07	07:24 17:21	06:58 16:59
4	07:50 17:12	07:34 17:47	06:57 18:20	07:06 19:53	06:22 20:24	06:53 (W2) 20:22	05:57 21:01	06:25 20:39	07:04 (W2) 19:55	06:55 19:05	07:25 17:20	06:59 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	06:53 (W2) 20:23	05:56 21:00	06:26 20:38	07:03 (W2) 19:53	06:56 19:03	07:26 17:19	07:00 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	06:52 (W2) 20:24	05:56 21:00	06:27 20:37	07:02 (W2) 19:52	06:57 19:02	07:27 17:18	07:01 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	06:52 (W2) 20:24	05:56 21:00	06:28 20:36	07:02 (W2) 19:50	06:58 19:00	07:28 17:17	07:02 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	06:53 (W2) 20:25	05:55 21:00	06:29 20:34	07:01 (W2) 19:48	06:59 18:58	07:29 17:16	07:03 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	06:53 (W2) 20:26	05:55 20:59	06:30 20:33	07:01 (W2) 19:47	07:00 18:57	07:30 17:15	07:05 16:59
10	07:50 17:17	07:27 17:54	06:48 18:26	06:57 19:59	06:15 20:30	06:54 (W2) 20:26	05:55 20:59	06:31 20:32	07:01 (W2) 19:45	07:01 18:55	07:31 17:14	07:06 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	06:14 20:31	06:54 (W2) 20:27	05:55 20:58	06:32 20:31	07:01 (W2) 19:43	07:02 18:54	07:32 17:13	07:07 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	06:13 20:32	06:55 (W2) 20:27	05:55 20:58	06:33 20:29	07:01 (W2) 19:42	07:03 18:52	07:33 17:12	07:08 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	06:12 20:33	06:55 (W2) 20:28	05:55 20:58	06:34 20:28	07:01 (W2) 19:40	07:04 18:50	07:34 17:11	07:09 16:59
14	07:49 17:22	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	06:56 (W2) 20:28	05:55 20:57	06:35 20:27	07:01 (W2) 19:38	07:05 18:49	07:35 17:10	07:11 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	06:10 20:35	06:57 (W2) 20:28	05:54 20:56	06:36 20:25	07:01 (W2) 19:37	07:06 18:47	07:36 17:09	07:12 17:00
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:06	06:09 20:36	06:57 (W2) 20:29	05:54 20:56	06:36 20:24	07:01 (W2) 19:35	07:07 18:46	07:37 17:08	07:13 17:00
17	07:48 17:25	07:19 18:02	06:36 18:34	06:46 20:07	06:08 20:37	06:58 (W2) 20:29	05:55 20:55	06:37 20:23	07:01 (W2) 19:33	07:08 18:44	07:38 17:07	07:14 17:00
18	07:47 17:26	07:17 18:04	06:35 18:35	06:44 20:08	06:07 20:38	07:00 (W2) 20:29	05:55 20:55	06:38 20:21	07:02 (W2) 19:32	07:09 18:43	07:39 17:07	07:15 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	07:02 (W2) 20:29	05:55 20:54	06:39 20:20	07:02 (W2) 19:30	07:10 18:41	07:41 17:06	07:16 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	06:06 20:40	07:03 (W2) 20:29	05:55 20:53	06:40 20:18	07:03 (W2) 19:28	07:11 18:40	07:42 17:05	07:18 17:01
21	07:45 17:30	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	07:03 (W2) 20:29	05:55 20:52	06:41 20:17	07:03 (W2) 19:27	07:12 18:38	07:43 17:05	07:19 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:39 20:12	06:04 20:42	07:06 (W2) 20:29	05:55 20:52	06:42 20:15	07:03 (W2) 19:25	07:13 18:37	07:44 17:04	07:20 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	07:07 (W2) 20:29	05:55 20:51	06:43 20:14	07:04 (W2) 19:23	07:14 18:36	07:45 17:03	07:21 17:03
24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:03 20:44	07:10 (W2) 20:29	05:56 20:50	06:44 20:12	07:05 (W2) 19:22	07:15 18:34	07:46 17:03	07:22 17:03
25	07:43 17:34	07:08 18:12	06:23 18:43	06:34 20:15	06:02 20:45	07:11 (W2) 20:29	05:56 20:49	06:45 20:11	07:06 (W2) 19:20	07:16 17:33	07:47 17:02	07:23 17:04
26	07:42 17:35	07:06 18:13	06:21 18:44	06:33 20:16	06:01 20:45	07:12 (W2) 20:29	05:56 20:48	06:46 20:09	07:07 (W2) 19:18	07:17 17:31	07:48 17:02	07:24 17:04
27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	07:13 (W2) 20:29	05:57 20:47	06:47 20:08	07:08 (W2) 19:17	07:18 17:30	07:49 17:01	07:25 17:05
28	07:41 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	07:14 (W2) 20:29	05:57 20:46	06:48 20:06	07:09 (W2) 19:15	07:19 17:29	07:50 17:01	07:26 17:06
29	07:40 17:39	07:02 18:16	06:16 18:47	06:29 20:19	05:59 20:48	07:15 (W2) 20:29	05:57 20:46	06:49 20:05	07:10 (W2) 19:13	07:20 17:28	07:51 17:01	07:27 17:06
30	07:39 17:40	07:01 18:15	06:15 18:47	06:27 20:20	05:58 20:49	07:16 (W2) 20:29	05:58 20:45	06:50 20:03	07:11 (W2) 19:12	07:21 17:26	07:52 17:00	07:28 17:07
31	07:38 17:42	07:00 18:17	06:13 18:48	06:29 20:21	05:58 20:49	07:17 (W2) 20:29	05:59 20:43	06:51 20:01	07:12 (W2) 19:11	07:22 17:25	07:53 17:00	07:29 17:08
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289
Total, worst case				624	879		357		1164			
Sun reduction				0,52	0,57		0,74		0,72			
Oper. time red.				0,76	0,76		0,76		0,76			
Wind dir. red.				0,72	0,72		0,72		0,72			
Total reduction				0,29	0,32		0,41		0,40			
Total, real				179	277		145		462			

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow day Shadow receptor: F33 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (25)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:18	07:10 19:51	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:23	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:07	06:58 17:21	07:32 16:59
4	07:50 17:12	07:34 17:47	06:57 18:20	07:06 19:53	06:22 20:24	05:57 20:52	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	05:56 20:54	06:01 21:00	06:27 20:37	06:57 19:52	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	05:56 20:54	06:02 21:00	06:28 20:36	06:58 19:50	07:28 19:00	07:02 17:17	07:36 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	05:55 20:55	06:02 21:00	06:29 20:34	06:59 19:48	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	05:55 20:55	06:03 20:59	06:30 20:33	07:00 19:47	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:48 18:26	06:57 19:59	06:15 20:30	05:55 20:56	06:04 20:59	06:31 20:32	07:01 19:45	07:31 18:55	07:06 17:14	07:38 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	06:14 20:31	05:55 20:57	06:04 20:58	06:32 20:31	07:02 19:43	07:32 18:54	07:07 17:13	07:39 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	06:13 20:32	05:55 20:57	06:05 20:58	06:33 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	06:12 20:33	05:55 20:58	06:06 20:57	06:34 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 16:59
14	07:49 17:22	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	05:54 20:58	06:06 20:57	06:35 20:27	07:05 19:38	07:35 18:49	07:10 17:10	07:41 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	06:10 20:35	05:54 20:58	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 17:00
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:06	06:09 20:36	05:54 20:59	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 17:00
17	07:48 17:25	07:19 18:02	06:36 18:34	06:46 20:07	06:08 20:37	05:55 20:59	06:09 20:55	06:37 20:23	07:08 19:33	07:38 18:44	07:14 17:07	07:44 17:00
18	07:47 17:26	07:17 18:04	06:34 18:35	06:44 20:08	06:07 20:38	05:55 21:00	06:09 20:55	06:38 20:21	07:09 19:32	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	05:55 21:00	06:10 20:54	06:39 20:20	07:10 19:30	07:40 18:41	07:16 17:06	07:45 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	06:06 20:40	05:55 21:00	06:11 20:53	06:40 20:18	07:11 19:28	07:42 18:40	07:17 17:05	07:45 17:01
21	07:45 17:30	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	05:55 21:00	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:39 20:12	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:47 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	07:44 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:02 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 17:03
25	07:43 17:34	07:07 18:12	06:23 18:43	06:34 20:15	06:02 20:45	05:56 21:01	06:15 20:49	06:45 20:11	07:16 19:20	06:47 17:33	07:23 17:02	07:48 17:04
26	07:42 17:35	07:06 18:13	06:21 18:44	06:33 20:16	06:01 20:45	05:56 21:01	06:16 20:48	06:46 20:09	07:17 19:18	06:48 17:31	07:24 17:02	07:48 17:04
27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	05:57 21:01	06:17 20:47	06:47 20:08	07:18 19:17	06:49 17:30	07:25 17:01	07:49 17:05
28	07:40 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	05:57 21:01	06:18 20:46	06:48 20:06	07:19 19:15	06:51 17:29	07:26 17:01	07:49 17:06
29	07:40 17:39		07:16 19:47	06:29 20:19	05:59 20:48	05:57 21:01	06:19 20:45	06:49 20:05	07:20 19:13	06:52 17:28	07:28 17:00	07:49 17:06
30	07:39 17:40		07:15 19:48	06:27 20:20	05:59 20:49	05:58 21:01	06:20 20:44	06:50 20:03	07:21 19:11	06:53 17:26	07:29 17:00	07:50 17:07
31	07:38 17:42		07:13 19:49		05:58 20:49		06:21 20:43	06:51 20:01		06:54 17:25		07:50 17:08
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

Day in month	Sun rise (hh:mm)	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)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow day Shadow receptor: F35 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (26)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31
	17:10	17:44	18:18	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:23	17:00
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:07	17:21	16:59
4	07:50	07:34	06:57	07:06	06:22	05:57	06:00	06:25	06:55	07:25	06:59	07:33
	17:12	17:47	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59
7	07:50	07:31	06:52	07:02	06:19	05:56	06:02	06:28	06:58	07:28	07:02	07:36
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37
	17:16	17:53	18:25	19:58	20:29	20:55	20:59	20:33	19:47	18:57	17:15	16:59
10	07:50	07:27	06:47	06:57	06:15	05:55	06:04	06:31	07:01	07:31	07:06	07:38
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:32	07:02	07:32	07:07	07:39
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:33	07:03	07:33	07:08	07:40
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59
13	07:49	07:24	06:43	06:52	06:12	05:55	06:06	06:34	07:04	07:34	07:09	07:41
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59
14	07:49	07:23	06:41	06:51	06:11	05:54	06:06	06:34	07:05	07:35	07:10	07:41
	17:22	17:59	18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	16:59
15	07:48	07:21	06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	07:42
	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	17:00
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43
	17:24	18:01	18:33	20:05	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00
17	07:48	07:19	06:36	06:46	06:08	05:55	06:09	06:37	07:08	07:38	07:14	07:44
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:23	19:33	18:44	17:07	17:00
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:17	07:45
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46
	17:30	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02
22	07:45	07:12	06:28	06:39	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03
24	07:44	07:09	06:25	06:36	06:02	05:56	06:15	06:44	07:15	07:46	07:22	07:47
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	07:48
	17:34	18:12	18:43	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	07:48
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	07:49
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05
28	07:40	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:26	07:49
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	07:49
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:28	17:00	17:06
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	07:50
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07
31	07:38		07:13		05:58		06:21	06:51		07:53		07:50
	17:42		19:49		20:49		20:43	20:01		17:25		17:08
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

Day in month	Sun rise (hh:mm)	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)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F59 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (18)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:50	07:37	07:02	07:11	06:26	05:58	05:58	06:22	06:52	07:22	06:55	07:30	
	17:09	17:43	18:16	19:50	20:21	20:50	21:01	20:42	20:00	19:10	17:24	17:00	
2	07:50	07:36	07:00	07:10	06:25	05:57	05:59	06:23	06:53	07:23	06:56	07:31	
	17:10	17:44	18:17	19:51	20:22	20:51	21:01	20:41	19:58	19:08	17:22	16:59	
3	07:50	07:35	06:58	07:08	06:24	05:57	05:59	06:24	06:54	07:24	06:58	07:32	
	17:11	17:45	18:19	19:52	20:23	20:52	21:01	20:40	19:57	19:06	17:21	16:59	
4	07:50	07:34	06:57	07:06	06:22	05:56	06:00	06:25	06:55	07:25	06:59	07:33	
	17:11	17:46	18:20	19:53	20:24	20:52	21:01	20:39	19:55	19:05	17:20	16:59	
5	07:50	07:33	06:55	07:05	06:21	05:56	06:00	06:26	06:56	07:26	07:00	07:34	
	17:12	17:48	18:21	19:54	20:25	20:53	21:00	20:38	19:53	19:03	17:19	16:59	
6	07:50	07:32	06:54	07:03	06:20	05:56	06:01	06:27	06:57	07:27	07:01	07:35	
	17:13	17:49	18:22	19:55	20:26	20:54	21:00	20:37	19:52	19:02	17:18	16:59	
7	07:50	07:31	06:52	07:02	06:19	05:55	06:02	06:28	06:58	07:28	07:02	07:36	
	17:14	17:50	18:23	19:56	20:27	20:54	21:00	20:36	19:50	19:00	17:17	16:59	
8	07:50	07:30	06:51	07:00	06:18	05:55	06:02	06:29	06:59	07:29	07:03	07:36	
	17:15	17:51	18:24	19:57	20:28	20:55	21:00	20:34	19:48	18:58	17:16	16:59	
9	07:50	07:29	06:49	06:58	06:16	05:55	06:03	06:30	07:00	07:30	07:05	07:37	
	17:16	17:53	18:25	19:58	20:29	20:56	20:59	20:33	19:47	18:57	17:15	16:59	
10	07:50	07:27	06:47	06:57	06:15	05:55	06:03	06:31	07:01	07:31	07:06	07:38	
	17:17	17:54	18:26	19:59	20:30	20:56	20:59	20:32	19:45	18:55	17:14	16:59	
11	07:50	07:26	06:46	06:55	06:14	05:55	06:04	06:31	07:02	07:32	07:07	07:39	
	17:18	17:55	18:28	20:00	20:31	20:57	20:58	20:31	19:43	18:54	17:13	16:59	
12	07:49	07:25	06:44	06:54	06:13	05:55	06:05	06:32	07:03	07:33	07:08	07:40	
	17:19	17:56	18:29	20:01	20:32	20:57	20:58	20:29	19:42	18:52	17:12	16:59	
13	07:49	07:24	06:43	06:52	06:12	05:54	06:06	06:33	07:04	07:34	07:09	07:41	
	17:20	17:58	18:30	20:02	20:33	20:58	20:57	20:28	19:40	18:50	17:11	16:59	
14	07:49	07:23	06:41	06:50	06:11	05:54	06:06	06:34	07:05	07:35	07:10	07:41	
	17:21	17:59	18:31	20:03	20:34	20:58	20:57	20:27	19:38	18:49	17:10	16:59	
15	07:48	07:21	06:39	06:49	06:10	05:54	06:07	06:35	07:06	07:36	07:12	07:42	
	17:23	18:00	18:32	20:04	20:35	20:58	20:56	20:25	19:37	18:47	17:09	16:59	
16	07:48	07:20	06:38	06:47	06:09	05:54	06:08	06:36	07:07	07:37	07:13	07:43	
	17:24	18:01	18:33	20:05	20:36	20:59	20:56	20:24	19:35	18:46	17:08	17:00	
17	07:48	07:19	06:36	06:46	06:08	05:54	06:09	06:37	07:08	07:38	07:14	07:44	14:21 (W2)
	17:25	18:02	18:34	20:07	20:37	20:59	20:55	20:22	19:33	18:44	17:07	17:00	3 14:24 (W2)
18	07:47	07:17	06:34	06:44	06:07	05:55	06:09	06:38	07:09	07:39	07:15	07:44	14:20 (W2)
	17:26	18:04	18:35	20:08	20:38	21:00	20:55	20:21	19:32	18:43	17:07	17:00	6 14:26 (W2)
19	07:47	07:16	06:33	06:43	06:06	05:55	06:10	06:39	07:10	07:40	07:16	07:45	14:19 (W2)
	17:27	18:05	18:36	20:09	20:39	21:00	20:54	20:20	19:30	18:41	17:06	17:01	8 14:27 (W2)
20	07:46	07:15	06:31	06:41	06:06	05:55	06:11	06:40	07:11	07:42	07:17	07:45	14:20 (W2)
	17:28	18:06	18:37	20:10	20:40	21:00	20:53	20:18	19:28	18:40	17:05	17:01	8 14:28 (W2)
21	07:45	07:13	06:30	06:40	06:05	05:55	06:12	06:41	07:12	07:43	07:19	07:46	14:20 (W2)
	17:29	18:07	18:38	20:11	20:41	21:00	20:52	20:17	19:27	18:38	17:05	17:02	8 14:28 (W2)
22	07:45	07:12	06:28	06:38	06:04	05:55	06:13	06:42	07:13	07:44	07:20	07:47	14:21 (W2)
	17:31	18:08	18:39	20:12	20:42	21:01	20:52	20:15	19:25	18:37	17:04	17:02	8 14:29 (W2)
23	07:44	07:10	06:26	06:37	06:03	05:55	06:14	06:43	07:14	07:45	07:21	07:47	14:21 (W2)
	17:32	18:09	18:40	20:13	20:43	21:01	20:51	20:14	19:23	18:36	17:03	17:03	8 14:29 (W2)
24	07:44	07:09	06:25	06:36	06:02	05:56	06:14	06:44	07:15	07:46	07:22	07:47	14:21 (W2)
	17:33	18:11	18:41	20:14	20:44	21:01	20:50	20:12	19:22	18:34	17:03	17:03	8 14:29 (W2)
25	07:43	07:07	06:23	06:34	06:02	05:56	06:15	06:45	07:16	07:47	07:23	07:48	14:23 (W2)
	17:34	18:12	18:42	20:15	20:45	21:01	20:49	20:11	19:20	17:33	17:02	17:04	7 14:30 (W2)
26	07:42	07:06	06:21	06:33	06:01	05:56	06:16	06:46	07:17	07:48	07:24	07:48	14:24 (W2)
	17:35	18:13	18:44	20:16	20:45	21:01	20:48	20:09	19:18	17:31	17:02	17:04	5 14:29 (W2)
27	07:41	07:05	06:20	06:31	06:00	05:57	06:17	06:47	07:18	07:49	07:25	07:49	
	17:37	18:14	18:45	20:17	20:46	21:01	20:47	20:08	19:16	17:30	17:01	17:05	
28	07:40	07:03	06:18	06:30	06:00	05:57	06:18	06:48	07:19	07:50	07:26	07:49	
	17:38	18:15	18:46	20:18	20:47	21:01	20:46	20:06	19:15	17:29	17:01	17:06	
29	07:40		07:16	06:29	05:59	05:57	06:19	06:49	07:20	07:51	07:28	07:49	
	17:39		19:47	20:19	20:48	21:01	20:45	20:05	19:13	17:27	17:00	17:06	
30	07:39		07:15	06:27	05:59	05:58	06:20	06:50	07:21	07:52	07:29	07:50	
	17:40		19:48	20:20	20:49	21:01	20:44	20:03	19:11	17:26	17:00	17:07	
31	07:38		07:13		05:58		06:21	06:51		07:53		07:50	
	17:42		19:49		20:49		20:43	20:01		17:25		17:08	
Potential sun hours	298	298	370	398	447	451	458	427	375	346	299	289	
Total, worst case													69
Sun reduction													0,42
Oper. time red.													0,76
Wind dir. red.													0,64
Total reduction													0,20
Total, real													14

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F84 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (19)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:50 17:09	07:37 17:43	07:02 18:16	07:11 19:50	06:26 20:21	05:58 20:50	05:58 21:01	06:22 20:42	06:52 20:00	07:22 19:10	06:55 17:24	07:30 17:00
2	07:50 17:10	07:36 17:44	07:00 18:17	07:10 19:51	06:25 20:22	05:57 20:51	05:59 21:01	06:23 20:41	06:53 19:58	07:23 19:08	06:56 17:22	07:31 17:00
3	07:50 17:11	07:35 17:45	06:58 18:19	07:08 19:52	06:24 20:23	05:57 20:52	05:59 21:01	06:24 20:40	06:54 19:57	07:24 19:06	06:58 17:21	07:32 16:59
4	07:50 17:11	07:34 17:46	06:57 18:20	07:06 19:53	06:22 20:24	05:56 20:52	06:00 21:01	06:25 20:39	06:55 19:55	07:25 19:05	06:59 17:20	07:33 16:59
5	07:50 17:12	07:33 17:48	06:55 18:21	07:05 19:54	06:21 20:25	05:56 20:53	06:00 21:00	06:26 20:38	06:56 19:53	07:26 19:03	07:00 17:19	07:34 16:59
6	07:50 17:13	07:32 17:49	06:54 18:22	07:03 19:55	06:20 20:26	05:56 20:54	06:01 21:00	06:27 20:37	06:57 19:52	07:27 19:02	07:01 17:18	07:35 16:59
7	07:50 17:14	07:31 17:50	06:52 18:23	07:02 19:56	06:19 20:27	05:56 20:54	06:02 21:00	06:28 20:36	06:58 19:50	07:28 19:00	07:02 17:17	07:36 16:59
8	07:50 17:15	07:30 17:51	06:51 18:24	07:00 19:57	06:18 20:28	05:55 20:55	06:02 21:00	06:29 20:34	06:59 19:48	07:29 18:58	07:03 17:16	07:36 16:59
9	07:50 17:16	07:29 17:53	06:49 18:25	06:58 19:58	06:16 20:29	05:55 20:55	06:03 20:59	06:30 20:33	07:00 19:47	07:30 18:57	07:05 17:15	07:37 16:59
10	07:50 17:17	07:27 17:54	06:47 18:26	06:57 19:59	06:15 20:30	05:55 20:56	06:03 20:59	06:31 20:32	07:01 19:45	07:31 18:55	07:06 17:14	07:38 16:59
11	07:50 17:18	07:26 17:55	06:46 18:28	06:55 20:00	06:14 20:31	05:55 20:57	06:04 20:58	06:32 20:31	07:02 19:43	07:32 18:54	07:07 17:13	07:39 16:59
12	07:49 17:19	07:25 17:56	06:44 18:29	06:54 20:01	06:13 20:32	05:55 20:57	06:05 20:58	06:32 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 16:59
13	07:49 17:20	07:24 17:58	06:43 18:30	06:52 20:02	06:12 20:33	05:54 20:58	06:06 20:57	06:33 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 16:59
14	07:49 17:22	07:23 17:59	06:41 18:31	06:51 20:03	06:11 20:34	05:54 20:58	06:06 20:57	06:34 20:27	07:05 19:38	07:35 18:49	07:10 17:10	07:41 16:59
15	07:48 17:23	07:21 18:00	06:39 18:32	06:49 20:04	06:10 20:35	05:54 20:58	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 16:59
16	07:48 17:24	07:20 18:01	06:38 18:33	06:47 20:05	06:09 20:36	05:54 20:59	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 17:00
17	07:48 17:25	07:19 18:02	06:36 18:34	06:46 20:07	06:08 20:37	05:54 20:59	06:09 20:55	06:37 20:22	07:08 19:33	07:38 18:44	07:14 17:07	07:44 17:00
18	07:47 17:26	07:17 18:04	06:34 18:35	06:44 20:08	06:07 20:38	05:55 21:00	06:09 20:55	06:38 20:21	07:09 19:32	07:39 18:43	07:15 17:07	07:44 17:00
19	07:47 17:27	07:16 18:05	06:33 18:36	06:43 20:09	06:06 20:39	05:55 21:00	06:10 20:54	06:39 20:20	07:10 19:30	07:40 18:41	07:16 17:06	07:45 17:01
20	07:46 17:28	07:15 18:06	06:31 18:37	06:41 20:10	06:06 20:40	05:55 21:00	06:11 20:53	06:40 20:18	07:11 19:28	07:42 18:40	07:17 17:05	07:45 17:01
21	07:45 17:29	07:13 18:07	06:30 18:38	06:40 20:11	06:05 20:41	05:55 21:00	06:12 20:52	06:41 20:17	07:12 19:27	07:43 18:38	07:19 17:05	07:46 17:02
22	07:45 17:31	07:12 18:08	06:28 18:39	06:38 20:12	06:04 20:42	05:55 21:01	06:13 20:52	06:42 20:15	07:13 19:25	07:44 18:37	07:20 17:04	07:46 17:02
23	07:44 17:32	07:10 18:09	06:26 18:40	06:37 20:13	06:03 20:43	05:55 21:01	06:14 20:51	06:43 20:14	07:14 19:23	07:45 18:36	07:21 17:03	07:47 17:03
24	07:43 17:33	07:09 18:11	06:25 18:41	06:36 20:14	06:02 20:44	05:56 21:01	06:15 20:50	06:44 20:12	07:15 19:22	07:46 18:34	07:22 17:03	07:47 17:03
25	07:43 17:34	07:07 18:12	06:23 18:42	06:34 20:15	06:02 20:45	05:56 21:01	06:15 20:49	06:45 20:11	07:16 19:20	07:47 17:33	07:23 17:02	07:48 17:04
26	07:42 17:35	07:06 18:13	06:21 18:44	06:33 20:16	06:01 20:45	05:56 21:01	06:16 20:48	06:46 20:09	07:17 19:18	07:48 17:31	07:24 17:02	07:48 17:04
27	07:41 17:37	07:05 18:14	06:20 18:45	06:31 20:17	06:00 20:46	05:57 21:01	06:17 20:47	06:47 20:08	07:18 19:16	07:49 17:30	07:25 17:01	07:49 17:05
28	07:40 17:38	07:03 18:15	06:18 18:46	06:30 20:18	06:00 20:47	05:57 21:01	06:18 20:46	06:48 20:06	07:19 19:15	07:51 17:29	07:26 17:01	07:49 17:06
29	07:40 17:39		07:16 19:47	06:29 20:19	05:59 20:48	05:57 21:01	06:19 20:45	06:49 20:05	07:20 19:13	07:52 17:27	07:27 17:00	07:49 17:06
30	07:39 17:40		07:15 19:48	06:27 20:20	05:59 20:49	05:58 21:01	06:20 20:44	06:50 20:03	07:21 19:11	07:53 17:26	07:29 17:00	07:49 17:07
31	07:38 17:42		07:13 19:49		05:58 20:49	06:21 20:43	06:21 20:43	06:51 20:01	07:22 17:25	07:54 17:25	07:30 17:08	
Potential sun hours	299	298	370	398	447	451	458	427	375	346	299	289
Total, worst case		95	35							131		
Sun reduction		0,45	0,49							0,57		
Oper. time red.		0,76	0,76							0,76		
Wind dir. red.		0,65	0,65							0,65		
Total reduction		0,22	0,24							0,29		
Total, real		21	8							37		

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F96 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (20)
 Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March		April		May		June			
1	07:50	07:37	07:01		17:19 (W5)	07:11	17:50 (W5)	06:26	19:54 (W2)	05:58		
	17:09	17:43	18:16	19	17:38 (W5)	19:50	64	18:54 (W5)	20:21	4	19:58 (W2)	20:50
2	07:50	07:36	07:00		17:15 (W5)	07:10		17:51 (W5)	06:25		19:53 (W2)	05:57
	17:10	17:44	18:17	28	17:43 (W5)	19:51	62	18:53 (W5)	20:22	6	19:59 (W2)	20:51
3	07:50	07:35	06:58		17:11 (W5)	07:08		17:51 (W5)	06:23		19:53 (W2)	05:57
	17:11	17:45	18:19	35	17:46 (W5)	19:52	60	18:51 (W5)	20:23	7	20:00 (W2)	20:52
4	07:50	07:34	06:57		17:09 (W5)	07:06		17:52 (W5)	06:22		19:52 (W2)	05:56
	17:11	17:46	18:20	39	17:48 (W5)	19:53	59	18:51 (W5)	20:24	10	20:02 (W2)	20:52
5	07:50	07:33	06:55		17:06 (W5)	07:05		17:53 (W5)	06:21		19:51 (W2)	05:56
	17:12	17:48	18:21	44	17:50 (W5)	19:54	56	18:49 (W5)	20:25	11	20:02 (W2)	20:53
6	07:50	07:32	06:54		17:05 (W5)	07:03		17:54 (W5)	06:20		19:51 (W2)	05:56
	17:13	17:49	18:22	47	17:52 (W5)	19:55	54	18:48 (W5)	20:26	12	20:03 (W2)	20:54
7	07:50	07:31	06:52		17:03 (W5)	07:02		17:55 (W5)	06:19		19:51 (W2)	05:55
	17:14	17:50	18:23	50	17:53 (W5)	19:56	52	18:47 (W5)	20:27	13	20:04 (W2)	20:54
8	07:50	07:30	06:51		17:01 (W5)	07:00		17:56 (W5)	06:17		19:51 (W2)	05:55
	17:15	17:51	18:24	53	17:54 (W5)	19:57	49	18:45 (W5)	20:28	14	20:05 (W2)	20:55
9	07:50	07:28	06:49		17:00 (W5)	06:58		17:58 (W5)	06:16		19:52 (W2)	05:55
	17:16	17:53	18:25	56	17:56 (W5)	19:58	45	18:43 (W5)	20:29	14	20:06 (W2)	20:55
10	07:50	07:27	06:47		16:58 (W5)	06:57		17:59 (W5)	06:15		19:52 (W2)	05:55
	17:17	17:54	18:26	58	17:56 (W5)	19:59	42	18:41 (W5)	20:30	15	20:07 (W2)	20:56
11	07:49	07:26	06:46		16:56 (W5)	06:55		18:01 (W5)	06:14		19:53 (W2)	05:55
	17:18	17:55	18:27	61	17:57 (W5)	20:00	38	18:39 (W5)	20:31	15	20:08 (W2)	20:56
12	07:49	07:25	06:44		16:56 (W5)	06:54		18:03 (W5)	06:13		19:53 (W2)	05:55
	17:19	17:56	18:29	62	17:58 (W5)	20:01	33	18:36 (W5)	20:32	16	20:09 (W2)	20:57
13	07:49	07:24	06:43		16:54 (W5)	06:52		18:05 (W5)	06:12		19:54 (W2)	05:54
	17:20	17:57	18:30	64	17:58 (W5)	20:02	28	18:33 (W5)	20:33	15	20:09 (W2)	20:57
14	07:49	07:22	06:41		16:54 (W5)	06:50		18:08 (W5)	06:11		19:55 (W2)	05:54
	17:21	17:59	18:31	65	17:59 (W5)	20:03	22	18:30 (W5)	20:34	13	20:08 (W2)	20:58
15	07:48	07:21	06:39		16:53 (W5)	06:49		18:13 (W5)	06:10		19:57 (W2)	05:54
	17:23	18:00	18:32	67	18:00 (W5)	20:04	11	18:24 (W5)	20:35	9	20:06 (W2)	20:58
16	07:48	07:20	06:38		16:52 (W5)	06:47			06:09		20:00 (W2)	05:54
	17:24	18:01	18:33	67	17:59 (W5)	20:05			20:36	3	20:03 (W2)	20:59
17	07:47	07:19	06:36		16:52 (W5)	06:46			06:08			05:54
	17:25	18:02	18:34	68	18:00 (W5)	20:06			20:37			20:59
18	07:47	07:17	06:34		16:51 (W5)	06:44			06:07			05:54
	17:26	18:03	18:35	69	18:00 (W5)	20:07			20:38			20:59
19	07:46	07:16	06:33		16:50 (W5)	06:43			06:06			05:55
	17:27	18:05	18:36	70	18:00 (W5)	20:09			20:39			21:00
20	07:46	07:15	06:31		16:50 (W5)	06:41			06:06			05:55
	17:28	18:06	18:37	70	18:00 (W5)	20:10			20:40			21:00
21	07:45	07:13	06:29		16:49 (W5)	06:40			06:05			05:55
	17:29	18:07	18:38	71	18:00 (W5)	20:11			20:41			21:00
22	07:45	07:12	06:28		16:49 (W5)	06:38			06:04			05:55
	17:31	18:08	18:39	70	17:59 (W5)	20:12			20:42			21:00
23	07:44	07:10	06:26		16:49 (W5)	06:37			06:03			05:55
	17:32	18:09	18:40	71	18:00 (W5)	20:13			20:43			21:01
24	07:43	07:09	06:24		16:49 (W5)	06:36			06:02			05:56
	17:33	18:11	18:41	70	17:59 (W5)	20:14			20:44			21:01
25	07:43	07:07	06:23		16:48 (W5)	06:34			06:02			05:56
	17:34	18:12	18:42	70	17:58 (W5)	20:15			20:44			21:01
26	07:42	07:06	06:21		16:49 (W5)	06:33			06:01			05:56
	17:35	18:13	18:43	70	17:59 (W5)	20:16			20:45			21:01
27	07:41	07:04	06:20		16:49 (W5)	06:31			06:00			05:57
	17:37	18:14	18:45	69	17:58 (W5)	20:17			20:46			21:01
28	07:40	07:03	06:18		16:48 (W5)	06:30			06:00			05:57
	17:38	18:15	18:46	69	17:57 (W5)	20:18			20:47			21:01
29	07:40		07:16		17:49 (W5)	06:29			05:59			05:57
	17:39		19:47	68	18:57 (W5)	20:19			20:48			21:01
30	07:39		07:15		17:49 (W5)	06:27		19:55 (W2)	05:59			05:58
	17:40		19:48	67	18:56 (W5)	20:20	2	19:57 (W2)	20:49			21:01
31	07:38		07:13		17:49 (W5)				05:58			
	17:41		19:49	65	18:54 (W5)				20:49			
Potential sun hours	299	298	370		398			447				451
Total, worst case				1852		677			177			
Sun reduction				0,49		0,52			0,57			
Oper. time red.				0,76		0,76			0,76			
Wind dir. red.				0,72		0,72			0,66			
Total reduction				0,27		0,29			0,29			
Total, real				497		195			51			

Table 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)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar

Calculation: Progetto_real case_max minutes per shadow dayShadow receptor: F96 - Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (20)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

July		August		September		October		November		December	
1	05:58	06:22	20:04 (W2)	06:52	18:00 (W5)	07:21	17:34 (W5)	06:55	07:30		
	21:01	20:42	15	20:19 (W2)	20:00	38	18:38 (W5)	19:10	63	18:37 (W5)	17:24
2	05:59	06:23	20:03 (W2)	06:53	17:58 (W5)	07:22	17:34 (W5)	06:56	07:31		
	21:01	20:41	15	20:18 (W2)	19:58	42	18:40 (W5)	19:08	62	18:36 (W5)	17:22
3	05:59	06:24	20:03 (W2)	06:54	17:56 (W5)	07:24	17:35 (W5)	06:57	07:32		
	21:01	20:40	14	20:17 (W2)	19:57	45	18:41 (W5)	19:06	59	18:34 (W5)	17:21
4	06:00	06:25	20:01 (W2)	06:55	17:53 (W5)	07:25	17:36 (W5)	06:59	07:33		
	21:01	20:39	14	20:15 (W2)	19:55	49	18:42 (W5)	19:05	57	18:33 (W5)	17:20
5	06:00	06:26	20:01 (W2)	06:56	17:51 (W5)	07:26	17:37 (W5)	07:00	07:34		
	21:00	20:38	13	20:14 (W2)	19:53	52	18:43 (W5)	19:03	54	18:31 (W5)	17:19
6	06:01	06:27	20:01 (W2)	06:57	17:49 (W5)	07:27	17:39 (W5)	07:01	07:34		
	21:00	20:37	12	20:13 (W2)	19:52	54	18:43 (W5)	19:02	52	18:31 (W5)	17:18
7	06:01	06:28	20:01 (W2)	06:58	17:48 (W5)	07:28	17:40 (W5)	07:02	07:35		
	21:00	20:35	11	20:12 (W2)	19:50	56	18:44 (W5)	19:00	49	18:29 (W5)	17:17
8	06:02	06:29	20:01 (W2)	06:59	17:46 (W5)	07:29	17:41 (W5)	07:03	07:36		
	20:59	20:34	10	20:11 (W2)	19:48	59	18:45 (W5)	18:58	46	18:27 (W5)	17:16
9	06:03	06:30	20:01 (W2)	07:00	17:45 (W5)	07:30	17:43 (W5)	07:05	07:37		
	20:59	20:33	9	20:10 (W2)	19:47	60	18:45 (W5)	18:57	41	18:24 (W5)	17:15
10	06:03	06:30	20:02 (W2)	07:01	17:44 (W5)	07:31	17:45 (W5)	07:06	07:38		
	20:59	20:32	7	20:09 (W2)	19:45	62	18:46 (W5)	18:55	37	18:22 (W5)	17:14
11	06:04	06:31	20:02 (W2)	07:02	17:43 (W5)	07:32	17:47 (W5)	07:07	07:39		
	20:58	20:31	6	20:08 (W2)	19:43	63	18:46 (W5)	18:54	32	18:19 (W5)	17:13
12	06:05	06:32	20:03 (W2)	07:03	17:42 (W5)	07:33	17:50 (W5)	07:08	07:40		
	20:58	20:29	3	20:06 (W2)	19:42	65	18:47 (W5)	18:52	25	18:15 (W5)	17:12
13	06:06	06:33	07:04	19:40	66	18:47 (W5)	18:50	13	18:09 (W5)	17:11	16:59
	20:57	20:28	07:05	19:40	66	18:47 (W5)	18:50	13	18:09 (W5)	17:11	16:59
14	06:06	06:34	07:05	19:40	66	18:47 (W5)	18:50	13	18:09 (W5)	17:11	16:59
	20:57	20:27	19:38	67	18:47 (W5)	18:49	17:10	16:59			
15	06:07	06:35	07:06	17:39 (W5)	07:36	68	18:47 (W5)	18:47	17:09	16:59	
	20:56	20:25	19:37	68	18:47 (W5)	18:47	17:09	16:59			
16	06:08	06:36	07:07	17:38 (W5)	07:37	69	18:47 (W5)	18:46	17:08	17:00	
	20:56	20:24	19:35	69	18:47 (W5)	18:46	17:08	17:00			
17	06:09	06:37	07:08	17:37 (W5)	07:38	70	18:47 (W5)	18:44	17:07	17:00	
	20:55	20:22	19:33	70	18:47 (W5)	18:44	17:07	17:00			
18	06:09	06:38	07:09	17:37 (W5)	07:39	70	18:47 (W5)	18:43	17:07	17:00	
	20:54	20:21	19:32	70	18:47 (W5)	18:43	17:07	17:00			
19	06:10	06:39	07:10	17:36 (W5)	07:40	70	18:46 (W5)	18:41	17:06	17:01	
	20:54	20:20	19:30	70	18:46 (W5)	18:41	17:06	17:01			
20	06:11	06:40	07:11	17:36 (W5)	07:41	70	18:46 (W5)	18:40	17:05	17:01	
	20:53	20:18	19:28	70	18:46 (W5)	18:40	17:05	17:01			
21	06:12	06:41	07:12	17:34 (W5)	07:43	71	18:45 (W5)	18:38	17:04	17:02	
	20:52	20:17	19:27	71	18:45 (W5)	18:38	17:04	17:02			
22	06:13	06:42	07:12	17:34 (W5)	07:44	70	18:44 (W5)	18:37	17:04	17:02	
	20:52	20:15	19:25	70	18:44 (W5)	18:37	17:04	17:02			
23	06:14	06:43	07:13	17:33 (W5)	07:45	71	18:44 (W5)	18:36	17:03	17:03	
	20:51	20:14	19:23	71	18:44 (W5)	18:36	17:03	17:03			
24	06:14	06:44	07:14	17:33 (W5)	07:46	70	18:43 (W5)	18:34	17:03	17:03	
	20:50	20:12	19:21	70	18:43 (W5)	18:34	17:03	17:03			
25	06:15	06:45	07:15	17:33 (W5)	06:47	70	18:43 (W5)	17:33	17:02	17:04	
	20:49	20:11	19:20	70	18:43 (W5)	17:33	17:02	17:04			
26	06:16	06:46	07:16	17:33 (W5)	06:48	69	18:42 (W5)	17:31	17:02	17:04	
	20:48	20:09	19:18	69	18:42 (W5)	17:31	17:02	17:04			
27	06:17	06:47	07:17	17:33 (W5)	06:49	68	18:41 (W5)	17:30	17:01	17:05	
	20:47	20:08	19:16	68	18:41 (W5)	17:30	17:01	17:05			
28	06:18	20:09 (W2)	06:48	18:15 (W5)	07:18	67	18:40 (W5)	17:29	17:01	17:06	
	20:46	6	20:15 (W2)	20:06	11	18:26 (W5)	19:15	67	18:40 (W5)	17:29	
29	06:19	20:07 (W2)	06:49	18:09 (W5)	07:19	66	18:39 (W5)	17:27	17:00	17:06	
	20:45	10	20:17 (W2)	20:04	22	18:31 (W5)	19:13	66	18:39 (W5)	17:27	
30	06:20	20:05 (W2)	06:50	18:05 (W5)	07:20	64	18:38 (W5)	17:26	17:00	17:07	
	20:44	14	20:19 (W2)	20:03	29	18:34 (W5)	19:11	64	18:38 (W5)	17:26	
31	06:21	20:04 (W2)	06:51	18:02 (W5)			06:54			07:50	
	20:43	16	20:20 (W2)	20:01	35	18:37 (W5)	17:25			17:08	
Potential sun hours	458		427		375		346		299	289	
Total, worst case	46		226		1881		590				
Sun reduction	0,74		0,72		0,65		0,57				
Oper. time red.	0,76		0,76		0,76		0,76				
Wind dir. red.	0,66		0,68		0,72		0,72				
Total reduction	0,37		0,38		0,36		0,32				
Total, real	17		85		677		187				

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)

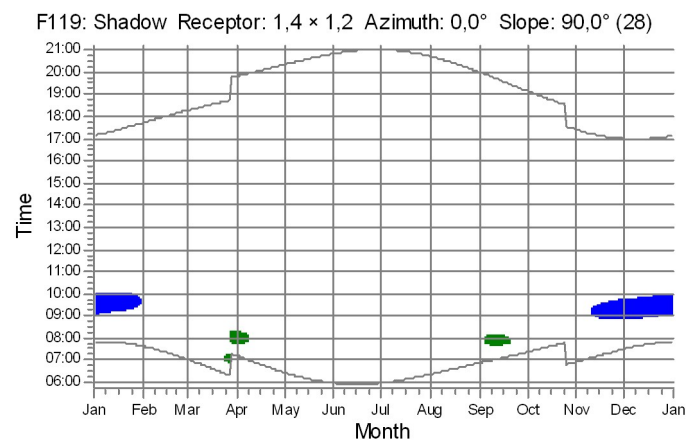
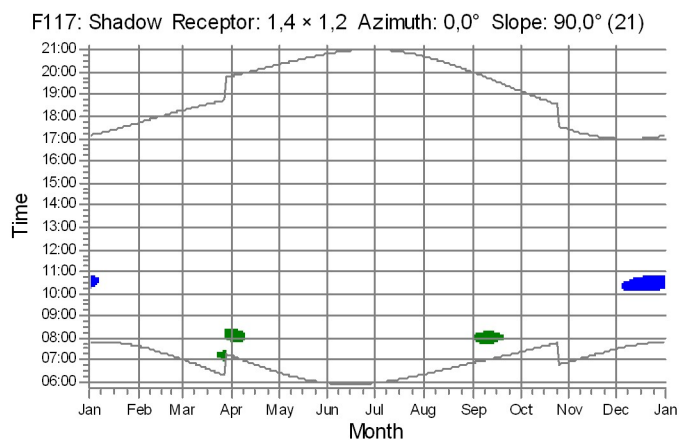
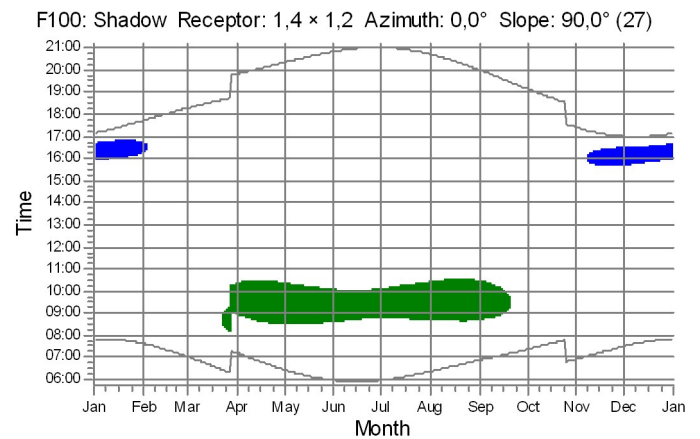
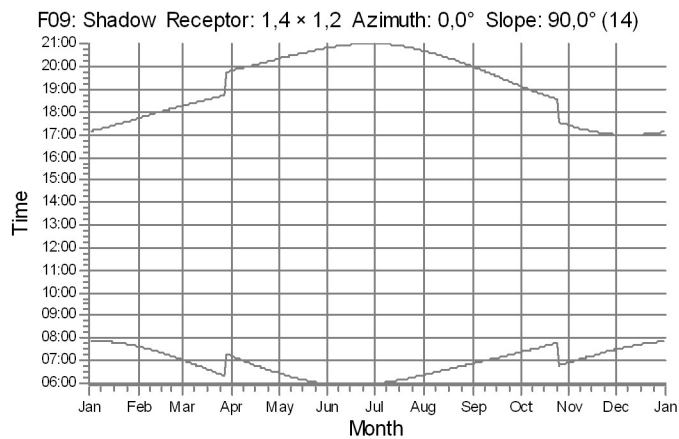
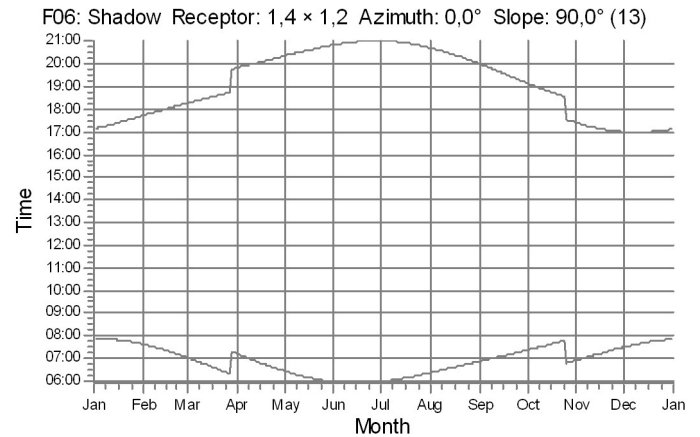
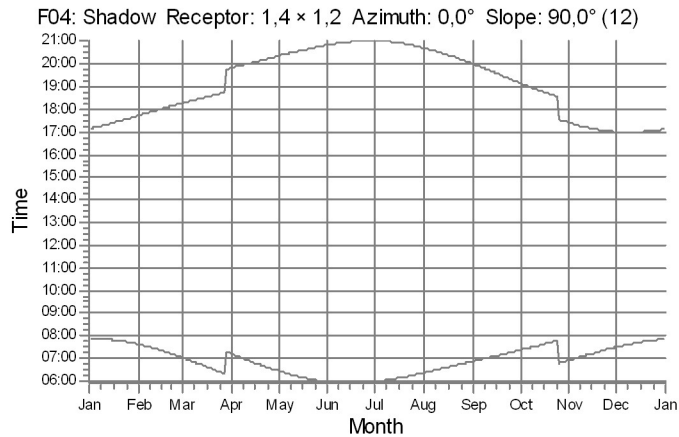
SCENARIO "REAL CASE"

Project:
Layout_GRVDEP_Ossi

Licensed user:
I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar, graphical

Calculation: Progetto_real case_max minutes per shadow day



WTGs



W4: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)

W3: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

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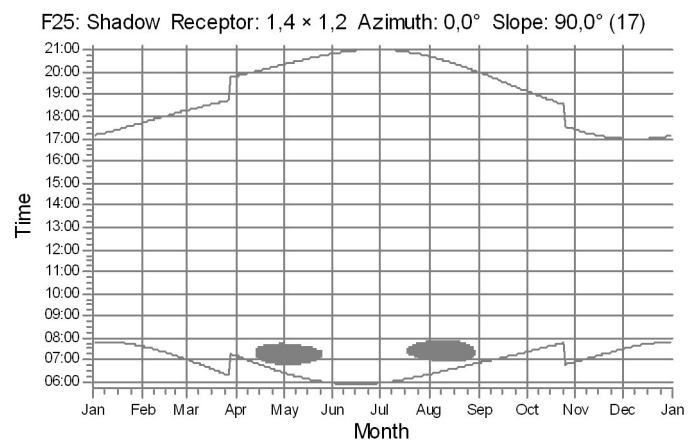
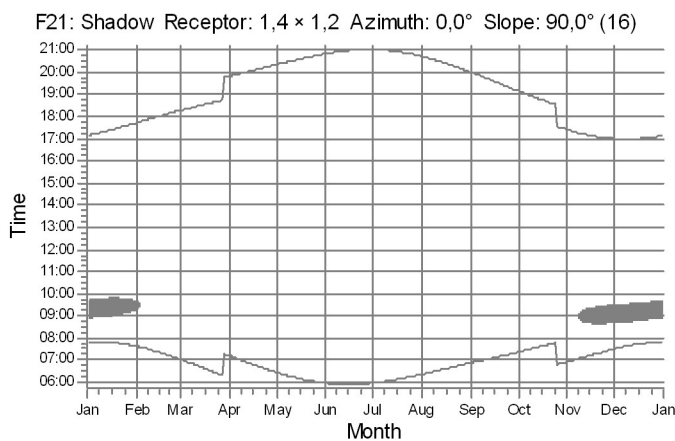
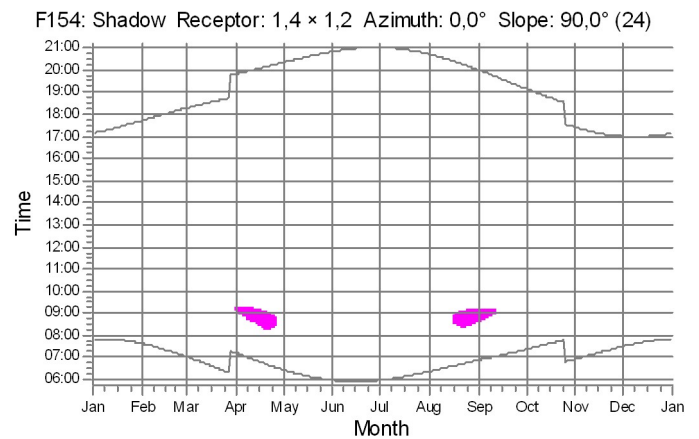
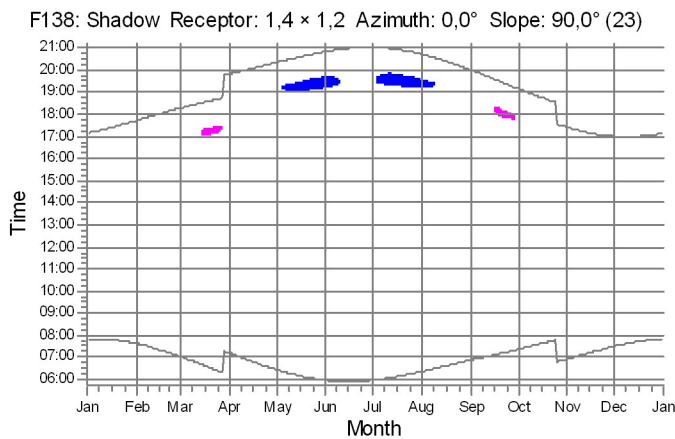
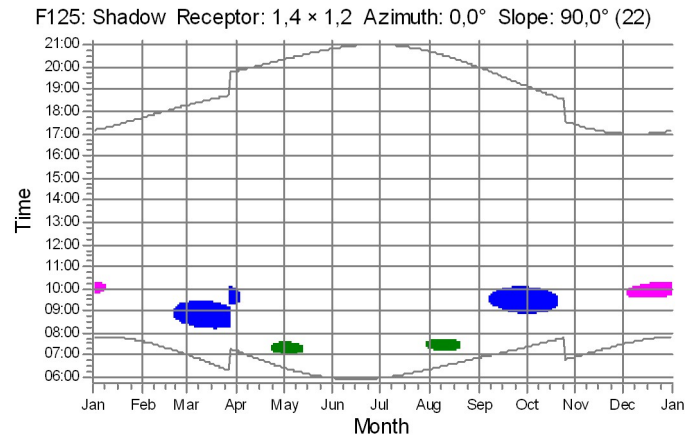
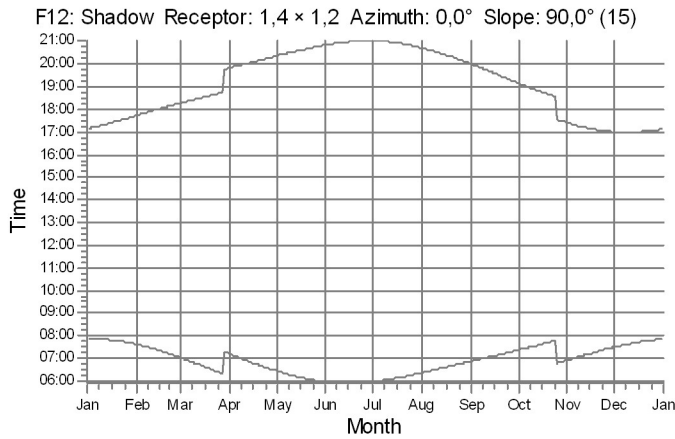
Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar, graphical

Calculation: Progetto_real case_max minutes per shadow day



WTGs



W4: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)

W3: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)

W2: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)

W1: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

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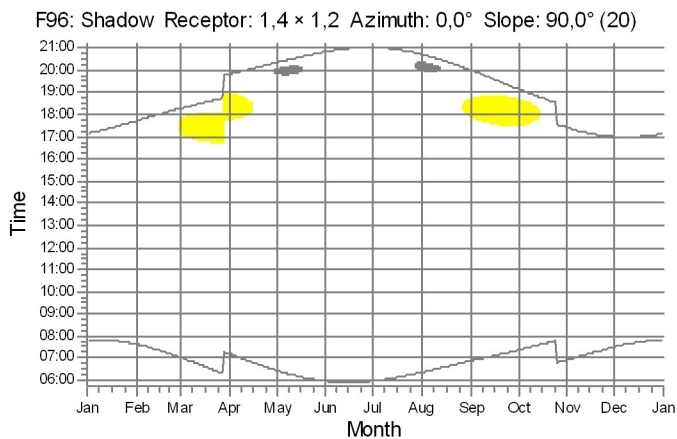
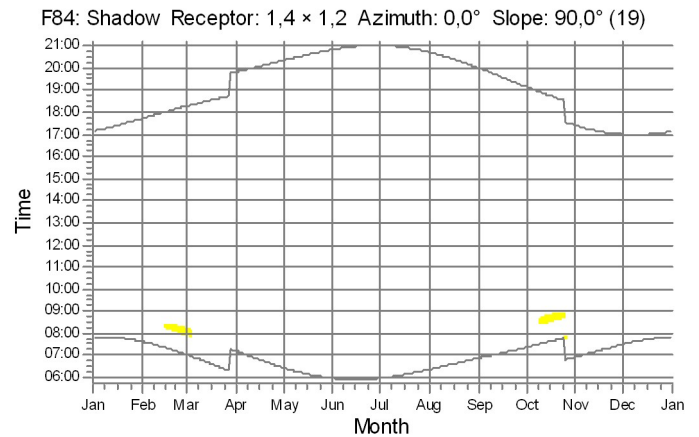
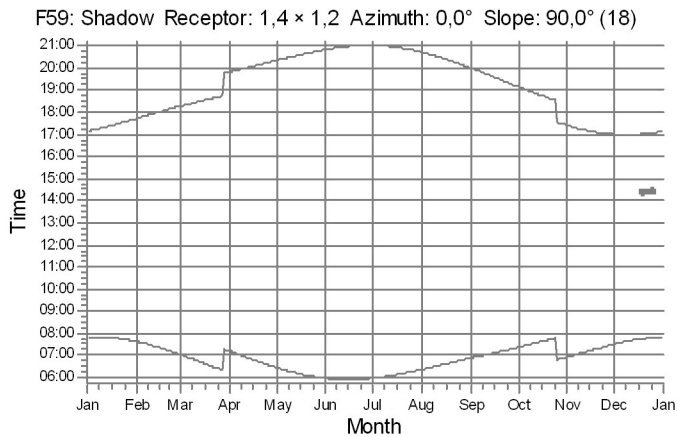
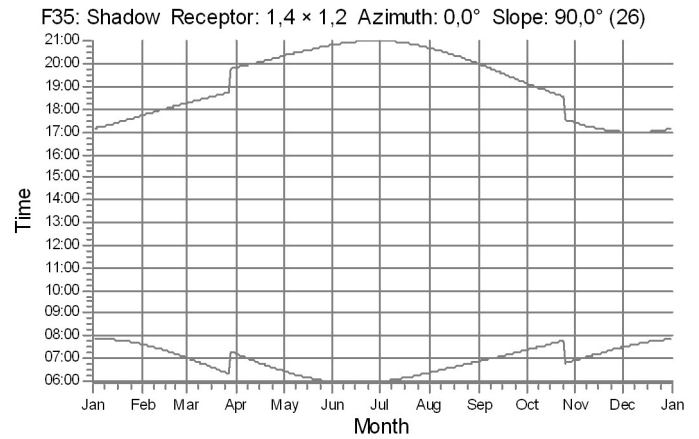
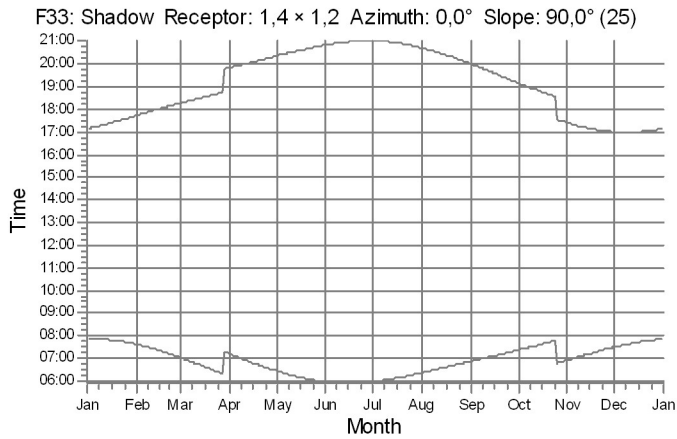
Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar, graphical

Calculation: Progetto_real case_max minutes per shadow day



WTGs



W5: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)

W2: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

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+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W1 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)
 Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June
1	07:50 09:50-10:14/24 17:09	07:37 17:43 18:16	07:01 18:16	07:11 09:10-09:12/2 19:50	06:26 20:21 20:50	05:58 20:50
2	07:50 09:51-10:14/23 17:10	07:36 17:44 18:18	07:00 18:18	07:10 09:08-09:12/4 19:51	06:25 20:22 20:51	05:57 20:51
3	07:50 09:52-10:13/21 17:11	07:35 17:45 18:19	06:58 18:19	07:08 09:05-09:12/7 19:52	06:24 20:23 20:52	05:57 20:52
4	07:50 09:53-10:13/20 17:12	07:34 17:47 18:20	06:57 18:20	07:06 09:03-09:12/9 19:53	06:22 20:24 20:52	05:57 20:52
5	07:50 09:55-10:12/17 17:12	07:33 17:48 18:21	06:55 18:21	07:05 09:00-09:12/12 19:54	06:21 20:25 20:53	05:56 20:53
6	07:50 09:56-10:12/16 17:13	07:32 17:49 18:22	06:54 18:22	07:03 08:57-09:12/15 19:55	06:20 20:26 20:54	05:56 20:54
7	07:50 09:59-10:10/11 17:14	07:31 17:50 18:23	06:52 18:23	07:02 08:54-09:11/17 19:56	06:19 20:27 20:54	05:56 20:54
8	07:50 10:02-10:08/6 17:15	07:30 17:51 18:24	06:51 18:24	07:00 08:50-09:10/20 19:57	06:18 20:28 20:55	05:55 20:55
9	07:50 17:16 17:16	07:29 17:53 18:25	06:49 18:25	06:58 08:47-09:10/23 19:58	06:16 20:29 20:55	05:55 20:55
10	07:50 17:17 17:17	07:27 17:54 18:26	06:47 18:26	06:57 08:44-09:09/25 19:59	06:15 20:30 20:56	05:55 20:56
11	07:49 17:18 17:18	07:26 17:55 18:28	06:46 18:28	06:55 08:42-09:09/27 20:00	06:14 20:31 20:56	05:55 20:56
12	07:49 17:19 17:19	07:25 17:56 18:29	06:44 18:29	06:54 08:40-09:08/28 20:01	06:13 20:32 20:57	05:55 20:57
13	07:49 17:20 17:20	07:24 17:58 18:30	06:43 18:30	06:52 08:38-09:07/29 20:02	06:12 20:33 20:57	05:55 20:57
14	07:49 17:22 17:22	07:22 17:59 18:31	06:41 18:31	06:51 08:35-09:06/31 20:03	06:11 20:34 20:58	05:54 20:58
15	07:48 17:23 17:23	07:21 18:00 18:32	06:39 17:11-17:12/1 18:32	06:49 08:34-09:06/32 20:04	06:10 20:35 20:58	05:54 20:58
16	07:48 17:24 17:24	07:20 18:01 18:33	06:38 17:10-17:14/4 18:33	06:47 08:31-09:04/33 20:05	06:09 20:36 20:59	05:54 20:59
17	07:47 17:25 17:25	07:19 18:02 18:34	06:36 17:11-17:16/5 18:34	06:46 08:29-09:03/34 20:06	06:08 20:37 20:59	05:55 20:59
18	07:47 17:26 17:26	07:17 18:04 18:35	06:34 17:10-17:16/6 18:35	06:44 08:27-09:01/34 20:08	06:07 20:38 20:59	05:55 20:59
19	07:46 17:27 17:27	07:16 18:05 18:36	06:33 17:10-17:17/7 18:36	06:43 08:25-09:00/35 20:09	06:06 20:39 21:00	05:55 21:00
20	07:46 17:28 17:28	07:15 18:06 18:37	06:31 17:11-17:19/8 18:37	06:41 08:22-08:58/36 20:10	06:06 20:40 21:00	05:55 21:00
21	07:45 17:30 17:30	07:13 18:07 18:38	06:29 17:12-17:19/7 18:38	06:40 08:21-08:57/36 20:11	06:05 20:41 21:00	05:55 21:00
22	07:45 17:31 17:31	07:12 18:08 18:39	06:28 17:12-17:20/8 18:39	06:39 08:22-08:55/33 20:12	06:04 20:42 21:00	05:55 21:00
23	07:44 17:32 17:32	07:10 18:09 18:40	06:26 17:14-17:23/9 18:40	06:37 08:24-08:53/29 20:13	06:03 20:43 21:01	05:55 21:01
24	07:43 17:33 17:33	07:09 18:11 18:41	06:25 17:15-17:24/9 18:41	06:36 08:25-08:50/25 20:14	06:02 20:44 21:01	05:56 21:01
25	07:43 17:34 17:34	07:07 18:12 18:42	06:23 17:17-17:24/7 18:42	06:34 08:28-08:47/19 20:15	06:02 20:44 21:01	05:56 21:01
26	07:42 17:35 17:35	07:06 18:13 18:44	06:21 17:21-17:26/5 18:44	06:33 08:31-08:44/13 20:16	06:01 20:45 21:01	05:56 21:01
27	07:41 17:37 17:37	07:04 18:14 18:45	06:20 18:45	06:31 20:17	06:00 20:46 21:01	05:57 21:01
28	07:40 17:38 17:38	07:03 18:15 18:46	06:18 18:46	06:30 20:18	06:00 20:47 21:01	05:57 21:01
29	07:40 17:39 17:39	07:02 18:16 18:47	06:17 18:47	06:29 20:19	05:59 20:48 21:01	05:57 21:01
30	07:39 17:40 17:40	07:01 18:17 18:48	06:16 18:48	06:28 20:20	05:59 20:49 21:01	05:58 21:01
31	07:38 17:42 17:42	07:00 18:18 18:49	06:15 18:49	06:27 20:21	05:58 20:50 21:01	05:58 21:01
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	138	0	76	608	0	0

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W1 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	06:52 20:00	08:41-09:08/27 19:10	07:22 17:24	06:55 17:00
2	05:59 21:01	06:23 20:41	06:53 19:58	08:43-09:08/25 19:08	07:23 17:23	06:56 17:00
3	05:59 21:01	06:24 20:40	06:54 19:57	08:45-09:08/23 19:06	07:24 17:21	06:57 16:59
4	06:00 21:01	06:25 20:39	06:55 19:55	08:48-09:08/20 19:05	07:25 17:20	06:59 16:59
5	06:00 21:00	06:26 20:38	06:56 19:53	08:51-09:08/17 19:03	07:26 17:19	07:34 16:59
6	06:01 21:00	06:27 20:37	06:57 19:52	08:52-09:07/15 19:02	07:27 17:18	07:35 16:59
7	06:02 21:00	06:28 20:36	06:58 19:50	08:55-09:07/12 19:00	07:28 17:17	07:35 16:59
8	06:02 20:59	06:29 20:34	06:59 19:48	08:57-09:06/9 18:58	07:29 17:16	07:36 16:59
9	06:03 20:59	06:30 20:33	07:00 19:47	08:59-09:06/7 18:57	07:30 17:15	07:37 16:59
10	06:04 20:59	06:31 20:32	07:01 19:45	09:01-09:05/4 18:55	07:31 17:14	07:38 16:59
11	06:04 20:58	06:32 20:31	07:02 19:43	09:02-09:04/2 18:54	07:32 17:13	07:39 16:59
12	06:05 20:58	06:33 20:29	07:03 19:42	07:33 18:52	07:08 17:12	07:40 16:59
13	06:06 20:57	06:34 20:28	07:04 19:40	07:34 18:50	07:09 17:11	07:41 16:59
14	06:06 20:57	06:34 20:27	07:05 19:38	07:35 18:49	07:10 17:10	07:41 16:59
15	06:07 20:56	06:35 20:25	07:06 19:37	07:36 18:47	07:12 17:09	07:42 17:00
16	06:08 20:56	06:36 20:24	07:07 19:35	07:37 18:46	07:13 17:08	07:43 17:00
17	06:09 20:55	06:37 20:22	07:08 19:33	08:37-08:51/14 18:44	07:14 17:07	07:43 17:00
18	06:09 20:54	06:38 20:21	07:09 19:32	18:05-18:13/8 18:43	07:15 17:07	07:44 17:00
19	06:10 20:54	06:39 20:20	07:10 19:30	18:03-18:11/8 18:41	07:16 17:06	07:45 17:01
20	06:11 20:53	06:40 20:18	07:11 19:28	18:00-18:09/9 18:40	07:17 17:05	07:45 17:01
21	06:12 20:52	06:41 20:17	07:12 19:27	17:58-18:06/8 18:40	07:19 17:05	07:46 17:02
22	06:13 20:52	06:42 20:15	07:13 19:25	17:56-18:04/8 18:37	07:20 17:04	07:46 17:02
23	06:14 20:51	06:43 20:14	07:14 19:23	17:55-18:03/8 18:36	07:21 17:03	07:47 17:03
24	06:15 20:50	06:44 20:12	07:15 19:22	17:54-18:01/7 18:34	07:22 17:03	07:47 17:03
25	06:15 20:49	06:45 20:11	07:16 19:20	17:53-17:59/6 18:33	07:23 17:02	07:48 17:04
26	06:16 20:48	06:46 20:09	07:17 19:18	17:52-17:58/6 18:32	07:24 17:02	07:48 17:04
27	06:17 20:47	06:47 20:08	07:18 19:16	17:52-17:56/4 18:31	07:25 17:01	07:49 17:05
28	06:18 20:46	06:48 20:06	07:19 19:15	17:51-17:54/3 18:30	07:26 17:01	07:49 17:06
29	06:19 20:45	06:49 20:05	07:20 19:13	08:36-09:07/31 18:29	07:27 17:00	07:49 17:06
30	06:20 20:44	06:50 20:03	07:21 19:11	08:38-09:07/29 18:28	07:29 17:00	07:49 17:07
31	06:21 20:43	06:51 20:01	08:40-09:08/28 18:27	07:30 17:00	07:30 17:00	07:50 17:08
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	0	453	241	0	0	703

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W2 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)
 Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
160	379	487	423	372	261	434	671	794	1.104	1.108	478	6.671

	January		February		March	April	May		June	
1	07:50	08:58-09:39/41	07:37	09:20-09:35/15	07:02	07:11	06:26	19:54-19:58/4	05:58	
	17:09		17:43		18:16	19:50	20:21	06:52-07:40/48	20:50	
2	07:50	08:58-09:39/41	07:36	09:26-09:30/4	07:00	07:10	06:25	19:53-19:59/6	05:57	
	17:10		17:44		18:18	19:51	20:22	06:52-07:40/48	20:51	
3	07:50	08:58-09:40/42	07:35		06:58	07:08	06:24	19:53-20:00/7	05:57	
	17:11		17:45		18:19	19:52	20:23	06:52-07:40/48	20:52	
4	07:50	08:59-09:40/41	07:34		06:57	07:06	06:22	19:52-20:02/10	05:56	
	17:11		17:46		18:20	19:53	20:24	06:53-07:40/47	20:52	
5	07:50	08:59-09:41/42	07:33		06:55	07:05	06:21	19:51-20:02/11	05:56	
	17:12		17:48		18:21	19:54	20:25	06:53-07:40/47	20:53	
6	07:50	09:00-09:42/42	07:32		06:54	07:03	06:20	19:51-20:03/12	05:56	
	17:13		17:49		18:22	19:55	20:26	06:52-07:38/46	20:54	
7	07:50	09:00-09:42/42	07:31		06:52	07:02	06:19	19:51-20:04/13	05:56	
	17:14		17:50		18:23	19:56	20:27	06:52-07:38/46	20:54	
8	07:50	09:01-09:43/42	07:30		06:51	07:00	06:18	19:51-20:05/14	05:55	
	17:15		17:51		18:24	19:57	20:28	06:53-07:38/45	20:55	
9	07:50	09:01-09:44/43	07:29		06:49	06:58	06:16	19:52-20:06/14	05:55	
	17:16		17:53		18:25	19:58	20:29	06:53-07:37/44	20:56	
10	07:50	09:01-09:43/42	07:27		06:47	06:57	06:15	19:52-20:07/15	05:55	
	17:17		17:54		18:26	19:59	20:30	06:54-07:37/43	20:56	
11	07:50	09:01-09:44/43	07:26		06:46	06:55	06:14	19:53-20:08/15	05:55	
	17:18		17:55		18:28	20:00	20:31	06:54-07:36/42	20:57	
12	07:49	09:02-09:45/43	07:25		06:44	06:54	06:13	19:53-20:09/16	05:55	
	17:19		17:56		18:29	20:01	20:32	06:55-07:35/40	20:57	
13	07:49	09:02-09:44/42	07:24		06:43	06:52	06:12	19:54-20:09/15	05:54	
	17:20		17:58		18:30	20:02	20:33	06:55-07:35/40	20:58	
14	07:49	09:03-09:45/42	07:23		06:41	06:51	06:11	19:55-20:08/13	05:54	
	17:22		17:59		18:31	20:03	20:34	06:56-07:34/38	20:58	
15	07:48	09:04-09:46/42	07:21		06:39	06:49	06:10	19:57-20:06/9	05:54	
	17:23		18:00		18:32	20:04	20:35	06:57-07:33/36	20:58	
16	07:48	09:03-09:45/42	07:20		06:38	06:47	06:09	20:00-20:03/3	05:54	
	17:24		18:01		18:33	20:05	20:36	06:57-07:32/35	20:59	
17	07:48	09:04-09:46/42	07:19		06:36	06:46	06:08	06:58-07:31/33	05:54	
	17:25		18:02		18:34	20:07	20:37		20:59	
18	07:47	09:05-09:46/41	07:17		06:34	06:44	06:07	07:00-07:31/31	05:55	
	17:26		18:04		18:35	20:08	20:38		21:00	
19	07:47	09:05-09:45/40	07:16		06:33	06:43	06:06	07:01-07:29/28	05:55	
	17:27		18:05		18:36	20:09	20:39		21:00	
20	07:46	09:06-09:46/40	07:15		06:31	06:41	06:06	07:02-07:28/26	05:55	
	17:28		18:06		18:37	20:10	20:40		21:00	
21	07:45	09:06-09:45/39	07:13		06:30	06:40	06:05	07:03-07:26/23	05:55	
	17:29		18:07		18:38	20:11	20:41		21:00	
22	07:45	09:06-09:45/39	07:12		06:28	06:38	06:04	07:06-07:25/19	05:55	
	17:31		18:08		18:39	20:12	20:42		21:01	
23	07:44	09:08-09:45/37	07:10		06:26	06:37	06:03	07:07-07:23/16	05:55	
	17:32		18:09		18:40	20:13	20:43		21:01	
24	07:44	09:09-09:45/36	07:09		06:25	06:36	06:02	07:10-07:20/10	05:56	
	17:33		18:11		18:41	20:14	20:44		21:01	
25	07:43	09:09-09:44/35	07:07		06:23	06:34	06:02		05:56	
	17:34		18:12		18:43	20:15	20:45		21:01	
26	07:42	09:10-09:43/33	07:06		06:21	06:33	06:01		05:56	
	17:35		18:13		18:44	20:16	20:45		21:01	
27	07:41	09:12-09:43/31	07:05		06:20	06:31	06:00		05:57	
	17:37		18:14		18:45	20:17	20:46		21:01	
28	07:40	09:13-09:42/29	07:03		06:18	06:30	06:00		05:57	
	17:38		18:15		18:46	20:18	20:47		21:01	
29	07:40	09:14-09:41/27			07:16	06:29	05:59		05:57	
	17:39				19:47	20:19	20:48		21:01	
30	07:39	09:16-09:39/23			07:15	06:27	05:59		05:58	
	17:40				19:48	20:20	20:49		21:01	
31	07:38	09:18-09:38/20			07:13		05:58			
	17:42				19:49		20:49			
Potential sun hours	298		298		370	398	447		451	
Sum of minutes with flicker	1184		19		0	626	1056		0	

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W2 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:04-20:19/15 20:42 07:05-07:46/41	06:52 20:00	07:22 19:10	06:55 17:24	07:30 08:43-09:26/43 17:00
2	05:59 21:01	06:23 20:03-20:18/15 20:41 07:05-07:47/42	06:53 19:58	07:23 19:08	06:56 17:23	07:31 08:44-09:26/42 17:00
3	05:59 21:01	06:24 20:03-20:17/14 20:40 07:04-07:48/44	06:54 19:57	07:24 19:07	06:58 17:21	07:32 08:44-09:27/43 16:59
4	06:00 21:01	06:25 20:01-20:15/14 20:39 07:04-07:48/44	06:55 19:55	07:25 19:05	06:59 17:20	07:33 08:45-09:27/42 16:59
5	06:00 21:00	06:26 20:01-20:14/13 20:38 07:03-07:48/45	06:56 19:53	07:26 19:03	07:00 17:19	07:34 08:45-09:27/42 16:59
6	06:01 21:00	06:27 20:01-20:13/12 20:37 07:02-07:48/46	06:57 19:52	07:27 19:02	07:01 17:18	07:35 08:46-09:28/42 16:59
7	06:02 21:00	06:28 20:01-20:12/11 20:36 07:02-07:48/46	06:58 19:50	07:28 19:00	07:02 17:17	07:36 08:46-09:28/42 16:59
8	06:02 21:00	06:29 20:01-20:11/10 20:34 07:01-07:48/47	06:59 19:48	07:29 18:58	07:03 17:16	07:36 08:47-09:29/42 16:59
9	06:03 20:59	06:30 20:01-20:10/9 20:33 07:01-07:49/48	07:00 19:47	07:30 18:57	07:05 08:56-09:02/6 17:15	07:37 08:47-09:29/42 16:59
10	06:03 20:59	06:31 20:02-20:09/7 20:32 07:01-07:49/48	07:01 19:45	07:31 18:55	07:06 08:51-09:06/15 17:14	07:38 08:48-09:29/41 16:59
11	06:04 20:58	06:32 20:02-20:08/6 20:31 07:01-07:49/48	07:02 19:43	07:32 18:54	07:07 08:49-09:09/20 17:13	07:39 08:49-09:30/41 16:59
12	06:05 20:58	06:33 20:03-20:06/3 20:29 07:01-07:49/48	07:03 19:42	07:33 18:52	07:08 08:47-09:10/23 17:12	07:40 08:48-09:30/42 16:59
13	06:06 20:57	06:33 07:01-07:48/47 20:28	07:04 19:40	07:34 18:50	07:09 08:46-09:13/27 17:11	07:41 08:49-09:30/41 16:59
14	06:06 20:57	06:34 07:01-07:48/47 20:27	07:05 19:38	07:35 18:49	07:10 08:45-09:14/29 17:10	07:41 08:50-09:31/41 16:59
15	06:07 20:56	06:35 07:01-07:48/47 20:25	07:06 19:37	07:36 18:47	07:12 08:44-09:15/31 17:09	07:42 08:51-09:31/40 16:59
16	06:08 20:56	06:36 07:01-07:47/46 20:24	07:07 19:35	07:37 18:46	07:13 08:43-09:16/33 17:08	07:43 08:51-09:31/40 17:00
17	06:09 20:55	06:37 07:01-07:47/46 20:23	07:08 19:33	07:38 18:44	07:14 08:43-09:18/35 17:07	07:44 14:21-14:24/3 17:00 08:52-09:32/40
18	06:09 20:55	06:38 07:02-07:46/44 20:21	07:09 19:32	07:39 18:43	07:15 08:42-09:19/37 17:07	07:44 14:20-14:26/6 17:00 08:52-09:33/41
19	06:10 20:54	06:39 07:02-07:46/44 20:20	07:10 19:30	07:40 18:41	07:16 08:42-09:19/37 17:06	07:45 14:19-14:27/8 17:01 08:52-09:32/40
20	06:11 20:53	06:40 07:03-07:45/42 20:18	07:11 19:28	07:42 18:40	07:17 08:42-09:20/38 17:05	07:45 14:20-14:28/8 17:01 08:53-09:33/40
21	06:12 20:52	06:41 07:03-07:44/41 20:17	07:12 19:27	07:43 18:38	07:19 08:42-09:21/39 17:05	07:46 14:20-14:28/8 17:02 08:53-09:33/40
22	06:13 20:52	06:42 07:03-07:42/39 20:15	07:13 19:25	07:44 18:37	07:20 08:42-09:22/40 17:04	07:47 14:21-14:29/8 17:02 08:54-09:34/40
23	06:14 20:51	06:43 07:04-07:41/37 20:14	07:14 19:23	07:45 18:36	07:21 08:42-09:22/40 17:03	07:47 14:21-14:29/8 17:03 08:54-09:34/40
24	06:15 20:50	06:44 07:05-07:39/34 20:12	07:15 19:22	07:46 18:34	07:22 08:42-09:23/41 17:03	07:47 14:21-14:29/8 17:03 08:54-09:34/40
25	06:15 20:49	06:45 07:06-07:37/31 20:11	07:16 19:20	06:47 17:33	07:23 08:41-09:23/42 17:02	07:48 14:23-14:30/7 17:04 08:55-09:36/41
26	06:16 20:48	06:46 07:08-07:35/27 20:09	07:17 19:18	06:48 17:31	07:24 08:43-09:24/41 17:02	07:48 14:24-14:29/5 17:04 08:55-09:36/41
27	06:17 20:47	06:47 07:10-07:33/23 20:08	07:18 19:16	06:49 17:30	07:25 08:43-09:25/42 17:01	07:49 08:56-09:36/40 17:05
28	06:18 20:46	06:48 07:13-07:30/17 20:06	07:19 19:15	06:51 17:29	07:26 08:43-09:25/42 17:01	07:49 08:57-09:37/40 17:06
29	06:19 20:45	06:49 07:18-07:23/5 20:05	07:20 19:13	06:52 17:27	07:28 08:43-09:25/42 17:00	07:49 08:57-09:38/41 17:06
30	06:20 20:44	06:50 20:05-20:19/14 20:03	07:21 19:11	06:53 17:26	07:29 08:43-09:26/43 17:00	07:50 08:57-09:38/41 17:07
31	06:21 20:43	06:51 20:04-20:20/16 07:06-07:46/40	07:22 20:01	06:54 17:25	07:30 17:00	07:50 08:57-09:38/41 17:08
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	403	1293	0	0	743	1341

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow dayWTG: W3 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4) Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June
1	07:50 09:08-09:55/47 16:01-16:37/36 17:09 10:21-10:44/23	07:37 16:21-16:39/18 17:43	07:01 08:28-09:18/50 18:16	07:11 09:27-09:54/27 19:50	06:26 20:21	05:58 19:16-19:37/21 20:50
2	07:50 09:08-09:56/48 16:01-16:38/37 17:10 10:22-10:43/21	07:36 16:24-16:36/12 17:44	07:00 08:28-09:19/51 18:17	07:10 09:29-09:50/21 19:51	06:25 20:22	05:57 19:18-19:38/20 20:51
3	07:50 09:08-09:56/48 16:01-16:38/37 17:11 10:24-10:43/19	07:35 17:45	06:58 08:26-09:20/54 18:19	07:08 09:33-09:45/12 19:52	06:24 20:23	05:57 19:18-19:37/19 20:52
4	07:50 09:09-09:57/48 16:01-16:39/38 17:12 10:25-10:41/16	07:34 17:46	06:57 08:25-09:21/56 18:20	07:06 19:53	06:22 20:24	05:56 19:19-19:36/17 20:52
5	07:50 09:10-09:57/47 16:02-16:40/38 17:12 10:28-10:40/12	07:33 17:48	06:55 08:24-09:21/57 18:21	07:05 19:54	06:21 19:11-19:12/1 20:25	05:56 19:21-19:36/15 20:53
6	07:50 09:10-09:58/48 16:02-16:40/38 17:13 10:32-10:37/5	07:32 17:49	06:54 08:23-09:22/59 18:22	07:03 19:55	06:20 19:10-19:13/3 20:26	05:56 19:21-19:34/13 20:54
7	07:50 09:11-09:58/47 17:14 16:03-16:41/38	07:31 17:50	06:52 08:22-09:22/60 18:23	07:02 19:56	06:19 19:09-19:14/5 20:27	05:56 19:23-19:33/10 20:54
8	07:50 09:11-09:59/48 17:15 16:03-16:42/39	07:30 17:51	06:51 08:21-09:22/61 18:24	07:00 19:57	06:18 19:09-19:15/6 20:28	05:55 19:25-19:32/7 20:55
9	07:50 09:12-09:59/47 17:16 16:03-16:41/38	07:29 17:53	06:49 08:20-09:23/63 18:25	06:58 19:58	06:16 19:09-19:16/7 20:29	05:55 19:27-19:30/3 20:55
10	07:50 09:12-09:59/47 17:17 16:03-16:42/39	07:27 17:54	06:47 08:19-09:22/63 18:26	06:57 19:59	06:15 19:08-19:17/9 20:30	05:55 20:56
11	07:50 09:13-09:59/46 17:18 16:04-16:43/39	07:26 17:55	06:46 08:19-09:23/64 18:28	06:55 20:00	06:14 19:08-19:18/10 20:31	05:55 20:57
12	07:49 09:14-10:00/46 17:19 16:04-16:44/40	07:25 17:56	06:44 08:19-09:22/63 18:29	06:54 20:01	06:13 19:08-19:19/11 20:32	05:55 20:57
13	07:49 09:14-09:59/45 17:20 16:04-16:44/40	07:24 17:58	06:43 08:18-09:21/63 18:30	06:52 20:02	06:12 19:08-19:20/12 20:33	05:55 20:57
14	07:49 09:15-10:00/45 17:22 16:05-16:44/39	07:22 17:59	06:41 08:18-09:21/63 18:31	06:51 20:03	06:11 19:08-19:22/14 20:34	05:54 20:58
15	07:48 09:15-09:59/44 17:23 16:05-16:44/39	07:21 18:00	06:39 08:17-09:21/64 18:32	06:49 20:04	06:10 19:07-19:23/16 20:35	05:54 20:58
16	07:48 09:16-09:59/43 17:24 16:06-16:45/39	07:20 18:01	06:38 08:17-09:20/63 18:33	06:47 20:05	06:09 19:07-19:24/17 20:36	05:54 20:59
17	07:47 09:16-09:59/43 17:25 16:06-16:45/39	07:19 18:02	06:36 08:17-09:20/63 18:34	06:46 20:06	06:08 19:07-19:25/18 20:37	05:55 20:59
18	07:47 09:17-09:59/42 17:26 16:07-16:46/39	07:17 18:04	06:34 08:17-09:18/61 18:35	06:44 20:08	06:07 19:09-19:27/18 20:38	05:55 20:59
19	07:46 09:18-09:59/41 17:27 16:07-16:45/38	07:16 18:05	06:33 08:16-09:17/61 18:36	06:43 20:09	06:06 19:09-19:27/18 20:39	05:55 21:00
20	07:46 09:19-09:59/40 17:28 16:08-16:46/38	07:15 18:06	06:31 08:17-09:17/60 18:37	06:41 20:10	06:06 19:09-19:28/19 20:40	05:55 21:00
21	07:45 09:20-09:58/38 17:29 16:08-16:46/38	07:13 18:07	06:29 08:17-09:15/58 18:38	06:40 20:11	06:05 19:09-19:28/19 20:41	05:55 21:00
22	07:45 09:20-09:57/37 17:31 16:08-16:45/37	07:12 08:48-09:02/14 18:08	06:28 08:17-09:14/57 18:39	06:38 20:12	06:04 19:10-19:30/20 20:42	05:55 21:00
23	07:44 09:22-09:57/35 17:32 16:10-16:46/36	07:10 08:42-09:06/24 18:09	06:26 08:18-09:13/55 18:40	06:37 20:13	06:03 19:10-19:31/21 20:43	05:55 21:01
24	07:43 09:23-09:56/33 17:33 16:10-16:46/36	07:09 08:39-09:10/31 18:11	06:25 08:18-09:11/53 18:41	06:36 20:14	06:02 19:10-19:31/21 20:44	05:56 21:01
25	07:43 09:24-09:55/31 17:34 16:11-16:45/34	07:07 08:36-09:12/36 18:12	06:23 08:18-09:09/51 18:42	06:34 20:15	06:02 19:12-19:32/20 20:44	05:56 21:01
26	07:42 09:25-09:54/29 17:35 16:12-16:45/33	07:06 08:34-09:14/40 18:13	06:21 08:19-09:08/49 18:44	06:33 20:16	06:01 19:12-19:33/21 20:45	05:56 21:01
27	07:41 09:27-09:52/25 17:37 16:13-16:44/31	07:04 08:32-09:15/43 18:14	06:20 08:20-09:06/46 18:45	06:31 20:17	06:00 19:12-19:33/21 20:46	05:57 21:01
28	07:40 09:30-09:51/21 17:38 16:15-16:44/29	07:03 08:31-09:17/46 18:15	06:18 08:20-09:04/44 18:46	06:30 20:18	06:00 19:13-19:35/22 20:47	05:57 21:01
29	07:40 09:32-09:48/16 17:39 16:16-16:43/27		06:16 09:22-10:03/41 19:47	06:29 20:19	05:59 19:13-19:35/22 20:48	05:57 21:01
30	07:39 09:37-09:44/7 17:40 16:17-16:42/25		06:15 09:23-10:00/37 19:48	06:27 20:20	05:59 19:15-19:36/21 20:49	05:58 21:01
31	07:38 16:19-16:41/22 17:42		07:13 09:24-09:57/33 19:49		05:58 19:15-19:36/21 20:49	
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	2394	264	1723	60	413	125

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W3 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
160	379	487	423	372	261	434	671	794	1.104	1.108	478	6.671

	July	August	September	October	November	December
1	05:58 21:01	06:22 19:18-19:30/12 20:42	06:52 20:00	07:22 08:57-10:01/64 19:10	06:55 17:24	07:30 08:55-09:41/46 17:00 15:46-16:25/39
2	05:59 21:01	06:23 19:19-19:29/10 20:41	06:53 19:58	07:23 08:57-10:00/63 19:08	06:56 17:23	07:31 08:55-09:42/47 17:00 15:46-16:25/39
3	05:59 21:01	06:24 19:19-19:28/9 20:40	06:54 19:57	07:24 08:57-10:00/63 19:06	06:57 17:21	07:32 08:55-09:42/47 16:59 15:47-16:26/39
4	06:00 19:30-19:37/7 21:01	06:25 19:19-19:27/8 20:39	06:55 19:55	07:25 08:58-10:00/62 19:05	06:59 17:20	07:33 08:55-09:43/48 16:59 15:47-16:26/39
5	06:00 19:29-19:39/10 21:00	06:26 19:19-19:25/6 20:38	06:56 19:53	07:26 08:58-10:00/62 19:03	07:00 17:19	07:34 08:56-09:43/47 16:59 15:48-16:26/38
6	06:01 19:28-19:40/12 21:00	06:27 19:19-19:24/5 20:37	06:57 19:52	07:27 08:58-09:59/61 19:02	07:01 17:18	07:35 08:56-09:44/48 15:48-16:26/38 16:59 10:18-10:22/4
7	06:02 19:27-19:41/14 21:00	06:28 19:20-19:23/3 20:36	06:58 19:50	07:28 08:59-09:58/59 19:00	07:02 17:17	07:35 08:57-09:44/47 15:49-16:27/38 16:59 10:15-10:27/12
8	06:02 19:27-19:43/16 20:59	06:29 19:21-19:22/1 20:34	06:59 19:48	07:29 08:59-09:57/58 18:58	07:03 17:16	07:36 08:57-09:45/48 15:50-16:27/37 16:59 10:14-10:29/15
9	06:03 19:25-19:43/18 20:59	06:30 20:33	07:00 09:28-09:38/10 19:47	07:30 08:59-09:56/57 18:57	07:05 15:55-16:07/12 17:15	07:37 08:58-09:45/47 15:50-16:27/37 16:59 10:13-10:31/18
10	06:04 19:25-19:45/20 20:59	06:31 20:32	07:01 09:22-09:43/21 19:45	07:31 09:00-09:55/55 18:55	07:06 15:52-16:10/18 17:14	07:38 08:58-09:46/48 15:51-16:28/37 16:59 10:12-10:33/21
11	06:04 19:25-19:46/21 20:58	06:32 20:31	07:02 09:19-09:46/27 19:43	07:32 09:01-09:54/53 18:54	07:07 15:50-16:12/22 17:13	07:39 08:58-09:46/48 15:51-16:27/36 16:59 10:11-10:34/23
12	06:05 19:24-19:45/21 20:58	06:33 20:29	07:03 09:16-09:49/33 19:42	07:33 09:01-09:52/51 18:52	07:08 09:07-09:15/8 17:12 15:48-16:13/25	07:40 08:58-09:46/48 15:51-16:28/37 16:59 10:11-10:35/24
13	06:06 19:23-19:45/22 20:57	06:34 20:28	07:04 09:14-09:51/37 19:40	07:34 09:02-09:51/49 18:50	07:09 09:04-09:21/17 17:11 15:48-16:15/27	07:41 08:59-09:47/48 15:52-16:28/36 16:59 10:11-10:37/26
14	06:06 19:23-19:44/21 20:57	06:34 20:27	07:05 09:12-09:52/40 19:38	07:35 09:04-09:49/45 18:49	07:10 09:02-09:23/21 17:10 15:47-16:16/29	07:41 09:00-09:48/48 15:53-16:29/36 16:59 10:11-10:38/27
15	06:07 19:22-19:43/21 20:56	06:35 20:25	07:06 09:11-09:54/43 19:37	07:36 09:05-09:47/42 18:47	07:12 09:00-09:25/25 17:09 15:46-16:17/31	07:42 09:00-09:48/48 15:53-16:28/35 16:59 10:11-10:39/28
16	06:08 19:22-19:43/21 20:56	06:36 20:24	07:07 09:09-09:55/46 19:35	07:37 09:08-09:46/38 18:46	07:13 08:58-09:27/29 17:08 15:45-16:18/33	07:43 09:00-09:48/48 15:54-16:29/35 17:00 10:11-10:40/29
17	06:09 19:21-19:43/22 20:55	06:37 20:22	07:08 09:08-09:56/48 19:33	07:38 09:09-09:43/34 18:44	07:14 08:58-09:29/31 17:07 15:45-16:19/34	07:43 09:01-09:49/48 15:55-16:30/35 17:00 10:11-10:41/30
18	06:09 19:21-19:42/21 20:54	06:38 20:21	07:09 09:06-09:57/51 19:32	07:39 09:12-09:40/28 18:43	07:15 08:57-09:30/33 17:07 15:44-16:20/36	07:44 09:01-09:49/48 15:55-16:30/35 17:00 10:11-10:41/30
19	06:10 19:21-19:42/21 20:54	06:39 20:20	07:10 09:05-09:58/53 19:30	07:40 09:15-09:36/21 18:41	07:16 08:56-09:31/35 17:06 15:44-16:20/36	07:45 09:02-09:50/48 15:56-16:30/34 17:01 10:11-10:42/31
20	06:11 19:20-19:40/20 20:53	06:40 20:18	07:11 09:04-09:59/55 19:28	07:42 09:21-09:30/9 18:40	07:17 08:55-09:32/37 17:05 15:43-16:20/37	07:45 09:03-09:51/48 15:57-16:31/34 17:01 10:12-10:43/31
21	06:12 19:20-19:40/20 20:52	06:41 20:17	07:12 09:03-10:00/57 19:27	07:43 18:38	07:19 08:56-09:34/38 17:05 15:43-16:21/38	07:46 09:03-09:50/47 15:57-16:31/34 17:02 10:12-10:43/31
22	06:13 19:19-19:39/20 20:52	06:42 20:15	07:13 09:02-10:00/58 19:25	07:44 18:37	07:20 08:55-09:35/40 17:04 15:44-16:22/38	07:46 09:04-09:51/47 15:56-16:31/35 17:02 10:13-10:44/31
23	06:14 19:19-19:39/20 20:51	06:43 20:14	07:14 09:02-10:01/59 19:23	07:45 18:36	07:21 08:55-09:36/41 17:03 15:44-16:22/38	07:47 09:04-09:52/48 15:58-16:32/34 17:03 10:13-10:44/31
24	06:15 19:19-19:38/19 20:50	06:44 20:12	07:15 09:00-10:00/60 19:22	07:46 18:34	07:22 08:54-09:36/42 17:03 15:44-16:23/39	07:47 09:04-09:52/48 15:58-16:32/34 17:03 10:13-10:44/31
25	06:15 19:19-19:37/18 20:49	06:45 20:11	07:16 08:59-10:01/62 19:20	07:47 17:33	07:23 08:54-09:37/43 17:02 15:44-16:23/39	07:48 09:05-09:53/48 15:59-16:33/34 17:04 10:15-10:45/30
26	06:16 19:18-19:36/18 20:48	06:46 20:09	07:17 08:59-10:01/62 19:18	07:48 17:31	07:24 08:54-09:37/43 17:02 15:44-16:23/39	07:48 09:05-09:53/48 15:59-16:34/35 17:04 10:15-10:45/30
27	06:17 19:18-19:35/17 20:47	06:47 20:08	07:18 08:58-10:01/63 19:16	07:49 17:30	07:25 08:55-09:39/44 17:01 15:45-16:24/39	07:49 09:05-09:53/48 15:59-16:34/35 17:05 10:15-10:45/30
28	06:18 19:18-19:34/16 20:46	06:48 20:06	07:19 08:58-10:01/63 19:15	07:50 17:29	07:26 08:55-09:40/45 17:01 15:45-16:24/39	07:49 09:06-09:54/48 16:00-16:35/35 17:06 10:17-10:45/28
29	06:19 19:18-19:33/15 20:45	06:49 20:05	07:20 08:57-10:01/64 19:13	07:51 17:27	07:27 08:55-09:40/45 17:00 15:45-16:25/40	07:49 09:07-09:54/47 16:00-16:36/36 17:06 10:18-10:45/27
30	06:20 19:32-19:33/1 20:44	06:50 20:03	07:21 08:57-10:01/64 19:11	07:52 17:26	07:29 08:55-09:41/46 17:00 15:46-16:25/39	07:49 09:07-09:55/48 16:00-16:36/36 17:07 10:18-10:45/27
31	06:21 19:18-19:30/12 20:43	06:51 20:01		06:54 17:25		07:50 09:07-09:55/48 16:00-16:37/37 17:08 10:19-10:45/26
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	497	54	1076	974	1391	3268

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

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Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W4 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,85	4,78	5,80	6,92	8,25	9,91	10,91	9,92	8,15	6,40	4,83	3,92

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
160	379	487	423	372	261	434	671	794	1.104	1.108	478	6.671

	January February March				April		May		June	
1	07:50	07:37	07:01		07:11	07:50-08:20/30	06:26	07:08-07:31/23	05:58	08:41-10:01/80
	17:09	17:43	18:16		19:50	09:03-10:18/75	20:21	08:34-10:18/104	20:50	
2	07:50	07:36	07:00		07:10	07:50-08:19/29	06:25	07:07-07:31/24	05:57	08:41-10:01/80
	17:10	17:44	18:17		19:51	09:00-10:19/79	20:22	08:34-10:18/104	20:51	
3	07:50	07:35	06:58		07:08	07:49-08:18/29	06:24	07:07-07:31/24	05:57	08:41-10:00/79
	17:11	17:45	18:19		19:52	08:58-10:20/82	20:23	08:34-10:17/103	20:52	
4	07:50	07:34	06:57		07:06	07:50-08:18/28	06:22	07:07-07:31/24	05:56	08:42-10:00/78
	17:11	17:46	18:20		19:53	08:57-10:21/84	20:24	08:34-10:17/103	20:52	
5	07:50	07:33	06:55		07:05	07:51-08:16/25	06:21	07:08-07:31/23	05:56	08:43-10:00/77
	17:12	17:48	18:21		19:54	08:55-10:22/87	20:25	08:33-10:15/102	20:53	
6	07:50	07:32	06:54		07:03	07:53-08:15/22	06:20	07:07-07:29/22	05:56	08:42-09:59/77
	17:13	17:49	18:22		19:55	08:54-10:23/89	20:26	08:33-10:15/102	20:54	
7	07:50	07:31	06:52		07:02	07:54-08:13/19	06:19	07:08-07:29/21	05:55	08:43-09:59/76
	17:14	17:50	18:23		19:56	08:52-10:23/91	20:27	08:33-10:14/101	20:54	
8	07:50	07:30	06:51		07:00	07:58-08:10/12	06:18	07:08-07:28/20	05:55	08:44-09:59/75
	17:15	17:51	18:24		19:57	08:50-10:24/94	20:28	08:34-10:14/100	20:55	
9	07:50	07:28	06:49		06:58	08:02-08:06/4	06:16	07:09-07:27/18	05:55	08:44-09:59/75
	17:16	17:53	18:25		19:58	08:49-10:25/96	20:29	08:34-10:13/99	20:55	
10	07:50	07:27	06:47		06:57	08:48-10:24/96	06:15	07:10-07:26/16	05:55	08:45-09:59/74
	17:17	17:54	18:26		19:59		20:30	08:34-10:12/98	20:56	
11	07:49	07:26	06:46		06:55	08:47-10:25/98	06:14	07:12-07:25/13	05:55	08:45-09:59/74
	17:18	17:55	18:27		20:00		20:31	08:34-10:12/98	20:56	
12	07:49	07:25	06:44		06:54	08:45-10:25/100	06:13	07:14-07:23/9	05:55	08:45-09:58/73
	17:19	17:56	18:29		20:01		20:32	08:34-10:11/97	20:57	
13	07:49	07:24	06:43		06:52	08:45-10:26/101	06:12	08:34-10:10/96	05:54	08:45-09:58/73
	17:20	17:57	18:30		20:02		20:33		20:57	
14	07:49	07:22	06:41		06:50	08:43-10:25/102	06:11	08:34-10:10/96	05:54	08:45-09:58/73
	17:21	17:59	18:31		20:03		20:34		20:58	
15	07:48	07:21	06:39		06:49	08:42-10:25/103	06:10	08:34-10:09/95	05:54	08:46-09:58/72
	17:23	18:00	18:32		20:04		20:35		20:58	
16	07:48	07:20	06:38		06:47	08:42-10:25/103	06:09	08:35-10:08/93	05:54	08:46-09:58/72
	17:24	18:01	18:33		20:05		20:36		20:59	
17	07:47	07:19	06:36		06:46	08:40-10:24/104	06:08	08:35-10:08/93	05:54	08:47-09:59/72
	17:25	18:02	18:34		20:06		20:37		20:59	
18	07:47	07:17	06:34		06:44	08:40-10:25/105	06:07	08:36-10:08/92	05:55	08:47-09:59/72
	17:26	18:03	18:35		20:07		20:38		20:59	
19	07:46	07:16	06:33		06:43	08:40-10:25/105	06:06	08:36-10:07/91	05:55	08:48-09:59/71
	17:27	18:05	18:36		20:09		20:39		21:00	
20	07:46	07:15	06:31		06:41	08:39-10:24/105	06:06	08:36-10:06/90	05:55	08:48-09:59/71
	17:28	18:06	18:37		20:10		20:40		21:00	
21	07:45	07:13	06:29		06:40	08:38-10:24/106	06:05	08:36-10:05/89	05:55	08:48-09:59/71
	17:29	18:07	18:38		20:11		20:41		21:00	
22	07:45	07:12	06:28		06:38	08:37-10:23/106	06:04	08:37-10:06/89	05:55	08:48-09:59/71
	17:31	18:08	18:39		20:12		20:42		21:00	
23	07:44	07:10	06:26		06:37	08:37-10:23/106	06:03	08:37-10:05/88	05:55	08:49-10:00/71
	17:32	18:09	18:40		20:13		20:43		21:01	
24	07:43	07:09	06:24	07:14-07:16/2	06:36	07:15-07:25/10	06:02	08:37-10:04/87	05:56	08:48-10:00/72
	17:33	18:11	18:41	08:32-08:54/22	20:14	08:36-10:22/106	20:44		21:01	
25	07:43	07:07	06:23	07:02-07:09/7 08:25-09:00/35	06:34	07:13-07:28/15	06:02	08:38-10:04/86	05:56	08:48-10:00/72
	17:34	18:12	18:42	07:11-07:18/7	20:15	08:36-10:22/106	20:44		21:01	
26	07:42	07:06	06:21	07:01-07:19/18	06:33	07:12-07:29/17	06:01	08:38-10:03/85	05:56	08:49-10:01/72
	17:35	18:13	18:43	08:21-09:05/44	20:16	08:36-10:22/106	20:45		21:01	
27	07:41	07:04	06:20	06:58-07:20/22	06:31	07:10-07:30/20	06:00	08:38-10:02/84	05:57	08:49-10:01/72
	17:37	18:14	18:45	08:16-09:08/52	20:17	08:35-10:20/105	20:46		21:01	
28	07:40	07:03	06:18	06:56-07:20/24	06:30	07:10-07:30/20	06:00	08:39-10:02/83	05:57	08:49-10:01/72
	17:38	18:15	18:46	08:13-09:10/57	20:18	08:35-10:20/105	20:47		21:01	
29	07:40		07:16	07:54-08:21/27	06:29	07:10-07:31/21	05:59	08:39-10:01/82	05:57	08:49-10:02/73
	17:39		19:47	09:10-10:13/63	20:19	08:35-10:20/105	20:48		21:01	
30	07:39		07:15	07:51-08:20/29	06:27	07:09-07:32/23	05:59	08:40-10:02/82	05:58	08:49-10:02/73
	17:40		19:48	09:07-10:14/67	20:20	08:34-10:19/105	20:49		21:01	
31	07:38		07:13	07:50-08:20/30			05:58	08:40-10:01/81		
	17:42		19:49	09:05-10:16/71			20:49			
Potential sun hours	299	298	370		398		447		451	
Sum of minutes with flicker	0	0	577		3279		3130		2213	

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

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker
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SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W4 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)
 Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July		August		September		October		November		December	
1	05:58	08:49-10:03/74	06:22	07:23-07:34/11	06:52	08:46-10:24/98	07:21	06:55	07:30			
	21:01		20:42	08:45-10:22/97	20:00		19:10	17:24	17:00			
2	05:59	08:49-10:03/74	06:23	07:22-07:36/14	06:53	08:47-10:23/96	07:22	06:56	07:31			
	21:01		20:41	08:45-10:23/98	19:58		19:08	17:22	16:59			
3	05:59	08:49-10:04/75	06:24	07:20-07:37/17	06:54	08:00-08:04/4	07:24	06:57	07:32			
	21:01		20:40	08:44-10:23/99	19:57	08:47-10:23/96	19:06	17:21	16:59			
4	06:00	08:49-10:04/75	06:25	07:20-07:38/18	06:55	07:56-08:08/12	07:25	06:59	07:33			
	21:01		20:39	08:44-10:24/100	19:55	08:48-10:22/94	19:05	17:20	16:59			
5	06:00	08:49-10:05/76	06:26	07:19-07:39/20	06:56	07:51-08:09/18	07:26	07:00	07:34			
	21:00		20:38	08:43-10:24/101	19:53	08:48-10:19/91	19:03	17:19	16:59			
6	06:01	08:49-10:05/76	06:27	07:17-07:39/22	06:57	07:48-08:10/22	07:27	07:01	07:34			
	21:00		20:37	08:43-10:24/101	19:52	08:49-10:18/89	19:02	17:18	16:59			
7	06:02	08:49-10:06/77	06:28	07:17-07:39/22	06:58	07:46-08:11/25	07:28	07:02	07:35			
	21:00		20:35	08:43-10:25/102	19:50	08:50-10:17/87	19:00	17:17	16:59			
8	06:02	08:49-10:07/78	06:29	07:16-07:40/24	06:59	07:45-08:12/27	07:29	07:03	07:36			
	20:59		20:34	08:43-10:25/102	19:48	08:51-10:15/84	18:58	17:16	16:59			
9	06:03	08:49-10:07/78	06:30	07:16-07:40/24	07:00	07:44-08:12/28	07:30	07:04	07:37			
	20:59		20:33	08:43-10:26/103	19:47	08:52-10:14/82	18:57	17:15	16:59			
10	06:03	08:49-10:08/79	06:31	07:16-07:40/24	07:01	07:43-08:12/29	07:31	07:06	07:38			
	20:59		20:32	08:43-10:26/103	19:45	08:53-10:12/79	18:55	17:14	16:59			
11	06:04	08:49-10:09/80	06:31	07:16-07:40/24	07:02	07:42-08:12/30	07:32	07:07	07:39			
	20:58		20:30	08:43-10:27/104	19:43	08:55-10:10/75	18:54	17:13	16:59			
12	06:05	08:48-10:09/81	06:32	07:17-07:40/23	07:03	07:42-08:12/30	07:33	07:08	07:40			
	20:58		20:29	08:43-10:27/104	19:42	08:56-10:08/72	18:52	17:12	16:59			
13	06:06	08:48-10:10/82	06:33	07:17-07:39/22	07:04	07:42-08:12/30	07:34	07:09	07:41			
	20:57		20:28	08:43-10:27/104	19:40	08:58-10:06/68	18:50	17:11	16:59			
14	06:06	08:48-10:11/83	06:34	07:18-07:39/21	07:05	07:44-08:11/27	07:35	07:10	07:41			
	20:57		20:27	08:43-10:28/105	19:38	09:00-10:03/63	18:49	17:10	16:59			
15	06:07	08:48-10:10/82	06:35	07:17-07:38/21	07:06	07:46-08:10/24	07:36	07:12	07:42			
	20:56		20:25	08:43-10:28/105	19:37	09:02-10:01/59	18:47	17:09	16:59			
16	06:08	08:48-10:11/83	06:36	07:18-07:37/19	07:07	07:47-08:09/22	07:37	07:13	07:43			
	20:56		20:24	08:43-10:28/105	19:35	09:05-09:57/52	18:46	17:08	17:00			
17	06:09	08:48-10:12/84	06:37	07:19-07:36/17	07:08	07:49-08:08/19	07:38	07:14	07:43			
	20:55		20:22	08:43-10:28/105	19:33	09:08-09:54/46	18:44	17:07	17:00			
18	06:09	08:48-10:13/85	06:38	07:20-07:34/14	07:09	07:50-07:58/8 09:12-09:49/37	07:39	07:15	07:44			
	20:54		20:21	08:43-10:29/106	19:32	07:59-08:06/7	18:43	17:07	17:00			
19	06:10	08:48-10:14/86	06:39	07:22-07:32/10	07:10	07:51-07:54/3 09:17-09:43/26	07:40	07:16	07:45			
	20:54		20:20	08:43-10:29/106	19:30	08:01-08:04/3	18:41	17:06	17:01			
20	06:11	08:47-10:14/87	06:40	08:42-10:28/106	07:11		07:41	07:17	07:45			
	20:53		20:18		19:28		18:40	17:05	17:01			
21	06:12	08:47-10:15/88	06:41	08:42-10:28/106	07:12		07:43	07:19	07:46			
	20:52		20:17		19:27		18:38	17:05	17:02			
22	06:13	08:47-10:15/88	06:42	08:42-10:28/106	07:13		07:44	07:20	07:46			
	20:52		20:15		19:25		18:37	17:04	17:02			
23	06:14	08:47-10:16/89	06:43	08:42-10:28/106	07:13		07:45	07:21	07:47			
	20:51		20:14		19:23		18:36	17:03	17:03			
24	06:14	08:46-10:17/91	06:44	08:43-10:28/105	07:14		07:46	07:22	07:47			
	20:50		20:12		19:21		18:34	17:03	17:03			
25	06:15	08:46-10:18/92	06:45	08:43-10:28/105	07:15		06:47	07:23	07:48			
	20:49		20:11		19:20		17:33	17:02	17:04			
26	06:16	08:45-10:18/93	06:46	08:43-10:27/104	07:16		06:48	07:24	07:48			
	20:48		20:09		19:18		17:31	17:02	17:04			
27	06:17	08:45-10:18/93	06:47	08:44-10:27/103	07:17		06:49	07:25	07:49			
	20:47		20:08		19:16		17:30	17:01	17:05			
28	06:18	08:45-10:19/94	06:48	08:44-10:27/103	07:18		06:50	07:26	07:49			
	20:46		20:06		19:15		17:29	17:01	17:06			
29	06:19	08:45-10:20/95	06:49	08:44-10:26/102	07:19		06:52	07:27	07:49			
	20:45		20:04		19:13		17:27	17:00	17:06			
30	06:20	08:45-10:21/96	06:50	08:45-10:26/101	07:20		06:53	07:28	07:49			
	20:44		20:03		19:11		17:26	17:00	17:07			
31	06:21	07:26-07:31/5	06:51	08:45-10:25/100			06:54		07:50			
	20:43	08:45-10:21/96	20:01				17:25		17:08			
Potential sun hours	458		427		375		346		299		289	
Sum of minutes with flicker	2615		3564		1762		0		0		0	

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

Via Santa Margherita 4

IT-09124 Cagliari

+39 070 658297

Giuseppe Frongia / direttore@iatprogetti.it

Calculated:

24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W5 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)
 Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	January	February	March	April	May	June
1	07:50	07:37	07:01	17:19-17:38/19	07:11	17:50-18:54/64
	17:09	17:43	18:16	07:58-08:09/11	19:50	20:21
2	07:50	07:36	07:00	17:15-17:43/28	07:10	17:51-18:53/62
	17:10	17:44	18:17	07:57-08:07/10	19:51	20:22
3	07:50	07:35	06:58	17:11-17:46/35	07:08	17:51-18:51/60
	17:11	17:45	18:19	07:55-08:04/9	19:52	20:23
4	07:50	07:34	06:57	17:09-17:48/39	07:06	17:52-18:51/59
	17:11	17:46	18:20	07:54-07:59/5	19:53	20:24
5	07:50	07:33	06:55	17:06-17:50/44	07:05	17:53-18:49/56
	17:12	17:48	18:21		19:54	20:25
6	07:50	07:32	06:54	17:05-17:52/47	07:03	17:54-18:48/54
	17:13	17:49	18:22		19:55	20:26
7	07:50	07:31	06:52	17:03-17:53/50	07:02	17:55-18:47/52
	17:14	17:50	18:23		19:56	20:27
8	07:50	07:30	06:51	17:01-17:54/53	07:00	17:56-18:45/49
	17:15	17:51	18:24		19:57	20:28
9	07:50	07:29	06:49	17:00-17:56/56	06:58	17:58-18:43/45
	17:16	17:53	18:25		19:58	20:29
10	07:50	07:27	06:47	16:58-17:56/58	06:57	17:59-18:41/42
	17:17	17:54	18:26		19:59	20:30
11	07:50	07:26	06:46	16:56-17:57/61	06:55	18:01-18:39/38
	17:18	17:55	18:27		20:00	20:31
12	07:49	07:25	06:44	16:56-17:58/62	06:54	18:03-18:36/33
	17:19	17:56	18:29		20:01	20:32
13	07:49	07:24	06:43	16:54-17:58/64	06:52	18:05-18:33/28
	17:20	17:57	18:30		20:02	20:33
14	07:49	07:22	06:41	16:54-17:59/65	06:50	18:08-18:30/22
	17:21	17:59	18:31		20:03	20:34
15	07:48	07:21	06:39	16:53-18:00/67	06:49	18:13-18:24/11
	17:23	18:00	18:32		20:04	20:35
16	07:48	07:20	06:38	16:52-17:59/67	06:47	
	17:24	18:01	18:33		20:05	20:36
17	07:47	07:19	06:36	16:52-18:00/68	06:46	
	17:25	18:02	18:34		20:06	20:37
18	07:47	07:17	06:34	16:51-18:00/69	06:44	
	17:26	18:03	18:35		20:08	20:38
19	07:46	07:16	06:33	16:50-18:00/70	06:43	
	17:27	18:05	18:36		20:09	20:39
20	07:46	07:15	06:31	16:50-18:00/70	06:41	
	17:28	18:06	18:37		20:10	20:40
21	07:45	07:13	06:29	16:49-18:00/71	06:40	
	17:29	18:07	18:38		20:11	20:41
22	07:45	07:12	06:28	16:49-17:59/70	06:38	
	17:31	18:08	18:39		20:12	20:42
23	07:44	07:10	06:26	16:49-18:00/71	06:37	
	17:32	18:09	18:40		20:13	20:43
24	07:43	07:09	06:24	16:49-17:59/70	06:36	
	17:33	18:11	18:41		20:14	20:44
25	07:43	07:07	06:23	16:48-17:58/70	06:34	
	17:34	18:12	18:42		20:15	20:44
26	07:42	07:06	06:21	16:49-17:59/70	06:33	
	17:35	18:13	18:43		20:16	20:45
27	07:41	07:04	06:20	16:49-17:58/69	06:31	
	17:37	18:14	18:45		20:17	20:46
28	07:40	07:03	06:18	16:48-17:57/69	06:30	
	17:38	18:15	18:46		20:18	20:47
29	07:40		07:16	17:49-18:57/68	06:29	
	17:39		19:47		20:19	20:48
30	07:39		07:15	17:49-18:56/67	06:27	
	17:40		19:48		20:20	20:49
31	07:38		07:13	17:49-18:54/65		
	17:42		19:49			
Potential sun hours	299	298	370	398	447	451
Sum of minutes with flicker	0	95	1887	675	0	0

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.
Via Santa Margherita 4
IT-09124 Cagliari
+39 070 658297
Giuseppe Frongia / direttore@iatprogetti.it
Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Calendar per WTG

Calculation: Progetto_real case_max minutes per shadow day WTG: W5 - VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)
Sunshine probability S (Average daily sunshine hours) [ALGHERO]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,85 4,78 5,80 6,92 8,25 9,91 10,91 9,92 8,15 6,40 4,83 3,92

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
160 379 487 423 372 261 434 671 794 1.104 1.108 478 6.671

	July	August	September	October	November	December
1	05:58 21:01	06:22 20:42	06:52 18:00-18:38/38 20:00	07:21 17:34-18:37/63 19:10	06:55 17:24	07:30 17:00
2	05:59 21:01	06:23 20:41	06:53 17:58-18:40/42 19:58	07:23 17:34-18:36/62 19:08	06:56 17:22	07:31 16:59
3	05:59 21:01	06:24 20:40	06:54 17:56-18:41/45 19:57	07:24 17:35-18:34/59 19:06	06:57 17:21	07:32 16:59
4	06:00 21:01	06:25 20:39	06:55 17:53-18:42/49 19:55	07:25 17:36-18:33/57 19:05	06:59 17:20	07:33 16:59
5	06:00 21:00	06:26 20:38	06:56 17:51-18:43/52 19:53	07:26 17:37-18:31/54 19:03	07:00 17:19	07:34 16:59
6	06:01 21:00	06:27 20:37	06:57 17:49-18:43/54 19:52	07:27 17:39-18:31/52 19:02	07:01 17:18	07:35 16:59
7	06:02 21:00	06:28 20:36	06:58 17:48-18:44/56 19:50	07:28 17:40-18:29/49 19:00	07:02 17:17	07:35 16:59
8	06:02 20:59	06:29 20:34	06:59 17:46-18:45/59 19:48	07:29 17:41-18:27/46 18:58	07:03 17:16	07:36 16:59
9	06:03 20:59	06:30 20:33	07:00 17:45-18:45/60 19:47	07:30 17:43-18:24/41 18:57	07:05 17:15	07:37 16:59
10	06:03 20:59	06:31 20:32	07:01 17:44-18:46/62 19:45	07:31 17:45-18:22/37 18:55	07:06 17:14	07:38 16:59
11	06:04 20:58	06:31 20:31	07:02 17:43-18:46/63 19:43	07:32 17:47-18:19/32 18:54	07:07 17:13	07:39 16:59
12	06:05 20:58	06:32 20:29	07:03 17:42-18:47/65 19:42	07:33 17:50-18:15/25 18:52	07:08 17:12	07:40 16:59
13	06:06 20:57	06:33 20:28	07:04 17:41-18:47/66 19:40	07:34 17:56-18:09/13 18:50	07:09 17:11	07:41 16:59
14	06:06 20:57	06:34 20:27	07:05 17:40-18:47/67 19:38	07:35 08:33-08:44/11 18:49	07:10 17:10	07:41 16:59
15	06:07 20:56	06:35 20:25	07:06 17:39-18:47/68 19:37	07:36 08:34-08:45/11 18:47	07:12 17:09	07:42 16:59
16	06:08 20:56	06:36 20:24	07:07 17:38-18:47/69 19:35	07:37 08:36-08:47/11 18:46	07:13 17:08	07:43 17:00
17	06:09 20:55	06:37 20:22	07:08 17:37-18:47/70 19:33	07:38 08:37-08:47/10 18:44	07:14 17:07	07:43 17:00
18	06:09 20:54	06:38 20:21	07:09 17:37-18:47/70 19:32	07:39 08:38-08:48/10 18:43	07:15 17:07	07:44 17:00
19	06:10 20:54	06:39 20:20	07:10 17:36-18:46/70 19:30	07:40 08:39-08:48/9 18:41	07:16 17:06	07:45 17:01
20	06:11 20:53	06:40 20:18	07:11 17:36-18:46/70 19:28	07:42 08:40-08:48/8 18:40	07:17 17:05	07:45 17:01
21	06:12 20:52	06:41 20:17	07:12 17:34-18:45/71 19:27	07:43 08:41-08:48/7 18:38	07:19 17:04	07:46 17:02
22	06:13 20:52	06:42 20:15	07:13 17:34-18:44/70 19:25	07:44 08:42-08:48/6 18:37	07:20 17:04	07:46 17:02
23	06:14 20:51	06:43 20:14	07:14 17:33-18:44/71 19:23	07:45 08:44-08:48/4 18:36	07:21 17:03	07:47 17:03
24	06:14 20:50	06:44 20:12	07:14 17:33-18:43/70 19:21	07:46 08:45-08:48/3 18:34	07:22 17:03	07:47 17:03
25	06:15 20:49	06:45 20:11	07:15 17:33-18:43/70 19:20	06:47 07:46-07:48/2 17:33	07:23 17:02	07:48 17:04
26	06:16 20:48	06:46 20:09	07:16 17:33-18:42/69 19:18	06:48 17:31	07:24 17:02	07:48 17:04
27	06:17 20:47	06:47 20:08	07:17 17:33-18:41/68 19:16	06:49 17:30	07:25 17:01	07:49 17:05
28	06:18 20:46	06:48 18:15-18:26/11 20:06	07:18 17:33-18:40/67 19:15	06:51 17:29	07:26 17:01	07:49 17:06
29	06:19 20:45	06:49 18:09-18:31/22 20:05	07:19 17:33-18:39/66 19:13	06:52 17:27	07:27 17:00	07:49 17:06
30	06:20 20:44	06:50 18:05-18:34/29 20:03	07:20 17:34-18:38/64 19:11	06:53 17:26	07:29 17:00	07:49 17:07
31	06:21 20:43	06:51 18:02-18:37/35 20:01		06:54 17:25		07:50 17:08
Potential sun hours	458	427	375	346	299	289
Sum of minutes with flicker	0	97	1881	721	0	0

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

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

SCENARIO "REAL CASE"

Project:

Layout_GRVDEP_Ossi

Licensed user:

I.A.T. Consulenza e progetti S.r.l.

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Giuseppe Frongia / direttore@iatprogetti.it

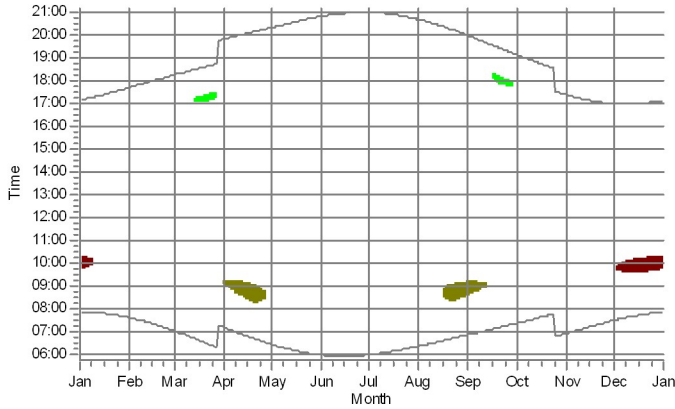
Calculated:

24/05/2021 15:31/3.4.415

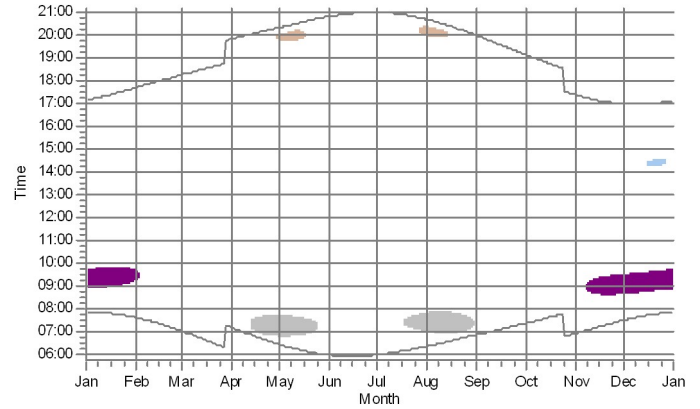
SHADOW - Calendar per WTG, graphical

Calculation: Progetto_real case_max minutes per shadow day

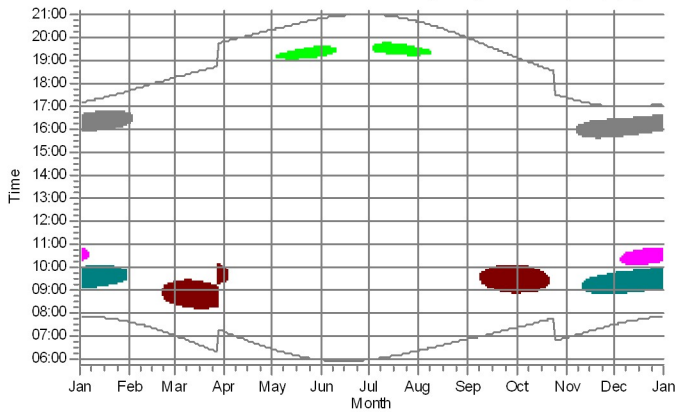
W1: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (6)



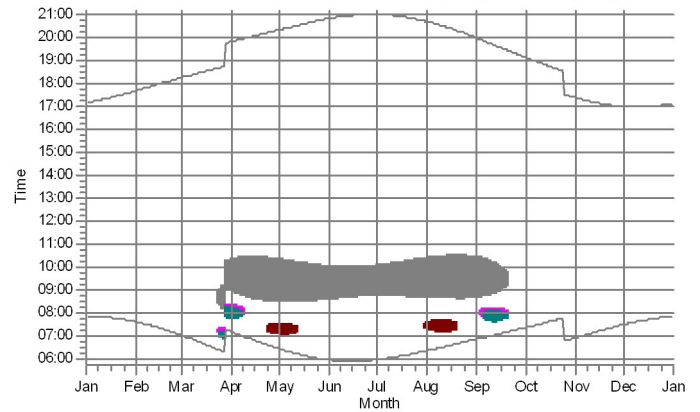
W2: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (5)



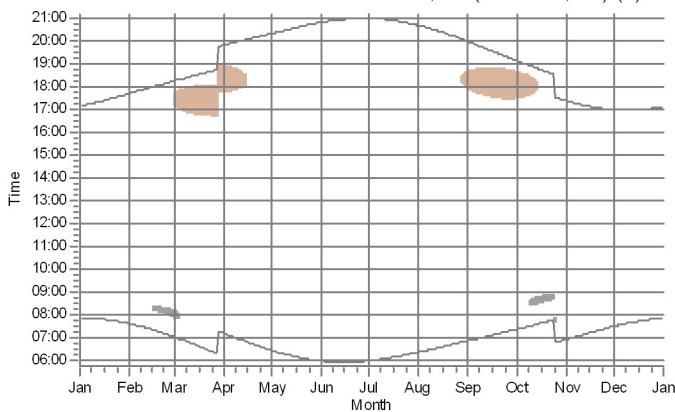
W3: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (4)



W4: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (2)



W5: VESTAS V162 6000 162.0 !O! hub: 125,0 m (TOT: 206,0 m) (3)



Shadow receptors

F100: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (27)
F117: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (21)
F119: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (28)
F125: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (22)
F138: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (23)
F154: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (24)

F21: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (16)
F25: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (17)
F59: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (18)
F84: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (19)
F96: Shadow Receptor: 1,4 × 1,2 Azimuth: 0,0° Slope: 90,0° (20)

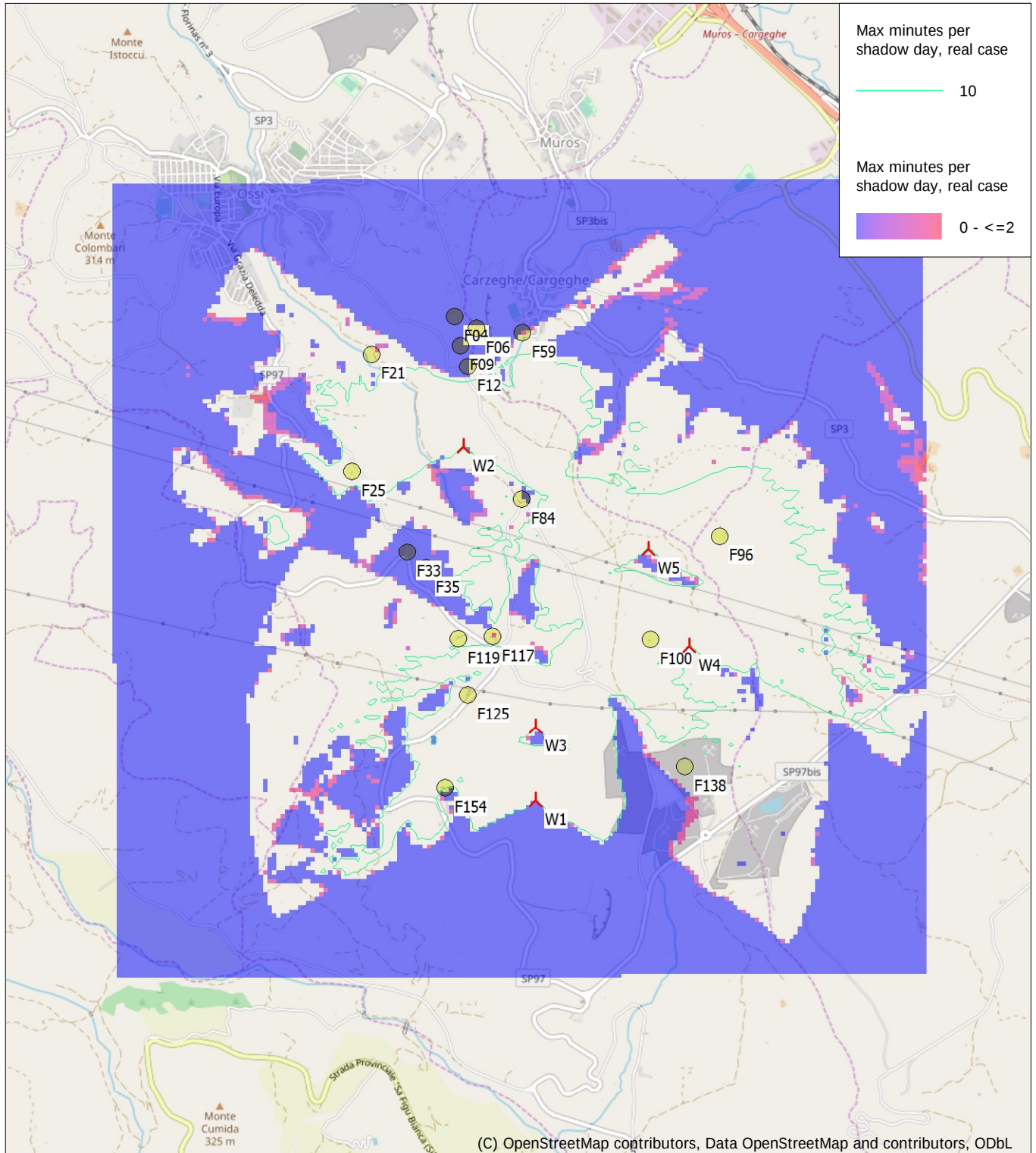
SCENARIO "REAL CASE"

Project:
Layout_GRVDEP_Ossi

Licensed user:
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Calculated:
24/05/2021 15:31/3.4.415

SHADOW - Map

Calculation: Progetto_real case_max minutes per shadow day



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap, Print scale 1:40.000, Map center Italian Gauss-Boaga west-ROMA40 (IT-peninsular <±4m) East: 1.467.390 North: 4.500.060
 New WTG Shadow receptor
 Flicker map level: Height Contours: CONTOURLINE_Layout_GRVDEP_Ossi_1.wpo (1)