REGIONE PUGLIA

PROVINCIA DI FOGGIA

COMUNE DI TROIA

POTENZIAMENTO DEL PARCO EOLICO DI TROIA SAN CIREO

"REPOWERING" di un impianto di produzione di energia elettrica da fonte rinnovabile eolica da ubicarsi nel comune di Troia (FG) e delle relative opere di connessione alla Stazione Elettrica SE RTN

POTENZA NOMINALE IMPIANTO: 57.6 MW

ELABORATO

RELAZIONE EFFETTI OMBREGGIAMENTO - SHADOW FLICKERING

IDENTIFICAZIONE ELABORATO

Livello progetto	Codice Pratica AU	Documento	Codice elaborato	n° foglio	n° tot. fogli	Nome file	Data	Scala
PD		R	2.24	1	30	R_2.24_SHADOW-FLICKERING	Agosto 2023	

REVISIONI

Rev. n°	Data	Descrizione	Redatto	Verificato	Approvato
00	01/08/2023	I Emissione	ADORNO	ADORNO	AMBRON

PROGETTAZIONE:

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POTENZIAMENTO DEL PARCO EOLICO DI TROIA SAN CIREO

REPOWERING DI UN IMPIANTO DI PRODUZIONE DI ENERGIA ELETTRICA DA FONTE RINNOVABILE EOLICA DA UBICARSI NEL COMUNE DI TROIA (FG) E DELLE RELATIVE OPERE DI CONNESSIONE ALLA STAZIONE ELETTRICA SE RTN

POTENZA NOMINALE IMPIANTO: 57.6 MW

COMMITTENTE:
ERG Eolica San Vincenzo S.r.l.

PROGETTAZIONE a cura di:
MATE SYSTEM S.r.l.
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70020 – Cassano delle Murge (BA)

Ing. Francesco Ambron

RELAZIONE EFFETTI OMBREGGIAMENTO – SHADOW FLICKERING

Sommario

1. PREMESSA

Finalità dell'intervento Scopo del progetto è il "repowering" di un "Parco eolico" per la produzione di energia elettrica da fonte rinnovabile (vento) e l'immissione dell'energia prodotta, attraverso una opportuna connessione, nella Rete di Distribuzione Nazionale.

2. AEROGENERATORE DI PROGETTO

L'impianto sarà costituito da 8 unità di produzione. Il tipo della turbina del progetto proposto è capace di generare fino a 7.2 MW tramite tre pale con un passo sopravento delle stesse ad imbardata regolata. Il diametro previsto del rotore è di max 175 m.

La turbina utilizza un sistema di potenza basato su di un generatore a magneti permanenti del convertitore. Con queste caratteristiche la turbina eolica è in grado di lavorare anche a velocità variabile mantenendo una potenza in prossimità di quella nominale anche in caso di vento forte. Alle basse velocità del vento, il sistema consente di lavorare massimizzando la potenza erogata alla velocità ottimale del rotore e l'opportuno angolo di inclinazione delle pale. In cima alla torre troverà alloggio la navicella cui è collegato il rotore per un'altezza massima complessiva del sistema torre–pale di 220 m (slt.).

La velocità del rotore sarà variabile e compresa nel range 3-25 m/s.

3. CENNI SUL FENOMENO DELLO SHADOW FLICKERING

Gli aerogeneratori, al pari di tutte le altre strutture fortemente sviluppate in altezza, proiettano un'ombra sulle aree circostanti in presenza di irraggiamento solare diretto.

Lo shadow flickering (letteralmente ombreggiamento intermittente) è l'espressione comunemente impiegata per descrivere una fluttuazione periodica dell'intensità luminosa osservata. Tale effetto (stroboscopico) è causato dalla proiezione, su una generica superficie, dell'ombra indotta da oggetti in movimento. Nel caso specifico di un impianto eolico il fenomeno è generato dalla proiezione, al suolo o su un ricettore (abitazione), dell'ombra prodotta dalle pale degli aerogeneratori in rotazione allorquando il sole si trova alle loro spalle (cfr. figura successiva).

Il fenomeno, dal punto di vista di un potenziale ricettore, si traduce in una variazione alternata e ciclica di intensità luminosa che, a lungo andare, può provocare fastidio agli occupanti delle abitazioni le cui finestre risultano esposte al fenomeno stesso. Il fenomeno, ovviamente, risulta assente sia quando il sole è oscurato da nuvole o dalla nebbia, sia quando, in assenza di vento, le pale dell'aerogeneratore non sono in rotazione.

In particolare, le frequenze che possono provocare un senso di fastidio sono comprese tra i 2,5 ed i 20 Hz (Verkuijlen and Westra, 1984), e, l'effetto sugli individui è simile a quello che si sperimenterebbe in seguito alle variazioni di intensità luminosa di una lampada ad incandescenza a causa di continui sbalzi della tensione della rete di alimentazione elettrica.

I più recenti aerogeneratori tripala operano ad una velocità di rotazione di molto inferiore ai 35 giri al minuto, corrispondente ad una frequenza di passaggio delle pale sulla verticale inferiore a 1,75 Hz, minore, quindi, della frequenza critica di 2,5 Hz riportata in letteratura.

Inoltre, i generatori di grande potenza (dal MW in su) raramente superano la velocità di rotazione di 15 giri al minuto, corrispondente a frequenze di passaggio delle pale ampiamente minori di quelle ritenute fastidiose per la maggioranza degli individui.

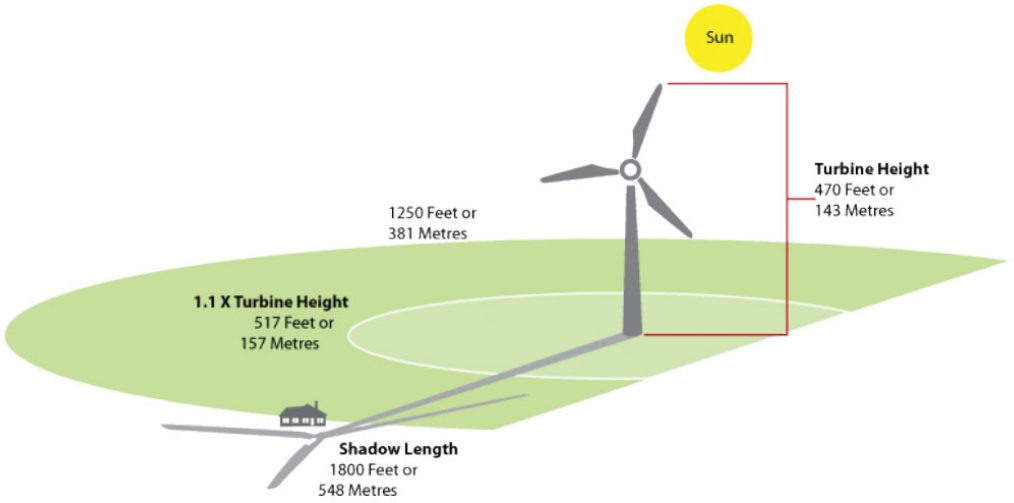


Figura 1: Fenomeno effetto flicker

Tale fenomeno, se sperimentato da un ricettore per periodi di tempo prolungati, può generare un disturbo, nelle seguenti condizioni:

- presenza di un livello sufficiente di intensità luminosa, ovvero in condizioni di cielo sereno sgombro da nubi ed in assenza di nebbia e con sole alto rispetto all'orizzonte;
- assenza di ostacoli sulla congiungente ricettore - aerogeneratore: la presenza di vegetazione e/o edifici interposti all'ombra generata da questi ultimi annullerebbe il fenomeno. quindi, condizione favorevole affinché il fenomeno in esame si verifichi, è quella rappresentata dall'orientamento perpendicolare delle finestre di un'abitazione rispetto alla linea congiungente il ricettore all'aerogeneratore in assenza di ostacoli fisici (alberi, altri edifici ecc…);
- orientamento perpendicolare del rotore rispetto alla congiungente sole - ricettore: infatti, quando il piano del rotore è perpendicolare alla linea sole-ricettore, l'ombra proiettata dalle pale risulta muoversi all'interno di un "disco" che induce un effetto non trascurabile di shadow flickering; viceversa, nel caso in cui il piano del rotore risulti essere in linea con il sole, l'ombra proiettata risulterebbe molto assottigliata e di bassa intensità per cui l'effetto di shadow flickering sarebbe del tutto trascurabile.

Inoltre, affinché lo shadow flickering, abbia un'intensità non trascurabile è necessario che:

- la posizione del sole sia tale da produrre una luminosità sufficiente; tale condizione corrispondere per la latitudine di progetto, in un'altezza del sole sull'orizzonte dell'ordine di almeno 10°;
- le pale del rotore siano ovviamente in rotazione;
- l'aerogeneratore ed il potenziale ricettore non siano troppo distanti: infatti, le ombre proiettate in prossimità dell'aerogeneratore risultano di maggiore intensità rispetto a quelle proiettate ad una

distanza crescente. Tale condizione deriva dal fatto che in presenza di un ricettore molto prossimo all'aerogeneratore, una porzione ampia di pala copre il disco solare così come osservato dal punto di vista del ricettore stesso, e, quindi, l'intensità del flicker risulta maggiormente percepibile. all'aumentare della distanza tra aerogeneratore e ricettore, le pale, durante il loro moto di rotazione, andranno a coprire una porzione sempre più piccola del disco solare, inducendo un effetto di flicker di minore intensità.

Alla luce di quanto sopra esposto, le relazioni spaziali tra un aerogeneratore ed un ricettore (abitazione), così come la direzione del vento risultano essere fattori chiave per la durata del fenomeno di shadow flicker. Per distanze dell'ordine dei 400-500 m, il fenomeno in esame potrebbe verificarsi all'alba oppure al tramonto, ovvero in quelle ore in cui le ombre risultano molto lunghe e la radiazione diretta è di minore intensità per effetto della piccola elevazione solare. Al di là di una certa distanza l'ombra smette di essere un problema perché il rapporto tra lo spessore della pala ed il diametro apparente del sole diventa molto piccolo. Quindi, come è facile immaginare, la condizione più penalizzante corrisponde al caso in cui il piano del rotore risulti ortogonale alla congiungente ricettore – sole; infatti, in tali condizioni, l'ombra proiettata darà origine ad un cerchio di diametro pari a quello del rotore del generatore eolico.
Sebbene il fenomeno possa essere percepito anche all'esterno, esso risulta evidente e fastidioso in quegli ambienti con finestrature rivolte verso le ombre. In generale, l'area soggetta a shadow flicker non si estende oltre i 500÷1000 m dall'aerogeneratore e le zone a maggiore impatto ricadono entro i 500 m di distanza dalle macchine con durata del fenomeno dell'ordine delle 200 ore all'anno; il flickering, se presente, non supera in genere i 30/40 minuti di durata potenziale nell'arco di una giornata.
L'intensità del fenomeno è definita come la differenza di luminosità che si percepisce in presenza ed in assenza di flickering in una data posizione.
In definitiva, si può affermare che:

- avendo le pale una forma rastremata con lo spessore che cresce verso il mozzo; il fenomeno risulterà tanto più intenso quanto maggiore sarà la porzione di disco solare coperta dalla pala stessa e quanto minore la distanza dal ricettore;
- l'intensità del flickering sarà minima quando l'ombra prodotta è generata all'estremità delle pale;
- maggiori distanze tra generatore e ricettore determinano ombre meno nette; in tal caso l'effetto flickering risulterà meno intenso e distinto.

La presente relazione ha lo scopo di stimare le aree potenzialmente interessate dal fenomeno in relazione agli aerogeneratori che costituiscono il parco eolico in oggetto.
Nello specifico, quando si valuta l'impatto da shadow flickering, lo stesso può essere realizzato attraverso l'analisi di due casi specifici:

- il worst case, in cui viene valutata la massima durata del fenomeno, ovvero quella astronomica, che corrisponde alle condizioni di cielo sempre sgombro da nubi, di rotore in movimento continuo e di perpendicolarità tra quest'ultimo ed il potenziale ricettore;
- il real case, in cui viene valutata la durata realistica del fenomeno, tenendo conto del soleggiamento effettivo dell'area e delle specifiche condizioni anemologiche che determinano la reale operabilità degli aerogeneratori.

4. NORME DI RIFERIMENTO

Attualmente nel nostro paese non sono state emanate specifiche norme o linee guida che regolamentino i limiti di esposizione al fenomeno dello Shadow flicker generato dall'esercizio degli impianti eolici, né è stata definita una distanza massima oltre la quale si ritiene improbabile il verificarsi di un impatto significativo sulla salute umana.
Viceversa, a livello internazionale esistono diverse linee guida e normative che stabiliscono specifici limiti di esposizione, in termini di ore/anno e ore/giorno, al fenomeno in esame.
La presente valutazione è finalizzata a valutare il cosiddetto "worst case", tenendo conto delle principali linee guida e/o normative internazionali che fissano i limiti di esposizione entro i quali gli effetti del fenomeno sulla salute umana posso considerarsi trascurabili o nulli, quali:

- Länderausschuss für Immissionsschutz "Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (Guideline for identification and evaluation of the optical emissions of wind turbines) (WEA-Schattenwurf-Hinweise)" (Germania, 2002);
- Department of Energy and Climate Change "National Policy Statement for Renewable Energy Infrastructure (EN-3)" (Regno Unito, 2011).

La maggior parte dei paesi che hanno adottato specifiche linee guida o regolamenti in materia si sono basati sulle norme di riferimento tedesche e sui limiti di accettabilità da esse introdotti. In assenza di una specifica normativa o linea guida, nazioni quali Austria, Brasile, Canada, India, Giappone e Polonia, impiegano, come buona pratica, le indicazioni contenute nelle linee guida tedesche. Nello specifico, tali linee guida sono state introdotte nel 2002 dal comitato statale per il controllo dell'inquinamento e, da allora, sono state adottate dalla maggior parte dei Lander e sono comunemente considerate buone pratiche nella valutazione dell'impatto prodotto da un parco eolico. In particolare, tali linee guida, stabiliscono che lo shadow flickering deve essere valutato:

- fino ad una distanza tale che il rotore copra il 20% del disco solare; a distanze superiori il fenomeno è considerato troppo diffuso da poter produrre fastidio;
- per angoli del sole sull'orizzonte superiori a 3 gradi; per angoli inferiori il fenomeno si ritiene schermato dalla presenza di edifici e/o vegetazione;
- ad un'altezza di 2 metri dal suolo.

I valori limite di accettabilità stabiliti dalle suddette linee guida sono un massimo di:

- 30 minuti al giorno;
- 30 ore all'anno.

5. INDIVIDUAZIONE RECETTORI

Allo scopo di valutare l'impatto indotto sugli edifici da parte dell'impianto eolico in progetto, sono stati individuati i recettori potenzialmente sensibili presenti in un'areale corrispondente all'inviluppo delle aree buffer circolari di raggio pari a 500m con centro coincidente con le postazioni delle WTG in oggetto.

Sebbene il fenomeno possa essere percepito anche all'esterno degli edifici, esso risulta evidente e potenzialmente fastidioso in quegli ambienti con finestrature localizzate lungo la direttrice sole-aerogeneratore e, per tale ragione, si è considerato nella simulazione la presenza di finestre di altezza pari a 1,5 metri e larghezza pari ad 1 metro, posizionate ad una quota dal suolo di 2 metri e disposte su tutte le facciate degli edifici considerati, in direzione dei quattro punti cardinali (N-E-S-W).

6. CALCOLO DELLO SHADOW FLICKERING

La valutazione tecnica è stata eseguita con un software utilizza una serie di dati di input caratterizzanti quali:

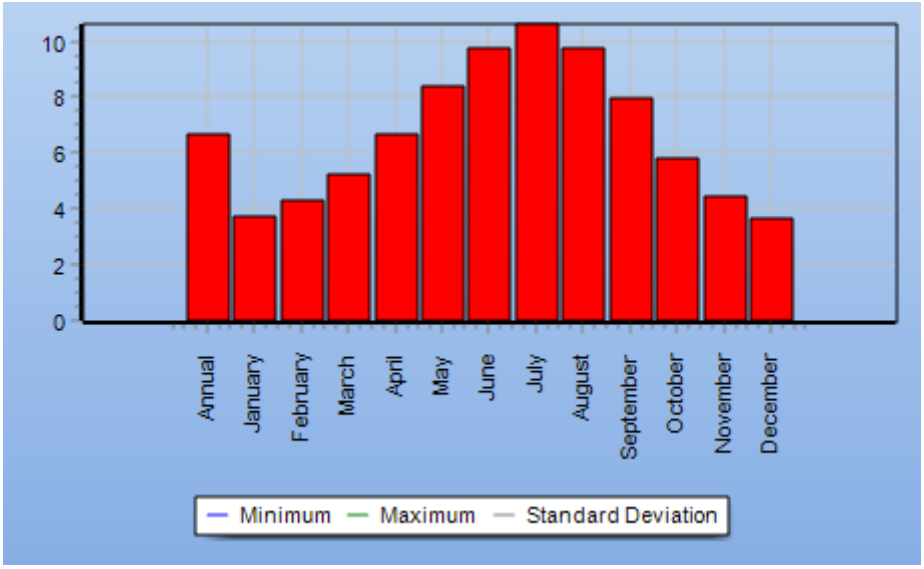
- l'altimetria della zona simulata;
- la disposizione geografica delle turbine e dimensione geometrica dei loro componenti (torre e pale);
- la disposizione geografica dei "recettori sensibili" (abitazioni e relative finestre);
- la latitudine e longitudine dell'area interessata.

Sulla base di questi dati il software calcola il numero di ore annue di esposizione allo shadow flickering per ciascun nodo del grigliato che copre l'intera area, nonché il numero di ore di esposizione per gli ambienti abitativi attraverso le finestre.

Per l'esecuzione della simulazione sono stati fissati i seguenti parametri:

- coordinate geografiche delle turbine considerate
- coordinate geografiche dei ricettori e disposizione delle finestre
- estensione area simulata: 6 km x 5 km
- raggio d'influenza massimo: 2 km dal punto di installazione dell'aerogeneratore;
- altezza del punto di vista dell'osservatore: 2 m
- parametri turbina

Allo scopo di pervenire a valori più realistici, prossimi al caso reale, si può tener conto dell'eliofania locale con i dati della stazione meteo di Brindisi e delle ore stimate di funzionamento dell'impianto eolico nell'arco dell'anno.



A seguito di quanto descritto nei paragrafi precedenti si può concludere che, pur considerando una stima cautelativa in quanto non si è tenuto conto degli effetti mitigativi dovuti al piano di rotazione delle pale non sempre ortogonale alla direttrice sole-finestra e all'eventuale presenza di ostacoli e/o vegetazione interposti tra il sole e la finestra, il fenomeno dello shadow flickering si verifica esclusivamente su due abitazioni (vedi tabella), incidendo in maniera molto limitata, in quanto il valore atteso è per buona parte per tutti i recettori inferiore a 80 ore l'anno.

Va altresì sottolineato che:

- la velocità di rotazione della turbina è 12,8 rotazioni al minuto, quindi nettamente inferiore a 60 rpm, frequenza massima raccomandata al fine di ridurre al minimo i fastidi e soddisfare le condizioni di benessere;
- Al fine di ridurre e/o eliminare gli effetti di shadow flickering sulle abitazioni interessate sono possibili due soluzioni:
    1. completamento della piantumazione già presente e non considerata nella fase di studio o, in alternativa;
    2. l'installazione sugli aerogeneratori che causano il fenomeno dell'ombreggiamento, dello Shadow Detection System, una innovativa tecnologia sviluppata da Vestas che, attraverso l'analisi della posizione del sole, del rotore della turbina e delle abitazioni circostanti, blocca la turbina nei periodi in cui si creano le condizioni favorevoli per il verificarsi dello shadow flickering, annullando così il fenomeno.

7 ALLEGATI CALCOLO

SHADOW - Main Result

Assumptions for shadow calculations

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

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

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

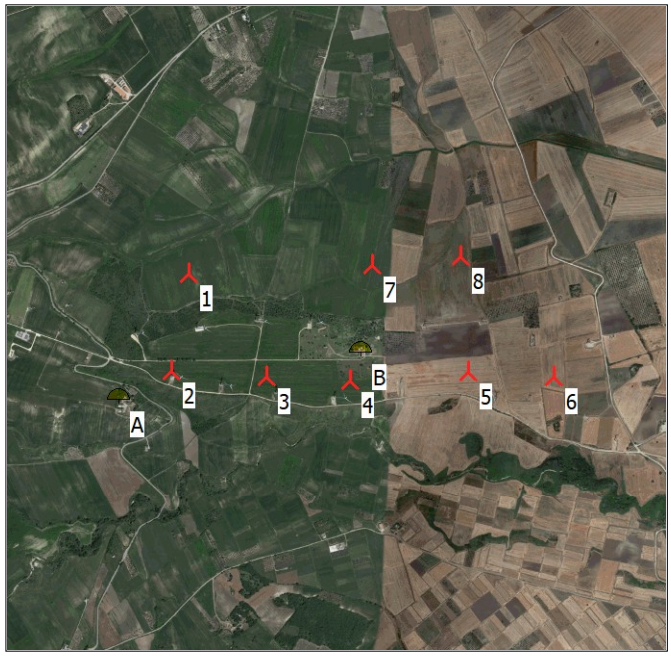
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window.
The ZVI calculation is based on the following assumptions:
Height contours used: Elevation Grid Data Object: troia_EMDGrid_0.wpg (1)
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
UTM (north)-WGS84 Zone: 33



Scale 1:40.000
New WTG
Shadow receptor

WTGs

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	524.290	4.576.542	331,0	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8
2	524.199	4.576.027	378,9	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8
3	524.705	4.575.998	368,5	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8
4	525.145	4.575.977	358,6	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8
5	525.773	4.576.021	345,7	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8
6	526.223	4.575.998	337,6	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8
7	525.261	4.576.587	310,0	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8
8	525.730	4.576.631	304,1	Siemens Gamesa SG 6.0-17...	Yes	Siemens Gamesa	SG 6.0-170-6.200	6.200	170,0	117,0	2.041	8,8

Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Degrees from south cw	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]	[°]		[m]
A	523.921	4.575.877	385,8	1,0	1,0	1,0	0,0	90,0	Fixed direction	2,0
B	525.203	4.576.123	358,3	1,0	1,0	1,0	0,0	90,0	Fixed direction	2,0

Calculation Results

Shadow receptor

Shadow, expected values

No.	Shadow hours per year [h/year]
A	0:00
B	101:42

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (1)	0:00	0:00
2	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (2)	24:34	0:24
3	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (3)	90:54	3:40

To be continued on next page...

SHADOW - Main Result

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
4	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (4)	679:38	95:37
5	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (5)	71:05	2:05
6	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (6)	18:57	0:23
7	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (7)	0:00	0:00
8	Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (8)	0:00	0:00

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

SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25	07:12	06:35	06:44	05:58	05:29	05:29	05:53	06:25	06:55	06:30	07:05
	16:40	17:15	17:49	19:24	19:56	20:26	20:37	20:17	19:34	18:43	16:56	16:31
2	07:25	07:11	06:34	06:43	05:57	05:28	05:30	05:54	06:26	06:56	06:31	07:06
	16:41	17:16	17:50	19:25	19:57	20:26	20:36	20:16	19:32	18:41	16:55	16:31
3	07:26	07:10	06:32	06:41	05:55	05:28	05:30	05:55	06:27	06:57	06:32	07:07
	16:42	17:17	17:51	19:26	19:58	20:27	20:36	20:15	19:31	18:40	16:53	16:31
4	07:26	07:09	06:31	06:39	05:54	05:28	05:31	05:56	06:28	06:58	06:33	07:08
	16:43	17:18	17:53	19:27	19:59	20:28	20:36	20:14	19:29	18:38	16:52	16:30
5	07:26	07:08	06:29	06:38	05:53	05:27	05:31	05:57	06:29	06:59	06:34	07:09
	16:44	17:20	17:54	19:28	20:00	20:28	20:36	20:13	19:27	18:36	16:51	16:30
6	07:26	07:07	06:28	06:36	05:52	05:27	05:32	05:58	06:30	07:00	06:36	07:10
	16:45	17:21	17:55	19:29	20:01	20:29	20:36	20:12	19:26	18:35	16:50	16:30
7	07:26	07:05	06:26	06:34	05:51	05:27	05:33	05:59	06:31	07:01	06:37	07:11
	16:46	17:22	17:56	19:30	20:02	20:30	20:35	20:10	19:24	18:33	16:49	16:30
8	07:25	07:04	06:24	06:33	05:49	05:26	05:33	06:00	06:32	07:02	06:38	07:12
	16:47	17:23	17:57	19:31	20:03	20:30	20:35	20:09	19:22	18:31	16:48	16:30
9	07:25	07:03	06:23	06:31	05:48	05:26	05:34	06:01	06:33	07:04	06:39	07:13
	16:48	17:25	17:58	19:32	20:04	20:31	20:35	20:08	19:21	18:30	16:47	16:30
10	07:25	07:02	06:21	06:29	05:47	05:26	05:35	06:02	06:34	07:05	06:40	07:14
	16:49	17:26	17:59	19:33	20:05	20:32	20:34	20:07	19:19	18:28	16:46	16:30
11	07:25	07:01	06:19	06:28	05:46	05:26	05:35	06:03	06:35	07:06	06:42	07:14
	16:50	17:27	18:01	19:34	20:06	20:32	20:34	20:05	19:17	18:26	16:45	16:30
12	07:25	06:59	06:18	06:26	05:45	05:26	05:36	06:04	06:36	07:07	06:43	07:15
	16:51	17:28	18:02	19:35	20:07	20:33	20:33	20:04	19:15	18:25	16:44	16:30
13	07:24	06:58	06:16	06:25	05:44	05:26	05:37	06:05	06:37	07:08	06:44	07:16
	16:52	17:30	18:03	19:36	20:08	20:33	20:33	20:03	19:14	18:23	16:43	16:30
14	07:24	06:57	06:15	06:23	05:43	05:25	05:38	06:06	06:38	07:09	06:45	07:17
	16:53	17:31	18:04	19:38	20:09	20:34	20:32	20:01	19:12	18:22	16:42	16:30
15	07:24	06:56	06:13	06:21	05:42	05:25	05:38	06:07	06:39	07:10	06:47	07:18
	16:54	17:32	18:05	19:39	20:10	20:34	20:32	20:00	19:10	18:20	16:41	16:31
16	07:23	06:54	06:11	06:20	05:41	05:25	05:39	06:08	06:40	07:11	06:48	07:18
	16:55	17:33	18:06	19:40	20:11	20:34	20:31	19:58	19:09	18:18	16:40	16:31
17	07:23	06:53	06:10	06:18	05:40	05:25	05:40	06:09	06:41	07:12	06:49	07:19
	16:56	17:35	18:07	19:41	20:12	20:35	20:31	19:57	19:07	18:17	16:39	16:31
18	07:22	06:52	06:08	06:17	05:39	05:26	05:41	06:10	06:42	07:13	06:50	07:20
	16:57	17:36	18:08	19:42	20:13	20:35	20:30	19:56	19:05	18:15	16:38	16:32
19	07:22	06:50	06:06	06:15	05:38	05:26	05:42	06:11	06:43	07:15	06:51	07:20
	16:59	17:37	18:09	19:43	20:14	20:35	20:29	19:54	19:03	18:14	16:38	16:32
20	07:21	06:49	06:04	06:14	05:37	05:26	05:42	06:12	06:44	07:16	06:52	07:21
	17:00	17:38	18:11	19:44	20:15	20:36	20:28	19:53	19:02	18:12	16:37	16:32
21	07:21	06:47	06:03	06:12	05:36	05:26	05:43	06:14	06:45	07:17	06:54	07:21
	17:01	17:40	18:12	19:45	20:16	20:36	20:28	19:51	19:00	18:11	16:36	16:33
22	07:20	06:46	06:01	06:11	05:35	05:26	05:44	06:15	06:46	07:18	06:55	07:22
	17:02	17:41	18:13	19:46	20:17	20:36	20:27	19:50	18:58	18:09	16:35	16:33
23	07:19	06:45	05:59	06:09	05:35	05:26	05:45	06:16	06:47	07:19	06:56	07:22
	17:03	17:42	18:14	19:47	20:18	20:36	20:26	19:48	18:57	18:08	16:35	16:34
24	07:19	06:43	05:58	06:08	05:34	05:27	05:46	06:17	06:48	07:20	06:57	07:23
	17:05	17:43	18:15	19:48	20:19	20:36	20:25	19:47	18:55	18:07	16:34	16:34
25	07:18	06:42	05:56	06:06	05:33	05:27	05:47	06:18	06:49	06:21	06:58	07:23
	17:06	17:44	18:16	19:49	20:20	20:37	20:24	19:45	18:53	17:05	16:34	16:35
26	07:17	06:40	05:54	06:05	05:32	05:27	05:48	06:19	06:50	06:23	06:59	07:24
	17:07	17:46	18:17	19:50	20:21	20:37	20:23	19:44	18:51	17:04	16:33	16:35
27	07:16	06:39	05:53	06:04	05:32	05:28	05:49	06:20	06:51	06:24	07:01	07:24
	17:08	17:47	18:18	19:51	20:22	20:37	20:22	19:42	18:50	17:02	16:33	16:36
28	07:15	06:37	05:51	06:02	05:31	05:28	05:50	06:21	06:52	06:25	07:02	07:24
	17:10	17:48	18:19	19:53	20:22	20:37	20:22	19:40	18:48	17:01	16:32	16:37
29	07:15		06:49	06:01	05:31	05:28	05:51	06:22	06:53	06:26	07:03	07:25
	17:11		19:20	19:54	20:23	20:37	20:21	19:39	18:46	17:00	16:32	16:38
30	07:14		06:48	05:59	05:30	05:29	05:52	06:23	06:54	06:27	07:04	07:25
	17:12		19:21	19:55	20:24	20:37	20:20	19:37	18:45	16:58	16:31	16:38
31	07:13		06:46		05:29		05:52	06:24		06:28		07:25
	17:13		19:22		20:25		20:18	19:36		16:57		16:39
Potential sun hours	297	297	369	399	449	453	460	428	375	345	297	287
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)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January			February			March			April			May	June
1	07:25		11:43 (4)	07:12		11:42 (4)	06:35		06:54 (5)	06:44		07:35 (5)	05:58	05:29
	16:40	179	14:42 (4)	17:15	200	15:02 (4)	17:49	294	17:19 (3)	19:23	247	18:40 (2)	19:56	20:26
2	07:25		11:43 (4)	07:11		11:42 (4)	06:34		06:53 (5)	06:43		07:36 (5)	05:57	05:28
	16:41	180	14:43 (4)	17:16	200	15:02 (4)	17:50	300	17:21 (3)	19:25	233	18:37 (2)	19:57	20:26
3	07:26		11:43 (4)	07:10		11:42 (4)	06:32		06:51 (5)	06:41		07:37 (5)	05:55	05:28
	16:42	180	14:43 (4)	17:17	201	15:03 (4)	17:51	305	17:22 (3)	19:26	217	18:35 (2)	19:58	20:27
4	07:26		11:43 (4)	07:09		11:42 (4)	06:31		06:50 (5)	06:39		07:39 (5)	05:54	05:28
	16:43	181	14:44 (4)	17:18	201	15:03 (4)	17:52	309	17:23 (3)	19:27	197	18:32 (2)	19:59	20:28
5	07:26		11:43 (4)	07:08		11:42 (4)	06:29		06:48 (6)	06:38		07:41 (5)	05:53	05:27
	16:44	182	14:45 (4)	17:20	202	15:04 (4)	17:54	314	17:24 (3)	19:28	169	18:08 (3)	20:00	20:28
6	07:26		11:44 (4)	07:07		11:40 (4)	06:28		06:46 (6)	06:36		07:43 (5)	05:52	05:27
	16:44	182	14:46 (4)	17:21	203	15:03 (4)	17:55	318	17:24 (3)	19:29	155	18:05 (3)	20:01	20:29
7	07:25		11:44 (4)	07:05		11:40 (4)	06:26		06:45 (6)	06:34		07:47 (5)	05:50	05:27
	16:45	182	14:46 (4)	17:22	204	15:04 (4)	17:56	322	17:26 (3)	19:30	136	18:03 (3)	20:02	20:30
8	07:25		11:43 (4)	07:04		11:40 (4)	06:24		06:43 (6)	06:33		07:53 (5)	05:49	05:26
	16:46	183	14:46 (4)	17:23	204	15:04 (4)	17:57	325	17:26 (3)	19:31	113	18:00 (3)	20:03	20:30
9	07:25		11:44 (4)	07:03		11:40 (4)	06:23		06:42 (6)	06:31		14:20 (4)	05:48	05:26
	16:47	183	14:47 (4)	17:25	204	15:04 (4)	17:58	327	17:27 (3)	19:32	93	17:57 (3)	20:04	20:31
10	07:25		11:44 (4)	07:02		11:40 (4)	06:21		06:40 (6)	06:29		14:23 (4)	05:47	05:26
	16:48	184	14:48 (4)	17:26	205	15:05 (4)	17:59	330	17:27 (3)	19:33	76	17:51 (3)	20:05	20:32
11	07:25		11:44 (4)	07:01		11:39 (4)	06:19		06:38 (6)	06:28		14:27 (4)	05:46	05:26
	16:50	185	14:49 (4)	17:27	205	15:04 (4)	18:00	331	17:27 (3)	19:34	58	15:25 (4)	20:06	20:32
12	07:25		11:44 (4)	06:59		11:40 (4)	06:18		06:37 (6)	06:26		14:31 (4)	05:45	05:26
	16:51	185	14:49 (4)	17:28	205	15:05 (4)	18:02	344	17:39 (2)	19:35	53	15:24 (4)	20:07	20:33
13	07:24		11:44 (4)	06:58		11:40 (4)	06:16		06:35 (6)	06:25		14:35 (4)	05:44	05:25
	16:52	186	14:50 (4)	17:30	205	15:05 (4)	18:03	349	17:42 (2)	19:36	46	15:21 (4)	20:08	20:33
14	07:24		11:44 (4)	06:57		11:39 (4)	06:14		06:33 (6)	06:23		14:39 (4)	05:43	05:25
	16:53	186	14:50 (4)	17:31	206	15:05 (4)	18:04	353	17:43 (2)	19:37	40	15:19 (4)	20:09	20:34
15	07:24		11:44 (4)	06:56		11:39 (4)	06:13		06:32 (6)	06:21		14:44 (4)	05:42	05:25
	16:54	188	14:52 (4)	17:32	206	15:05 (4)	18:05	352	17:44 (2)	19:39	31	15:15 (4)	20:10	20:34
16	07:23		11:44 (4)	06:54		11:39 (4)	06:11		06:30 (6)	06:20		14:49 (4)	05:41	05:25
	16:55	188	14:52 (4)	17:33	207	15:06 (4)	18:06	354	17:45 (2)	19:40	23	15:12 (4)	20:11	20:34
17	07:23		11:44 (4)	06:53		11:38 (4)	06:09		06:28 (6)	06:18		14:59 (4)	05:40	05:25
	16:56	189	14:53 (4)	17:35	207	15:05 (4)	18:07	355	17:46 (2)	19:41	4	15:03 (4)	20:12	20:35
18	07:22		11:44 (4)	06:52		11:38 (4)	06:08		06:26 (6)	06:17			05:39	05:25
	16:57	189	14:53 (4)	17:36	208	15:06 (4)	18:08	356	17:47 (2)	19:42			20:13	20:35
19	07:22		11:44 (4)	06:50		11:39 (4)	06:06		06:25 (6)	06:15			05:38	05:26
	16:59	190	14:54 (4)	17:37	207	15:06 (4)	18:09	357	17:48 (2)	19:43			20:14	20:35
20	07:21		11:44 (4)	06:49		11:38 (4)	06:04		06:23 (6)	06:14			05:37	05:26
	17:00	191	14:55 (4)	17:38	207	15:05 (4)	18:10	355	17:48 (2)	19:44			20:15	20:36
21	07:20		11:43 (4)	06:47		11:38 (4)	06:03		06:24 (6)	06:12			05:36	05:26
	17:01	192	14:55 (4)	17:39	208	15:06 (4)	18:12	351	17:48 (2)	19:45			20:16	20:36
22	07:20		11:44 (4)	06:46		11:37 (4)	06:01		06:25 (6)	06:11			05:35	05:26
	17:02	192	14:56 (4)	17:41	217	16:59 (3)	18:13	346	17:48 (2)	19:46			20:17	20:36
23	07:19		11:43 (4)	06:44		11:38 (4)	05:59		06:25 (6)	06:09			05:35	05:26
	17:03	194	14:57 (4)	17:42	231	17:06 (3)	18:14	343	17:48 (2)	19:47			20:18	20:36
24	07:18		11:43 (4)	06:43		11:37 (4)	05:58		06:26 (6)	06:08			05:34	05:27
	17:05	194	14:57 (4)	17:43	238	17:09 (3)	18:15	335	17:47 (2)	19:48			20:19	20:36
25	07:18		11:43 (4)	06:41		07:02 (5)	05:56		06:28 (6)	06:06			05:33	05:27
	17:06	195	14:58 (4)	17:44	259	17:13 (3)	18:16	328	17:48 (2)	19:49			20:20	20:37
26	07:17		11:43 (4)	06:40		06:59 (5)	05:54		06:30 (6)	06:05			05:32	05:27
	17:07	196	14:59 (4)	17:45	272	17:15 (3)	18:17	319	17:47 (2)	19:50			20:21	20:37
27	07:16		11:43 (4)	06:38		06:58 (5)	05:53		06:31 (5)	06:03			05:32	05:28
	17:08	196	14:59 (4)	17:47	280	17:17 (3)	18:18	306	17:46 (2)	19:51			20:21	20:37
28	07:15		11:43 (4)	06:37		06:56 (5)	05:51		06:32 (5)	06:02			05:31	05:28
	17:10	197	15:00 (4)	17:48	287	17:18 (3)	18:19	295	17:44 (2)	19:53			20:22	20:37
29	07:14		11:43 (4)				06:49		07:33 (5)	06:01			05:30	05:28
	17:11	197	15:00 (4)				19:20	285	18:44 (2)	19:54			20:23	20:37
30	07:14		11:42 (4)				06:48		07:33 (5)	05:59			05:30	05:29
	17:12	199	15:01 (4)				19:21	272	18:43 (2)	19:55			20:24	20:37
31	07:13		11:42 (4)				06:46		07:34 (5)				05:29	
	17:13	199	15:01 (4)				19:22	260	18:41 (2)				20:25	
Potential sun hours	297			297			369			399			449	453
Total, worst case		5844			6079			10090			1891			
Sun reduction		0,44			0,46			0,44			0,48			
Oper. time red.		0,34			0,34			0,34			0,34			
Wind dir. red.		0,93			0,89			0,58			0,65			
Total reduction		0,14			0,14			0,09			0,11			
Total, real		833			861			904			204			

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

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

SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

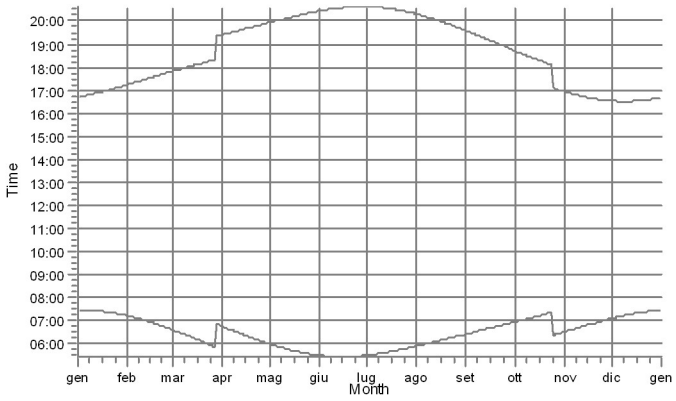
	July		August			September			October			November			December		
1	05:29		05:53			06:25		14:26 (4)	06:55		07:15 (6)	06:30		11:09 (4)	07:05		11:26 (4)
	20:37		20:17			19:34	58	15:24 (4)	18:43	347	18:19 (2)	16:56	205	14:34 (4)	16:31	185	14:31 (4)
2	05:30		05:54			06:26		14:21 (4)	06:56		07:16 (6)	06:31		11:10 (4)	07:06		11:27 (4)
	20:36		20:16			19:32	76	17:49 (3)	18:41	339	18:14 (2)	16:55	204	14:34 (4)	16:31	184	14:31 (4)
3	05:30		05:55			06:27		14:17 (4)	06:57		07:17 (6)	06:32		11:10 (4)	07:07		11:28 (4)
	20:36		20:15			19:31	93	17:54 (3)	18:40	331	18:05 (3)	16:53	204	14:34 (4)	16:31	183	14:31 (4)
4	05:31		05:56			06:28		07:50 (5)	06:58		07:18 (6)	06:33		11:10 (4)	07:08		11:28 (4)
	20:36		20:14			19:29	113	17:57 (3)	18:38	329	18:04 (3)	16:52	203	14:33 (4)	16:30	183	14:31 (4)
5	05:31		05:57			06:29		07:43 (5)	06:59		07:19 (6)	06:34		11:10 (4)	07:09		11:29 (4)
	20:36		20:13			19:27	136	17:59 (3)	18:36	326	18:03 (3)	16:51	203	14:33 (4)	16:30	182	14:31 (4)
6	05:32		05:58			06:30		07:39 (5)	07:00		07:20 (6)	06:36		11:11 (4)	07:10		11:30 (4)
	20:36		20:12			19:26	155	18:01 (3)	18:34	323	18:02 (3)	16:50	202	14:33 (4)	16:30	182	14:32 (4)
7	05:33		05:59			06:31		07:36 (5)	07:01		07:22 (6)	06:37		11:12 (4)	07:11		11:30 (4)
	20:35		20:10			19:24	169	18:03 (3)	18:33	319	18:01 (3)	16:49	201	14:33 (4)	16:30	182	14:32 (4)
8	05:33		06:00			06:32		07:34 (5)	07:02		07:23 (6)	06:38		11:12 (4)	07:12		11:31 (4)
	20:35		20:09			19:22	193	18:25 (2)	18:31	315	18:00 (3)	16:48	200	14:32 (4)	16:30	181	14:32 (4)
9	05:34		06:01			06:33		07:31 (5)	07:03		07:24 (6)	06:39		11:13 (4)	07:13		11:31 (4)
	20:35		20:08			19:21	214	18:28 (2)	18:30	313	17:59 (3)	16:47	200	14:33 (4)	16:30	180	14:31 (4)
10	05:35		06:02			06:34		07:29 (5)	07:05		07:25 (5)	06:40		11:13 (4)	07:14		11:32 (4)
	20:34		20:07			19:19	232	18:30 (2)	18:28	307	17:57 (3)	16:45	199	14:32 (4)	16:30	180	14:32 (4)
11	05:35		06:03			06:35		07:28 (5)	07:06		07:26 (5)	06:42		11:13 (4)	07:14		11:33 (4)
	20:34		20:05			19:17	245	18:32 (2)	18:26	303	17:56 (3)	16:44	199	14:32 (4)	16:30	179	14:32 (4)
12	05:36		06:04			06:36		07:26 (5)	07:07		07:27 (5)	06:43		11:13 (4)	07:15		11:33 (4)
	20:33		20:04			19:15	259	18:33 (2)	18:25	297	17:54 (3)	16:43	199	14:32 (4)	16:30	180	14:33 (4)
13	05:37		06:05			06:37		07:25 (5)	07:08		07:28 (5)	06:44		11:15 (4)	07:16		11:34 (4)
	20:33		20:03			19:14	270	18:34 (2)	18:23	291	17:52 (3)	16:43	197	14:32 (4)	16:30	179	14:33 (4)
14	05:37		06:06			06:38		07:23 (5)	07:09		07:29 (5)	06:45		11:15 (4)	07:17		11:35 (4)
	20:32		20:01			19:12	282	18:34 (2)	18:22	285	17:50 (3)	16:42	197	14:32 (4)	16:30	179	14:34 (4)
15	05:38		06:07			06:39		07:22 (5)	07:10		07:31 (5)	06:46		11:15 (4)	07:18		11:35 (4)
	20:32		20:00			19:10	295	18:35 (2)	18:20	276	17:49 (3)	16:41	196	14:31 (4)	16:31	178	14:33 (4)
16	05:39		06:08			06:40		07:21 (5)	07:11		07:32 (5)	06:48		11:16 (4)	07:18		11:36 (4)
	20:31		19:58			19:09	305	18:35 (2)	18:18	267	17:46 (3)	16:40	196	14:32 (4)	16:31	178	14:34 (4)
17	05:40		06:09			06:41		07:19 (6)	07:12		07:37 (5)	06:49		11:17 (4)	07:19		11:37 (4)
	20:30		19:57			19:07	315	18:35 (2)	18:17	250	17:43 (3)	16:39	194	14:31 (4)	16:31	178	14:35 (4)
18	05:41		06:10			06:42		07:16 (6)	07:13		12:09 (4)	06:50		11:17 (4)	07:20		11:37 (4)
	20:30		19:56			19:05	325	18:35 (2)	18:15	236	17:40 (3)	16:38	194	14:31 (4)	16:31	177	14:34 (4)
19	05:41		06:11			06:43		07:14 (6)	07:14		12:08 (4)	06:51		11:17 (4)	07:20		11:38 (4)
	20:29		19:54			19:03	334	18:35 (2)	18:14	227	17:35 (3)	16:37	194	14:31 (4)	16:32	177	14:35 (4)
20	05:42		06:12			06:44		07:12 (6)	07:16		12:08 (4)	06:52		11:19 (4)	07:21		11:38 (4)
	20:28		19:53			19:02	340	18:34 (2)	18:12	208	15:36 (4)	16:37	192	14:31 (4)	16:32	177	14:35 (4)
21	05:43		06:13			06:45		07:10 (6)	07:17		12:09 (4)	06:54		11:19 (4)	07:21		11:39 (4)
	20:28		19:51			19:00	347	18:34 (2)	18:11	207	15:36 (4)	16:36	192	14:31 (4)	16:33	177	14:36 (4)
22	05:44		06:14			06:46		07:09 (6)	07:18		12:09 (4)	06:55		11:20 (4)	07:22		11:39 (4)
	20:27		19:50			18:58	351	18:33 (2)	18:09	207	15:36 (4)	16:35	191	14:31 (4)	16:33	177	14:36 (4)
23	05:45		06:15			06:47		07:08 (6)	07:19		12:08 (4)	06:56		11:20 (4)	07:22		11:40 (4)
	20:26		19:48			18:57	354	18:33 (2)	18:08	208	15:36 (4)	16:35	190	14:30 (4)	16:34	177	14:37 (4)
24	05:46		06:16			06:48		07:08 (6)	07:20		12:08 (4)	06:57		11:22 (4)	07:23		11:40 (4)
	20:25		19:47			18:55	357	18:32 (2)	18:07	207	15:35 (4)	16:34	189	14:31 (4)	16:34	177	14:37 (4)
25	05:47		06:17			06:49		07:09 (6)	06:21		11:08 (4)	06:58		11:22 (4)	07:23		11:41 (4)
	20:24		19:45			18:53	358	18:31 (2)	17:05	207	14:35 (4)	16:34	189	14:31 (4)	16:35	177	14:38 (4)
26	05:48		06:19		15:00 (4)	06:50		07:10 (6)	06:23		11:09 (4)	06:59		11:23 (4)	07:24		11:41 (4)
	20:23		19:43	8	15:08 (4)	18:51	356	18:29 (2)	17:04	206	14:35 (4)	16:33	188	14:31 (4)	16:35	178	14:39 (4)
27	05:49		06:20		14:51 (4)	06:51		07:11 (6)	06:24		11:09 (4)	07:00		11:23 (4)	07:24		11:41 (4)
	20:22		19:42	23	15:14 (4)	18:50	355	18:27 (2)	17:02	206	14:35 (4)	16:33	188	14:31 (4)	16:36	178	14:39 (4)
28	05:50		06:21		14:45 (4)	06:52		07:12 (6)	06:25		11:08 (4)	07:02		11:24 (4)	07:24		11:41 (4)
	20:21		19:40	33	15:18 (4)	18:48	353	18:25 (2)	17:01	207	14:35 (4)	16:32	186	14:30 (4)	16:37	178	14:39 (4)
29	05:51		06:22		14:40 (4)	06:53		07:13 (6)	06:26		11:08 (4)	07:03		11:24 (4)	07:25		11:42 (4)
	20:20		19:39	40	15:20 (4)	18:46	352	18:24 (2)	17:00	206	14:34 (4)	16:32	186	14:30 (4)	16:37	178	14:40 (4)
30	05:51		06:23		14:35 (4)	06:54		07:14 (6)	06:27		11:09 (4)	07:04		11:25 (4)	07:25		11:42 (4)
	20:19		19:37	47	15:22 (4)	18:45	350	18:22 (2)	16:58	206	14:35 (4)	16:31	185	14:30 (4)	16:38	179	14:41 (4)
31	05:52		06:24		14:31 (4)				06:28		11:09 (4)				07:25		11:42 (4)
	20:18		19:35	53	15:24 (4)				16:57	205	14:34 (4)				16:39	179	14:41 (4)
Potential sun hours	460		428			375			345			297			287		
Total, worst case				204			7942			8161			5863			5559	
Sun reduction				0,67			0,58			0,43			0,40			0,36	
Oper. time red.				0,34			0,34			0,34			0,34			0,34	
Wind dir. red.				0,93			0,56			0,76			0,93			0,93	
Total reduction				0,22			0,11			0,12			0,13			0,12	
Total, real				44			891			946			767			652	

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

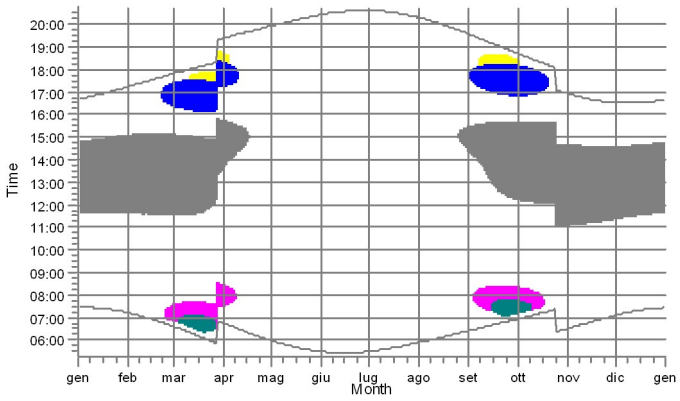
Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar, graphical

A: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)



B: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)



WTGs

- 2: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (2)
- 3: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (3)
- 4: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (4)
- 5: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (5)
- 6: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (6)

SHADOW - Calendar per WTG

WTG: 1 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (1)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25	07:12	06:35	06:44	05:58	05:29	05:29	05:53	06:25	06:55	06:30	07:05
	16:40	17:15	17:49	19:24	19:56	20:26	20:37	20:17	19:34	18:43	16:56	16:31
2	07:25	07:11	06:34	06:43	05:57	05:28	05:30	05:54	06:26	06:56	06:31	07:06
	16:41	17:16	17:50	19:25	19:57	20:26	20:36	20:16	19:32	18:41	16:55	16:31
3	07:26	07:10	06:32	06:41	05:55	05:28	05:30	05:55	06:27	06:57	06:32	07:07
	16:42	17:17	17:51	19:26	19:58	20:27	20:36	20:15	19:31	18:40	16:53	16:31
4	07:26	07:09	06:31	06:39	05:54	05:28	05:31	05:56	06:28	06:58	06:33	07:08
	16:43	17:18	17:53	19:27	19:59	20:28	20:36	20:14	19:29	18:38	16:52	16:30
5	07:26	07:08	06:29	06:38	05:53	05:27	05:31	05:57	06:29	06:59	06:34	07:09
	16:44	17:20	17:54	19:28	20:00	20:28	20:36	20:13	19:27	18:36	16:51	16:30
6	07:26	07:07	06:28	06:36	05:52	05:27	05:32	05:58	06:30	07:00	06:36	07:10
	16:45	17:21	17:55	19:29	20:01	20:29	20:36	20:12	19:26	18:35	16:50	16:30
7	07:26	07:05	06:26	06:34	05:50	05:27	05:33	05:59	06:31	07:01	06:37	07:11
	16:45	17:22	17:56	19:30	20:02	20:30	20:35	20:10	19:24	18:33	16:49	16:30
8	07:25	07:04	06:24	06:33	05:49	05:26	05:33	06:00	06:32	07:02	06:38	07:12
	16:46	17:23	17:57	19:31	20:03	20:30	20:35	20:09	19:22	18:31	16:48	16:30
9	07:25	07:03	06:23	06:31	05:48	05:26	05:34	06:01	06:33	07:03	06:39	07:13
	16:47	17:25	17:58	19:32	20:04	20:31	20:35	20:08	19:21	18:30	16:47	16:30
10	07:25	07:02	06:21	06:29	05:47	05:26	05:35	06:02	06:34	07:05	06:40	07:14
	16:49	17:26	17:59	19:33	20:05	20:32	20:34	20:07	19:19	18:28	16:46	16:30
11	07:25	07:01	06:19	06:28	05:46	05:26	05:35	06:03	06:35	07:06	06:42	07:14
	16:50	17:27	18:01	19:34	20:06	20:32	20:34	20:05	19:17	18:26	16:44	16:30
12	07:25	06:59	06:18	06:26	05:45	05:26	05:36	06:04	06:36	07:07	06:43	07:15
	16:51	17:28	18:02	19:35	20:07	20:33	20:33	20:04	19:15	18:25	16:44	16:30
13	07:24	06:58	06:16	06:25	05:44	05:25	05:37	06:05	06:37	07:08	06:44	07:16
	16:52	17:30	18:03	19:36	20:08	20:33	20:33	20:03	19:14	18:23	16:43	16:30
14	07:24	06:57	06:15	06:23	05:43	05:25	05:37	06:06	06:38	07:09	06:45	07:17
	16:53	17:31	18:04	19:38	20:09	20:34	20:32	20:01	19:12	18:22	16:42	16:30
15	07:24	06:56	06:13	06:21	05:42	05:25	05:38	06:07	06:39	07:10	06:47	07:18
	16:54	17:32	18:05	19:39	20:10	20:34	20:32	20:00	19:10	18:20	16:41	16:31
16	07:23	06:54	06:11	06:20	05:41	05:25	05:39	06:08	06:40	07:11	06:48	07:18
	16:55	17:33	18:06	19:40	20:11	20:34	20:31	19:58	19:09	18:18	16:40	16:31
17	07:23	06:53	06:10	06:18	05:40	05:25	05:40	06:09	06:41	07:12	06:49	07:19
	16:56	17:35	18:07	19:41	20:12	20:35	20:31	19:57	19:07	18:17	16:39	16:31
18	07:22	06:52	06:08	06:17	05:39	05:26	05:41	06:10	06:42	07:13	06:50	07:20
	16:57	17:36	18:08	19:42	20:13	20:35	20:30	19:56	19:05	18:15	16:38	16:31
19	07:22	06:50	06:06	06:15	05:38	05:26	05:42	06:11	06:43	07:15	06:51	07:20
	16:59	17:37	18:09	19:43	20:14	20:35	20:29	19:54	19:03	18:14	16:38	16:32
20	07:21	06:49	06:04	06:14	05:37	05:26	05:42	06:12	06:44	07:16	06:52	07:21
	17:00	17:38	18:11	19:44	20:15	20:36	20:28	19:53	19:02	18:12	16:37	16:32
21	07:21	06:47	06:03	06:12	05:36	05:26	05:43	06:13	06:45	07:17	06:54	07:21
	17:01	17:39	18:12	19:45	20:16	20:36	20:28	19:51	19:00	18:11	16:36	16:33
22	07:20	06:46	06:01	06:11	05:35	05:26	05:44	06:14	06:46	07:18	06:55	07:22
	17:02	17:41	18:13	19:46	20:17	20:36	20:27	19:50	18:58	18:09	16:35	16:33
23	07:19	06:44	05:59	06:09	05:35	05:26	05:45	06:16	06:47	07:19	06:56	07:22
	17:03	17:42	18:14	19:47	20:18	20:36	20:26	19:48	18:57	18:08	16:35	16:34
24	07:19	06:43	05:58	06:08	05:34	05:27	05:46	06:17	06:48	07:20	06:57	07:23
	17:05	17:43	18:15	19:48	20:19	20:36	20:25	19:47	18:55	18:07	16:34	16:34
25	07:18	06:42	05:56	06:06	05:33	05:27	05:47	06:18	06:49	06:21	06:58	07:23
	17:06	17:44	18:16	19:49	20:20	20:37	20:24	19:45	18:53	17:05	16:34	16:35
26	07:17	06:40	05:54	06:05	05:32	05:27	05:48	06:19	06:50	06:23	06:59	07:24
	17:07	17:45	18:17	19:50	20:21	20:37	20:23	19:43	18:51	17:04	16:33	16:35
27	07:16	06:39	05:53	06:04	05:32	05:28	05:49	06:20	06:51	06:24	07:01	07:24
	17:08	17:47	18:18	19:51	20:22	20:37	20:22	19:42	18:50	17:02	16:33	16:36
28	07:15	06:37	05:51	06:02	05:31	05:28	05:50	06:21	06:52	06:25	07:02	07:24
	17:10	17:48	18:19	19:53	20:22	20:37	20:22	19:40	18:48	17:01	16:32	16:37
29	07:15		06:49	06:01	05:30	05:28	05:51	06:22	06:53	06:26	07:03	07:25
	17:11		19:20	19:54	20:23	20:37	20:21	19:39	18:46	17:00	16:32	16:37
30	07:14		06:48	05:59	05:30	05:29	05:51	06:23	06:54	06:27	07:04	07:25
	17:12		19:21	19:55	20:24	20:37	20:20	19:37	18:45	16:58	16:31	16:38
31	07:13		06:46		05:29		05:52	06:24		06:28		07:25
	17:13		19:22		20:25		20:18	19:36		16:57		16:39
Potential sun hours	297	297	369	399	449	453	460	428	375	345	297	287
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

WTG: 2 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (2)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March		April		May	June	July	August	September		October		November	December
1	07:25	07:12	06:35		06:44	18:13-18:40/27	05:58	05:29	05:29	05:53	06:25		06:55	18:03-18:19/16	06:30	07:05
	16:40	17:15	17:49		19:24		19:56	20:26	20:37	20:17	19:34		18:43		16:56	16:31
2	07:25	07:11	06:34		06:43	18:14-18:37/23	05:57	05:28	05:30	05:54	06:26		06:56	18:07-18:14/7	06:31	07:06
	16:41	17:16	17:50		19:25		19:57	20:26	20:36	20:16	19:32		18:41		16:55	16:31
3	07:26	07:10	06:32		06:41	18:16-18:35/19	05:55	05:28	05:30	05:55	06:27		06:57		06:32	07:07
	16:42	17:17	17:51		19:26		19:58	20:27	20:36	20:15	19:31		18:40		16:53	16:31
4	07:26	07:09	06:31		06:39	18:19-18:32/13	05:54	05:28	05:31	05:56	06:28		06:58		06:33	07:08
	16:43	17:18	17:53		19:27		19:59	20:28	20:36	20:14	19:29		18:38		16:52	16:30
5	07:26	07:08	06:29		06:38		05:53	05:27	05:31	05:57	06:29		06:59		06:34	07:09
	16:44	17:20	17:54		19:28		20:00	20:28	20:36	20:13	19:27		18:36		16:51	16:30
6	07:26	07:07	06:28		06:36		05:52	05:27	05:32	05:58	06:30		07:00		06:36	07:10
	16:45	17:21	17:55		19:29		20:01	20:29	20:36	20:12	19:26		18:35		16:50	16:30
7	07:26	07:05	06:26		06:34		05:50	05:27	05:33	05:59	06:31		07:01		06:37	07:11
	16:46	17:22	17:56		19:30		20:02	20:30	20:35	20:10	19:24		18:33		16:49	16:30
8	07:25	07:04	06:24		06:33		05:49	05:26	05:33	06:00	06:32	18:14-18:25/11	07:02		06:38	07:12
	16:47	17:23	17:57		19:31		20:03	20:30	20:35	20:09	19:22		18:31		16:48	16:30
9	07:25	07:03	06:23		06:31		05:48	05:26	05:34	06:01	06:33	18:10-18:28/18	07:03		06:39	07:13
	16:48	17:25	17:58		19:32		20:04	20:31	20:35	20:08	19:21		18:30		16:47	16:30
10	07:25	07:02	06:21		06:29		05:47	05:26	05:35	06:02	06:34	18:07-18:30/23	07:05		06:40	07:14
	16:49	17:26	17:59		19:33		20:05	20:32	20:34	20:07	19:19		18:28		16:46	16:30
11	07:25	07:01	06:19		06:28		05:46	05:26	05:35	06:03	06:35	18:05-18:32/27	07:06		06:42	07:14
	16:50	17:27	18:01		19:34		20:06	20:32	20:34	20:05	19:17		18:26		16:45	16:30
12	07:25	06:59	06:18	17:26-17:39/13	06:26		05:45	05:26	05:36	06:04	06:36	18:03-18:33/30	07:07		06:43	07:15
	16:51	17:28	18:02		19:35		20:07	20:33	20:33	20:04	19:15		18:25		16:44	16:30
13	07:24	06:58	06:16	17:22-17:42/20	06:25		05:44	05:26	05:37	06:05	06:37	18:02-18:34/32	07:08		06:44	07:16
	16:52	17:30	18:03		19:36		20:08	20:33	20:33	20:03	19:14		18:23		16:43	16:30
14	07:24	06:57	06:15	17:19-17:43/24	06:23		05:43	05:25	05:38	06:06	06:38	18:01-18:34/33	07:09		06:45	07:17
	16:53	17:31	18:04		19:38		20:09	20:34	20:32	20:01	19:12		18:22		16:42	16:30
15	07:24	06:56	06:13	17:18-17:44/26	06:21		05:42	05:25	05:38	06:07	06:39	17:59-18:35/36	07:10		06:47	07:18
	16:54	17:32	18:05		19:39		20:10	20:34	20:32	20:00	19:10		18:20		16:41	16:31
16	07:23	06:54	06:11	17:16-17:45/29	06:20		05:41	05:25	05:39	06:08	06:40	17:58-18:35/37	07:11		06:48	07:18
	16:55	17:33	18:06		19:40		20:11	20:34	20:31	19:58	19:09		18:18		16:40	16:31
17	07:23	06:53	06:10	17:14-17:46/32	06:18		05:40	05:25	05:40	06:09	06:41	17:58-18:35/37	07:12		06:49	07:19
	16:56	17:35	18:07		19:41		20:12	20:35	20:31	19:57	19:07		18:17		16:39	16:31
18	07:22	06:52	06:08	17:13-17:47/34	06:17		05:39	05:26	05:41	06:10	06:42	17:57-18:35/38	07:13		06:50	07:20
	16:57	17:36	18:08		19:42		20:13	20:35	20:30	19:56	19:05		18:15		16:38	16:31
19	07:22	06:50	06:06	17:12-17:48/36	06:15		05:38	05:26	05:42	06:11	06:43	17:56-18:35/39	07:15		06:51	07:20
	16:59	17:37	18:09		19:43		20:14	20:35	20:29	19:54	19:03		18:14		16:38	16:32
20	07:21	06:49	06:04	17:11-17:48/37	06:14		05:37	05:26	05:42	06:12	06:44	17:56-18:34/38	07:16		06:52	07:21
	17:00	17:38	18:11		19:44		20:15	20:36	20:28	19:53	19:02		18:12		16:37	16:32
21	07:21	06:47	06:03	17:10-17:48/38	06:12		05:36	05:26	05:43	06:13	06:45	17:56-18:34/38	07:17		06:54	07:21
	17:01	17:39	18:12		19:45		20:16	20:36	20:28	19:51	19:00		18:11		16:36	16:33
22	07:20	06:46	06:01	17:10-17:48/38	06:11		05:35	05:26	05:44	06:15	06:46	17:55-18:33/38	07:18		06:55	07:22
	17:02	17:41	18:13		19:46		20:17	20:36	20:27	19:50	18:58		18:09		16:35	16:33
23	07:19	06:44	05:59	17:10-17:48/38	06:09		05:35	05:26	05:45	06:16	06:47	17:55-18:33/38	07:19		06:56	07:22
	17:03	17:42	18:14		19:47		20:18	20:36	20:26	19:48	18:57		18:08		16:35	16:34
24	07:19	06:43	05:58	17:09-17:47/38	06:08		05:34	05:27	05:46	06:17	06:48	17:55-18:32/37	07:20		06:57	07:23
	17:05	17:43	18:15		19:48		20:19	20:36	20:25	19:47	18:55		18:07		16:34	16:34
25	07:18	06:42	05:56	17:10-17:48/38	06:06		05:33	05:27	05:47	06:18	06:49	17:56-18:31/35	06:21		06:58	07:23
	17:06	17:44	18:16		19:49		20:20	20:37	20:24	19:45	18:53		17:05		16:34	16:35
26	07:17	06:40	05:54	17:09-17:47/38	06:05		05:32	05:27	05:48	06:19	06:50	17:56-18:29/33	06:23		06:59	07:24
	17:07	17:45	18:17		19:50		20:21	20:37	20:23	19:43	18:51		17:04		16:33	16:35
27	07:16	06:39	05:53	17:09-17:46/37	06:04		05:32	05:28	05:49	06:20	06:51	17:57-18:27/30	06:24		07:00	07:24
	17:08	17:47	18:18		19:51		20:22	20:37	20:22	19:42	18:50		17:02		16:33	16:36
28	07:15	06:37	05:51	17:09-17:44/35	06:02		05:31	05:28	05:50	06:21	06:52	17:58-18:25/27	06:25		07:02	07:24
	17:10	17:48	18:19		19:53		20:22	20:37	20:22	19:40	18:48		17:01		16:32	16:37
29	07:15		06:49	18:10-18:44/34	06:01		05:30	05:28	05:51	06:22	06:53	17:59-18:24/25	06:26		07:03	07:25
	17:11		19:20		19:54		20:23	20:37	20:21	19:39	18:46		17:00		16:32	16:38
30	07:14		06:48	18:11-18:43/32	05:59		05:30	05:29	05:52	06:23	06:54	18:00-18:22/22	06:27		07:04	07:25
	17:12		19:21		19:55		20:24	20:37	20:20	19:37	18:45		16:58		16:31	16:38
31	07:13		06:46	18:11-18:41/30			05:29		05:52	06:24			06:28			07:25
	17:13		19:22				20:25		20:18	19:36			16:57			16:39
Potential sun hours	297	297	369		399		449	453	460	428	375		345		297	287
Sum of minutes with flicker	0	0	647		82		0	0	0	0	722		23		0	0

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

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

SHADOW - Calendar per WTG

WTG: 3 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (3)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25	07:12	06:35 16:27-17:19/52	06:44 17:19-18:15/56	05:58	05:29	05:29	05:53	06:25	06:55 16:54-18:06/72	06:30	07:05
	16:40	17:15	17:49	19:23	19:56	20:26	20:37	20:17	19:34	18:43	16:56	16:31
2	07:25	07:11	06:34 16:26-17:21/55	06:43 17:20-18:13/53	05:57	05:28	05:30	05:54	06:26 17:37-17:49/12	06:56 16:54-18:05/71	06:31	07:06
	16:41	17:16	17:50	19:25	19:57	20:26	20:36	20:16	19:32	18:41	16:55	16:31
3	07:26	07:10	06:32 16:24-17:22/58	06:41 17:20-18:11/51	05:55	05:28	05:30	05:55	06:27 17:31-17:54/23	06:57 16:54-18:05/71	06:32	07:07
	16:42	17:17	17:51	19:26	19:58	20:27	20:36	20:15	19:31	18:40	16:53	16:31
4	07:26	07:09	06:31 16:23-17:23/60	06:39 17:22-18:10/48	05:54	05:28	05:31	05:56	06:28 17:27-17:57/30	06:58 16:54-18:04/70	06:33	07:08
	16:43	17:18	17:52	19:27	19:59	20:28	20:36	20:14	19:29	18:38	16:52	16:30
5	07:26	07:08	06:29 16:22-17:24/62	06:38 17:24-18:08/44	05:53	05:27	05:31	05:57	06:29 17:24-17:59/35	06:59 16:55-18:03/68	06:34	07:09
	16:44	17:20	17:54	19:28	20:00	20:28	20:36	20:13	19:27	18:36	16:51	16:30
6	07:26	07:07	06:28 16:20-17:24/64	06:36 17:25-18:05/40	05:52	05:27	05:32	05:58	06:30 17:21-18:01/40	07:00 16:55-18:02/67	06:36	07:10
	16:45	17:21	17:55	19:29	20:01	20:29	20:36	20:12	19:26	18:35	16:50	16:30
7	07:25	07:05	06:26 16:20-17:26/66	06:34 17:28-18:03/35	05:50	05:27	05:33	05:59	06:31 17:19-18:03/44	07:01 16:56-18:01/65	06:37	07:11
	16:45	17:22	17:56	19:30	20:02	20:30	20:35	20:10	19:24	18:33	16:49	16:30
8	07:25	07:04	06:24 16:18-17:26/68	06:33 17:30-18:00/30	05:49	05:26	05:33	06:00	06:32 17:17-18:04/47	07:02 16:57-18:00/63	06:38	07:12
	16:46	17:23	17:57	19:31	20:03	20:30	20:35	20:09	19:22	18:31	16:48	16:30
9	07:25	07:03	06:23 16:18-17:27/69	06:31 17:34-17:57/23	05:48	05:26	05:34	06:01	06:33 17:15-18:05/50	07:03 16:57-17:59/62	06:39	07:13
	16:47	17:25	17:58	19:32	20:04	20:31	20:35	20:08	19:21	18:30	16:47	16:30
10	07:25	07:02	06:21 16:17-17:27/70	06:29 17:39-17:51/12	05:47	05:26	05:35	06:02	06:34 17:13-18:06/53	07:05 16:58-17:57/59	06:40	07:14
	16:49	17:26	17:59	19:33	20:05	20:32	20:34	20:07	19:19	18:28	16:46	16:30
11	07:25	07:01	06:19 16:16-17:27/71	06:28	05:46	05:26	05:35	06:03	06:35 17:11-18:07/56	07:06 16:59-17:56/57	06:42	07:14
	16:50	17:27	18:00	19:34	20:06	20:32	20:34	20:05	19:17	18:26	16:44	16:30
12	07:25	06:59	06:18 16:16-17:28/72	06:26	05:45	05:26	05:36	06:04	06:36 17:09-18:08/59	07:07 17:00-17:54/54	06:43	07:15
	16:51	17:28	18:02	19:35	20:07	20:33	20:33	20:04	19:15	18:25	16:44	16:30
13	07:24	06:58	06:16 16:15-17:27/72	06:25	05:44	05:25	05:37	06:05	06:37 17:08-18:08/60	07:08 17:01-17:52/51	06:44	07:16
	16:52	17:30	18:03	19:36	20:08	20:33	20:33	20:03	19:14	18:23	16:43	16:30
14	07:24	06:57	06:15 16:14-17:27/73	06:23	05:43	05:25	05:37	06:06	06:38 17:07-18:09/62	07:09 17:02-17:50/48	06:45	07:17
	16:53	17:31	18:04	19:37	20:09	20:34	20:32	20:01	19:12	18:22	16:42	16:30
15	07:24	06:56	06:13 16:15-17:28/73	06:21	05:42	05:25	05:38	06:07	06:39 17:05-18:09/64	07:10 17:05-17:49/44	06:46	07:18
	16:54	17:32	18:05	19:39	20:10	20:34	20:32	20:00	19:10	18:20	16:41	16:31
16	07:23	06:54	06:11 16:14-17:27/73	06:20	05:41	05:25	05:39	06:08	06:40 17:04-18:10/66	07:11 17:07-17:46/39	06:48	07:18
	16:55	17:33	18:06	19:40	20:11	20:34	20:31	19:58	19:09	18:18	16:40	16:31
17	07:23	06:53	06:09 16:13-17:27/74	06:18	05:40	05:25	05:40	06:09	06:41 17:03-18:10/67	07:12 17:09-17:43/34	06:49	07:19
	16:56	17:35	18:07	19:41	20:12	20:35	20:31	19:57	19:07	18:17	16:39	16:31
18	07:22	06:52	06:08 16:13-17:26/73	06:17	05:39	05:26	05:41	06:10	06:42 17:02-18:10/68	07:13 17:12-17:40/28	06:50	07:20
	16:57	17:36	18:08	19:42	20:13	20:35	20:30	19:56	19:05	18:15	16:38	16:31
19	07:22	06:50	06:06 16:13-17:26/73	06:15	05:38	05:26	05:42	06:11	06:43 17:01-18:10/69	07:14 17:16-17:35/19	06:51	07:20
	16:59	17:37	18:09	19:43	20:14	20:35	20:29	19:54	19:03	18:14	16:37	16:32
20	07:21	06:49	06:04 16:13-17:26/73	06:14	05:37	05:26	05:42	06:12	06:44 17:00-18:10/70	07:16	06:52	07:21
	17:00	17:38	18:10	19:44	20:15	20:36	20:28	19:53	19:02	18:12	16:37	16:32
21	07:20	06:47	06:03 16:13-17:25/72	06:12	05:36	05:26	05:43	06:13	06:45 16:59-18:10/71	07:17	06:54	07:21
	17:01	17:39	18:12	19:45	20:16	20:36	20:28	19:51	19:00	18:11	16:36	16:33
22	07:20	06:46 16:50-16:59/9	06:01 16:14-17:25/71	06:11	05:35	05:26	05:44	06:14	06:46 16:58-18:10/72	07:18	06:55	07:22
	17:02	17:41	18:13	19:46	20:17	20:36	20:27	19:50	18:58	18:09	16:35	16:33
23	07:19	06:44 16:43-17:06/23	05:59 16:13-17:24/71	06:09	05:35	05:26	05:45	06:15	06:47 16:58-18:10/72	07:19	06:56	07:22
	17:03	17:42	18:14	19:47	20:18	20:36	20:26	19:48	18:57	18:08	16:35	16:34
24	07:18	06:43 16:39-17:09/30	05:58 16:13-17:23/70	06:08	05:34	05:27	05:46	06:17	06:48 16:57-18:10/73	07:20	06:57	07:23
	17:05	17:43	18:15	19:48	20:19	20:36	20:25	19:47	18:55	18:07	16:34	16:34
25	07:18	06:42 16:36-17:13/37	05:56 16:14-17:23/69	06:06	05:33	05:27	05:47	06:18	06:49 16:56-18:09/73	06:21	06:58	07:23
	17:06	17:44	18:16	19:49	20:20	20:37	20:24	19:45	18:53	17:05	16:34	16:35
26	07:17	06:40 16:33-17:15/42	05:54 16:14-17:22/68	06:05	05:32	05:27	05:48	06:19	06:50 16:56-18:09/73	06:23	06:59	07:24
	17:07	17:45	18:17	19:50	20:21	20:37	20:23	19:43	18:51	17:04	16:33	16:35
27	07:16	06:38 16:32-17:17/45	05:53 16:15-17:21/66	06:03	05:32	05:28	05:49	06:20	06:51 16:55-18:09/74	06:24	07:00	07:24
	17:08	17:47	18:18	19:51	20:22	20:37	20:22	19:42	18:50	17:02	16:33	16:36
28	07:15	06:37 16:29-17:18/49	05:51 16:15-17:19/64	06:02	05:31	05:28	05:50	06:21	06:52 16:55-18:08/73	06:25	07:02	07:24
	17:10	17:48	18:19	19:53	20:22	20:37	20:21	19:40	18:48	17:01	16:32	16:37
29	07:14		06:49 17:16-18:19/63	06:01	05:30	05:28	05:51	06:22	06:53 16:55-18:08/73	06:26	07:03	07:25
	17:11		19:20	19:54	20:23	20:37	20:20	19:39	18:46	17:00	16:32	16:37
30	07:14		06:48 17:17-18:17/60	05:59	05:30	05:29	05:51	06:23	06:54 16:55-18:07/72	06:27	07:04	07:25
	17:12		19:21	19:55	20:24	20:37	20:19	19:37	18:45	16:58	16:31	16:38
31	07:13		06:46 17:17-18:16/59		05:29		05:52	06:24		06:28		07:25
	17:13		19:22		20:25		20:18	19:35		16:57		16:39
Potential sun hours	297	297	369	399	449	453	460	428	375	345	297	287
Sum of minutes with flicker	0	235	2084	392	0	0	0	0	1701	1042	0	0

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

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

SHADOW - Calendar per WTG

WTG: 4 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (4)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March	April	May	June
1	07:25 11:43-14:42/179 16:40	07:12 11:42-15:02/200 17:15	06:35 11:36-15:04/208 17:49	06:44 13:43-15:41/118 19:23	05:58 19:56	05:29 20:26
2	07:25 11:43-14:43/180 16:41	07:11 11:42-15:02/200 17:16	06:34 11:37-15:04/207 17:50	06:43 13:48-15:40/112 19:25	05:57 19:57	05:28 20:26
3	07:26 11:43-14:43/180 16:42	07:10 11:42-15:03/201 17:17	06:32 11:37-15:03/206 17:51	06:41 13:53-15:38/105 19:26	05:55 19:58	05:28 20:27
4	07:26 11:43-14:44/181 16:43	07:09 11:42-15:03/201 17:18	06:31 11:37-15:03/206 17:52	06:39 13:59-15:37/98 19:27	05:54 19:59	05:28 20:28
5	07:26 11:43-14:45/182 16:44	07:08 11:42-15:04/202 17:20	06:29 11:37-15:03/206 17:54	06:38 14:03-15:35/92 19:28	05:53 20:00	05:27 20:28
6	07:26 11:44-14:46/182 16:45	07:07 11:40-15:03/203 17:21	06:28 11:37-15:02/205 17:55	06:36 14:07-15:34/87 19:29	05:52 20:01	05:27 20:29
7	07:25 11:44-14:46/182 16:45	07:05 11:40-15:04/204 17:22	06:26 11:37-15:02/205 17:56	06:34 14:12-15:33/81 19:30	05:50 20:02	05:27 20:30
8	07:25 11:43-14:46/183 16:46	07:04 11:40-15:04/204 17:23	06:24 11:37-15:01/204 17:57	06:33 14:15-15:31/76 19:31	05:49 20:03	05:26 20:30
9	07:25 11:44-14:47/183 16:47	07:03 11:40-15:04/204 17:25	06:23 11:38-15:01/203 17:58	06:31 14:20-15:30/70 19:32	05:48 20:04	05:26 20:31
10	07:25 11:44-14:48/184 16:49	07:02 11:40-15:05/205 17:26	06:21 11:38-15:00/202 17:59	06:29 14:23-15:27/64 19:33	05:47 20:05	05:26 20:32
11	07:25 11:44-14:49/185 16:50	07:01 11:39-15:04/205 17:27	06:19 11:38-14:59/201 18:00	06:28 14:27-15:25/58 19:34	05:46 20:06	05:26 20:32
12	07:25 11:44-14:49/185 16:51	06:59 11:40-15:05/205 17:28	06:18 11:39-14:59/200 18:02	06:26 14:31-15:24/53 19:35	05:45 20:07	05:26 20:33
13	07:24 11:44-14:50/186 16:52	06:58 11:40-15:05/205 17:30	06:16 11:39-14:58/199 18:03	06:25 14:35-15:21/46 19:36	05:44 20:08	05:25 20:33
14	07:24 11:44-14:50/186 16:53	06:57 11:39-15:05/206 17:31	06:14 11:39-14:58/199 18:04	06:23 14:39-15:19/40 19:37	05:43 20:09	05:25 20:34
15	07:24 11:44-14:52/188 16:54	06:56 11:39-15:05/206 17:32	06:13 11:41-14:58/197 18:05	06:21 14:44-15:15/31 19:39	05:42 20:10	05:25 20:34
16	07:23 11:44-14:52/188 16:55	06:54 11:39-15:06/207 17:33	06:11 11:41-14:56/195 18:06	06:20 14:49-15:12/23 19:40	05:41 20:11	05:25 20:34
17	07:23 11:44-14:53/189 16:56	06:53 11:38-15:05/207 17:35	06:09 11:42-14:55/193 18:07	06:18 14:59-15:03/4 19:41	05:40 20:12	05:25 20:35
18	07:22 11:44-14:53/189 16:57	06:52 11:38-15:06/208 17:36	06:08 11:43-14:54/191 18:08	06:17 19:42	05:39 20:13	05:25 20:35
19	07:22 11:44-14:54/190 16:59	06:50 11:39-15:06/207 17:37	06:06 11:44-14:54/190 18:09	06:15 19:43	05:38 20:14	05:26 20:35
20	07:21 11:44-14:55/191 17:00	06:49 11:38-15:05/207 17:38	06:04 11:46-14:53/187 18:10	06:14 19:44	05:37 20:15	05:26 20:36
21	07:20 11:43-14:55/192 17:01	06:47 11:38-15:06/208 17:39	06:03 11:47-14:52/185 18:12	06:12 19:45	05:36 20:16	05:26 20:36
22	07:20 11:44-14:56/192 17:02	06:46 11:37-15:05/208 17:41	06:01 11:50-14:52/182 18:13	06:11 19:46	05:35 20:17	05:26 20:36
23	07:19 11:43-14:57/194 17:03	06:44 11:38-15:06/208 17:42	05:59 11:52-14:51/179 18:14	06:09 19:47	05:35 20:18	05:26 20:36
24	07:18 11:43-14:57/194 17:05	06:43 11:37-15:05/208 17:43	05:58 11:55-14:49/174 18:15	06:08 19:48	05:34 20:19	05:27 20:36
25	07:18 11:43-14:58/195 17:06	06:41 11:38-15:05/207 17:44	05:56 12:00-14:49/169 18:16	06:06 19:49	05:33 20:20	05:27 20:37
26	07:17 11:43-14:59/196 17:07	06:40 11:37-15:05/208 17:45	05:54 12:04-14:48/164 18:17	06:05 19:50	05:32 20:21	05:27 20:37
27	07:16 11:43-14:59/196 17:08	06:38 11:37-15:05/208 17:47	05:53 12:10-14:46/156 18:18	06:03 19:51	05:32 20:21	05:28 20:37
28	07:15 11:43-15:00/197 17:10	06:37 11:37-15:04/207 17:48	05:51 12:16-14:45/149 18:19	06:02 19:53	05:31 20:22	05:28 20:37
29	07:14 11:43-15:00/197 17:11		06:49 13:23-15:45/142 19:20	06:01 19:54	05:30 20:23	05:28 20:37
30	07:14 11:42-15:01/199 17:12		06:48 13:30-15:43/133 19:21	05:59 19:55	05:30 20:24	05:29 20:37
31	07:13 11:42-15:01/199 17:13		06:46 13:36-15:42/126 19:22		05:29 20:25	
Potential sun hours	297	297	369	399	449	453
Sum of minutes with flicker	5844	5749	5763	1158	0	0

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

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

SHADOW - Calendar per WTG

WTG: 4 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (4)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	July	August	September	October	November	December
1	05:29 20:37	05:53 20:17	06:25 14:26-15:24/58 19:34	06:55 12:18-15:38/200 18:43	06:30 11:09-14:34/205 16:56	07:05 11:26-14:31/185 16:31
2	05:30 20:36	05:54 20:16	06:26 14:21-15:25/64 19:32	06:56 12:17-15:38/201 18:41	06:31 11:10-14:34/204 16:55	07:06 11:27-14:31/184 16:31
3	05:30 20:36	05:55 20:15	06:27 14:17-15:27/70 19:31	06:57 12:16-15:38/202 18:40	06:32 11:10-14:34/204 16:53	07:07 11:28-14:31/183 16:31
4	05:31 20:36	05:56 20:14	06:28 14:12-15:28/76 19:29	06:58 12:15-15:38/203 18:38	06:33 11:10-14:33/203 16:52	07:08 11:28-14:31/183 16:30
5	05:31 20:36	05:57 20:13	06:29 14:08-15:29/81 19:27	06:59 12:14-15:38/204 18:36	06:34 11:10-14:33/203 16:51	07:09 11:29-14:31/182 16:30
6	05:32 20:36	05:58 20:12	06:30 14:03-15:30/87 19:26	07:00 12:13-15:37/204 18:35	06:36 11:11-14:33/202 16:50	07:10 11:30-14:32/182 16:30
7	05:33 20:35	05:59 20:10	06:31 13:58-15:30/92 19:24	07:01 12:14-15:38/204 18:33	06:37 11:12-14:33/201 16:49	07:11 11:30-14:32/182 16:30
8	05:33 20:35	06:00 20:09	06:32 13:53-15:31/98 19:22	07:02 12:13-15:38/205 18:31	06:38 11:12-14:32/200 16:48	07:12 11:31-14:32/181 16:30
9	05:34 20:35	06:01 20:08	06:33 13:48-15:32/104 19:21	07:03 12:12-15:38/206 18:30	06:39 11:13-14:33/200 16:47	07:13 11:31-14:31/180 16:30
10	05:35 20:34	06:02 20:07	06:34 13:42-15:33/111 19:19	07:05 12:12-15:38/206 18:28	06:40 11:13-14:32/199 16:45	07:14 11:32-14:32/180 16:30
11	05:35 20:34	06:03 20:05	06:35 13:36-15:33/117 19:17	07:06 12:11-15:38/207 18:26	06:42 11:13-14:32/199 16:44	07:14 11:33-14:32/179 16:30
12	05:36 20:33	06:04 20:04	06:36 13:29-15:34/125 19:15	07:07 12:10-15:37/207 18:25	06:43 11:13-14:32/199 16:43	07:15 11:33-14:33/180 16:30
13	05:37 20:33	06:05 20:03	06:37 13:22-15:34/132 19:14	07:08 12:10-15:37/207 18:23	06:44 11:15-14:32/197 16:43	07:16 11:34-14:33/179 16:30
14	05:37 20:32	06:06 20:01	06:38 13:15-15:35/140 19:12	07:09 12:09-15:37/208 18:22	06:45 11:15-14:32/197 16:42	07:17 11:35-14:34/179 16:30
15	05:38 20:32	06:07 20:00	06:39 13:07-15:35/148 19:10	07:10 12:10-15:37/207 18:20	06:46 11:15-14:31/196 16:41	07:18 11:35-14:33/178 16:31
16	05:39 20:31	06:08 19:58	06:40 13:00-15:36/156 19:09	07:11 12:09-15:37/208 18:18	06:48 11:16-14:32/196 16:40	07:18 11:36-14:34/178 16:31
17	05:40 20:30	06:09 19:57	06:41 12:54-15:36/162 19:07	07:12 12:09-15:37/208 18:17	06:49 11:17-14:31/194 16:39	07:19 11:37-14:35/178 16:31
18	05:41 20:30	06:10 19:56	06:42 12:48-15:36/168 19:05	07:13 12:09-15:37/208 18:15	06:50 11:17-14:31/194 16:38	07:20 11:37-14:34/177 16:31
19	05:41 20:29	06:11 19:54	06:43 12:43-15:37/174 19:03	07:14 12:08-15:36/208 18:14	06:51 11:17-14:31/194 16:37	07:20 11:38-14:35/177 16:32
20	05:42 20:28	06:12 19:53	06:44 12:39-15:37/178 19:02	07:16 12:08-15:36/208 18:12	06:52 11:19-14:31/192 16:37	07:21 11:38-14:35/177 16:32
21	05:43 20:28	06:13 19:51	06:45 12:36-15:37/181 19:00	07:17 12:09-15:36/207 18:11	06:54 11:19-14:31/192 16:36	07:21 11:39-14:36/177 16:33
22	05:44 20:27	06:14 19:50	06:46 12:33-15:37/184 18:58	07:18 12:09-15:36/207 18:09	06:55 11:20-14:31/191 16:35	07:22 11:39-14:36/177 16:33
23	05:45 20:26	06:15 19:48	06:47 12:31-15:37/186 18:57	07:19 12:08-15:36/208 18:08	06:56 11:20-14:30/190 16:35	07:22 11:40-14:37/177 16:34
24	05:46 20:25	06:16 19:47	06:48 12:28-15:38/190 18:55	07:20 12:08-15:35/207 18:07	06:57 11:22-14:31/189 16:34	07:23 11:40-14:37/177 16:34
25	05:47 20:24	06:17 19:45	06:49 12:26-15:38/192 18:53	06:21 11:08-14:35/207 17:05	06:58 11:22-14:31/189 16:34	07:23 11:41-14:38/177 16:35
26	05:48 20:23	06:19 15:00-15:08/8 19:43	06:50 12:25-15:38/193 18:51	06:23 11:09-14:35/206 17:04	06:59 11:23-14:31/188 16:33	07:24 11:41-14:39/178 16:35
27	05:49 20:22	06:20 14:51-15:14/23 19:42	06:51 12:23-15:38/195 18:50	06:24 11:09-14:35/206 17:02	07:00 11:23-14:31/188 16:33	07:24 11:41-14:39/178 16:36
28	05:50 20:21	06:21 14:45-15:18/33 19:40	06:52 12:22-15:38/196 18:48	06:25 11:08-14:35/207 17:01	07:02 11:24-14:30/186 16:32	07:24 11:41-14:39/178 16:37
29	05:51 20:20	06:22 14:40-15:20/40 19:39	06:53 12:20-15:38/198 18:46	06:26 11:08-14:34/206 17:00	07:03 11:24-14:30/186 16:32	07:25 11:42-14:40/178 16:37
30	05:51 20:19	06:23 14:35-15:22/47 19:37	06:54 12:19-15:38/199 18:45	06:27 11:09-14:35/206 16:58	07:04 11:25-14:30/185 16:31	07:25 11:42-14:41/179 16:38
31	05:52 20:18	06:24 14:31-15:24/53 19:35		06:28 11:09-14:34/205 16:57		07:25 11:42-14:41/179 16:39
Potential sun hours	460	428	375	345	297	287
Sum of minutes with flicker	0	204	4255	6383	5863	5559

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

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

SHADOW - Calendar per WTG

WTG: 5 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (5)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25 16:40	07:12 17:14	06:35 06:54-07:28/34 17:49	06:44 07:35-08:23/48 19:23	05:58 19:56	05:29 20:26	05:29 20:37	05:53 20:17	06:25 19:34	06:55 07:15-08:17/62 18:43	06:30 16:56	07:05 16:31
2	07:25 16:41	07:11 17:16	06:34 06:53-07:31/38 17:50	06:43 07:36-08:21/45 19:25	05:57 19:57	05:28 20:26	05:30 20:36	05:54 20:16	06:26 19:32	06:56 07:16-08:16/60 18:41	06:31 16:55	07:06 16:31
3	07:25 16:42	07:10 17:17	06:32 06:51-07:32/41 17:51	06:41 07:37-08:19/42 19:26	05:55 19:58	05:28 20:27	05:30 20:36	05:55 20:15	06:27 19:31	06:57 07:17-08:15/58 18:39	06:32 16:53	07:07 16:31
4	07:26 16:43	07:09 17:18	06:31 06:50-07:33/43 17:52	06:39 07:39-08:17/38 19:27	05:54 19:59	05:28 20:28	05:31 20:36	05:56 20:14	06:28 07:50-07:57/7 19:29	06:58 07:18-08:14/56 18:38	06:33 16:52	07:08 16:30
5	07:26 16:44	07:08 17:20	06:29 06:48-07:34/46 17:54	06:38 07:41-08:14/33 19:28	05:53 20:00	05:27 20:28	05:31 20:36	05:57 20:13	06:29 07:43-08:03/20 19:27	06:59 07:19-08:13/54 18:36	06:34 16:51	07:09 16:30
6	07:26 16:44	07:06 17:21	06:28 06:46-07:35/49 17:55	06:36 07:43-08:11/28 19:29	05:52 20:01	05:27 20:29	05:32 20:36	05:58 20:12	06:30 07:39-08:07/28 19:26	07:00 07:20-08:12/52 18:34	06:36 16:50	07:10 16:30
7	07:25 16:45	07:05 17:22	06:26 06:45-07:36/51 17:56	06:34 07:47-08:07/20 19:30	05:50 20:02	05:27 20:30	05:33 20:35	05:59 20:10	06:31 07:36-08:09/33 19:24	07:01 07:22-08:12/50 18:33	06:37 16:49	07:11 16:30
8	07:25 16:46	07:04 17:23	06:24 06:43-07:36/53 17:57	06:33 07:53-08:00/7 19:31	05:49 20:03	05:26 20:30	05:33 20:35	06:00 20:09	06:32 07:34-08:11/37 19:22	07:02 07:23-08:10/47 18:31	06:38 16:48	07:12 16:30
9	07:25 16:47	07:03 17:25	06:23 06:42-07:37/55 17:58	06:31 19:32	05:48 20:04	05:26 20:31	05:34 20:35	06:01 20:08	06:33 07:31-08:13/42 19:20	07:03 07:24-08:09/45 18:30	06:39 16:46	07:13 16:30
10	07:25 16:48	07:02 17:26	06:21 06:40-07:38/58 17:59	06:29 19:33	05:47 20:05	05:26 20:31	05:35 20:34	06:02 20:07	06:34 07:29-08:14/45 19:19	07:05 07:25-08:07/42 18:28	06:40 16:45	07:13 16:30
11	07:25 16:50	07:01 17:27	06:19 06:38-07:37/59 18:00	06:28 19:34	05:46 20:06	05:26 20:32	05:35 20:34	06:03 20:05	06:35 07:28-08:15/47 19:17	07:06 07:26-08:05/39 18:26	06:42 16:44	07:14 16:30
12	07:25 16:51	06:59 17:28	06:18 06:37-07:38/61 18:02	06:26 19:35	05:45 20:07	05:26 20:33	05:36 20:33	06:04 20:04	06:36 07:26-08:16/50 19:15	07:07 07:27-08:03/36 18:25	06:43 16:43	07:15 16:30
13	07:24 16:52	06:58 17:30	06:16 06:35-07:38/63 18:03	06:25 19:36	05:44 20:08	05:25 20:33	05:37 20:33	06:05 20:03	06:37 07:25-08:17/52 19:14	07:08 07:28-08:01/33 18:23	06:44 16:43	07:16 16:30
14	07:24 16:53	06:57 17:31	06:14 06:33-07:38/65 18:04	06:23 19:37	05:43 20:09	05:25 20:33	05:37 20:32	06:06 20:01	06:38 07:23-08:18/55 19:12	07:09 07:29-07:58/29 18:22	06:45 16:42	07:17 16:30
15	07:23 16:54	06:56 17:32	06:13 06:33-07:38/65 18:05	06:21 19:39	05:42 20:10	05:25 20:34	05:38 20:32	06:07 20:00	06:39 07:22-08:19/57 19:10	07:10 07:31-07:56/25 18:20	06:46 16:41	07:17 16:31
16	07:23 16:55	06:54 17:33	06:11 06:32-07:38/66 18:06	06:20 19:40	05:41 20:11	05:25 20:34	05:39 20:31	06:08 19:58	06:40 07:21-08:19/58 19:09	07:11 07:32-07:52/20 18:18	06:48 16:40	07:18 16:31
17	07:23 16:56	06:53 17:35	06:09 06:31-07:37/66 18:07	06:18 19:41	05:40 20:12	05:25 20:35	05:40 20:30	06:09 19:57	06:41 07:20-08:20/60 19:07	07:12 07:37-07:45/8 18:17	06:49 16:39	07:19 16:31
18	07:22 16:57	06:52 17:36	06:08 06:31-07:37/66 18:08	06:17 19:42	05:39 20:13	05:25 20:35	05:41 20:30	06:10 19:56	06:42 07:19-08:20/61 19:05	07:13 18:15	06:50 16:38	07:20 16:31
19	07:22 16:59	06:50 17:37	06:06 06:31-07:37/66 18:09	06:15 19:43	05:38 20:14	05:26 20:35	05:41 20:29	06:11 19:54	06:43 07:18-08:20/62 19:03	07:14 18:14	06:51 16:37	07:20 16:32
20	07:21 17:00	06:49 17:38	06:04 06:31-07:36/65 18:10	06:14 19:44	05:37 20:15	05:26 20:36	05:42 20:28	06:12 19:53	06:44 07:17-08:20/63 19:02	07:16 18:12	06:52 16:37	07:21 16:32
21	07:20 17:01	06:47 17:39	06:03 06:30-07:35/65 18:12	06:12 19:45	05:36 20:16	05:26 20:36	05:43 20:28	06:13 19:51	06:45 07:16-08:21/65 19:00	07:17 18:11	06:54 16:36	07:21 16:33
22	07:20 17:02	06:46 17:41	06:01 06:31-07:35/64 18:13	06:11 19:46	05:35 20:17	05:26 20:36	05:44 20:27	06:14 19:50	06:46 07:16-08:21/65 18:58	07:18 18:09	06:55 16:35	07:22 16:33
23	07:19 17:03	06:44 17:42	05:59 06:31-07:34/63 18:14	06:09 19:47	05:34 20:18	05:26 20:36	05:45 20:26	06:15 19:48	06:47 07:15-08:21/66 18:56	07:19 18:08	06:56 16:35	07:22 16:34
24	07:18 17:05	06:43 17:43	05:58 06:30-07:33/63 18:15	06:08 19:48	05:34 20:19	05:27 20:36	05:46 20:25	06:16 19:47	06:48 07:15-08:20/65 18:55	07:20 18:06	06:57 16:34	07:23 16:34
25	07:18 17:06	06:41 07:02-07:17/15 17:44	05:56 06:31-07:33/62 18:16	06:06 19:49	05:33 20:20	05:27 20:37	05:47 20:24	06:17 19:45	06:49 07:14-08:20/66 18:53	06:21 17:05	06:58 16:34	07:23 16:35
26	07:17 17:07	06:40 06:59-07:21/22 17:45	05:54 06:31-07:32/61 18:17	06:05 19:50	05:32 20:21	05:27 20:37	05:48 20:23	06:18 19:43	06:50 07:14-08:20/66 18:51	06:22 17:04	06:59 16:33	07:24 16:35
27	07:16 17:08	06:38 06:58-07:25/27 17:47	05:53 06:31-07:30/59 18:18	06:03 19:51	05:32 20:21	05:28 20:37	05:49 20:22	06:19 19:42	06:51 07:13-08:19/66 18:50	06:24 17:02	07:00 16:33	07:24 16:36
28	07:15 17:09	06:37 06:56-07:27/31 17:48	05:51 06:32-07:29/57 18:19	06:02 19:52	05:31 20:22	05:28 20:37	05:50 20:21	06:21 19:40	06:52 07:13-08:19/66 18:48	06:25 17:01	07:02 16:32	07:24 16:37
29	07:14 17:11		06:49 07:33-08:28/55 19:20	06:01 19:54	05:30 20:23	05:28 20:37	05:50 20:20	06:22 19:39	06:53 07:13-08:18/65 18:46	06:26 17:00	07:03 16:32	07:25 16:37
30	07:14 17:12		06:48 07:33-08:26/53 19:21	05:59 19:55	05:30 20:24	05:29 20:37	05:51 20:19	06:23 19:37	06:54 07:14-08:18/64 18:45	06:27 16:58	07:04 16:31	07:25 16:38
31	07:13 17:13		06:46 07:34-08:24/50 19:22		05:29 20:25		05:52 20:18	06:24 19:35		06:28 16:57		07:25 16:39
Potential sun hours	297	297	369	399	449	453	460	428	375	345	297	287
Sum of minutes with flicker	0	95	1762	261	0	0	0	0	1431	716	0	0

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

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

SHADOW - Calendar per WTG

WTG: 6 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (6)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25	07:12	06:35	06:44	05:58	05:29	05:29	05:53	06:25	06:55 07:15-07:41/26	06:30	07:05
	16:40	17:14	17:49	19:23	19:56	20:25	20:36	20:17	19:34	18:43	16:56	16:31
2	07:25	07:11	06:34	06:42	05:57	05:28	05:30	05:54	06:26	06:56 07:16-07:40/24	06:31	07:06
	16:41	17:16	17:50	19:24	19:57	20:26	20:36	20:16	19:32	18:41	16:54	16:31
3	07:25	07:10	06:32	06:41	05:55	05:28	05:30	05:55	06:27	06:57 07:17-07:39/22	06:32	07:07
	16:42	17:17	17:51	19:26	19:58	20:27	20:36	20:15	19:31	18:39	16:53	16:31
4	07:26	07:09	06:31	06:39	05:54	05:27	05:31	05:56	06:28	06:58 07:18-07:38/20	06:33	07:08
	16:43	17:18	17:52	19:27	19:59	20:28	20:36	20:14	19:29	18:38	16:52	16:30
5	07:26	07:08	06:29 06:48-06:54/6	06:38	05:53	05:27	05:31	05:57	06:29	06:59 07:19-07:36/17	06:34	07:09
	16:44	17:20	17:54	19:28	20:00	20:28	20:36	20:13	19:27	18:36	16:51	16:30
6	07:25	07:06	06:27 06:46-06:56/10	06:36	05:52	05:27	05:32	05:58	06:30	07:00 07:20-07:34/14	06:36	07:10
	16:44	17:21	17:55	19:29	20:01	20:29	20:36	20:12	19:26	18:34	16:50	16:30
7	07:25	07:05	06:26 06:45-06:58/13	06:34	05:50	05:27	05:33	05:59	06:31	07:01 07:22-07:33/11	06:37	07:11
	16:45	17:22	17:56	19:30	20:02	20:30	20:35	20:10	19:24	18:33	16:49	16:30
8	07:25	07:04	06:24 06:43-06:59/16	06:33	05:49	05:26	05:33	06:00	06:32	07:02 07:23-07:31/8	06:38	07:12
	16:46	17:23	17:57	19:31	20:03	20:30	20:35	20:09	19:22	18:31	16:48	16:30
9	07:25	07:03	06:23 06:42-07:00/18	06:31	05:48	05:26	05:34	06:01	06:33	07:03 07:24-07:28/4	06:39	07:13
	16:47	17:25	17:58	19:32	20:04	20:31	20:35	20:08	19:20	18:30	16:46	16:30
10	07:25	07:02	06:21 06:40-07:01/21	06:29	05:47	05:26	05:34	06:02	06:34	07:04	06:40	07:13
	16:48	17:26	17:59	19:33	20:05	20:31	20:34	20:07	19:19	18:28	16:45	16:30
11	07:25	07:01	06:19 06:38-07:01/23	06:28	05:46	05:26	05:35	06:03	06:35	07:06	06:42	07:14
	16:50	17:27	18:00	19:34	20:06	20:32	20:34	20:05	19:17	18:26	16:44	16:30
12	07:24	06:59	06:18 06:37-07:02/25	06:26	05:45	05:26	05:36	06:04	06:36	07:07	06:43	07:15
	16:51	17:28	18:02	19:35	20:07	20:33	20:33	20:04	19:15	18:25	16:43	16:30
13	07:24	06:58	06:16 06:35-07:02/27	06:25	05:44	05:25	05:37	06:05	06:37	07:08	06:44	07:16
	16:52	17:30	18:03	19:36	20:08	20:33	20:33	20:03	19:14	18:23	16:42	16:30
14	07:24	06:57	06:14 06:33-07:01/28	06:23	05:43	05:25	05:37	06:06	06:38	07:09	06:45	07:17
	16:53	17:31	18:04	19:37	20:09	20:33	20:32	20:01	19:12	18:21	16:42	16:30
15	07:23	06:56	06:13 06:32-07:02/30	06:21	05:42	05:25	05:38	06:07	06:39	07:10	06:46	07:17
	16:54	17:32	18:05	19:38	20:10	20:34	20:32	20:00	19:10	18:20	16:41	16:31
16	07:23	06:54	06:11 06:30-07:01/31	06:20	05:41	05:25	05:39	06:08	06:40 07:23-07:33/10	07:11	06:48	07:18
	16:55	17:33	18:06	19:40	20:11	20:34	20:31	19:58	19:09	18:18	16:40	16:31
17	07:23	06:53	06:09 06:28-07:01/33	06:18	05:40	05:25	05:40	06:09	06:41 07:19-07:37/18	07:12	06:49	07:19
	16:56	17:35	18:07	19:41	20:12	20:35	20:30	19:57	19:07	18:17	16:39	16:31
18	07:22	06:51	06:08 06:26-07:00/34	06:17	05:39	05:25	05:41	06:10	06:42 07:16-07:39/23	07:13	06:50	07:20
	16:57	17:36	18:08	19:42	20:13	20:35	20:30	19:55	19:05	18:15	16:38	16:31
19	07:22	06:50	06:06 06:25-07:00/35	06:15	05:38	05:26	05:41	06:11	06:43 07:14-07:40/26	07:14	06:51	07:20
	16:58	17:37	18:09	19:43	20:14	20:35	20:29	19:54	19:03	18:14	16:37	16:32
20	07:21	06:49	06:04 06:23-06:59/36	06:14	05:37	05:26	05:42	06:12	06:44 07:12-07:41/29	07:16	06:52	07:21
	17:00	17:38	18:10	19:44	20:15	20:36	20:28	19:53	19:02	18:12	16:37	16:32
21	07:20	06:47	06:03 06:24-06:57/33	06:12	05:36	05:26	05:43	06:13	06:45 07:10-07:42/32	07:17	06:54	07:21
	17:01	17:39	18:12	19:45	20:16	20:36	20:28	19:51	19:00	18:11	16:36	16:33
22	07:20	06:46	06:01 06:25-06:57/32	06:11	05:35	05:26	05:44	06:14	06:46 07:09-07:42/33	07:18	06:55	07:22
	17:02	17:41	18:13	19:46	20:17	20:36	20:27	19:50	18:58	18:09	16:35	16:33
23	07:19	06:44	05:59 06:25-06:55/30	06:09	05:34	05:26	05:45	06:15	06:47 07:08-07:43/35	07:19	06:56	07:22
	17:03	17:42	18:14	19:47	20:18	20:36	20:26	19:48	18:56	18:08	16:35	16:34
24	07:18	06:43	05:58 06:26-06:53/27	06:08	05:34	05:27	05:46	06:16	06:48 07:08-07:43/35	07:20	06:57	07:23
	17:05	17:43	18:15	19:48	20:19	20:36	20:25	19:47	18:55	18:06	16:34	16:34
25	07:18	06:41	05:56 06:28-06:52/24	06:06	05:33	05:27	05:47	06:17	06:49 07:09-07:43/34	06:21	06:58	07:23
	17:06	17:44	18:16	19:49	20:20	20:37	20:24	19:45	18:53	17:05	16:34	16:35
26	07:17	06:40	05:54 06:30-06:49/19	06:05	05:32	05:27	05:48	06:18	06:50 07:10-07:43/33	06:22	06:59	07:24
	17:07	17:45	18:17	19:50	20:21	20:37	20:23	19:43	18:51	17:04	16:33	16:35
27	07:16	06:38	05:53 06:32-06:45/13	06:03	05:32	05:27	05:49	06:19	06:51 07:11-07:43/32	06:24	07:00	07:24
	17:08	17:47	18:18	19:51	20:21	20:37	20:22	19:42	18:50	17:02	16:33	16:36
28	07:15	06:37	05:51	06:02	05:31	05:28	05:50	06:20	06:52 07:12-07:43/31	06:25	07:02	07:24
	17:09	17:48	18:19	19:52	20:22	20:37	20:21	19:40	18:48	17:01	16:32	16:37
29	07:14		06:49	06:01	05:30	05:28	05:50	06:21	06:53 07:13-07:42/29	06:26	07:03	07:25
	17:11		19:20	19:54	20:23	20:37	20:20	19:39	18:46	17:00	16:32	16:37
30	07:14		06:48	05:59	05:30	05:29	05:51	06:23	06:54 07:14-07:41/27	06:27	07:04	07:25
	17:12		19:21	19:55	20:24	20:37	20:19	19:37	18:45	16:58	16:31	16:38
31	07:13		06:46		05:29		05:52	06:24		06:28		07:25
	17:13		19:22		20:25		20:18	19:35		16:57		16:39
Potential sun hours	297	297	369	399	449	453	460	428	375	345	297	287
Sum of minutes with flicker	0	0	564	0	0	0	0	0	427	146	0	0

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

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

SHADOW - Calendar per WTG

WTG: 7 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (7)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25	07:12	06:35	06:44	05:58	05:29	05:29	05:53	06:25	06:55	06:30	07:05
	16:40	17:15	17:49	19:23	19:56	20:26	20:37	20:17	19:34	18:43	16:56	16:31
2	07:25	07:11	06:34	06:43	05:57	05:28	05:30	05:54	06:26	06:56	06:31	07:06
	16:41	17:16	17:50	19:25	19:57	20:26	20:36	20:16	19:32	18:41	16:55	16:31
3	07:26	07:10	06:32	06:41	05:55	05:28	05:30	05:55	06:27	06:57	06:32	07:07
	16:42	17:17	17:51	19:26	19:58	20:27	20:36	20:15	19:31	18:39	16:53	16:31
4	07:26	07:09	06:31	06:39	05:54	05:28	05:31	05:56	06:28	06:58	06:33	07:08
	16:43	17:18	17:52	19:27	19:59	20:28	20:36	20:14	19:29	18:38	16:52	16:30
5	07:26	07:08	06:29	06:38	05:53	05:27	05:31	05:57	06:29	06:59	06:34	07:09
	16:44	17:20	17:54	19:28	20:00	20:28	20:36	20:13	19:27	18:36	16:51	16:30
6	07:26	07:07	06:28	06:36	05:52	05:27	05:32	05:58	06:30	07:00	06:36	07:10
	16:44	17:21	17:55	19:29	20:01	20:29	20:36	20:12	19:26	18:34	16:50	16:30
7	07:25	07:05	06:26	06:34	05:50	05:27	05:33	05:59	06:31	07:01	06:37	07:11
	16:45	17:22	17:56	19:30	20:02	20:30	20:35	20:10	19:24	18:33	16:49	16:30
8	07:25	07:04	06:24	06:33	05:49	05:26	05:33	06:00	06:32	07:02	06:38	07:12
	16:46	17:23	17:57	19:31	20:03	20:30	20:35	20:09	19:22	18:31	16:48	16:30
9	07:25	07:03	06:23	06:31	05:48	05:26	05:34	06:01	06:33	07:03	06:39	07:13
	16:47	17:25	17:58	19:32	20:04	20:31	20:35	20:08	19:21	18:30	16:47	16:30
10	07:25	07:02	06:21	06:29	05:47	05:26	05:35	06:02	06:34	07:05	06:40	07:14
	16:48	17:26	17:59	19:33	20:05	20:32	20:34	20:07	19:19	18:28	16:45	16:30
11	07:25	07:01	06:19	06:28	05:46	05:26	05:35	06:03	06:35	07:06	06:42	07:14
	16:50	17:27	18:00	19:34	20:06	20:32	20:34	20:05	19:17	18:26	16:44	16:30
12	07:25	06:59	06:18	06:26	05:45	05:26	05:36	06:04	06:36	07:07	06:43	07:15
	16:51	17:28	18:02	19:35	20:07	20:33	20:33	20:04	19:15	18:25	16:43	16:30
13	07:24	06:58	06:16	06:25	05:44	05:25	05:37	06:05	06:37	07:08	06:44	07:16
	16:52	17:30	18:03	19:36	20:08	20:33	20:33	20:03	19:14	18:23	16:43	16:30
14	07:24	06:57	06:14	06:23	05:43	05:25	05:37	06:06	06:38	07:09	06:45	07:17
	16:53	17:31	18:04	19:37	20:09	20:34	20:32	20:01	19:12	18:22	16:42	16:30
15	07:24	06:56	06:13	06:21	05:42	05:25	05:38	06:07	06:39	07:10	06:46	07:18
	16:54	17:32	18:05	19:39	20:10	20:34	20:32	20:00	19:10	18:20	16:41	16:31
16	07:23	06:54	06:11	06:20	05:41	05:25	05:39	06:08	06:40	07:11	06:48	07:18
	16:55	17:33	18:06	19:40	20:11	20:34	20:31	19:58	19:09	18:18	16:40	16:31
17	07:23	06:53	06:09	06:18	05:40	05:25	05:40	06:09	06:41	07:12	06:49	07:19
	16:56	17:35	18:07	19:41	20:12	20:35	20:30	19:57	19:07	18:17	16:39	16:31
18	07:22	06:52	06:08	06:17	05:39	05:25	05:41	06:10	06:42	07:13	06:50	07:20
	16:57	17:36	18:08	19:42	20:13	20:35	20:30	19:56	19:05	18:15	16:38	16:31
19	07:22	06:50	06:06	06:15	05:38	05:26	05:41	06:11	06:43	07:14	06:51	07:20
	16:59	17:37	18:09	19:43	20:14	20:35	20:29	19:54	19:03	18:14	16:37	16:32
20	07:21	06:49	06:04	06:14	05:37	05:26	05:42	06:12	06:44	07:16	06:52	07:21
	17:00	17:38	18:10	19:44	20:15	20:36	20:28	19:53	19:02	18:12	16:37	16:32
21	07:20	06:47	06:03	06:12	05:36	05:26	05:43	06:13	06:45	07:17	06:54	07:21
	17:01	17:39	18:12	19:45	20:16	20:36	20:28	19:51	19:00	18:11	16:36	16:33
22	07:20	06:46	06:01	06:11	05:35	05:26	05:44	06:14	06:46	07:18	06:55	07:22
	17:02	17:41	18:13	19:46	20:17	20:36	20:27	19:50	18:58	18:09	16:35	16:33
23	07:19	06:44	05:59	06:09	05:34	05:26	05:45	06:15	06:47	07:19	06:56	07:22
	17:03	17:42	18:14	19:47	20:18	20:36	20:26	19:48	18:57	18:08	16:35	16:34
24	07:18	06:43	05:58	06:08	05:34	05:27	05:46	06:16	06:48	07:20	06:57	07:23
	17:05	17:43	18:15	19:48	20:19	20:36	20:25	19:47	18:55	18:07	16:34	16:34
25	07:18	06:41	05:56	06:06	05:33	05:27	05:47	06:17	06:49	06:21	06:58	07:23
	17:06	17:44	18:16	19:49	20:20	20:37	20:24	19:45	18:53	17:05	16:34	16:35
26	07:17	06:40	05:54	06:05	05:32	05:27	05:48	06:18	06:50	06:23	06:59	07:24
	17:07	17:45	18:17	19:50	20:21	20:37	20:23	19:43	18:51	17:04	16:33	16:35
27	07:16	06:38	05:53	06:03	05:32	05:28	05:49	06:20	06:51	06:24	07:00	07:24
	17:08	17:47	18:18	19:51	20:22	20:37	20:22	19:42	18:50	17:02	16:33	16:36
28	07:15	06:37	05:51	06:02	05:31	05:28	05:50	06:21	06:52	06:25	07:02	07:24
	17:09	17:48	18:19	19:53	20:22	20:37	20:21	19:40	18:48	17:01	16:32	16:37
29	07:14		06:49	06:01	05:30	05:28	05:50	06:22	06:53	06:26	07:03	07:25
	17:11		19:20	19:54	20:23	20:37	20:20	19:39	18:46	17:00	16:32	16:37
30	07:14		06:48	05:59	05:30	05:29	05:51	06:23	06:54	06:27	07:04	07:25
	17:12		19:21	19:55	20:24	20:37	20:19	19:37	18:45	16:58	16:31	16:38
31	07:13		06:46		05:29		05:52	06:24		06:28		07:25
	17:13		19:22		20:25		20:18	19:35		16:57		16:39
Potential sun hours	297	297	369	399	449	453	460	428	375	345	297	287
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

WTG: 8 - Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0 m) (8)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

Operational time

0	Sum
3.000	3.000

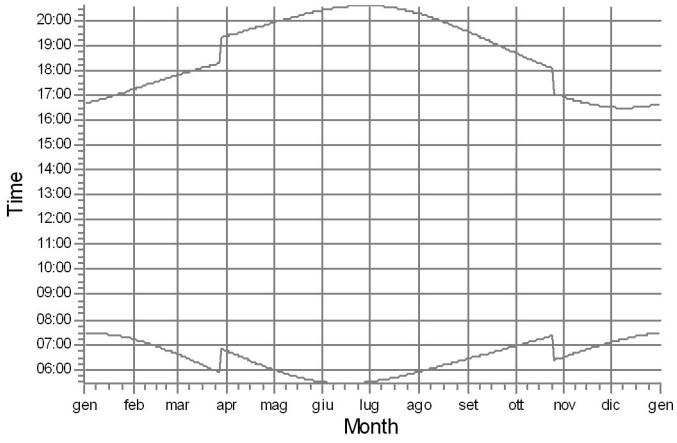
	January	February	March	April	May	June	July	August	September	October	November	December
1	07:25	07:12	06:35	06:44	05:58	05:29	05:29	05:53	06:25	06:55	06:30	07:05
	16:40	17:14	17:49	19:23	19:56	20:26	20:37	20:17	19:34	18:43	16:56	16:31
2	07:25	07:11	06:34	06:43	05:57	05:28	05:30	05:54	06:26	06:56	06:31	07:06
	16:41	17:16	17:50	19:25	19:57	20:26	20:36	20:16	19:32	18:41	16:55	16:31
3	07:26	07:10	06:32	06:41	05:55	05:28	05:30	05:55	06:27	06:57	06:32	07:07
	16:42	17:17	17:51	19:26	19:58	20:27	20:36	20:15	19:31	18:39	16:53	16:31
4	07:26	07:09	06:31	06:39	05:54	05:28	05:31	05:56	06:28	06:58	06:33	07:08
	16:43	17:18	17:52	19:27	19:59	20:28	20:36	20:14	19:29	18:38	16:52	16:30
5	07:26	07:08	06:29	06:38	05:53	05:27	05:31	05:57	06:29	06:59	06:34	07:09
	16:44	17:20	17:54	19:28	20:00	20:28	20:36	20:13	19:27	18:36	16:51	16:30
6	07:26	07:06	06:28	06:36	05:52	05:27	05:32	05:58	06:30	07:00	06:36	07:10
	16:44	17:21	17:55	19:29	20:01	20:29	20:36	20:12	19:26	18:34	16:50	16:30
7	07:25	07:05	06:26	06:34	05:50	05:27	05:33	05:59	06:31	07:01	06:37	07:11
	16:45	17:22	17:56	19:30	20:02	20:30	20:35	20:10	19:24	18:33	16:49	16:30
8	07:25	07:04	06:24	06:33	05:49	05:26	05:33	06:00	06:32	07:02	06:38	07:12
	16:46	17:23	17:57	19:31	20:03	20:30	20:35	20:09	19:22	18:31	16:48	16:30
9	07:25	07:03	06:23	06:31	05:48	05:26	05:34	06:01	06:33	07:03	06:39	07:13
	16:47	17:25	17:58	19:32	20:04	20:31	20:35	20:08	19:21	18:30	16:46	16:30
10	07:25	07:02	06:21	06:29	05:47	05:26	05:34	06:02	06:34	07:05	06:40	07:13
	16:48	17:26	17:59	19:33	20:05	20:32	20:34	20:07	19:19	18:28	16:45	16:30
11	07:25	07:01	06:19	06:28	05:46	05:26	05:35	06:03	06:35	07:06	06:42	07:14
	16:50	17:27	18:00	19:34	20:06	20:32	20:34	20:05	19:17	18:26	16:44	16:30
12	07:25	06:59	06:18	06:26	05:45	05:26	05:36	06:04	06:36	07:07	06:43	07:15
	16:51	17:28	18:02	19:35	20:07	20:33	20:33	20:04	19:15	18:25	16:43	16:30
13	07:24	06:58	06:16	06:25	05:44	05:25	05:37	06:05	06:37	07:08	06:44	07:16
	16:52	17:30	18:03	19:36	20:08	20:33	20:33	20:03	19:14	18:23	16:42	16:30
14	07:24	06:57	06:14	06:23	05:43	05:25	05:37	06:06	06:38	07:09	06:45	07:17
	16:53	17:31	18:04	19:37	20:09	20:34	20:32	20:01	19:12	18:22	16:42	16:30
15	07:23	06:56	06:13	06:21	05:42	05:25	05:38	06:07	06:39	07:10	06:46	07:18
	16:54	17:32	18:05	19:39	20:10	20:34	20:32	20:00	19:10	18:20	16:41	16:31
16	07:23	06:54	06:11	06:20	05:41	05:25	05:39	06:08	06:40	07:11	06:48	07:18
	16:55	17:33	18:06	19:40	20:11	20:34	20:31	19:58	19:09	18:18	16:40	16:31
17	07:23	06:53	06:09	06:18	05:40	05:25	05:40	06:09	06:41	07:12	06:49	07:19
	16:56	17:35	18:07	19:41	20:12	20:35	20:30	19:57	19:07	18:17	16:39	16:31
18	07:22	06:52	06:08	06:17	05:39	05:25	05:41	06:10	06:42	07:13	06:50	07:20
	16:57	17:36	18:08	19:42	20:13	20:35	20:30	19:56	19:05	18:15	16:38	16:31
19	07:22	06:50	06:06	06:15	05:38	05:26	05:41	06:11	06:43	07:14	06:51	07:20
	16:59	17:37	18:09	19:43	20:14	20:35	20:29	19:54	19:03	18:14	16:37	16:32
20	07:21	06:49	06:04	06:14	05:37	05:26	05:42	06:12	06:44	07:16	06:52	07:21
	17:00	17:38	18:10	19:44	20:15	20:36	20:28	19:53	19:02	18:12	16:37	16:32
21	07:20	06:47	06:03	06:12	05:36	05:26	05:43	06:13	06:45	07:17	06:54	07:21
	17:01	17:39	18:12	19:45	20:16	20:36	20:28	19:51	19:00	18:11	16:36	16:33
22	07:20	06:46	06:01	06:11	05:35	05:26	05:44	06:14	06:46	07:18	06:55	07:22
	17:02	17:41	18:13	19:46	20:17	20:36	20:27	19:50	18:58	18:09	16:35	16:33
23	07:19	06:44	05:59	06:09	05:34	05:26	05:45	06:15	06:47	07:19	06:56	07:22
	17:03	17:42	18:14	19:47	20:18	20:36	20:26	19:48	18:57	18:08	16:35	16:34
24	07:18	06:43	05:58	06:08	05:34	05:27	05:46	06:16	06:48	07:20	06:57	07:23
	17:05	17:43	18:15	19:48	20:19	20:36	20:25	19:47	18:55	18:06	16:34	16:34
25	07:18	06:41	05:56	06:06	05:33	05:27	05:47	06:17	06:49	06:21	06:58	07:23
	17:06	17:44	18:16	19:49	20:20	20:37	20:24	19:45	18:53	17:05	16:34	16:35
26	07:17	06:40	05:54	06:05	05:32	05:27	05:48	06:18	06:50	06:22	06:59	07:24
	17:07	17:45	18:17	19:50	20:21	20:37	20:23	19:43	18:51	17:04	16:33	16:35
27	07:16	06:38	05:53	06:03	05:32	05:28	05:49	06:19	06:51	06:24	07:00	07:24
	17:08	17:47	18:18	19:51	20:21	20:37	20:22	19:42	18:50	17:02	16:33	16:36
28	07:15	06:37	05:51	06:02	05:31	05:28	05:50	06:20	06:52	06:25	07:02	07:24
	17:09	17:48	18:19	19:52	20:22	20:37	20:21	19:40	18:48	17:01	16:32	16:37
29	07:14		06:49	06:01	05:30	05:28	05:50	06:22	06:53	06:26	07:03	07:25
	17:11		19:20	19:54	20:23	20:37	20:20	19:39	18:46	17:00	16:32	16:37
30	07:14		06:48	05:59	05:30	05:29	05:51	06:23	06:54	06:27	07:04	07:25
	17:12		19:21	19:55	20:24	20:37	20:19	19:37	18:45	16:58	16:31	16:38
31	07:13		06:46		05:29		05:52	06:24		06:28		07:25
	17:13		19:22		20:25		20:18	19:35		16:57		16:39
Potential sun hours	297	297	369	399	449	453	460	428	375	345	297	287
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

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

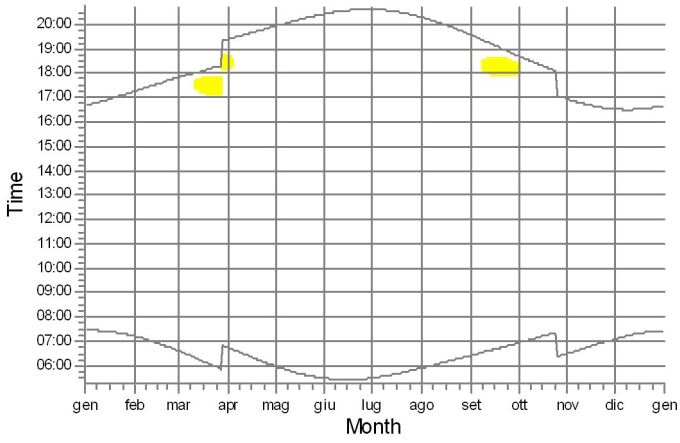
Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG, graphical

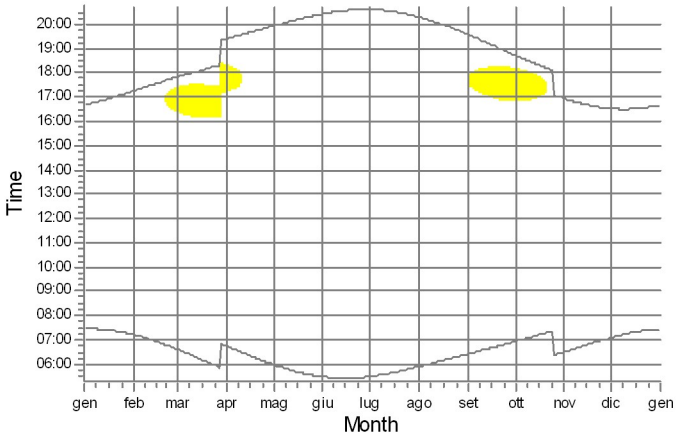
1: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0



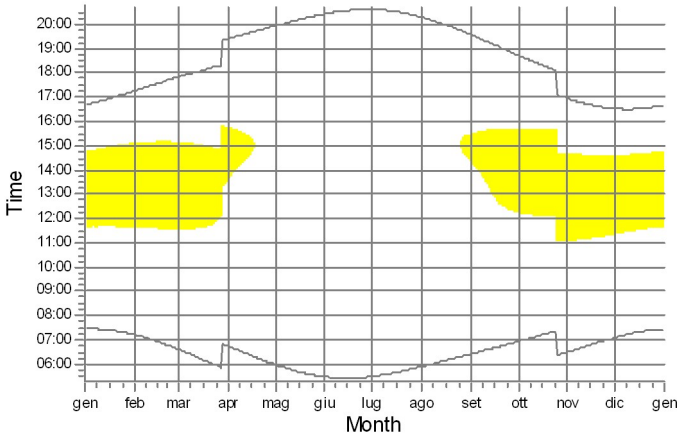
2: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0



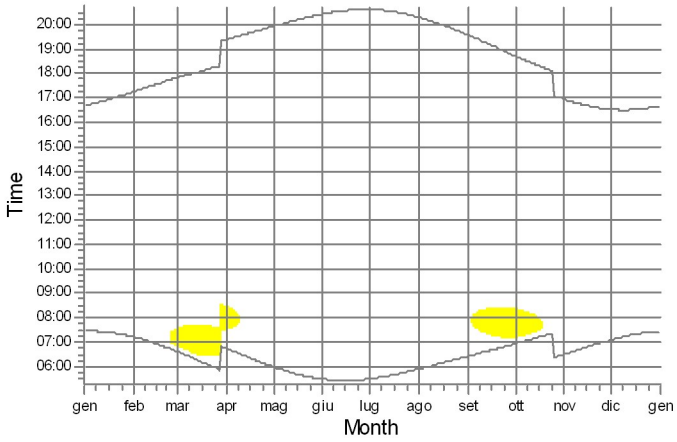
3: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0



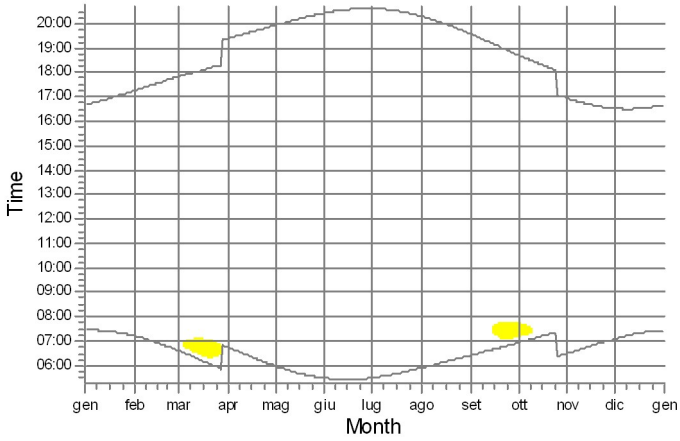
4: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0



5: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0



6: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0

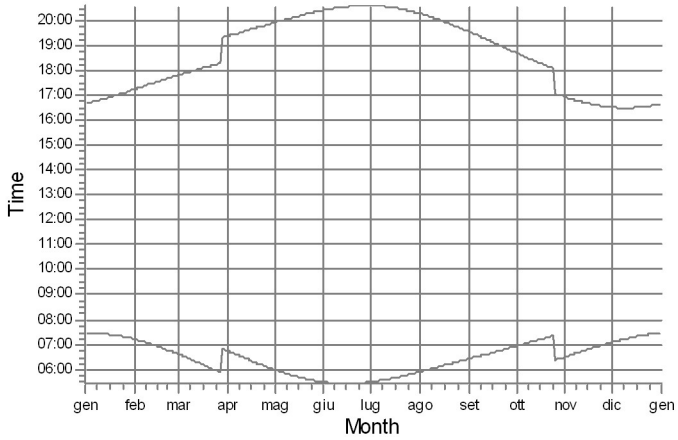


Shadow receptors

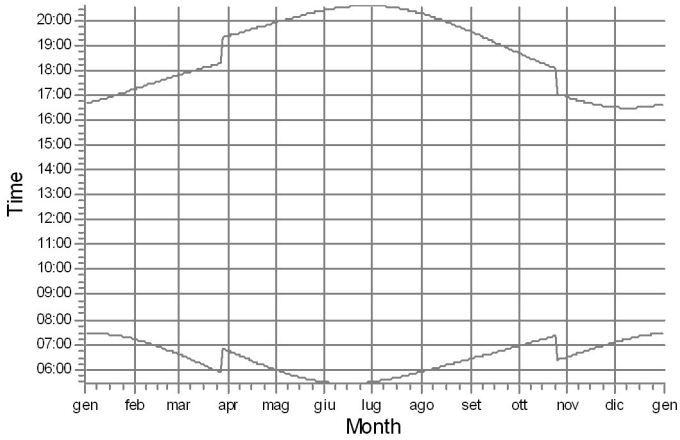
B: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)

SHADOW - Calendar per WTG, graphical

7: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0

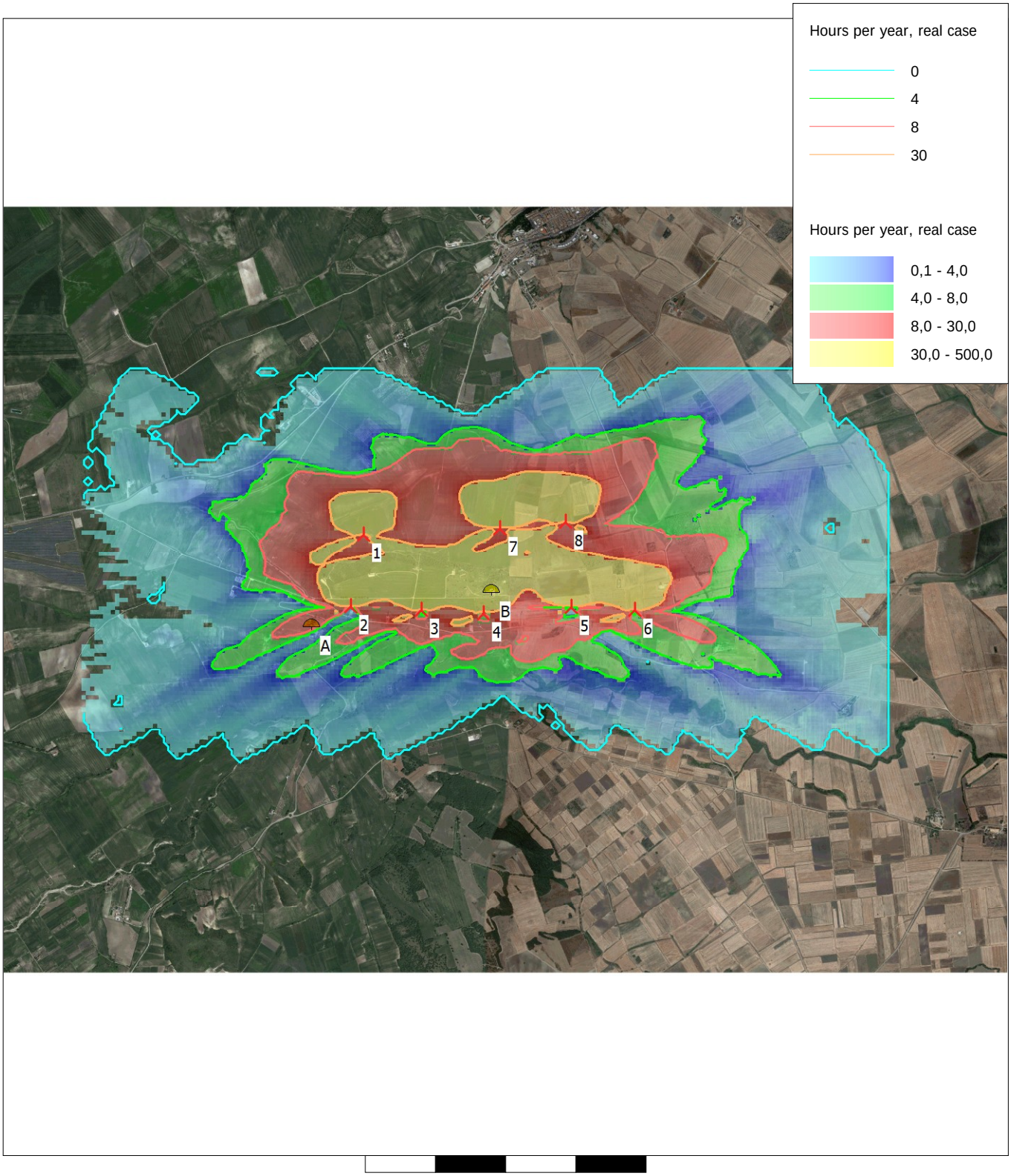


8: Siemens Gamesa SG 6.0-170 6200 170.0 !O! hub: 117,0 m (TOT: 202,0



Shadow receptors

SHADOW - Map



0 500 1000 1500 2000 m

Map: orto , Print scale 1:40.000, Map center UTM (north)-WGS84 Zone: 33 East: 525.300 North: 4.576.170

New WTG Shadow receptor

Flicker map level: Elevation Grid Data Object: troia_EMDGrid_0.wpg (1)