REGIONE MOLISE
PROVINCIA DI CAMPOBASSO

Comune:
Rotello

Località "Crocella - Mazzincollo - Difesa Grande - Piano Cavato"

PROGETTO DEFINITIVO PER LA REALIZZAZIONE DI UN IMPIANTO DI PRODUZIONE DI ENERGIA ELETTRICA DA FONTE EOLICA E RELATIVE OPERE DI CONNESSIONE - 12 AEROGENERATORI

Titolo elaborato:

RELAZIONE SULL'EVOLUZIONE DELL'OMBRA INDOTTA DALL'IMPIANTO

N. Elaborato: PD.OM.SIA01

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1. PREMESSA

Il presente elaborato ha lo scopo di valutare in maniera tecnica l'eventuale impatto generato dall'evoluzione dell'ombra derivante dalla futura installazione di un impianto di produzione di energia da fonte eolica costituita da 12 aerogeneratori di potenza elettrica nominale 3,85 MW per una potenza complessiva pari a 46,2 MW previsti nel comune di Rotello (CB) in località "Crocella – Mazzincollo – Difesa Grande – Piano Cavato" e con opere di connessione nello stesso comune presso la stazione elettrica di trasformazione della RTN di TERNA. Proponente dell'iniziativa è la società Blunova S.r.l..
Lo Shadow-Flickering è l'espressione comunemente impiegata in ambito specialistico per descrivere l'effetto stroboscopico delle ombre proiettate dalle pale rotanti degli aerogeneratori eolici quando sussistono le condizioni meteorologiche opportune; infatti la possibilità e la durata di tali effetti dipendono da una serie di condizioni ambientali, tra cui: la posizione del sole, l'ora del giorno, il giorno dell'anno, le condizioni atmosferiche ambientali e la posizione della turbina eolica rispetto ad un recettore sensibile. La valutazione tecnica è eseguita con l'ausilio di un software di simulazione specifico per la progettazione degli impianti eolici WIND PRO®, costituito da un insieme di moduli di elaborazione orientati alla simulazione di una serie di aspetti che caratterizzano le diverse fasi progettuali. Il modulo SHADOW è quello specifico per la valutazione dell'evoluzione dell'ombra e del flickering. In tale report è riportata:

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

2. IL CASO STUDIO

Come anticipato, il presente elaborato ha lo scopo di valutare in maniera tecnica l'eventuale impatto generato dall'evoluzione dell'ombra dalla presenza di un impianto di produzione di energia da fonte eolica costituito da 12 aerogeneratori con caratteristiche dimensionali di 158 m di diametro di rotore, altezza al mozzo fissata a 120,9 m s.l.t. e di potenza elettrica nominale 3,85 MW per una potenza complessiva pari a 46,2 MW, da installare nel comune di Rotello (CB) in località "Crocella - Mazzincollo - Difesa Grande - Piano Cavato" e avente opere di connessione ricadenti nello stesso comune presso la stazione elettrica di trasformazione della RTN di Terna.

Le elaborazioni saranno eseguite considerando una delle possibili tipologie di turbina attualmente presenti sul mercato e che da un punto di vista dimensionale e di potenza sia compatibile con i valori indicati; pertanto il modello di aerogeneratore che verrà preso ad esempio in tale elaborato, e con il quale saranno effettuate tutte le simulazioni del caso, è la Ge Wind Energy GeW158 – con hub 120.9 m s.l.t.

In particolare, per tale tipologia di turbina, non essendo ancora disponibile la versione deratizzata in potenza a 3.85 MW, sarà considerata la sua versione originale (di pari diametro rotore ed altezza mozzo), ma di potenza nominale unitaria 5.3 MW sebbene per quanto concerne il fenomeno di Shadow Flickering la potenza nominale della tipologia di turbina non gioca un ruolo fondamentale poiché ciò che realmente determina e influisce sull'effetto in questione, è legato alle dimensioni strutturali della macchina e riguardano fondamentalmente l'ampiezza del diametro di rotore e l'altezza del mozzo..

Inoltre, onde poter valutare il potenziale effetto cumulativo per la stima previsionale dell'effetto Shadow/Flickering, sono state inserite e considerate nel modello di simulazione anche tutte le turbine già insistenti sul territorio vicine ad ogni singolo punto di sviluppo progettuale del nuovo layout.

2.1. DESCRIZIONE DEL SITO DI INDAGINE

L'area in esame, oggetto di futura installazione della windfarm di progetto, è sita in Italia, in Regione Molise, in provincia di Campobasso e coinvolge esclusivamente il comune di Rotello. Sebbene la zona di interesse (nel suo complesso) risulti essere non nuova alla installazione di aerogeneratori, l'area di progetto della windfarm, risulta piuttosto libera di insediamenti di questo tipo vedendo la prima turbina eolica già installata, posta a distanza superiore i 1200 m in linea d'aria. Tale distanza dovrebbe garantire ridotte possibilità di interferenza per effetto cumulato con le turbine di progetto che in ogni caso saranno debitamente valutate in tale elaborato. A tal fine, saranno inserite nel modello di simulazione e calcolo, tutte le turbine esistenti nelle aree limitrofe a quella di installazione delle turbine di progetto.

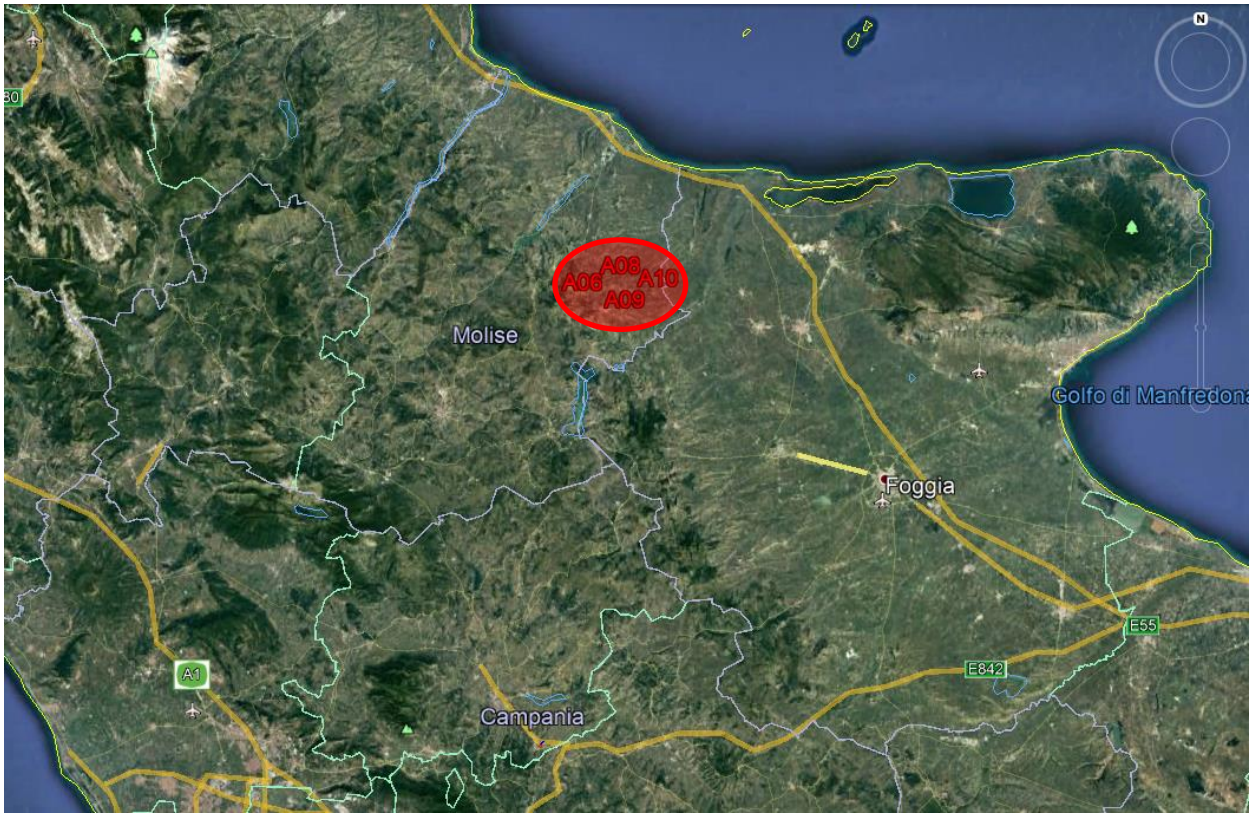


Figura 1: Inquadramento territoriale. – Localizzazione su larga scala dell'area di sviluppo del parco eolico di Rotello (CB).

L'area di interesse risulta essere di tipo collinare con una quota media di circa 190 m s.l.m. e caratterizzata dalla presenza di case sparse. La zona per la gran parte della sua estensione è sostanzialmente adibita ad attività agricola anche se per alcune ristrette e circoscritte aree, risulta presente vegetazione rada con alberature di medio fusto. L'orografia della zona è caratterizzata anche da modeste pendenze e l'area oggetto di analisi è essenzialmente posta su una linea di crinale che tende a degradare lungo modeste zone di versante.

La tabella a seguire individua le coordinate geografiche delle turbine oggetto di analisi nel sistema di riferimento UTM WGS84

Tabella 1: Coordinate delle turbine di progetto nel sistema UTM GS84

ID Turbina	*UTM WGS 84 Long. Est [m]*	*UTM WGS 84 Lat. Nord [m]*	*Quota altimetrica s.l.m. [m]*
A01	504816	4625498	158,0
A02	503655	4625804	137,7
A03	502629	4625349	208,5
A04	501637	4625084	228,6
A05	500974	4624123	230,0
A06	501727	4623511	220,0
A07	502282	4624057	202,1
A08	503129	4623985	201,5
A09	503793	4623737	200,0
A10	504501	4624218	182,4
A11	505318	4624444	172,5
A12	506134	4624412	155,6

Per questioni di semplicità di interpretazione grafica, si riporta a seguire un'immagine senza cartografia di base e su stralcio di base cartografica IGM 1:50000, della disposizione del layout di progetto (icone in rosso) con la presenza simultanea delle turbine già insistenti sul territorio (icone in blu) e la disposizione dei recettori sensibili su cui è stata concentrata l'analisi (icone in giallo identificati con le lettere "SR").

La prima immagine pone evidenza degli impianti esistenti e considerati nel modello di simulazione.

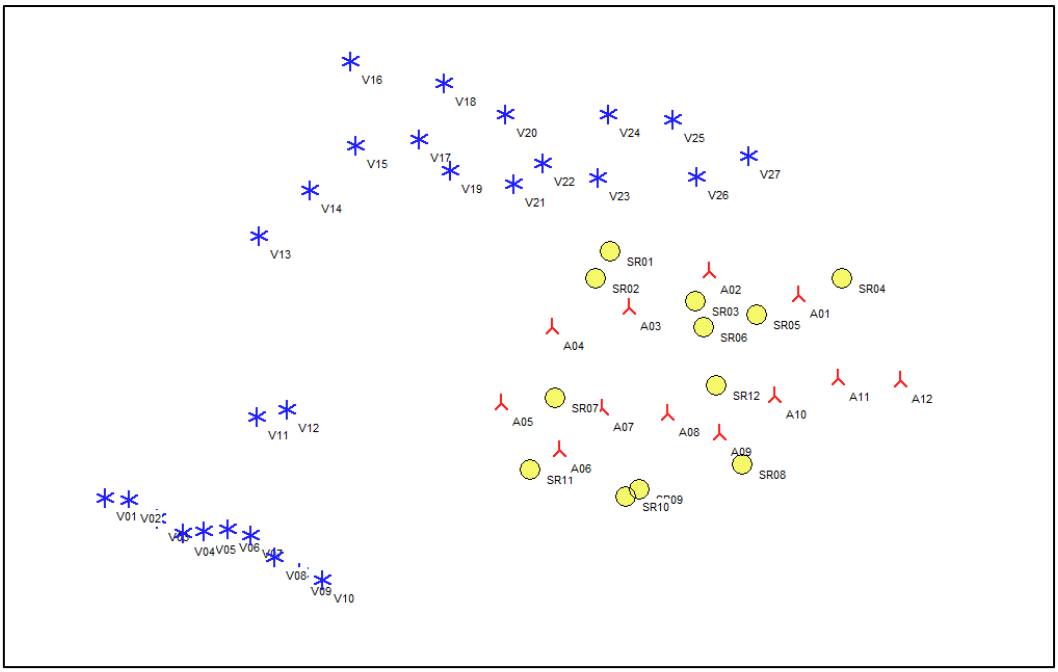


Figura 2: Inquadramento territoriale del parco eolico di Rotello in assenza di base cartografica. Le icone in blu individuano le Wind farm già presenti sul territorio e considerate nel modello di simulazione per la sima previsionale del fenomeno di Shadow/Flickering. Gli aerogeneratori di progetto sono rappresentati dal simbolo , mentre con l'indicazione "SR" sono individuati in giallo i recettori sensibili.

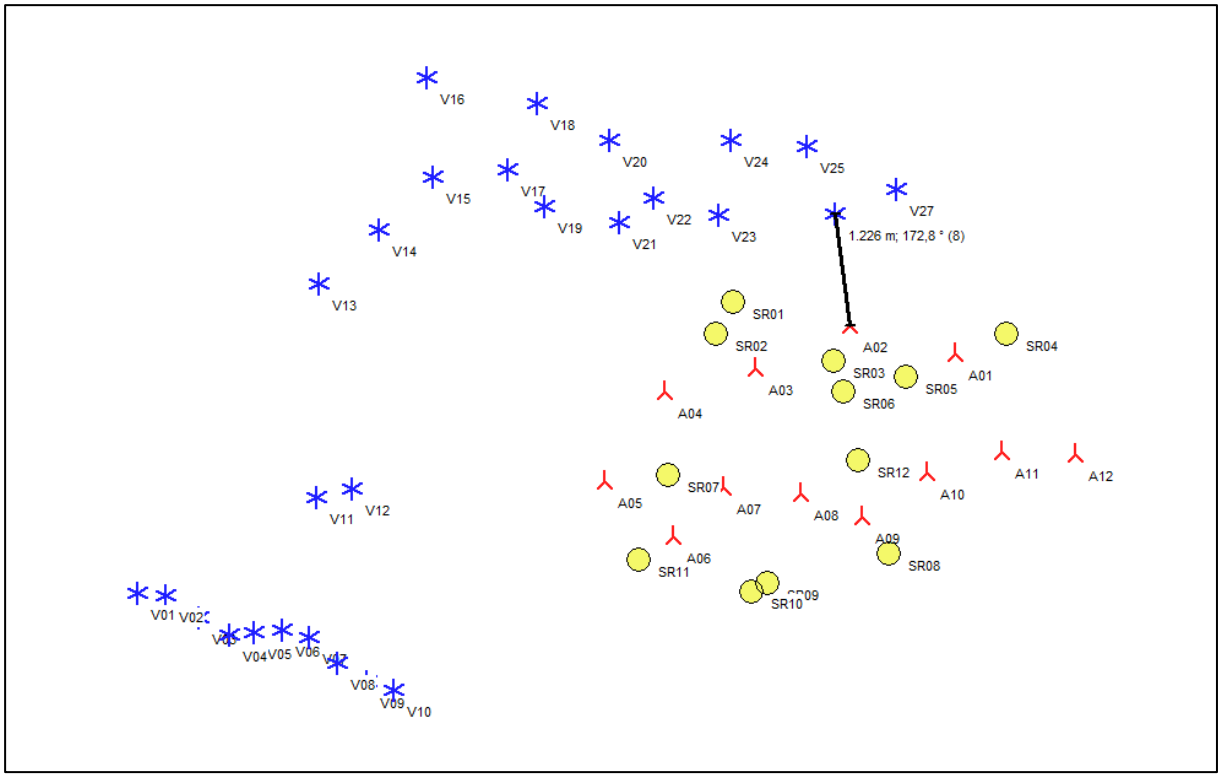


Figura 3: Inquadramento territoriale del parco eolico di Rotello in assenza di base cartografica. In evidenza la distanza minima intercorrente tra turbina di progetto e aerogeneratore più prossimo di Wind farm già presente sul territorio. Gli aerogeneratori di progetto sono rappresentati dal simbolo ; con l'indicazione "SR" sono individuati in rosa i recettori sensibili.

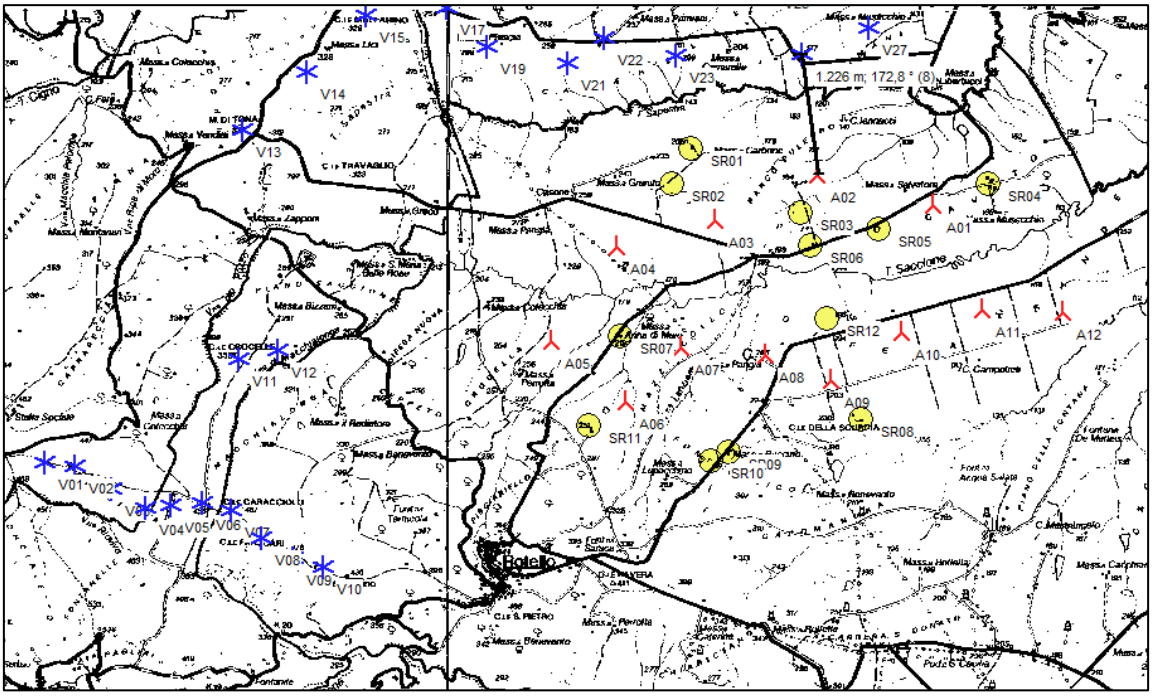


Figura 4: Inquadramento delle turbine di progetto e del recettore su stralcio cartografico IGM 1:50000; turbina di progetto [ ], turbine esistenti [ ] e recettori sensibili [ ].

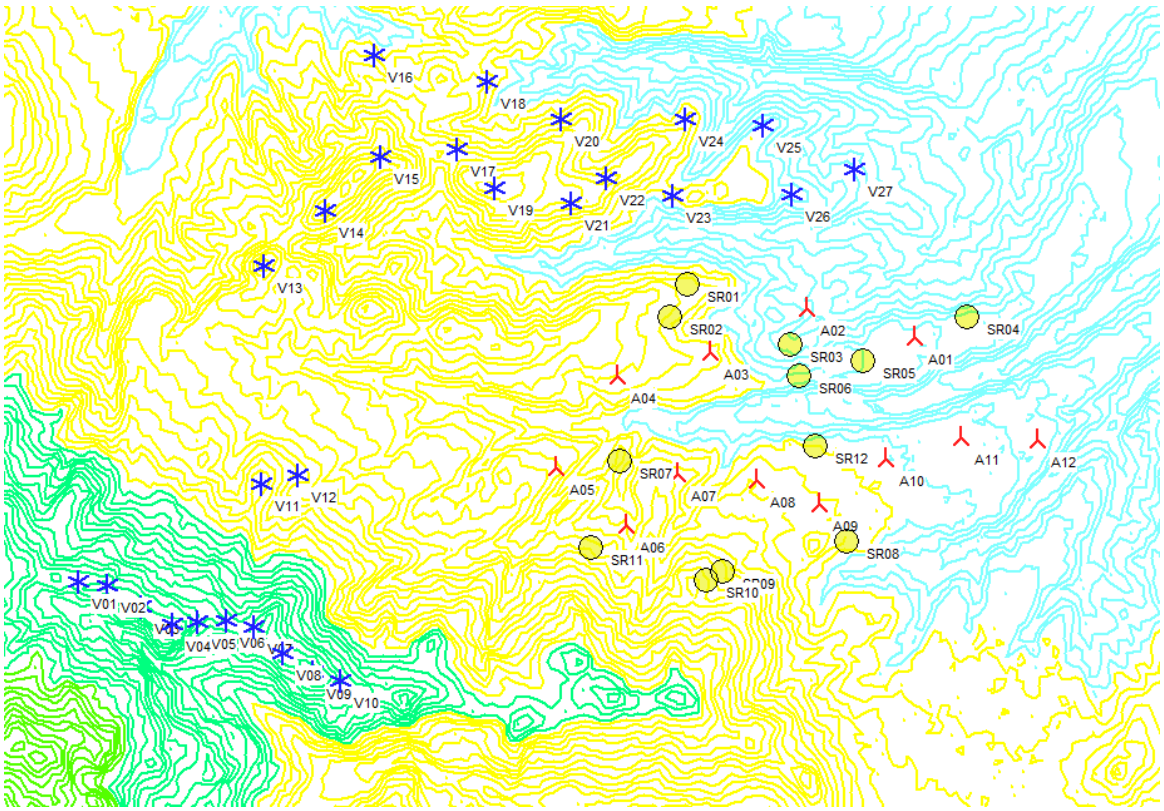


Figura 5: Inquadramento delle turbine di progetto, delle turbine esistenti e di tutti i recettori sensibili su modello digitale di Terreno (DTM) in assenza di cartografia di base per una maggiore comprensione visiva. Le icone individuano: turbine di progetto [ ], turbine esistenti [ ] recettori sensibili [ ].

Nell'immagine proposta è altresì evidenziata la distanza minima degli aerogeneratori di progetto dalle turbine più prossime già installate e presenti sul territorio. Per quanto concerne l'evoluzione dell'ombra e del fenomeno di flickering sono stati considerati anche gli impianti già insistenti sul territorio e vicini ad ogni punto di sviluppo progettuale del nuovo layout.

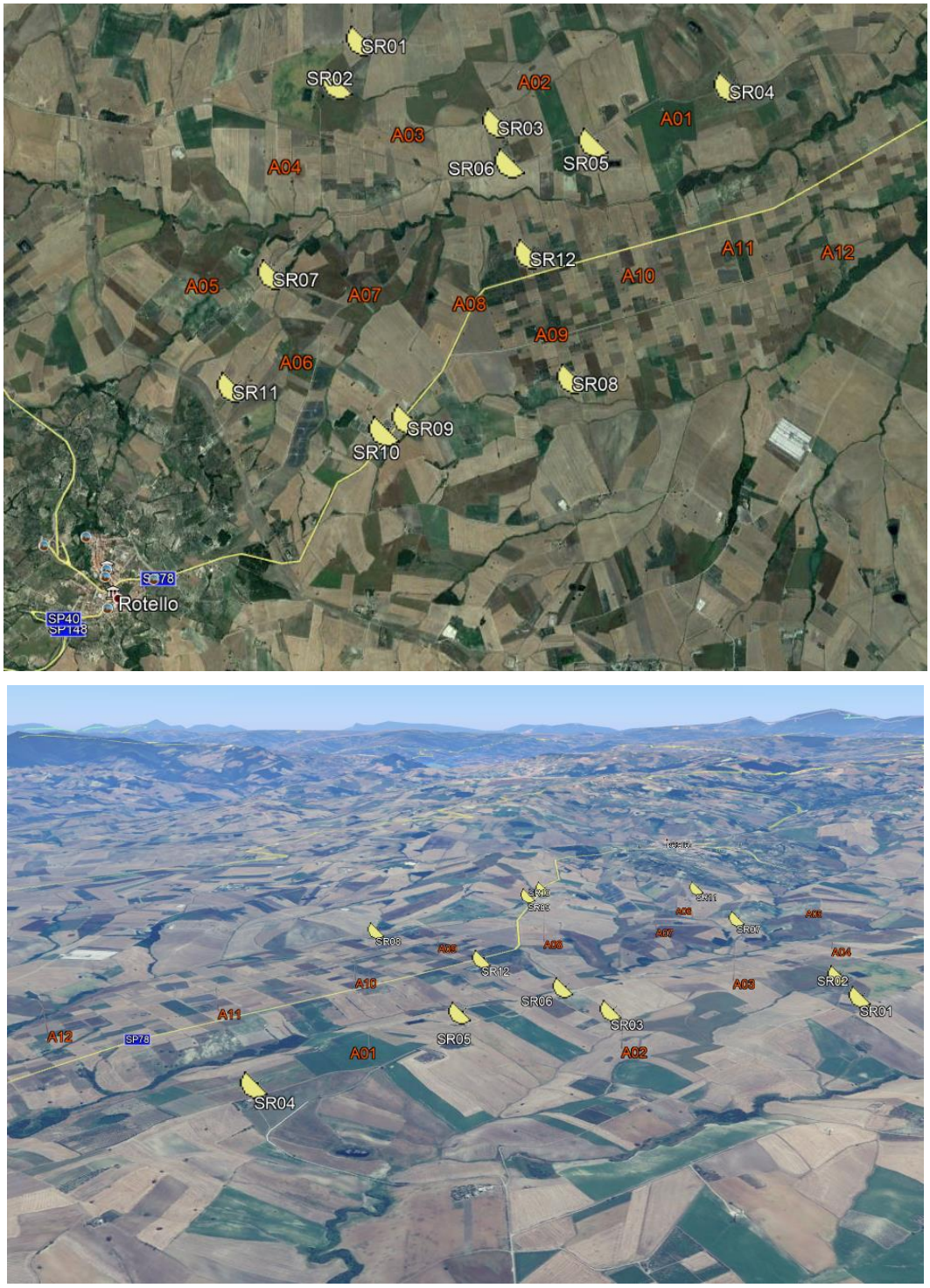


Figura 6: Inquadramento delle turbine di progetto e di tutti i recettori sensibili analizzati su stralcio di ortofoto satellitare nel prospetto 2D e 3D estratto da Google Earth.

2.2. DESCRIZIONE DEGLI AEROGENERATORI E CARATTERISTICHE GEOGRAFICHE DI POSIZIONE

Le macchine oggetto di studio sono costituite da una delle possibili tipologie di turbina attualmente presenti sul mercato che da un punto di vista dimensionale e di potenza unitaria, sia compatibile con i valori indicati; pertanto il modello di aerogeneratore che verrà preso ad esempio in tale elaborato e con il quale saranno effettuate tutte le simulazioni del caso è la Ge Wind Energy Ge W 158 – con hub 120.9 m s.l.t. considerata nella sua versione originale di potenza unitaria nominale pari a 5.3 MW.

Sebbene l'area di insediamento del futuro impianto sia priva di altre installazioni eoliche (la cui prima turbina esistente dista otre 1200 m in linea d'aria dall'aerogeneratore di progetto), per tutte le strutture considerate nel modello di simulazione sono stati elaborati anche gli effetti cumulativi legati alla presenza delle turbine installate in area limitrofa; tali impianti risultano essere costituiti da turbine modello Vestas V90 con hub 80 m s.l.t. e potenza unitaria nominale di 2 MW.

Tabella 2: Coordinate degli aerogeneratori di progetto

ID Turbina	*UTM WGS 84 Long. Est [m]*	*UTM WGS 84 Lat. Nord [m]*	*Quota altimetrica s.l.m. [m]*	*Mod. Turbina*	*Altezza mozzo [m]*	*Potenza Nominale [kW]*
A01	504816	4625498	158,0	GE WIND -158	120,9	5300
A02	503655	4625804	137,7	GE WIND -158	120,9	5300
A03	502629	4625349	208,5	GE WIND -158	120,9	5300
A04	501637	4625084	228,6	GE WIND -158	120,9	5300
A05	500974	4624123	230,0	GE WIND -158	120,9	5300
A06	501727	4623511	220,0	GE WIND -158	120,9	5300
A07	502282	4624057	202,1	GE WIND -158	120,9	5300
A08	503129	4623985	201,5	GE WIND -158	120,9	5300
A09	503793	4623737	200,0	GE WIND -158	120,9	5300
A10	504501	4624218	182,4	GE WIND -158	120,9	5300
A11	505318	4624444	172,5	GE WIND -158	120,9	5300
A12	506134	4624412	155,6	GE WIND -158	120,9	5300

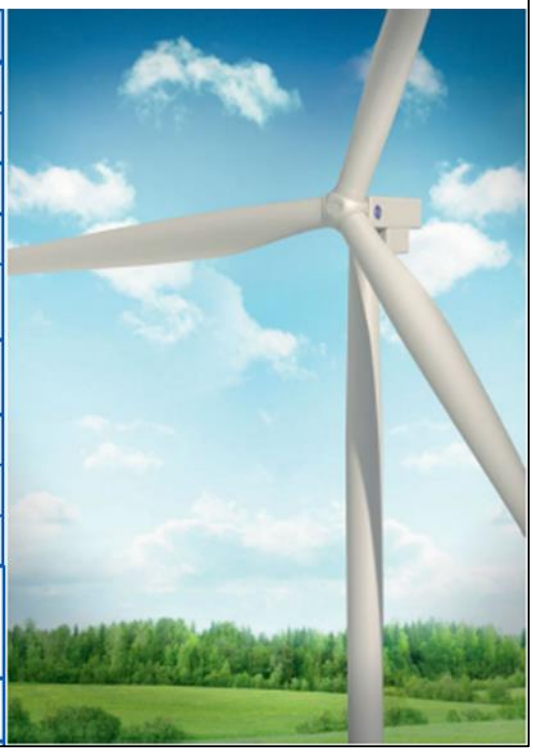
Tabella 3: Coordinate e caratteristiche tecniche degli impianti esistenti Vestas V90

ID Turbina	UTM WGS 84 Long. Est [m]	UTM WGS 84 Lat. Nord [m]	Quota altimetrica s.l.m. [m]	Mod. Turbina	Altezza mozzo [m]	Potenza Nominale [kW]
V01	495870	4622909	494,2	VESTAS - V90	80	2000
V02	496170	4622873	499,5	VESTAS - V90	80	2000
V03	496532	4622634	495,0	VESTAS - V90	80	2000
V04	496877	4622447	490,0	VESTAS - V90	80	2000
V05	497137	4622475	473,1	VESTAS - V90	80	2000
V06	497449	4622499	440,0	VESTAS - V90	80	2000
V07	497741	4622423	454,8	VESTAS - V90	80	2000
V08	498048	4622149	458,0	VESTAS - V90	80	2000
V09	498370	4621944	460,0	VESTAS - V90	80	2000
V10	498671	4621856	431,5	VESTAS - V90	80	2000
V11	497824	4623945	352,0	VESTAS - V90	80	2000
V12	498209	4624032	309,1	VESTAS - V90	80	2000
V13	497854	4626262	310,0	VESTAS - V90	80	2000
V14	498505	4626848	318,8	VESTAS - V90	80	2000
V15	499104	4627419	300,0	VESTAS - V90	80	2000
V16	499028	4628498	190,0	VESTAS - V90	80	2000
V17	499921	4627497	239,8	VESTAS - V90	80	2000
V18	500236	4628216	198,7	VESTAS - V90	80	2000
V19	500319	4627094	250,0	VESTAS - V90	80	2000
V20	501037	4627820	213,1	VESTAS - V90	80	2000
V21	501140	4626931	248,1	VESTAS - V90	80	2000
V22	501508	4627191	230,0	VESTAS - V90	80	2000
V23	502228	4627008	190,0	VESTAS - V90	80	2000
V24	502361	4627820	200,4	VESTAS - V90	80	2000
V25	503188	4627752	176,9	VESTAS - V90	80	2000
V26	503505	4627026	170,0	VESTAS - V90	80	2000
V27	504168	4627293	130,0	VESTAS - V90	80	2000

Tabella 4: Caratteristiche tecniche della turbina ipotizzato nelle simulazioni come turbina di progetto Ge W 158 – 5.3 MW

Wind Turbine Generator Systems
5.3-158 - 50 Hz

Turbine	5.3-158
Rated output [MW]	5.3
Rotor diameter [m]	158
Number of blades	3
Swept area [m^2]	19607
Rotational direction (viewed from an upwind location)	Clockwise
Maximum speed of the blade tips [m/s]	80.3
Orientation	Upwind
Speed regulation	Pitch control
Aerodynamic brake	Full feathering
Hub height	101 m tubular steel tower* 120.9 m tubular steel tower*/** 150 m hybrid tower** 161 m hybrid tower**
Wind turbine design standard	* IEC 61400-1, Ed. 3 ** DIBt 2012



2.3. ANALISI DEI RECETTORI

L'analisi di shadow-flickering, di cui al presente studio, è stata richiesta per specifici 12 recettori nell'intorno dell'impianto.

Nelle tabelle a seguire sono riportati i riferimenti geografici (coordinate) di tutti i recettori oggetto di analisi e simulazione e, in successione, una tabella di riepilogo della matrice delle distanze minime intercorrenti tra recettori in oggetto e l'aerogeneratore più prossimo.

Tabella 5: Inquadramento geografico – Coordinate di tutti i recettori sensibili individuati ed inseriti nel modello di simulazione.

ID Shadow Receptor	*UTM WGS 84 Long. Est [m]*	*UTM WGS 84 Lat. Nord [m]*	*Quota altimetrica s.l.m. [m]*
SR01	502386	4626063	213,5
SR02	502194	4625711	220,8
SR03	503487	4625427	149,0
SR04	505380	4625717	126,9
SR05	504271	4625255	139,2
SR06	503588	4625088	154,2
SR07	501669	4624179	198,5
SR08	504094	4623338	191,0
SR09	502764	4623013	253,7
SR10	502583	4622918	270,6
SR11	501357	4623269	248,3
SR12	503750	4624349	189,4

Tabella 6: Matrice delle distanze (in metri) aerogeneratori/recettori.

Matrice Distanze WTG/Recettori Sensibili												
WTG/REC	**SR01**	**SR02**	**SR03**	**SR04**	**SR05**	**SR06**	**SR07**	**SR08**	**SR09**	**SR10**	**SR11**	**SR12**
A01	2495	2631	1331	605	597	1295	3413	2278	3223	3413	4115	1567
A02	1296	1464	413	1727	825	719	2567	2505	2930	3079	3422	1458
A03	754	566	861	2775	1644	994	1514	2488	2340	2432	2438	1502
A04	1232	838	1881	3796	2639	1951	906	3014	2358	2364	1836	2237
A05	2399	2002	2831	4685	3485	2786	697	3217	2106	2010	936	2785
A06	2635	2249	2601	4267	3084	2439	670	2373	1150	1041	442	2190
A07	2008	1656	1824	3514	2321	1663	625	1949	1150	1178	1215	1497
A08	2207	1963	1485	2840	1707	1194	1473	1162	1039	1199	1911	720
A09	2718	2540	1717	2537	1591	1366	2170	500	1259	1462	2481	613
A10	2807	2748	1578	1737	1062	1261	2833	970	2115	2318	3284	762
A11	3350	3371	2078	1274	1325	1846	3659	1650	2928	3132	4132	1571
A12	4096	4149	2835	1507	2045	2635	4472	2306	3649	3853	4912	2385

In rosso è stata evidenziata la minima distanza intercorrente tra un recettore sensibile ed una turbina di progetto che nello specifico risulta essere di 413 m in linea d'aria ed interessa il recettore individuato come SR03 e la turbina A02.

3. ANALISI DI SHADOW - FLICKERING

3.1. CENNI SUL FENOMENO DELL'EVOLUZIONE DELL'OMBRA GENERATA DAGLI AEROGENERATORI

Le turbine eoliche, come altre strutture fortemente sviluppate in altezza, proiettano un'ombra sulle aree adiacenti in presenza della luce solare diretta

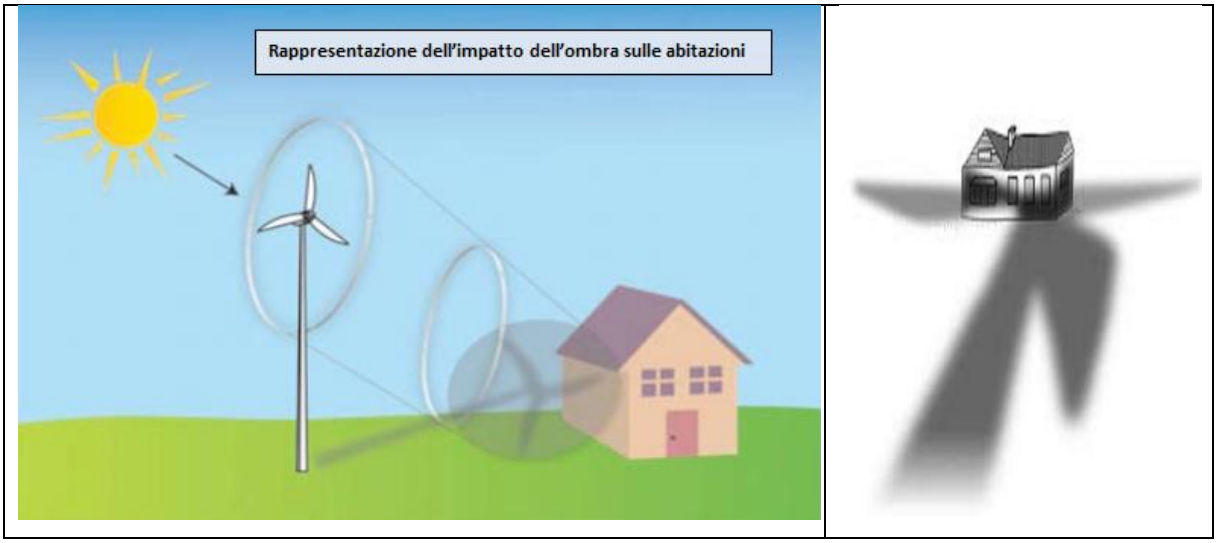


Figura 7: Rappresentazione grafica dell'impatto dell'ombra generata da una turbina eolica

Il cosiddetto fenomeno del "flickering", consiste in un effetto di lampeggiamento che si verifica quando le pale del rotore in movimento "tagliano" la luce solare in maniera intermittente. Il flickering si verifica solo in determinate condizioni e coinvolge solo un area limitata che circonda un parco eolico, tuttavia esso può determinare disturbo per i residenti dei fabbricati situati nei pressi dell'impianto e pertanto è importante valutare e garantire che l'esposizione sia limitata.

Affinché il fenomeno si verifichi presso un recettore, il cielo deve essere chiaro e la turbina deve funzionare, altrimenti non vengono emesse ombre in movimento; inoltre il rotore della turbina deve essere situato lungo la linea di vista, senza ostacoli, dal recettore al sole. Poiché la posizione del sole cambia per tutto il giorno e per tutto l'anno, anche l'area interessata dall'ombra cambia. Il flickering è percepito come disturbante quando la variazione dell'intensità luminosa è superiore al livello di percezione dell'occhio umano.

La distanza tra una turbina eolica e un recettore influisce sull'intensità dello "sfarfallio che diminuisce con la distanza dal recettore alla turbina, fino ad un punto in cui il cambiamento dell'intensità luminosa è inferiore a quello che l'occhio umano può distinguere. Le ombre proiettate vicino ad una turbina sono più intense, distinte e "focalizzate" perché una maggior parte del sole è bloccata intermittentemente dalle lame passanti. Quando aumenta la separazione tra il recettore e la turbina, la percentuale del sole oscurata diminuisce e le ombre diventano meno intense e meno discernibili. A una distanza di circa 10 volte il diametro del rotore, l'intensità del tremolio dell'ombra è significativamente ridotta e diventa meno percepibile all'occhio umano. L'intensità è anche ridotta se il piano del rotore è ad un angolo diverso da quello perpendicolare alla linea di vista dal recettore al sole, anche perché le lame passanti oscurano una parte minore di sole. Le condizioni di illuminazione ambientale influenzano anche la visibilità dello

sfarfallio: il flickering è più evidente in una stanza oscura con una finestra rivolta verso la turbina rispetto all'esterno dove i livelli di luce ambientale sono più alti. La frequenza o la velocità del tremolio dell'ombra è correlata alla velocità del rotore e al numero di lame sulla turbina. Alcune linee guida di paesi esteri, raccomandano una velocità di flicker non superiore a 3 "tagli" al secondo.

Per la classica turbina eolica provvista di tre pale, questo effetto corrisponde quindi ad una completa rotazione del rotore in un secondo, equivalente a 60 giri al minuto (60 RPM). Tali valori sono tipici di aerogeneratori di piccola taglia con piccoli rotori (circa 20 m) e più elevata velocità di rotazione. Le attuali turbine in commercio di grande taglia hanno una velocità di rotazione ben inferiore a tali valori, con velocità del rotore intorno ai 20 RPM. Ciò si traduce in bande che passano frequenze inferiori a 1 Hz o 1 ciclo al secondo. A queste basse frequenze, lo sfarfallio potrebbe essere motivo di fastidio, ma non costituisce una minaccia per la salute. Secondo l'Associazione britannica di epilessia, le frequenze inferiori a 3Hz non causano episodi di epilessia fotosensibile e le velocità di sfarfallio delle turbine eoliche moderne non sono in grado di innescare crisi epilettiche. Considerando la relazione spaziale tra le turbine e i recettori (localizzazioni geografiche e elevazioni del suolo) nonché la geometria delle turbine (altezza del mozzo e dimensioni del rotore), il verificarsi del fenomeno di flickering può essere accuratamente modellato e previsto con il dettaglio dei minuti. Una progettazione attenta è comunque fondamentale per evitare questo spiacevole fenomeno semplicemente prevedendo il luogo di incidenza dell'ombra e disponendo le turbine in maniera tale che l'ombra sulle zone sensibili non superi un certo numero di ore all'anno.

Il grafico che segue riporta l'evoluzione annuale tipica dell'ombra di una turbina considerando il caso peggiore di pale sempre in rotazione intorno al mozzo, e orientate sempre ortogonalmente al sole durante la sua evoluzione giornaliera. Come è evidente dal grafico e dalla legenda, le ore annue di ombra sono sempre minori con l'aumentare della distanza dal pilone secondo una particolare geometria dettata dalla posizione geografica; da osservare che l'ombra arriva a proiettarsi anche sino ad una distanza di 1 km, anche se solo per pochi minuti all'anno.

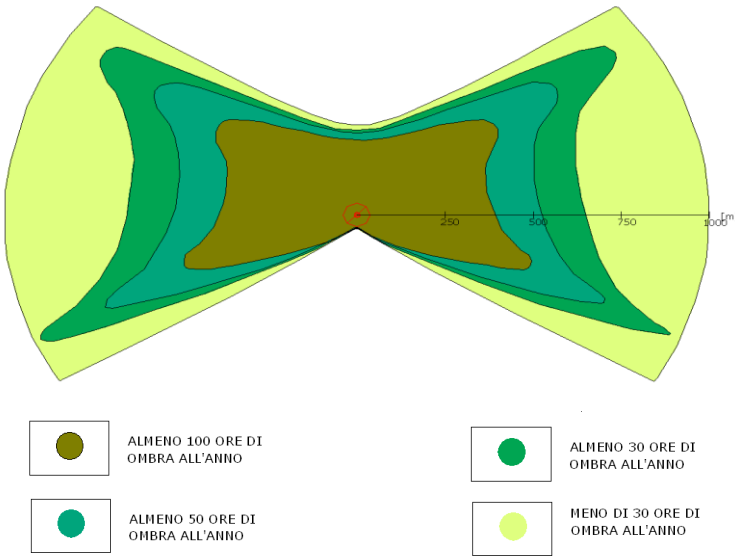


Figura 8: Evoluzione annuale tipo dell'ombra di un aerogeneratore

In Italia, così come nella maggior parte dei paesi Europei ed extraeuropei non esiste una normativa specifica in relativa al disturbo generato dal fenomeno di Shadow – Flickering. Esistono delle regolamentazioni locali ma quasi mai comprendono limiti numerici specifici, quanto piuttosto delle raccomandazioni tese a sottolineare che il fenomeno non sia "unreasonable" o "significant".
Il valore di riferimento più diffuso è quello delle 30 ore per anno calcolate come ore effettive del fenomeno atteso al recettore che in via generale corrispondo a circa 100-150 ore in worst case in dipendenza delle condizioni meteo.

3.2. METODOLOGIA DI ANALISI

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

- modello DTM del terreno;
- la posizione degli aerogeneratori, il modello e le caratteristiche dimensionali;
- definizione di aree sensibili o recettori, posizione geografica e caratteristiche dimensionali dell'area disturbata; (finestra, patio, area esterna)
- definizione di caratteristiche anemologiche dell'area per il calcolo del "real case" basato sulla effettiva distribuzione statistica dei dati del vento in relazione alle ore di funzionamento ed al posizionamento della navicella per la proiezione del rotore.
- definizione di dati meteorologici storici di una stazione di riferimento per il calcolo probabilistico delle ore di soleggiamento

Nel modello di calcolo dell'ombra utilizzato da windPRO i seguenti parametri definiscono la propagazione dell'ombra dietro il disco del rotore:

- Il diametro del Sole, D: 1.390.000 km
- La distanza dal Sole, d: 150.000.000 km
- Angolo di attacco: 0.531 gradi

Teoricamente, ciò comporterebbe un impatto di ombra fino a 4,8 km con un rotore di 45 metri di diametro. In realtà, tuttavia, le ombre non raggiungono mai il massimo teorico a causa delle caratteristiche ottiche dell'atmosfera. Quando il Sole diventa troppo basso all'orizzonte e la distanza diventa troppo lunga, l'ombra si disperde prima che raggiunga il suolo (o il recettore).
I recettori dell'ombra sono invece definiti nel modello dalle seguenti informazioni:

- La posizione della "finestra" sopra il livello del suolo e la sua dimensione (altezza e larghezza).
- L'inclinazione della "finestra" rispetto all'orizzontale (si può scegliere tra finestra verticale, orizzontale e tetto [45 °]).
- L'orientamento direzionale della finestra rispetto al sud (in gradi, positivi, a ovest).
- In alternativa è possibile selezionare la modalità "Green house", ovvero il recettore è modellato con caratteristiche di una "serra" che riceve ombra da qualunque direzione in quanto

completamente esposto al fenomeno dell'ombra intermittente.

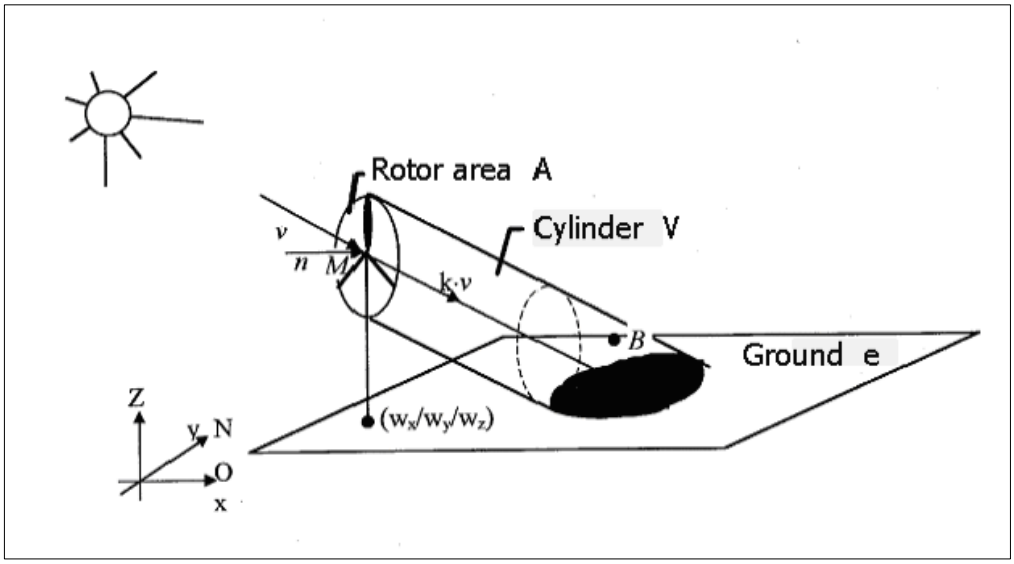


Figura 9: Schema di calcolo del modulo Shadow

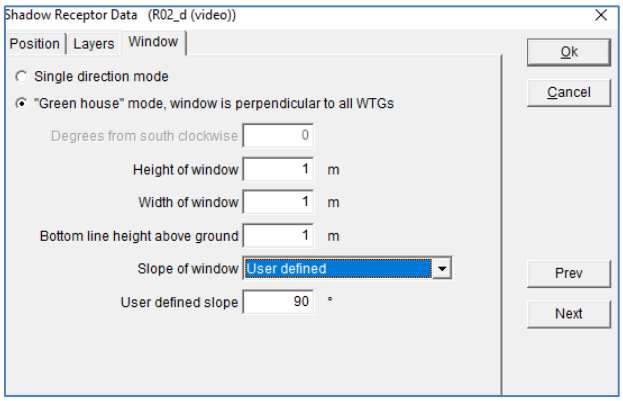


Figura 10: Finestra di input delle caratteristiche del recettore

Il software tiene conto dell'ostacolo naturale costituito dall'orografia e da eventuali ostacoli inputati specificatamente (ad es. foreste, barriere naturali o artificiali etc..), grazie all'opzione ZVI.

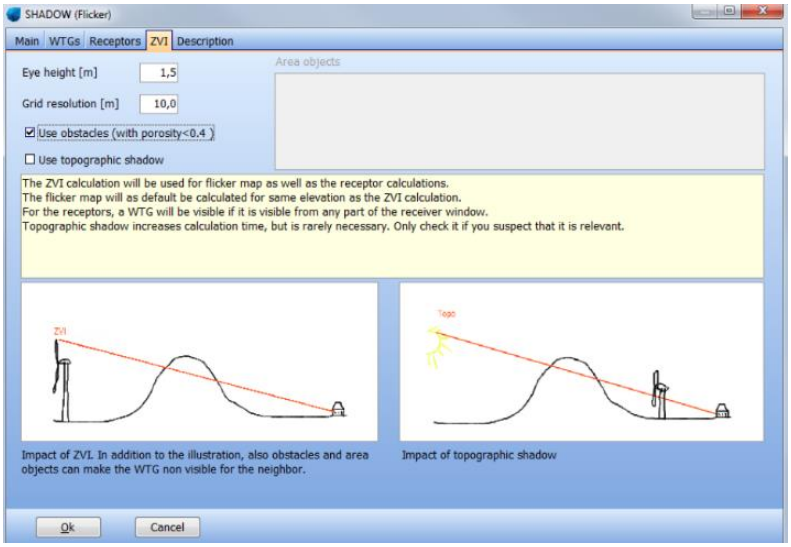


Figura 11: Finestra della opzione ZVI che tiene conto degli ostacoli naturali ed artificiali inputati nel software

Per le simulazioni, ogni singolo ricettore viene considerato in modalità "green house", cioè come se tutte le pareti esterne fossero esposte al fenomeno, senza considerare la presenza di finestre e/o porte dalle quali l'effetto arriva realmente all'interno dell'abitazione. Allo stesso tempo, si è trascurata la presenza degli alberi e di altri ostacoli posti ai margini delle strade che, "intercettando" l'ombra degli aerogeneratori, potrebbero ridurre il fastidio del flickering.

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

Ai fini di una comprensione del reale effetto di disturbo, lo studio è stato effettuato in modalità "Real Case", ovvero tenendo conto dei dati statistici ricavati da una stazione anemometrica sita nella stessa area, e di una stazione meteo che fornisce i dati di copertura nuvolosa della zona. In tal modo, viene ricavato il numero di ore di ombreggiamento più realistico in quanto si tiene conto della reale presenza del sole e delle ore di funzionamento della turbina nell'arco di un anno anche in funzione della direzione del vento che influisce sull'orientamento delle pale rispetto al sole e dunque sull'ombra proiettate sui ricettori.

3.3. DATI DI INPUT E PARAMETRI DEL MODELLO

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

DTM: Modello del terreno digitale per caratterizzare l'orografia, che svolge un ruolo importante nella mascheratura fisica dell'impatto dell'ombra

• Posizioni geografiche di recettori con dettaglio dimensionale delle aree più esposte.

• Posizioni geografiche di generatori di turbine eoliche e loro caratteristiche dimensionali

• Dati del vento di una stazione di misura locale per il calcolo dell'energia per stimare le ore operative e le probabilità associate alle diverse direzioni del vento

• Probabilità mensile della presenza del sole da una stazione meteo nazionale

• Nessun ostacolo naturale o artificiale è stato modellato.

3.4. DTM

Il modello digitale del terreno DTM (Digital Terrain Model) è stato estrapolato dal grid disponibile in download dal satellite, georeferenziato, sovrapposto, confrontato e adeguato con le curve di livello presenti sulla cartografia ufficiale CTR 1:10.000 con uno step di 10 m. Il modello digitale ottenuto copre un'area di 40x40 Km e trova una buon riscontro con l'andamento orografico verificato in sito.

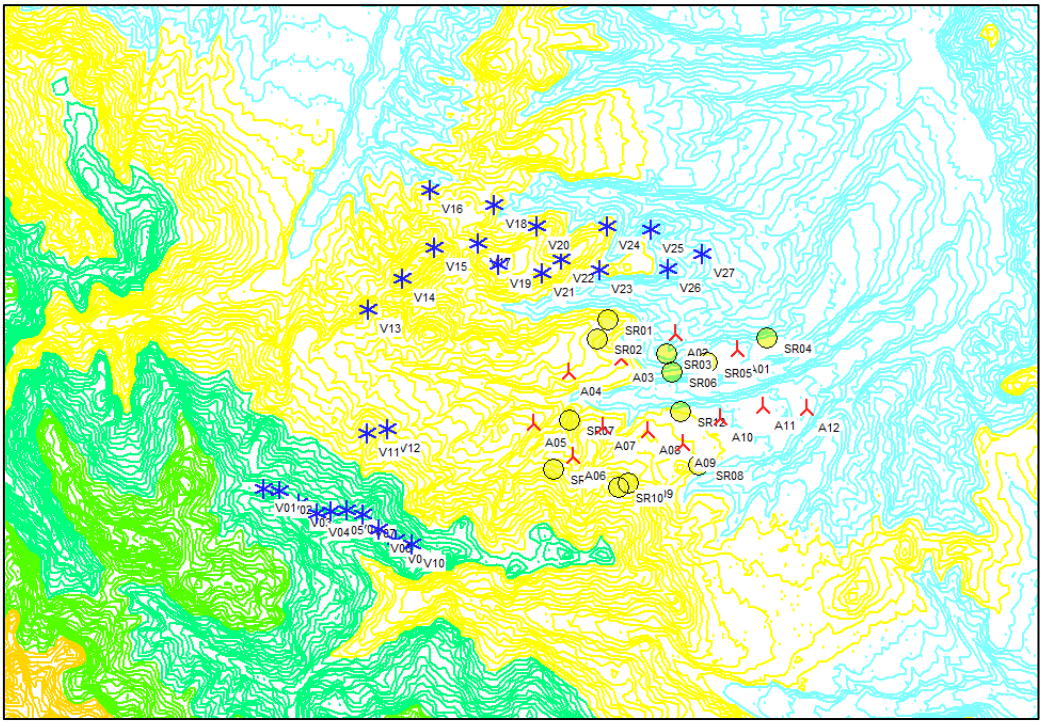


Figura 12: Stralcio del DTM di input con posizione degli aerogenratori e dei recettori

3.5. AEROGENERATORI E RECETTORI

Le coordinate ed il relativo modello di turbina sono dettagliati al paragrafo 2.2.

Le caratteristiche e le coordinate dei recettori sono state dettagliate al paragrafo 2.3, ma è importante sottolineare che per tutti i recettori si è ritenuto opportuno usare l'ipotesi di cautela della modalità "green house mode". Questa scelta è stata operata poiché in talune circostanze anche lo spazio antistante le strutture può essere considerato o adibito a luogo di riposo e relax. La scelta di una singola finestra o di una facciata in alcune condizioni potrebbe risultare riduttiva allo scopo di una vera valutazione d'impatto.

Tabella 7: Coordinate geografiche dei recettori e caratteristiche dimensionali della tipologia di area considerata nell'analisi

ID Recettore	UTM WGS 84 Long. Est [m]	UTM WGS 84 Lat. Nord [m]	Altitudine s.l.m. [m]	Lunghezza [m]	Larghezza [m]	Altezza [m]	Direction mode
SR01	502386	4626063	213,5	1	1	1	"Green house mode"
SR02	502194	4625711	220,8	1	1	1	"Green house mode"
SR03	503487	4625427	149	1	1	1	"Green house mode"
SR04	505380	4625717	126,9	1	1	1	"Green house mode"
SR05	504271	4625255	139,2	1	1	1	"Green house mode"
SR06	503588	4625088	154,2	1	1	1	"Green house mode"
SR07	501669	4624179	198,5	1	1	1	"Green house mode"
SR08	504094	4623338	191	1	1	1	"Green house mode"
SR09	502764	4623013	253,7	1	1	1	"Green house mode"
SR10	502583	4622918	270,6	1	1	1	"Green house mode"
SR11	501357	4623269	248,3	1	1	1	"Green house mode"
SR12	503750	4624349	189,4	1	1	1	"Green house mode"

3.6. INPUT PER LA MODELLAZIONE DEL "REAL CASE"

Per un calcolo "REAL CASE" affidabile, sono richieste le probabilità mensili di presenza di sole in aggiunta ai dati locali sul vento. I dati meteo di copertura nuvolosa sono dedotti dalla stazione meteo di Campobasso posta a circa 33 km a Sud Ovest dell'area di studio. La distanza dalla stazione di riferimento, risulta essere rappresentativa per le condizioni locali.

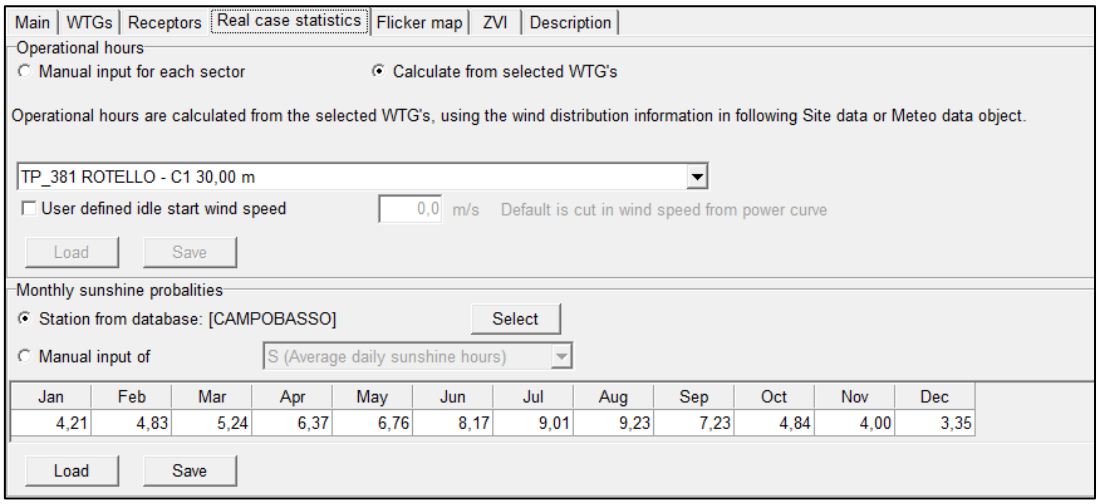


Figura 13: Valori di probabilità di soleggiamento mensile della stazione meteo di Campobasso

I dati meteo utili al calcolo energetico e di funzionamento degli aerogeneratori è stato ricavato dai dati anemologici della stazione di misura TP_381 di altezza 30m posta nello stesso comune in area molto prossima ad una delle turbine costituenti la Windfarm. I parametri anemologici a seguire fanno riferimento al dato ad altezza 30m s.l.t.

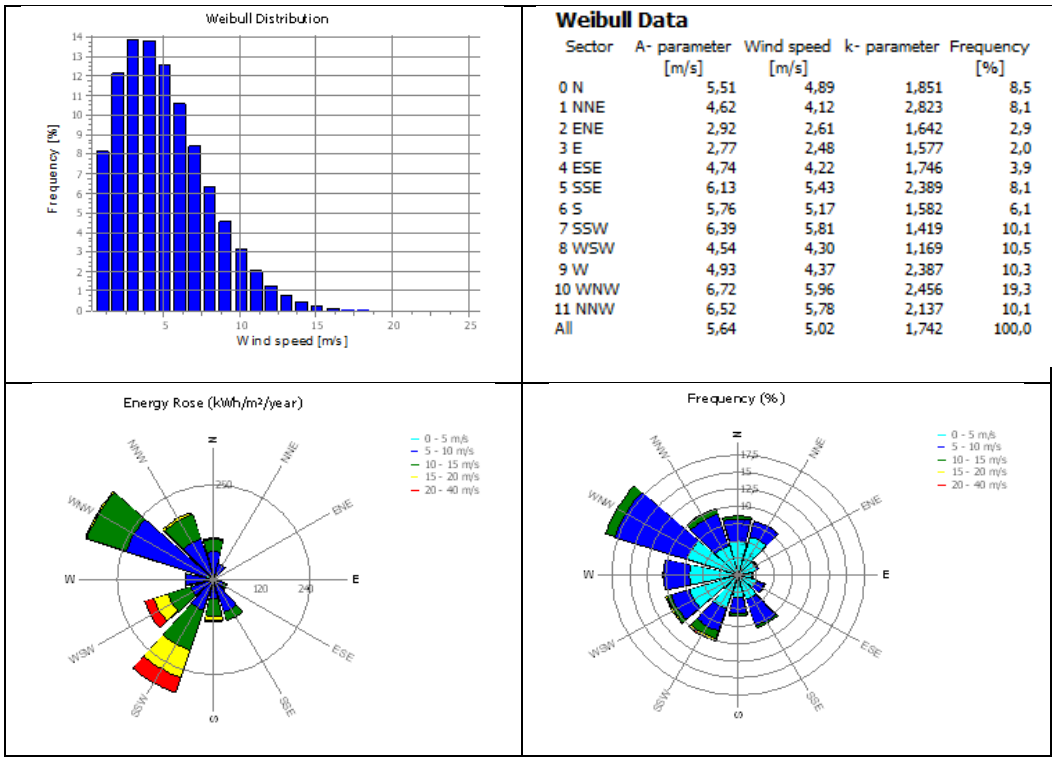


Figura 14: Informazioni sulla anemologia locale utili al calcolo dello shadow flickering

4. RISULTATI

Si riportano di seguito sinteticamente in forma tabellare i risultati della simulazione per i recettori analizzati evidenziati per le condizioni di Real Case.

Tabella 8: Risultati del calcolo

ID Recettore	REAL CASE VALORI REALI ATTESI AL RECETTORE
	Shadow ore/anno
SR01	00:57
SR02	29:32
SR03	11:15
SR04	15:13
SR05	26:03
SR06	22:25
SR07	27:21
SR08	00:00
SR09	08:39
SR10	00:00
SR11	05:44
SR12	25:04

4.1. ANALISI DEI RISULTATI

Dalle simulazioni effettuate, si evince che gli aerogeneratori considerati generano maggiormente il fenomeno di shadow/flickering sui recettori individuati nell'analisi come SR01, SR02, SR03, SR04, SR05, SR06, SR07, SR09, SR11, SR12 per i quali risultano come valore reale atteso (ossia quello che tiene in conto anche i fattori derivati dai dati anemometrici di sito e della stazione meteorologica storica) rispettivamente: **00:57** (SR01); **29:32** (SR02**); 11:15** (SR03); **15:13** (SR04); **26:03** (SR05); **22:25** (SR06); **27:21** (SR07); **08:39** (SR09); **05:44** (SR11); **25:04** (SR12) **ore annue per recettore**.

Per i rimanenti recettori considerati nella analisi invece, l'effetto calcolato è nullo ossia il fenomeno non si genera.

Tale risultato ("real case") deve intendersi comunque a carattere cautelativo poiché non tiene conto della presenza di nubi e di vegetazione ad alto fusto.

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

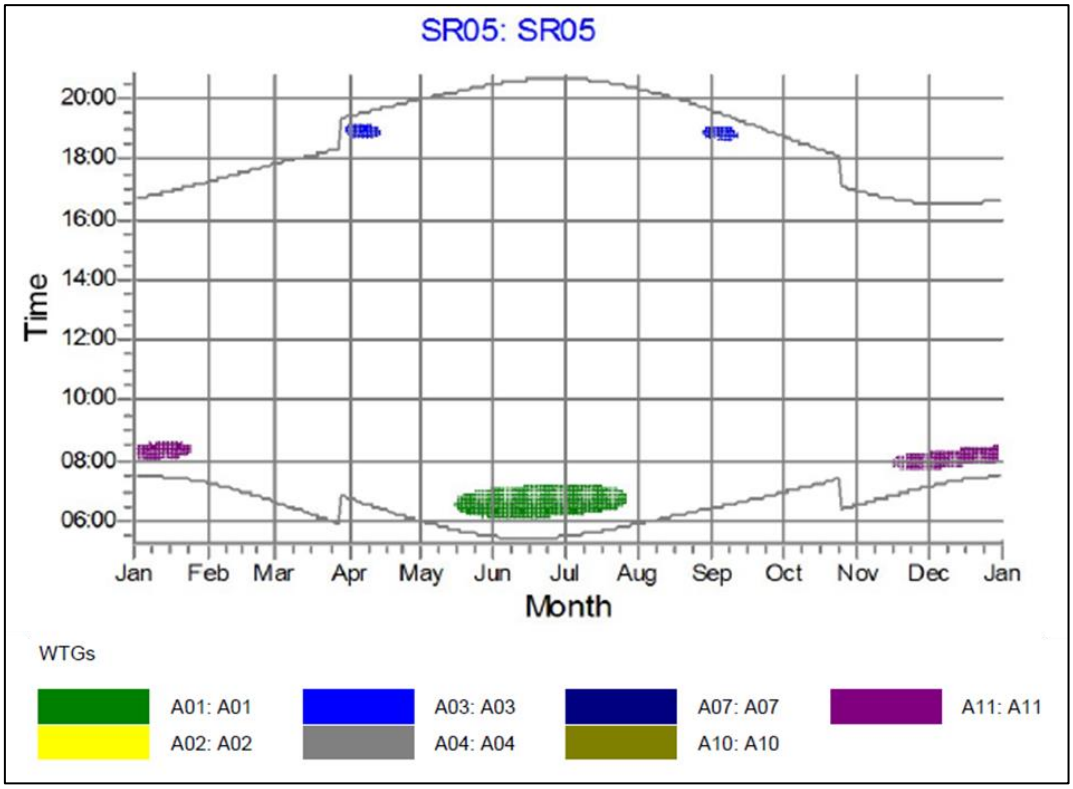


Figura 15: Rappresentazione grafica dell'ombreggiamento durante l'anno alle diverse fasce orarie e nei diversi mesi, i differenti colori sono utilizzati per distinguere le turbine che causano l'ombreggiamento.

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

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

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

4.2. MISURE DI MITIGAZIONE

Lo studio eseguito ha evidenziato che il fenomeno di shadow flickering sussiste in maniera tangibile su 4 dei 10 recettori individuati per alcuni dei quali, qualora dovessero realmente sussistere condizioni di disagio, potrebbero essere richieste misure di mitigazione in virtù delle reali condizioni calcolate ai recettori in termini temporali e di frequenza di intermittenza. In tal senso è opportuno segnalare che esistono efficaci misure di mitigazione che potrebbero essere implementate, se necessario, quali la realizzazione di schermi artificiali o naturali (vegetazione) che esprimono la piena funzionalità solo in determinate condizioni orografiche oppure, la pre-programmazione software di esercizio delle macchine, eseguita sulla base dei dati di "calendar" calcolati.

Tali dati esplicitano con dettaglio del minuto tutti i momenti dell'anno in cui è previsto il verificarsi del fenomeno e, nelle ore in cui ciò avviene, la macchina potrebbe essere pre-programmata a non funzionare. Da alcuni anni sono inoltre stati brevettati diversi sistemi che si abbinano alla pre-programmazione, basati su sensori che rilevano le effettive condizioni ambientali (ventosità e copertura nuvolosa) ed applicano la pre-programmazione solo nei casi in cui il fenomeno si dovesse realmente verificare. In tal senso le macchine sarebbero limitate nel loro funzionamento solo per un numero di ore pari a quelle stimate per il real case, e quindi con impatto economico trascurabile.

5. CONCLUSIONI E RACCOMANDAZIONI

In conclusione, si può affermare che i risultati ottenuti delle elaborazioni evidenziano, pur considerando le condizioni più sfavorevoli, che le turbine considerate nello studio generano effetti di shadow flichering i cui impatti risultano essere nulli per alcune strutture e modesti (o non particolarmente problematici) per altre.

In via generale va comunque sottolineato che, anche laddove vi siano le condizioni più sfavorevoli di esposizione, come nel caso dei recettori individuati con SR02, SR05, SR06, SR07, SR12 il fenomeno di ombreggiamento si manifesterebbe per un periodo massimo di circa 30 ore/anno (**29 ore e 32'**) per l'elaborazione effettuata nelle condizioni più verosimili ("Real Case") i cui risultati devono comunque intendersi a carattere cautelativo poiché l'elaborazione ed il modello di simulazione non tiene in conto di tutte le possibili fonti di attenuazione dell'effetto cui ogni recettore è (o può essere) soggetto quali presenza di alberi, ostacoli, siepi e quant'altro possa attenuare il fenomeno dell'evoluzione giornaliera dell'ombra.

Si rimarca altresì che sono stati elaborati gli effetti cumulativi sui recettori interessati valutando l'apporto degli impianti esistenti sul territorio e già in esercizio vicini ad ogni singolo punto di sviluppo progettuale del nuovo layout.

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ALLEGATO 1: "MAIN RESULT": QUADRO SINTETICO DEI RISULTATI DI CALCOLO nell'ipotesi elaborata di "Worst Case" e "Real Case"

SHADOW - Main Result

Calculation: GE.RTL01

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

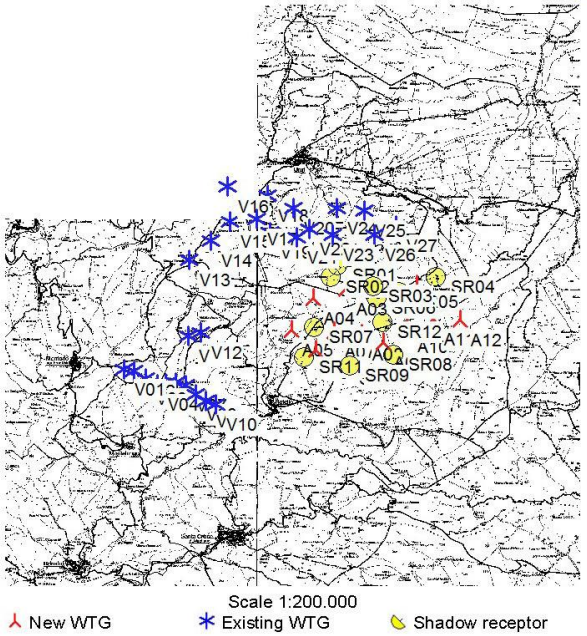
Operational hours are calculated from WTGs in calculation and wind distribution:
TP_381 ROTELLO

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: DTM 30X30 PM.wpo (4)
Obstacles used in calculation
Eye height: 1,5 m
Grid resolution: 10 m



WTGs

	UTM WGS84 Zone: 33 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
	UTM WGS84 Zone: 33		[m]					[kW]	[m]	[m]	[m]	[RPM]
A01	504.816	4.625.498	158,0	A01	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A02	503.655	4.625.804	137,7	A02	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A03	502.629	4.625.349	208,5	A03	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A04	501.637	4.625.084	228,6	A04	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A05	500.974	4.624.123	230,0	A05	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A06	501.727	4.623.511	220,0	A06	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A07	502.282	4.624.057	202,1	A07	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A08	503.129	4.623.985	201,5	A08	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A09	503.793	4.623.737	200,0	A09	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A10	504.501	4.624.218	182,4	A10	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A11	505.318	4.624.444	172,5	A11	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
A12	506.134	4.624.412	155,6	A12	Yes	GE WIND ENERGY	5.3-158 Thrust 665-5.300	5.300	158,0	120,9	1.819	0,0
V01	495.870	4.622.909	494,2	V01	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V02	496.170	4.622.873	499,5	V02	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V03	496.532	4.622.634	495,0	V03	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V04	496.877	4.622.447	490,0	V04	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V05	497.137	4.622.475	473,1	V05	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V06	497.449	4.622.499	440,0	V06	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V07	497.741	4.622.423	454,8	V07	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V08	498.048	4.622.149	458,0	V08	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V09	498.370	4.621.944	460,0	V09	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V10	498.671	4.621.856	431,5	V10	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V11	497.824	4.623.945	352,0	V11	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V12	498.209	4.624.032	309,1	V12	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V13	497.854	4.626.262	310,0	V13	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V14	498.505	4.626.848	318,8	V14	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V15	499.104	4.627.419	300,0	V15	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V16	499.028	4.628.498	190,0	V16	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V17	499.921	4.627.497	239,8	V17	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V18	500.236	4.628.216	198,7	V18	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V19	500.319	4.627.094	250,0	V19	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V20	501.037	4.627.820	213,1	V20	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9

To be continued on next page...

SHADOW - Main Result

Calculation: GE.RTL01

...continued from previous page

	UTM WGS84 Zone: 33 East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
	UTM WGS84 Zone: 33		[m]					[kW]	[m]	[m]	[m]	[RPM]
V21	501.140	4.626.931	248,1	V21	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V22	501.508	4.627.191	230,0	V22	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V23	502.228	4.627.008	190,0	V23	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V24	502.361	4.627.820	200,4	V24	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V25	503.188	4.627.752	176,9	V25	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V26	503.505	4.627.026	170,0	V26	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9
V27	504.168	4.627.293	130,0	V27	Yes	VESTAS	V90-2.000	2.000	90,0	80,0	1.507	14,9

Shadow receptor-Input

No.	Name	UTM WGS84 Zone: 33 East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
SR01	SR01	502.386	4.626.063	213,5	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR02	SR02	502.194	4.625.711	220,8	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR03	SR03	503.487	4.625.427	149,0	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR04	SR04	505.380	4.625.717	126,9	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR05	SR05	504.271	4.625.255	139,2	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR06	SR06	503.588	4.625.088	154,2	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR07	SR07	501.669	4.624.179	198,5	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR08	SR08	504.094	4.623.338	191,0	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR09	SR09	502.764	4.623.013	253,7	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR10	SR10	502.583	4.622.918	270,6	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR11	SR11	501.357	4.623.269	248,3	1,0	1,0	1,0	-180,0	90,0	"Green house mode"
SR12	SR12	503.750	4.624.349	189,4	1,0	1,0	1,0	-180,0	90,0	"Green house mode"

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
SR01	SR01	0:57
SR02	SR02	29:32
SR03	SR03	11:15
SR04	SR04	15:13
SR05	SR05	26:03
SR06	SR06	22:25
SR07	SR07	27:21
SR08	SR08	0:00
SR09	SR09	8:39
SR10	SR10	0:00
SR11	SR11	5:44
SR12	SR12	25:04

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

No.	Name	Worst case [h/year]	Expected [h/year]
A01	A01	144:45	38:07
A02	A02	12:11	3:11
A03	A03	186:46	45:43
A04	A04	21:41	4:21
A05	A05	44:28	12:19
A06	A06	49:28	14:22
A07	A07	82:44	19:54
A08	A08	63:00	14:15
A09	A09	0:00	0:00
A10	A10	48:37	11:38

To be continued on next page...

SHADOW - Main Result

Calculation: GE.RTL01

...continued from previous page

No.	Name	Worst case [h/year]	Expected [h/year]
A11	A11	36:55	8:24
A12	A12	0:00	0:00
V01	V01	0:00	0:00
V02	V02	0:00	0:00
V03	V03	0:00	0:00
V04	V04	0:00	0:00
V05	V05	0:00	0:00
V06	V06	0:00	0:00
V07	V07	0:00	0:00
V08	V08	0:00	0:00
V09	V09	0:00	0:00
V10	V10	0:00	0:00
V11	V11	0:00	0:00
V12	V12	0:00	0:00
V13	V13	0:00	0:00
V14	V14	0:00	0:00
V15	V15	0:00	0:00
V16	V16	0:00	0:00
V17	V17	0:00	0:00
V18	V18	0:00	0:00
V19	V19	0:00	0:00
V20	V20	0:00	0:00
V21	V21	0:00	0:00
V22	V22	0:00	0:00
V23	V23	0:00	0:00
V24	V24	0:00	0:00
V25	V25	0:00	0:00
V26	V26	0:00	0:00
V27	V27	0:00	0:00

ALLEGATO 2: "CALENDAR": DETTAGLIO ANALITICO GIORNALIERO DELL'EFFETTO "FLICKERING" PER OGNI RECETTORE

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR01 - SR01

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April	May	June	July	August	September	October		November	December
1	07:28	07:14		06:37		06:45	05:58	05:28	05:29	05:53	06:25	06:56		06:31	07:07
	16:40	17:15		17:50	7	07:03 (A02)	19:25	19:58	20:28	20:39	20:20	19:35	18:44		16:56	16:31
2	07:28	07:13		06:35		06:43	05:57	05:28	05:29	05:54	06:26	06:57			06:33	07:08
	16:41	17:16		17:51	9	07:04 (A02)	19:26	19:59	20:29	20:39	20:18	19:34	18:42		16:55	16:31
3	07:28	07:12		06:34		06:42	05:56	05:28	05:30	05:55	06:27	06:58		07:21 (A02)	06:34	07:09
	16:41	17:17		17:52	10	07:03 (A02)	19:27	20:00	20:30	20:39	20:17	19:32	18:40	9 07:30 (A02)	16:54	16:30
4	07:28	07:11		06:32		06:40	05:54	05:27	05:30	05:56	06:28	06:59		07:20 (A02)	06:35	07:10
	16:42	17:18		17:53	11	07:02 (A02)	19:28	20:01	20:30	20:39	20:16	19:30	18:39	13 07:33 (A02)	16:52	16:30
5	07:28	07:10		06:31		06:38	05:53	05:27	05:31	05:57	06:29	07:00		07:21 (A02)	06:36	07:11
	16:43	17:20		17:54	12	07:02 (A02)	19:29	20:02	20:31	20:38	20:15	19:29	18:37	13 07:34 (A02)	16:51	16:30
6	07:28	07:09		06:29		06:37	05:52	05:26	05:32	05:58	06:30	07:02		07:22 (A02)	06:38	07:12
	16:44	17:21		17:56	13	07:01 (A02)	19:30	20:03	20:32	20:38	20:14	19:27	18:35	13 07:35 (A02)	16:50	16:30
7	07:28	07:07		06:27		06:35	05:50	05:26	05:32	05:59	06:31	07:03		07:23 (A02)	06:39	07:13
	16:45	17:22		17:57	13	06:59 (A02)	19:31	20:04	20:32	20:38	20:12	19:25	18:34	13 07:36 (A02)	16:49	16:30
8	07:28	07:06		06:26		06:33	05:49	05:26	05:33	06:00	06:32	07:04		07:24 (A02)	06:40	07:14
	16:46	17:24		17:58	13	06:58 (A02)	19:33	20:05	20:33	20:38	20:11	19:24	18:32	12 07:36 (A02)	16:48	16:30
9	07:28	07:05		06:24		06:32	05:48	05:26	05:33	06:01	06:33	07:05		07:25 (A02)	06:41	07:15
	16:47	17:25		17:59	13	06:56 (A02)	19:34	20:06	20:34	20:37	20:10	19:22	18:30	11 07:36 (A02)	16:47	16:30
10	07:27	07:04		06:22		06:30	05:47	05:25	05:34	06:02	06:34	07:06		07:26 (A02)	06:43	07:16
	16:48	17:26		18:00	12	06:53 (A02)	19:35	20:07	20:34	20:37	20:09	19:20	18:29	10 07:36 (A02)	16:46	16:30
11	07:27	07:03		06:21			06:28	05:46	05:25	05:35	06:03	06:35	07:07	07:28 (A02)	06:44	07:17
	16:49	17:27		18:01			19:36	20:08	20:35	20:36	20:07	19:19	18:27	9 07:37 (A02)	16:45	16:30
12	07:27	07:01		06:19			06:27	05:45	05:25	05:36	06:04	06:36	07:08	07:29 (A02)	06:45	07:18
	16:50	17:29		18:03			19:37	20:09	20:35	20:36	20:06	19:17	18:25	8 07:37 (A02)	16:44	16:30
13	07:27	07:00		06:17			06:25	05:44	05:25	05:36	06:06	06:37	07:09	07:30 (A02)	06:46	07:19
	16:51	17:30		18:04			19:38	20:11	20:36	20:35	20:05	19:15	18:24	6 07:36 (A02)	16:43	16:30
14	07:26	06:59		06:16			06:23	05:43	05:25	05:37	06:07	06:38	07:10	07:31 (A02)	06:47	07:19
	16:53	17:31		18:05			19:39	20:12	20:36	20:35	20:03	19:13	18:22	5 07:36 (A02)	16:42	16:30
15	07:26	06:57		06:14			06:22	05:42	05:25	05:38	06:08	06:40	07:12	07:32 (A02)	06:49	07:20
	16:54	17:32		18:06			19:40	20:13	20:37	20:34	20:02	19:12	18:21	3 07:35 (A02)	16:41	16:30
16	07:25	06:56		06:12			06:20	05:41	05:25	05:39	06:09	06:41	07:13	07:33 (A02)	06:50	07:21
	16:55	17:34		18:07			19:41	20:14	20:37	20:34	20:00	19:10	18:19	2 07:34 (A02)	16:40	16:30
17	07:25	06:55		06:11			06:19	05:40	05:25	05:40	06:10	06:42	07:14		06:51	07:21
	16:56	17:35		18:08			19:42	20:15	20:37	20:33	19:59	19:08	18:17		16:39	16:31
18	07:24	06:53		06:09			06:17	05:39	05:25	05:40	06:11	06:43	07:15		06:52	07:22
	16:57	17:36		18:09			19:44	20:16	20:38	20:32	19:57	19:06	18:16		16:38	16:31
19	07:24	06:52		06:07			06:16	05:38	05:25	05:41	06:12	06:44	07:16		06:53	07:23
	16:58	17:37		18:10			19:45	20:17	20:38	20:32	19:56	19:05	18:14		16:37	16:31
20	07:23	06:50		06:06			06:14	05:37	05:25	05:42	06:13	06:45	07:17		06:55	07:23
	17:00	17:39		18:12			19:46	20:18	20:38	20:31	19:54	19:03	18:13		16:37	16:32
21	07:23	06:49		06:04			06:13	05:36	05:25	05:43	06:14	06:46	07:18		06:56	07:24
	17:01	17:40		18:13			19:47	20:18	20:39	20:30	19:53	19:01	18:11		16:36	16:32
22	07:22	06:48		06:02			06:11	05:35	05:26	05:44	06:15	06:47	07:20		06:57	07:24
	17:02	17:41		18:14			19:48	20:19	20:39	20:29	19:51	18:59	18:10		16:35	16:33
23	07:21	06:46		06:00			06:10	05:34	05:26	05:45	06:16	06:48	07:21		06:58	07:25
	17:03	17:42		18:15			19:49	20:20	20:39	20:28	19:50	18:58	18:08		16:35	16:33
24	07:21	06:45		05:59			06:08	05:34	05:26	05:46	06:17	06:49	07:22		06:59	07:25
	17:05	17:44		18:16			19:50	20:21	20:39	20:28	19:48	18:56	18:07		16:34	16:34
25	07:20	06:43		05:57			06:07	05:33	05:26	05:47	06:18	06:50	06:23		07:01	07:26
	17:06	17:45		18:17			19:51	20:22	20:39	20:27	19:47	18:54	17:06		16:33	16:34
26	07:19	06:42	07:01 (A02)	05:55			06:05	05:32	05:27	05:48	06:19	06:51	06:24		07:02	07:26
	17:07	17:46	2 07:03 (A02)	18:18			19:52	20:23	20:39	20:26	19:45	18:52	17:04		16:33	16:35
27	07:18	06:40	06:59 (A02)	05:54			06:04	05:31	05:27	05:48	06:20	06:52	06:25		07:03	07:27
	17:08	17:47	4 07:03 (A02)	18:19			19:53	20:24	20:39	20:25	19:44	18:51	17:03		16:32	16:36
28	07:17	06:38	06:58 (A02)	05:52			06:02	05:31	05:27	05:49	06:21	06:53	06:27		07:04	07:27
	17:10	17:48	5 07:03 (A02)	18:20			19:54	20:25	20:39	20:24	19:42	18:49	17:01		16:32	16:36
29	07:17			06:50			06:01	05:30	05:28	05:50	06:22	06:54	06:28		07:05	07:27
	17:11			19:22			19:56	20:26	20:39	20:23	19:40	18:47	17:00		16:32	16:37
30	07:16			06:48			06:00	05:30	05:28	05:51	06:23	06:55	06:29		07:06	07:27
	17:12			19:23			19:57	20:26	20:39	20:22	19:39	18:46	16:59		16:31	16:38
31	07:15			06:47				05:29		05:52	06:24		06:30			07:28
	17:13			19:24				20:27		20:21	19:37		16:57			16:39
Potential sun hours	295	296		369		400	450	455	461	429	375	344		296	285
Total, worst case			11		113								127		
Sun reduction			0,46		0,44								0,44		
Oper. time red.			0,81		0,81								0,81		
Wind dir. red.			0,64		0,64								0,64		
Total reduction			0,24		0,23								0,23		
Total, real			3		26								29		

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR02 - SR02

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May	June
1	07:28		07:56 (A03)	07:14		08:07 (A03)	06:37	06:45	07:04 (A02)	05:58	05:29
	16:40	97	15:29 (A04)	17:15	61	09:08 (A03)	17:50	19:25	7 07:11 (A02)	19:58	20:28
2	07:28		07:57 (A03)	07:13		08:08 (A03)	06:35	06:43	07:02 (A02)	05:57	05:28
	16:41	96	15:29 (A04)	17:16	59	09:07 (A03)	17:51	19:26	7 07:09 (A02)	19:59	20:29
3	07:28		07:57 (A03)	07:12		08:09 (A03)	06:34	06:42	07:00 (A02)	05:56	05:28
	16:41	95	15:29 (A04)	17:17	58	09:07 (A03)	17:52	19:27	8 07:08 (A02)	20:00	20:30
4	07:28		07:57 (A03)	07:11		08:10 (A03)	06:32	06:40	06:59 (A02)	05:54	05:27
	16:42	95	15:29 (A04)	17:18	56	09:06 (A03)	17:53	19:28	8 07:07 (A02)	20:01	20:30
5	07:28		07:58 (A03)	07:10		08:11 (A03)	06:31	06:38	06:57 (A02)	05:53	05:27
	16:43	93	15:29 (A04)	17:20	55	09:06 (A03)	17:54	19:29	8 07:05 (A02)	20:02	20:31
6	07:28		07:57 (A03)	07:09		08:12 (A03)	06:29	06:37	06:55 (A02)	05:52	05:26
	16:44	92	15:28 (A04)	17:21	53	09:05 (A03)	17:56	19:30	7 07:02 (A02)	20:03	20:32
7	07:28		07:58 (A03)	07:07		08:12 (A03)	06:27	06:35		05:51	05:26
	16:45	91	15:28 (A04)	17:22	51	09:03 (A03)	17:57	19:31		20:04	20:32
8	07:28		07:58 (A03)	07:06		08:14 (A03)	06:26	06:33		05:49	05:26
	16:46	89	15:27 (A04)	17:24	48	09:02 (A03)	17:58	19:33		20:05	20:33
9	07:28		07:59 (A03)	07:05		08:15 (A03)	06:24	06:32		05:48	05:26
	16:47	87	15:27 (A04)	17:25	46	09:01 (A03)	17:59	19:34		20:06	20:34
10	07:27		07:59 (A03)	07:04		08:17 (A03)	06:22	06:30		05:47	05:25
	16:48	85	15:26 (A04)	17:26	43	09:00 (A03)	18:00	19:35		20:07	20:34
11	07:27		07:59 (A03)	07:03		08:18 (A03)	06:21	06:28		05:46	05:25
	16:49	81	15:24 (A04)	17:27	39	08:57 (A03)	18:01	19:36		20:08	20:35
12	07:27		07:59 (A03)	07:01		08:20 (A03)	06:19	06:27		05:45	05:25
	16:50	78	15:23 (A04)	17:29	35	08:55 (A03)	18:03	19:37		20:10	20:35
13	07:27		07:59 (A03)	07:00		08:22 (A03)	06:17	06:25		05:44	05:25
	16:52	67	09:06 (A03)	17:30	31	08:53 (A03)	18:04	19:38		20:11	20:36
14	07:26		08:00 (A03)	06:59		08:25 (A03)	06:16	06:24		05:43	05:25
	16:53	67	09:07 (A03)	17:31	25	08:50 (A03)	18:05	19:39		20:12	20:36
15	07:26		08:00 (A03)	06:57		08:29 (A03)	06:14	06:22		05:42	05:25
	16:54	68	09:08 (A03)	17:33	17	08:46 (A03)	18:06	19:40		20:13	20:37
16	07:25		08:00 (A03)	06:56			06:12	06:20		05:41	05:25
	16:55	68	09:08 (A03)	17:34			18:07	19:41		20:14	20:37
17	07:25		08:00 (A03)	06:55			06:11	06:19		05:40	05:25
	16:56	67	09:07 (A03)	17:35			18:08	19:42		20:15	20:37
18	07:24		08:01 (A03)	06:53			06:09	06:17		05:39	05:25
	16:57	67	09:08 (A03)	17:36			18:09	19:44		20:16	20:38
19	07:24		08:01 (A03)	06:52			06:07	06:16		05:38	05:25
	16:58	67	09:08 (A03)	17:38			18:10	19:45		20:17	20:38
20	07:23		08:02 (A03)	06:50			06:06	06:14		05:37	05:25
	17:00	67	09:09 (A03)	17:39			18:12	19:46		20:18	20:38
21	07:23		08:02 (A03)	06:49			06:04	06:13		05:36	05:25
	17:01	67	09:09 (A03)	17:40			18:13	19:47		20:18	20:39
22	07:22		08:02 (A03)	06:48			06:02	06:11		05:35	05:26
	17:02	67	09:09 (A03)	17:41			18:14	19:48		20:19	20:39
23	07:21		08:02 (A03)	06:46			06:00	06:10		05:34	05:26
	17:03	67	09:09 (A03)	17:42			18:15	19:49		20:20	20:39
24	07:21		08:03 (A03)	06:45			05:59	06:08		05:34	05:26
	17:05	67	09:10 (A03)	17:44			18:16	19:50		20:21	20:39
25	07:20		08:04 (A03)	06:43			05:57	06:07		05:33	05:26
	17:06	66	09:10 (A03)	17:45			18:17	19:51		20:22	20:39
26	07:19		08:04 (A03)	06:42			05:55	06:05		05:32	05:27
	17:07	65	09:09 (A03)	17:46			18:18	19:52		20:23	20:39
27	07:18		08:04 (A03)	06:40			05:54	06:04		05:31	05:27
	17:08	65	09:09 (A03)	17:47			18:19	19:53		20:24	20:39
28	07:17		08:05 (A03)	06:38			05:52	06:11 (A02)	06:02	05:31	05:27
	17:10	64	09:09 (A03)	17:48			18:20	2 06:12 (A02)	19:54	20:25	20:39
29	07:17		08:05 (A03)				06:50	07:09 (A02)	06:01	05:30	05:28
	17:11	64	09:09 (A03)				19:22	3 07:12 (A02)	19:56	20:26	20:39
30	07:16		08:06 (A03)				06:48	07:07 (A02)	06:00	05:30	05:28
	17:12	63	09:09 (A03)				19:23	4 07:11 (A02)	19:57	20:26	20:39
31	07:15		08:06 (A03)				06:47	07:05 (A02)		05:29	
	17:13	62	09:08 (A03)				19:24	6 07:11 (A02)		20:27	
Potential sun hours	295			296			369		400	450	455
Total, worst case		2334			677			15	45		
Sun reduction		0,44			0,46			0,44	0,48		
Oper. time red.		0,81			0,81			0,81	0,81		
Wind dir. red.		0,66			0,67			0,65	0,65		
Total reduction		0,24			0,25			0,23	0,25		
Total, real		555			169			3	11		

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR02 - SR02

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July		August		September			October			November			December		
1	05:29		05:53		06:25			06:56			06:31		07:45 (A03)	07:07		07:41 (A03)
	20:39		20:20		19:35			18:44			16:56	44	08:29 (A03)	16:31	81	15:06 (A04)
2	05:29		05:54		06:26			06:57			06:33		07:45 (A03)	07:08		07:41 (A03)
	20:39		20:18		19:34			18:42			16:55	46	08:31 (A03)	16:31	84	15:08 (A04)
3	05:30		05:55		06:27			06:58			06:34		07:43 (A03)	07:09		07:42 (A03)
	20:39		20:17		19:32			18:40			16:54	49	08:32 (A03)	16:30	86	15:10 (A04)
4	05:30		05:56		06:28			06:59			06:35		07:42 (A03)	07:10		07:42 (A03)
	20:39		20:16		19:30			18:39			16:52	51	08:33 (A03)	16:30	89	15:11 (A04)
5	05:31		05:57		06:29			07:00			06:36		07:42 (A03)	07:11		07:43 (A03)
	20:38		20:15		19:29			18:37			16:51	53	08:35 (A03)	16:30	90	15:12 (A04)
6	05:32		05:58		06:30		06:51 (A02)	07:02			06:38		07:40 (A03)	07:12		07:43 (A03)
	20:38		20:14		19:27	7	06:58 (A02)	18:35			16:50	56	08:36 (A03)	16:30	92	15:14 (A04)
7	05:32		05:59		06:31		06:52 (A02)	07:03			06:39		07:39 (A03)	07:13		07:44 (A03)
	20:38		20:12		19:25	8	07:00 (A02)	18:34			16:49	57	08:36 (A03)	16:30	94	15:15 (A04)
8	05:33		06:00		06:32		06:53 (A02)	07:04			06:40		07:40 (A03)	07:14		07:44 (A03)
	20:38		20:11		19:24	8	07:01 (A02)	18:32			16:48	58	08:38 (A03)	16:30	95	15:16 (A04)
9	05:33		06:01		06:33		06:54 (A02)	07:05			06:41		07:39 (A03)	07:15		07:45 (A03)
	20:37		20:10		19:22	8	07:02 (A02)	18:30			16:47	59	08:38 (A03)	16:30	95	15:17 (A04)
10	05:34		06:02		06:34		06:55 (A02)	07:06			06:43		07:38 (A03)	07:16		07:46 (A03)
	20:37		20:09		19:20	7	07:02 (A02)	18:29			16:46	61	08:39 (A03)	16:30	96	15:18 (A04)
11	05:35		06:03		06:35		06:56 (A02)	07:07			06:44		07:37 (A03)	07:17		07:46 (A03)
	20:36		20:07		19:19	7	07:03 (A02)	18:27			16:45	62	08:39 (A03)	16:30	97	15:19 (A04)
12	05:36		06:05		06:36		06:57 (A02)	07:08			06:45		07:38 (A03)	07:18		07:47 (A03)
	20:36		20:06		19:17	6	07:03 (A02)	18:25			16:44	62	08:40 (A03)	16:30	97	15:20 (A04)
13	05:36		06:06		06:37		06:58 (A02)	07:09			06:46		07:37 (A03)	07:19		07:48 (A03)
	20:35		20:05		19:15	5	07:03 (A02)	18:24			16:43	64	08:41 (A03)	16:30	97	15:21 (A04)
14	05:37		06:07		06:38		06:59 (A02)	07:10			06:47		07:37 (A03)	07:19		07:48 (A03)
	20:35		20:03		19:13	3	07:02 (A02)	18:22			16:42	64	08:41 (A03)	16:30	98	15:21 (A04)
15	05:38		06:08		06:40		07:00 (A02)	07:12			06:49		07:37 (A03)	07:20		07:48 (A03)
	20:34		20:02		19:12	2	07:02 (A02)	18:21			16:41	65	08:42 (A03)	16:30	98	15:22 (A04)
16	05:39		06:09		06:41			07:13			06:50		07:37 (A03)	07:21		07:49 (A03)
	20:34		20:00		19:10			18:19			16:40	65	08:42 (A03)	16:30	99	15:23 (A04)
17	05:40		06:10		06:42			07:14			06:51		07:37 (A03)	07:21		07:49 (A03)
	20:33		19:59		19:08			18:17			16:39	66	08:43 (A03)	16:31	99	15:23 (A04)
18	05:40		06:11		06:43			07:15			06:52		07:37 (A03)	07:22		07:50 (A03)
	20:32		19:57		19:06			18:16			16:38	67	08:44 (A03)	16:31	98	15:24 (A04)
19	05:41		06:12		06:44			07:16			06:53		07:37 (A03)	07:23		07:51 (A03)
	20:32		19:56		19:05			18:14			16:37	67	08:44 (A03)	16:31	99	15:25 (A04)
20	05:42		06:13		06:45			07:17			06:55		07:37 (A03)	07:23		07:51 (A03)
	20:31		19:54		19:03			18:13			16:37	67	08:44 (A03)	16:32	98	15:24 (A04)
21	05:43		06:14		06:46			07:18			06:56		07:37 (A03)	07:24		07:52 (A03)
	20:30		19:53		19:01			18:11			16:36	67	08:44 (A03)	16:32	98	15:25 (A04)
22	05:44		06:15		06:47			07:20			06:57		07:38 (A03)	07:24		07:52 (A03)
	20:29		19:51		18:59			18:10			16:35	67	08:45 (A03)	16:33	98	15:25 (A04)
23	05:45		06:16		06:48			07:21			06:58		07:38 (A03)	07:25		07:53 (A03)
	20:28		19:50		18:58			18:08			16:35	67	08:45 (A03)	16:33	98	15:26 (A04)
24	05:46		06:17		06:49			07:22			06:59		07:38 (A03)	07:25		07:53 (A03)
	20:28		19:48		18:56			18:07			16:34	67	08:45 (A03)	16:34	99	15:27 (A04)
25	05:47		06:18		06:50			06:23			07:01		07:38 (A03)	07:26		07:53 (A03)
	20:27		19:47		18:54			17:06			16:33	67	08:45 (A03)	16:34	98	15:27 (A04)
26	05:48		06:19		06:51			06:24		08:05 (A03)	07:02		07:38 (A03)	07:26		07:54 (A03)
	20:26		19:45		18:52			17:04	5	08:10 (A03)	16:33	68	08:46 (A03)	16:35	99	15:28 (A04)
27	05:48		06:20		06:52			06:25		07:57 (A03)	07:03		07:39 (A03)	07:27		07:54 (A03)
	20:25		19:44		18:51			17:03	20	08:17 (A03)	16:32	68	08:47 (A03)	16:36	99	15:28 (A04)
28	05:49		06:21		06:53			06:27		07:54 (A03)	07:04		07:40 (A03)	07:27		07:54 (A03)
	20:24		19:42		18:49			17:01	26	08:20 (A03)	16:32	67	08:47 (A03)	16:36	98	15:28 (A04)
29	05:50		06:22		06:54			06:28		07:51 (A03)	07:05		07:40 (A03)	07:27		07:55 (A03)
	20:23		19:40		18:47			17:00	32	08:23 (A03)	16:32	67	08:47 (A03)	16:37	98	15:28 (A04)
30	05:51		06:23		06:55			06:29		07:49 (A03)	07:06		07:40 (A03)	07:27		07:56 (A03)
	20:22		19:39		18:46			16:59	37	08:26 (A03)	16:31	77	15:03 (A04)	16:38	97	15:29 (A04)
31	05:52		06:24					06:30		07:47 (A03)				07:28		07:56 (A03)
	20:21		19:37					16:57	40	08:27 (A03)				16:39	97	15:29 (A04)
Potential sun hours	461		429		375			344			296			285		
Total, worst case						61			160			1865			2961	
Sun reduction						0,58			0,44			0,41			0,36	
Oper. time red.						0,81			0,81			0,81			0,81	
Wind dir. red.						0,65			0,67			0,67			0,65	
Total reduction						0,30			0,24			0,22			0,19	
Total, real						19			38			412			565	

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR03 - SR03

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March		April		May	June	July	August		September		October	November	December
1	07:28	07:14	06:37		06:45	07:04 (A01)	05:58	05:28	05:29	05:53		06:25	06:58 (A01)	06:56	06:31	07:07
	16:40	17:15	17:50		19:25	62 18:36 (A03)	19:58	20:28	20:39	20:19		19:35	42 18:23 (A03)	18:44	16:56	16:31
2	07:28	07:13	06:35		06:43	07:02 (A01)	05:57	05:28	05:29	05:54		06:26	06:57 (A01)	06:57	06:33	07:08
	16:41	17:16	17:51		19:26	63 18:35 (A03)	19:59	20:29	20:39	20:18		19:34	48 18:24 (A03)	18:42	16:55	16:31
3	07:28	07:12	06:34		06:42	07:00 (A01)	05:56	05:28	05:30	05:55		06:27	06:55 (A01)	06:58	06:34	07:09
	16:41	17:17	17:52		19:27	64 18:34 (A03)	20:00	20:30	20:39	20:17		19:32	54 18:26 (A03)	18:40	16:54	16:30
4	07:28	07:11	06:32		06:40	06:59 (A01)	05:54	05:27	05:30	05:56		06:28	06:54 (A01)	06:59	06:35	07:10
	16:42	17:18	17:53		19:28	64 18:34 (A03)	20:01	20:30	20:39	20:16		19:30	57 18:26 (A03)	18:39	16:52	16:30
5	07:28	07:10	06:30		06:38	06:57 (A01)	05:53	05:27	05:31	05:57		06:29	06:53 (A01)	07:00	06:36	07:11
	16:43	17:20	17:54		19:29	65 18:33 (A03)	20:02	20:31	20:38	20:15		19:29	61 18:27 (A03)	18:37	16:51	16:30
6	07:28	07:08	06:29		06:37	06:57 (A01)	05:52	05:26	05:31	05:58		06:30	06:53 (A01)	07:02	06:38	07:12
	16:44	17:21	17:56		19:30	63 18:32 (A03)	20:03	20:32	20:38	20:14		19:27	63 18:28 (A03)	18:35	16:50	16:30
7	07:28	07:07	06:27		06:35	06:57 (A01)	05:50	05:26	05:32	05:59		06:31	06:52 (A01)	07:03	06:39	07:13
	16:45	17:22	17:57		19:31	61 18:31 (A03)	20:04	20:32	20:38	20:12		19:25	65 18:28 (A03)	18:34	16:49	16:30
8	07:28	07:06	06:26		06:33	06:57 (A01)	05:49	05:26	05:33	06:00		06:32	06:53 (A01)	07:04	06:40	07:14
	16:46	17:24	17:58		19:32	57 18:29 (A03)	20:05	20:33	20:37	20:11		19:24	64 18:28 (A03)	18:32	16:48	16:30
9	07:28	07:05	06:24		06:32	06:57 (A01)	05:48	05:26	05:33	06:01		06:33	06:54 (A01)	07:05	06:41	07:15
	16:47	17:25	17:59		19:34	54 18:28 (A03)	20:06	20:33	20:37	20:10		19:22	64 18:28 (A03)	18:30	16:47	16:30
10	07:27	07:04	06:22		06:30	06:59 (A01)	05:47	05:25	05:34	06:02		06:34	06:55 (A01)	07:06	06:42	07:16
	16:48	17:26	18:00		19:35	48 18:26 (A03)	20:07	20:34	20:37	20:09		19:20	63 18:28 (A03)	18:29	16:46	16:30
11	07:27	07:03	06:21		06:28	06:59 (A01)	05:46	05:25	05:35	06:03		06:35	06:56 (A01)	07:07	06:44	07:17
	16:49	17:27	18:01		19:36	42 18:24 (A03)	20:08	20:35	20:36	20:07		19:18	62 18:28 (A03)	18:27	16:45	16:30
12	07:27	07:01	06:19		06:27	07:00 (A01)	05:45	05:25	05:36	06:04		06:36	06:57 (A01)	07:08	06:45	07:18
	16:50	17:29	18:02		19:37	32 18:20 (A03)	20:09	20:35	20:36	20:06		19:17	60 18:28 (A03)	18:25	16:44	16:30
13	07:27	07:00	06:17		06:25	07:03 (A01)	05:44	05:25	05:36	06:05		06:37	06:58 (A01)	07:09	06:46	07:18
	16:51	17:30	18:04		19:38	19 18:16 (A03)	20:10	20:36	20:35	20:05		19:15	59 18:28 (A03)	18:24	16:43	16:30
14	07:26	06:59	06:16		06:23		05:43	05:25	05:37	06:07		06:38	06:59 (A01)	07:10	06:47	07:19
	16:53	17:31	18:05		19:39		20:11	20:36	20:35	20:03		19:13	55 18:27 (A03)	18:22	16:42	16:30
15	07:26	06:57	06:14		06:22		05:41	05:25	05:38	06:08		06:39	07:00 (A01)	07:11	06:49	07:20
	16:54	17:32	18:06		19:40		20:13	20:37	20:34	20:02		19:12	50 18:26 (A03)	18:21	16:41	16:30
16	07:25	06:56	06:12		06:20		05:40	05:25	05:39	06:09		06:40	07:01 (A01)	07:13	06:50	07:21
	16:55	17:34	18:07		19:41		20:14	20:37	20:34	20:00		19:10	46 18:26 (A03)	18:19	16:40	16:30
17	07:25	06:55	06:11		06:19		05:40	05:25	05:39	06:10		06:42	17:46 (A03)	07:14	06:51	07:21
	16:56	17:35	18:08		19:42		20:15	20:37	20:33	19:59		19:08	39 18:25 (A03)	18:17	16:39	16:31
18	07:24	06:53	06:09	17:14 (A03)	06:17		05:39	05:25	05:40	06:11		06:43	17:46 (A03)	07:15	06:52	07:22
	16:57	17:36	18:09	11 17:25 (A03)	19:43		20:16	20:38	20:32	19:57		19:06	38 18:24 (A03)	18:16	16:38	16:31
19	07:24	06:52	06:07	17:09 (A03)	06:16		05:38	05:25	05:41	06:12		06:44	17:46 (A03)	07:16	06:53	07:23
	16:58	17:37	18:10	20 17:29 (A03)	19:45		20:16	20:38	20:31	19:56		19:05	37 18:23 (A03)	18:14	16:37	16:31
20	07:23	06:50	06:05	17:06 (A03)	06:14		05:37	05:25	05:42	06:13		06:45	17:47 (A03)	07:17	06:55	07:23
	17:00	17:39	18:12	25 17:31 (A03)	19:46		20:17	20:38	20:31	19:54		19:03	34 18:21 (A03)	18:13	16:37	16:32
21	07:23	06:49	06:04	17:05 (A03)	06:13		05:36	05:25	05:43	06:14		06:46	17:48 (A03)	07:18	06:56	07:24
	17:01	17:40	18:13	28 17:33 (A03)	19:47		20:18	20:38	20:30	19:53		19:01	32 18:20 (A03)	18:11	16:36	16:32
22	07:22	06:47	06:02	17:03 (A03)	06:11		05:35	05:26	05:44	06:15		06:47	17:49 (A03)	07:19	06:57	07:24
	17:02	17:41	18:14	31 17:34 (A03)	19:48		20:19	20:39	20:29	19:51		18:59	29 18:18 (A03)	18:10	16:35	16:33
23	07:21	06:46	06:00	17:01 (A03)	06:10		05:34	05:26	05:45	06:16		06:48	17:50 (A03)	07:21	06:58	07:25
	17:03	17:42	18:15	34 17:35 (A03)	19:49		20:20	20:39	20:28	19:50		18:58	26 18:16 (A03)	18:08	16:35	16:33
24	07:21	06:45	05:59	16:59 (A03)	06:08		05:33	05:26	05:46	06:17		06:49	17:52 (A03)	07:22	06:59	07:25
	17:04	17:44	18:16	36 17:35 (A03)	19:50		20:21	20:39	20:27	19:48		18:56	21 18:13 (A03)	18:07	16:34	16:34
25	07:20	06:43	05:57	16:59 (A03)	06:07		05:33	05:26	05:47	06:18		06:50	17:55 (A03)	06:23	07:00	07:26
	17:06	17:45	18:17	37 17:36 (A03)	19:51		20:22	20:39	20:27	19:47		18:54	14 18:09 (A03)	17:05	16:33	16:34
26	07:19	06:42	05:55	16:58 (A03)	06:05		05:32	05:27	05:47	06:19		06:51		06:24	07:02	07:26
	17:07	17:46	18:18	38 17:36 (A03)	19:52		20:23	20:39	20:26	19:45		18:52		17:04	16:33	16:35
27	07:18	06:40	05:53	06:12 (A01)	06:04		05:31	05:27	05:48	06:20		06:52		06:25	07:03	07:26
	17:08	17:47	18:19	43 17:36 (A03)	19:53		20:24	20:39	20:25	19:44		18:51		17:03	16:32	16:36
28	07:17	06:38	05:52	06:10 (A01)	06:02		05:31	05:27	05:49	06:21		06:53		06:27	07:04	07:27
	17:09	17:48	18:20	50 17:36 (A03)	19:54		20:25	20:39	20:24	19:42		18:49		17:01	16:32	16:36
29	07:17		06:50	07:09 (A01)	06:01		05:30	05:28	05:50	06:22		06:54		06:28	07:05	07:27
	17:11		19:21	54 18:37 (A03)	19:55		20:26	20:39	20:23	19:40		18:47		17:00	16:32	16:37
30	07:16		06:48	07:07 (A01)	06:00		05:30	05:28	05:51	06:23	07:03 (A01)	06:55		06:29	07:06	07:27
	17:12		19:23	57 18:36 (A03)	19:57		20:26	20:39	20:22	19:39	20 18:17 (A03)	18:45		16:59	16:31	16:38
31	07:15		06:47	07:05 (A01)			05:29		05:52	06:24	07:00 (A01)			06:30		07:28
	17:13		19:24	60 18:36 (A03)			20:27		20:21	19:37	33 18:21 (A03)			16:57		16:39
Potential sun hours	295	296	369		400		450	455	461	429		375		344	296	285
Total, worst case				524		694					53		1183			
Sun reduction				0,44		0,48					0,67		0,58			
Oper. time red.				0,81		0,81					0,81		0,81			
Wind dir. red.				0,65		0,65					0,65		0,65			
Total reduction				0,23		0,25					0,35		0,30			
Total, real				121		175					19		360			

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR04 - SR04

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May	June
1	07:28	07:14		06:37		06:45	18:49 (A02)	05:58	05:28
	16:40	17:14		17:50	56	17:02 (A01)	19:25	15 19:04 (A02)	19:58	20:28
2	07:28	07:13		06:35		16:05 (A01)	06:43	18:48 (A02)	05:57	05:28
	16:40	17:16		17:51	57	17:02 (A01)	19:26	16 19:04 (A02)	19:59	20:29
3	07:28	07:12		06:34		16:05 (A01)	06:42	18:47 (A02)	05:55	05:27
	16:41	17:17		17:52	58	17:03 (A01)	19:27	18 19:05 (A02)	20:00	20:29
4	07:28	07:11		06:32		16:04 (A01)	06:40	18:47 (A02)	05:54	05:27
	16:42	17:18		17:53	58	17:02 (A01)	19:28	19 19:06 (A02)	20:01	20:30
5	07:28	07:09		06:30		16:04 (A01)	06:38	18:48 (A02)	05:53	05:27
	16:43	17:20		17:54	58	17:02 (A01)	19:29	19 19:07 (A02)	20:02	20:31
6	07:28	07:08		06:29		16:04 (A01)	06:36	18:48 (A02)	05:52	05:26
	16:44	17:21		17:55	58	17:02 (A01)	19:30	18 19:06 (A02)	20:03	20:32
7	07:28	07:07		06:27		16:04 (A01)	06:35	18:48 (A02)	05:50	05:26
	16:45	17:22		17:57	58	17:02 (A01)	19:31	16 19:04 (A02)	20:04	20:32
8	07:28	07:06		06:26		16:05 (A01)	06:33	18:50 (A02)	05:49	05:26
	16:46	17:23		17:58	57	17:02 (A01)	19:32	13 19:03 (A02)	20:05	20:33
9	07:28	07:05		06:24		16:04 (A01)	06:31	18:53 (A02)	05:48	05:25
	16:47	17:25		17:59	57	17:01 (A01)	19:33	6 18:59 (A02)	20:06	20:33
10	07:27	07:04		06:22		16:04 (A01)	06:30		05:47	05:25
	16:48	17:26		18:00	56	17:00 (A01)	19:35		20:07	20:34
11	07:27	07:02		06:21		16:05 (A01)	06:28		05:46	05:25
	16:49	17:27		18:01	55	17:00 (A01)	19:36		20:08	20:35
12	07:27	07:01		06:19		16:05 (A01)	06:27		05:45	05:25
	16:50	17:29		18:02	54	16:59 (A01)	19:37		20:09	20:35
13	07:26	07:00		06:17		16:06 (A01)	06:25		05:43	05:25
	16:51	17:30		18:04	52	16:58 (A01)	19:38		20:10	20:36
14	07:26	06:59	16:32 (A01)	06:16		16:06 (A01)	06:23		05:42	05:25
	16:52	17:31	6 16:38 (A01)	18:05	51	16:57 (A01)	19:39		20:11	20:36
15	07:26	06:57	16:26 (A01)	06:14		16:07 (A01)	06:22		05:41	05:25
	16:54	17:32	19 16:45 (A01)	18:06	49	16:56 (A01)	19:40		20:12	20:36
16	07:25	06:56	16:23 (A01)	06:12		16:08 (A01)	06:20		05:40	05:25
	16:55	17:34	25 16:48 (A01)	18:07	47	16:55 (A01)	19:41		20:13	20:37
17	07:25	06:55	16:19 (A01)	06:10		16:09 (A01)	06:19		05:39	05:25
	16:56	17:35	31 16:50 (A01)	18:08	44	16:53 (A01)	19:42		20:14	20:37
18	07:24	06:53	16:18 (A01)	06:09		16:11 (A01)	06:17		05:38	05:25
	16:57	17:36	35 16:53 (A01)	18:09	41	16:52 (A01)	19:43		20:15	20:38
19	07:24	06:52	16:15 (A01)	06:07		16:12 (A01)	06:15		05:38	05:25
	16:58	17:37	39 16:54 (A01)	18:10	38	16:50 (A01)	19:44		20:16	20:38
20	07:23	06:50	16:14 (A01)	06:05		16:13 (A01)	06:14		05:37	05:25
	16:59	17:39	42 16:56 (A01)	18:11	35	16:48 (A01)	19:46		20:17	20:38
21	07:23	06:49	16:12 (A01)	06:04		16:15 (A01)	06:12		05:36	05:25
	17:01	17:40	45 16:57 (A01)	18:13	30	16:45 (A01)	19:47		20:18	20:38
22	07:22	06:47	16:11 (A01)	06:02		16:18 (A01)	06:11		05:35	05:25
	17:02	17:41	47 16:58 (A01)	18:14	25	16:43 (A01)	19:48		20:19	20:39
23	07:21	06:46	16:10 (A01)	06:00		16:21 (A01)	06:09		05:34	05:26
	17:03	17:42	49 16:59 (A01)	18:15	18	16:39 (A01)	19:49		20:20	20:39
24	07:21	06:44	16:09 (A01)	05:59		16:29 (A01)	06:08		05:33	05:26
	17:04	17:43	51 17:00 (A01)	18:16	2	16:30 (A01)	19:50		20:21	20:39
25	07:20	06:43	16:08 (A01)	05:57			06:06		05:33	05:26
	17:06	17:45	52 17:00 (A01)	18:17			19:51		20:22	20:39
26	07:19	06:41	16:08 (A01)	05:55			06:05		05:32	05:27
	17:07	17:46	54 17:02 (A01)	18:18			19:52		20:23	20:39
27	07:18	06:40	16:07 (A01)	05:53		17:56 (A02)	06:04		05:31	05:27
	17:08	17:47	55 17:02 (A01)	18:19	2	17:58 (A02)	19:53		20:24	20:39
28	07:17	06:38	16:07 (A01)	05:52		17:53 (A02)	06:02		05:31	05:27
	17:09	17:48	56 17:03 (A01)	18:20	6	17:59 (A02)	19:54		20:25	20:39
29	07:16			06:50		18:52 (A02)	06:01		05:30	05:28
	17:11			19:21	8	19:00 (A02)	19:55		20:26	20:39
30	07:16			06:48		18:50 (A02)	05:59		05:29	05:28
	17:12			19:22	11	19:01 (A02)	19:56		20:26	20:39
31	07:15			06:47		18:49 (A02)			05:29	
	17:13			19:24	13	19:02 (A02)			20:27	
Potential sun hours	295	296		369		400		450	455
Total, worst case			606		1154		140		
Sun reduction			0,46		0,44		0,48		
Oper. time red.			0,81		0,81		0,81		
Wind dir. red.			0,63		0,63		0,65		
Total reduction			0,23		0,23		0,25		
Total, real			142		260		36		

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR04 - SR04

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July		August		September			October			November		December	
1	05:29		05:53		06:25			06:56		16:44 (A01)	06:31		07:07	
	20:39		20:19		19:35			18:44	54	17:38 (A01)	16:56		16:31	
2	05:29		05:54		06:26			06:57		16:43 (A01)	06:33		07:08	
	20:39		20:18		19:34			18:42	55	17:38 (A01)	16:55		16:30	
3	05:30		05:55		06:27		18:51 (A02)	06:58		16:43 (A01)	06:34		07:09	
	20:39		20:17		19:32	6	18:57 (A02)	18:40	56	17:39 (A01)	16:53		16:30	
4	05:30		05:56		06:28		18:48 (A02)	06:59		16:42 (A01)	06:35		07:10	
	20:39		20:16		19:30	12	19:00 (A02)	18:39	57	17:39 (A01)	16:52		16:30	
5	05:31		05:57		06:29		18:46 (A02)	07:00		16:41 (A01)	06:36		07:11	
	20:38		20:15		19:29	15	19:01 (A02)	18:37	58	17:39 (A01)	16:51		16:30	
6	05:31		05:58		06:30		18:44 (A02)	07:01		16:41 (A01)	06:37		07:12	
	20:38		20:14		19:27	18	19:02 (A02)	18:35	57	17:38 (A01)	16:50		16:30	
7	05:32		05:59		06:31		18:43 (A02)	07:03		16:40 (A01)	06:39		07:13	
	20:38		20:12		19:25	19	19:02 (A02)	18:34	58	17:38 (A01)	16:49		16:29	
8	05:33		06:00		06:32		18:42 (A02)	07:04		16:40 (A01)	06:40		07:14	
	20:37		20:11		19:24	19	19:01 (A02)	18:32	58	17:38 (A01)	16:48		16:29	
9	05:33		06:01		06:33		18:41 (A02)	07:05		16:39 (A01)	06:41		07:15	
	20:37		20:10		19:22	18	18:59 (A02)	18:30	58	17:37 (A01)	16:47		16:29	
10	05:34		06:02		06:34		18:41 (A02)	07:06		16:39 (A01)	06:42		07:16	
	20:37		20:08		19:20	17	18:58 (A02)	18:29	58	17:37 (A01)	16:45		16:29	
11	05:35		06:03		06:35		18:41 (A02)	07:07		16:38 (A01)	06:44		07:17	
	20:36		20:07		19:18	15	18:56 (A02)	18:27	58	17:36 (A01)	16:44		16:29	
12	05:35		06:04		06:36		18:41 (A02)	07:08		16:39 (A01)	06:45		07:18	
	20:36		20:06		19:17	13	18:54 (A02)	18:25	57	17:36 (A01)	16:43		16:30	
13	05:36		06:05		06:37		18:41 (A02)	07:09		16:39 (A01)	06:46		07:18	
	20:35		20:04		19:15	12	18:53 (A02)	18:24	57	17:36 (A01)	16:42		16:30	
14	05:37		06:06		06:38		18:42 (A02)	07:10		16:39 (A01)	06:47		07:19	
	20:35		20:03		19:13	9	18:51 (A02)	18:22	56	17:35 (A01)	16:41		16:30	
15	05:38		06:07		06:39		18:43 (A02)	07:11		16:39 (A01)	06:48		07:20	
	20:34		20:02		19:11	6	18:49 (A02)	18:20	55	17:34 (A01)	16:41		16:30	
16	05:39		06:08		06:40		18:45 (A02)	07:13		16:39 (A01)	06:50		07:21	
	20:33		20:00		19:10	2	18:47 (A02)	18:19	54	17:33 (A01)	16:40		16:30	
17	05:39		06:10		06:41			07:14		16:40 (A01)	06:51		07:21	
	20:33		19:59		19:08			18:17	52	17:32 (A01)	16:39		16:31	
18	05:40		06:11		06:42			07:15		16:41 (A01)	06:52		07:22	
	20:32		19:57		19:06			18:16	50	17:31 (A01)	16:38		16:31	
19	05:41		06:12		06:43			07:16		16:42 (A01)	06:53		07:23	
	20:31		19:56		19:04			18:14	48	17:30 (A01)	16:37		16:31	
20	05:42		06:13		06:45		17:09 (A01)	07:17		16:42 (A01)	06:55		07:23	
	20:31		19:54		19:03	15	17:24 (A01)	18:13	47	17:29 (A01)	16:37		16:32	
21	05:43		06:14		06:46		17:04 (A01)	07:18		16:43 (A01)	06:56		07:24	
	20:30		19:53		19:01	24	17:28 (A01)	18:11	44	17:27 (A01)	16:36		16:32	
22	05:44		06:15		06:47		17:01 (A01)	07:19		16:45 (A01)	06:57		07:24	
	20:29		19:51		18:59	29	17:30 (A01)	18:10	41	17:26 (A01)	16:35		16:33	
23	05:45		06:16		06:48		16:58 (A01)	07:21		16:46 (A01)	06:58		07:25	
	20:28		19:50		18:58	34	17:32 (A01)	18:08	38	17:24 (A01)	16:35		16:33	
24	05:46		06:17		06:49		16:56 (A01)	07:22		16:48 (A01)	06:59		07:25	
	20:27		19:48		18:56	37	17:33 (A01)	18:07	34	17:22 (A01)	16:34		16:34	
25	05:46		06:18		06:50		16:54 (A01)	06:23		15:50 (A01)	07:00		07:26	
	20:26		19:47		18:54	40	17:34 (A01)	17:05	29	16:19 (A01)	16:33		16:34	
26	05:47		06:19		06:51		16:52 (A01)	06:24		15:53 (A01)	07:02		07:26	
	20:26		19:45		18:52	43	17:35 (A01)	17:04	24	16:17 (A01)	16:33		16:35	
27	05:48		06:20		06:52		16:50 (A01)	06:25		15:57 (A01)	07:03		07:26	
	20:25		19:43		18:51	46	17:36 (A01)	17:03	16	16:13 (A01)	16:32		16:36	
28	05:49		06:21		06:53		16:48 (A01)	06:27			07:04		07:27	
	20:24		19:42		18:49	49	17:37 (A01)	17:01			16:32		16:36	
29	05:50		06:22		06:54		16:47 (A01)	06:28			07:05		07:27	
	20:23		19:40		18:47	50	17:37 (A01)	17:00			16:31		16:37	
30	05:51		06:23		06:55		16:46 (A01)	06:29			07:06		07:27	
	20:22		19:39		18:45	51	17:37 (A01)	16:59			16:31		16:38	
31	05:52		06:24					06:30					07:27	
	20:21		19:37					16:57					16:38	
Potential sun hours	461		429		375			344			296		285	
Total, worst case						599			1329					
Sun reduction						0,58			0,44					
Oper. time red.						0,81			0,81					
Wind dir. red.						0,64			0,63					
Total reduction						0,30			0,22					
Total, real						179			296					

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR05 - SR05

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January			February		March			April			May			June		
1	07:28		07:56 (A11)	07:14		06:37			06:45		18:47 (A03)	05:58			05:28		06:06 (A01)
	16:40	29	08:25 (A11)	17:15		17:50			19:25	12	18:59 (A03)	19:58			20:28	52	06:58 (A01)
2	07:28		07:57 (A11)	07:13		06:35			06:43		18:45 (A03)	05:57			05:28		06:06 (A01)
	16:40	29	08:26 (A11)	17:16		17:51			19:26	16	19:01 (A03)	19:59			20:29	53	06:59 (A01)
3	07:28		07:57 (A11)	07:12		06:34			06:42		18:43 (A03)	05:55			05:28		06:05 (A01)
	16:41	29	08:26 (A11)	17:17		17:52			19:27	18	19:01 (A03)	20:00			20:29	54	06:59 (A01)
4	07:28		07:57 (A11)	07:11		06:32			06:40		18:42 (A03)	05:54			05:27		06:05 (A01)
	16:42	30	08:27 (A11)	17:18		17:53			19:28	20	19:02 (A03)	20:01			20:30	55	07:00 (A01)
5	07:28		07:57 (A11)	07:10		06:30			06:38		18:41 (A03)	05:53			05:27		06:05 (A01)
	16:43	29	08:26 (A11)	17:20		17:54			19:29	21	19:02 (A03)	20:02			20:31	56	07:01 (A01)
6	07:28		07:57 (A11)	07:08		06:29			06:37		18:40 (A03)	05:52			05:26		06:04 (A01)
	16:44	30	08:27 (A11)	17:21		17:55			19:30	22	19:02 (A03)	20:03			20:32	57	07:01 (A01)
7	07:28		07:58 (A11)	07:07		06:27			06:35		18:40 (A03)	05:50			05:26		06:05 (A01)
	16:45	29	08:27 (A11)	17:22		17:57			19:31	23	19:03 (A03)	20:04			20:32	56	07:01 (A01)
8	07:28		07:59 (A11)	07:06		06:26			06:33		18:40 (A03)	05:49			05:26		06:05 (A01)
	16:46	29	08:28 (A11)	17:24		17:58			19:32	22	19:02 (A03)	20:05			20:33	57	07:02 (A01)
9	07:28		07:59 (A11)	07:05		06:24			06:32		18:40 (A03)	05:48			05:26		06:05 (A01)
	16:47	30	08:29 (A11)	17:25		17:59			19:34	21	19:01 (A03)	20:06			20:33	57	07:02 (A01)
10	07:27		07:59 (A11)	07:04		06:22			06:30		18:40 (A03)	05:47			05:25		06:05 (A01)
	16:48	29	08:28 (A11)	17:26		18:00			19:35	21	19:01 (A03)	20:07			20:34	58	07:03 (A01)
11	07:27		08:00 (A11)	07:02		06:21			06:28		18:41 (A03)	05:46			05:25		06:05 (A01)
	16:49	29	08:29 (A11)	17:27		18:01			19:36	18	18:59 (A03)	20:08			20:35	58	07:03 (A01)
12	07:27		08:01 (A11)	07:01		06:19			06:27		18:41 (A03)	05:45			05:25		06:04 (A01)
	16:50	29	08:30 (A11)	17:29		18:02			19:37	16	18:57 (A03)	20:09			20:35	59	07:03 (A01)
13	07:27		08:00 (A11)	07:00		06:17			06:25		18:43 (A03)	05:44			05:25		06:04 (A01)
	16:51	29	08:29 (A11)	17:30		18:04			19:38	13	18:56 (A03)	20:10			20:36	59	07:03 (A01)
14	07:26		08:01 (A11)	06:59		06:16			06:23		18:45 (A03)	05:42			05:25		06:05 (A01)
	16:53	29	08:30 (A11)	17:31		18:05			19:39	8	18:53 (A03)	20:11			20:36	59	07:04 (A01)
15	07:26		08:02 (A11)	06:57		06:14			06:22			05:41			05:25		06:05 (A01)
	16:54	27	08:29 (A11)	17:32		18:06			19:40			20:12			20:36	59	07:04 (A01)
16	07:25		08:03 (A11)	06:56		06:12			06:20			05:40		06:27 (A01)	05:25		06:05 (A01)
	16:55	27	08:30 (A11)	17:34		18:07			19:41			20:13	8	06:35 (A01)	20:37	59	07:04 (A01)
17	07:25		08:03 (A11)	06:55		06:11			06:19			05:39		06:22 (A01)	05:25		06:06 (A01)
	16:56	27	08:30 (A11)	17:35		18:08			19:42			20:14	18	06:40 (A01)	20:37	59	07:05 (A01)
18	07:24		08:04 (A11)	06:53		06:09			06:17			05:39		06:19 (A01)	05:25		06:06 (A01)
	16:57	26	08:30 (A11)	17:36		18:09			19:43			20:15	23	06:42 (A01)	20:38	59	07:05 (A01)
19	07:24		08:05 (A11)	06:52		06:07			06:16			05:38		06:17 (A01)	05:25		06:06 (A01)
	16:58	24	08:29 (A11)	17:37		18:10			19:44			20:16	28	06:45 (A01)	20:38	60	07:06 (A01)
20	07:23		08:05 (A11)	06:50		06:05			06:14			05:37		06:16 (A01)	05:25		06:06 (A01)
	17:00	24	08:29 (A11)	17:39		18:11			19:46			20:17	31	06:47 (A01)	20:38	60	07:06 (A01)
21	07:23		08:07 (A11)	06:49		06:04			06:12			05:36		06:14 (A01)	05:25		06:06 (A01)
	17:01	22	08:29 (A11)	17:40		18:13			19:47			20:18	35	06:49 (A01)	20:38	60	07:06 (A01)
22	07:22		08:08 (A11)	06:47		06:02			06:11			05:35		06:12 (A01)	05:26		06:06 (A01)
	17:02	20	08:28 (A11)	17:41		18:14			19:48			20:19	38	06:50 (A01)	20:39	60	07:06 (A01)
23	07:21		08:09 (A11)	06:46		06:00			06:09			05:34		06:11 (A01)	05:26		06:07 (A01)
	17:03	18	08:27 (A11)	17:42		18:15			19:49			20:20	40	06:51 (A01)	20:39	60	07:07 (A01)
24	07:21		08:11 (A11)	06:44		05:59			06:08			05:33		06:11 (A01)	05:26		06:07 (A01)
	17:04	14	08:25 (A11)	17:44		18:16			19:50			20:21	41	06:52 (A01)	20:39	60	07:07 (A01)
25	07:20		08:14 (A11)	06:43		05:57			06:07			05:33		06:10 (A01)	05:26		06:07 (A01)
	17:06	10	08:24 (A11)	17:45		18:17			19:51			20:22	43	06:53 (A01)	20:39	59	07:06 (A01)
26	07:19			06:41		05:55			06:05			05:32		06:09 (A01)	05:27		06:08 (A01)
	17:07			17:46		18:18			19:52			20:23	45	06:54 (A01)	20:39	59	07:07 (A01)
27	07:18			06:40		05:53			06:04			05:31		06:08 (A01)	05:27		06:08 (A01)
	17:08			17:47		18:19			19:53			20:24	47	06:55 (A01)	20:39	59	07:07 (A01)
28	07:17			06:38		05:52			06:02			05:31		06:07 (A01)	05:27		06:08 (A01)
	17:09			17:48		18:20			19:54			20:25	49	06:56 (A01)	20:39	59	07:07 (A01)
29	07:17					06:50			06:01			05:30		06:08 (A01)	05:28		06:08 (A01)
	17:11					19:21			19:55			20:26	49	06:57 (A01)	20:39	59	07:07 (A01)
30	07:16					06:48			05:59			05:29		06:07 (A01)	05:28		06:08 (A01)
	17:12					19:23			19:57			20:26	50	06:57 (A01)	20:39	59	07:07 (A01)
31	07:15					06:47		18:50 (A03)				05:29		06:07 (A01)			
	17:13					19:24	5	18:55 (A03)				20:27	51	06:58 (A01)			
Potential sun hours	295			296		369			400			450			455		
Total, worst case		648					5			251			596			1740	
Sun reduction		0,44					0,44			0,48			0,47			0,54	
Oper. time red.		0,81					0,81			0,81			0,81			0,81	
Wind dir. red.		0,67					0,65			0,65			0,63			0,63	
Total reduction		0,24					0,23			0,25			0,24			0,28	
Total, real		158					1			64			143			483	

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR05 - SR05

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July			August			September			October	November			December		
1	05:29		06:09 (A01)	05:53			06:25		18:40 (A03)	06:56	06:31			07:07		07:42 (A11)
	20:39	59	07:08 (A01)	20:19			19:35	18	18:58 (A03)	18:44	16:56			16:31	29	08:11 (A11)
2	05:29		06:09 (A01)	05:54			06:26		18:38 (A03)	06:57	06:33			07:08		07:42 (A11)
	20:39	58	07:07 (A01)	20:18			19:34	21	18:59 (A03)	18:42	16:55			16:30	29	08:11 (A11)
3	05:30		06:10 (A01)	05:55			06:27		18:38 (A03)	06:58	06:34			07:09		07:42 (A11)
	20:39	58	07:08 (A01)	20:17			19:32	21	18:59 (A03)	18:40	16:53			16:30	30	08:12 (A11)
4	05:30		06:10 (A01)	05:56			06:28		18:37 (A03)	06:59	06:35			07:10		07:43 (A11)
	20:39	57	07:07 (A01)	20:16			19:30	22	18:59 (A03)	18:39	16:52			16:30	29	08:12 (A11)
5	05:31		06:11 (A01)	05:57			06:29		18:37 (A03)	07:00	06:36			07:11		07:43 (A11)
	20:38	56	07:07 (A01)	20:15			19:29	22	18:59 (A03)	18:37	16:51			16:30	29	08:12 (A11)
6	05:31		06:11 (A01)	05:58			06:30		18:36 (A03)	07:01	06:37			07:12		07:43 (A11)
	20:38	56	07:07 (A01)	20:14			19:27	22	18:58 (A03)	18:35	16:50			16:30	30	08:13 (A11)
7	05:32		06:11 (A01)	05:59			06:31		18:36 (A03)	07:03	06:39			07:13		07:44 (A11)
	20:38	56	07:07 (A01)	20:12			19:25	22	18:58 (A03)	18:34	16:49			16:30	29	08:13 (A11)
8	05:33		06:12 (A01)	06:00			06:32		18:36 (A03)	07:04	06:40			07:14		07:44 (A11)
	20:37	55	07:07 (A01)	20:11			19:24	21	18:57 (A03)	18:32	16:48			16:29	30	08:14 (A11)
9	05:33		06:12 (A01)	06:01			06:33		18:37 (A03)	07:05	06:41			07:15		07:45 (A11)
	20:37	55	07:07 (A01)	20:10			19:22	18	18:55 (A03)	18:30	16:47			16:29	29	08:14 (A11)
10	05:34		06:13 (A01)	06:02			06:34		18:38 (A03)	07:06	06:42			07:16		07:46 (A11)
	20:37	54	07:07 (A01)	20:09			19:20	16	18:54 (A03)	18:29	16:46			16:29	29	08:15 (A11)
11	05:35		06:14 (A01)	06:03			06:35		18:39 (A03)	07:07	06:44			07:17		07:46 (A11)
	20:36	53	07:07 (A01)	20:07			19:18	13	18:52 (A03)	18:27	16:44			16:30	29	08:15 (A11)
12	05:36		06:14 (A01)	06:04			06:36		18:42 (A03)	07:08	06:45			07:18		07:47 (A11)
	20:36	52	07:06 (A01)	20:06			19:17	6	18:48 (A03)	18:25	16:43			16:30	29	08:16 (A11)
13	05:36		06:15 (A01)	06:05			06:37			07:09	06:46			07:18		07:47 (A11)
	20:35	51	07:06 (A01)	20:04			19:15			18:24	16:43			16:30	28	08:15 (A11)
14	05:37		06:16 (A01)	06:06			06:38			07:10	06:47			07:19		07:47 (A11)
	20:35	49	07:05 (A01)	20:03			19:13			18:22	16:42			16:30	29	08:16 (A11)
15	05:38		06:17 (A01)	06:07			06:39			07:11	06:49			07:20		07:48 (A11)
	20:34	48	07:05 (A01)	20:02			19:11			18:21	16:41			16:30	28	08:16 (A11)
16	05:39		06:17 (A01)	06:09			06:40			07:13	06:50			07:21		07:49 (A11)
	20:33	48	07:05 (A01)	20:00			19:10			18:19	16:40			16:30	28	08:17 (A11)
17	05:39		06:18 (A01)	06:10			06:41			07:14	06:51		07:47 (A11)	07:21		07:49 (A11)
	20:33	45	07:03 (A01)	19:59			19:08			18:17	16:39	10	07:57 (A11)	16:31	28	08:17 (A11)
18	05:40		06:19 (A01)	06:11			06:42			07:15	06:52		07:45 (A11)	07:22		07:50 (A11)
	20:32	44	07:03 (A01)	19:57			19:06			18:16	16:38	14	07:59 (A11)	16:31	28	08:18 (A11)
19	05:41		06:20 (A01)	06:12			06:44			07:16	06:53		07:44 (A11)	07:23		07:50 (A11)
	20:31	42	07:02 (A01)	19:56			19:05			18:14	16:37	18	08:02 (A11)	16:31	27	08:17 (A11)
20	05:42		06:21 (A01)	06:13			06:45			07:17	06:55		07:43 (A11)	07:23		07:51 (A11)
	20:31	41	07:02 (A01)	19:54			19:03			18:13	16:37	20	08:03 (A11)	16:32	27	08:18 (A11)
21	05:43		06:22 (A01)	06:14			06:46			07:18	06:56		07:42 (A11)	07:24		07:52 (A11)
	20:30	39	07:01 (A01)	19:53			19:01			18:11	16:36	22	08:04 (A11)	16:32	27	08:19 (A11)
22	05:44		06:24 (A01)	06:15			06:47			07:19	06:57		07:42 (A11)	07:24		07:52 (A11)
	20:29	36	07:00 (A01)	19:51			18:59			18:10	16:35	24	08:06 (A11)	16:33	27	08:19 (A11)
23	05:45		06:24 (A01)	06:16			06:48			07:21	06:58		07:42 (A11)	07:25		07:52 (A11)
	20:28	34	06:58 (A01)	19:50			18:58			18:08	16:35	24	08:06 (A11)	16:33	27	08:19 (A11)
24	05:46		06:26 (A01)	06:17			06:49			07:22	06:59		07:41 (A11)	07:25		07:53 (A11)
	20:27	30	06:56 (A01)	19:48			18:56			18:07	16:34	26	08:07 (A11)	16:34	27	08:20 (A11)
25	05:47		06:28 (A01)	06:18			06:50			06:23	07:00		07:41 (A11)	07:26		07:53 (A11)
	20:27	26	06:54 (A01)	19:47			18:54			17:05	16:33	27	08:08 (A11)	16:34	28	08:21 (A11)
26	05:47		06:31 (A01)	06:19			06:51			06:24	07:02		07:41 (A11)	07:26		07:54 (A11)
	20:26	21	06:52 (A01)	19:45			18:52			17:04	16:33	27	08:08 (A11)	16:35	28	08:22 (A11)
27	05:48		06:34 (A01)	06:20			06:52			06:25	07:03		07:42 (A11)	07:26		07:54 (A11)
	20:25	15	06:49 (A01)	19:43			18:51			17:03	16:32	27	08:09 (A11)	16:36	28	08:22 (A11)
28	05:49			06:21			06:53			06:27	07:04		07:42 (A11)	07:27		07:54 (A11)
	20:24			19:42			18:49			17:01	16:32	28	08:10 (A11)	16:36	28	08:22 (A11)
29	05:50			06:22		18:46 (A03)	06:54			06:28	07:05		07:42 (A11)	07:27		07:54 (A11)
	20:23			19:40	8	18:54 (A03)	18:47			17:00	16:32	28	08:10 (A11)	16:37	29	08:23 (A11)
30	05:51			06:23		18:43 (A03)	06:55			06:29	07:06		07:42 (A11)	07:27		07:55 (A11)
	20:22			19:39	13	18:56 (A03)	18:45			16:59	16:31	29	08:11 (A11)	16:38	28	08:23 (A11)
31	05:52			06:24		18:41 (A03)				06:30				07:27		07:56 (A11)
	20:21			19:37	16	18:57 (A03)				16:57				16:39	28	08:24 (A11)
Potential sun hours	461			429			375			344	296			285		
Total, worst case		1238			37			222				324			879	
Sun reduction		0,61			0,67			0,58				0,41			0,36	
Oper. time red.		0,81			0,81			0,81				0,81			0,81	
Wind dir. red.		0,63			0,65			0,65				0,67			0,67	
Total reduction		0,31			0,36			0,31				0,22			0,20	
Total, real		386			13			68				72			176	

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR06 - SR06

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January			February		March		April			May			June		
1	07:28		08:20 (A10)	07:14		06:37		06:45			05:58		06:18 (A01)	05:28		19:00 (A03)
	16:40	45	16:07 (A07)	17:15		17:50		19:25			19:58	45	19:22 (A03)	20:28	15	19:15 (A03)
2	07:28		08:21 (A10)	07:13		06:35		06:43			05:57		06:16 (A01)	05:28		19:02 (A03)
	16:41	43	16:07 (A07)	17:16		17:51		19:26			19:59	49	19:22 (A03)	20:29	13	19:15 (A03)
3	07:28		08:22 (A10)	07:12		06:34		06:42			05:56		06:15 (A01)	05:28		19:03 (A03)
	16:41	43	16:08 (A07)	17:17		17:52		19:27			20:00	53	19:23 (A03)	20:30	9	19:12 (A03)
4	07:28		08:23 (A10)	07:11		06:32		06:40			05:54		06:14 (A01)	05:27		19:07 (A03)
	16:42	41	16:08 (A07)	17:18		17:53		19:28			20:01	56	19:24 (A03)	20:30	3	19:10 (A03)
5	07:28		08:25 (A10)	07:10		06:30		06:38			05:53		06:13 (A01)	05:27		
	16:43	38	16:09 (A07)	17:20		17:54		19:29			20:02	59	19:24 (A03)	20:31		
6	07:28		08:25 (A10)	07:08		06:29		06:37			05:52		06:12 (A01)	05:26		
	16:44	37	16:08 (A07)	17:21		17:56		19:30			20:03	61	19:25 (A03)	20:32		
7	07:28		08:27 (A10)	07:07		06:27		06:35			05:50		06:10 (A01)	05:26		
	16:45	34	16:09 (A07)	17:22		17:57		19:31			20:04	62	19:24 (A03)	20:32		
8	07:28		08:29 (A10)	07:06		06:26		06:33			05:49		06:09 (A01)	05:26		
	16:46	30	16:09 (A07)	17:24		17:58		19:32			20:05	64	19:25 (A03)	20:33		
9	07:28		15:48 (A07)	07:05		06:24		06:32			05:48		06:08 (A01)	05:26		
	16:47	22	16:10 (A07)	17:25		17:59		19:34			20:06	66	19:25 (A03)	20:33		
10	07:27		15:48 (A07)	07:04		06:22		06:30			05:47		06:07 (A01)	05:25		
	16:48	21	16:09 (A07)	17:26		18:00		19:35			20:07	68	19:25 (A03)	20:34		
11	07:27		15:49 (A07)	07:02		06:21		06:28			05:46		06:07 (A01)	05:25		
	16:49	20	16:09 (A07)	17:27		18:01		19:36			20:08	67	19:25 (A03)	20:35		
12	07:27		15:50 (A07)	07:01		06:19		06:27			05:45		06:08 (A01)	05:25		
	16:50	20	16:10 (A07)	17:29		18:02		19:37			20:09	65	19:25 (A03)	20:35		
13	07:27		15:50 (A07)	07:00		06:17		06:25			05:44		06:08 (A01)	05:25		
	16:51	19	16:09 (A07)	17:30		18:04		19:38			20:10	65	19:25 (A03)	20:36		
14	07:26		15:52 (A07)	06:59		06:16		06:23			05:43		06:08 (A01)	05:25		
	16:53	17	16:09 (A07)	17:31		18:05		19:39			20:11	65	19:25 (A03)	20:36		
15	07:26		15:52 (A07)	06:57		06:14		06:22			05:41		06:09 (A01)	05:25		
	16:54	16	16:08 (A07)	17:32		18:06		19:40			20:13	63	19:25 (A03)	20:37		
16	07:25		15:54 (A07)	06:56		06:12		06:20			05:40		06:09 (A01)	05:25		
	16:55	14	16:08 (A07)	17:34		18:07		19:41			20:14	62	19:25 (A03)	20:37		
17	07:25		15:55 (A07)	06:55		06:11		06:19			05:40		06:10 (A01)	05:25		
	16:56	12	16:07 (A07)	17:35		18:08		19:42			20:15	60	19:24 (A03)	20:37		
18	07:24		15:58 (A07)	06:53		06:09		06:17			05:39		06:10 (A01)	05:25		
	16:57	8	16:06 (A07)	17:36		18:09		19:43			20:16	58	19:24 (A03)	20:38		
19	07:24			06:52		06:07		06:16			05:38		06:11 (A01)	05:25		
	16:58			17:37		18:10		19:45			20:16	55	19:23 (A03)	20:38		
20	07:23			06:50		06:05		06:14			05:37		06:13 (A01)	05:25		
	17:00			17:39		18:12		19:46			20:17	53	19:24 (A03)	20:38		
21	07:23			06:49		06:04		06:13			05:36		06:14 (A01)	05:25		
	17:01			17:40		18:13		19:47			20:18	50	19:23 (A03)	20:38		
22	07:22			06:47		06:02		06:11			05:35		06:15 (A01)	05:26		
	17:02			17:41		18:14		19:48			20:19	45	19:22 (A03)	20:39		
23	07:21			06:46		06:00		06:10			05:34		06:16 (A01)	05:26		
	17:03			17:42		18:15		19:49			20:20	42	19:22 (A03)	20:39		
24	07:21			06:45		05:59		06:08			05:33		06:20 (A01)	05:26		
	17:04			17:44		18:16		19:50			20:21	34	19:22 (A03)	20:39		
25	07:20			06:43		05:57		06:07			05:33		18:53 (A03)	05:26		
	17:06			17:45		18:17		19:51			20:22	28	19:21 (A03)	20:39		
26	07:19			06:41		05:55		06:05		19:04 (A03)	05:32		18:53 (A03)	05:27		
	17:07			17:46		18:18		19:52	7	19:11 (A03)	20:23	27	19:20 (A03)	20:39		
27	07:18			06:40		05:53		06:04		06:23 (A01)	05:31		18:55 (A03)	05:27		
	17:08			17:47		18:19		19:53	17	19:15 (A03)	20:24	25	19:20 (A03)	20:39		
28	07:17			06:38		05:52		06:02		06:22 (A01)	05:31		18:55 (A03)	05:27		
	17:09			17:48		18:20		19:54	28	19:18 (A03)	20:25	24	19:19 (A03)	20:39		
29	07:17					06:50		06:01		06:20 (A01)	05:30		18:57 (A03)	05:28		
	17:11					19:21		19:55	35	19:19 (A03)	20:26	22	19:19 (A03)	20:39		
30	07:16					06:48		06:00		06:19 (A01)	05:30		18:58 (A03)	05:28		
	17:12					19:23		19:57	40	19:20 (A03)	20:26	19	19:17 (A03)	20:39		
31	07:15					06:47					05:29		18:59 (A03)			
	17:13					19:24					20:27	18	19:17 (A03)			
Potential sun hours	295			296		369		400			450			455		
Total, worst case		480							127			1530			40	
Sun reduction		0,44							0,48			0,47			0,54	
Oper. time red.		0,81							0,81			0,81			0,81	
Wind dir. red.		0,62							0,63			0,63			0,64	
Total reduction		0,22							0,25			0,24			0,28	
Total, real		108							31			367			11	

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR06 - SR06

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July			August			September	October	November			December		
1	05:29			05:53		06:18 (A01)	06:25	06:56	06:31			07:07		15:31 (A07)
	20:39			20:19	67	19:36 (A03)	19:35	18:44	16:56			16:31	20	15:51 (A07)
2	05:29			05:54		06:18 (A01)	06:26	06:57	06:33			07:08		15:31 (A07)
	20:39			20:18	67	19:36 (A03)	19:34	18:42	16:55			16:31	21	15:52 (A07)
3	05:30			05:55		06:18 (A01)	06:27	06:58	06:34			07:09		15:31 (A07)
	20:39			20:17	67	19:36 (A03)	19:32	18:40	16:54			16:30	22	15:53 (A07)
4	05:30			05:56		06:19 (A01)	06:28	06:59	06:35			07:10		08:14 (A10)
	20:39			20:16	66	19:36 (A03)	19:30	18:39	16:52			16:30	29	15:53 (A07)
5	05:31			05:57		06:20 (A01)	06:29	07:00	06:36			07:11		08:12 (A10)
	20:38			20:15	64	19:35 (A03)	19:29	18:37	16:51			16:30	34	15:54 (A07)
6	05:32			05:58		06:21 (A01)	06:30	07:02	06:38			07:12		08:11 (A10)
	20:38			20:14	62	19:35 (A03)	19:27	18:35	16:50			16:30	37	15:54 (A07)
7	05:32			05:59		06:22 (A01)	06:31	07:03	06:39			07:13		08:11 (A10)
	20:38			20:12	60	19:34 (A03)	19:25	18:34	16:49			16:30	38	15:55 (A07)
8	05:33			06:00		06:22 (A01)	06:32	07:04	06:40			07:14		08:11 (A10)
	20:37			20:11	58	19:33 (A03)	19:24	18:32	16:48			16:30	40	15:55 (A07)
9	05:33		19:12 (A03)	06:01		06:23 (A01)	06:33	07:05	06:41			07:15		08:10 (A10)
	20:37	7	19:19 (A03)	20:10	54	19:32 (A03)	19:22	18:30	16:47			16:30	43	15:56 (A07)
10	05:34		19:10 (A03)	06:02		06:24 (A01)	06:34	07:06	06:42			07:16		08:10 (A10)
	20:37	11	19:21 (A03)	20:09	52	19:31 (A03)	19:20	18:29	16:46			16:30	44	15:57 (A07)
11	05:35		19:09 (A03)	06:03		06:25 (A01)	06:35	07:07	06:44			07:17		08:11 (A10)
	20:36	14	19:23 (A03)	20:07	48	19:30 (A03)	19:18	18:27	16:45			16:30	44	15:57 (A07)
12	05:36		19:07 (A03)	06:04		06:26 (A01)	06:36	07:08	06:45			07:18		08:11 (A10)
	20:36	17	19:24 (A03)	20:06	44	19:29 (A03)	19:17	18:25	16:44			16:30	45	15:58 (A07)
13	05:36		19:06 (A03)	06:05		06:27 (A01)	06:37	07:09	06:46			07:18		08:10 (A10)
	20:35	19	19:25 (A03)	20:04	39	19:28 (A03)	19:15	18:24	16:43			16:30	45	15:57 (A07)
14	05:37		19:06 (A03)	06:07		06:28 (A01)	06:38	07:10	06:47			07:19		08:10 (A10)
	20:35	21	19:27 (A03)	20:03	33	19:26 (A03)	19:13	18:22	16:42			16:30	47	15:58 (A07)
15	05:38		19:05 (A03)	06:08		06:29 (A01)	06:39	07:11	06:49			07:20		08:11 (A10)
	20:34	23	19:28 (A03)	20:02	26	19:24 (A03)	19:12	18:21	16:41			16:30	47	15:59 (A07)
16	05:39		19:05 (A03)	06:09		19:07 (A03)	06:40	07:13	06:50			07:21		08:12 (A10)
	20:34	24	19:29 (A03)	20:00	14	19:21 (A03)	19:10	18:19	16:40			16:30	47	16:00 (A07)
17	05:39		19:03 (A03)	06:10			06:42	07:14	06:51			07:21		08:11 (A10)
	20:33	26	19:29 (A03)	19:59			19:08	18:17	16:39			16:31	47	15:59 (A07)
18	05:40		19:03 (A03)	06:11			06:43	07:15	06:52			07:22		08:12 (A10)
	20:32	27	19:30 (A03)	19:57			19:06	18:16	16:38			16:31	47	16:00 (A07)
19	05:41		19:02 (A03)	06:12			06:44	07:16	06:53			07:23		08:13 (A10)
	20:31	29	19:31 (A03)	19:56			19:05	18:14	16:37			16:31	48	16:01 (A07)
20	05:42		06:28 (A01)	06:13			06:45	07:17	06:55			07:23		08:13 (A10)
	20:31	38	19:32 (A03)	19:54			19:03	18:13	16:37			16:32	48	16:01 (A07)
21	05:43		06:26 (A01)	06:14			06:46	07:18	06:56			07:24		08:13 (A10)
	20:30	44	19:33 (A03)	19:53			19:01	18:11	16:36			16:32	49	16:02 (A07)
22	05:44		06:25 (A01)	06:15			06:47	07:19	06:57			07:24		08:13 (A10)
	20:29	47	19:33 (A03)	19:51			18:59	18:10	16:35			16:33	49	16:02 (A07)
23	05:45		06:23 (A01)	06:16			06:48	07:21	06:58			07:25		08:14 (A10)
	20:28	51	19:33 (A03)	19:50			18:58	18:08	16:35			16:33	48	16:02 (A07)
24	05:46		06:22 (A01)	06:17			06:49	07:22	06:59		15:36 (A07)	07:25		08:15 (A10)
	20:27	54	19:34 (A03)	19:48			18:56	18:07	16:34	7	15:43 (A07)	16:34	48	16:03 (A07)
25	05:47		06:21 (A01)	06:18			06:50	06:23	07:00		15:34 (A07)	07:26		08:15 (A10)
	20:27	57	19:34 (A03)	19:47			18:54	17:05	16:33	11	15:45 (A07)	16:34	48	16:03 (A07)
26	05:47		06:20 (A01)	06:19			06:51	06:24	07:02		15:32 (A07)	07:26		08:16 (A10)
	20:26	60	19:35 (A03)	19:45			18:52	17:04	16:33	14	15:46 (A07)	16:35	47	16:04 (A07)
27	05:48		06:20 (A01)	06:20			06:52	06:25	07:03		15:32 (A07)	07:26		08:16 (A10)
	20:25	61	19:35 (A03)	19:44			18:51	17:03	16:32	16	15:48 (A07)	16:36	47	16:04 (A07)
28	05:49		06:19 (A01)	06:21			06:53	06:27	07:04		15:32 (A07)	07:27		08:17 (A10)
	20:24	62	19:35 (A03)	19:42			18:49	17:01	16:32	17	15:49 (A07)	16:36	47	16:05 (A07)
29	05:50		06:19 (A01)	06:22			06:54	06:28	07:05		15:31 (A07)	07:27		08:17 (A10)
	20:23	64	19:35 (A03)	19:40			18:47	17:00	16:32	19	15:50 (A07)	16:37	47	16:05 (A07)
30	05:51		06:19 (A01)	06:23			06:55	06:29	07:06		15:31 (A07)	07:27		08:18 (A10)
	20:22	65	19:36 (A03)	19:39			18:45	16:59	16:31	20	15:51 (A07)	16:38	45	16:05 (A07)
31	05:52		06:18 (A01)	06:24				06:30				07:28		08:19 (A10)
	20:21	67	19:36 (A03)	19:37				16:57				16:39	46	16:07 (A07)
Potential sun hours	461			429			375	344	296			285		
Total, worst case	888			821					104			1314		
Sun reduction	0,61			0,67					0,41			0,36		
Oper. time red.	0,81			0,81					0,81			0,81		
Wind dir. red.	0,63			0,63					0,61			0,64		
Total reduction	0,31			0,34					0,20			0,19		
Total, real	278			282					21			247		

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR07 - SR07

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April			May		June	
1	07:28		07:14		06:37		07:06 (A07)	06:45		07:48 (A07)	05:58	05:29	
	16:40		17:15		17:50	18	07:24 (A07)	19:25	87	18:41 (A05)	19:58	20:28	
2	07:28		07:13		06:35		07:03 (A07)	06:43		07:49 (A07)	05:57	05:28	
	16:41		17:16		17:51	25	07:28 (A07)	19:26	83	18:40 (A05)	19:59	20:29	
3	07:28		07:12		06:34		07:00 (A07)	06:42		07:51 (A07)	05:56	05:28	
	16:42		17:17		17:52	31	07:31 (A07)	19:27	79	18:40 (A05)	20:00	20:30	
4	07:28		07:11		06:32		06:57 (A07)	06:40		07:54 (A07)	05:54	05:27	
	16:42		17:19		17:53	35	07:32 (A07)	19:28	72	18:40 (A05)	20:01	20:30	
5	07:28		07:10		06:31		06:55 (A07)	06:38		07:58 (A07)	05:53	05:27	
	16:43		17:20		17:54	39	07:34 (A07)	19:29	62	18:39 (A05)	20:02	20:31	
6	07:28		07:09		06:29		06:53 (A07)	06:37		17:49 (A05)	05:52	05:27	
	16:44		17:21		17:56	42	07:35 (A07)	19:30	49	18:38 (A05)	20:03	20:32	
7	07:28		07:07		06:27		06:46 (A08)	06:35		17:50 (A05)	05:51	05:26	
	16:45		17:22		17:57	49	07:36 (A07)	19:31	48	18:38 (A05)	20:04	20:32	
8	07:28		07:06		06:26		06:45 (A08)	06:33		17:50 (A05)	05:49	05:26	
	16:46		17:24		17:58	53	07:38 (A07)	19:33	47	18:37 (A05)	20:05	20:33	
9	07:28		07:05		06:24		06:43 (A08)	06:32		17:51 (A05)	05:48	05:26	
	16:47		17:25		17:59	55	07:38 (A07)	19:34	44	18:35 (A05)	20:06	20:34	
10	07:27		07:04		06:22		06:41 (A08)	06:30		17:52 (A05)	05:47	05:26	
	16:48		17:26		18:00	57	07:38 (A07)	19:35	43	18:35 (A05)	20:07	20:34	
11	07:27		07:03		06:21		06:40 (A08)	06:28		17:52 (A05)	05:46	05:25	
	16:49		17:27		18:01	60	07:40 (A07)	19:36	41	18:33 (A05)	20:08	20:35	
12	07:27		07:01		06:19		06:38 (A08)	06:27		17:54 (A05)	05:45	05:25	
	16:50		17:29		18:03	62	07:40 (A07)	19:37	39	18:33 (A05)	20:09	20:35	
13	07:27		07:00		06:17		06:36 (A08)	06:25		17:54 (A05)	05:44	05:25	
	16:52		17:30		18:04	64	07:40 (A07)	19:38	37	18:31 (A05)	20:11	20:36	
14	07:26		06:59		06:16		06:35 (A08)	06:24		17:55 (A05)	05:43	05:25	
	16:53		17:31		18:05	65	07:40 (A07)	19:39	34	18:29 (A05)	20:12	20:36	
15	07:26		06:57		06:14		06:33 (A08)	06:22		17:57 (A05)	05:42	05:25	
	16:54		17:33		18:06	67	07:40 (A07)	19:40	30	18:27 (A05)	20:13	20:37	
16	07:25		06:56		06:12		06:31 (A08)	06:20		17:59 (A05)	05:41	05:25	
	16:55		17:34		18:07	69	07:40 (A07)	19:41	26	18:25 (A05)	20:14	20:37	
17	07:25		06:55		06:11		06:31 (A08)	06:19		18:01 (A05)	05:40	05:25	
	16:56		17:35		18:08	83	17:27 (A05)	19:42	22	18:23 (A05)	20:15	20:37	
18	07:24		06:53		06:09		06:32 (A08)	06:17		18:04 (A05)	05:39	05:25	
	16:57		17:36		18:09	91	17:31 (A05)	19:44	14	18:18 (A05)	20:16	20:38	
19	07:24		06:52		06:07		06:32 (A08)	06:16			05:38	05:25	
	16:58		17:38		18:10	95	17:33 (A05)	19:45			20:17	20:38	
20	07:23		06:50		06:06		06:33 (A08)	06:14			05:37	05:25	
	17:00		17:39		18:12	98	17:35 (A05)	19:46			20:18	20:38	
21	07:23		06:49		06:04		06:36 (A08)	06:13			05:36	05:26	
	17:01		17:40		18:13	98	17:37 (A05)	19:47			20:18	20:39	
22	07:22		06:48		06:02		06:40 (A08)	06:11			05:35	05:26	
	17:02		17:41		18:14	96	17:38 (A05)	19:48			20:19	20:39	
23	07:21		06:46		06:00		06:42 (A07)	06:10			05:34	05:26	
	17:03		17:42		18:15	96	17:39 (A05)	19:49			20:20	20:39	
24	07:21		06:45		05:59		06:42 (A07)	06:08			05:34	05:26	
	17:05		17:44		18:16	97	17:39 (A05)	19:50			20:21	20:39	
25	07:20		06:43		05:57		06:43 (A07)	06:07			05:33	05:26	
	17:06		17:45		18:17	97	17:40 (A05)	19:51			20:22	20:39	
26	07:19		06:42		05:55		06:43 (A07)	06:05			05:32	05:27	
	17:07		17:46		18:18	97	17:41 (A05)	19:52			20:23	20:39	
27	07:18		06:40		05:54		06:43 (A07)	06:04			05:31	05:27	
	17:08		17:47		18:19	97	17:41 (A05)	19:53			20:24	20:39	
28	07:17		06:38		05:52		06:44 (A07)	06:02			05:31	05:28	
	17:10		17:49		18:20	97	17:42 (A05)	19:54			20:25	20:39	
29	07:17				06:50		07:45 (A07)	06:01			05:30	05:28	
	17:11				19:22	94	18:41 (A05)	19:56			20:26	20:39	
30	07:16				06:48		07:45 (A07)	06:00			05:30	05:28	
	17:12				19:23	93	18:41 (A05)	19:57			20:26	20:39	
31	07:15				06:47		07:46 (A07)				05:29		
	17:13				19:24	90	18:41 (A05)				20:27		
Potential sun hours	295		296		369			400			450	455	
Total, worst case						2210			857				
Sun reduction						0,44			0,48				
Oper. time red.						0,81			0,81				
Wind dir. red.						0,65			0,65				
Total reduction						0,23			0,25				
Total, real						511			216				

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR07 - SR07

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July	August			September			October			November	December
1	05:29	05:53			06:25		17:51 (A05)	06:56		07:17 (A08)	06:31	07:07
	20:39	20:20			19:35	41	18:32 (A05)	18:44	62	08:19 (A07)	16:56	16:31
2	05:29	05:54			06:26		17:50 (A05)	06:57		07:18 (A08)	06:33	07:08
	20:39	20:18			19:34	43	18:33 (A05)	18:42	60	08:18 (A07)	16:55	16:31
3	05:30	05:55			06:27		17:49 (A05)	06:58		07:19 (A08)	06:34	07:09
	20:39	20:17			19:32	45	18:34 (A05)	18:40	58	08:17 (A07)	16:54	16:30
4	05:30	05:56			06:28		17:47 (A05)	06:59		07:20 (A08)	06:35	07:10
	20:39	20:16			19:30	47	18:34 (A05)	18:39	56	08:16 (A07)	16:52	16:30
5	05:31	05:57			06:29		17:46 (A05)	07:01		07:21 (A08)	06:36	07:11
	20:38	20:15			19:29	48	18:34 (A05)	18:37	54	08:15 (A07)	16:51	16:30
6	05:32	05:58			06:30		17:46 (A05)	07:02		07:22 (A08)	06:38	07:12
	20:38	20:14			19:27	48	18:34 (A05)	18:35	51	08:13 (A07)	16:50	16:30
7	05:32	05:59			06:31		07:53 (A07)	07:03		07:23 (A08)	06:39	07:13
	20:38	20:12			19:25	61	18:34 (A05)	18:34	46	08:12 (A07)	16:49	16:30
8	05:33	06:00			06:32		07:48 (A07)	07:04		07:29 (A07)	06:40	07:14
	20:38	20:11			19:24	72	18:34 (A05)	18:32	41	08:10 (A07)	16:48	16:30
9	05:34	06:01			06:33		07:45 (A07)	07:05		07:31 (A07)	06:41	07:15
	20:37	20:10			19:22	78	18:34 (A05)	18:30	37	08:08 (A07)	16:47	16:30
10	05:34	06:03			06:34		07:42 (A07)	07:06		07:32 (A07)	06:42	07:16
	20:37	20:09			19:20	83	18:34 (A05)	18:29	34	08:06 (A07)	16:46	16:30
11	05:35	06:04			06:35		07:40 (A07)	07:07		07:35 (A07)	06:44	07:17
	20:36	20:07			19:19	87	18:33 (A05)	18:27	29	08:04 (A07)	16:45	16:30
12	05:36	06:05			06:36		07:38 (A07)	07:08		07:38 (A07)	06:45	07:18
	20:36	20:06			19:17	90	18:33 (A05)	18:25	22	08:00 (A07)	16:44	16:30
13	05:36	06:06			06:37		07:37 (A07)	07:09		07:42 (A07)	06:46	07:18
	20:35	20:05			19:15	92	18:32 (A05)	18:24	14	07:56 (A07)	16:43	16:30
14	05:37	06:07			06:39		07:35 (A07)	07:10			06:47	07:19
	20:35	20:03			19:13	95	18:32 (A05)	18:22			16:42	16:30
15	05:38	06:08			06:40		07:34 (A07)	07:12			06:49	07:20
	20:34	20:02			19:12	95	18:31 (A05)	18:21			16:41	16:30
16	05:39	06:09			06:41		07:32 (A07)	07:13			06:50	07:21
	20:34	20:00			19:10	97	18:30 (A05)	18:19			16:40	16:31
17	05:40	06:10			06:42		07:31 (A07)	07:14			06:51	07:21
	20:33	19:59			19:08	98	18:29 (A05)	18:18			16:39	16:31
18	05:40	06:11			06:43		07:30 (A07)	07:15			06:52	07:22
	20:32	19:57			19:06	98	18:28 (A05)	18:16			16:38	16:31
19	05:41	06:12			06:44		07:29 (A07)	07:16			06:53	07:23
	20:32	19:56			19:05	97	18:27 (A05)	18:14			16:37	16:32
20	05:42	06:13			06:45		07:28 (A07)	07:17			06:55	07:23
	20:31	19:54			19:03	96	18:25 (A05)	18:13			16:37	16:32
21	05:43	06:14			06:46		07:27 (A07)	07:18			06:56	07:24
	20:30	19:53			19:01	96	18:24 (A05)	18:11			16:36	16:32
22	05:44	06:15			06:47		07:21 (A08)	07:20			06:57	07:24
	20:29	19:51			18:59	99	18:22 (A05)	18:10			16:35	16:33
23	05:45	06:16			06:48		07:18 (A08)	07:21			06:58	07:25
	20:28	19:50			18:58	98	18:20 (A05)	18:08			16:35	16:33
24	05:46	06:17			06:49		07:16 (A08)	07:22			06:59	07:25
	20:28	19:48			18:56	95	18:17 (A05)	18:07			16:34	16:34
25	05:47	06:18		18:07 (A05)	06:50		07:15 (A08)	06:23			07:01	07:26
	20:27	19:47	15	18:22 (A05)	18:54	92	18:15 (A05)	17:06			16:34	16:35
26	05:48	06:19		18:03 (A05)	06:51		07:14 (A08)	06:24			07:02	07:26
	20:26	19:45	22	18:25 (A05)	18:52	86	18:11 (A05)	17:04			16:33	16:35
27	05:49	06:20		18:00 (A05)	06:52		07:13 (A08)	06:25			07:03	07:27
	20:25	19:44	27	18:27 (A05)	18:51	73	18:04 (A05)	17:03			16:33	16:36
28	05:50	06:21		17:58 (A05)	06:53		07:13 (A08)	06:27			07:04	07:27
	20:24	19:42	30	18:28 (A05)	18:49	68	08:21 (A07)	17:01			16:32	16:36
29	05:50	06:22		17:56 (A05)	06:54		07:14 (A08)	06:28			07:05	07:27
	20:23	19:40	34	18:30 (A05)	18:47	66	08:20 (A07)	17:00			16:32	16:37
30	05:51	06:23		17:54 (A05)	06:55		07:15 (A08)	06:29			07:06	07:27
	20:22	19:39	37	18:31 (A05)	18:46	64	08:19 (A07)	16:59			16:31	16:38
31	05:52	06:24		17:53 (A05)				06:30				07:28
	20:21	19:37	39	18:32 (A05)				16:57				16:39
Potential sun hours	461	429			375			344			296	285
Total, worst case			204			2348			564			
Sun reduction			0,67			0,58			0,44			
Oper. time red.			0,81			0,81			0,81			
Wind dir. red.			0,65			0,65			0,65			
Total reduction			0,35			0,30			0,23			
Total, real			72			714			129			

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR08 - SR08

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28	07:14	06:37	06:45	05:58	05:28	05:29	05:53	06:25	06:56	06:31	07:07
	16:40	17:15	17:50	19:25	19:58	20:28	20:39	20:19	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43	05:57	05:28	05:29	05:54	06:26	06:57	06:33	07:08
	16:41	17:16	17:51	19:26	19:59	20:29	20:39	20:18	19:34	18:42	16:55	16:31
3	07:28	07:12	06:34	06:42	05:56	05:28	05:30	05:55	06:27	06:58	06:34	07:09
	16:41	17:17	17:52	19:27	20:00	20:29	20:39	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32	06:40	05:54	05:27	05:30	05:56	06:28	06:59	06:35	07:10
	16:42	17:18	17:53	19:28	20:01	20:30	20:39	20:16	19:30	18:39	16:52	16:30
5	07:28	07:09	06:30	06:38	05:53	05:27	05:31	05:57	06:29	07:00	06:36	07:11
	16:43	17:20	17:54	19:29	20:02	20:31	20:38	20:15	19:29	18:37	16:51	16:30
6	07:28	07:08	06:29	06:37	05:52	05:26	05:32	05:58	06:30	07:01	06:37	07:12
	16:44	17:21	17:56	19:30	20:03	20:32	20:38	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35	05:50	05:26	05:32	05:59	06:31	07:03	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32	20:38	20:12	19:25	18:34	16:49	16:30
8	07:28	07:06	06:26	06:33	05:49	05:26	05:33	06:00	06:32	07:04	06:40	07:14
	16:46	17:24	17:58	19:32	20:05	20:33	20:37	20:11	19:24	18:32	16:48	16:30
9	07:28	07:05	06:24	06:32	05:48	05:26	05:33	06:01	06:33	07:05	06:41	07:15
	16:47	17:25	17:59	19:34	20:06	20:33	20:37	20:10	19:22	18:30	16:47	16:30
10	07:27	07:04	06:22	06:30	05:47	05:25	05:34	06:02	06:34	07:06	06:42	07:16
	16:48	17:26	18:00	19:35	20:07	20:34	20:37	20:08	19:20	18:29	16:46	16:30
11	07:27	07:02	06:21	06:28	05:46	05:25	05:35	06:03	06:35	07:07	06:44	07:17
	16:49	17:27	18:01	19:36	20:08	20:35	20:36	20:07	19:18	18:27	16:45	16:30
12	07:27	07:01	06:19	06:27	05:45	05:25	05:36	06:04	06:36	07:08	06:45	07:18
	16:50	17:29	18:02	19:37	20:09	20:35	20:36	20:06	19:17	18:25	16:44	16:30
13	07:26	07:00	06:17	06:25	05:44	05:25	05:36	06:05	06:37	07:09	06:46	07:18
	16:51	17:30	18:04	19:38	20:10	20:36	20:35	20:04	19:15	18:24	16:43	16:30
14	07:26	06:59	06:16	06:23	05:43	05:25	05:37	06:07	06:38	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:11	20:36	20:35	20:03	19:13	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22	05:42	05:25	05:38	06:08	06:39	07:11	06:48	07:20
	16:54	17:32	18:06	19:40	20:12	20:36	20:34	20:02	19:11	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20	05:41	05:25	05:39	06:09	06:40	07:13	06:50	07:21
	16:55	17:34	18:07	19:41	20:13	20:37	20:33	20:00	19:10	18:19	16:40	16:30
17	07:25	06:55	06:11	06:19	05:40	05:25	05:40	06:10	06:41	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:14	20:37	20:33	19:59	19:08	18:17	16:39	16:31
18	07:24	06:53	06:09	06:17	05:39	05:25	05:40	06:11	06:43	07:15	06:52	07:22
	16:57	17:36	18:09	19:43	20:15	20:38	20:32	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:16	05:38	05:25	05:41	06:12	06:44	07:16	06:53	07:23
	16:58	17:37	18:10	19:44	20:16	20:38	20:31	19:56	19:05	18:14	16:37	16:31
20	07:23	06:50	06:05	06:14	05:37	05:25	05:42	06:13	06:45	07:17	06:55	07:23
	17:00	17:39	18:11	19:46	20:17	20:38	20:31	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:13	05:36	05:25	05:43	06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:18	20:38	20:30	19:53	19:01	18:11	16:36	16:32
22	07:22	06:47	06:02	06:11	05:35	05:26	05:44	06:15	06:47	07:19	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39	20:29	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:10	05:34	05:26	05:45	06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	20:39	20:28	19:50	18:58	18:08	16:35	16:33
24	07:21	06:44	05:59	06:08	05:34	05:26	05:46	06:17	06:49	07:22	06:59	07:25
	17:04	17:44	18:16	19:50	20:21	20:39	20:27	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:07	05:33	05:26	05:47	06:18	06:50	06:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20:39	20:26	19:47	18:54	17:05	16:33	16:34
26	07:19	06:41	05:55	06:05	05:32	05:27	05:48	06:19	06:51	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	20:39	20:26	19:45	18:52	17:04	16:33	16:35
27	07:18	06:40	05:53	06:04	05:31	05:27	05:48	06:20	06:52	06:25	07:03	07:26
	17:08	17:47	18:19	19:53	20:24	20:39	20:25	19:43	18:51	17:03	16:32	16:36
28	07:17	06:38	05:52	06:02	05:31	05:27	05:49	06:21	06:53	06:27	07:04	07:27
	17:09	17:48	18:20	19:54	20:25	20:39	20:24	19:42	18:49	17:01	16:32	16:36
29	07:16		06:50	06:01	05:30	05:28	05:50	06:22	06:54	06:28	07:05	07:27
	17:11		19:21	19:55	20:26	20:39	20:23	19:40	18:47	17:00	16:32	16:37
30	07:16		06:48	06:00	05:30	05:28	05:51	06:23	06:55	06:29	07:06	07:27
	17:12		19:23	19:57	20:26	20:39	20:22	19:39	18:45	16:59	16:31	16:38
31	07:15		06:47		05:29		05:52	06:24		06:30		07:27
	17:13		19:24		20:27		20:21	19:37		16:57		16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	345	296	286
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) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR09 - SR09

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May		June		July		August	September	October	November	December
1	07:28	07:14	06:37	06:45	05:58		05:29		19:38 (A06)	05:29	19:45 (A06)	05:53	06:25	06:56	06:31	07:07
	16:40	17:15	17:50	19:25	19:58		20:28	24	20:02 (A06)	20:39	20:13 (A06)	20:19	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43	05:57		05:28		19:38 (A06)	05:29	19:45 (A06)	05:54	06:26	06:57	06:33	07:08
	16:41	17:16	17:51	19:26	19:59		20:29	26	20:04 (A06)	20:39	20:13 (A06)	20:18	19:34	18:42	16:55	16:31
3	07:28	07:12	06:34	06:42	05:56		05:28		19:39 (A06)	05:30	19:45 (A06)	05:55	06:27	06:58	06:34	07:09
	16:41	17:17	17:52	19:27	20:00		20:29	26	20:05 (A06)	20:39	20:13 (A06)	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32	06:40	05:54		05:27		19:38 (A06)	05:30	19:45 (A06)	05:56	06:28	06:59	06:35	07:10
	16:42	17:19	17:53	19:28	20:01		20:30	27	20:05 (A06)	20:39	20:12 (A06)	20:16	19:30	18:39	16:52	16:30
5	07:28	07:10	06:31	06:38	05:53		05:27		19:39 (A06)	05:31	19:45 (A06)	05:57	06:29	07:00	06:36	07:11
	16:43	17:20	17:54	19:29	20:02		20:31	27	20:06 (A06)	20:38	20:13 (A06)	20:15	19:29	18:37	16:51	16:30
6	07:28	07:08	06:29	06:37	05:52		05:27		19:39 (A06)	05:32	19:46 (A06)	05:58	06:30	07:02	06:38	07:12
	16:44	17:21	17:56	19:30	20:03		20:32	27	20:06 (A06)	20:38	20:13 (A06)	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35	05:51		05:26		19:39 (A06)	05:32	19:45 (A06)	05:59	06:31	07:03	06:39	07:13
	16:45	17:22	17:57	19:31	20:04		20:32	27	20:06 (A06)	20:38	20:12 (A06)	20:12	19:25	18:34	16:49	16:30
8	07:28	07:06	06:26	06:33	05:49		05:26		19:39 (A06)	05:33	19:46 (A06)	06:00	06:32	07:04	06:40	07:14
	16:46	17:24	17:58	19:32	20:05		20:33	28	20:07 (A06)	20:37	20:12 (A06)	20:11	19:24	18:32	16:48	16:30
9	07:28	07:05	06:24	06:32	05:48		05:26		19:40 (A06)	05:34	19:45 (A06)	06:01	06:33	07:05	06:41	07:15
	16:47	17:25	17:59	19:34	20:06		20:33	28	20:08 (A06)	20:37	20:11 (A06)	20:10	19:22	18:30	16:47	16:30
10	07:27	07:04	06:22	06:30	05:47		05:26		19:40 (A06)	05:34	19:45 (A06)	06:02	06:34	07:06	06:42	07:16
	16:48	17:26	18:00	19:35	20:07		20:34	29	20:09 (A06)	20:37	20:11 (A06)	20:09	19:20	18:29	16:46	16:30
11	07:27	07:03	06:21	06:28	05:46		05:25		19:41 (A06)	05:35	19:46 (A06)	06:03	06:35	07:07	06:44	07:17
	16:49	17:27	18:01	19:36	20:08		20:35	28	20:09 (A06)	20:36	20:11 (A06)	20:07	19:18	18:27	16:45	16:30
12	07:27	07:01	06:19	06:27	05:45		05:25		19:41 (A06)	05:36	19:46 (A06)	06:05	06:36	07:08	06:45	07:18
	16:50	17:29	18:03	19:37	20:09		20:35	29	20:10 (A06)	20:36	20:11 (A06)	20:06	19:17	18:25	16:44	16:30
13	07:27	07:00	06:17	06:25	05:44		19:45 (A06)	05:25	19:41 (A06)	05:36	19:46 (A06)	06:06	06:37	07:09	06:46	07:18
	16:52	17:30	18:04	19:38	20:10	2	19:46 (A06)	20:36	20:10 (A06)	20:35	20:10 (A06)	20:04	19:15	18:24	16:43	16:30
14	07:26	06:59	06:16	06:24	05:43		19:44 (A06)	05:25	19:42 (A06)	05:37	19:46 (A06)	06:07	06:38	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:11	3	19:47 (A06)	20:36	20:11 (A06)	20:35	20:09 (A06)	20:03	19:13	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22	05:42		19:42 (A06)	05:25	19:42 (A06)	05:38	19:46 (A06)	06:08	06:39	07:11	06:49	07:20
	16:54	17:33	18:06	19:40	20:12	6	19:48 (A06)	20:36	20:11 (A06)	20:34	20:09 (A06)	20:02	19:12	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20	05:41		19:41 (A06)	05:25	19:42 (A06)	05:39	19:47 (A06)	06:09	06:41	07:13	06:50	07:21
	16:55	17:34	18:07	19:41	20:14	8	19:49 (A06)	20:37	20:11 (A06)	20:33	20:09 (A06)	20:00	19:10	18:19	16:40	16:31
17	07:25	06:55	06:11	06:19	05:40		19:40 (A06)	05:25	19:43 (A06)	05:40	19:46 (A06)	06:10	06:42	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:15	10	19:50 (A06)	20:37	20:12 (A06)	20:33	20:07 (A06)	19:59	19:08	18:17	16:39	16:31
18	07:24	06:53	06:09	06:17	05:39		19:39 (A06)	05:25	19:43 (A06)	05:40	19:47 (A06)	06:11	06:43	07:15	06:52	07:22
	16:57	17:36	18:09	19:43	20:15	12	19:51 (A06)	20:38	20:12 (A06)	20:32	20:07 (A06)	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:16	05:38		19:40 (A06)	05:25	19:43 (A06)	05:41	19:47 (A06)	06:12	06:44	07:16	06:53	07:23
	16:58	17:38	18:10	19:45	20:16	13	19:53 (A06)	20:38	20:12 (A06)	20:31	20:06 (A06)	19:56	19:05	18:14	16:37	16:32
20	07:23	06:50	06:06	06:14	05:37		19:39 (A06)	05:25	19:43 (A06)	05:42	19:48 (A06)	06:13	06:45	07:17	06:55	07:23
	17:00	17:39	18:12	19:46	20:17	14	19:53 (A06)	20:38	20:12 (A06)	20:31	20:06 (A06)	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:13	05:36		19:38 (A06)	05:25	19:43 (A06)	05:43	19:48 (A06)	06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:18	16	19:54 (A06)	20:38	20:12 (A06)	20:30	20:05 (A06)	19:53	19:01	18:11	16:36	16:32
22	07:22	06:48	06:02	06:11	05:35		19:38 (A06)	05:26	19:43 (A06)	05:44	19:49 (A06)	06:15	06:47	07:20	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	17	19:55 (A06)	20:39	20:12 (A06)	20:29	20:05 (A06)	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:10	05:34		19:37 (A06)	05:26	19:44 (A06)	05:45	19:49 (A06)	06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	18	19:55 (A06)	20:39	20:13 (A06)	20:28	20:04 (A06)	19:50	18:58	18:08	16:35	16:33
24	07:21	06:45	05:59	06:08	05:34		19:38 (A06)	05:26	19:44 (A06)	05:46	19:49 (A06)	06:17	06:49	07:22	06:59	07:25
	17:05	17:44	18:16	19:50	20:21	19	19:57 (A06)	20:39	20:13 (A06)	20:27	20:02 (A06)	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:07	05:33		19:37 (A06)	05:26	19:44 (A06)	05:47	19:50 (A06)	06:18	06:50	06:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20	19:57 (A06)	20:39	20:13 (A06)	20:27	20:02 (A06)	19:47	18:54	17:06	16:34	16:34
26	07:19	06:42	05:55	06:05	05:32		19:37 (A06)	05:27	19:44 (A06)	05:48	19:50 (A06)	06:19	06:51	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	21	19:58 (A06)	20:39	20:14 (A06)	20:26	20:01 (A06)	19:45	18:52	17:04	16:33	16:35
27	07:18	06:40	05:54	06:04	05:31		19:37 (A06)	05:27	19:44 (A06)	05:49	19:51 (A06)	06:20	06:52	06:25	07:03	07:26
	17:08	17:47	18:19	19:53	20:24	22	19:59 (A06)	20:39	20:13 (A06)	20:25	20:00 (A06)	19:44	18:51	17:03	16:33	16:36
28	07:17	06:38	05:52	06:02	05:31		19:37 (A06)	05:28	19:44 (A06)	05:49	19:52 (A06)	06:21	06:53	06:27	07:04	07:27
	17:10	17:48	18:20	19:54	20:25	22	19:59 (A06)	20:39	20:13 (A06)	20:24	19:59 (A06)	19:42	18:49	17:01	16:32	16:36
29	07:17		06:50	06:01	05:30		19:38 (A06)	05:28	19:45 (A06)	05:50	19:53 (A06)	06:22	06:54	06:28	07:05	07:27
	17:11		19:22	19:55	20:26	23	20:01 (A06)	20:39	20:13 (A06)	20:23	19:58 (A06)	19:40	18:47	17:00	16:32	16:37
30	07:16		06:48	06:00	05:30		19:37 (A06)	05:28	19:44 (A06)	05:51	19:55 (A06)	06:23	06:55	06:29	07:06	07:27
	17:12		19:23	19:57	20:26	24	20:01 (A06)	20:39	20:13 (A06)	20:22	19:58 (A06)	19:39	18:46	16:59	16:31	16:38
31	07:15		06:47		05:29		19:38 (A06)			05:52		06:24		06:30		07:27
	17:13		19:24		20:27	24	20:02 (A06)			20:21		19:37		16:57		16:39
Potential sun hours	295	286	369	400	450			455		461		429	375	345	298	286
Total, worst case						294			848		599					
Sun reduction						0,47			0,54		0,61					
Oper. time red.						0,81			0,81		0,81					
Wind dir. red.						0,67			0,67		0,67					
Total reduction						0,25			0,29		0,33					
Total, real						74			248		197					

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR10 - SR10

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28	07:14	06:37	06:45	05:58	05:29	05:29	05:53	06:25	06:56	06:31	07:07
	16:40	17:15	17:50	19:25	19:58	20:28	20:39	20:19	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43	05:57	05:28	05:29	05:54	06:26	06:57	06:33	07:08
	16:41	17:16	17:51	19:26	19:59	20:29	20:39	20:18	19:34	18:42	16:55	16:31
3	07:28	07:12	06:34	06:42	05:56	05:28	05:30	05:55	06:27	06:58	06:34	07:09
	16:41	17:17	17:52	19:27	20:00	20:29	20:39	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32	06:40	05:54	05:27	05:30	05:56	06:28	06:59	06:35	07:10
	16:42	17:19	17:53	19:28	20:01	20:30	20:39	20:16	19:30	18:39	16:52	16:30
5	07:28	07:10	06:31	06:38	05:53	05:27	05:31	05:57	06:29	07:00	06:36	07:11
	16:43	17:20	17:54	19:29	20:02	20:31	20:38	20:15	19:29	18:37	16:51	16:30
6	07:28	07:08	06:29	06:37	05:52	05:27	05:32	05:58	06:30	07:02	06:38	07:12
	16:44	17:21	17:56	19:30	20:03	20:32	20:38	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35	05:51	05:26	05:32	05:59	06:31	07:03	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32	20:38	20:12	19:25	18:34	16:49	16:30
8	07:28	07:06	06:26	06:33	05:49	05:26	05:33	06:00	06:32	07:04	06:40	07:14
	16:46	17:24	17:58	19:32	20:05	20:33	20:37	20:11	19:24	18:32	16:48	16:30
9	07:28	07:05	06:24	06:32	05:48	05:26	05:34	06:01	06:33	07:05	06:41	07:15
	16:47	17:25	17:59	19:34	20:06	20:33	20:37	20:10	19:22	18:30	16:47	16:30
10	07:27	07:04	06:22	06:30	05:47	05:26	05:34	06:02	06:34	07:06	06:42	07:16
	16:48	17:26	18:00	19:35	20:07	20:34	20:37	20:09	19:20	18:29	16:46	16:30
11	07:27	07:03	06:21	06:28	05:46	05:25	05:35	06:04	06:35	07:07	06:44	07:17
	16:49	17:27	18:01	19:36	20:08	20:35	20:36	20:07	19:18	18:27	16:45	16:30
12	07:27	07:01	06:19	06:27	05:45	05:25	05:36	06:05	06:36	07:08	06:45	07:18
	16:50	17:29	18:03	19:37	20:09	20:35	20:36	20:06	19:17	18:25	16:44	16:30
13	07:27	07:00	06:17	06:25	05:44	05:25	05:36	06:06	06:37	07:09	06:46	07:18
	16:52	17:30	18:04	19:38	20:10	20:36	20:35	20:05	19:15	18:24	16:43	16:30
14	07:26	06:59	06:16	06:24	05:43	05:25	05:37	06:07	06:38	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:11	20:36	20:35	20:03	19:13	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22	05:42	05:25	05:38	06:08	06:40	07:11	06:49	07:20
	16:54	17:33	18:06	19:40	20:12	20:36	20:34	20:02	19:12	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20	05:41	05:25	05:39	06:09	06:41	07:13	06:50	07:21
	16:55	17:34	18:07	19:41	20:14	20:37	20:33	20:00	19:10	18:19	16:40	16:31
17	07:25	06:55	06:11	06:19	05:40	05:25	05:40	06:10	06:42	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:15	20:37	20:33	19:59	19:08	18:17	16:39	16:31
18	07:24	06:53	06:09	06:17	05:39	05:25	05:40	06:11	06:43	07:15	06:52	07:22
	16:57	17:36	18:09	19:43	20:15	20:38	20:32	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:16	05:38	05:25	05:41	06:12	06:44	07:16	06:53	07:23
	16:58	17:38	18:10	19:45	20:16	20:38	20:31	19:56	19:05	18:14	16:37	16:32
20	07:23	06:50	06:06	06:14	05:37	05:25	05:42	06:13	06:45	07:17	06:55	07:23
	17:00	17:39	18:12	19:46	20:17	20:38	20:31	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:13	05:36	05:26	05:43	06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:18	20:38	20:30	19:53	19:01	18:11	16:36	16:32
22	07:22	06:48	06:02	06:11	05:35	05:26	05:44	06:15	06:47	07:20	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39	20:29	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:10	05:34	05:26	05:45	06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	20:39	20:28	19:50	18:58	18:08	16:35	16:33
24	07:21	06:45	05:59	06:08	05:34	05:26	05:46	06:17	06:49	07:22	06:59	07:25
	17:05	17:44	18:16	19:50	20:21	20:39	20:27	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:07	05:33	05:26	05:47	06:18	06:50	06:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20:39	20:27	19:47	18:54	17:06	16:34	16:35
26	07:19	06:42	05:55	06:05	05:32	05:27	05:48	06:19	06:51	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	20:39	20:26	19:45	18:52	17:04	16:33	16:35
27	07:18	06:40	05:54	06:04	05:31	05:27	05:49	06:20	06:52	06:25	07:03	07:26
	17:08	17:47	18:19	19:53	20:24	20:39	20:25	19:44	18:51	17:03	16:33	16:36
28	07:17	06:38	05:52	06:02	05:31	05:28	05:49	06:21	06:53	06:27	07:04	07:27
	17:10	17:48	18:20	19:54	20:25	20:39	20:24	19:42	18:49	17:01	16:32	16:36
29	07:17		06:50	06:01	05:30	05:28	05:50	06:22	06:54	06:28	07:05	07:27
	17:11		19:22	19:55	20:26	20:39	20:23	19:40	18:47	17:00	16:32	16:37
30	07:16		06:48	06:00	05:30	05:28	05:51	06:23	06:55	06:29	07:06	07:27
	17:12		19:23	19:57	20:26	20:39	20:22	19:39	18:46	16:59	16:31	16:38
31	07:15		06:47		05:29		05:52	06:24		06:30		07:28
	17:13		19:24		20:27		20:21	19:37		16:57		16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	345	296	286
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) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR11 - SR11

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June			July			August	September	October	November	December
1	07:28	07:14	06:37	06:45	05:58	05:29			05:29		05:52 (A06)	05:53	06:25	06:56	06:31	07:07
	16:40	17:15	17:50	19:25	19:58	20:28			20:39	34	06:26 (A06)	20:20	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43	05:57	05:28		05:56 (A06)	05:29		05:52 (A06)	05:54	06:26	06:57	06:33	07:08
	16:41	17:16	17:51	19:26	19:59	20:29	9	06:05 (A06)	20:39	33	06:25 (A06)	20:18	19:34	18:42	16:55	16:31
3	07:28	07:12	06:34	06:42	05:56	05:28		05:52 (A06)	05:30		05:53 (A06)	05:55	06:27	06:58	06:34	07:09
	16:42	17:17	17:52	19:27	20:00	20:30	17	06:09 (A06)	20:39	32	06:25 (A06)	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32	06:40	05:54	05:27		05:49 (A06)	05:30		05:53 (A06)	05:56	06:28	06:59	06:35	07:10
	16:42	17:19	17:53	19:28	20:01	20:30	22	06:11 (A06)	20:39	31	06:24 (A06)	20:16	19:30	18:39	16:52	16:30
5	07:28	07:10	06:31	06:38	05:53	05:27		05:49 (A06)	05:31		05:54 (A06)	05:57	06:29	07:01	06:36	07:11
	16:43	17:20	17:54	19:29	20:02	20:31	25	06:14 (A06)	20:38	29	06:23 (A06)	20:15	19:29	18:37	16:51	16:30
6	07:28	07:09	06:29	06:37	05:52	05:27		05:49 (A06)	05:32		05:55 (A06)	05:58	06:30	07:02	06:38	07:12
	16:44	17:21	17:56	19:30	20:03	20:32	27	06:16 (A06)	20:38	28	06:23 (A06)	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35	05:51	05:26		05:48 (A06)	05:32		05:55 (A06)	05:59	06:31	07:03	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32	28	06:16 (A06)	20:38	26	06:21 (A06)	20:12	19:25	18:34	16:49	16:30
8	07:28	07:06	06:26	06:33	05:49	05:26		05:48 (A06)	05:33		05:56 (A06)	06:00	06:32	07:04	06:40	07:14
	16:46	17:24	17:58	19:33	20:05	20:33	30	06:18 (A06)	20:38	23	06:19 (A06)	20:11	19:24	18:32	16:48	16:30
9	07:28	07:05	06:24	06:32	05:48	05:26		05:48 (A06)	05:34		05:58 (A06)	06:02	06:33	07:05	06:41	07:15
	16:47	17:25	17:59	19:34	20:06	20:34	31	06:19 (A06)	20:37	20	06:18 (A06)	20:10	19:22	18:30	16:47	16:30
10	07:27	07:04	06:22	06:30	05:47	05:26		05:48 (A06)	05:34		06:01 (A06)	06:03	06:34	07:06	06:42	07:16
	16:48	17:26	18:00	19:35	20:07	20:34	33	06:21 (A06)	20:37	13	06:14 (A06)	20:09	19:20	18:29	16:46	16:30
11	07:27	07:03	06:21	06:28	05:46	05:25		05:48 (A06)	05:35			06:04	06:35	07:07	06:44	07:17
	16:49	17:28	18:01	19:36	20:08	20:35	34	06:22 (A06)	20:36			20:07	19:19	18:27	16:45	16:30
12	07:27	07:01	06:19	06:27	05:45	05:25		05:48 (A06)	05:36			06:05	06:36	07:08	06:45	07:18
	16:51	17:29	18:03	19:37	20:09	20:35	35	06:23 (A06)	20:36			20:06	19:17	18:25	16:44	16:30
13	07:27	07:00	06:17	06:25	05:44	05:25		05:48 (A06)	05:36			06:06	06:38	07:09	06:46	07:18
	16:52	17:30	18:04	19:38	20:11	20:36	35	06:23 (A06)	20:35			20:05	19:15	18:24	16:43	16:30
14	07:26	06:59	06:16	06:24	05:43	05:25		05:48 (A06)	05:37			06:07	06:39	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:12	20:36	36	06:24 (A06)	20:35			20:03	19:13	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22	05:42	05:25		05:48 (A06)	05:38			06:08	06:40	07:12	06:49	07:20
	16:54	17:33	18:06	19:40	20:13	20:37	37	06:25 (A06)	20:34			20:02	19:12	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20	05:41	05:25		05:48 (A06)	05:39			06:09	06:41	07:13	06:50	07:21
	16:55	17:34	18:07	19:41	20:14	20:37	37	06:25 (A06)	20:34			20:00	19:10	18:19	16:40	16:31
17	07:25	06:55	06:11	06:19	05:40	05:25		05:48 (A06)	05:40			06:10	06:42	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:15	20:37	38	06:26 (A06)	20:33			19:59	19:08	18:18	16:39	16:31
18	07:24	06:53	06:09	06:17	05:39	05:25		05:48 (A06)	05:40			06:11	06:43	07:15	06:52	07:22
	16:57	17:36	18:09	19:44	20:16	20:38	38	06:26 (A06)	20:32			19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:16	05:38	05:25		05:48 (A06)	05:41			06:12	06:44	07:16	06:53	07:23
	16:59	17:38	18:10	19:45	20:17	20:38	38	06:26 (A06)	20:32			19:56	19:05	18:14	16:38	16:32
20	07:23	06:50	06:06	06:14	05:37	05:25		05:48 (A06)	05:42			06:13	06:45	07:17	06:55	07:23
	17:00	17:39	18:12	19:46	20:18	20:38	38	06:26 (A06)	20:31			19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:13	05:36	05:26		05:48 (A06)	05:43			06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:18	20:39	38	06:26 (A06)	20:30			19:53	19:01	18:11	16:36	16:32
22	07:22	06:48	06:02	06:11	05:35	05:26		05:49 (A06)	05:44			06:15	06:47	07:20	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39	38	06:27 (A06)	20:29			19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:10	05:34	05:26		05:49 (A06)	05:45			06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	20:39	38	06:27 (A06)	20:28			19:50	18:58	18:09	16:35	16:33
24	07:21	06:45	05:59	06:08	05:34	05:26		05:49 (A06)	05:46			06:17	06:49	07:22	06:59	07:25
	17:05	17:44	18:16	19:50	20:21	20:39	38	06:27 (A06)	20:28			19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:07	05:33	05:27		05:49 (A06)	05:47			06:18	06:50	06:23	07:01	07:26
	17:06	17:45	18:17	19:51	20:22	20:39	38	06:27 (A06)	20:27			19:47	18:54	17:06	16:34	16:35
26	07:19	06:42	05:55	06:05	05:32	05:27		05:50 (A06)	05:48			06:19	06:51	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	20:39	37	06:27 (A06)	20:26			19:45	18:52	17:04	16:33	16:35
27	07:18	06:40	05:54	06:04	05:32	05:27		05:50 (A06)	05:49			06:20	06:52	06:25	07:03	07:27
	17:08	17:47	18:19	19:53	20:24	20:39	37	06:27 (A06)	20:25			19:44	18:51	17:03	16:33	16:36
28	07:17	06:39	05:52	06:02	05:31	05:28		05:51 (A06)	05:50			06:21	06:53	06:27	07:04	07:27
	17:10	17:49	18:20	19:54	20:25	20:39	36	06:27 (A06)	20:24			19:42	18:49	17:01	16:32	16:37
29	07:17		06:50	06:01	05:30	05:28		05:51 (A06)	05:51			06:22	06:54	06:28	07:05	07:27
	17:11		19:22	19:56	20:26	20:39	36	06:27 (A06)	20:23			19:40	18:47	17:00	16:32	16:37
30	07:16		06:48	06:00	05:30	05:28		05:51 (A06)	05:51			06:23	06:55	06:29	07:06	07:27
	17:12		19:23	19:57	20:26	20:39	35	06:26 (A06)	20:22			19:39	18:46	16:59	16:31	16:38
31	07:15		06:47		05:29				05:52			06:24		06:30		07:28
	17:13		19:24		20:27				20:21			19:37		16:57		16:39
Potential sun hours	295	296	369	400	450	455			461			429	375	345	296	286
Total, worst case							959			269						
Sun reduction							0,54			0,61						
Oper. time red.							0,81			0,81						
Wind dir. red.							0,62			0,62						
Total reduction							0,27			0,31						
Total, real							262			82						

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR12 - SR12

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January			February			March			April			May	June
1	07:28			07:14			15:54 (A08)	06:37		07:01 (A10)	06:45		07:04 (A11)	05:58	05:28
	16:40			17:15	47		16:41 (A08)	17:50	12	17:28 (A07)	19:25	13	07:17 (A11)	19:58	20:28
2	07:28			07:13			15:54 (A08)	06:35		06:54 (A10)	06:43		07:02 (A11)	05:57	05:28
	16:41			17:16	48		16:42 (A08)	17:51	28	17:29 (A07)	19:26	15	07:17 (A11)	19:59	20:29
3	07:28			07:12			15:54 (A08)	06:34		06:53 (A10)	06:42		07:00 (A11)	05:56	05:28
	16:41			17:17	49		16:43 (A08)	17:52	36	17:31 (A07)	19:27	16	07:16 (A11)	20:00	20:29
4	07:28			07:11			15:53 (A08)	06:32		06:51 (A10)	06:40		06:59 (A11)	05:54	05:27
	16:42			17:18	50		16:43 (A08)	17:53	41	17:31 (A07)	19:28	17	07:16 (A11)	20:01	20:30
5	07:28			07:10			15:53 (A08)	06:30		06:50 (A10)	06:38		06:57 (A11)	05:53	05:27
	16:43			17:20	51		16:44 (A08)	17:54	46	17:33 (A07)	19:29	18	07:15 (A11)	20:02	20:31
6	07:28			07:08			15:52 (A08)	06:29		06:48 (A10)	06:37		06:55 (A11)	05:52	05:26
	16:44			17:21	51		16:43 (A08)	17:56	52	17:34 (A07)	19:30	19	07:14 (A11)	20:03	20:32
7	07:28			07:07			15:53 (A08)	06:27		06:46 (A10)	06:35		06:55 (A11)	05:50	05:26
	16:45			17:22	51		16:44 (A08)	17:57	56	17:35 (A07)	19:31	18	07:13 (A11)	20:04	20:32
8	07:28			07:06			15:53 (A08)	06:26		06:45 (A10)	06:33		06:56 (A11)	05:49	05:26
	16:46			17:24	51		16:44 (A08)	17:58	61	17:37 (A07)	19:32	15	07:11 (A11)	20:05	20:33
9	07:28			07:05			15:53 (A08)	06:24		06:43 (A10)	06:32		06:57 (A11)	05:48	05:26
	16:47			17:25	52		16:45 (A08)	17:59	64	17:38 (A07)	19:34	12	07:09 (A11)	20:06	20:33
10	07:27			07:04			15:54 (A08)	06:22		06:41 (A10)	06:30		07:02 (A11)	05:47	05:25
	16:48			17:26	51		16:45 (A08)	18:00	66	17:37 (A07)	19:35	2	07:04 (A11)	20:07	20:34
11	07:27			07:02			15:53 (A08)	06:21		06:40 (A10)	06:28			05:46	05:25
	16:49			17:27	51		16:44 (A08)	18:01	67	17:37 (A07)	19:36			20:08	20:35
12	07:27			07:01			15:54 (A08)	06:19		06:38 (A10)	06:27			05:45	05:25
	16:50			17:29	50		16:44 (A08)	18:02	66	17:35 (A07)	19:37			20:09	20:35
13	07:27			07:00			15:54 (A08)	06:17		06:37 (A10)	06:25			05:44	05:25
	16:51			17:30	50		16:44 (A08)	18:04	65	17:33 (A07)	19:38			20:10	20:36
14	07:26			06:59			15:54 (A08)	06:16		06:37 (A10)	06:23			05:43	05:25
	16:53			17:31	49		16:43 (A08)	18:05	61	17:31 (A07)	19:39			20:11	20:36
15	07:26			06:57			15:55 (A08)	06:14		06:37 (A10)	06:22			05:42	05:25
	16:54			17:32	48		16:43 (A08)	18:06	57	17:29 (A07)	19:40			20:12	20:36
16	07:25			06:56			15:56 (A08)	06:12		06:36 (A10)	06:20			05:40	05:25
	16:55			17:34	47		16:43 (A08)	18:07	47	07:23 (A10)	19:41			20:13	20:37
17	07:25		16:11 (A08)	06:55			15:56 (A08)	06:11		06:36 (A10)	06:19			05:40	05:25
	16:56	5	16:16 (A08)	17:35	46		16:42 (A08)	18:08	47	07:23 (A10)	19:42			20:14	20:37
18	07:24		16:07 (A08)	06:53			15:57 (A08)	06:09		06:36 (A10)	06:17			05:39	05:25
	16:57	14	16:21 (A08)	17:36	45		16:42 (A08)	18:09	47	07:23 (A10)	19:43			20:15	20:38
19	07:24		16:05 (A08)	06:52			15:57 (A08)	06:07		06:36 (A10)	06:16			05:38	05:25
	16:58	19	16:24 (A08)	17:37	43		16:40 (A08)	18:10	46	07:22 (A10)	19:45			20:16	20:38
20	07:23		16:03 (A08)	06:50			15:59 (A08)	06:05		06:36 (A10)	06:14			05:37	05:25
	17:00	23	16:26 (A08)	17:39	41		16:40 (A08)	18:11	45	07:21 (A10)	19:46			20:17	20:38
21	07:23		16:02 (A08)	06:49			16:00 (A08)	06:04		06:36 (A10)	06:13			05:36	05:25
	17:01	26	16:28 (A08)	17:40	38		16:38 (A08)	18:13	44	07:20 (A10)	19:47			20:18	20:38
22	07:22		16:01 (A08)	06:47			16:01 (A08)	06:02		06:37 (A10)	06:11			05:35	05:26
	17:02	29	16:30 (A08)	17:41	36		16:37 (A08)	18:14	43	07:20 (A10)	19:48			20:19	20:39
23	07:21		15:59 (A08)	06:46			16:03 (A08)	06:00		06:37 (A10)	06:10			05:34	05:26
	17:03	32	16:31 (A08)	17:42	32		16:35 (A08)	18:15	41	07:18 (A10)	19:49			20:20	20:39
24	07:21		15:58 (A08)	06:45			16:05 (A08)	05:59		06:37 (A10)	06:08			05:33	05:26
	17:04	35	16:33 (A08)	17:44	28		16:33 (A08)	18:16	40	07:17 (A10)	19:50			20:21	20:39
25	07:20		15:58 (A08)	06:43			16:07 (A08)	05:57		06:39 (A10)	06:07			05:33	05:26
	17:06	37	16:35 (A08)	17:45	23		16:30 (A08)	18:17	37	07:16 (A10)	19:51			20:22	20:39
26	07:19		15:57 (A08)	06:41			16:11 (A08)	05:55		06:39 (A10)	06:05			05:32	05:27
	17:07	39	16:36 (A08)	17:46	16		16:27 (A08)	18:18	35	07:14 (A10)	19:52			20:23	20:39
27	07:18		15:56 (A08)	06:40				05:53		06:12 (A11)	06:04			05:31	05:27
	17:08	41	16:37 (A08)	17:47				18:19	34	07:12 (A10)	19:53			20:24	20:39
28	07:17		15:56 (A08)	06:38				05:52		06:10 (A11)	06:02			05:31	05:27
	17:09	42	16:38 (A08)	17:48				18:20	33	07:09 (A10)	19:54			20:25	20:39
29	07:17		15:55 (A08)					06:50		07:09 (A11)	06:01			05:30	05:28
	17:11	44	16:39 (A08)					19:21	30	08:07 (A10)	19:55			20:26	20:39
30	07:16		15:55 (A08)					06:48		07:07 (A11)	06:00			05:30	05:28
	17:12	45	16:40 (A08)					19:23	28	08:04 (A10)	19:57			20:26	20:39
31	07:15		15:54 (A08)					06:47		07:05 (A11)				05:29	
	17:13	46	16:40 (A08)					19:24	17	07:57 (A10)				20:27	
Potential sun hours	295			296			369			400			450	455	
Total, worst case		477			1144			1392			145				
Sun reduction		0,44			0,46			0,44			0,48				
Oper. time red.		0,81			0,81			0,81			0,81				
Wind dir. red.		0,63			0,63			0,64			0,65				
Total reduction		0,22			0,23			0,23			0,25				
Total, real		107			266			321			37				

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

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

SHADOW - Calendar

Calculation: GE.RTL01 **Shadow receptor:** SR12 - SR12

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

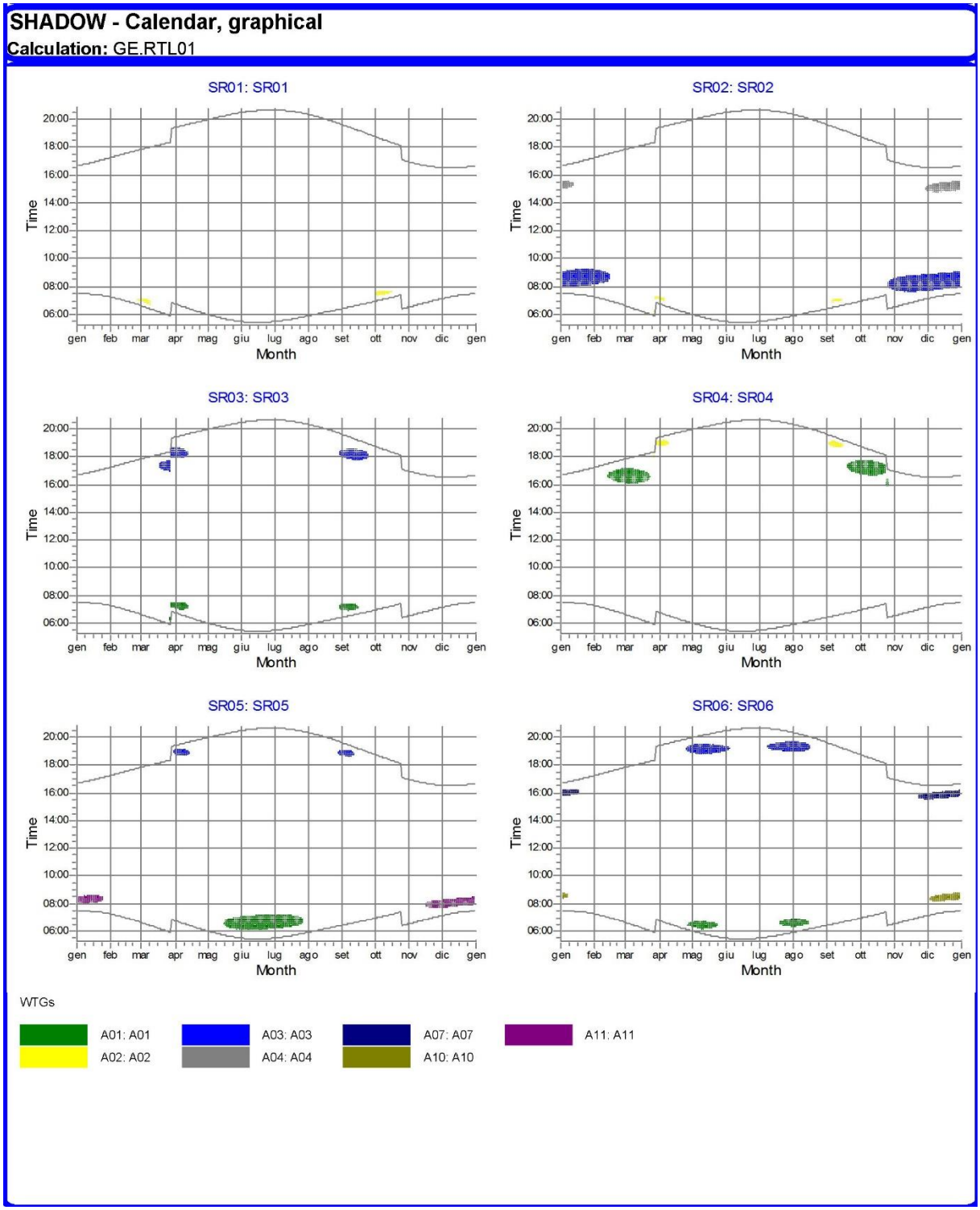
Idle start wind speed: Cut in wind speed from power curve

	July		August		September		October		November		December	
1	05:29		05:53		06:25		06:56		07:17 (A10)		06:31	15:22 (A08)	07:07
	20:39		20:19		19:35		18:44	65	18:13 (A07)	52	16:56	16:14 (A08)	16:31
2	05:29		05:54		06:26		07:00 (A11)		06:57		07:17 (A10)	06:33	15:23 (A08)	07:08
	20:39		20:18		19:34	2	07:02 (A11)		18:42	67	18:14 (A07)	16:55	16:14 (A08)	16:31
3	05:30		05:55		06:27		06:55 (A11)		06:58		07:19 (A10)	06:34	15:23 (A08)	07:09
	20:39		20:17		19:32	12	07:07 (A11)		18:40	66	18:15 (A07)	16:54	16:14 (A08)	16:30
4	05:30		05:56		06:28		06:53 (A11)		06:59		07:20 (A10)	06:35	15:22 (A08)	07:10
	20:39		20:16		19:30	15	07:08 (A11)		18:39	65	18:15 (A07)	16:52	16:14 (A08)	16:30
5	05:31		05:57		06:29		06:51 (A11)		07:00		07:21 (A10)	06:36	15:22 (A08)	07:11
	20:38		20:15		19:29	18	07:09 (A11)		18:37	62	18:14 (A07)	16:51	16:13 (A08)	16:30
6	05:32		05:58		06:30		06:51 (A11)		07:01		07:22 (A10)	06:37	15:23 (A08)	07:12
	20:38		20:14		19:27	19	07:10 (A11)		18:35	58	18:12 (A07)	16:50	16:14 (A08)	16:30
7	05:32		05:59		06:31		06:52 (A11)		07:03		07:23 (A10)	06:39	15:23 (A08)	07:13
	20:38		20:12		19:25	18	07:10 (A11)		18:34	55	18:11 (A07)	16:49	16:13 (A08)	16:30
8	05:33		06:00		06:32		06:53 (A11)		07:04		07:24 (A10)	06:40	15:23 (A08)	07:14
	20:37		20:11		19:24	18	07:11 (A11)		18:32	50	18:09 (A07)	16:48	16:12 (A08)	16:30
9	05:33		06:01		06:33		06:54 (A11)		07:05		07:25 (A10)	06:41	15:25 (A08)	07:15
	20:37		20:10		19:22	16	07:10 (A11)		18:30	45	18:07 (A07)	16:47	16:13 (A08)	16:30
10	05:34		06:02		06:34		06:55 (A11)		07:06		07:26 (A10)	06:42	15:25 (A08)	07:16
	20:37		20:09		19:20	15	07:10 (A11)		18:29	38	18:05 (A07)	16:46	16:12 (A08)	16:30
11	05:35		06:03		06:35		06:56 (A11)		07:07		07:27 (A10)	06:44	15:25 (A08)	07:17
	20:36		20:07		19:18	14	07:10 (A11)		18:27	32	18:03 (A07)	16:45	16:11 (A08)	16:30
12	05:36		06:04		06:36		06:57 (A11)		07:08		07:31 (A10)	06:45	15:27 (A08)	07:18
	20:36		20:06		19:17	12	07:09 (A11)		18:25	22	18:03 (A07)	16:44	16:12 (A08)	16:30
13	05:36		06:05		06:37		06:58 (A11)		07:09		17:56 (A07)	06:46	15:27 (A08)	07:18
	20:35		20:04		19:15	26	07:54 (A10)		18:24	5	18:01 (A07)	16:43	16:11 (A08)	16:30
14	05:37		06:07		06:38		06:59 (A11)		07:10			06:47	15:28 (A08)	07:19
	20:35		20:03		19:13	30	07:57 (A10)		18:22			16:42	16:10 (A08)	16:30
15	05:38		06:08		06:39		07:00 (A11)		07:11		16:46 (A08)	06:49	15:29 (A08)	07:20
	20:34		20:02		19:12	32	07:59 (A10)		18:21	10	16:56 (A08)	16:41	16:10 (A08)	16:30
16	05:39		06:09		06:40		07:01 (A11)		07:13		16:41 (A08)	06:50	15:30 (A08)	07:21
	20:33		20:00		19:10	33	08:01 (A10)		18:19	19	17:00 (A08)	16:40	16:09 (A08)	16:30
17	05:40		06:10		06:41		07:28 (A10)		07:14		16:38 (A08)	06:51	15:31 (A08)	07:21
	20:33		19:59		19:08	34	08:02 (A10)		18:17	26	17:04 (A08)	16:39	16:08 (A08)	16:31
18	05:40		06:11		06:43		07:26 (A10)		07:15		16:36 (A08)	06:52	15:32 (A08)	07:22
	20:32		19:57		19:06	37	08:03 (A10)		18:16	29	17:05 (A08)	16:38	16:07 (A08)	16:31
19	05:41		06:12		06:44		07:25 (A10)		07:16		16:34 (A08)	06:53	15:34 (A08)	07:23
	20:31		19:56		19:05	39	08:04 (A10)		18:14	33	17:07 (A08)	16:37	16:06 (A08)	16:31
20	05:42		06:13		06:45		07:23 (A10)		07:17		16:32 (A08)	06:55	15:36 (A08)	07:23
	20:31		19:54		19:03	41	08:04 (A10)		18:13	36	17:08 (A08)	16:37	16:05 (A08)	16:32
21	05:43		06:14		06:46		07:22 (A10)		07:18		16:30 (A08)	06:56	15:37 (A08)	07:24
	20:30		19:53		19:01	43	08:05 (A10)		18:11	39	17:09 (A08)	16:36	16:04 (A08)	16:32
22	05:44		06:15		06:47		07:21 (A10)		07:19		16:29 (A08)	06:57	15:40 (A08)	07:24
	20:29		19:51		18:59	44	08:05 (A10)		18:10	41	17:10 (A08)	16:35	16:03 (A08)	16:33
23	05:45		06:16		06:48		07:20 (A10)		07:21		16:28 (A08)	06:58	15:42 (A08)	07:25
	20:28		19:50		18:58	45	08:05 (A10)		18:08	43	17:11 (A08)	16:35	16:01 (A08)	16:33
24	05:46		06:17		06:49		07:19 (A10)		07:22		16:26 (A08)	06:59	15:44 (A08)	07:25
	20:27		19:48		18:56	46	08:05 (A10)		18:07	45	17:11 (A08)	16:34	15:58 (A08)	16:34
25	05:47		06:18		06:50		07:19 (A10)		06:23		15:25 (A08)	07:00	15:49 (A08)	07:26
	20:27		19:47		18:54	46	08:05 (A10)		17:05	47	16:12 (A08)	16:33	15:54 (A08)	16:34
26	05:47		06:19		06:51		07:18 (A10)		06:24		15:25 (A08)	07:02		07:26
	20:26		19:45		18:52	47	08:05 (A10)		17:04	48	16:13 (A08)	16:33		16:35
27	05:48		06:20		06:52		07:18 (A10)		06:25		15:24 (A08)	07:03		07:26
	20:25		19:43		18:51	47	08:05 (A10)		17:03	49	16:13 (A08)	16:32		16:36
28	05:49		06:21		06:53		07:17 (A10)		06:27		15:24 (A08)	07:04		07:27
	20:24		19:42		18:49	53	18:08 (A07)		17:01	49	16:13 (A08)	16:32		16:36
29	05:50		06:22		06:54		07:17 (A10)		06:28		15:23 (A08)	07:05		07:27
	20:23		19:40		18:47	60	18:11 (A07)		17:00	50	16:13 (A08)	16:32		16:37
30	05:51		06:23		06:55		07:17 (A10)		06:29		15:23 (A08)	07:06		07:27
	20:22		19:39		18:45	63	18:12 (A07)		16:59	51	16:14 (A08)	16:31		16:38
31	05:52		06:24				06:30				15:23 (A08)			07:27
	20:21		19:37				16:57	51	16:14 (A08)					16:39
Potential sun hours	461		429		375		344		296					285
Total, worst case						925		1296		980				
Sun reduction						0,58		0,44		0,41				
Oper. time red.						0,81		0,81		0,81				
Wind dir. red.						0,65		0,63		0,63				
Total reduction						0,30		0,22		0,21				
Total, real						281		291		202				

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)

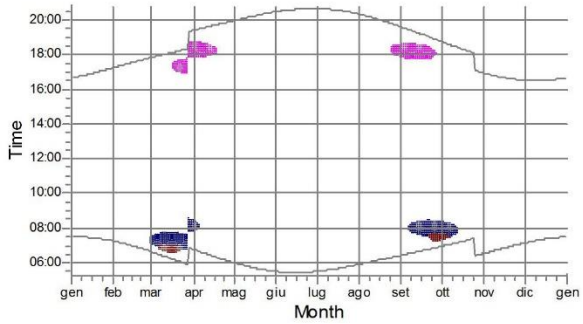
ALLEGATO 3: "CALENDAR GRAPHIC": SINTESI GRAFICA DEL "FLICKERING" SUI RECETTORI ANALIZZATI



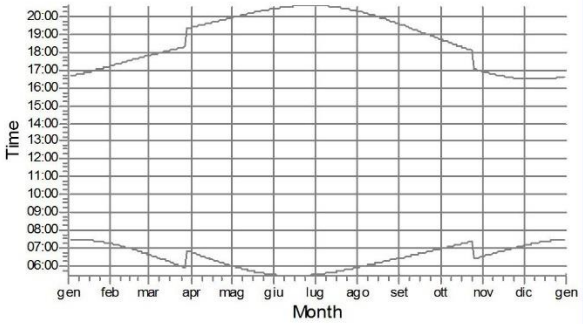
SHADOW - Calendar, graphical

Calculation: GE.RTL01

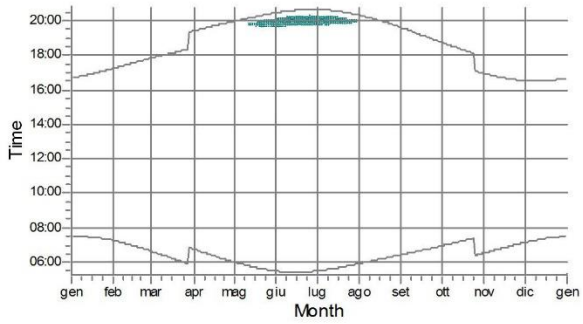
SR07: SR07



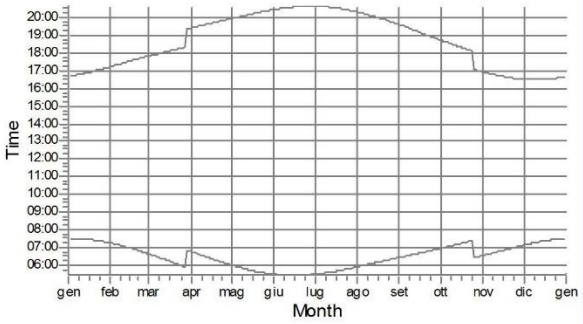
SR08: SR08



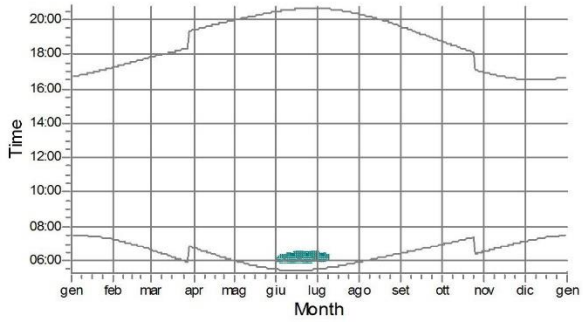
SR09: SR09



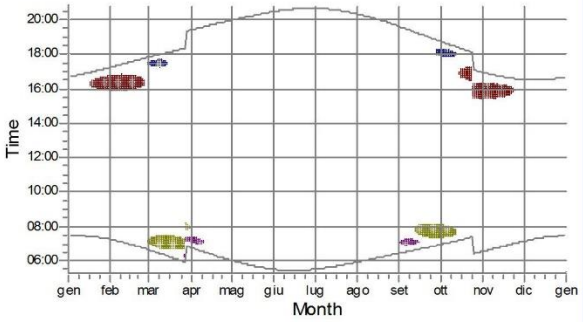
SR10: SR10



SR11: SR11



SR12: SR12



WTGs

A05: A05 | A06: A06 | A07: A07 | A08: A08 | A10: A10 | A11: A11

ALLEGATO 4:"CALENDAR WTG" DETTAGLIO ANALITICO E GRAFICO GIORNALIERO DELL'EFFETTO "FLICKERING" GENERATO DA OGNI TURBINA

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A01 - A01

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February		March		April		May		June	
1	07:28	07:14		06:37	16:06-17:02/56	06:45	07:04-07:25/21	05:58	06:18-06:34/16	05:28	06:06-06:58/52
	16:40	17:15		17:50		19:25		19:58		20:28	
2	07:28	07:13		06:35	16:05-17:02/57	06:43	07:02-07:25/23	05:57	06:16-06:34/18	05:28	06:06-06:59/53
	16:40	17:16		17:51		19:26		19:59		20:29	
3	07:28	07:12		06:34	16:05-17:03/58	06:42	07:00-07:25/25	05:55	06:15-06:35/20	05:27	06:05-06:59/54
	16:41	17:17		17:52		19:27		20:00		20:29	
4	07:28	07:11		06:32	16:04-17:02/58	06:40	06:59-07:25/26	05:54	06:14-06:36/22	05:27	06:05-07:00/55
	16:42	17:18		17:53		19:28		20:01		20:30	
5	07:28	07:09		06:30	16:04-17:02/58	06:38	06:57-07:25/28	05:53	06:13-06:37/24	05:27	06:05-07:01/56
	16:43	17:20		17:54		19:29		20:02		20:31	
6	07:28	07:08		06:29	16:04-17:02/58	06:36	06:57-07:24/27	05:52	06:12-06:37/25	05:26	06:04-07:01/57
	16:44	17:21		17:55		19:30		20:03		20:32	
7	07:28	07:07		06:27	16:04-17:02/58	06:35	06:57-07:24/27	05:50	06:10-06:36/26	05:26	06:05-07:01/56
	16:45	17:22		17:57		19:31		20:04		20:32	
8	07:28	07:06		06:26	16:05-17:02/57	06:33	06:57-07:23/26	05:49	06:09-06:36/27	05:26	06:05-07:02/57
	16:46	17:23		17:58		19:32		20:05		20:33	
9	07:28	07:05		06:24	16:04-17:01/57	06:32	06:57-07:21/24	05:48	06:08-06:37/29	05:26	06:05-07:02/57
	16:47	17:25		17:59		19:34		20:06		20:33	
10	07:27	07:04		06:22	16:04-17:00/56	06:30	06:59-07:21/22	05:47	06:07-06:37/30	05:25	06:05-07:03/58
	16:48	17:26		18:00		19:35		20:07		20:34	
11	07:27	07:02		06:21	16:05-17:00/55	06:28	06:59-07:19/20	05:46	06:07-06:36/29	05:25	06:05-07:03/58
	16:49	17:27		18:01		19:36		20:08		20:35	
12	07:27	07:01		06:19	16:05-16:59/54	06:27	07:00-07:16/16	05:45	06:08-06:36/28	05:25	06:04-07:03/59
	16:50	17:29		18:02		19:37		20:09		20:35	
13	07:26	07:00		06:17	16:06-16:58/52	06:25	07:03-07:14/11	05:44	06:08-06:36/28	05:25	06:04-07:03/59
	16:51	17:30		18:04		19:38		20:10		20:36	
14	07:26	06:59	16:32-16:38/6	06:16	16:06-16:57/51	06:23		05:42	06:08-06:36/28	05:25	06:05-07:04/59
	16:53	17:31		18:05		19:39		20:11		20:36	
15	07:26	06:57	16:26-16:45/19	06:14	16:07-16:56/49	06:22		05:41	06:09-06:35/26	05:25	06:05-07:04/59
	16:54	17:32		18:06		19:40		20:12		20:36	
16	07:25	06:56	16:23-16:48/25	06:12	16:08-16:55/47	06:20		05:40	06:09-06:35/26	05:25	06:05-07:04/59
	16:55	17:34		18:07		19:41		20:13		20:37	
17	07:25	06:55	16:19-16:50/31	06:11	16:09-16:53/44	06:19		05:39	06:10-06:35/25	05:25	06:06-07:05/59
	16:56	17:35		18:08		19:42		20:14	06:35-06:40/5	20:37	
18	07:24	06:53	16:18-16:53/35	06:09	16:11-16:52/41	06:17		05:38	06:10-06:34/24	05:25	06:06-07:05/59
	16:57	17:36		18:09		19:43		20:15	06:34-06:42/8	20:38	
19	07:24	06:52	16:15-16:54/39	06:07	16:12-16:50/38	06:16		05:38	06:11-06:33/22	05:25	06:06-07:06/60
	16:58	17:37		18:10		19:44		20:16	06:33-06:45/12	20:38	
20	07:23	06:50	16:14-16:56/42	06:05	16:13-16:48/35	06:14		05:37	06:13-06:33/20	05:25	06:06-07:06/60
	17:00	17:39		18:11		19:46		20:17	06:33-06:47/14	20:38	
21	07:23	06:49	16:12-16:57/45	06:04	16:15-16:45/30	06:12		05:36	06:14-06:32/18	05:25	06:06-07:06/60
	17:01	17:40		18:13		19:47		20:18	06:32-06:49/17	20:38	
22	07:22	06:47	16:11-16:58/47	06:02	16:18-16:43/25	06:11		05:35	06:12-06:30/18	05:26	06:06-07:06/60
	17:02	17:41		18:14		19:48		20:19	06:30-06:50/20	20:39	
23	07:21	06:46	16:10-16:59/49	06:00	16:21-16:39/18	06:09		05:34	06:11-06:28/17	05:26	06:07-07:07/60
	17:03	17:42		18:15		19:49		20:20	06:28-06:51/23	20:39	
24	07:21	06:44	16:09-17:00/51	05:59	16:29-16:30/1	06:08		05:33	06:11-06:26/15	05:26	06:07-07:07/60
	17:04	17:44		18:16		19:50		20:21	06:26-06:52/26	20:39	
25	07:20	06:43	16:08-17:00/52	05:57		06:07		05:33	06:10-06:53/43	05:26	06:07-07:06/59
	17:06	17:45		18:17		19:51		20:22		20:39	
26	07:19	06:41	16:08-17:02/54	05:55		06:05		05:32	06:09-06:54/45	05:27	06:08-07:07/59
	17:07	17:46		18:18		19:52		20:23		20:39	
27	07:18	06:40	16:07-17:02/55	05:53	06:12-06:16/4	06:04	06:23-06:24/1	05:31	06:08-06:55/47	05:27	06:08-07:07/59
	17:08	17:47		18:19		19:53		20:24		20:39	
28	07:17	06:38	16:07-17:03/56	05:52	06:10-06:20/10	06:02	06:22-06:30/8	05:31	06:07-06:56/49	05:27	06:08-07:07/59
	17:09	17:48		18:20		19:54		20:25		20:39	
29	07:16			06:50	07:09-07:22/13	06:01	06:20-06:31/11	05:30	06:08-06:57/49	05:28	06:08-07:07/59
	17:11			19:21		19:55		20:26		20:39	
30	07:16			06:48	07:07-07:23/16	05:59	06:19-06:33/14	05:29	06:07-06:57/50	05:28	06:08-07:07/59
	17:12			19:23		19:57		20:26		20:39	
31	07:15			06:47	07:05-07:24/19			05:29	06:07-06:58/51		
	17:13			19:24				20:27			
Potential sun hours	295	296		369		400		450		455	
Sum of minutes with flicker	0	606		1175		330		1020		1740	

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

Calculation: GE.RTL01**WTG:** A01 - A01

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:29 06:09-07:08/59 20:39	05:53 06:18-06:47/29 20:19	06:25 06:58-07:18/20 19:35	06:56 16:44-17:38/54 18:44	06:31 16:56	07:07 16:31
2	05:29 06:09-07:07/58 20:39	05:54 06:18-06:47/29 20:18	06:26 06:57-07:19/22 19:34	06:57 16:43-17:38/55 18:42	06:33 16:55	07:08 16:30
3	05:30 06:10-07:08/58 20:39	05:55 06:18-06:47/29 20:17	06:27 06:55-07:19/24 19:32	06:58 16:43-17:39/56 18:40	06:34 16:53	07:09 16:30
4	05:30 06:10-07:07/57 20:39	05:56 06:19-06:47/28 20:16	06:28 06:54-07:20/26 19:30	06:59 16:42-17:39/57 18:39	06:35 16:52	07:10 16:30
5	05:31 06:11-07:07/56 20:38	05:57 06:20-06:47/27 20:15	06:29 06:53-07:20/27 19:29	07:00 16:41-17:39/58 18:37	06:36 16:51	07:11 16:30
6	05:31 06:11-07:07/56 20:38	05:58 06:21-06:47/26 20:14	06:30 06:53-07:20/27 19:27	07:01 16:41-17:38/57 18:35	06:37 16:50	07:12 16:30
7	05:32 06:11-07:07/56 20:38	05:59 06:22-06:47/25 20:12	06:31 06:52-07:20/28 19:25	07:03 16:40-17:38/58 18:34	06:39 16:49	07:13 16:30
8	05:33 06:12-07:07/55 20:37	06:00 06:22-06:45/23 20:11	06:32 06:53-07:19/26 19:24	07:04 16:40-17:38/58 18:32	06:40 16:48	07:14 16:29
9	05:33 06:12-07:07/55 20:37	06:01 06:23-06:44/21 20:10	06:33 06:54-07:19/25 19:22	07:05 16:39-17:37/58 18:30	06:41 16:47	07:15 16:29
10	05:34 06:13-07:07/54 20:37	06:02 06:24-06:44/20 20:08	06:34 06:55-07:18/23 19:20	07:06 16:39-17:37/58 18:29	06:42 16:45	07:16 16:29
11	05:35 06:14-07:07/53 20:36	06:03 06:25-06:43/18 20:07	06:35 06:56-07:17/21 19:18	07:07 16:38-17:36/58 18:27	06:44 16:44	07:17 16:30
12	05:35 06:14-07:06/52 20:36	06:04 06:26-06:42/16 20:06	06:36 06:57-07:16/19 19:17	07:08 16:39-17:36/57 18:25	06:45 16:43	07:18 16:30
13	05:36 06:15-07:06/51 20:35	06:05 06:27-06:40/13 20:04	06:37 06:58-07:15/17 19:15	07:09 16:39-17:36/57 18:24	06:46 16:42	07:18 16:30
14	05:37 06:16-07:05/49 20:35	06:06 06:28-06:38/10 20:03	06:38 06:59-07:13/14 19:13	07:10 16:39-17:35/56 18:22	06:47 16:42	07:19 16:30
15	05:38 06:17-07:05/48 20:34	06:07 06:29-06:36/7 20:02	06:39 07:00-07:10/10 19:11	07:11 16:39-17:34/55 18:21	06:48 16:41	07:20 16:30
16	05:39 06:17-07:05/48 20:33	06:09 20:00	06:40 07:01-07:07/6 19:10	07:13 16:39-17:33/54 18:19	06:50 16:40	07:21 16:30
17	05:39 06:18-07:03/45 20:33	06:10 19:59	06:41 19:08	07:14 16:40-17:32/52 18:17	06:51 16:39	07:21 16:31
18	05:40 06:19-07:03/44 20:32	06:11 19:57	06:42 19:06	07:15 16:41-17:31/50 18:16	06:52 16:38	07:22 16:31
19	05:41 06:20-07:02/42 20:31	06:12 19:56	06:43 19:04	07:16 16:42-17:30/48 18:14	06:53 16:37	07:23 16:31
20	05:42 06:21-06:37/16 20:31 06:37-07:02/25	06:13 19:54	06:45 17:09-17:24/15 19:03	07:17 16:42-17:29/47 18:13	06:55 16:37	07:23 16:32
21	05:43 06:22-06:40/18 20:30 06:40-07:01/21	06:14 19:53	06:46 17:04-17:28/24 19:01	07:18 16:43-17:27/44 18:11	06:56 16:36	07:24 16:32
22	05:44 06:24-06:41/17 20:29 06:41-07:00/19	06:15 19:51	06:47 17:01-17:30/29 18:59	07:19 16:45-17:26/41 18:10	06:57 16:35	07:24 16:33
23	05:45 06:23-06:42/19 20:28 06:42-06:58/16	06:16 19:50	06:48 16:58-17:32/34 18:58	07:21 16:46-17:24/38 18:08	06:58 16:35	07:25 16:33
24	05:46 06:22-06:43/21 20:27 06:43-06:56/13	06:17 19:48	06:49 16:56-17:33/37 18:56	07:22 16:48-17:22/34 18:07	06:59 16:34	07:25 16:34
25	05:46 06:21-06:44/23 20:26 06:44-06:54/10	06:18 19:47	06:50 16:54-17:34/40 18:54	06:23 15:50-16:19/29 17:05	07:00 16:33	07:26 16:34
26	05:47 06:20-06:45/25 20:26 06:45-06:52/7	06:19 19:45	06:51 16:52-17:35/43 18:52	06:24 15:53-16:17/24 17:04	07:02 16:33	07:26 16:35
27	05:48 06:20-06:46/26 20:25 06:46-06:49/3	06:20 19:43	06:52 16:50-17:36/46 18:51	06:25 15:57-16:13/16 17:03	07:03 16:32	07:26 16:36
28	05:49 06:19-06:45/26 20:24	06:21 19:42	06:53 16:48-17:37/49 18:49	06:27 17:01	07:04 16:32	07:27 16:36
29	05:50 06:19-06:46/27 20:23	06:22 19:40	06:54 16:47-17:37/50 18:47	06:28 17:00	07:05 16:31	07:27 16:37
30	05:51 06:19-06:46/27 20:22	06:23 07:03-07:14/11 19:39	06:55 16:46-17:37/51 18:45	06:29 16:59	07:06 16:31	07:27 16:38
31	05:52 06:18-06:47/29 20:21	06:24 07:00-07:16/16 19:37		06:30 16:57		07:27 16:39
Potential sun hours	461	429	375	344	296	285
Sum of minutes with flicker	1384	348	753	1329	0	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A02 - A02

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28	07:14	06:37 06:56-07:03/7	06:45 07:04-07:11/7	05:58	05:28	05:29	05:53	06:25	06:56	06:31	07:07
	16:40	17:15	17:50	19:25 18:49-19:04/15	19:58	20:28	20:39	20:19	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35 06:55-07:04/9	06:43 07:02-07:09/7	05:57	05:28	05:29	05:54	06:26	06:57	06:33	07:08
	16:40	17:16	17:51	19:26 18:48-19:04/16	19:59	20:29	20:39	20:18	19:34	18:42	16:55	16:30
3	07:28	07:12	06:34 06:53-07:03/10	06:42 07:00-07:08/8	05:55	05:28	05:30	05:55	06:27 18:51-18:57/6	06:58 07:21-07:30/9	06:34	07:09
	16:41	17:17	17:52	19:27 18:47-19:05/18	20:00	20:30	20:39	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32 06:51-07:02/11	06:40 06:59-07:07/8	05:54	05:27	05:30	05:56	06:28 18:48-19:00/12	06:59 07:20-07:33/13	06:35	07:10
	16:42	17:18	17:53	19:28 18:47-19:06/19	20:01	20:30	20:39	20:16	19:30	18:39	16:52	16:30
5	07:28	07:10	06:30 06:50-07:02/12	06:38 06:57-07:05/8	05:53	05:27	05:31	05:57	06:29 18:46-19:01/15	07:00 07:21-07:34/13	06:36	07:11
	16:43	17:20	17:54	19:29 18:48-19:07/19	20:02	20:31	20:38	20:15	19:29	18:37	16:51	16:30
6	07:28	07:08	06:29 06:48-07:01/13	06:37 06:55-07:02/7	05:52	05:26	05:31	05:58	06:30 06:51-06:58/7	07:02 07:22-07:35/13	06:38	07:12
	16:44	17:21	17:56	19:30 18:48-19:06/18	20:03	20:32	20:38	20:14	19:27 18:44-19:02/18	18:35	16:50	16:30
7	07:28	07:07	06:27 06:46-06:59/13	06:35 18:48-19:04/16	05:50	05:26	05:32	05:59	06:31 06:52-07:00/8	07:03 07:23-07:36/13	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32	20:38	20:12	19:25 18:43-19:02/19	18:34	16:49	16:30
8	07:28	07:06	06:26 06:45-06:58/13	06:33 18:50-19:03/13	05:49	05:26	05:33	06:00	06:32 06:53-07:01/8	07:04 07:24-07:36/12	06:40	07:14
	16:46	17:24	17:58	19:32	20:05	20:33	20:37	20:11	19:24 18:42-19:01/19	18:32	16:48	16:30
9	07:28	07:05	06:24 06:43-06:56/13	06:32 18:53-18:59/6	05:48	05:26	05:33	06:01	06:33 06:54-07:02/8	07:05 07:25-07:36/11	06:41	07:15
	16:47	17:25	17:59	19:34	20:06	20:33	20:37	20:10	19:22 18:41-18:59/18	18:30	16:47	16:29
10	07:27	07:04	06:22 06:41-06:53/12	06:30	05:47	05:25	05:34	06:02	06:34 06:55-07:02/7	07:06 07:26-07:36/10	06:42	07:16
	16:48	17:26	18:00	19:35	20:07	20:34	20:37	20:09	19:20 18:41-18:58/17	18:29	16:46	16:29
11	07:27	07:03	06:21	06:28	05:46	05:25	05:35	06:03	06:35 06:56-07:03/7	07:07 07:28-07:37/9	06:44	07:17
	16:49	17:27	18:01	19:36	20:08	20:35	20:36	20:07	19:18 18:41-18:56/15	18:27	16:44	16:30
12	07:27	07:01	06:19	06:27	05:45	05:25	05:36	06:04	06:36 06:57-07:03/6	07:08 07:29-07:37/8	06:45	07:18
	16:50	17:29	18:02	19:37	20:09	20:35	20:36	20:06	19:17 18:41-18:54/13	18:25	16:43	16:30
13	07:27	07:00	06:17	06:25	05:44	05:25	05:36	06:05	06:37 06:58-07:03/5	07:09 07:30-07:36/6	06:46	07:18
	16:51	17:30	18:04	19:38	20:10	20:36	20:35	20:05	19:15 18:41-18:53/12	18:24	16:43	16:30
14	07:26	06:59	06:16	06:23	05:43	05:25	05:37	06:06	06:38 06:59-07:02/3	07:10 07:31-07:36/5	06:47	07:19
	16:53	17:31	18:05	19:39	20:11	20:36	20:35	20:03	19:13 18:42-18:51/9	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22	05:41	05:25	05:38	06:08	06:39 07:00-07:02/2	07:11 07:32-07:35/3	06:49	07:20
	16:54	17:32	18:06	19:40	20:13	20:37	20:34	20:02	19:12 18:43-18:49/6	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20	05:40	05:25	05:39	06:09	06:40 18:45-18:47/2	07:13 07:33-07:34/1	06:50	07:21
	16:55	17:34	18:07	19:41	20:14	20:37	20:34	20:00	19:10	18:19	16:40	16:30
17	07:25	06:55	06:11	06:19	05:39	05:25	05:39	06:10	06:41	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:15	20:37	20:33	19:59	19:08	18:17	16:39	16:31
18	07:24	06:53	06:09	06:17	05:39	05:25	05:40	06:11	06:43	07:15	06:52	07:22
	16:57	17:36	18:09	19:43	20:16	20:38	20:32	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:16	05:38	05:25	05:41	06:12	06:44	07:16	06:53	07:23
	16:58	17:37	18:10	19:45	20:16	20:38	20:31	19:56	19:05	18:14	16:37	16:31
20	07:23	06:50	06:05	06:14	05:37	05:25	05:42	06:13	06:45	07:17	06:55	07:23
	17:00	17:39	18:12	19:46	20:17	20:38	20:31	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:13	05:36	05:25	05:43	06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:18	20:38	20:30	19:53	19:01	18:11	16:36	16:32
22	07:22	06:47	06:02	06:11	05:35	05:26	05:44	06:15	06:47	07:19	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39	20:29	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:09	05:34	05:26	05:45	06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	20:39	20:28	19:50	18:58	18:08	16:35	16:33
24	07:21	06:45	05:59	06:08	05:33	05:26	05:46	06:17	06:49	07:22	06:59	07:25
	17:04	17:44	18:16	19:50	20:21	20:39	20:27	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:07	05:33	05:26	05:47	06:18	06:50	06:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20:39	20:27	19:47	18:54	17:05	16:33	16:34
26	07:19	06:41 07:01-07:03/2	05:55	06:05	05:32	05:27	05:47	06:19	06:51	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	20:39	20:26	19:45	18:52	17:04	16:33	16:35
27	07:18	06:40 06:59-07:03/4	05:53 17:56-17:58/2	06:04	05:31	05:27	05:48	06:20	06:52	06:25	07:03	07:26
	17:08	17:47	18:19	19:53	20:24	20:39	20:25	19:44	18:51	17:03	16:32	16:36
28	07:17	06:38 06:58-07:03/5	05:52 06:11-06:12/1	06:02	05:31	05:27	05:49	06:21	06:53	06:27	07:04	07:27
	17:09	17:48	18:20 17:53-17:59/6	19:54	20:25	20:39	20:24	19:42	18:49	17:01	16:32	16:36
29	07:17		06:50 07:09-07:12/3	06:01	05:30	05:28	05:50	06:22	06:54	06:28	07:05	07:27
	17:11		19:21 18:52-19:00/8	19:55	20:26	20:39	20:23	19:40	18:47	17:00	16:32	16:37
30	07:16		06:48 07:07-07:11/4	05:59	05:29	05:28	05:51	06:23	06:55	06:29	07:06	07:27
	17:12		19:23 18:50-19:01/11	19:57	20:26	20:39	20:22	19:39	18:45	16:59	16:31	16:38
31	07:15		06:47 07:05-07:11/6		05:29		05:52	06:24		06:30		07:28
	17:13		19:24 18:49-19:02/13		20:27		20:21	19:37		16:57		16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	344	296	285
Sum of minutes with flicker	0	11	167	185	0	0	0	0	242	126	0	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A03 - A03

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January		February		March		April		May		June	
1	07:28	07:56-09:00/64	07:14	08:07-09:08/61	06:37		06:45	17:55-18:36/41	05:58	18:53-19:22/29	05:29	19:00-19:15/15
	16:40		17:15		17:50		19:25	18:47-18:59/12	19:58		20:28	
2	07:28	07:57-09:01/64	07:13	08:08-09:07/59	06:35		06:43	17:55-18:35/40	05:57	18:51-19:22/31	05:28	19:02-19:15/13
	16:41		17:16		17:51		19:26	18:45-19:01/16	19:59		20:29	
3	07:28	07:57-09:01/64	07:12	08:09-09:07/58	06:34		06:42	17:55-18:34/39	05:56	18:50-19:23/33	05:28	19:03-19:12/9
	16:41		17:17		17:52		19:27	18:43-19:01/18	20:00		20:30	
4	07:28	07:57-09:02/65	07:11	08:10-09:06/56	06:32		06:40	17:56-18:34/38	05:54	18:50-19:24/34	05:27	19:07-19:10/3
	16:42		17:18		17:53		19:28	18:42-19:02/20	20:01		20:30	
5	07:28	07:58-09:02/64	07:10	08:11-09:06/55	06:31		06:38	17:56-18:33/37	05:53	18:49-19:24/35	05:27	
	16:43		17:20		17:54		19:29	18:41-19:02/21	20:02		20:31	
6	07:28	07:57-09:02/65	07:08	08:12-09:05/53	06:29		06:37	17:56-18:32/36	05:52	18:49-19:25/36	05:26	
	16:44		17:21		17:56		19:30	18:40-19:02/22	20:03		20:32	
7	07:28	07:58-09:03/65	07:07	08:12-09:03/51	06:27		06:35	17:57-18:31/34	05:50	18:48-19:24/36	05:26	
	16:45		17:22		17:57		19:31	18:40-19:03/23	20:04		20:32	
8	07:28	07:58-09:04/66	07:06	08:14-09:02/48	06:26		06:33	17:58-18:29/31	05:49	18:48-19:25/37	05:26	
	16:46		17:24		17:58		19:33	18:40-19:02/22	20:05		20:33	
9	07:28	07:59-09:04/65	07:05	08:15-09:01/46	06:24		06:32	17:58-18:28/30	05:48	18:48-19:25/37	05:26	
	16:47		17:25		17:59		19:34	18:40-19:01/21	20:06		20:34	
10	07:27	07:59-09:05/66	07:04	08:17-09:00/43	06:22		06:30	18:00-18:26/26	05:47	18:47-19:25/38	05:25	
	16:48		17:26		18:00		19:35	18:40-19:01/21	20:07		20:34	
11	07:27	07:59-09:05/66	07:03	08:18-08:57/39	06:21		06:28	18:02-18:24/22	05:46	18:47-19:25/38	05:25	
	16:49		17:27		18:01		19:36	18:41-18:59/18	20:08		20:35	
12	07:27	07:59-09:06/67	07:01	08:20-08:55/35	06:19		06:27	18:04-18:20/16	05:45	18:48-19:25/37	05:25	
	16:50		17:29		18:03		19:37	18:41-18:57/16	20:09		20:35	
13	07:27	07:59-09:06/67	07:00	08:22-08:53/31	06:17		06:25	18:08-18:16/8	05:44	18:48-19:25/37	05:25	
	16:51		17:30		18:04		19:38	18:43-18:56/13	20:11		20:36	
14	07:26	08:00-09:07/67	06:59	08:25-08:50/25	06:16		06:23	18:45-18:53/8	05:43	18:48-19:25/37	05:25	
	16:53		17:31		18:05		19:39		20:12		20:36	
15	07:26	08:00-09:08/68	06:57	08:29-08:46/17	06:14		06:22		05:42	18:48-19:25/37	05:25	
	16:54		17:32		18:06		19:40		20:13		20:37	
16	07:25	08:00-09:08/68	06:56		06:12		06:20		05:41	18:48-19:25/37	05:25	
	16:55		17:34		18:07		19:41		20:14		20:37	
17	07:25	08:00-09:07/67	06:55		06:11		06:19		05:40	18:48-19:24/36	05:25	
	16:56		17:35		18:08		19:42		20:15		20:37	
18	07:24	08:01-09:08/67	06:53		06:09	17:14-17:25/11	06:17		05:39	18:49-19:24/35	05:25	
	16:57		17:36		18:09		19:43		20:16		20:38	
19	07:24	08:01-09:08/67	06:52		06:07	17:09-17:29/20	06:16		05:38	18:49-19:23/34	05:25	
	16:58		17:37		18:10		19:45		20:17		20:38	
20	07:23	08:02-09:09/67	06:50		06:06	17:06-17:31/25	06:14		05:37	18:50-19:24/34	05:25	
	17:00		17:39		18:12		19:46		20:18		20:38	
21	07:23	08:02-09:09/67	06:49		06:04	17:05-17:33/28	06:13		05:36	18:50-19:23/33	05:25	
	17:01		17:40		18:13		19:47		20:18		20:39	
22	07:22	08:02-09:09/67	06:48		06:02	17:03-17:34/31	06:11		05:35	18:51-19:22/31	05:26	
	17:02		17:41		18:14		19:48		20:19		20:39	
23	07:21	08:02-09:09/67	06:46		06:00	17:01-17:35/34	06:10		05:34	18:51-19:22/31	05:26	
	17:03		17:42		18:15		19:49		20:20		20:39	
24	07:21	08:03-09:10/67	06:45		05:59	16:59-17:35/36	06:08		05:34	18:53-19:22/29	05:26	
	17:05		17:44		18:16		19:50		20:21		20:39	
25	07:20	08:04-09:10/66	06:43		05:57	16:59-17:36/37	06:07		05:33	18:53-19:21/28	05:26	
	17:06		17:45		18:17		19:51		20:22		20:39	
26	07:19	08:04-09:09/65	06:42		05:55	16:58-17:36/38	06:05	19:04-19:11/7	05:32	18:53-19:20/27	05:27	
	17:07		17:46		18:18		19:52		20:23		20:39	
27	07:18	08:04-09:09/65	06:40		05:54	16:57-17:36/39	06:04	19:00-19:15/15	05:31	18:55-19:20/25	05:27	
	17:08		17:47		18:19		19:53		20:24		20:39	
28	07:17	08:05-09:09/64	06:38		05:52	16:56-17:36/40	06:02	18:58-19:18/20	05:31	18:55-19:19/24	05:27	
	17:10		17:48		18:20		19:54		20:25		20:39	
29	07:17	08:05-09:09/64			06:50	17:56-18:37/41	06:01	18:55-19:19/24	05:30	18:57-19:19/22	05:28	
	17:11				19:22		19:56		20:26		20:39	
30	07:16	08:06-09:09/63			06:48	17:55-18:36/41	06:00	18:54-19:20/26	05:30	18:58-19:17/19	05:28	
	17:12				19:23		19:57		20:26		20:39	
31	07:15	08:06-09:08/62			06:47	17:55-18:36/41			05:29	18:59-19:17/18		
	17:13				19:24	18:50-18:55/5			20:27			
Potential sun hours	295		296		369		400		450		455	
Sum of minutes with flicker	2036		677		467		741		995		40	

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A03 - A03

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:29 20:39	05:53 18:58-19:36/38 20:20	06:25 18:01-18:23/22 19:35 18:40-18:58/18	06:56 18:44	06:31 07:45-08:29/44 16:56	07:07 07:41-08:47/66 16:31
2	05:29 20:39	05:54 18:58-19:36/38 20:18	06:26 17:58-18:24/26 19:34 18:38-18:59/21	06:57 18:42	06:33 07:45-08:31/46 16:55	07:08 07:41-08:47/66 16:31
3	05:30 20:39	05:55 18:58-19:36/38 20:17	06:27 17:56-18:26/30 19:32 18:38-18:59/21	06:58 18:40	06:34 07:43-08:32/49 16:54	07:09 07:42-08:47/65 16:30
4	05:30 20:39	05:56 18:58-19:36/38 20:16	06:28 17:55-18:26/31 19:30 18:37-18:59/22	06:59 18:39	06:35 07:42-08:33/51 16:52	07:10 07:42-08:48/66 16:30
5	05:31 20:38	05:57 18:58-19:35/37 20:15	06:29 17:53-18:27/34 19:29 18:37-18:59/22	07:00 18:37	06:36 07:42-08:35/53 16:51	07:11 07:43-08:48/65 16:30
6	05:32 20:38	05:58 18:59-19:35/36 20:14	06:30 17:52-18:28/36 19:27 18:36-18:58/22	07:02 18:35	06:38 07:40-08:36/56 16:50	07:12 07:43-08:48/65 16:30
7	05:32 20:38	05:59 18:59-19:34/35 20:12	06:31 17:51-18:28/37 19:25 18:36-18:58/22	07:03 18:34	06:39 07:39-08:36/57 16:49	07:13 07:44-08:49/65 16:30
8	05:33 20:38	06:00 18:58-19:33/35 20:11	06:32 17:50-18:28/38 19:24 18:36-18:57/21	07:04 18:32	06:40 07:40-08:38/58 16:48	07:14 07:44-08:49/65 16:30
9	05:33 19:12-19:19/7 20:37	06:01 18:59-19:32/33 20:10	06:33 17:49-18:28/39 19:22 18:37-18:55/18	07:05 18:30	06:41 07:39-08:38/59 16:47	07:15 07:45-08:49/64 16:30
10	05:34 19:10-19:21/11 20:37	06:02 18:59-19:31/32 20:09	06:34 17:48-18:28/40 19:20 18:38-18:54/16	07:06 18:29	06:42 07:38-08:39/61 16:46	07:16 07:46-08:50/64 16:30
11	05:35 19:09-19:23/14 20:36	06:03 19:00-19:30/30 20:07	06:35 17:47-18:28/41 19:18 18:39-18:52/13	07:07 18:27	06:44 07:37-08:39/62 16:45	07:17 07:46-08:50/64 16:30
12	05:36 19:07-19:24/17 20:36	06:04 19:01-19:29/28 20:06	06:36 17:47-18:28/41 19:17 18:42-18:48/6	07:08 18:25	06:45 07:38-08:40/62 16:44	07:18 07:47-08:51/64 16:30
13	05:36 19:06-19:25/19 20:35	06:06 19:02-19:28/26 20:05	06:37 17:46-18:28/42 19:15	07:09 18:24	06:46 07:37-08:41/64 16:43	07:18 07:48-08:51/63 16:30
14	05:37 19:06-19:27/21 20:35	06:07 19:03-19:26/23 20:03	06:38 17:46-18:27/41 19:13	07:10 18:22	06:47 07:37-08:41/64 16:42	07:19 07:48-08:51/63 16:30
15	05:38 19:05-19:28/23 20:34	06:08 19:05-19:24/19 20:02	06:39 17:46-18:26/40 19:12	07:12 18:21	06:49 07:37-08:42/65 16:41	07:20 07:48-08:51/63 16:30
16	05:39 19:05-19:29/24 20:34	06:09 19:07-19:21/14 20:00	06:41 17:46-18:26/40 19:10	07:13 18:19	06:50 07:37-08:42/65 16:40	07:21 07:49-08:52/63 16:30
17	05:40 19:03-19:29/26 20:33	06:10 19:59	06:42 17:46-18:25/39 19:08	07:14 18:17	06:51 07:37-08:43/66 16:39	07:21 07:49-08:52/63 16:31
18	05:40 19:03-19:30/27 20:32	06:11 19:57	06:43 17:46-18:24/38 19:06	07:15 18:16	06:52 07:37-08:44/67 16:38	07:22 07:50-08:52/62 16:31
19	05:41 19:02-19:31/29 20:32	06:12 19:56	06:44 17:46-18:23/37 19:05	07:16 18:14	06:53 07:37-08:44/67 16:37	07:23 07:51-08:53/62 16:31
20	05:42 19:02-19:32/30 20:31	06:13 19:54	06:45 17:47-18:21/34 19:03	07:17 18:13	06:55 07:37-08:44/67 16:37	07:23 07:51-08:53/62 16:32
21	05:43 19:02-19:33/31 20:30	06:14 19:53	06:46 17:48-18:20/32 19:01	07:18 18:11	06:56 07:37-08:44/67 16:36	07:24 07:52-08:54/62 16:32
22	05:44 19:01-19:33/32 20:29	06:15 19:51	06:47 17:49-18:18/29 18:59	07:20 18:10	06:57 07:38-08:45/67 16:35	07:24 07:52-08:54/62 16:33
23	05:45 19:00-19:33/33 20:28	06:16 19:50	06:48 17:50-18:16/26 18:58	07:21 18:08	06:58 07:38-08:45/67 16:35	07:25 07:53-08:55/62 16:33
24	05:46 19:00-19:34/34 20:27	06:17 19:48	06:49 17:52-18:13/21 18:56	07:22 18:07	06:59 07:38-08:45/67 16:34	07:25 07:53-08:55/62 16:34
25	05:47 18:59-19:34/35 20:27	06:18 19:47	06:50 17:55-18:09/14 18:54	06:23 17:06	07:01 07:38-08:45/67 16:33	07:26 07:53-08:55/62 16:34
26	05:48 18:59-19:35/36 20:26	06:19 19:45	06:51 18:52	06:24 08:05-08:10/5 17:04	07:02 07:38-08:46/68 16:33	07:26 07:54-08:57/63 16:35
27	05:48 18:59-19:35/36 20:25	06:20 19:44	06:52 18:51	06:25 07:57-08:17/20 17:03	07:03 07:39-08:47/68 16:32	07:27 07:54-08:57/63 16:36
28	05:49 18:59-19:35/36 20:24	06:21 19:42	06:53 18:49	06:27 07:54-08:20/26 17:01	07:04 07:40-08:47/67 16:32	07:27 07:54-08:57/63 16:36
29	05:50 18:58-19:35/37 20:23	06:22 18:46-18:54/8 19:40	06:54 18:47	06:28 07:51-08:23/32 17:00	07:05 07:40-08:47/67 16:32	07:27 07:55-08:58/63 16:37
30	05:51 18:58-19:36/38 20:22	06:23 18:08-18:17/9 19:39 18:43-18:56/13	06:55 18:46	06:29 07:49-08:26/37 16:59	07:06 07:40-08:47/67 16:31	07:27 07:56-08:59/63 16:38
31	05:52 18:58-19:36/38 20:21	06:24 18:04-18:21/17 19:37 18:41-18:57/16		06:30 07:47-08:27/40 16:57		07:28 07:56-08:59/63 16:39
Potential sun hours	461	429	375	344	296	285
Sum of minutes with flicker	634	563	1070	160	1855	1968

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

Calculation: GE.RTL01**WTG:** A04 - A04

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28 14:56-15:29/33 16:40	07:14 17:15	06:37 17:50	06:45 19:25	05:58 19:58	05:29 20:28	05:29 20:39	05:53 20:20	06:25 19:35	06:56 18:44	06:32 16:56	07:07 14:51-15:06/15 16:31
2	07:28 14:57-15:29/32 16:41	07:13 17:16	06:35 17:51	06:43 19:26	05:57 19:59	05:28 20:29	05:29 20:39	05:54 20:18	06:26 19:34	06:57 18:42	06:33 16:55	07:08 14:50-15:08/18 16:31
3	07:28 14:58-15:29/31 16:41	07:12 17:17	06:34 17:52	06:42 19:27	05:56 20:00	05:28 20:30	05:30 20:39	05:55 20:17	06:27 19:32	06:58 18:40	06:34 16:54	07:09 14:49-15:10/21 16:30
4	07:28 14:59-15:29/30 16:42	07:11 17:19	06:32 17:53	06:40 19:28	05:54 20:01	05:27 20:30	05:30 20:39	05:56 20:16	06:28 19:30	06:59 18:39	06:35 16:52	07:10 14:48-15:11/23 16:30
5	07:28 15:00-15:29/29 16:43	07:10 17:20	06:31 17:54	06:38 19:29	05:53 20:02	05:27 20:31	05:31 20:38	05:57 20:15	06:29 19:29	07:01 18:37	06:36 16:51	07:11 14:47-15:12/25 16:30
6	07:28 15:01-15:28/27 16:44	07:09 17:21	06:29 17:56	06:37 19:30	05:52 20:03	05:27 20:32	05:32 20:38	05:58 20:14	06:30 19:27	07:02 18:35	06:38 16:50	07:12 14:47-15:14/27 16:30
7	07:28 15:02-15:28/26 16:45	07:07 17:22	06:27 17:57	06:35 19:31	05:51 20:04	05:26 20:32	05:32 20:38	05:59 20:12	06:31 19:25	07:03 18:34	06:39 16:49	07:13 14:46-15:15/29 16:30
8	07:28 15:04-15:27/23 16:46	07:06 17:24	06:26 17:58	06:33 19:33	05:49 20:05	05:26 20:33	05:33 20:38	06:00 20:11	06:32 19:24	07:04 18:32	06:40 16:48	07:14 14:46-15:16/30 16:30
9	07:28 15:05-15:27/22 16:47	07:05 17:25	06:24 17:59	06:32 19:34	05:48 20:06	05:26 20:34	05:34 20:37	06:01 20:10	06:33 19:22	07:05 18:30	06:41 16:47	07:15 14:46-15:17/31 16:30
10	07:27 15:07-15:26/19 16:48	07:04 17:26	06:22 18:00	06:30 19:35	05:47 20:07	05:25 20:34	05:34 20:37	06:02 20:09	06:34 19:20	07:06 18:29	06:43 16:46	07:16 14:46-15:18/32 16:30
11	07:27 15:09-15:24/15 16:49	07:03 17:27	06:21 18:01	06:28 19:36	05:46 20:08	05:25 20:35	05:35 20:36	06:04 20:07	06:35 19:19	07:07 18:27	06:44 16:45	07:17 14:46-15:19/33 16:30
12	07:27 15:12-15:23/11 16:50	07:01 17:29	06:19 18:03	06:27 19:37	05:45 20:10	05:25 20:35	05:36 20:36	06:05 20:06	06:36 19:17	07:08 18:25	06:45 16:44	07:18 14:47-15:20/33 16:30
13	07:27 16:52	07:00 17:30	06:17 18:04	06:25 19:38	05:44 20:11	05:25 20:36	05:36 20:35	06:06 20:05	06:37 19:15	07:09 18:24	06:46 16:43	07:19 14:47-15:21/34 16:30
14	07:26 16:53	06:59 17:31	06:16 18:05	06:24 19:39	05:43 20:12	05:25 20:36	05:37 20:35	06:07 20:03	06:39 19:13	07:10 18:22	06:47 16:42	07:19 14:46-15:21/35 16:30
15	07:26 16:54	06:57 17:33	06:14 18:06	06:22 19:40	05:42 20:13	05:25 20:37	05:38 20:34	06:08 20:02	06:40 19:12	07:12 18:21	06:49 16:41	07:20 14:47-15:22/35 16:30
16	07:25 16:55	06:56 17:34	06:12 18:07	06:20 19:41	05:41 20:14	05:25 20:37	05:39 20:34	06:09 20:00	06:41 19:10	07:13 18:19	06:50 16:40	07:21 14:47-15:23/36 16:31
17	07:25 16:56	06:55 17:35	06:11 18:08	06:19 19:42	05:40 20:15	05:25 20:37	05:40 20:33	06:10 19:59	06:42 19:08	07:14 18:18	06:51 16:39	07:21 14:47-15:23/36 16:31
18	07:24 16:57	06:53 17:36	06:09 18:09	06:17 19:44	05:39 20:16	05:25 20:38	05:40 20:32	06:11 19:57	06:43 19:06	07:15 18:16	06:52 16:38	07:22 14:48-15:24/36 16:31
19	07:24 16:58	06:52 17:38	06:07 18:10	06:16 19:45	05:38 20:17	05:25 20:38	05:41 20:32	06:12 19:56	06:44 19:05	07:16 18:14	06:53 16:37	07:23 14:48-15:25/37 16:32
20	07:23 17:00	06:50 17:39	06:06 18:12	06:14 19:46	05:37 20:18	05:25 20:38	05:42 20:31	06:13 19:54	06:45 19:03	07:17 18:13	06:55 16:37	07:23 14:48-15:24/36 16:32
21	07:23 17:01	06:49 17:40	06:04 18:13	06:13 19:47	05:36 20:19	05:25 20:39	05:43 20:30	06:14 19:53	06:46 19:01	07:18 18:11	06:56 16:36	07:24 14:49-15:25/36 16:32
22	07:22 17:02	06:48 17:41	06:02 18:14	06:11 19:48	05:35 20:19	05:26 20:39	05:44 20:29	06:15 19:51	06:47 18:59	07:20 18:10	06:57 16:35	07:24 14:49-15:25/36 16:33
23	07:21 17:03	06:46 17:42	06:00 18:15	06:10 19:49	05:34 20:20	05:26 20:39	05:45 20:28	06:16 19:50	06:48 18:58	07:21 18:08	06:58 16:35	07:25 14:50-15:26/36 16:33
24	07:21 17:05	06:45 17:44	05:59 18:16	06:08 19:50	05:34 20:21	05:26 20:39	05:46 20:28	06:17 19:48	06:49 18:56	07:22 18:07	06:59 16:34	07:25 14:50-15:27/37 16:34
25	07:20 17:06	06:43 17:45	05:57 18:17	06:07 19:51	05:33 20:22	05:26 20:39	05:47 20:27	06:18 19:47	06:50 18:54	06:23 17:06	07:01 16:34	07:26 14:51-15:27/36 16:34
26	07:19 17:07	06:42 17:46	05:55 18:18	06:05 19:52	05:32 20:23	05:27 20:39	05:48 20:26	06:19 19:45	06:51 18:52	06:24 17:04	07:02 16:33	07:26 14:52-15:28/36 16:35
27	07:18 17:08	06:40 17:47	05:54 18:19	06:04 19:53	05:31 20:24	05:27 20:39	05:49 20:25	06:20 19:44	06:52 18:51	06:25 17:03	07:03 16:33	07:27 14:52-15:28/36 16:36
28	07:18 17:10	06:39 17:49	05:52 18:20	06:02 19:54	05:31 20:25	05:28 20:39	05:49 20:24	06:21 19:42	06:53 18:49	06:27 17:01	07:04 16:32	07:27 14:53-15:28/35 16:36
29	07:17 17:11		06:50 19:22	06:01 19:56	05:30 20:26	05:28 20:39	05:50 20:23	06:22 19:40	06:54 18:47	06:28 17:00	07:05 16:32	07:27 14:53-15:28/35 16:37
30	07:16 17:12		06:48 19:23	06:00 19:57	05:30 20:26	05:28 20:39	05:51 20:22	06:23 19:39	06:55 18:46	06:29 16:59	07:06 14:53-15:03/10 16:31	07:27 14:55-15:29/34 16:38
31	07:15 17:13		06:47 19:24		05:29 20:27		05:52 20:21	06:24 19:37		06:30 16:57		07:28 14:55-15:29/34 16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	344	296	285
Sum of minutes with flicker	298	0	0	0	0	0	0	0	0	0	10	993

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

Calculation: GE.RTL01**WTG:** A05 - A05

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28	07:14	06:37	06:45 17:50-18:41/51	05:58	05:29	05:29	05:53	06:25 17:51-18:32/41	06:56	06:32	07:07
	16:40	17:15	17:50	19:25	19:58	20:28	20:39	20:20	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43 17:50-18:40/50	05:57	05:28	05:29	05:54	06:26 17:50-18:33/43	06:57	06:33	07:08
	16:41	17:16	17:51	19:26	19:59	20:29	20:39	20:18	19:34	18:42	16:55	16:31
3	07:28	07:12	06:34	06:42 17:49-18:40/51	05:56	05:28	05:30	05:55	06:27 17:49-18:34/45	06:58	06:34	07:09
	16:42	17:17	17:52	19:27	20:00	20:30	20:39	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32	06:40 17:50-18:40/50	05:54	05:27	05:30	05:56	06:28 17:47-18:34/47	06:59	06:35	07:10
	16:42	17:19	17:53	19:28	20:01	20:30	20:39	20:16	19:30	18:39	16:52	16:30
5	07:28	07:10	06:31	06:38 17:50-18:39/49	05:53	05:27	05:31	05:57	06:29 17:46-18:34/48	07:01	06:36	07:11
	16:43	17:20	17:54	19:29	20:02	20:31	20:38	20:15	19:29	18:37	16:51	16:30
6	07:28	07:09	06:29	06:37 17:49-18:38/49	05:52	05:27	05:32	05:58	06:30 17:46-18:34/48	07:02	06:38	07:12
	16:44	17:21	17:56	19:30	20:03	20:32	20:38	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35 17:50-18:38/48	05:51	05:26	05:32	05:59	06:31 17:45-18:34/49	07:03	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32	20:38	20:13	19:25	18:34	16:49	16:30
8	07:28	07:06	06:26	06:33 17:50-18:37/47	05:49	05:26	05:33	06:00	06:32 17:44-18:34/50	07:04	06:40	07:14
	16:46	17:24	17:58	19:33	20:05	20:33	20:38	20:11	19:24	18:32	16:48	16:30
9	07:28	07:05	06:24	06:32 17:51-18:35/44	05:48	05:26	05:34	06:02	06:33 17:43-18:34/51	07:05	06:41	07:15
	16:47	17:25	17:59	19:34	20:06	20:34	20:37	20:10	19:22	18:30	16:47	16:30
10	07:27	07:04	06:22	06:30 17:52-18:35/43	05:47	05:26	05:34	06:03	06:34 17:43-18:34/51	07:06	06:43	07:16
	16:48	17:26	18:00	19:35	20:07	20:34	20:37	20:09	19:20	18:29	16:46	16:30
11	07:27	07:03	06:21	06:28 17:52-18:33/41	05:46	05:25	05:35	06:04	06:35 17:42-18:33/51	07:07	06:44	07:17
	16:49	17:28	18:01	19:36	20:08	20:35	20:36	20:07	19:19	18:27	16:45	16:30
12	07:27	07:01	06:19	06:27 17:54-18:33/39	05:45	05:25	05:36	06:05	06:37 17:42-18:33/51	07:08	06:45	07:18
	16:51	17:29	18:03	19:37	20:10	20:35	20:36	20:06	19:17	18:26	16:44	16:30
13	07:27	07:00	06:17	06:25 17:54-18:31/37	05:44	05:25	05:36	06:06	06:38 17:42-18:32/50	07:09	06:46	07:19
	16:52	17:30	18:04	19:38	20:11	20:36	20:35	20:05	19:15	18:24	16:43	16:30
14	07:26	06:59	06:16	06:24 17:55-18:29/34	05:43	05:25	05:37	06:07	06:39 17:42-18:32/50	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:12	20:36	20:35	20:03	19:13	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22 17:57-18:27/30	05:42	05:25	05:38	06:08	06:40 17:42-18:31/49	07:12	06:49	07:20
	16:54	17:33	18:06	19:40	20:13	20:37	20:34	20:02	19:12	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20 17:59-18:25/26	05:41	05:25	05:39	06:09	06:41 17:42-18:30/48	07:13	06:50	07:21
	16:55	17:34	18:07	19:41	20:14	20:37	20:34	20:00	19:10	18:19	16:40	16:31
17	07:25	06:55	06:11 17:12-17:27/15	06:19 18:01-18:23/22	05:40	05:25	05:40	06:10	06:42 17:42-18:29/47	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:15	20:37	20:33	19:59	19:08	18:18	16:39	16:31
18	07:24	06:53	06:09 17:08-17:31/23	06:17 18:04-18:18/14	05:39	05:25	05:40	06:11	06:43 17:42-18:28/46	07:15	06:52	07:22
	16:57	17:36	18:09	19:44	20:16	20:38	20:32	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07 17:05-17:33/28	06:16	05:38	05:25	05:41	06:12	06:44 17:43-18:27/44	07:16	06:53	07:23
	16:59	17:38	18:11	19:45	20:17	20:38	20:32	19:56	19:05	18:14	16:38	16:32
20	07:23	06:51	06:06 17:02-17:35/33	06:14	05:37	05:25	05:42	06:13	06:45 17:43-18:25/42	07:17	06:55	07:23
	17:00	17:39	18:12	19:46	20:18	20:38	20:31	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04 17:01-17:37/36	06:13	05:36	05:26	05:43	06:14	06:46 17:44-18:24/40	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:19	20:39	20:30	19:53	19:01	18:11	16:36	16:32
22	07:22	06:48	06:02 16:59-17:38/39	06:11	05:35	05:26	05:44	06:15	06:47 17:45-18:22/37	07:20	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39	20:29	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00 16:57-17:39/42	06:10	05:34	05:26	05:45	06:16	06:48 17:46-18:20/34	07:21	06:58	07:25
	17:03	17:43	18:15	19:49	20:20	20:39	20:28	19:50	18:58	18:09	16:35	16:33
24	07:21	06:45	05:59 16:55-17:39/44	06:08	05:34	05:26	05:46	06:17	06:49 17:48-18:17/29	07:22	06:59	07:25
	17:05	17:44	18:16	19:50	20:21	20:39	20:28	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57 16:55-17:40/45	06:07	05:33	05:27	05:47	06:18 18:07-18:22/15	06:50 17:50-18:15/25	06:23	07:01	07:26
	17:06	17:45	18:17	19:51	20:22	20:39	20:27	19:47	18:54	17:06	16:34	16:35
26	07:19	06:42	05:55 16:54-17:41/47	06:05	05:32	05:27	05:48	06:19 18:03-18:25/22	06:51 17:53-18:11/18	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	20:39	20:26	19:45	18:53	17:04	16:33	16:35
27	07:18	06:40	05:54 16:53-17:41/48	06:04	05:32	05:27	05:49	06:20 18:00-18:27/27	06:52 17:59-18:04/5	06:26	07:03	07:27
	17:08	17:47	18:19	19:53	20:24	20:39	20:25	19:44	18:51	17:03	16:33	16:36
28	07:18	06:39	05:52 16:52-17:42/50	06:02	05:31	05:28	05:50	06:21 17:58-18:28/30	06:53	06:27	07:04	07:27
	17:10	17:49	18:20	19:54	20:25	20:39	20:24	19:42	18:49	17:01	16:32	16:37
29	07:17		06:50 17:52-18:41/49	06:01	05:30	05:28	05:51	06:22 17:56-18:30/34	06:54	06:28	07:05	07:27
	17:11		19:22	19:56	20:26	20:39	20:23	19:40	18:47	17:00	16:32	16:37
30	07:16		06:48 17:51-18:41/50	06:00	05:30	05:28	05:51	06:23 17:54-18:31/37	06:55	06:29	07:06	07:27
	17:12		19:23	19:57	20:26	20:39	20:22	19:39	18:46	16:59	16:31	16:38
31	07:15		06:47 17:50-18:41/51		05:29		05:52	06:24 17:53-18:32/39		06:30		07:28
	17:13		19:24		20:27		20:21	19:37		16:57		16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	344	296	285
Sum of minutes with flicker	0	0	800	725	0	0	0	204	1139	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A06 - A06

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28	07:14	06:37	06:45	05:58	05:29 19:38-20:02/24	05:29 05:52-06:26/34	05:53	06:25	06:56	06:31	07:07
	16:40	17:15	17:50	19:25	19:58	20:28	20:39 19:45-20:13/28	20:20	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43	05:57	05:28 05:56-06:05/9	05:29 05:52-06:25/33	05:54	06:26	06:57	06:33	07:08
	16:41	17:16	17:51	19:26	19:59	20:29 19:38-20:04/26	20:39 19:45-20:13/28	20:18	19:34	18:42	16:55	16:31
3	07:28	07:12	06:34	06:42	05:56	05:28 05:52-06:09/17	05:30 05:53-06:25/32	05:55	06:27	06:58	06:34	07:09
	16:42	17:17	17:52	19:27	20:00	20:30 19:39-20:05/26	20:39 19:45-20:13/28	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32	06:40	05:54	05:27 05:49-06:11/22	05:30 05:53-06:24/31	05:56	06:28	06:59	06:35	07:10
	16:42	17:19	17:53	19:28	20:01	20:30 19:38-20:05/27	20:39 19:45-20:12/27	20:16	19:30	18:39	16:52	16:30
5	07:28	07:10	06:31	06:38	05:53	05:27 05:49-06:14/25	05:31 05:54-06:23/29	05:57	06:29	07:01	06:36	07:11
	16:43	17:20	17:54	19:29	20:02	20:31 19:39-20:06/27	20:38 19:45-20:13/28	20:15	19:29	18:37	16:51	16:30
6	07:28	07:08	06:29	06:37	05:52	05:27 05:49-06:16/27	05:32 05:55-06:23/28	05:58	06:30	07:02	06:38	07:12
	16:44	17:21	17:56	19:30	20:03	20:32 19:39-20:06/27	20:38 19:46-20:13/27	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35	05:51	05:26 05:48-06:16/28	05:32 05:55-06:21/26	05:59	06:31	07:03	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32 19:39-20:06/27	20:38 19:45-20:12/27	20:12	19:25	18:34	16:49	16:30
8	07:28	07:06	06:26	06:33	05:49	05:26 05:48-06:18/30	05:33 05:56-06:19/23	06:00	06:32	07:04	06:40	07:14
	16:46	17:24	17:58	19:33	20:05	20:33 19:39-20:07/28	20:38 19:46-20:12/26	20:11	19:24	18:32	16:48	16:30
9	07:28	07:05	06:24	06:32	05:48	05:26 05:48-06:19/31	05:34 05:58-06:18/20	06:01	06:33	07:05	06:41	07:15
	16:47	17:25	17:59	19:34	20:06	20:34 19:40-20:08/28	20:37 19:45-20:11/26	20:10	19:22	18:30	16:47	16:30
10	07:27	07:04	06:22	06:30	05:47	05:26 05:48-06:21/33	05:34 06:01-06:14/13	06:03	06:34	07:06	06:42	07:16
	16:48	17:26	18:00	19:35	20:07	20:34 19:40-20:09/29	20:37 19:45-20:11/26	20:09	19:20	18:29	16:46	16:30
11	07:27	07:03	06:21	06:28	05:46	05:25 05:48-06:22/34	05:35 19:46-20:11/25	06:04	06:35	07:07	06:44	07:17
	16:49	17:27	18:01	19:36	20:08	20:35 19:41-20:09/28	20:36	20:07	19:19	18:27	16:45	16:30
12	07:27	07:01	06:19	06:27	05:45	05:25 05:48-06:23/35	05:36 19:46-20:11/25	06:05	06:36	07:08	06:45	07:18
	16:50	17:29	18:03	19:37	20:09	20:35 19:41-20:10/29	20:36	20:06	19:17	18:25	16:44	16:30
13	07:27	07:00	06:17	06:25	05:44 19:45-19:46/1	05:25 05:48-06:23/35	05:36 19:46-20:10/24	06:06	06:37	07:09	06:46	07:18
	16:52	17:30	18:04	19:38	20:11	20:36 19:41-20:10/29	20:35	20:05	19:15	18:24	16:43	16:30
14	07:26	06:59	06:16	06:24	05:43 19:44-19:47/3	05:25 05:48-06:24/36	05:37 19:46-20:09/23	06:07	06:39	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:12	20:36 19:42-20:11/29	20:35	20:03	19:13	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22	05:42 19:42-19:48/6	05:25 05:48-06:25/37	05:38 19:46-20:09/23	06:08	06:40	07:12	06:49	07:20
	16:54	17:33	18:06	19:40	20:13	20:37 19:42-20:11/29	20:34	20:02	19:12	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20	05:41 19:41-19:49/8	05:25 05:48-06:25/37	05:39 19:47-20:09/22	06:09	06:41	07:13	06:50	07:21
	16:55	17:34	18:07	19:41	20:14	20:37 19:42-20:11/29	20:34	20:00	19:10	18:19	16:40	16:31
17	07:25	06:55	06:11	06:19	05:40 19:40-19:50/10	05:25 05:48-06:26/38	05:40 19:46-20:07/21	06:10	06:42	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:15	20:37 19:43-20:12/29	20:33	19:59	19:08	18:18	16:39	16:31
18	07:24	06:53	06:09	06:17	05:39 19:39-19:51/12	05:25 05:48-06:26/38	05:40 19:47-20:07/20	06:11	06:43	07:15	06:52	07:22
	16:57	17:36	18:09	19:44	20:16	20:38 19:43-20:12/29	20:32	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:16	05:38 19:40-19:53/13	05:25 05:48-06:26/38	05:41 19:47-20:06/19	06:12	06:44	07:16	06:53	07:23
	16:59	17:38	18:10	19:45	20:17	20:38 19:43-20:12/29	20:32	19:56	19:05	18:14	16:38	16:32
20	07:23	06:50	06:06	06:14	05:37 19:39-19:53/14	05:25 05:48-06:26/38	05:42 19:48-20:06/18	06:13	06:45	07:17	06:55	07:23
	17:00	17:39	18:12	19:46	20:18	20:38 19:43-20:12/29	20:31	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:13	05:36 19:38-19:54/16	05:26 05:48-06:26/38	05:43 19:48-20:05/17	06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:18	20:38 19:43-20:12/29	20:30	19:53	19:01	18:11	16:36	16:32
22	07:22	06:48	06:02	06:11	05:35 19:38-19:55/17	05:26 05:49-06:27/38	05:44 19:49-20:05/16	06:15	06:47	07:20	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39 19:43-20:12/29	20:29	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:10	05:34 19:37-19:55/18	05:26 05:49-06:27/38	05:45 19:49-20:04/15	06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	20:39 19:44-20:13/29	20:28	19:50	18:58	18:08	16:35	16:33
24	07:21	06:45	05:59	06:08	05:34 19:38-19:57/19	05:26 05:49-06:27/38	05:46 19:49-20:02/13	06:17	06:49	07:22	06:59	07:25
	17:05	17:44	18:16	19:50	20:21	20:39 19:44-20:13/29	20:27	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:07	05:33 19:37-19:57/20	05:27 05:49-06:27/38	05:47 19:50-20:02/12	06:18	06:50	06:23	07:01	07:26
	17:06	17:45	18:17	19:51	20:22	20:39 19:44-20:13/29	20:27	19:47	18:54	17:06	16:34	16:35
26	07:19	06:42	05:55	06:05	05:32 19:37-19:58/21	05:27 05:50-06:27/37	05:48 19:50-20:01/11	06:19	06:51	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	20:39 19:44-20:14/30	20:26	19:45	18:52	17:04	16:33	16:35
27	07:18	06:40	05:54	06:04	05:31 19:37-19:59/22	05:27 05:50-06:27/37	05:49 19:51-20:00/9	06:20	06:52	06:25	07:03	07:27
	17:08	17:47	18:19	19:53	20:24	20:39 19:44-20:13/29	20:25	19:44	18:51	17:03	16:33	16:36
28	07:17	06:38	05:52	06:02	05:31 19:37-19:59/22	05:28 05:51-06:27/36	05:50 19:52-19:59/7	06:21	06:53	06:27	07:04	07:27
	17:10	17:49	18:20	19:54	20:25	20:39 19:44-20:13/29	20:24	19:42	18:49	17:01	16:32	16:36
29	07:17		06:50	06:01	05:30 19:38-20:01/23	05:28 05:51-06:27/36	05:50 19:53-19:58/5	06:22	06:54	06:28	07:05	07:27
	17:11		19:22	19:56	20:26	20:39 19:45-20:13/28	20:23	19:40	18:47	17:00	16:32	16:37
30	07:16		06:48	06:00	05:30 19:37-20:01/24	05:28 05:51-06:26/35	05:51 19:55-19:58/3	06:23	06:55	06:29	07:06	07:27
	17:12		19:23	19:57	20:26	20:39 19:44-20:13/29	20:22	19:39	18:46	16:59	16:31	16:38
31	07:15		06:47		05:29 19:38-20:02/24		05:52	06:24		06:30		07:28
	17:13		19:24		20:27		20:21	19:37		16:57		16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	344	296	285
Sum of minutes with flicker	0	0	0	0	293	1807	868	0	0	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A07 - A07

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:28 15:43-16:07/24	07:14	06:37 07:06-07:24/18	06:45 07:48-08:24/36	05:58	05:29
	16:40	17:15	17:50 17:21-17:28/7	19:25	19:58	20:28
2	07:28 15:44-16:07/23	07:13	06:35 07:03-07:28/25	06:43 07:49-08:22/33	05:57	05:28
	16:41	17:16	17:51 17:19-17:29/10	19:26	19:59	20:29
3	07:28 15:44-16:08/24	07:12	06:34 07:00-07:31/31	06:42 07:51-08:19/28	05:56	05:28
	16:41	17:17	17:52 17:17-17:31/14	19:27	20:00	20:30
4	07:28 15:45-16:08/23	07:11	06:32 06:57-07:32/35	06:40 07:54-08:16/22	05:54	05:27
	16:42	17:19	17:53 17:16-17:31/15	19:28	20:01	20:30
5	07:28 15:46-16:09/23	07:10	06:31 06:55-07:34/39	06:38 07:58-08:11/13	05:53	05:27
	16:43	17:20	17:54 17:16-17:33/17	19:29	20:02	20:31
6	07:28 15:45-16:08/23	07:08	06:29 06:53-07:35/42	06:37	05:52	05:27
	16:44	17:21	17:56 17:14-17:34/20	19:30	20:03	20:32
7	07:28 15:46-16:09/23	07:07	06:27 06:51-07:36/45	06:35	05:51	05:26
	16:45	17:22	17:57 17:14-17:35/21	19:31	20:04	20:32
8	07:28 15:47-16:09/22	07:06	06:26 06:51-07:38/47	06:33	05:49	05:26
	16:46	17:24	17:58 17:14-17:37/23	19:33	20:05	20:33
9	07:28 15:48-16:10/22	07:05	06:24 06:49-07:38/49	06:32	05:48	05:26
	16:47	17:25	17:59 17:14-17:38/24	19:34	20:06	20:34
10	07:27 15:48-16:09/21	07:04	06:22 06:48-07:38/50	06:30	05:47	05:25
	16:48	17:26	18:00 17:13-17:37/24	19:35	20:07	20:34
11	07:27 15:49-16:09/20	07:03	06:21 06:47-07:40/53	06:28	05:46	05:25
	16:49	17:27	18:01 17:14-17:37/23	19:36	20:08	20:35
12	07:27 15:50-16:10/20	07:01	06:19 06:46-07:40/54	06:27	05:45	05:25
	16:50	17:29	18:03 17:15-17:35/20	19:37	20:09	20:35
13	07:27 15:50-16:09/19	07:00	06:17 06:45-07:40/55	06:25	05:44	05:25
	16:52	17:30	18:04 17:15-17:33/18	19:38	20:10	20:36
14	07:26 15:52-16:09/17	06:59	06:16 06:45-07:40/55	06:24	05:43	05:25
	16:53	17:31	18:05 17:16-17:31/15	19:39	20:12	20:36
15	07:26 15:52-16:08/16	06:57	06:14 06:44-07:40/56	06:22	05:42	05:25
	16:54	17:33	18:06 17:19-17:29/10	19:40	20:13	20:37
16	07:25 15:54-16:08/14	06:56	06:12 06:43-07:40/57	06:20	05:41	05:25
	16:55	17:34	18:07	19:41	20:14	20:37
17	07:25 15:55-16:07/12	06:55	06:11 06:42-07:39/57	06:19	05:40	05:25
	16:56	17:35	18:08	19:42	20:15	20:37
18	07:24 15:58-16:06/8	06:53	06:09 06:43-07:40/57	06:17	05:39	05:25
	16:57	17:36	18:09	19:43	20:16	20:38
19	07:24	06:52	06:07 06:42-07:39/57	06:16	05:38	05:25
	16:58	17:38	18:10	19:45	20:17	20:38
20	07:23	06:50	06:06 06:42-07:38/56	06:14	05:37	05:25
	17:00	17:39	18:12	19:46	20:17	20:38
21	07:23	06:49	06:04 06:42-07:38/56	06:13	05:36	05:25
	17:01	17:40	18:13	19:47	20:18	20:38
22	07:22	06:48	06:02 06:42-07:37/55	06:11	05:35	05:26
	17:02	17:41	18:14	19:48	20:19	20:39
23	07:21	06:46	06:00 06:42-07:36/54	06:10	05:34	05:26
	17:03	17:42	18:15	19:49	20:20	20:39
24	07:21	06:45	05:59 06:42-07:35/53	06:08	05:34	05:26
	17:05	17:44	18:16	19:50	20:21	20:39
25	07:20	06:43	05:57 06:43-07:35/52	06:07	05:33	05:26
	17:06	17:45	18:17	19:51	20:22	20:39
26	07:19	06:42	05:55 06:43-07:33/50	06:05	05:32	05:27
	17:07	17:46	18:18	19:52	20:23	20:39
27	07:18	06:40	05:54 06:43-07:32/49	06:04	05:31	05:27
	17:08	17:47	18:19	19:53	20:24	20:39
28	07:17	06:38	05:52 06:44-07:31/47	06:02	05:31	05:28
	17:10	17:48	18:20	19:54	20:25	20:39
29	07:17		06:50 07:45-08:30/45	06:01	05:30	05:28
	17:11		19:22	19:56	20:26	20:39
30	07:16		06:48 07:45-08:28/43	06:00	05:30	05:28
	17:12		19:23	19:57	20:26	20:39
31	07:15		06:47 07:46-08:25/39		05:29	
	17:13		19:24		20:27	
Potential sun hours	295	296	369	400	450	455
Sum of minutes with flicker	354	0	1742	132	0	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A07 - A07

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:29	05:53	06:25	06:56 07:25-08:19/54	06:31	07:07 15:31-15:51/20
	20:39	20:20	19:35	18:44 17:54-18:13/19	16:56	16:31
2	05:29	05:54	06:26	06:57 07:26-08:18/52	06:33	07:08 15:31-15:52/21
	20:39	20:18	19:34	18:42 17:52-18:14/22	16:55	16:31
3	05:30	05:55	06:27	06:58 07:26-08:17/51	06:34	07:09 15:31-15:53/22
	20:39	20:17	19:32	18:40 17:52-18:15/23	16:54	16:30
4	05:30	05:56	06:28	06:59 07:26-08:16/50	06:35	07:10 15:31-15:53/22
	20:39	20:16	19:30	18:39 17:51-18:15/24	16:52	16:30
5	05:31	05:57	06:29	07:00 07:27-08:15/48	06:36	07:11 15:31-15:54/23
	20:38	20:15	19:29	18:37 17:51-18:14/23	16:51	16:30
6	05:32	05:58	06:30	07:02 07:28-08:13/45	06:38	07:12 15:31-15:54/23
	20:38	20:14	19:27	18:35 17:50-18:12/22	16:50	16:30
7	05:32	05:59	06:31 07:53-08:05/12	07:03 07:28-08:12/44	06:39	07:13 15:32-15:55/23
	20:38	20:12	19:25	18:34 17:50-18:11/21	16:49	16:30
8	05:33	06:00	06:32 07:48-08:10/22	07:04 07:29-08:10/41	06:40	07:14 15:32-15:55/23
	20:37	20:11	19:24	18:32 17:50-18:09/19	16:48	16:30
9	05:34	06:01	06:33 07:45-08:12/27	07:05 07:31-08:08/37	06:41	07:15 15:32-15:56/24
	20:37	20:10	19:22	18:30 17:50-18:07/17	16:47	16:30
10	05:34	06:02	06:34 07:42-08:14/32	07:06 07:32-08:06/34	06:42	07:16 15:33-15:57/24
	20:37	20:09	19:20	18:29 17:51-18:05/14	16:46	16:30
11	05:35	06:04	06:35 07:40-08:16/36	07:07 07:35-08:04/29	06:44	07:17 15:33-15:57/24
	20:36	20:07	19:19	18:27 17:51-18:03/12	16:45	16:30
12	05:36	06:05	06:36 07:38-08:17/39	07:08 07:38-08:00/22	06:45	07:18 15:34-15:58/24
	20:36	20:06	19:17	18:25 17:54-18:03/9	16:44	16:30
13	05:36	06:06	06:37 07:37-08:19/42	07:09 07:42-07:56/14	06:46	07:18 15:34-15:57/23
	20:35	20:05	19:15	18:24 17:56-18:01/5	16:43	16:30
14	05:37	06:07	06:38 07:35-08:20/45	07:10	06:47	07:19 15:34-15:58/24
	20:35	20:03	19:13	18:22	16:42	16:30
15	05:38	06:08	06:40 07:34-08:20/46	07:12	06:49	07:20 15:35-15:59/24
	20:34	20:02	19:12	18:21	16:41	16:30
16	05:39	06:09	06:41 07:32-08:21/49	07:13	06:50	07:21 15:36-16:00/24
	20:34	20:00	19:10	18:19	16:40	16:31
17	05:40	06:10	06:42 07:31-08:22/51	07:14	06:51	07:21 15:36-15:59/23
	20:33	19:59	19:08	18:18	16:39	16:31
18	05:40	06:11	06:43 07:30-08:22/52	07:15	06:52	07:22 15:37-16:00/23
	20:32	19:57	19:06	18:16	16:38	16:31
19	05:41	06:12	06:44 07:29-08:22/53	07:16	06:53	07:23 15:37-16:01/24
	20:32	19:56	19:05	18:14	16:37	16:32
20	05:42	06:13	06:45 07:28-08:22/54	07:17	06:55	07:23 15:37-16:01/24
	20:31	19:54	19:03	18:13	16:37	16:32
21	05:43	06:14	06:46 07:27-08:23/56	07:18	06:56	07:24 15:38-16:02/24
	20:30	19:53	19:01	18:11	16:36	16:32
22	05:44	06:15	06:47 07:27-08:23/56	07:20	06:57	07:24 15:38-16:02/24
	20:29	19:51	18:59	18:10	16:35	16:33
23	05:45	06:16	06:48 07:26-08:22/56	07:21	06:58	07:25 15:38-16:02/24
	20:28	19:50	18:58	18:08	16:35	16:33
24	05:46	06:17	06:49 07:26-08:22/56	07:22	06:59 15:36-15:43/7	07:25 15:39-16:03/24
	20:27	19:48	18:56	18:07	16:34	16:34
25	05:47	06:18	06:50 07:25-08:22/57	06:23	07:00 15:34-15:45/11	07:26 15:39-16:03/24
	20:27	19:47	18:54	17:06	16:34	16:34
26	05:48	06:19	06:51 07:25-08:22/57	06:24	07:02 15:32-15:46/14	07:26 15:41-16:04/23
	20:26	19:45	18:52	17:04	16:33	16:35
27	05:49	06:20	06:52 07:25-08:21/56	06:25	07:03 15:32-15:48/16	07:27 15:41-16:04/23
	20:25	19:44	18:51	17:03	16:33	16:36
28	05:49	06:21	06:53 07:24-08:21/57	06:27	07:04 15:32-15:49/17	07:27 15:41-16:05/24
	20:24	19:42	18:49 18:02-18:08/6	17:01	16:32	16:36
29	05:50	06:22	06:54 07:24-08:20/56	06:28	07:05 15:31-15:50/19	07:27 15:41-16:05/24
	20:23	19:40	18:47 17:58-18:11/13	17:00	16:32	16:37
30	05:51	06:23	06:55 07:24-08:19/55	06:29	07:06 15:31-15:51/20	07:27 15:42-16:05/23
	20:22	19:39	18:46 17:55-18:12/17	16:59	16:31	16:38
31	05:52	06:24		06:30		07:28 15:43-16:07/24
	20:21	19:37		16:57		16:39
Potential sun hours	461	429	375	344	296	285
Sum of minutes with flicker	0	0	1158	751	104	723

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A08 - A08

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:28	07:14 15:54-16:41/47	06:37	06:45	05:58	05:29
	16:40	17:15	17:50	19:25	19:58	20:28
2	07:28	07:13 15:54-16:42/48	06:35	06:43	05:57	05:28
	16:41	17:16	17:51	19:26	19:59	20:29
3	07:28	07:12 15:54-16:43/49	06:34	06:42	05:56	05:28
	16:41	17:17	17:52	19:27	20:00	20:29
4	07:28	07:11 15:53-16:43/50	06:32	06:40	05:54	05:27
	16:42	17:18	17:53	19:28	20:01	20:30
5	07:28	07:10 15:53-16:44/51	06:31	06:38	05:53	05:27
	16:43	17:20	17:54	19:29	20:02	20:31
6	07:28	07:08 15:52-16:43/51	06:29	06:37	05:52	05:26
	16:44	17:21	17:56	19:30	20:03	20:32
7	07:28	07:07 15:53-16:44/51	06:27 06:46-06:50/4	06:35	05:51	05:26
	16:45	17:22	17:57	19:31	20:04	20:32
8	07:28	07:06 15:53-16:44/51	06:26 06:45-06:53/8	06:33	05:49	05:26
	16:46	17:24	17:58	19:32	20:05	20:33
9	07:28	07:05 15:53-16:45/52	06:24 06:43-06:54/11	06:32	05:48	05:26
	16:47	17:25	17:59	19:34	20:06	20:33
10	07:27	07:04 15:54-16:45/51	06:22 06:41-06:55/14	06:30	05:47	05:25
	16:48	17:26	18:00	19:35	20:07	20:34
11	07:27	07:03 15:53-16:44/51	06:21 06:40-06:56/16	06:28	05:46	05:25
	16:49	17:27	18:01	19:36	20:08	20:35
12	07:27	07:01 15:54-16:44/50	06:19 06:38-06:56/18	06:27	05:45	05:25
	16:50	17:29	18:02	19:37	20:09	20:35
13	07:27	07:00 15:54-16:44/50	06:17 06:36-06:56/20	06:25	05:44	05:25
	16:52	17:30	18:04	19:38	20:10	20:36
14	07:26	06:59 15:54-16:43/49	06:16 06:35-06:56/21	06:23	05:43	05:25
	16:53	17:31	18:05	19:39	20:11	20:36
15	07:26	06:57 15:55-16:43/48	06:14 06:33-06:56/23	06:22	05:42	05:25
	16:54	17:32	18:06	19:40	20:12	20:36
16	07:25	06:56 15:56-16:43/47	06:12 06:31-06:55/24	06:20	05:41	05:25
	16:55	17:34	18:07	19:41	20:14	20:37
17	07:25 16:11-16:16/5	06:55 15:56-16:42/46	06:11 06:31-06:54/23	06:19	05:40	05:25
	16:56	17:35	18:08	19:42	20:15	20:37
18	07:24 16:07-16:21/14	06:53 15:57-16:42/45	06:09 06:32-06:54/22	06:17	05:39	05:25
	16:57	17:36	18:09	19:43	20:15	20:38
19	07:24 16:05-16:24/19	06:52 15:57-16:40/43	06:07 06:32-06:52/20	06:16	05:38	05:25
	16:58	17:37	18:10	19:45	20:16	20:38
20	07:23 16:03-16:26/23	06:50 15:59-16:40/41	06:05 06:33-06:50/17	06:14	05:37	05:25
	17:00	17:39	18:12	19:46	20:17	20:38
21	07:23 16:02-16:28/26	06:49 16:00-16:38/38	06:04 06:36-06:48/12	06:13	05:36	05:25
	17:01	17:40	18:13	19:47	20:18	20:38
22	07:22 16:01-16:30/29	06:47 16:01-16:37/36	06:02 06:40-06:42/2	06:11	05:35	05:26
	17:02	17:41	18:14	19:48	20:19	20:39
23	07:21 15:59-16:31/32	06:46 16:03-16:35/32	06:00	06:10	05:34	05:26
	17:03	17:42	18:15	19:49	20:20	20:39
24	07:21 15:58-16:33/35	06:45 16:05-16:33/28	05:59	06:08	05:34	05:26
	17:05	17:44	18:16	19:50	20:21	20:39
25	07:20 15:58-16:35/37	06:43 16:07-16:30/23	05:57	06:07	05:33	05:26
	17:06	17:45	18:17	19:51	20:22	20:39
26	07:19 15:57-16:36/39	06:42 16:11-16:27/16	05:55	06:05	05:32	05:27
	17:07	17:46	18:18	19:52	20:23	20:39
27	07:18 15:56-16:37/41	06:40	05:54	06:04	05:31	05:27
	17:08	17:47	18:19	19:53	20:24	20:39
28	07:17 15:56-16:38/42	06:38	05:52	06:02	05:31	05:27
	17:10	17:48	18:20	19:54	20:25	20:39
29	07:17 15:55-16:39/44		06:50	06:01	05:30	05:28
	17:11		19:21	19:55	20:26	20:39
30	07:16 15:55-16:40/45		06:48	06:00	05:30	05:28
	17:12		19:23	19:57	20:26	20:39
31	07:15 15:54-16:40/46		06:47		05:29	
	17:13		19:24		20:27	
Potential sun hours	295	296	369	400	450	455
Sum of minutes with flicker	477	1144	255	0	0	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A08 - A08

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:29	05:53	06:25	06:56 07:17-07:36/19	06:31 15:22-16:14/52	07:07
	20:39	20:19	19:35	18:44	16:56	16:31
2	05:29	05:54	06:26	06:57 07:18-07:35/17	06:33 15:23-16:14/51	07:08
	20:39	20:18	19:34	18:42	16:55	16:31
3	05:30	05:55	06:27	06:58 07:19-07:34/15	06:34 15:23-16:14/51	07:09
	20:39	20:17	19:32	18:40	16:54	16:30
4	05:30	05:56	06:28	06:59 07:20-07:32/12	06:35 15:22-16:14/52	07:10
	20:39	20:16	19:30	18:39	16:52	16:30
5	05:31	05:57	06:29	07:00 07:21-07:31/10	06:36 15:22-16:13/51	07:11
	20:38	20:15	19:29	18:37	16:51	16:30
6	05:32	05:58	06:30	07:02 07:22-07:28/6	06:38 15:23-16:14/51	07:12
	20:38	20:14	19:27	18:35	16:50	16:30
7	05:32	05:59	06:31	07:03 07:23-07:24/1	06:39 15:23-16:13/50	07:13
	20:38	20:12	19:25	18:34	16:49	16:30
8	05:33	06:00	06:32	07:04	06:40 15:23-16:12/49	07:14
	20:37	20:11	19:24	18:32	16:48	16:30
9	05:33	06:01	06:33	07:05	06:41 15:25-16:13/48	07:15
	20:37	20:10	19:22	18:30	16:47	16:30
10	05:34	06:02	06:34	07:06	06:42 15:25-16:12/47	07:16
	20:37	20:09	19:20	18:29	16:46	16:30
11	05:35	06:03	06:35	07:07	06:44 15:25-16:11/46	07:17
	20:36	20:07	19:18	18:27	16:45	16:30
12	05:36	06:04	06:36	07:08	06:45 15:27-16:12/45	07:18
	20:36	20:06	19:17	18:25	16:44	16:30
13	05:36	06:06	06:37	07:09	06:46 15:27-16:11/44	07:18
	20:35	20:04	19:15	18:24	16:43	16:30
14	05:37	06:07	06:38	07:10	06:47 15:28-16:10/42	07:19
	20:35	20:03	19:13	18:22	16:42	16:30
15	05:38	06:08	06:39	07:11 16:46-16:56/10	06:49 15:29-16:10/41	07:20
	20:34	20:02	19:12	18:21	16:41	16:30
16	05:39	06:09	06:41	07:13 16:41-17:00/19	06:50 15:30-16:09/39	07:21
	20:34	20:00	19:10	18:19	16:40	16:30
17	05:40	06:10	06:42	07:14 16:38-17:04/26	06:51 15:31-16:08/37	07:21
	20:33	19:59	19:08	18:17	16:39	16:31
18	05:40	06:11	06:43	07:15 16:36-17:05/29	06:52 15:32-16:07/35	07:22
	20:32	19:57	19:06	18:16	16:38	16:31
19	05:41	06:12	06:44	07:16 16:34-17:07/33	06:53 15:34-16:06/32	07:23
	20:31	19:56	19:05	18:14	16:37	16:31
20	05:42	06:13	06:45	07:17 16:32-17:08/36	06:55 15:36-16:05/29	07:23
	20:31	19:54	19:03	18:13	16:37	16:32
21	05:43	06:14	06:46	07:18 16:30-17:09/39	06:56 15:37-16:04/27	07:24
	20:30	19:53	19:01	18:11	16:36	16:32
22	05:44	06:15	06:47 07:21-07:32/11	07:19 16:29-17:10/41	06:57 15:40-16:03/23	07:24
	20:29	19:51	18:59	18:10	16:35	16:33
23	05:45	06:16	06:48 07:18-07:34/16	07:21 16:28-17:11/43	06:58 15:42-16:01/19	07:25
	20:28	19:50	18:58	18:08	16:35	16:33
24	05:46	06:17	06:49 07:16-07:35/19	07:22 16:26-17:11/45	06:59 15:44-15:58/14	07:25
	20:27	19:48	18:56	18:07	16:34	16:34
25	05:47	06:18	06:50 07:15-07:36/21	06:23 15:25-16:12/47	07:00 15:49-15:54/5	07:26
	20:27	19:47	18:54	17:06	16:33	16:34
26	05:48	06:19	06:51 07:14-07:36/22	06:24 15:25-16:13/48	07:02	07:26
	20:26	19:45	18:52	17:04	16:33	16:35
27	05:48	06:20	06:52 07:13-07:36/23	06:25 15:24-16:13/49	07:03	07:26
	20:25	19:44	18:51	17:03	16:32	16:36
28	05:49	06:21	06:53 07:13-07:36/23	06:27 15:24-16:13/49	07:04	07:27
	20:24	19:42	18:49	17:01	16:32	16:36
29	05:50	06:22	06:54 07:14-07:36/22	06:28 15:23-16:13/50	07:05	07:27
	20:23	19:40	18:47	17:00	16:32	16:37
30	05:51	06:23	06:55 07:15-07:36/21	06:29 15:23-16:14/51	07:06	07:27
	20:22	19:39	18:46	16:59	16:31	16:38
31	05:52	06:24		06:30 15:23-16:14/51		07:28
	20:21	19:37		16:57		16:39
Potential sun hours	461	429	375	344	296	285
Sum of minutes with flicker	0	0	178	746	980	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A09 - A09

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28	07:14	06:37	06:45	05:58	05:28	05:29	05:53	06:25	06:56	06:31	07:07
	16:40	17:15	17:50	19:25	19:58	20:28	20:39	20:19	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43	05:57	05:28	05:29	05:54	06:26	06:57	06:33	07:08
	16:41	17:16	17:51	19:26	19:59	20:29	20:39	20:18	19:34	18:42	16:55	16:31
3	07:28	07:12	06:34	06:42	05:56	05:28	05:30	05:55	06:27	06:58	06:34	07:09
	16:41	17:17	17:52	19:27	20:00	20:29	20:39	20:17	19:32	18:40	16:54	16:30
4	07:28	07:11	06:32	06:40	05:54	05:27	05:30	05:56	06:28	06:59	06:35	07:10
	16:42	17:18	17:53	19:28	20:01	20:30	20:39	20:16	19:30	18:39	16:52	16:30
5	07:28	07:10	06:30	06:38	05:53	05:27	05:31	05:57	06:29	07:00	06:36	07:11
	16:43	17:20	17:54	19:29	20:02	20:31	20:38	20:15	19:29	18:37	16:51	16:30
6	07:28	07:08	06:29	06:37	05:52	05:26	05:32	05:58	06:30	07:01	06:37	07:12
	16:44	17:21	17:56	19:30	20:03	20:32	20:38	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35	05:50	05:26	05:32	05:59	06:31	07:03	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32	20:38	20:12	19:25	18:34	16:49	16:30
8	07:28	07:06	06:26	06:33	05:49	05:26	05:33	06:00	06:32	07:04	06:40	07:14
	16:46	17:24	17:58	19:32	20:05	20:33	20:37	20:11	19:24	18:32	16:48	16:30
9	07:28	07:05	06:24	06:32	05:48	05:26	05:33	06:01	06:33	07:05	06:41	07:15
	16:47	17:25	17:59	19:34	20:06	20:33	20:37	20:10	19:22	18:30	16:47	16:30
10	07:27	07:04	06:22	06:30	05:47	05:25	05:34	06:02	06:34	07:06	06:42	07:16
	16:48	17:26	18:00	19:35	20:07	20:34	20:37	20:09	19:20	18:29	16:46	16:30
11	07:27	07:02	06:21	06:28	05:46	05:25	05:35	06:03	06:35	07:07	06:44	07:17
	16:49	17:27	18:01	19:36	20:08	20:35	20:36	20:07	19:18	18:27	16:45	16:30
12	07:27	07:01	06:19	06:27	05:45	05:25	05:36	06:04	06:36	07:08	06:45	07:18
	16:50	17:29	18:02	19:37	20:09	20:35	20:36	20:06	19:17	18:25	16:44	16:30
13	07:27	07:00	06:17	06:25	05:44	05:25	05:36	06:05	06:37	07:09	06:46	07:18
	16:51	17:30	18:04	19:38	20:10	20:36	20:35	20:04	19:15	18:24	16:43	16:30
14	07:26	06:59	06:16	06:23	05:43	05:25	05:37	06:07	06:38	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:11	20:36	20:35	20:03	19:13	18:22	16:42	16:30
15	07:26	06:57	06:14	06:22	05:42	05:25	05:38	06:08	06:39	07:11	06:49	07:20
	16:54	17:32	18:06	19:40	20:12	20:36	20:34	20:02	19:12	18:21	16:41	16:30
16	07:25	06:56	06:12	06:20	05:41	05:25	05:39	06:09	06:40	07:13	06:50	07:21
	16:55	17:34	18:07	19:41	20:13	20:37	20:33	20:00	19:10	18:19	16:40	16:30
17	07:25	06:55	06:11	06:19	05:40	05:25	05:40	06:10	06:41	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:14	20:37	20:33	19:59	19:08	18:17	16:39	16:31
18	07:24	06:53	06:09	06:17	05:39	05:25	05:40	06:11	06:43	07:15	06:52	07:22
	16:57	17:36	18:09	19:43	20:15	20:38	20:32	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:16	05:38	05:25	05:41	06:12	06:44	07:16	06:53	07:23
	16:58	17:37	18:10	19:45	20:16	20:38	20:31	19:56	19:05	18:14	16:37	16:31
20	07:23	06:50	06:05	06:14	05:37	05:25	05:42	06:13	06:45	07:17	06:55	07:23
	17:00	17:39	18:11	19:46	20:17	20:38	20:31	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:13	05:36	05:25	05:43	06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:13	19:47	20:18	20:38	20:30	19:53	19:01	18:11	16:36	16:32
22	07:22	06:47	06:02	06:11	05:35	05:26	05:44	06:15	06:47	07:19	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39	20:29	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:10	05:34	05:26	05:45	06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	20:39	20:28	19:50	18:58	18:08	16:35	16:33
24	07:21	06:44	05:59	06:08	05:34	05:26	05:46	06:17	06:49	07:22	06:59	07:25
	17:04	17:44	18:16	19:50	20:21	20:39	20:27	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:07	05:33	05:26	05:47	06:18	06:50	06:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20:39	20:27	19:47	18:54	17:05	16:33	16:34
26	07:19	06:41	05:55	06:05	05:32	05:27	05:48	06:19	06:51	06:24	07:02	07:26
	17:07	17:46	18:18	19:52	20:23	20:39	20:26	19:45	18:52	17:04	16:33	16:35
27	07:18	06:40	05:53	06:04	05:31	05:27	05:48	06:20	06:52	06:25	07:03	07:26
	17:08	17:47	18:19	19:53	20:24	20:39	20:25	19:43	18:51	17:03	16:32	16:36
28	07:17	06:38	05:52	06:02	05:31	05:27	05:49	06:21	06:53	06:27	07:04	07:27
	17:10	17:48	18:20	19:54	20:25	20:39	20:24	19:42	18:49	17:01	16:32	16:36
29	07:16		06:50	06:01	05:30	05:28	05:50	06:22	06:54	06:28	07:05	07:27
	17:11		19:21	19:55	20:26	20:39	20:23	19:40	18:47	17:00	16:32	16:37
30	07:16		06:48	06:00	05:30	05:28	05:51	06:23	06:55	06:29	07:06	07:27
	17:12		19:23	19:57	20:26	20:39	20:22	19:39	18:45	16:59	16:31	16:38
31	07:15		06:47		05:29		05:52	06:24		06:30		07:27
	17:13		19:24		20:27		20:21	19:37		16:57		16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	344	296	285
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) 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

Calculation: GE.RTL01**WTG:** A10 - A10

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28 08:20-08:41/21 16:40	07:14 17:15	06:37 07:01-07:06/5 17:50	06:45 19:25	05:58 19:58	05:28 20:28	05:29 20:39	05:53 20:19	06:25 19:35	06:56 07:17-08:03/46 18:44	06:31 16:56	07:07 16:31
2	07:28 08:21-08:41/20 16:40	07:13 17:16	06:35 06:54-07:12/18 17:51	06:43 19:26	05:57 19:59	05:28 20:29	05:29 20:39	05:54 20:18	06:26 19:34	06:57 07:17-08:02/45 18:42	06:33 16:55	07:08 16:31
3	07:28 08:22-08:41/19 16:41	07:12 17:17	06:34 06:53-07:15/22 17:52	06:42 19:27	05:55 20:00	05:28 20:29	05:30 20:39	05:55 20:17	06:27 19:32	06:58 07:19-08:02/43 18:40	06:34 16:53	07:09 16:30
4	07:28 08:23-08:41/18 16:42	07:11 17:18	06:32 06:51-07:17/26 17:53	06:40 19:28	05:54 20:01	05:27 20:30	05:30 20:39	05:56 20:16	06:28 19:30	06:59 07:20-08:01/41 18:39	06:35 16:52	07:10 08:14-08:21/7 16:30
5	07:28 08:25-08:40/15 16:43	07:09 17:20	06:30 06:50-07:19/29 17:54	06:38 19:29	05:53 20:02	05:27 20:31	05:31 20:38	05:57 20:15	06:29 19:29	07:00 07:21-08:00/39 18:37	06:36 16:51	07:11 08:12-08:23/11 16:30
6	07:28 08:25-08:39/14 16:44	07:08 17:21	06:29 06:48-07:20/32 17:55	06:37 19:30	05:52 20:03	05:26 20:32	05:31 20:38	05:58 20:14	06:30 19:27	07:01 07:22-07:58/36 18:35	06:37 16:50	07:12 08:11-08:25/14 16:30
7	07:28 08:27-08:38/11 16:45	07:07 17:22	06:27 06:46-07:21/35 17:57	06:35 19:31	05:50 20:04	05:26 20:32	05:32 20:38	05:59 20:12	06:31 19:25	07:03 07:23-07:57/34 18:34	06:39 16:49	07:13 08:11-08:26/15 16:30
8	07:28 08:29-08:37/8 16:46	07:06 17:24	06:26 06:45-07:23/38 17:58	06:33 19:32	05:49 20:05	05:26 20:33	05:33 20:37	06:00 20:11	06:32 19:24	07:04 07:24-07:55/31 18:32	06:40 16:48	07:14 08:11-08:28/17 16:30
9	07:28 16:47	07:05 17:25	06:24 06:43-07:23/40 17:59	06:32 19:34	05:48 20:06	05:26 20:33	05:33 20:37	06:01 20:10	06:33 19:22	07:05 07:25-07:53/28 18:30	06:41 16:47	07:15 08:10-08:29/19 16:29
10	07:27 16:48	07:04 17:26	06:22 06:41-07:23/42 18:00	06:30 19:35	05:47 20:07	05:25 20:34	05:34 20:37	06:02 20:08	06:34 19:20	07:06 07:26-07:50/24 18:29	06:42 16:46	07:16 08:10-08:30/20 16:29
11	07:27 16:49	07:02 17:27	06:21 06:40-07:24/44 18:01	06:28 19:36	05:46 20:08	05:25 20:35	05:35 20:36	06:03 20:07	06:35 19:18	07:07 07:27-07:47/20 18:27	06:44 16:44	07:17 08:11-08:31/20 16:30
12	07:27 16:50	07:01 17:29	06:19 06:38-07:24/46 18:02	06:27 19:37	05:45 20:09	05:25 20:35	05:36 20:36	06:04 20:06	06:36 19:17	07:08 07:31-07:44/13 18:25	06:45 16:43	07:18 08:11-08:32/21 16:30
13	07:26 16:51	07:00 17:30	06:17 06:37-07:24/47 18:04	06:25 19:38	05:44 20:10	05:25 20:36	05:36 20:35	06:05 20:04	06:37 07:38-07:54/16 19:15	07:09 18:24	06:46 16:43	07:18 08:10-08:32/22 16:30
14	07:26 16:53	06:59 17:31	06:16 06:37-07:23/46 18:05	06:23 19:39	05:43 20:11	05:25 20:36	05:37 20:35	06:06 20:03	06:38 07:35-07:57/22 19:13	07:10 18:22	06:47 16:42	07:19 08:10-08:33/23 16:30
15	07:26 16:54	06:57 17:32	06:14 06:37-07:24/47 18:06	06:22 19:40	05:41 20:12	05:25 20:36	05:38 20:34	06:08 20:02	06:39 07:32-07:59/27 19:11	07:11 18:21	06:48 16:41	07:20 08:11-08:34/23 16:30
16	07:25 16:55	06:56 17:34	06:12 06:36-07:23/47 18:07	06:20 19:41	05:40 20:13	05:25 20:37	05:39 20:33	06:09 20:00	06:40 07:30-08:01/31 19:10	07:13 18:19	06:50 16:40	07:21 08:12-08:35/23 16:30
17	07:25 16:56	06:55 17:35	06:11 06:36-07:23/47 18:08	06:19 19:42	05:39 20:14	05:25 20:37	05:39 20:33	06:10 19:59	06:41 07:28-08:02/34 19:08	07:14 18:17	06:51 16:39	07:21 08:11-08:35/24 16:31
18	07:24 16:57	06:53 17:36	06:09 06:36-07:23/47 18:09	06:17 19:43	05:39 20:15	05:25 20:38	05:40 20:32	06:11 19:57	06:42 07:26-08:03/37 19:06	07:15 18:16	06:52 16:38	07:22 08:12-08:36/24 16:31
19	07:24 16:58	06:52 17:37	06:07 06:36-07:22/46 18:10	06:16 19:44	05:38 20:16	05:25 20:38	05:41 20:31	06:12 19:56	06:44 07:25-08:04/39 19:05	07:16 18:14	06:53 16:37	07:23 08:13-08:37/24 16:31
20	07:23 17:00	06:50 17:39	06:05 06:36-07:21/45 18:11	06:14 19:46	05:37 20:17	05:25 20:38	05:42 20:31	06:13 19:54	06:45 07:23-08:04/41 19:03	07:17 18:13	06:55 16:37	07:23 08:13-08:37/24 16:32
21	07:23 17:01	06:49 17:40	06:04 06:36-07:20/44 18:13	06:12 19:47	05:36 20:18	05:25 20:38	05:43 20:30	06:14 19:53	06:46 07:22-08:05/43 19:01	07:18 18:11	06:56 16:36	07:24 08:13-08:38/25 16:32
22	07:22 17:02	06:47 17:41	06:02 06:37-07:20/43 18:14	06:11 19:48	05:35 20:19	05:26 20:39	05:44 20:29	06:15 19:51	06:47 07:21-08:05/44 18:59	07:19 18:10	06:57 16:35	07:24 08:13-08:38/25 16:33
23	07:21 17:03	06:46 17:42	06:00 06:37-07:18/41 18:15	06:09 19:49	05:34 20:20	05:26 20:39	05:45 20:28	06:16 19:50	06:48 07:20-08:05/45 18:58	07:21 18:08	06:58 16:35	07:25 08:14-08:38/24 16:33
24	07:21 17:04	06:44 17:44	05:59 06:37-07:17/40 18:16	06:08 19:50	05:33 20:21	05:26 20:39	05:46 20:27	06:17 19:48	06:49 07:19-08:05/46 18:56	07:22 18:07	06:59 16:34	07:25 08:15-08:39/24 16:34
25	07:20 17:06	06:43 17:45	05:57 06:39-07:16/37 18:17	06:07 19:51	05:33 20:22	05:26 20:39	05:47 20:26	06:18 19:47	06:50 07:19-08:05/46 18:54	06:23 17:05	07:00 16:33	07:26 08:15-08:39/24 16:34
26	07:19 17:07	06:41 17:46	05:55 06:39-07:14/35 18:18	06:05 19:52	05:32 20:23	05:27 20:39	05:47 20:26	06:19 19:45	06:51 07:18-08:05/47 18:52	06:24 17:04	07:02 16:33	07:26 08:16-08:40/24 16:35
27	07:18 17:08	06:40 17:47	05:53 06:40-07:12/32 18:19	06:04 19:53	05:31 20:24	05:27 20:39	05:48 20:25	06:20 19:43	06:52 07:18-08:05/47 18:51	06:25 17:03	07:03 16:32	07:26 08:16-08:40/24 16:36
28	07:17 17:09	06:38 17:48	05:52 06:41-07:09/28 18:20	06:02 19:54	05:31 20:25	05:27 20:39	05:49 20:24	06:21 19:42	06:53 07:17-08:04/47 18:49	06:27 17:01	07:04 16:32	07:27 08:17-08:40/23 16:36
29	07:16 17:11		06:50 07:44-08:07/23 19:21	06:01 19:55	05:30 20:26	05:28 20:39	05:50 20:23	06:22 19:40	06:54 07:17-08:04/47 18:47	06:28 17:00	07:05 16:32	07:27 08:17-08:40/23 16:37
30	07:16 17:12		06:48 07:46-08:04/18 19:23	05:59 19:57	05:30 20:26	05:28 20:39	05:51 20:22	06:23 19:39	06:55 07:17-08:03/46 18:45	06:29 16:59	07:06 16:31	07:27 08:18-08:40/22 16:38
31	07:15 17:13		06:47 07:52-07:57/5 19:24		05:29 20:27		05:52 20:21	06:24 19:37		06:30 16:57		07:27 08:19-08:41/22 16:39
Potential sun hours	295	296	369	400	450	455	461	429	375	344	296	285
Sum of minutes with flicker	126	0	1095	0	0	0	0	0	705	400	0	591

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

Calculation: GE.RTL01**WTG:** A11 - A11

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:28 07:56-08:25/29	07:14	06:37	06:45 07:04-07:17/13	05:58	05:28
	16:40	17:15	17:50	19:25	19:58	20:28
2	07:28 07:57-08:26/29	07:13	06:35	06:43 07:02-07:17/15	05:57	05:28
	16:40	17:16	17:51	19:26	19:59	20:29
3	07:28 07:57-08:26/29	07:12	06:34	06:42 07:00-07:16/16	05:55	05:27
	16:41	17:17	17:52	19:27	20:00	20:29
4	07:28 07:57-08:27/30	07:11	06:32	06:40 06:59-07:16/17	05:54	05:27
	16:42	17:18	17:53	19:28	20:01	20:30
5	07:28 07:57-08:26/29	07:09	06:30	06:38 06:57-07:15/18	05:53	05:27
	16:43	17:20	17:54	19:29	20:02	20:31
6	07:28 07:57-08:27/30	07:08	06:29	06:36 06:55-07:14/19	05:52	05:26
	16:44	17:21	17:55	19:30	20:03	20:31
7	07:28 07:58-08:27/29	07:07	06:27	06:35 06:55-07:13/18	05:50	05:26
	16:45	17:22	17:57	19:31	20:04	20:32
8	07:28 07:59-08:28/29	07:06	06:26	06:33 06:56-07:11/15	05:49	05:26
	16:46	17:23	17:58	19:32	20:05	20:33
9	07:27 07:59-08:29/30	07:05	06:24	06:32 06:57-07:09/12	05:48	05:26
	16:47	17:25	17:59	19:33	20:06	20:33
10	07:27 07:59-08:28/29	07:04	06:22	06:30 07:02-07:04/2	05:47	05:25
	16:48	17:26	18:00	19:35	20:07	20:34
11	07:27 08:00-08:29/29	07:02	06:21	06:28	05:46	05:25
	16:49	17:27	18:01	19:36	20:08	20:34
12	07:27 08:01-08:30/29	07:01	06:19	06:27	05:45	05:25
	16:50	17:29	18:02	19:37	20:09	20:35
13	07:26 08:00-08:29/29	07:00	06:17	06:25	05:44	05:25
	16:51	17:30	18:04	19:38	20:10	20:36
14	07:26 08:01-08:30/29	06:59	06:16	06:23	05:42	05:25
	16:53	17:31	18:05	19:39	20:11	20:36
15	07:26 08:02-08:29/27	06:57	06:14	06:22	05:41	05:25
	16:54	17:32	18:06	19:40	20:12	20:36
16	07:25 08:03-08:30/27	06:56	06:12	06:20	05:40	05:25
	16:55	17:34	18:07	19:41	20:13	20:37
17	07:25 08:03-08:30/27	06:55	06:10	06:19	05:39	05:25
	16:56	17:35	18:08	19:42	20:14	20:37
18	07:24 08:04-08:30/26	06:53	06:09	06:17	05:38	05:25
	16:57	17:36	18:09	19:43	20:15	20:38
19	07:24 08:05-08:29/24	06:52	06:07	06:16	05:38	05:25
	16:58	17:37	18:10	19:44	20:16	20:38
20	07:23 08:05-08:29/24	06:50	06:05	06:14	05:37	05:25
	17:00	17:39	18:11	19:46	20:17	20:38
21	07:23 08:07-08:29/22	06:49	06:04	06:12	05:36	05:25
	17:01	17:40	18:13	19:47	20:18	20:38
22	07:22 08:08-08:28/20	06:47	06:02	06:11	05:35	05:26
	17:02	17:41	18:14	19:48	20:19	20:39
23	07:21 08:09-08:27/18	06:46	06:00	06:09	05:34	05:26
	17:03	17:42	18:15	19:49	20:20	20:39
24	07:21 08:11-08:25/14	06:44	05:59	06:08	05:33	05:26
	17:04	17:44	18:16	19:50	20:21	20:39
25	07:20 08:14-08:24/10	06:43	05:57	06:06	05:33	05:26
	17:06	17:45	18:17	19:51	20:22	20:39
26	07:19	06:41	05:55	06:05	05:32	05:27
	17:07	17:46	18:18	19:52	20:23	20:39
27	07:18	06:40	05:53 06:12-06:13/1	06:04	05:31	05:27
	17:08	17:47	18:19	19:53	20:24	20:39
28	07:17	06:38	05:52 06:10-06:15/5	06:02	05:31	05:27
	17:09	17:48	18:20	19:54	20:25	20:39
29	07:16		06:50 07:09-07:16/7	06:01	05:30	05:28
	17:11		19:21	19:55	20:25	20:39
30	07:16		06:48 07:07-07:17/10	05:59	05:29	05:28
	17:12		19:22	19:56	20:26	20:39
31	07:15		06:47 07:05-07:17/12		05:29	
	17:13		19:24		20:27	
Potential sun hours	295	296	369	400	450	455
Sum of minutes with flicker	648	0	35	145	0	0

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

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

SHADOW - Calendar per WTG

Calculation: GE.RTL01**WTG:** A11 - A11

Assumptions for shadow calculations

Maximum distance for influence	2.000 m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:29 20:39	05:53 20:19	06:25 19:35	06:56 18:44	06:31 16:56	07:07 07:42-08:11/29 16:31
2	05:29 20:39	05:54 20:18	06:26 07:00-07:02/2 19:34	06:57 18:42	06:33 16:55	07:08 07:42-08:11/29 16:30
3	05:30 20:39	05:55 20:17	06:27 06:55-07:07/12 19:32	06:58 18:40	06:34 16:53	07:09 07:42-08:12/30 16:30
4	05:30 20:39	05:56 20:16	06:28 06:53-07:08/15 19:30	06:59 18:39	06:35 16:52	07:10 07:43-08:12/29 16:30
5	05:31 20:38	05:57 20:15	06:29 06:51-07:09/18 19:29	07:00 18:37	06:36 16:51	07:11 07:43-08:12/29 16:30
6	05:31 20:38	05:58 20:14	06:30 06:51-07:10/19 19:27	07:01 18:35	06:37 16:50	07:12 07:43-08:13/30 16:30
7	05:32 20:38	05:59 20:12	06:31 06:52-07:10/18 19:25	07:03 18:34	06:39 16:49	07:13 07:44-08:13/29 16:30
8	05:33 20:37	06:00 20:11	06:32 06:53-07:11/18 19:24	07:04 18:32	06:40 16:48	07:14 07:44-08:14/30 16:29
9	05:33 20:37	06:01 20:10	06:33 06:54-07:10/16 19:22	07:05 18:30	06:41 16:47	07:15 07:45-08:14/29 16:29
10	05:34 20:37	06:02 20:08	06:34 06:55-07:10/15 19:20	07:06 18:29	06:42 16:45	07:16 07:46-08:15/29 16:29
11	05:35 20:36	06:03 20:07	06:35 06:56-07:10/14 19:18	07:07 18:27	06:44 16:44	07:17 07:46-08:15/29 16:30
12	05:36 20:36	06:04 20:06	06:36 06:57-07:09/12 19:17	07:08 18:25	06:45 16:43	07:18 07:47-08:16/29 16:30
13	05:36 20:35	06:05 20:04	06:37 06:58-07:08/10 19:15	07:09 18:24	06:46 16:42	07:18 07:47-08:15/28 16:30
14	05:37 20:35	06:06 20:03	06:38 06:59-07:07/8 19:13	07:10 18:22	06:47 16:42	07:19 07:47-08:16/29 16:30
15	05:38 20:34	06:07 20:02	06:39 07:00-07:05/5 19:11	07:11 18:20	06:48 16:41	07:20 07:48-08:16/28 16:30
16	05:39 20:33	06:08 20:00	06:40 07:01-07:03/2 19:10	07:12 18:19	06:50 16:40	07:21 07:49-08:17/28 16:30
17	05:39 20:33	06:10 19:59	06:41 19:08	07:14 18:17	06:51 07:47-07:57/10 16:39	07:21 07:49-08:17/28 16:31
18	05:40 20:32	06:11 19:57	06:42 19:06	07:15 18:16	06:52 07:45-07:59/14 16:38	07:22 07:50-08:18/28 16:31
19	05:41 20:31	06:12 19:56	06:43 19:04	07:16 18:14	06:53 07:44-08:02/18 16:37	07:23 07:50-08:17/27 16:31
20	05:42 20:31	06:13 19:54	06:45 19:03	07:17 18:13	06:54 07:43-08:03/20 16:37	07:23 07:51-08:18/27 16:32
21	05:43 20:30	06:14 19:53	06:46 19:01	07:18 18:11	06:56 07:42-08:04/22 16:36	07:24 07:52-08:19/27 16:32
22	05:44 20:29	06:15 19:51	06:47 18:59	07:19 18:10	06:57 07:42-08:06/24 16:35	07:24 07:52-08:19/27 16:33
23	05:45 20:28	06:16 19:50	06:48 18:58	07:21 18:08	06:58 07:42-08:06/24 16:35	07:25 07:52-08:19/27 16:33
24	05:46 20:27	06:17 19:48	06:49 18:56	07:22 18:07	06:59 07:41-08:07/26 16:34	07:25 07:53-08:20/27 16:34
25	05:46 20:26	06:18 19:47	06:50 18:54	06:23 17:05	07:00 07:41-08:08/27 16:33	07:26 07:53-08:21/28 16:34
26	05:47 20:26	06:19 19:45	06:51 18:52	06:24 17:04	07:01 07:41-08:08/27 16:33	07:26 07:54-08:22/28 16:35
27	05:48 20:25	06:20 19:43	06:52 18:51	06:25 17:03	07:03 07:42-08:09/27 16:32	07:26 07:54-08:22/28 16:36
28	05:49 20:24	06:21 19:42	06:53 18:49	06:26 17:01	07:04 07:42-08:10/28 16:32	07:27 07:54-08:22/28 16:36
29	05:50 20:23	06:22 19:40	06:54 18:47	06:28 17:00	07:05 07:42-08:10/28 16:31	07:27 07:54-08:23/29 16:37
30	05:51 20:22	06:23 19:39	06:55 18:45	06:29 16:59	07:06 07:42-08:11/29 16:31	07:27 07:55-08:23/28 16:38
31	05:52 20:20	06:24 19:37		06:30 16:57		07:27 07:56-08:24/28 16:39
Potential sun hours	461	429	375	344	296	285
Sum of minutes with flicker	0	0	184	0	324	879

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

Calculation: GE.RTL01**WTG:** A12 - A12

Assumptions for shadow calculations

Maximum distance for influence	2.000	m
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

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
608	581	206	140	281	576	431	720	749	737	1.378	721	7.128

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:28	07:14	06:37	06:45	05:58	05:28	05:29	05:53	06:25	06:56	06:31	07:07
	16:40	17:14	17:49	19:25	19:58	20:28	20:39	20:19	19:35	18:44	16:56	16:31
2	07:28	07:13	06:35	06:43	05:57	05:28	05:29	05:54	06:26	06:57	06:32	07:08
	16:40	17:16	17:51	19:26	19:59	20:29	20:39	20:18	19:34	18:42	16:55	16:30
3	07:28	07:12	06:34	06:41	05:55	05:27	05:30	05:55	06:27	06:58	06:34	07:09
	16:41	17:17	17:52	19:27	20:00	20:29	20:39	20:17	19:32	18:40	16:53	16:30
4	07:28	07:10	06:32	06:40	05:54	05:27	05:30	05:56	06:28	06:59	06:35	07:10
	16:42	17:18	17:53	19:28	20:01	20:30	20:38	20:16	19:30	18:39	16:52	16:30
5	07:28	07:09	06:30	06:38	05:53	05:27	05:31	05:57	06:29	07:00	06:36	07:11
	16:43	17:20	17:54	19:29	20:02	20:31	20:38	20:15	19:29	18:37	16:51	16:30
6	07:28	07:08	06:29	06:36	05:52	05:26	05:31	05:58	06:30	07:01	06:37	07:12
	16:44	17:21	17:55	19:30	20:03	20:31	20:38	20:14	19:27	18:35	16:50	16:30
7	07:28	07:07	06:27	06:35	05:50	05:26	05:32	05:59	06:31	07:02	06:39	07:13
	16:45	17:22	17:57	19:31	20:04	20:32	20:38	20:12	19:25	18:33	16:49	16:29
8	07:28	07:06	06:25	06:33	05:49	05:26	05:33	06:00	06:32	07:04	06:40	07:14
	16:46	17:23	17:58	19:32	20:05	20:33	20:37	20:11	19:23	18:32	16:48	16:29
9	07:27	07:05	06:24	06:31	05:48	05:26	05:33	06:01	06:33	07:05	06:41	07:15
	16:47	17:25	17:59	19:33	20:06	20:33	20:37	20:10	19:22	18:30	16:46	16:29
10	07:27	07:04	06:22	06:30	05:47	05:25	05:34	06:02	06:34	07:06	06:42	07:16
	16:48	17:26	18:00	19:35	20:07	20:34	20:37	20:08	19:20	18:29	16:45	16:29
11	07:27	07:02	06:21	06:28	05:46	05:25	05:35	06:03	06:35	07:07	06:44	07:17
	16:49	17:27	18:01	19:36	20:08	20:34	20:36	20:07	19:18	18:27	16:44	16:29
12	07:27	07:01	06:19	06:27	05:45	05:25	05:35	06:04	06:36	07:08	06:45	07:17
	16:50	17:29	18:02	19:37	20:09	20:35	20:36	20:06	19:17	18:25	16:43	16:30
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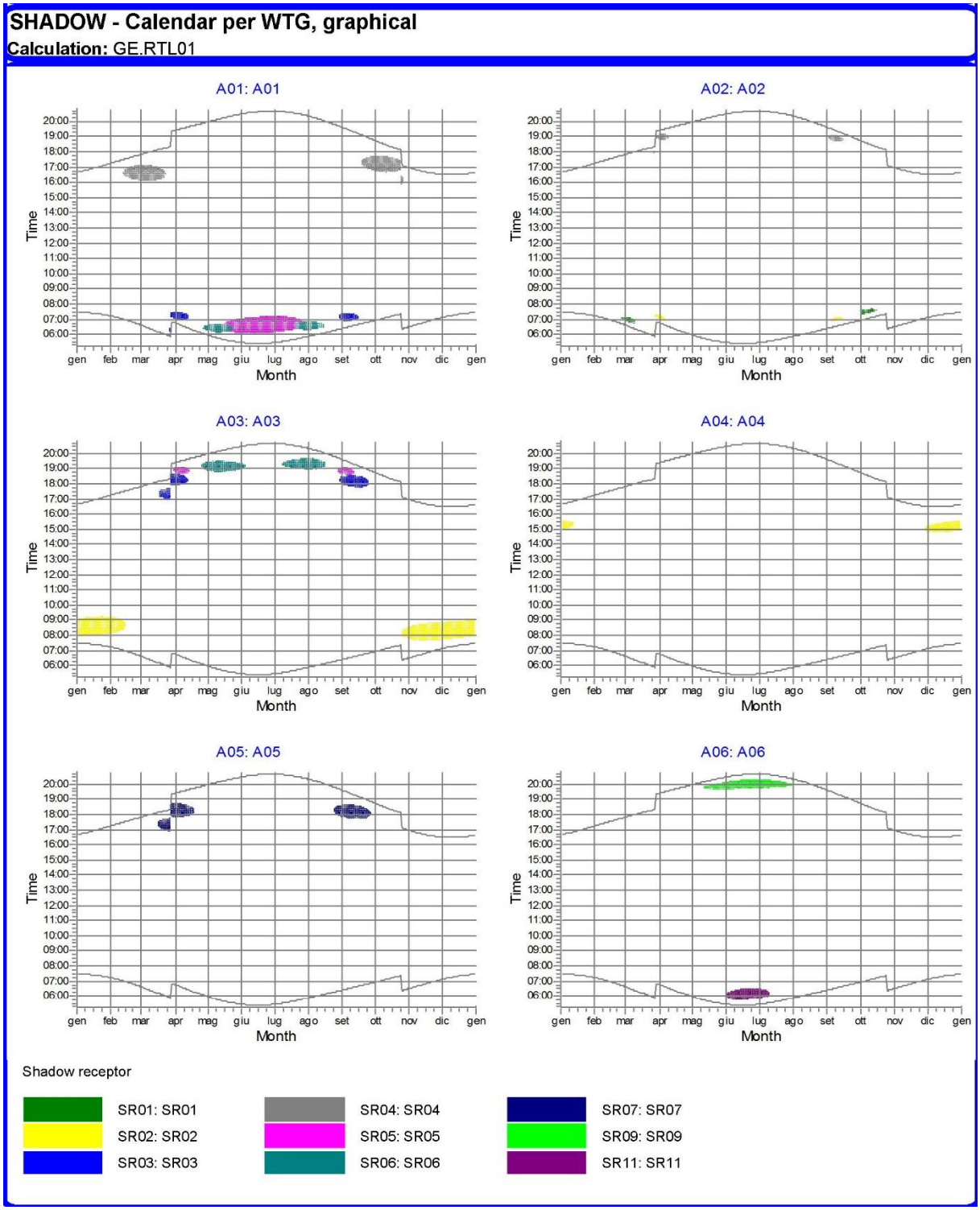
	16:51	17:30	18:03	19:38	20:10	20:35	20:35	20:04	19:15	18:24	16:42	16:30
14	07:26	06:59	06:16	06:23	05:42	05:25	05:37	06:06	06:38	07:10	06:47	07:19
	16:52	17:31	18:05	19:39	20:11	20:36	20:35	20:03	19:13	18:22	16:41	16:30
15	07:26	06:57	06:14	06:22	05:41	05:25	05:38	06:07	06:39	07:11	06:48	07:20
	16:54	17:32	18:06	19:40	20:12	20:36	20:34	20:02	19:11	18:20	16:41	16:30
16	07:25	06:56	06:12	06:20	05:40	05:25	05:39	06:08	06:40	07:12	06:50	07:21
	16:55	17:34	18:07	19:41	20:13	20:37	20:33	20:00	19:10	18:19	16:40	16:30
17	07:25	06:54	06:10	06:19	05:39	05:25	05:39	06:09	06:41	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:14	20:37	20:33	19:59	19:08	18:17	16:39	16:31
18	07:24	06:53	06:09	06:17	05:38	05:25	05:40	06:11	06:42	07:15	06:52	07:22
	16:57	17:36	18:09	19:43	20:15	20:37	20:32	19:57	19:06	18:16	16:38	16:31
19	07:24	06:52	06:07	06:15	05:38	05:25	05:41	06:12	06:43	07:16	06:53	07:23
	16:58	17:37	18:10	19:44	20:16	20:38	20:31	19:56	19:04	18:14	16:37	16:31
20	07:23	06:50	06:05	06:14	05:37	05:25	05:42	06:13	06:44	07:17	06:54	07:23
	16:59	17:39	18:11	19:45	20:17	20:38	20:31	19:54	19:03	18:13	16:37	16:32
21	07:23	06:49	06:04	06:12	05:36	05:25	05:43	06:14	06:46	07:18	06:56	07:24
	17:01	17:40	18:12	19:47	20:18	20:38	20:30	19:53	19:01	18:11	16:36	16:32
22	07:22	06:47	06:02	06:11	05:35	05:25	05:44	06:15	06:47	07:19	06:57	07:24
	17:02	17:41	18:14	19:48	20:19	20:39	20:29	19:51	18:59	18:10	16:35	16:33
23	07:21	06:46	06:00	06:09	05:34	05:26	05:45	06:16	06:48	07:21	06:58	07:25
	17:03	17:42	18:15	19:49	20:20	20:39	20:28	19:50	18:57	18:08	16:35	16:33
24	07:20	06:44	05:59	06:08	05:33	05:26	05:46	06:17	06:49	07:22	06:59	07:25
	17:04	17:43	18:16	19:50	20:21	20:39	20:27	19:48	18:56	18:07	16:34	16:34
25	07:20	06:43	05:57	06:06	05:33	05:26	05:46	06:18	06:50	06:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20:39	20:26	19:47	18:54	17:05	16:33	16:34
26	07:19	06:41	05:55	06:05	05:32	05:27	05:47	06:19	06:51	06:24	07:01	07:26
	17:07	17:46	18:18	19:52	20:23	20:39	20:25	19:45	18:52	17:04	16:33	16:35
27	07:18	06:40	05:53	06:04	05:31	05:27	05:48	06:20	06:52	06:25	07:03	07:26
	17:08	17:47	18:19	19:53	20:24	20:39	20:25	19:43	18:51	17:03	16:32	16:36
28	07:17	06:38	05:52	06:02	05:31	05:27	05:49	06:21	06:53	06:26	07:04	07:27
	17:09	17:48	18:20	19:54	20:25	20:39	20:24	19:42	18:49	17:01	16:32	16:36
29	07:16		06:50	06:01	05:30	05:28	05:50	06:22	06:54	06:28	07:05	07:27
	17:11		19:21	19:55	20:25	20:39	20:23	19:40	18:47	17:00	16:31	16:37
30	07:15		06:48	05:59	05:29	05:28	05:51	06:23	06:55	06:29	07:06	07:27
	17:12		19:22	19:56	20:26	20:39	20:22	19:39	18:45	16:59	16:31	16:38
31	07:15		06:47		05:29		05:52	06:24		06:30		07:27
	17:13		19:24		20:27		20:20	19:37		16:57		16:38
Potential sun hours	295	296	369	400	450	455	461	429	375	344	296	285
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	0	0

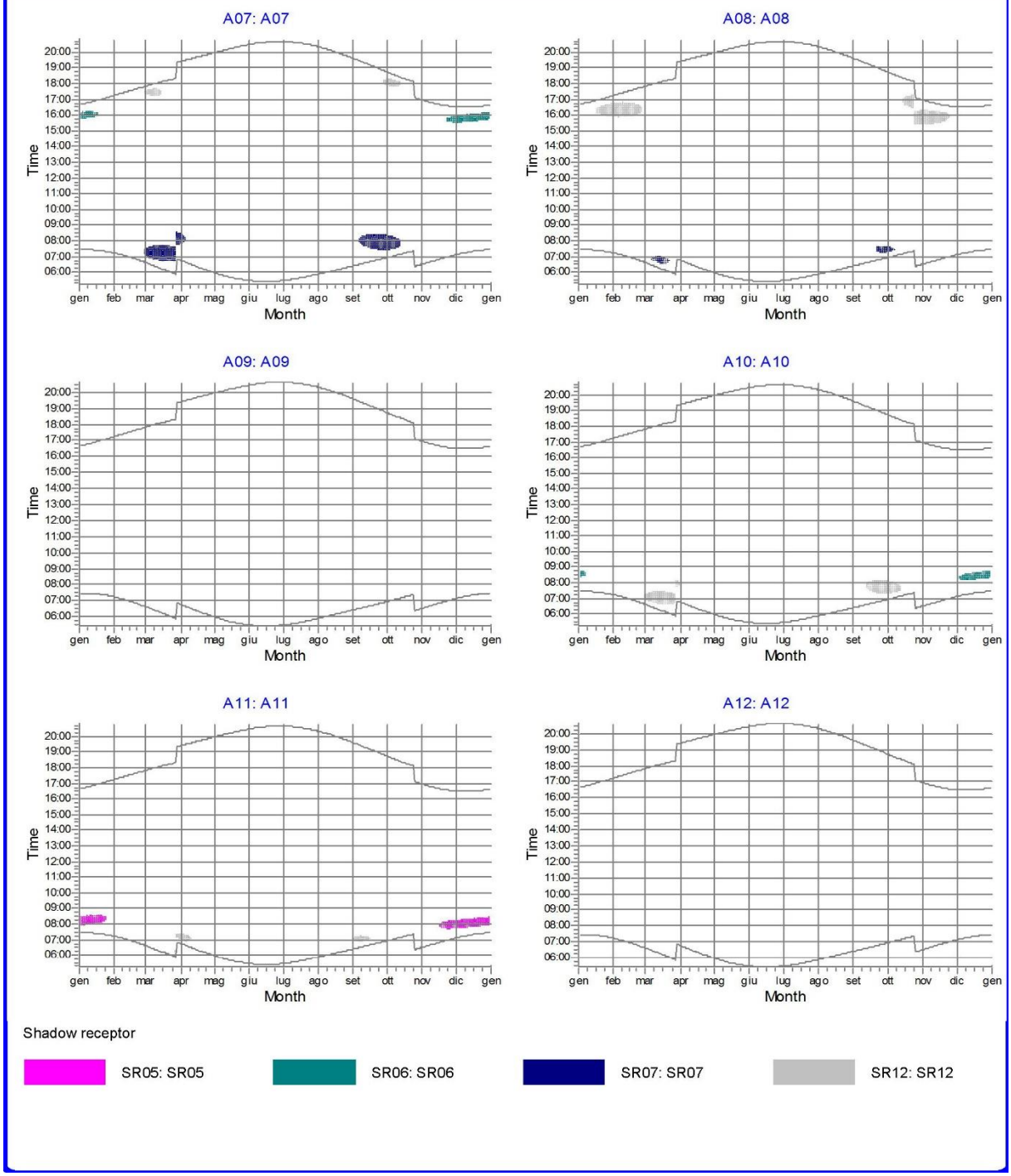
Table layout: For each day in each month the following matrix apply

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
Calculation: GE.RTL01
A01: A01
A02: A02
A03: A03
A04: A04
A05: A05
A06: A06
Time
Month
gen feb mar apr mag giu lug ago set ott nov dic gen
Shadow receptor
SR01: SR01
SR02: SR02
SR03: SR03
SR04: SR04
SR05: SR05
SR06: SR06
SR07: SR07
SR09: SR09
SR11: SR11

SHADOW - Calendar per WTG, graphical

Calculation: GE.RTL01



ALLEGATO 5: "SHADOW MAP"

MAPPA CHE RAPPRESENTA LE ORE DI OMBREGGIAMENTO ("REAL CASE") PER LE AREE LIMITROFE ALLE TURBINE DI PROGETTO.