

IMPIANTO DI PRODUZIONE DI ENERGIA DA FONTE EOLICA
"SAN PANCRAZIO TORREVECCHIA" DI POTENZA PARI A 34,50 MW

REGIONE PUGLIA
PROVINCIA di BRINDISI
COMUNE di SAN PANCRAZIO SALENTINO
Località: Masserie Corte Finocchio, Torre Vecchia e Campone
OPERE DI CONNESSIONE NEI COMUNI DI: San Pancrazio S. (BR) Erchie (BR) ed Avetrana (TA)

PROGETTO DEFINITIVO
Id AU H4QPRN5

Tav.:

Titolo:

R29

ANALISI DELL'EVOLUZIONE DELL'OMBRA
INDOTTA DAGLI AEREOGENERATORI.
SHADOW FLICKERING

Scala:

Formato Stampa:

Codice Identificatore Elaborato

N.A.

A4

H4QPRN5_DocumentazioneSpecialistica_29

Committente:

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Data	Motivo della revisione:	Redatto:	Controllato:	Approvato:
16 febbraio 2018	Prima emissione	STC	FC	TOZZI GREEN S.p.a.

1. SHADOW FLICKERING

Lo *shadow flickering* consiste in una variazione periodica dell'intensità luminosa osservata, causata dalla proiezione, su una superficie, dell'ombra indotta da oggetti in movimento. Per un impianto eolico tale fenomeno è generato dalla proiezione, al suolo o su un recettore, dell'ombra prodotta dalle pale in rotazione degli aerogeneratori.

Dal punto di vista di un recettore, lo *shadow flickering* si manifesta in una variazione ciclica dell'intensità luminosa: in presenza di luce solare diretta, un recettore localizzato nella zona d'ombra indotta dal rotore, sarà investito da un continuo alternarsi di luce diretta ed ombra, causato dalla proiezione delle ombre dalle pale in movimento.

Tale fenomeno se vissuto dal recettore per periodi di tempo non trascurabile può generare un disturbo, quando:

- si sia in presenza di un livello sufficiente di intensità luminosa, ossia in condizioni di cielo sereno sgombro da nubi ed in assenza di nebbia e con sole alto rispetto all'orizzonte;
- la linea recettore-aerogeneratore non incontri ostacoli: in presenza di vegetazione o edifici interposti l'ombra generata da quest'ultimi annulla il fenomeno. Pertanto, ad esempio, qualora il recettore sia un'abitazione, perché si generi lo *shadow flickering* le finestre dovrebbero essere orientate perpendicolarmente alla linea recettore-aerogeneratore e non affacciarsi su ostacoli (alberi, altri edifici, ecc.);
- la turbina sia orientata in modo che il rotore risulti perpendicolare alla linea sole-recettore: quando il piano del rotore è perpendicolare alla linea sole-recettore, l'ombra proiettata dalle pale risulta muoversi all'interno di un "cerchio" che riferisce all'circonferenza del rotore inducendo uno *shadow flickering* non trascurabile;
- per situazioni in cui, dal punto di vista del recettore, il piano del rotore risulti essere in linea con il sole ed il recettore, l'ombra proiettata è sottile, di bassa intensità ed è caratterizzata da un rapido movimento, risultando pertanto lo *shadow flickering* di entità trascurabile;
- la posizione del sole sia tale da indurre una luminosità sufficiente. Ciò si traduce, in riferimento alla latitudine di progetto, in un'altezza del sole pari ad almeno $15^\circ - 20^\circ$;
- le pale siano in movimento;
- turbina e recettore siano vicini: le ombre proiettate in prossimità dell'aerogeneratore risultano di maggiore intensità e nitidezza rispetto a quelle proiettate lontano. Quando una turbina è posizionata sufficientemente vicino al recettore, così che una porzione ampia di pala copra il sole (così come osservato dal punto di vista del recettore), l'intensità del flicker risulta maggiore. All'aumentare della distanza tra turbina e recettore, le pale coprono una porzione sempre più piccola del sole, inducendo un flicker di minore entità. Inoltre il fenomeno risulta di bassa entità quando l'ombra proiettata sul recettore è indotta dall'estremità delle pale (rotor tip); raggiunge il massimo dell'intensità in corrispondenza dell'attacco di pala all'hub.

Pertanto, in riferimento a quanto sin qui esposto, durata ed entità dello *Shadow flickering* sono determinate e condizionate:

- dalla distanza tra aerogeneratore e recettore;
- dalla direzione ed intensità del vento;
- dall'orientamento del recettore;
- dalla presenza o meno di ostacoli lungo la linea di vista recettore – aerogeneratore – sole;
- dalle condizioni meteorologiche;
- dall'altezza del sole.

2. CALCOLO DELL'OMBRA

Al fine di verificare la sussistenza del fenomeno dello *shadow flickering* indotto dalle opere in progetto sono state effettuate simulazioni in considerazione:

- del diagramma solare riferito alla latitudine di installazione del parco;
- dell'altezza complessiva di macchina, intesa quale somma tra l'altezza del mozzo e la lunghezza di pala;
- dall'orientamento del rotore rispetto al ricettore;
- della posizione del sole e quindi della proiezione dell'ombra rispetto ai recettori;
- della posizione dei possibili recettori.

Le simulazioni effettuate con l'ausilio del programma windPRO facendo le seguenti assunzioni:

- la massima distanza di influenza pari a 1.814 m è stata calcolata solo quando più del 20% del sole è coperto dalla pala;
- altezza minima del sole sull'orizzonte 3°;
- probabilità di sole per Brindisi (probabilità di ore di sole al giorno), secondo quanto riportato in tabella

Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

- le ore di funzionamento dell'impianto, in relazione anche alla direzione del vento, sono state calcolate sulla base di dati statistici elaborati dallo stesso programma. Si rammenta a tal proposito che windPRO è uno dei programmi più utilizzati per il calcolo della producibilità degli impianti eolici
- un aerogeneratore è stato considerato visibile quando è completamente visibile dalle finestre del ricettore
- sono stati individuati nell'area di impianto 13 ricettori sensibili (edifici rurali abitati), rispetto ai quali è stato effettuato il calcolo
- non sono stati considerati eventuali ostacoli interposti tra i recettori e la turbina eolica
- la simulazione è stata altresì condotta non considerando l'orografia del terreno in quanto non ha una influenza significativa sulla proiezione delle ombre per via dell'andamento piano altimetrico praticamente piatto dell'area di esame.

Il programma effettua il calcolo delle ore del giorno in cui si potrebbe avere l'effetto del flickering sul ricettore, facendo la somma dei minuti. Effettua poi la somma teorica dei minuti di ciascun mese (worst case) che poi viene ridotta in considerazione delle giornate soleggiate, dell'operatività effettiva dell'impianto eolico, della direzione del vento.

Si ottengono così i dati sinteticamente riportati in tabella per ciascun ricettore individuato.

RICETTORE	AEROGENERATORI (che generano il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
A	9-10	29-31 gen	16-17	22 min	7 min
A	8-9-10	1-25 feb	16-17	51 min	166 min
A	8-10	17-31 ott	15,40-17,30	51 min	136 min
A	8-9-10	1-13 nov	15,30-16,15	45 min	79 min

RICETTORE	AEROGENERATORI (che generano il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
B	8-9-10	14-28 feb	16,44-17,15	34	55
B	8-10	1-14 mar	16,39-17,15	34	65
B	10	29-30 set	17,30-17,40	15	5
B	8-9-10	1-28 ott	16,15-17,50	34	147

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
C	8-6	1-2 gen	15,42-15,49	8	3
C	8-9-10	3-31 mar	16,55-18,35	39	142
C	10	1-10 apr	17,55-18,32	37	61
C	9-10	2-30 set	17,45-18,26	39	226
C	8-9	1-11 ott	17,36-18,06	30	50
C	3	10-31 dic	15,31-15,50	14	56

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
D	2-4-5	1-31 gen	8-9 e 16-17	42	201
D	2-3-4	1-28 feb	16-17	56	237
D	4	1-3 mar	16-16,30	23	10
D	8-9	13-30 apr	18,45-19,15	22	69
D	9	1-31 mag	18,45-19,30	32	228
D	9	12-31 lug	19-19,45	31	170
D	8-9	1-30 ago	18,55-19,30	31	209
D	3-4	11-31 ott	15,20-17,20	55	217
D	2-3-4-5	1-30 nov	15,00-16,15	53	351

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
E	2-3-5	1-31 gen	7,50-8,40 e 16-17	83	440
E	3-4-5	1-28 feb	7-8 e 16-17	74	332
E	4	1-3 mar	15,50-16,10	23	8
E	7-8	5-30 apr	18,40-19,20	25	110
E	8-9	1-4 mag e 10-31 mag	18,50-19,40	37	226
E	9	1-30 giu	18,55-19,40	36	352
E	9	1-31 lug	19,05-19,50	37	398
E	7-8-9	1-3 ago e 8-31 ago	18,50-19,40	25	163
E	7	1-7 set	18,40-19,05	19	27
E	3-4	11-31 ott	16,00-17,20	73	269
E	2-3-4-5	1-30 nov	15,00-16,20 e 17,20-8	83	516
E	5-2		7,30-8,40	54	347

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
F	6-7-10	1-31 gen	7-8 e 15-17	69	387
F	10	1-21 feb	7,30-8,40	53	226
F	10	20-31 ott	7,20-9,00	47	129
F	6-10	1-30 nov	7,30-8,20	67	429
F	6-7-10	1-31 dic	7-8 e 15-16,30	69	337

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
G	6-7-10	1-22 gen e 26-31 gen	15-16,20 e 7,45-8,15	53	216
G	10	1-28 feb	7,30-8,20	50	291
G	10	1-3 mar	7,35-8,05	26	14
G	10	11-31 ott	7,00-8,50	50	268
G	6-7-10	1-16 nov e 20-30 nov	6,50-7,50 e 14,50-16,00	49	228
G	6-7	1-31 dic	14,50-16,20	53	235

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
H	6	30-31 mar	7,15-7,30	18	5
H	6-7-8	1-30 apr	6,15-7,40	54	264
H	7	1-7 mag	6,15-6,30	21	22
H	6-7-8	6-31 ago	6,20-7,40	55	282
H	6	1-13 set	6,20-7,40	55	115

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
I	2	12-23 mar	6,15-6,30	15	25
	2	21-30 set	6,55-7,15	16	37
	2	1 ott	7,05-7,10	4	1

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
J	1	25-28 feb	16,30-17,00	30	12
J	1	1-29 mar	16-18	52	196
J	2-4	5-30 giu	5,40-6,20	28	170
J	2	1-7 lug	5,50-6,15	20	35
J	1	14-30 set	16,55-17,55	52	123
J	1	1-16 ott	16,55-17,55	52	158

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
K	2	17-30 apr	18,30-19,10	33	95
K	2	1-12 mag	18,30-19,20	32	81
K	5	1-30 giu	5,40-6,15	27	216
K	5	1-13 lug	5,40-6,10	25	79
K	2	1-26 ago	5,45-6,10	33	230

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
L	3-4	15-28 feb	16,54-17,15	24	38
L	4	1-3 mar	16,50-17,10	17	7
L	4	6-18 apr e 26-30 apr	18,50-19,10	19	53
L	9	1-16 mag	18,45-19,25	24	92
L	10	27-31 lug	19,10-19,30	18	22
L	9-10	1-16 ago e 25-31 ago	18,45-19,30	24	146
L	9	1-6 set	18,40-19,05	17	19
L	3-4	10-27 ott	16,30-17,30	24	58

RICETTORE	AEROGENERATORE (che genera il flickering)	PERIODO	ORARIO	DURATA MASSIMA TEORICA NEL PERIODO	MINUTI REALI TOTALI NEL PERIODO
M	Nessuno				0

Infine si riporta per ciascun ricettore il numero di ore/anno in cui si possono potenzialmente manifestare gli effetti dell'ombra.

RICETTORE	A	B	C	D	E	F	G
Ore ombra/anno	6:28	4:32	8:58	31:25	53:09	25:09	22:21

RICETTORE	H	I	J	K	L	M
Ore ombra/anno	11:28	1:03	11:33	11:40	7:14	0:00

3. CONCLUSIONI

A commento dei dati sopra riportati riguardanti lo shadow flickering osserviamo quanto segue.

- 1) L'effetto sui ricettori si presenta per un periodo limitato durante la giornata, tipicamente per circa 1,5 ore nelle prime ore del mattino e 1,5 ore prima del tramonto
- 2) L'effetto sui ricettori non si presenta tutti i giorni dell'anno ma solo in alcuni periodi;
- 3) In genere anche sulla base di normative presenti in altri Paesi, l'effetto si considera trascurabile qualora si mantenga al di sotto delle 10 ore anno. In base a questa considerazione l'effetto è:
 - trascurabile sui ricettori A, B, C, I, L, M
 - molto limitato sui ricettori H, J, K
 - presente di fatto solo sui ricettori D, E, F, G.
- 4) E' evidente che si tratta di ore potenziali poiché se l'aerogeneratore è fermo per assenza di vento l'effetto dello shadow flickering è assente, potendosi manifestare solo l'ombra sul ricettore.
- 5) Studi scientifici hanno accertato che frequenze inferiori a 10 Hz non hanno alcuna correlazione con attacchi di natura epilettica. Nel nostro caso gli aerogeneratori hanno una velocità di rotazione intorno 15,3 g/min, corrispondente a circa 0,26 Hz circa.

Infine per quanto attiene all'ombra che si potrebbe manifestare sulle strade più vicine al parco eolico:

- Date le latitudini l'ombra non può generare ghiaccio sulla sede stradale;
- Sono interessati dal fenomeno tratti stradali molto brevi di strade peraltro secondarie.

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Main Result

Assumptions for shadow calculations

Maximum distance for influence

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

Please look in WTG table

Minimum sun height over horizon for influence 3 °

Day step for calculation 1 days

Time step for calculation 1 minutes

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

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

EmdConwx_N40.400_E017.810 (1) (Regression MCP using ERA5_N40.327854

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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: CONTOURLINE_ONLINEDATA_0.wpo

Obstacles used in calculation

Eye height: 1,5 m

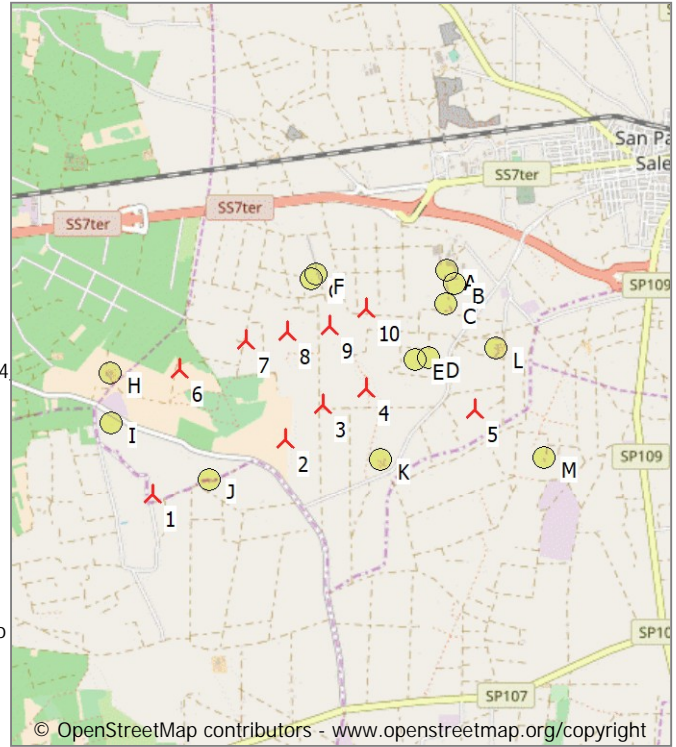
Grid resolution: 10,0 m

All coordinates are in

UTM (north)-WGS84 Zone: 33

WTGs

No.	Easting	Northing	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	735.788	4.474.550	60,0	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
2	737.098	4.475.152	55,0	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
3	737.458	4.475.502	55,0	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
4	737.883	4.475.674	55,0	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
5	738.969	4.475.502	55,0	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
6	736.022	4.475.810	58,4	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
7	736.670	4.476.120	63,5	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
8	737.083	4.476.213	61,5	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
9	737.495	4.476.285	60,0	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7
10	737.861	4.476.468	57,6	VESTAS V136-3.45 3450 136.0 !O!... Yes	Yes	VESTAS	V136-3.45 -3.450	3.450	136,0	132,0	1.814	11,7



Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	738.646	4.476.877	55,9	1,0	1,0	1,0	0,0	90,0	"Green house mode"
B	738.733	4.476.744	59,2	1,0	1,0	1,0	0,0	90,0	"Green house mode"
C	738.651	4.476.543	55,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
D	738.493	4.476.001	55,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
E	738.360	4.475.979	55,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
F	737.347	4.476.793	60,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
G	737.300	4.476.744	60,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
H	735.337	4.475.750	60,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
I	735.361	4.475.254	60,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
J	736.355	4.474.719	56,9	1,0	1,0	1,0	0,0	90,0	"Green house mode"
K	738.047	4.474.978	57,9	1,0	1,0	1,0	0,0	90,0	"Green house mode"
L	739.161	4.476.121	55,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"
M	739.672	4.475.049	65,0	1,0	1,0	1,0	0,0	90,0	"Green house mode"

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Main Result

Calculation Results

Shadow receptor

Shadow, expected values

No. Shadow hours

per year

[h/year]

A	6:28
B	4:32
C	8:58
D	31:25
E	53:09
F	25:09
G	22:21
H	11:28
I	1:03
J	11:33
K	11:40
L	7:14
M	0:00

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

No. Name

Worst case Expected
[h/year] [h/year]

1	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (14)	44:20	8:15
2	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (15)	53:36	14:13
3	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (16)	33:33	6:36
4	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (17)	85:07	17:39
5	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (18)	95:03	26:01
6	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (19)	55:00	12:37
7	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (20)	46:02	10:14
8	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (21)	37:05	8:33
9	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (22)	97:35	27:40
10	VESTAS V136-3.45	3450	136.0	!O!	hub: 132,0 m (TOT: 200,0 m) (23)	175:12	42:26

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:12 16:33	07:00 17:06	16:17 (10) 16:42 (9)	06:25 17:40	06:35 19:13	05:50 19:44	05:22 20:13	05:22 20:23	05:46 20:05	06:16 19:23	06:45 18:33	06:18 16:47	15:39 (10) 16:24 (8)
2	07:13 16:34	06:59 17:08	16:15 (10) 16:44 (9)	06:23 17:41	06:33 19:14	05:49 19:45	05:21 20:13	05:23 20:23	05:47 20:04	06:17 19:21	06:46 18:31	06:19 16:46	15:40 (10) 16:23 (8)
3	07:13 16:35	06:58 17:09	16:14 (10) 16:45 (9)	06:22 17:42	06:31 19:15	05:47 19:46	05:21 20:14	05:23 20:23	05:48 20:03	06:18 19:20	06:47 18:30	06:20 16:45	15:41 (10) 16:23 (8)
4	07:13 16:35	06:57 17:10	16:13 (10) 16:46 (9)	06:20 17:43	06:30 19:16	05:46 19:47	05:20 20:15	05:24 20:23	05:48 20:02	06:18 19:18	06:48 18:28	06:21 16:44	15:41 (10) 16:23 (8)
5	07:13 16:36	06:56 17:11	16:12 (10) 16:47 (9)	06:18 17:44	06:28 19:17	05:45 19:48	05:20 20:15	05:24 20:23	05:49 20:01	06:19 19:16	06:49 18:27	06:23 16:43	15:42 (10) 16:23 (8)
6	07:13 16:37	06:55 17:13	16:12 (10) 16:48 (9)	06:17 17:45	06:27 19:18	05:44 19:49	05:20 20:16	05:25 20:23	05:50 19:59	06:20 19:15	06:50 18:25	06:24 16:42	15:42 (10) 16:23 (8)
7	07:13 16:38	06:54 17:14	16:11 (10) 16:48 (9)	06:15 17:46	06:25 19:19	05:42 19:50	05:20 20:17	05:26 20:22	05:51 19:58	06:21 19:13	06:51 18:23	06:25 16:41	15:44 (10) 16:23 (8)
8	07:13 16:39	06:52 17:15	16:11 (10) 16:52 (8)	06:14 17:48	06:23 19:20	05:41 19:51	05:19 20:17	05:26 20:22	05:52 19:57	06:22 19:11	06:52 18:22	06:26 16:39	15:45 (10) 16:23 (8)
9	07:12 16:40	06:51 17:16	16:11 (10) 16:54 (8)	06:12 17:49	06:22 19:21	05:40 19:52	05:19 20:18	05:27 20:22	05:53 19:56	06:23 19:10	06:53 18:20	06:27 16:38	15:46 (10) 16:23 (8)
10	07:12 16:41	06:50 17:17	16:11 (10) 16:55 (8)	06:11 17:50	06:20 19:22	05:39 19:53	05:19 20:18	05:27 20:21	05:54 19:58	06:24 19:08	06:54 18:19	06:28 16:37	15:48 (10) 16:23 (8)
11	07:12 16:42	06:49 17:19	16:10 (10) 16:56 (8)	06:09 17:51	06:19 19:23	05:38 19:54	05:19 20:19	05:28 20:21	05:55 19:53	06:25 19:06	06:55 18:17	06:30 16:36	15:51 (10) 16:23 (8)
12	07:12 16:43	06:48 17:20	16:10 (10) 16:57 (8)	06:07 17:52	06:17 19:24	05:37 19:55	05:19 20:19	05:29 20:20	05:56 19:52	06:26 19:05	06:56 18:15	06:31 16:36	15:55 (10) 16:23 (8)
13	07:12 16:44	06:47 17:21	16:10 (10) 16:59 (8)	06:06 17:53	06:16 19:25	05:36 19:56	05:19 20:20	05:30 20:20	05:57 19:51	06:27 19:03	06:57 18:14	06:32 16:35	16:05 (9) 16:23 (8)
14	07:11 16:45	06:45 17:22	16:10 (10) 17:00 (8)	06:04 17:54	06:14 19:26	05:35 19:57	05:18 20:20	05:30 20:19	05:58 19:49	06:28 19:02	06:58 18:12	06:33 16:34	16:07 (9) 16:23 (8)
15	07:11 16:46	06:44 17:23	16:10 (10) 17:01 (8)	06:03 17:55	06:13 19:27	05:34 19:58	05:18 20:21	05:31 20:19	05:59 19:48	06:29 19:00	06:59 18:11	06:34 16:33	16:08 (9) 16:23 (8)
16	07:10 16:48	06:43 17:25	16:11 (10) 17:01 (8)	06:01 17:56	06:11 19:28	05:33 19:59	05:18 20:21	05:32 20:18	06:00 19:47	06:30 18:58	07:00 18:09	06:35 16:32	16:09 (9) 16:24 (8)
17	07:10 16:49	06:42 17:26	16:11 (10) 17:01 (8)	05:59 17:57	06:09 19:29	05:32 20:00	05:18 20:22	05:33 20:18	06:01 19:45	06:31 18:56	07:01 18:08	12 16:54 (10) 17:06 (10)	16:37 16:31
18	07:10 16:50	06:40 17:27	16:11 (10) 17:00 (8)	05:58 17:58	06:08 19:30	05:31 20:01	05:19 20:22	05:33 20:17	06:02 19:44	06:32 18:55	07:02 18:06	18 17:08 (10) 16:30 (8)	16:38 16:24
19	07:09 16:51	06:39 17:28	16:12 (10) 16:59 (8)	05:56 17:59	06:06 19:31	05:30 20:02	05:19 20:22	05:34 20:16	06:03 19:42	06:33 18:53	07:03 18:05	22 17:10 (10) 16:30 (8)	16:39 16:25
20	07:09 16:52	06:37 17:29	16:14 (10) 16:58 (8)	05:54 18:00	06:05 19:32	05:29 20:03	05:19 20:22	05:35 20:16	06:04 19:41	06:34 18:51	07:04 18:03	25 17:11 (10) 16:29 (8)	16:40 16:25
21	07:08 16:53	06:36 17:31	16:14 (10) 16:53 (8)	05:53 18:01	06:04 19:33	05:29 20:03	05:19 20:23	05:36 20:15	06:05 19:40	06:35 18:50	07:06 18:02	34 17:25 (8) 16:28 (8)	16:41 16:26
22	07:07 16:54	06:35 17:32	16:16 (10) 16:40 (10)	05:51 18:02	06:02 19:35	05:28 20:04	05:19 20:23	05:37 20:14	06:06 19:38	06:36 18:48	07:07 18:01	42 17:28 (8) 16:28 (8)	16:42 16:26
23	07:07 16:56	06:33 17:33	16:17 (10) 16:38 (10)	05:49 18:04	06:01 19:36	05:27 20:05	05:19 20:23	05:38 20:13	06:07 19:37	06:37 18:46	07:08 17:59	46 17:29 (8) 16:27 (8)	16:43 16:27
24	07:06 16:57	06:32 17:34	16:20 (10) 16:36 (10)	05:48 18:05	05:59 19:37	05:26 20:06	05:20 20:23	05:38 20:13	06:08 19:35	06:38 18:45	07:09 17:58	49 17:31 (8) 16:27 (8)	16:44 16:27
25	07:05 16:58	06:30 17:35	16:23 (10) 16:31 (10)	05:46 18:06	05:58 19:38	05:26 20:07	05:20 20:23	05:39 20:12	06:09 19:34	06:39 18:43	07:10 16:56	50 16:31 (8) 16:26 (8)	16:46 16:28
26	07:05 16:59	06:29 17:36	05:45 18:07	05:56 19:39	05:25 20:08	05:25 20:23	05:20 20:23	05:40 20:11	06:10 19:32	06:40 18:41	07:11 16:55	51 16:31 (8) 16:26 (8)	16:47 16:28
27	07:04 17:00	06:28 17:37	05:43 18:08	05:55 19:40	05:24 20:09	05:24 20:24	05:21 20:24	05:41 20:10	06:11 19:31	06:41 18:40	07:12 16:54	50 16:30 (8) 16:25 (8)	16:48 16:29
28	07:03 17:02	06:26 17:39	05:41 18:09	05:54 19:41	05:24 20:09	05:24 20:24	05:21 20:24	05:42 20:09	06:12 19:29	06:42 18:38	07:13 16:52	50 16:29 (8) 16:25 (8)	16:49 16:30
29	07:02 17:03	16:33 (9) 16:36 (9)	06:40 19:10	05:52 19:42	05:23 20:10	05:23 20:24	05:21 20:24	05:43 20:08	06:13 19:28	06:43 18:36	07:14 16:51	48 16:28 (8) 16:24 (8)	16:50 16:31
30	07:01 17:04	16:23 (10) 16:40 (9)	06:38 19:11	05:51 19:43	05:20 20:11	05:20 20:23	05:22 20:23	05:44 20:07	06:14 19:26	06:44 18:35	07:15 16:50	47 16:27 (8) 16:24 (8)	16:51 16:31
31	07:01 17:05	16:19 (10) 16:41 (9)	06:36 19:12	05:52 19:44	05:22 20:12	05:22 20:24	05:25 20:24	05:45 20:06	06:15 19:24	06:17 18:49	07:16 16:49	46 16:25 (8) 16:25 (8)	16:52 16:32
Potential sun hours	299	298	370	398	447	450	457	427	375	346	299	394	290
Total, worst case	42	930										590	394
Sun reduction	0,39	0,40										0,52	0,45
Oper. time red.	0,96	0,96										0,96	0,96
Wind dir. red.	0,46	0,46										0,46	0,46
Total reduction	0,17	0,18										0,23	0,20
Total, real	7	166										136	79

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:12 16:33	07:00 17:06	06:25 17:40	16:39 (10) 17:12 (8)	06:35 19:13	05:50 19:44	05:22 20:13	05:22 20:23	05:46 20:05	06:16 19:23	06:45 18:33	17:22 (10) 16:47	06:18 16:24
2	07:13 16:34	06:59 17:08	06:23 17:41	16:39 (10) 17:13 (10)	06:33 19:14	05:49 19:45	05:21 20:13	05:23 20:23	05:47 20:04	06:17 19:21	06:46 18:31	17:20 (10) 16:46	06:19 16:23
3	07:13 16:35	06:58 17:09	06:22 17:42	16:38 (10) 17:12 (10)	06:31 19:15	05:47 19:46	05:21 20:14	05:23 20:23	05:48 20:03	06:17 19:20	06:47 18:30	17:19 (10) 16:45	06:20 16:23
4	07:13 16:35	06:57 17:10	06:20 17:43	16:38 (10) 17:12 (10)	06:30 19:16	05:46 19:47	05:20 20:15	05:24 20:23	05:48 20:02	06:18 19:18	06:48 18:28	17:18 (10) 16:44	06:21 16:23
5	07:13 16:36	06:56 17:11	06:18 17:44	16:38 (10) 17:12 (10)	06:28 19:17	05:45 19:48	05:20 20:15	05:24 20:23	05:49 20:01	06:19 19:16	06:49 18:27	17:16 (10) 16:43	06:23 16:23
6	07:13 16:37	06:55 17:13	06:17 17:45	16:39 (10) 17:12 (10)	06:27 19:18	05:44 19:49	05:20 20:16	05:25 20:23	05:50 19:59	06:20 19:15	06:50 18:25	17:15 (10) 16:42	06:24 16:23
7	07:13 16:38	06:54 17:14	06:15 17:46	16:38 (10) 17:11 (10)	06:25 19:19	05:42 19:50	05:20 20:17	05:26 20:22	05:51 19:58	06:21 19:13	06:51 18:23	17:14 (10) 16:41	06:25 16:23
8	07:13 16:39	06:52 17:15	06:14 17:48	16:38 (10) 17:10 (10)	06:23 19:20	05:41 19:51	05:19 20:17	05:26 20:22	05:52 19:57	06:22 19:11	06:52 18:22	17:14 (10) 16:39	06:26 16:23
9	07:12 16:40	06:51 17:16	06:12 17:49	16:40 (10) 17:09 (10)	06:22 19:21	05:40 19:52	05:19 20:18	05:27 20:22	05:53 19:56	06:23 19:10	06:53 18:20	17:13 (10) 16:38	06:27 16:23
10	07:12 16:41	06:50 17:17	06:11 17:50	16:40 (10) 17:08 (10)	06:20 19:22	05:39 19:53	05:19 20:18	05:27 20:21	05:54 19:55	06:24 19:08	06:54 18:19	17:13 (10) 16:37	06:28 16:23
11	07:12 16:42	06:49 17:19	06:09 17:51	16:42 (10) 17:07 (10)	06:19 19:23	05:38 19:54	05:19 20:19	05:28 20:21	05:55 19:53	06:25 19:06	06:55 18:17	17:12 (10) 16:36	06:30 16:23
12	07:12 16:43	06:48 17:20	06:07 17:52	16:43 (10) 17:04 (10)	06:17 19:24	05:37 19:55	05:19 20:19	05:29 20:20	05:56 19:52	06:26 19:05	06:56 18:15	17:12 (10) 16:36	06:31 16:23
13	07:12 16:44	06:47 17:21	06:06 17:53	16:44 (10) 17:02 (10)	06:16 19:25	05:36 19:56	05:19 20:20	05:30 20:20	05:57 19:51	06:27 19:03	06:57 18:14	17:12 (10) 16:35	06:32 16:23
14	07:11 16:45	06:45 17:22	06:04 17:00 (9)	16:48 (10) 17:54	06:14 19:26	05:35 19:57	05:18 20:20	05:30 20:19	05:58 19:49	06:28 19:02	06:58 18:12	17:12 (10) 16:34	06:33 16:23
15	07:11 16:46	06:44 17:23	06:03 17:01 (9)	16:50 (9) 17:55	06:03 19:27	05:34 19:58	05:18 20:21	05:31 20:19	05:59 19:48	06:29 19:00	06:59 18:11	17:13 (10) 16:33	06:34 16:23
16	07:10 16:48	06:43 17:25	06:01 17:03 (9)	16:48 (9) 17:56	06:01 19:28	05:33 19:59	05:18 20:21	05:32 20:18	06:00 19:47	06:30 18:58	07:00 18:09	17:13 (10) 16:32	06:35 16:24
17	07:10 16:49	06:42 17:26	05:59 17:04 (9)	16:47 (9) 17:57	05:59 19:29	05:32 20:00	05:18 20:22	05:33 20:18	06:01 19:45	06:31 18:56	07:01 18:08	17:14 (10) 16:31	06:37 16:24
18	07:10 16:50	06:40 17:27	05:58 17:05 (9)	16:45 (9) 17:58	05:58 19:30	05:31 20:01	05:19 20:22	05:33 20:17	06:02 19:44	06:32 18:55	07:02 18:06	17:16 (9) 16:30	06:38 16:24
19	07:09 16:51	06:39 17:28	05:56 17:06 (9)	16:45 (9) 17:59	05:56 19:31	05:30 20:02	05:19 20:22	05:34 20:16	06:03 19:42	06:33 18:53	07:03 18:05	17:15 (9) 16:30	06:39 16:25
20	07:09 16:52	06:37 17:29	05:54 17:08 (9)	16:45 (9) 18:00	05:54 19:32	05:29 20:03	05:19 20:22	05:35 20:16	06:04 19:41	06:34 18:51	07:04 18:03	17:15 (9) 16:29	06:40 16:25
21	07:08 16:53	06:36 17:31	05:53 17:09 (8)	16:44 (9) 18:01	05:53 19:33	05:29 20:03	05:19 20:23	05:36 20:15	06:05 19:40	06:35 18:50	07:06 18:02	17:15 (9) 16:28	06:41 16:26
22	07:07 16:54	06:35 17:32	05:51 17:10 (8)	16:44 (9) 18:02	05:51 19:35	05:28 20:04	05:19 20:23	05:37 20:14	06:06 19:38	06:36 18:48	07:07 18:01	17:15 (9) 16:28	06:42 16:26
23	07:07 16:56	06:33 17:33	05:49 17:11 (8)	16:44 (9) 18:04	05:49 19:36	05:27 20:05	05:19 20:23	05:38 20:13	06:07 19:37	06:37 18:46	07:08 17:59	17:15 (9) 16:27	06:43 16:27
24	07:06 16:57	06:32 17:34	05:48 17:13 (8)	16:44 (9) 18:05	05:48 19:37	05:26 20:06	05:20 20:23	05:38 20:13	06:08 19:35	06:38 18:45	07:09 17:58	17:16 (9) 16:27	06:45 16:27
25	07:05 16:58	06:30 17:35	05:46 17:13 (8)	16:42 (10) 18:06	05:46 19:38	05:26 20:07	05:20 20:23	05:39 20:12	06:09 19:34	06:39 18:43	07:10 16:56	16:17 (9) 16:26	06:46 16:28
26	07:05 16:59	06:29 17:36	05:45 17:15 (8)	16:41 (10) 18:07	05:45 19:39	05:25 20:08	05:20 20:23	05:40 20:11	06:10 19:32	06:40 18:41	07:11 16:55	16:18 (9) 16:26	06:47 16:28
27	07:04 17:00	06:28 17:37	05:43 17:14 (8)	16:40 (10) 18:08	05:43 19:40	05:24 20:09	05:21 20:24	05:41 20:10	06:11 19:31	06:41 18:40	07:12 16:54	16:20 (9) 16:25	06:48 16:29
28	07:03 17:02	06:26 17:39	05:41 17:14 (8)	16:40 (10) 18:09	05:41 19:41	05:24 20:09	05:21 20:24	05:42 20:12	06:12 19:29	06:42 18:38	07:13 16:52	16:24 (9) 16:25	06:49 16:30
29	07:02 17:03	06:25 17:40	05:40 19:10	16:40 (10) 19:10	05:40 19:42	05:23 20:10	05:21 20:24	05:43 20:08	06:13 19:27	06:43 18:36	07:14 16:51	16:25 (9) 16:30	06:50 16:30
30	07:01 17:04	06:24 17:41	05:38 19:11	16:38 (10) 19:11	05:41 19:43	05:23 20:11	05:22 20:23	05:44 20:07	06:14 19:26	06:44 18:35	07:15 16:50	17:25 (10) 16:24	06:51 16:31
31	07:01 17:05	06:23 17:42	05:36 19:12	16:36 (10) 19:12	05:40 19:44	05:22 20:12	05:21 20:24	05:45 20:06	06:15 19:24	06:45 18:34	07:16 16:49	17:40 (10) 16:23	06:52 16:32
Potential sun hours	299	298	370	398	447	450	457	427	375	21	346	299	290
Total, worst case		353	399							740			
Sun reduction		0,40	0,44							0,63			
Oper. time red.		0,96	0,96							0,96			
Wind dir. red.		0,40	0,39							0,39			
Total reduction		0,16	0,16							0,24			
Total, real		55	65						5	147			

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June					
1	07:12 16:33	15:42 (3) 15:50 (3)	07:00 17:06	06:25 17:40	06:35 19:13	17:56 (10) 18:33 (10)	05:50 19:44	05:22 20:13			
2	07:13 16:34	15:43 (3) 15:49 (3)	06:59 17:08	06:23 17:41	06:33 19:14	17:55 (10) 18:32 (10)	05:49 19:45	05:21 20:13			
3	07:13 16:35		06:58 17:09	06:22 17:42	17:07 (9) 17:21 (8)	06:31 19:15	17:56 (10) 18:32 (10)	05:47 19:46	05:21 20:14		
4	07:13 16:35		06:57 17:10	06:20 17:43	17:05 (9) 17:22 (8)	06:30 19:16	17:56 (10) 18:31 (10)	05:46 19:47	05:20 20:15		
5	07:13 16:36		06:56 17:11	06:18 17:44	17:03 (9) 17:23 (8)	06:28 19:17	17:58 (10) 18:30 (10)	05:45 19:48	05:20 20:15		
6	07:13 16:37		06:55 17:13	06:17 17:45	17:02 (9) 17:25 (8)	06:27 19:18	17:58 (10) 18:28 (10)	05:44 19:49	05:20 20:16		
7	07:13 16:38		06:54 17:14	06:15 17:46	17:00 (9) 17:25 (8)	06:25 19:19	17:59 (10) 18:26 (10)	05:42 19:50	05:20 20:17		
8	07:13 16:39		06:52 17:15	06:14 17:48	16:59 (9) 17:26 (8)	06:23 19:20	18:01 (10) 18:25 (10)	05:41 19:51	05:19 20:17		
9	07:12 16:40		06:51 17:16	06:12 17:49	16:59 (9) 17:28 (8)	06:22 19:21	18:02 (10) 18:22 (10)	05:40 19:52	05:19 20:18		
10	07:12 16:41		06:50 17:17	06:11 17:50	16:58 (9) 17:28 (8)	06:20 19:22	18:05 (10) 18:20 (10)	05:39 19:53	05:19 20:18		
11	07:12 16:42		06:49 17:19	06:09 17:51	16:58 (9) 17:28 (8)	06:19 19:23		05:38 19:54	05:19 20:19		
12	07:12 16:43		06:48 17:20	06:07 17:52	16:58 (9) 17:26 (8)	06:17 19:24		05:37 19:55	05:19 20:19		
13	07:12 16:44		06:47 17:21	06:06 17:53	16:58 (9) 17:25 (8)	06:16 19:25		05:36 19:56	05:19 20:20		
14	07:11 16:45		06:45 17:22	06:04 17:54	16:59 (9) 17:24 (8)	06:14 19:26		05:35 19:57	05:18 20:20		
15	07:11 16:46		06:44 17:23	06:03 17:55	16:59 (9) 17:21 (9)	06:13 19:27		05:34 19:58	05:18 20:21		
16	07:10 16:48		06:43 17:25	06:01 17:56	17:00 (9) 17:19 (9)	06:11 19:28		05:33 19:59	05:18 20:21		
17	07:10 16:49		06:42 17:26	05:59 17:57	17:02 (9) 17:23 (10)	06:09 19:29		05:32 20:00	05:19 20:22		
18	07:10 16:50		06:40 17:27	05:58 17:58	17:03 (9) 17:27 (10)	06:08 19:30		05:31 20:01	05:19 20:22		
19	07:09 16:51		06:39 17:28	05:56 17:59	17:07 (10) 17:29 (10)	06:06 19:31		05:30 20:02	05:19 20:22		
20	07:09 16:52		06:37 17:29	05:54 18:00	17:05 (10) 17:31 (10)	06:05 19:32		05:29 20:03	05:19 20:22		
21	07:08 16:53		06:36 17:31	05:53 18:01	17:03 (10) 17:32 (10)	06:04 19:33		05:29 20:03	05:19 20:23		
22	07:07 16:54		06:35 17:32	05:51 18:02	17:01 (10) 17:33 (10)	06:02 19:35		05:28 20:04	05:19 20:23		
23	07:07 16:56		06:33 17:33	05:49 18:04	17:00 (10) 17:34 (10)	06:01 19:36		05:27 20:05	05:19 20:23		
24	07:06 16:57		06:32 17:34	05:48 18:05	16:59 (10) 17:34 (10)	05:59 19:37		05:26 20:06	05:20 20:23		
25	07:05 16:58		06:30 17:35	05:46 18:06	16:59 (10) 17:35 (10)	05:58 19:38		05:26 20:07	05:20 20:23		
26	07:05 16:59		06:29 17:36	05:45 18:07	16:58 (10) 17:35 (10)	05:56 19:39		05:25 20:08	05:20 20:23		
27	07:04 17:00		06:28 17:37	05:43 18:08	16:57 (10) 17:35 (10)	05:55 19:40		05:24 20:09	05:21 20:24		
28	07:03 17:02		06:26 17:39	05:41 18:09	16:57 (10) 17:36 (10)	05:54 19:41		05:24 20:09	05:21 20:24		
29	07:02 17:03			06:40 19:10	17:56 (10) 18:35 (10)	05:52 19:42		05:23 20:10	05:21 20:24		
30	07:01 17:04			06:38 19:11	17:55 (10) 18:34 (10)	05:51 19:43		05:23 20:11	05:22 20:23		
31	07:01 17:05			06:36 19:12	17:56 (10) 18:34 (10)			05:22 20:12			
Potential sun hours	299	298	370	398	447	450					
Total, worst case	14		825	293							
Sun reduction	0,39		0,44	0,50							
Oper. time red.	0,96		0,96	0,96							
Wind dir. red.	0,54		0,41	0,42							
Total reduction	0,20		0,17	0,21							
Total, real	3		142	61							

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

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

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	July	August	September	October	November	December					
1	05:22 20:23	05:46 20:05	06:16 19:23		06:45 18:33	17:37 (9) 18:05 (8)	06:18 16:47	06:52 16:24			
2	05:23 20:23	05:47 20:04	06:17 19:21	15	18:03 (10) 18:31	17:36 (9) 18:05 (8)	06:19 16:46	06:53 16:23			
3	05:23 20:23	05:48 20:03	06:18 19:20	20	18:00 (10) 18:30	17:37 (9) 18:06 (8)	06:20 16:45	06:54 16:23			
4	05:24 20:23	05:48 20:02	06:18 19:18	24	17:58 (10) 18:22 (10)	17:36 (9) 18:06 (8)	06:21 16:44	06:55 16:23			
5	05:24 20:23	05:49 20:01	06:19 19:16	27	17:56 (10) 18:23 (10)	17:36 (9) 18:04 (8)	06:23 16:43	06:56 16:23			
6	05:25 20:23	05:50 19:59	06:20 19:15	30	17:54 (10) 18:24 (10)	17:37 (9) 18:03 (8)	06:24 16:42	06:57 16:23			
7	05:26 20:22	05:51 19:58	06:21 19:13	32	17:53 (10) 18:25 (10)	17:37 (9) 18:01 (8)	06:25 16:41	06:58 16:23			
8	05:26 20:22	05:52 19:57	06:22 19:11	34	17:52 (10) 18:26 (10)	17:38 (9) 17:59 (9)	06:26 16:39	06:59 16:23			
9	05:27 20:22	05:53 19:56	06:23 19:10	35	17:51 (10) 18:26 (10)	17:39 (9) 17:58 (8)	06:27 16:38	07:00 16:23			
10	05:27 20:21	05:54 19:55	06:24 19:08	36	17:49 (10) 18:25 (10)	17:40 (9) 17:56 (8)	06:28 16:37	07:01 16:23	5	15:33 (3) 15:38 (3)	
11	05:28 20:21	05:55 19:53	06:25 19:06	38	17:48 (10) 18:26 (10)	17:43 (9) 17:51 (9)	06:30 16:36	07:01 16:23	8	15:32 (3) 15:40 (3)	
12	05:29 20:20	05:56 19:52	06:26 19:05	39	17:47 (10) 18:26 (10)	06:31 16:36	07:02 16:23	15:32 (3) 15:41 (3)	9	15:41 (3)	
13	05:30 20:20	05:57 19:51	06:27 19:03	38	17:47 (10) 18:25 (10)	06:32 16:35	07:03 16:23	15:31 (3) 15:42 (3)	11	15:42 (3)	
14	05:30 20:19	05:58 19:49	06:28 19:02	39	17:46 (10) 18:25 (10)	06:33 16:34	07:04 16:23	15:31 (3) 15:43 (3)	12	15:43 (3)	
15	05:31 20:19	05:59 19:48	06:29 19:00	39	17:46 (10) 18:25 (10)	06:34 16:33	07:05 16:23	15:32 (3) 15:44 (3)	12	15:44 (3)	
16	05:32 20:18	06:00 19:47	06:30 18:58	38	17:46 (10) 18:24 (10)	06:35 16:32	07:05 16:24	15:32 (3) 15:45 (3)	13	15:45 (3)	
17	05:33 20:18	06:01 19:45	06:31 18:56	38	17:46 (10) 18:24 (10)	06:37 16:31	07:06 16:24	15:32 (3) 15:45 (3)	13	15:45 (3)	
18	05:33 20:17	06:02 19:44	06:32 18:55	37	17:46 (10) 18:23 (10)	06:38 16:30	07:07 16:24	15:32 (3) 15:46 (3)	14	15:46 (3)	
19	05:34 20:16	06:03 19:42	06:33 18:53	36	17:46 (10) 18:22 (10)	06:39 16:30	07:07 16:25	15:32 (3) 15:46 (3)	14	15:46 (3)	
20	05:35 20:16	06:04 19:41	06:34 18:51	34	17:47 (10) 18:21 (10)	06:40 16:29	07:08 16:25	15:33 (3) 15:47 (3)	14	15:47 (3)	
21	05:36 20:15	06:05 19:40	06:35 18:50	33	17:47 (10) 18:20 (10)	06:41 16:28	07:08 16:26	15:33 (3) 15:47 (3)	14	15:47 (3)	
22	05:37 20:14	06:06 19:38	06:36 18:48	30	17:48 (10) 18:18 (10)	06:42 16:28	07:09 16:26	15:34 (3) 15:48 (3)	14	15:48 (3)	
23	05:38 20:13	06:07 19:37	06:37 18:46	27	17:49 (10) 18:16 (10)	06:43 16:27	07:09 16:27	15:34 (3) 15:48 (3)	14	15:48 (3)	
24	05:38 20:13	06:08 19:35	06:38 18:45	23	17:51 (10) 18:14 (10)	06:45 16:27	07:10 16:27	15:35 (3) 15:49 (3)	14	15:49 (3)	
25	05:39 20:12	06:09 19:34	06:39 18:43	23	17:48 (9) 18:11 (10)	06:10 16:26	07:10 16:28	15:35 (3) 15:49 (3)	14	15:49 (3)	
26	05:40 20:11	06:10 19:32	06:40 18:41	23	17:45 (9) 18:08 (10)	06:11 16:26	07:11 16:28	15:35 (3) 15:49 (3)	14	15:49 (3)	
27	05:41 20:10	06:11 19:31	06:41 18:40	18	17:43 (9) 18:01 (9)	06:12 16:25	07:11 16:29	15:37 (3) 15:50 (3)	13	15:50 (3)	
28	05:42 20:09	06:12 19:29	06:42 18:38	21	17:40 (9) 18:01 (9)	06:13 16:25	07:11 16:30	15:37 (3) 15:50 (3)	13	15:50 (3)	
29	05:43 20:08	06:13 19:27	06:43 18:36	23	17:39 (9) 18:02 (9)	06:14 16:24	07:12 16:30	15:38 (3) 15:50 (3)	12	15:50 (3)	
30	05:44 20:07	06:14 19:26	06:44 18:35	26	17:38 (9) 18:04 (8)	06:16 16:24	07:12 16:31	15:39 (3) 15:50 (3)	11	15:50 (3)	
31	05:45 20:06	06:15 19:24			06:17 16:49		07:12 16:32	15:40 (3) 15:49 (3)	9	15:49 (3)	
Potential sun hours	457	427	375	346	299	290					
Total, worst case			876		258			267			
Sun reduction			0,63		0,52			0,39			
Oper. time red.			0,96		0,96			0,96			
Wind dir. red.			0,42		0,38			0,54			
Total reduction			0,26		0,19			0,21			
Total, real			226		50			56			

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

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

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
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Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January		February		March		April		May		June			
1	07:12	08:23 (5)	07:00	16:07 (4)	06:25	16:07 (4)	06:35	05:50	19:01 (9)	05:22				
	16:33	42	09:05 (5)	17:07	27	16:34 (2)	17:40	19:44	16	19:17 (9)	20:13			
2	07:13	08:24 (5)	06:59	16:05 (4)	06:23	16:10 (4)	06:33	05:49	18:59 (9)	05:21				
	16:34	41	09:05 (5)	17:08	34	16:41 (3)	17:41	19:45	20	19:19 (9)	20:13			
3	07:13	08:25 (5)	06:58	16:04 (4)	06:22	16:15 (4)	06:31	05:47	18:57 (9)	05:21				
	16:35	40	09:05 (5)	17:09	40	16:44 (3)	17:42	19:46	22	19:19 (9)	20:14			
4	07:13	08:26 (5)	06:57	16:02 (4)	06:20	16:16 (4)	06:30	05:46	18:56 (9)	05:20				
	16:35	39	09:05 (5)	17:10	44	16:46 (3)	17:43	19:47	24	19:20 (9)	20:15			
5	07:13	08:26 (5)	06:56	16:01 (4)	06:18	16:17 (4)	06:28	05:45	18:55 (9)	05:20				
	16:36	39	09:05 (5)	17:11	47	16:48 (3)	17:44	19:48	26	19:21 (9)	20:15			
6	07:13	08:26 (5)	06:55	16:01 (4)	06:17	16:18 (4)	06:27	05:44	18:54 (9)	05:20				
	16:37	38	09:04 (5)	17:13	48	16:49 (3)	17:45	19:49	28	19:22 (9)	20:16			
7	07:13	08:27 (5)	06:54	16:00 (4)	06:15	16:19 (4)	06:25	05:43	18:54 (9)	05:20				
	16:38	37	09:04 (5)	17:14	50	16:50 (3)	17:46	19:50	29	19:23 (9)	20:17			
8	07:13	08:28 (5)	06:52	15:59 (4)	06:14	16:20 (4)	06:23	05:41	18:53 (9)	05:19				
	16:39	36	09:04 (5)	17:15	52	16:51 (3)	17:48	19:20	30	19:23 (9)	20:17			
9	07:12	08:30 (5)	06:51	15:59 (4)	06:12	16:21 (4)	06:22	05:40	18:53 (9)	05:19				
	16:40	34	09:04 (5)	17:16	53	16:52 (3)	17:49	19:21	30	19:23 (9)	20:18			
10	07:12	08:31 (5)	06:50	15:59 (4)	06:11	16:22 (4)	06:20	05:39	18:53 (9)	05:19				
	16:41	33	09:04 (5)	17:17	54	16:53 (3)	17:50	19:22	31	19:24 (9)	20:18			
11	07:12	08:31 (5)	06:49	15:58 (4)	06:09	16:23 (4)	06:19	05:38	18:52 (9)	05:19				
	16:42	32	09:03 (5)	17:19	54	16:52 (3)	17:51	19:23	32	19:24 (9)	20:19			
12	07:12	08:33 (5)	06:48	15:57 (4)	06:07	16:24 (4)	06:17	05:37	18:52 (9)	05:19				
	16:43	30	09:03 (5)	17:20	56	16:53 (3)	17:52	19:24	32	19:24 (9)	20:19			
13	07:12	08:34 (5)	06:47	15:57 (4)	06:06	16:25 (4)	06:16	05:36	18:52 (9)	05:19				
	16:44	29	09:03 (5)	17:21	56	16:53 (3)	17:53	19:25	10	19:04 (8)	19:56	32	19:24 (9)	20:20
14	07:11	08:35 (5)	06:45	15:58 (4)	06:04	16:26 (4)	06:14	05:35	18:51 (8)	05:18				
	16:45	26	09:01 (5)	17:22	55	16:53 (3)	17:54	19:26	13	19:04 (8)	19:57	32	19:24 (9)	20:20
15	07:11	08:37 (5)	06:44	15:57 (4)	06:03	16:27 (4)	06:13	05:34	18:50 (8)	05:18				
	16:46	26	16:22 (2)	17:24	55	16:52 (3)	17:55	19:27	16	19:06 (8)	19:58	31	19:23 (9)	20:21
16	07:10	08:39 (5)	06:43	15:57 (4)	06:01	16:28 (4)	06:11	05:33	18:48 (8)	05:18				
	16:48	24	16:22 (2)	17:25	55	16:52 (3)	17:56	19:28	18	19:06 (8)	19:59	31	19:23 (9)	20:21
17	07:10	08:42 (5)	06:42	15:57 (4)	05:59	16:29 (4)	06:09	05:32	18:48 (8)	05:19				
	16:49	23	16:24 (2)	17:26	55	16:52 (3)	17:57	19:29	20	19:08 (8)	20:00	30	19:23 (9)	20:22
18	07:10	08:44 (5)	06:40	15:57 (4)	05:58	16:30 (4)	06:08	05:31	18:46 (8)	05:19				
	16:50	19	16:25 (2)	17:27	53	16:50 (3)	17:58	19:30	22	19:08 (8)	20:01	29	19:22 (9)	20:22
19	07:09	16:16 (2)	06:39	15:58 (4)	05:56	16:31 (4)	06:07	05:30	18:46 (8)	05:19				
	16:51	10	16:26 (2)	17:28	51	16:49 (3)	17:59	19:31	23	19:09 (8)	20:02	29	19:23 (9)	20:22
20	07:09	16:16 (2)	06:37	15:58 (4)	05:54	16:32 (4)	06:05	05:29	18:47 (8)	05:19				
	16:52	11	16:27 (2)	17:29	50	16:48 (3)	18:00	19:32	22	19:09 (8)	20:03	28	19:22 (9)	20:22
21	07:08	16:16 (2)	06:36	15:58 (4)	05:53	16:33 (4)	06:04	05:29	18:46 (8)	05:19				
	16:53	13	16:29 (2)	17:31	47	16:45 (3)	18:01	19:33	22	19:08 (8)	20:03	28	19:22 (9)	20:23
22	07:07	16:15 (2)	06:35	15:59 (4)	05:51	16:34 (4)	06:02	05:28	18:46 (8)	05:19				
	16:54	15	16:30 (2)	17:32	43	16:42 (3)	18:02	19:35	22	19:08 (8)	20:04	26	19:21 (9)	20:23
23	07:07	16:15 (2)	06:33	15:59 (4)	05:49	16:35 (4)	06:01	05:27	18:46 (8)	05:19				
	16:56	16	16:31 (2)	17:33	40	16:39 (4)	18:04	19:36	21	19:07 (8)	20:05	25	19:21 (9)	20:23
24	07:06	16:15 (2)	06:32	16:00 (4)	05:48	16:36 (4)	05:59	05:26	18:47 (8)	05:20				
	16:57	17	16:32 (2)	17:34	39	16:39 (4)	18:05	19:37	19	19:06 (8)	20:06	23	19:20 (9)	20:23
25	07:05	16:16 (2)	06:30	16:01 (4)	05:46	16:37 (4)	05:58	05:26	18:48 (8)	05:20				
	16:58	18	16:34 (2)	17:35	36	16:37 (4)	18:06	19:38	17	19:05 (8)	20:07	22	19:19 (9)	20:23
26	07:05	16:16 (2)	06:29	16:02 (4)	05:45	16:38 (4)	05:56	05:25	18:49 (8)	05:20				
	16:59	19	16:35 (2)	17:36	35	16:37 (4)	18:07	19:39	14	19:03 (8)	20:08	20	19:19 (9)	20:23
27	07:04	16:16 (2)	06:28	16:03 (4)	05:43	16:39 (4)	05:55	05:24	18:51 (8)	05:21				
	17:00	20	16:36 (2)	17:37	31	16:34 (4)	18:08	19:40	11	19:02 (8)	20:09	19	19:18 (9)	20:24
28	07:03	16:16 (2)	06:26	16:05 (4)	05:41	16:40 (4)	05:54	05:24	18:54 (8)	05:21				
	17:02	20	16:36 (2)	17:39	28	16:33 (4)	18:09	19:41	4	18:58 (8)	20:09	16	19:17 (9)	20:24
29	07:02	16:17 (2)	06:24	16:06 (4)	05:40	16:41 (4)	05:52	05:23	18:52 (8)	05:21				
	17:03	19	16:36 (2)	17:40	27	16:34 (4)	18:10	19:42		20:10	14	19:16 (9)	20:24	
30	07:01	16:12 (4)	06:22	16:07 (4)	05:38	16:42 (4)	05:51	05:23	19:03 (9)	05:23				
	17:04	23	16:35 (2)	17:41	26	16:35 (4)	18:11	19:43	11	19:14 (9)	20:11	11	19:15 (9)	20:23
31	07:01	16:09 (4)	06:20	16:08 (4)	05:36	16:43 (4)	05:50	05:22		20:12	8	19:13 (9)	20:23	
	17:05	26	16:35 (2)	17:42	25	16:36 (4)	18:12	19:44		20:13	7	19:14 (9)	20:23	
Potential sun hours	299		298		370		398		447			450		
Total, worst case	815		1288		48		285		774					
Sun reduction	0,39		0,40		0,44		0,50		0,58					
Oper. time red.	0,96		0,96		0,96		0,96		0,96					
Wind dir. red.	0,65		0,46		0,47		0,49		0,52					
Total reduction	0,25		0,18		0,20		0,24		0,29					
Total, real	201		237		10		69		228					

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

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

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

		July	August	September	October	November	December									
1	05:22		05:46	19:03 (9)	06:16	06:45		06:18	15:28 (4)	06:52		08:13 (5)				
	20:23		20:05	31	19:34 (9)	19:23		18:33				08:45 (5)				
2	05:23		05:47		19:02 (9)	06:17		06:46	16:47	53	16:21 (3)	16:24	32	08:13 (5)		
	20:23		20:04	31	19:33 (9)	19:21		18:31	16:46	53	16:21 (3)	16:23	33	08:46 (5)		
3	05:23		05:48		19:02 (9)	06:18		06:47	06:20		15:29 (4)	06:54		08:13 (5)		
	20:23		20:03	31	19:33 (9)	19:20		18:30	16:45	52	16:21 (3)	16:23	34	08:47 (5)		
4	05:24		05:49		19:03 (9)	06:18		06:48	06:21		15:30 (4)	06:55		08:13 (5)		
	20:23		20:02	30	19:33 (9)	19:18		18:28	16:44	50	16:20 (3)	16:23	35	08:48 (5)		
5	05:24		05:49		19:03 (9)	06:19		06:49	06:23		15:31 (4)	06:56		08:12 (5)		
	20:23		20:01	30	19:33 (9)	19:16		18:27	16:43	48	16:19 (3)	16:23	37	08:49 (5)		
6	05:25		05:50		19:03 (9)	06:20		06:50	06:24		15:31 (4)	06:57		08:12 (5)		
	20:23		19:59	29	19:32 (9)	19:15		18:25	16:42	47	16:18 (3)	16:23	38	08:50 (5)		
7	05:26		05:51		19:04 (9)	06:21		06:51	06:25		15:33 (4)	06:58		08:13 (5)		
	20:22		19:58	27	19:31 (9)	19:13		18:23	16:41	44	16:17 (3)	16:23	38	08:51 (5)		
8	05:26		05:52		19:05 (9)	06:22		06:52	06:26		15:35 (4)	06:59		08:13 (5)		
	20:22		19:57	26	19:31 (9)	19:11		18:22	16:39	40	16:15 (3)	16:23	39	08:52 (5)		
9	05:27		05:53		19:06 (9)	06:23		06:53	06:27		15:36 (4)	07:00		08:13 (5)		
	20:22		19:56	24	19:30 (9)	19:10		18:20	16:38	33	16:11 (3)	16:23	40	08:53 (5)		
10	05:27		05:54		19:07 (9)	06:24		06:54	06:28		15:38 (4)	07:01		08:13 (5)		
	20:21		19:55	21	19:28 (9)	19:08		18:19	16:37	27	16:05 (2)	16:23	41	08:54 (5)		
11	05:28		05:55		19:08 (9)	06:25		06:55			15:41 (4)	07:01		08:14 (5)		
	20:21		19:53	19	19:27 (9)	19:07		18:17	14	17:00 (4)	16:36	26	16:07 (2)	16:23	41	08:55 (5)
12	05:29		19:15 (9)	05:56		19:10 (9)	06:26	06:56			16:42 (4)	06:31		15:44 (4)	07:02	08:14 (5)
	20:20	4	19:19 (9)	19:52	15	19:25 (9)	19:05	18:15	21	17:03 (4)	16:36	23	16:07 (2)	16:23	42	08:56 (5)
13	05:30		19:13 (9)	05:57		19:13 (9)	06:27	06:57			16:39 (4)	06:32		15:49 (2)	07:03	08:13 (5)
	20:20	9	19:22 (9)	19:51	9	19:22 (9)	19:03	18:14	26	17:05 (4)	16:35	19	16:08 (2)	16:23	43	08:56 (5)
14	05:30		19:12 (9)	05:58			06:28	06:58			16:37 (4)	06:33		15:48 (2)	07:04	08:14 (5)
	20:19	12	19:24 (9)	19:49			19:02	18:12	29	17:06 (4)	16:34	20	16:08 (2)	16:23	42	08:56 (5)
15	05:31		19:10 (9)	05:59		19:00 (8)	06:29	06:59			16:35 (4)	06:34		15:49 (2)	07:05	08:15 (5)
	20:19	15	19:25 (9)	19:48	6	19:06 (8)	19:00	18:11	33	17:08 (4)	16:33	20	16:09 (2)	16:23	42	08:57 (5)
16	05:32		19:09 (9)	06:00		18:57 (8)	06:30	07:00			16:33 (4)	06:35		15:49 (2)	07:05	08:15 (5)
	20:18	18	19:27 (9)	19:47	12	19:09 (8)	18:58	18:09	35	17:08 (4)	16:32	19	16:08 (2)	16:24	43	08:58 (5)
17	05:33		19:08 (9)	06:01		18:55 (8)	06:31	07:01			16:32 (4)	06:37		15:49 (2)	07:06	08:15 (5)
	20:18	20	19:28 (9)	19:45	15	19:10 (8)	18:56	18:08	37	17:09 (4)	16:31	18	16:07 (2)	16:24	43	08:58 (5)
18	05:33		19:08 (9)	06:02		18:54 (8)	06:32	07:02			16:32 (4)	06:38		15:49 (2)	07:07	08:16 (5)
	20:17	21	19:29 (9)	19:44	17	19:11 (8)	18:55	18:06	39	17:11 (4)	16:30	17	16:06 (2)	16:24	43	08:59 (5)
19	05:34		19:06 (9)	06:03		18:53 (8)	06:33	07:03			16:30 (4)	06:39		15:50 (2)	07:07	08:16 (5)
	20:16	23	19:29 (9)	19:42	19	19:12 (8)	18:53	18:05	41	17:11 (4)	16:30	16	16:06 (2)	16:25	43	08:59 (5)
20	05:35		19:06 (9)	06:04		18:52 (8)	06:34	07:04			16:29 (4)	06:40		15:50 (2)	07:08	08:16 (5)
	20:16	24	19:30 (9)	19:41	21	19:13 (8)	18:51	18:03	45	17:14 (3)	16:29	15	16:05 (2)	16:25	44	09:00 (5)
21	05:36		19:06 (9)	06:05		18:51 (8)	06:35	07:06			16:29 (4)	06:41		15:51 (2)	07:08	08:16 (5)
	20:15	25	19:31 (9)	19:40	22	19:13 (8)	18:50	18:02	48	17:17 (3)	16:28	13	16:04 (2)	16:26	44	09:00 (5)
22	05:37		19:05 (9)	06:06		18:51 (8)	06:36	07:07			16:28 (4)	06:42		15:52 (2)	07:09	08:17 (5)
	20:14	27	19:32 (9)	19:38	22	19:13 (8)	18:48	18:01	50	17:18 (3)	16:28	11	16:03 (2)	16:26	44	09:01 (5)
23	05:38		19:05 (9)	06:07		18:50 (8)	06:37	07:08			16:27 (4)	06:43		15:52 (2)	07:09	08:17 (5)
	20:13	27	19:32 (9)	19:37	23	19:13 (8)	18:46	17:59	52	17:19 (3)	16:27	11	16:03 (2)	16:27	44	09:01 (5)
24	05:38		19:04 (9)	06:08		18:50 (8)	06:38	07:09			16:28 (4)	06:45		08:23 (5)	07:10	08:19 (5)
	20:13	28	19:32 (9)	19:35	23	19:13 (8)	18:45	17:58	53	17:21 (3)	16:27	18	16:03 (2)	16:27	43	09:02 (5)
25	05:39		19:03 (9)	06:09		18:50 (8)	06:39	06:10			15:27 (4)	06:46		08:20 (5)	07:10	08:19 (5)
	20:12	30	19:33 (9)	19:34	22	19:12 (8)	18:43	16:56	55	16:22 (3)	16:26	23	16:02 (2)	16:28	43	09:02 (5)
26	05:40		19:03 (9)	06:10		18:51 (8)	06:40	06:11			15:27 (4)	06:47		08:18 (5)	07:11	08:19 (5)
	20:11	30	19:33 (9)	19:32	19	19:10 (8)	18:41	16:55	55	16:22 (3)	16:26	24	16:01 (2)	16:28	43	09:02 (5)
27	05:41		19:03 (9)	06:11		18:51 (8)	06:41	06:12			15:26 (4)	06:48		08:16 (5)	07:11	08:20 (5)
	20:10	31	19:34 (9)	19:31	18	19:09 (8)	18:40	16:54	56	16:22 (3)	16:25	26	16:01 (2)	16:29	43	09:03 (5)
28	05:42		19:03 (9)	06:12		18:51 (8)	06:42	06:13			15:26 (4)	06:49		08:15 (5)	07:11	08:20 (5)
	20:09	31	19:34 (9)	19:29	15	19:06 (8)	18:38	16:52	56	16:22 (3)	16:25	26	08:41 (5)	16:30	43	09:03 (5)
29	05:43		19:03 (9)	06:13		18:52 (8)	06:43	06:14			15:27 (4)	06:50		08:15 (5)	07:12	08:21 (5)
	20:08	31	19:34 (9)	19:27	13	19:05 (8)	18:36	16:51	56	16:23 (3)	16:24	28	08:43 (5)	16:30	42	09:03 (5)
30	05:44		19:03 (9)	06:14		18:54 (8)	06:44	06:16			15:27 (4)	06:51		08:14 (5)	07:12	08:21 (5)
	20:07	31	19:34 (9)	19:26	10	19:04 (8)	18:35	16:50	55	16:22 (3)	16:24	30	08:44 (5)	16:31	42	09:03 (5)
31	05:45		19:03 (9)	06:15				06:17			15:27 (4)			07:12		08:22 (5)
	20:06	31	19:34 (9)	19:24				16:49	55	16:22 (3)				16:32	42	09:04 (5)
Potential sun hours	457		427		375	346		299			290					
Total, worst case	468		600		911			850			1266					
Sun reduction	0,72		0,71		0,52			0,45			0,39					
Oper. time red.	0,96		0,96		0,96			0,96			0,96					
Wind dir. red.	0,52		0,50		0,46			0,52			0,72					
Total reduction	0,36		0,35		0,24			0,23			0,28					
Total, real	170		209		217			193			351					

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June	
1	07:12	07:52 (5) 07:00	08:18 (5) 06:25	15:49 (4) 06:35	05:50	18:49 (8) 05:22	18:58 (9)
	16:33	42 08:34 (5) 17:07	73 16:40 (3) 17:40	23 16:12 (4) 19:13	19:44	19:08 (8) 20:13	36 19:34 (9)
2	07:13	07:52 (5) 06:59	15:35 (4) 06:23	15:53 (4) 06:33	05:49	18:50 (8) 05:21	18:58 (9)
	16:34	43 08:35 (5) 17:08	66 16:41 (3) 17:41	16 16:09 (4) 19:14	19:45	17 19:07 (8) 20:13	35 19:33 (9)
3	07:13	07:53 (5) 06:58	15:34 (4) 06:22	06:31	05:47	18:51 (8) 05:21	18:58 (9)
	16:35	42 08:35 (5) 17:09	68 16:42 (3) 17:42	19:15	19:46	14 19:05 (8) 20:14	36 19:34 (9)
4	07:13	07:53 (5) 06:57	15:34 (4) 06:20	06:30	05:46	18:53 (8) 05:20	18:59 (9)
	16:35	43 08:36 (5) 17:10	69 16:43 (3) 17:43	19:16	19:47	10 19:03 (8) 20:15	35 19:34 (9)
5	07:13	07:53 (5) 06:56	15:33 (4) 06:18	06:28	18:50 (7) 05:45	05:20	18:59 (9)
	16:36	43 08:36 (5) 17:11	71 16:44 (3) 17:44	19:17	6 18:56 (7) 19:48	20:15	36 19:35 (9)
6	07:13	07:53 (5) 06:55	15:33 (4) 06:17	06:27	18:47 (7) 05:44	05:20	18:59 (9)
	16:37	43 08:36 (5) 17:13	72 16:45 (3) 17:45	19:18	10 18:57 (7) 19:49	20:16	35 19:34 (9)
7	07:13	07:53 (5) 06:54	15:33 (4) 06:15	06:25	18:45 (7) 05:43	05:20	18:59 (9)
	16:38	45 16:12 (2) 17:14	72 16:45 (3) 17:46	19:19	12 18:57 (7) 19:50	20:17	35 19:34 (9)
8	07:13	07:54 (5) 06:52	15:33 (4) 06:14	06:23	18:45 (7) 05:41	05:19	19:00 (9)
	16:39	49 16:14 (2) 17:15	73 16:46 (3) 17:48	19:20	14 18:59 (7) 19:51	20:17	35 19:35 (9)
9	07:12	07:55 (5) 06:51	15:33 (4) 06:12	06:22	18:44 (7) 05:40	05:19	19:00 (9)
	16:40	50 16:15 (2) 17:16	73 16:46 (3) 17:49	19:21	16 19:00 (7) 19:52	20:18	35 19:35 (9)
10	07:12	07:55 (5) 06:50	15:33 (4) 06:11	06:20	18:44 (7) 05:39	19:09 (9) 05:19	19:01 (9)
	16:41	51 16:16 (2) 17:17	74 16:47 (3) 17:50	19:22	17 19:01 (7) 19:53	12 19:21 (9) 20:18	34 19:35 (9)
11	07:12	07:55 (5) 06:49	15:33 (4) 06:09	06:19	18:43 (7) 05:38	19:06 (9) 05:19	19:00 (9)
	16:42	54 16:17 (2) 17:19	73 16:46 (3) 17:51	19:23	19 19:02 (7) 19:54	17 19:23 (9) 20:19	34 19:34 (9)
12	07:12	07:56 (5) 06:48	15:33 (4) 06:07	06:17	18:44 (7) 05:37	19:04 (9) 05:19	19:01 (9)
	16:43	55 16:18 (2) 17:20	73 16:46 (3) 17:52	19:24	18 19:02 (7) 19:55	21 19:25 (9) 20:19	33 19:34 (9)
13	07:12	07:56 (5) 06:47	15:33 (4) 06:06	06:16	18:43 (7) 05:36	19:03 (9) 05:19	19:01 (9)
	16:44	55 16:19 (2) 17:21	73 16:46 (3) 17:53	19:25	17 19:00 (7) 19:56	23 19:26 (9) 20:20	33 19:34 (9)
14	07:11	07:56 (5) 06:45	15:34 (4) 06:04	06:14	18:44 (7) 05:35	19:02 (9) 05:19	19:01 (9)
	16:45	57 16:20 (2) 17:22	71 16:45 (3) 17:54	19:26	15 18:59 (7) 19:57	25 19:27 (9) 20:20	34 19:35 (9)
15	07:11	07:57 (5) 06:44	15:33 (4) 06:03	06:13	18:45 (7) 05:34	19:01 (9) 05:18	19:02 (9)
	16:46	58 16:22 (2) 17:24	71 16:44 (3) 17:55	19:27	13 18:58 (7) 19:58	27 19:28 (9) 20:21	33 19:35 (9)
16	07:10	07:57 (5) 06:43	15:34 (4) 06:01	06:11	18:46 (7) 05:33	19:00 (9) 05:18	19:02 (9)
	16:48	58 16:22 (2) 17:25	70 16:44 (3) 17:56	19:28	9 18:55 (7) 19:59	29 19:29 (9) 20:21	33 19:35 (9)
17	07:10	07:58 (5) 06:42	15:35 (4) 05:59	06:10	18:56 (8) 05:32	18:59 (9) 05:19	19:03 (9)
	16:49	60 16:24 (2) 17:26	68 16:43 (3) 17:57	19:29	11 19:07 (8) 20:00	30 19:29 (9) 20:22	33 19:36 (9)
18	07:10	07:58 (5) 06:40	15:34 (4) 05:58	06:08	18:54 (8) 05:31	18:58 (9) 05:19	19:03 (9)
	16:50	60 16:25 (2) 17:27	67 16:41 (3) 17:58	19:30	15 19:09 (8) 20:01	32 19:30 (9) 20:22	33 19:36 (9)
19	07:09	08:00 (5) 06:39	15:35 (4) 05:56	06:07	18:52 (8) 05:30	18:59 (9) 05:19	19:03 (9)
	16:51	60 16:26 (2) 17:28	64 16:39 (3) 17:59	19:31	17 19:09 (8) 20:02	32 19:31 (9) 20:22	33 19:36 (9)
20	07:09	08:00 (5) 06:37	15:36 (4) 05:54	06:05	18:51 (8) 05:29	18:58 (9) 05:19	19:03 (9)
	16:52	72 16:27 (2) 17:29	61 16:37 (3) 18:00	19:32	20 19:11 (8) 20:03	33 19:31 (9) 20:22	33 19:36 (9)
21	07:08	08:01 (5) 06:36	15:37 (4) 05:53	06:04	18:49 (8) 05:29	18:57 (9) 05:19	19:03 (9)
	16:53	79 16:29 (2) 17:31	48 16:25 (4) 18:01	19:33	22 19:11 (8) 20:03	35 19:32 (9) 20:23	33 19:36 (9)
22	07:07	08:02 (5) 06:35	15:38 (4) 05:51	06:02	18:49 (8) 05:28	18:57 (9) 05:19	19:03 (9)
	16:54	81 16:29 (2) 17:32	46 16:24 (4) 18:02	19:35	23 19:12 (8) 20:04	35 19:32 (9) 20:23	33 19:36 (9)
23	07:07	08:02 (5) 06:33	15:38 (4) 05:49	06:01	18:47 (8) 05:27	18:57 (9) 05:19	19:04 (9)
	16:56	83 16:29 (2) 17:33	45 16:23 (4) 18:04	19:36	25 19:12 (8) 20:05	36 19:33 (9) 20:23	33 19:37 (9)
24	07:06	08:03 (5) 06:32	15:40 (4) 05:48	05:59	18:47 (8) 05:26	18:57 (9) 05:20	19:04 (9)
	16:57	82 16:29 (2) 17:34	42 16:22 (4) 18:05	19:37	25 19:12 (8) 20:06	36 19:33 (9) 20:23	33 19:37 (9)
25	07:05	08:05 (5) 06:30	15:41 (4) 05:46	05:58	18:48 (8) 05:26	18:57 (9) 05:20	19:04 (9)
	16:58	81 16:29 (2) 17:35	39 16:20 (4) 18:06	19:38	24 19:12 (8) 20:07	35 19:32 (9) 20:23	33 19:37 (9)
26	07:05	08:05 (5) 06:29	15:43 (4) 05:45	05:57	18:47 (8) 05:25	18:57 (9) 05:20	19:05 (9)
	16:59	81 16:29 (2) 17:36	36 16:19 (4) 18:07	19:39	24 19:11 (8) 20:08	36 19:33 (9) 20:23	33 19:38 (9)
27	07:04	08:07 (5) 06:28	15:44 (4) 05:43	05:55	18:47 (8) 05:24	18:57 (9) 05:21	19:05 (9)
	17:00	78 16:28 (2) 17:38	33 16:17 (4) 18:08	19:40	24 19:11 (8) 20:09	36 19:33 (9) 20:24	33 19:38 (9)
28	07:03	08:08 (5) 06:26	15:46 (4) 05:41	05:54	18:48 (8) 05:24	18:57 (9) 05:21	19:04 (9)
	17:02	80 16:31 (3) 17:39	29 16:15 (4) 18:09	19:41	23 19:11 (8) 20:09	37 19:34 (9) 20:24	34 19:38 (9)
29	07:02	08:09 (5) 06:25	15:48 (4) 05:40	05:52	18:47 (8) 05:23	18:57 (9) 05:21	19:05 (9)
	17:03	83 16:35 (3) 17:40	26 16:13 (4) 18:10	19:42	23 19:10 (8) 20:10	36 19:33 (9) 20:24	34 19:39 (9)
30	07:01	08:11 (5) 06:24	15:50 (4) 05:39	05:51	18:48 (8) 05:23	18:58 (9) 05:22	19:05 (9)
	17:04	82 16:37 (3) 17:41	23 16:11 (4) 18:11	19:43	21 19:09 (8) 20:11	36 19:34 (9) 20:23	33 19:38 (9)
31	07:01	08:14 (5) 06:23	15:52 (4) 05:38	05:50	18:48 (8) 05:23	18:58 (9) 05:22	19:05 (9)
	17:05	79 16:39 (3) 17:42	20 16:09 (4) 18:12	19:44	20 19:08 (8) 20:12	36 19:33 (9) 20:23	33 19:38 (9)
Potential sun hours	299	298	370	398	447	450	
Total, worst case	1929	1720	39	463	735	1016	
Sun reduction	0,39	0,40	0,44	0,50	0,58	0,65	
Oper. time red.	0,96	0,96	0,96	0,96	0,96	0,96	
Wind dir. red.	0,61	0,49	0,50	0,49	0,54	0,55	
Total reduction	0,23	0,19	0,21	0,24	0,31	0,35	
Total, real	440	332	8	110	226	352	

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	July		August		September		October		November		December		
1	05:22	19:05 (9)	05:46	19:16 (9)	06:16	18:42 (7)	06:45	06:18	15:02 (4)	06:52	07:37 (5)		
	20:23	34 19:39 (9)	20:05	19 19:35 (9)	19:23	19 19:01 (7)	18:33	16:47	73 16:15 (3)	16:24	54 15:59 (2)		
2	05:23	19:05 (9)	05:47	19:17 (9)	06:17	18:42 (7)	06:46	06:19	15:02 (4)	06:53	07:37 (5)		
	20:23	34 19:39 (9)	20:04	15 19:32 (9)	19:21	17 18:59 (7)	18:31	16:46	73 16:15 (3)	16:23	51 15:58 (2)		
3	05:23	19:06 (9)	05:48	19:20 (9)	06:18	18:42 (7)	06:47	06:20	15:03 (4)	06:54	07:38 (5)		
	20:23	34 19:40 (9)	20:03	9 19:29 (9)	19:20	16 18:58 (7)	18:30	16:45	73 16:16 (3)	16:23	50 15:58 (2)		
4	05:24	19:05 (9)	05:49		06:18	18:42 (7)	06:48	06:21	15:03 (4)	06:55	07:38 (5)		
	20:23	35 19:40 (9)	20:02		19:18	14 18:56 (7)	18:28	16:44	72 16:15 (3)	16:23	49 15:58 (2)		
5	05:24	19:06 (9)	05:49		06:19	18:42 (7)	06:49	06:23	15:03 (4)	06:56	07:38 (5)		
	20:23	34 19:40 (9)	20:01		19:16	12 18:54 (7)	18:27	16:43	72 16:15 (3)	16:23	47 15:58 (2)		
6	05:25	19:05 (9)	05:50		06:20	18:43 (7)	06:50	06:24	15:03 (4)	06:57	07:39 (5)		
	20:23	35 19:40 (9)	19:59		19:15	10 18:53 (7)	18:25	16:42	71 16:14 (3)	16:23	43 08:22 (5)		
7	05:26	19:06 (9)	05:51		06:21	18:45 (7)	06:51	06:25	15:05 (4)	06:58	07:39 (5)		
	20:22	35 19:41 (9)	19:58		19:13	6 18:51 (7)	18:23	16:41	69 16:14 (3)	16:23	43 08:22 (5)		
8	05:26	19:05 (9)	05:52	19:06 (8)	06:22		06:52	06:26	15:05 (4)	06:59	07:40 (5)		
	20:22	35 19:40 (9)	19:57	3 19:09 (8)	19:11		18:22	16:39	68 16:13 (3)	16:23	43 08:23 (5)		
9	05:27	19:05 (9)	05:53	19:02 (8)	06:23		06:53	06:27	15:05 (4)	07:00	07:41 (5)		
	20:22	36 19:41 (9)	19:56	11 19:13 (8)	19:10		18:20	16:38	67 16:12 (3)	16:23	42 08:23 (5)		
10	05:27	19:06 (9)	05:54	19:00 (8)	06:24		06:54	06:28	15:04 (4)	07:01	07:41 (5)		
	20:21	36 19:42 (9)	19:55	15 19:15 (8)	19:08		18:19	16:37	74 16:11 (3)	16:23	43 08:24 (5)		
11	05:28	19:05 (9)	05:55	18:59 (8)	06:25		06:55	06:30	15:04 (4)	07:01	07:42 (5)		
	20:21	36 19:41 (9)	19:53	17 19:16 (8)	19:07		18:17	9 16:39 (4)	16:36	80 16:11 (3)	16:23	42 08:24 (5)	
12	05:29	19:06 (9)	05:56	18:58 (8)	06:26		06:56	16:24 (4)	06:31	07:43 (5)	07:02	07:43 (5)	
	20:20	36 19:42 (9)	19:52	19 19:17 (8)	19:05		18:15	20 16:44 (4)	16:36	82 16:09 (3)	16:23	42 08:25 (5)	
13	05:30	19:06 (9)	05:57	18:57 (8)	06:27		06:57	16:21 (4)	06:32	07:41 (5)	07:03	07:42 (5)	
	20:20	36 19:42 (9)	19:51	21 19:18 (8)	19:03		18:14	25 16:46 (4)	16:35	83 16:07 (3)	16:23	42 08:24 (5)	
14	05:30	19:06 (9)	05:58	18:56 (8)	06:28		06:58	16:18 (4)	06:33	07:40 (5)	07:04	07:43 (5)	
	20:19	37 19:43 (9)	19:49	22 19:18 (8)	19:02		18:12	30 16:48 (4)	16:34	80 16:03 (3)	16:23	42 08:25 (5)	
15	05:31	19:06 (9)	05:59	18:54 (8)	06:29		06:59	16:15 (4)	06:34	07:39 (5)	07:05	07:44 (5)	
	20:19	36 19:42 (9)	19:48	24 19:18 (8)	19:00		18:11	35 16:50 (4)	16:33	79 16:01 (2)	16:23	42 08:26 (5)	
16	05:32	19:06 (9)	06:00	18:54 (8)	06:30		07:00	16:13 (4)	06:35	07:38 (5)	07:05	07:45 (5)	
	20:18	36 19:42 (9)	19:47	24 19:18 (8)	18:58		18:09	38 16:51 (4)	16:32	81 16:02 (2)	16:24	42 08:27 (5)	
17	05:33	19:07 (9)	06:01	18:53 (8)	06:31		07:01	16:13 (4)	06:37	07:38 (5)	07:06	07:45 (5)	
	20:18	36 19:43 (9)	19:45	25 19:18 (8)	18:56		18:08	40 16:53 (4)	16:31	81 16:02 (2)	16:24	41 08:26 (5)	
18	05:33	19:07 (9)	06:02	18:53 (8)	06:32		07:02	16:11 (4)	06:38	07:37 (5)	07:07	07:45 (5)	
	20:17	36 19:43 (9)	19:44	25 19:18 (8)	18:55		18:06	43 16:54 (4)	16:31	82 16:03 (2)	16:24	42 08:27 (5)	
19	05:34	19:06 (9)	06:03	18:53 (8)	06:33		07:03	16:09 (4)	06:39	07:37 (5)	07:07	07:45 (5)	
	20:16	36 19:42 (9)	19:42	25 19:18 (8)	18:53		18:05	46 16:55 (4)	16:30	83 16:04 (2)	16:25	42 08:27 (5)	
20	05:35	19:07 (9)	06:04	18:53 (8)	06:34		07:04	16:08 (4)	06:40	07:37 (5)	07:08	07:46 (5)	
	20:16	35 19:42 (9)	19:41	24 19:17 (8)	18:51		18:03	47 16:55 (4)	16:29	81 16:04 (2)	16:25	42 08:28 (5)	
21	05:36	19:07 (9)	06:05	18:54 (8)	06:35		07:06	16:07 (4)	06:41	07:36 (5)	07:08	07:46 (5)	
	20:15	35 19:42 (9)	19:40	23 19:17 (8)	18:50		18:02	53 17:03 (3)	16:28	79 16:04 (2)	16:26	42 08:28 (5)	
22	05:37	19:08 (9)	06:06	18:54 (8)	06:36		07:07	16:06 (4)	06:42	07:36 (5)	07:09	07:47 (5)	
	20:14	34 19:42 (9)	19:38	22 19:16 (8)	18:48		18:01	61 17:07 (3)	16:28	72 16:03 (2)	16:26	42 08:29 (5)	
23	05:38	19:08 (9)	06:07	18:55 (8)	06:37		07:08	16:05 (4)	06:43	07:36 (5)	07:09	07:47 (5)	
	20:13	34 19:42 (9)	19:37	20 19:15 (8)	18:46		17:59	64 17:09 (3)	16:27	61 16:03 (2)	16:27	42 08:29 (5)	
24	05:38	19:08 (9)	06:08	18:56 (8)	06:38		07:09	16:05 (4)	06:45	07:36 (5)	07:10	07:48 (5)	
	20:13	33 19:41 (9)	19:35	17 19:13 (8)	18:45		17:58	67 17:12 (3)	16:27	60 16:03 (2)	16:27	42 08:30 (5)	
25	05:39	19:08 (9)	06:09	18:57 (8)	06:39		06:10	15:04 (4)	06:46	07:36 (5)	07:10	07:48 (5)	
	20:12	33 19:41 (9)	19:34	15 19:12 (8)	18:43		16:56	69 16:13 (3)	16:26	60 16:02 (2)	16:28	42 08:30 (5)	
26	05:40	19:09 (9)	06:10	18:59 (8)	06:40		06:11	15:03 (4)	06:47	07:36 (5)	07:11	07:49 (5)	
	20:11	31 19:40 (9)	19:32	10 19:09 (8)	18:41		16:55	70 16:13 (3)	16:26	58 16:01 (2)	16:28	41 08:30 (5)	
27	05:41	19:10 (9)	06:11	18:49 (7)	06:41		06:12	15:03 (4)	06:48	07:36 (5)	07:11	07:50 (5)	
	20:10	30 19:40 (9)	19:31	9 18:58 (7)	18:40		16:54	71 16:14 (3)	16:25	59 16:01 (2)	16:29	41 08:31 (5)	
28	05:42	19:11 (9)	06:12	18:46 (7)	06:42		06:13	15:02 (4)	06:49	07:36 (5)	07:11	07:50 (5)	
	20:09	28 19:39 (9)	19:29	13 18:59 (7)	18:38		16:52	72 16:14 (3)	16:25	57 16:00 (2)	16:30	42 08:32 (5)	
29	05:43	19:12 (9)	06:13	18:44 (7)	06:43		06:15	15:03 (4)	06:50	07:36 (5)	07:12	07:50 (5)	
	20:08	26 19:38 (9)	19:28	16 19:00 (7)	18:36		16:51	72 16:15 (3)	16:24	56 16:00 (2)	16:30	42 08:32 (5)	
30	05:44	19:13 (9)	06:14	18:43 (7)	06:44		06:16	15:03 (4)	06:51	07:37 (5)	07:12	07:50 (5)	
	20:07	24 19:37 (9)	19:26	17 19:00 (7)	18:35		16:50	73 16:16 (3)	16:24	54 15:59 (2)	16:31	42 08:32 (5)	
31	05:45	19:14 (9)	06:15	18:43 (7)			06:17	15:02 (4)			07:12	07:50 (5)	
	20:06	22 19:36 (9)	19:24	18 19:01 (7)			16:49	73 16:15 (3)			16:32	43 08:33 (5)	
Potential sun hours	457		427		375		346		299		290		
Total, worst case	1038		478		94		1078		2140		1345		
Sun reduction	0,72		0,71		0,63		0,52		0,45		0,39		
Oper. time red.	0,96		0,96		0,96		0,96		0,96		0,96		
Wind dir. red.	0,55		0,50		0,47		0,49		0,55		0,67		
Total reduction	0,38		0,34		0,29		0,25		0,24		0,26		
Total, real	398		163		27		269		516		347		

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

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

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June
1	07:12 16:33 47	15:09 (7) 16:08 (6) 17:07	07:00 07:45 (10) 06:25	06:25 07:45 (10) 17:40	06:35 19:13 19:44	05:22 20:13
2	07:13 16:34 45	15:10 (7) 16:08 (6) 17:08	06:59 07:44 (10) 06:22	06:23 07:44 (10) 17:41	06:33 19:14 19:45	05:21 20:13
3	07:13 16:35 50	08:00 (10) 16:09 (6) 17:09	06:58 07:44 (10) 06:20	06:22 07:42 (10) 17:42	06:32 19:15 19:46	05:21 20:14
4	07:13 16:35 57	07:57 (10) 16:10 (6) 17:10	06:57 07:44 (10) 06:20	06:20 07:43 (10) 17:43	06:30 19:16 19:47	05:21 20:15
5	07:13 16:36 60	07:56 (10) 16:11 (6) 17:11	06:56 07:45 (10) 17:44	06:19 08:37 (10) 17:44	06:28 19:17 19:48	05:20 20:15
6	07:13 16:37 63	07:55 (10) 16:12 (6) 17:13	06:55 07:45 (10) 17:45	06:17 08:37 (10) 17:45	06:27 19:18 19:49	05:20 20:16
7	07:13 16:38 65	07:53 (10) 16:12 (6) 17:14	06:54 07:46 (10) 17:46	06:15 08:37 (10) 17:46	06:25 19:19 19:50	05:20 20:17
8	07:13 16:39 68	07:52 (10) 16:14 (6) 17:15	06:53 07:46 (10) 17:48	06:14 08:36 (10) 17:48	06:23 19:20 19:51	05:19 20:17
9	07:12 16:40 69	07:52 (10) 16:15 (6) 17:16	06:51 07:47 (10) 17:49	06:12 08:36 (10) 17:49	06:22 19:21 19:52	05:19 20:18
10	07:12 16:41 69	07:51 (10) 16:15 (6) 17:18	06:50 07:47 (10) 17:50	06:11 08:36 (10) 17:50	06:20 19:22 19:53	05:19 20:18
11	07:12 16:42 69	07:50 (10) 16:15 (6) 17:19	06:49 07:47 (10) 17:51	06:09 08:35 (10) 17:51	06:19 19:23 19:54	05:19 20:19
12	07:12 16:43 68	07:50 (10) 16:15 (6) 17:20	06:48 07:48 (10) 17:52	06:07 08:34 (10) 17:52	06:17 19:24 19:55	05:19 20:20
13	07:12 16:44 66	07:49 (10) 16:15 (6) 17:21	06:47 07:49 (10) 17:53	06:06 08:33 (10) 17:53	06:16 19:25 19:56	05:19 20:20
14	07:11 16:45 65	07:48 (10) 16:15 (6) 17:22	06:45 08:33 (10) 17:54	06:04 07:51 (10) 17:54	06:14 19:26 19:57	05:19 20:20
15	07:11 16:47 60	07:48 (10) 16:15 (6) 17:24	06:44 08:31 (10) 17:55	06:03 07:51 (10) 17:55	06:13 19:27 19:58	05:19 20:21
16	07:11 16:48 53	07:47 (10) 16:14 (6) 17:25	06:43 07:52 (10) 17:56	06:01 08:30 (10) 17:56	06:11 19:28 19:59	05:19 20:21
17	07:10 16:49 53	07:47 (10) 16:14 (6) 17:26	06:42 07:54 (10) 17:57	05:59 08:29 (10) 17:57	06:10 19:29 20:00	05:19 20:22
18	07:10 16:50 53	07:46 (10) 16:13 (6) 17:27	06:40 07:55 (10) 17:58	05:58 08:26 (10) 17:58	06:08 19:30 20:01	05:19 20:22
19	07:09 16:51 51	07:47 (10) 16:13 (6) 17:28	06:39 07:57 (10) 17:59	05:56 08:24 (10) 17:59	06:07 19:31 20:02	05:19 20:22
20	07:09 16:52 46	07:46 (10) 16:09 (6) 17:29	06:38 08:00 (10) 17:54	05:54 08:00 (10) 17:54	06:05 19:31 20:03	05:19 20:23
21	07:08 16:53 45	07:46 (10) 08:31 (10) 17:31	06:36 08:03 (10) 17:53	05:53 08:17 (10) 17:53	06:04 19:34 20:04	05:19 20:23
22	07:07 16:55 46	07:46 (10) 08:32 (10) 17:32	06:35 18:03 19:35	05:51 18:03 19:35	06:02 19:35 20:04	05:19 20:23
23	07:07 16:56 47	07:45 (10) 08:32 (10) 17:33	06:33 18:04 19:36	05:50 18:04 19:36	06:01 19:36 20:05	05:19 20:23
24	07:06 16:57 48	07:45 (10) 08:33 (10) 17:34	06:32 18:05 19:37	05:48 18:05 19:37	05:59 19:37 20:06	05:20 20:23
25	07:05 16:58 49	07:45 (10) 08:34 (10) 17:35	06:30 18:06 19:38	05:46 18:06 19:38	05:58 19:38 20:07	05:20 20:23
26	07:05 16:59 50	07:45 (10) 08:35 (10) 17:36	06:29 18:07 19:39	05:45 18:07 19:39	05:57 19:39 20:08	05:20 20:24
27	07:04 17:00 50	07:45 (10) 08:35 (10) 17:38	06:28 18:08 19:40	05:43 18:08 19:40	05:55 19:40 20:09	05:21 20:24
28	07:03 17:02 51	07:44 (10) 08:35 (10) 17:39	06:26 18:09 19:41	05:41 18:09 19:41	05:54 19:41 20:10	05:21 20:24
29	07:02 17:03 52	07:44 (10) 08:36 (10)	06:24 19:10 19:42	05:40 19:10 19:42	05:52 19:42 20:10	05:21 20:24
30	07:01 17:04 52	07:44 (10) 08:36 (10)	06:23 19:11 19:43	05:51 19:11 19:43	05:23 19:43 20:11	05:22 20:24
31	07:01 17:05 52	07:44 (10) 08:36 (10)	06:22 19:12 19:44	05:52 19:12 19:44	05:24 19:44 20:12	05:22 20:24
Potential sun hours	299	298	370	398	447	450
Total, worst case	1719	902				
Sun reduction	0,39	0,40				
Oper. time red.	0,96	0,96				
Wind dir. red.	0,60	0,64				
Total reduction	0,23	0,25				
Total, real	387	226				

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	July	August	September	October	November	December
1	05:22	05:46	06:16	06:45	06:18	07:16 (10) 06:52 07:32 (10)
	20:23	20:05	19:23	18:33	16:47	49 08:05 (10) 16:24 69 15:57 (6)
2	05:23	05:47	06:17	06:46	06:19	07:16 (10) 06:53 07:34 (10)
	20:23	20:04	19:21	18:32	16:46	50 08:06 (10) 16:24 69 15:58 (6)
3	05:23	05:48	06:18	06:47	06:20	07:16 (10) 06:54 07:36 (10)
	20:23	20:03	19:20	18:30	16:45	50 08:06 (10) 16:23 69 15:59 (6)
4	05:24	05:49	06:19	06:48	06:21	07:15 (10) 06:55 07:37 (10)
	20:23	20:02	19:18	18:28	16:44	52 08:07 (10) 16:23 68 15:59 (6)
5	05:24	05:50	06:19	06:49	06:23	07:15 (10) 06:56 07:39 (10)
	20:23	20:01	19:16	18:27	16:43	52 08:07 (10) 16:23 66 15:59 (6)
6	05:25	05:50	06:20	06:50	06:24	07:16 (10) 06:57 07:40 (10)
	20:23	20:00	19:15	18:25	16:42	52 08:08 (10) 16:23 63 15:57 (6)
7	05:26	05:51	06:21	06:51	06:25	07:15 (10) 06:58 07:42 (10)
	20:22	19:58	19:13	18:23	16:41	53 08:08 (10) 16:23 60 15:57 (6)
8	05:26	05:52	06:22	06:52	06:26	07:15 (10) 06:59 07:44 (10)
	20:22	19:57	19:12	18:22	16:40	53 08:08 (10) 16:23 58 15:57 (6)
9	05:27	05:53	06:23	06:53	06:27	07:15 (10) 07:00 07:48 (10)
	20:22	19:56	19:10	18:20	16:38	52 08:07 (10) 16:23 51 15:57 (6)
10	05:28	05:54	06:24	06:54	06:28	07:16 (10) 07:01 14:59 (7)
	20:21	19:55	19:08	18:19	16:37	52 08:08 (10) 16:23 46 15:58 (6)
11	05:28	05:55	06:25	06:55	06:30	07:16 (10) 07:02 14:59 (7)
	20:21	19:53	19:07	18:17	16:37	52 08:08 (10) 16:23 47 15:58 (6)
12	05:29	05:56	06:26	06:56	06:31	07:16 (10) 07:02 14:59 (7)
	20:20	19:52	19:05	18:16	16:36	52 08:08 (10) 16:23 47 15:58 (6)
13	05:30	05:57	06:27	06:57	06:32	07:16 (10) 07:03 14:59 (7)
	20:20	19:51	19:03	18:14	16:35	52 08:08 (10) 16:23 46 15:57 (6)
14	05:30	05:58	06:28	06:58	06:33	07:17 (10) 07:04 14:59 (7)
	20:19	19:49	19:02	18:12	16:34	51 08:08 (10) 16:23 48 15:58 (6)
15	05:31	05:59	06:29	06:59	06:34	07:17 (10) 07:05 15:00 (7)
	20:19	19:48	19:00	18:11	16:33	51 08:08 (10) 16:23 47 15:58 (6)
16	05:32	06:00	06:30	07:00	06:35	07:18 (10) 07:05 15:01 (7)
	20:18	19:47	18:58	18:09	16:32	49 08:07 (10) 16:24 47 15:59 (6)
17	05:33	06:01	06:31	07:01	06:37	07:18 (10) 07:06 15:00 (7)
	20:18	19:45	18:57	18:08	16:31	49 08:07 (10) 16:24 46 15:58 (6)
18	05:33	06:02	06:32	07:02	06:38	07:19 (10) 07:07 15:01 (7)
	20:17	19:44	18:55	18:06	16:31	48 08:07 (10) 16:24 46 15:59 (6)
19	05:34	06:03	06:33	07:03	06:39	07:20 (10) 07:07 15:01 (7)
	20:16	19:43	18:53	18:05	16:30	47 08:07 (10) 16:25 46 15:59 (6)
20	05:35	06:04	06:34	07:05	06:40	07:21 (10) 07:08 15:02 (7)
	20:16	19:41	18:52	18:03	4 08:39 (10) 16:29 46 08:07 (10) 16:25 46 16:00 (6)	
21	05:36	06:05	06:35	07:06	06:41	07:21 (10) 07:08 15:02 (7)
	20:15	19:40	18:50	18:02	17 08:49 (10) 16:28 45 08:06 (10) 16:26 46 16:00 (6)	
22	05:37	06:06	06:36	07:07	06:42	07:22 (10) 07:09 15:03 (7)
	20:14	19:38	18:48	18:01	23 08:52 (10) 16:28 46 15:45 (6) 16:26 46 16:01 (6)	
23	05:38	06:07	06:37	07:08	06:43	07:23 (10) 07:09 15:03 (7)
	20:13	19:37	18:46	17:59	28 08:54 (10) 16:27 51 15:49 (6) 16:27 46 16:01 (6)	
24	05:38	06:08	06:38	07:09	06:45	07:24 (10) 07:10 15:04 (7)
	20:13	19:35	18:45	17:58	32 08:57 (10) 16:27 53 15:51 (6) 16:27 46 16:02 (6)	
25	05:39	06:09	06:39	06:10	06:46	07:25 (10) 07:10 15:04 (7)
	20:12	19:34	18:43	16:56	36 07:59 (10) 16:26 53 15:52 (6) 16:28 46 16:02 (6)	
26	05:40	06:10	06:40	06:11	06:47	07:26 (10) 07:11 15:04 (7)
	20:11	19:32	18:41	16:55	38 08:00 (10) 16:26 53 15:53 (6) 16:28 46 16:02 (6)	
27	05:41	06:11	06:41	06:12	06:48	07:27 (10) 07:11 15:06 (7)
	20:10	19:31	18:40	16:54	41 08:01 (10) 16:25 60 15:54 (6) 16:29 47 16:04 (6)	
28	05:42	06:12	06:42	06:13	06:49	07:28 (10) 07:11 15:06 (7)
	20:09	19:29	18:38	16:52	43 08:02 (10) 16:25 65 15:55 (6) 16:30 47 16:04 (6)	
29	05:43	06:13	06:43	06:15	06:50	07:29 (10) 07:12 15:06 (7)
	20:08	19:28	18:36	16:51	44 08:03 (10) 16:24 66 15:55 (6) 16:30 48 16:05 (6)	
30	05:44	06:14	06:44	06:16	06:51	07:31 (10) 07:12 15:07 (7)
	20:07	19:26	18:35	16:50	46 08:04 (10) 16:24 67 15:56 (6) 16:31 46 16:05 (6)	
31	05:45	06:15	06:45	06:17	06:52	07:32 (10) 07:13 15:08 (7)
	20:06	19:24	18:33	16:49	47 08:04 (10) 16:24 68 15:57 (6) 16:32 47 16:07 (6)	
Potential sun hours	457	427	375	346	299	290
Total, worst case				399	1571	1596
Sun reduction				0,52	0,45	0,39
Oper. time red.				0,96	0,96	0,96
Wind dir. red.				0,64	0,63	0,56
Total reduction				0,32	0,27	0,21
Total, real				129	429	337

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)
--------------	------------------	-----------------	----------------------	---------------------------------	--------------------------------	----------------------------------	---------------------------------

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January		February		March		April	May	June
1	07:12	15:05 (7)	07:00	07:34 (10)	06:25	07:37 (10)	06:35	05:50	05:22
	16:33	52	16:08 (6)	17:07	36	08:10 (10)	17:40	19:44	20:13
2	07:13	15:06 (7)	06:59	07:33 (10)	06:23	07:40 (10)	06:33	05:49	05:21
	16:34	51	16:08 (6)	17:08	38	08:11 (10)	17:41	19:45	20:13
3	07:13	15:06 (7)	06:58	07:32 (10)	06:22	07:44 (10)	06:32	05:47	05:21
	16:35	51	16:09 (6)	17:09	39	08:11 (10)	17:42	19:46	20:14
4	07:13	15:07 (7)	06:57	07:31 (10)	06:20	07:55 (10)	06:30	05:46	05:21
	16:35	51	16:10 (6)	17:10	42	08:13 (10)	17:43	19:16	19:47
5	07:13	15:08 (7)	06:56	07:30 (10)	06:19	07:30 (10)	06:28	05:45	05:20
	16:36	52	16:11 (6)	17:11	44	08:14 (10)	17:44	19:17	19:48
6	07:13	15:09 (7)	06:55	07:30 (10)	06:17	07:30 (10)	06:27	05:44	05:20
	16:37	51	16:12 (6)	17:13	44	08:14 (10)	17:45	19:18	19:49
7	07:13	15:08 (7)	06:54	07:29 (10)	06:15	07:29 (10)	06:25	05:43	05:20
	16:38	52	16:12 (6)	17:14	46	08:15 (10)	17:46	19:19	19:50
8	07:13	15:09 (7)	06:53	07:29 (10)	06:14	08:16 (10)	06:24	05:41	05:19
	16:39	52	16:14 (6)	17:15	47	08:16 (10)	17:48	19:20	19:51
9	07:12	15:10 (7)	06:51	07:29 (10)	06:12	08:16 (10)	06:22	05:40	05:19
	16:40	53	16:15 (6)	17:16	48	08:17 (10)	17:49	19:21	19:52
10	07:12	15:12 (7)	06:50	07:29 (10)	06:11	07:29 (10)	06:20	05:39	05:19
	16:41	51	16:16 (6)	17:18	48	08:17 (10)	17:50	19:22	19:53
11	07:12	15:12 (7)	06:49	07:28 (10)	06:09	07:28 (10)	06:19	05:38	05:19
	16:42	50	16:16 (6)	17:19	49	08:17 (10)	17:51	19:23	19:54
12	07:12	15:13 (7)	06:48	07:28 (10)	06:07	08:17 (10)	06:17	05:37	05:19
	16:43	49	16:17 (6)	17:20	49	08:17 (10)	17:52	19:24	19:55
13	07:12	15:15 (7)	06:47	07:28 (10)	06:06	08:18 (10)	06:16	05:36	05:19
	16:44	46	16:17 (6)	17:21	50	08:18 (10)	17:53	19:25	19:56
14	07:11	15:15 (7)	06:45	07:28 (10)	06:04	07:28 (10)	06:14	05:35	05:19
	16:45	45	16:17 (6)	17:22	50	08:18 (10)	17:54	19:26	19:57
15	07:11	15:17 (7)	06:44	07:27 (10)	06:03	07:27 (10)	06:13	05:34	05:19
	16:47	42	16:17 (6)	17:24	50	08:17 (10)	17:55	19:27	19:58
16	07:11	15:18 (7)	06:43	07:27 (10)	06:01	08:17 (10)	06:11	05:33	05:19
	16:48	40	16:17 (6)	17:25	50	08:17 (10)	17:56	19:28	19:59
17	07:10	15:20 (7)	06:42	07:28 (10)	05:59	08:18 (10)	06:10	05:32	05:19
	16:49	36	16:17 (6)	17:26	50	08:18 (10)	17:57	19:29	20:00
18	07:10	15:22 (7)	06:40	07:27 (10)	05:58	08:18 (10)	06:08	05:31	05:19
	16:50	30	16:16 (6)	17:27	50	08:17 (10)	17:58	19:30	20:01
19	07:09	15:26 (7)	06:39	07:28 (10)	05:56	08:18 (10)	06:07	05:30	05:19
	16:51	23	16:16 (6)	17:28	48	08:16 (10)	17:59	19:31	20:02
20	07:09	16:02 (6)	06:38	07:29 (10)	05:54	08:18 (10)	06:05	05:30	05:19
	16:52	13	16:15 (6)	17:29	47	08:16 (10)	18:00	19:33	20:03
21	07:08	16:05 (6)	06:36	07:29 (10)	05:53	08:15 (10)	06:04	05:29	05:19
	16:53	10	16:15 (6)	17:31	46	08:15 (10)	18:01	19:34	20:04
22	07:07	16:07 (6)	06:35	07:30 (10)	05:51	08:15 (10)	06:02	05:28	05:19
	16:55	6	16:13 (6)	17:32	45	08:15 (10)	18:03	19:35	20:04
23	07:07	16:13 (6)	06:33	07:30 (10)	05:50	08:13 (10)	06:01	05:27	05:19
	16:56		17:33	08:13 (10)	18:04	07:31 (10)	05:48	19:36	20:05
24	07:06	16:13 (6)	06:32	07:31 (10)	05:48	08:12 (10)	05:59	05:26	05:20
	16:57		17:34	08:12 (10)	18:05	08:11 (10)	18:06	19:37	20:06
25	07:05	16:14 (6)	06:31	07:31 (10)	05:46	08:11 (10)	05:58	05:26	05:20
	16:58		17:35	08:11 (10)	18:06	08:10 (10)	18:07	19:38	20:07
26	07:05	07:45 (10)	06:29	07:33 (10)	05:45	08:10 (10)	05:57	05:25	05:20
	16:59	11	07:56 (10)	17:36	37	08:10 (10)	18:07	19:39	20:08
27	07:04	07:41 (10)	06:28	07:34 (10)	05:43	08:07 (10)	05:55	05:24	05:21
	17:00	19	08:00 (10)	17:38	33	08:07 (10)	18:08	19:40	20:09
28	07:03	07:39 (10)	06:26	07:36 (10)	05:41	08:06 (10)	05:54	05:24	05:21
	17:02	23	08:02 (10)	17:39	30	08:06 (10)	18:09	19:41	20:10
29	07:02	07:37 (10)	06:25	07:37 (10)	05:40	08:05 (10)	05:52	05:23	05:21
	17:03	27	08:04 (10)	17:40	27	08:05 (10)	18:10	19:42	20:10
30	07:01	07:36 (10)	06:24	07:36 (10)	05:38	08:04 (10)	05:51	05:23	05:22
	17:04	30	08:06 (10)	17:41	24	08:04 (10)	18:11	19:43	20:11
31	07:01	07:34 (10)	06:23	07:34 (10)	05:36	08:03 (10)	05:50	05:22	05:22
	17:05	34	08:08 (10)	17:42	21	08:03 (10)	18:12	19:44	20:12
Potential sun hours	299		298		370		398	447	450
Total, worst case	1050		1240		57				
Sun reduction	0,39		0,40		0,44				
Oper. time red.	0,96		0,96		0,96				
Wind dir. red.	0,55		0,60		0,60				
Total reduction	0,21		0,23		0,25				
Total, real	216		291		14				

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

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+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

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

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	July	August	September	October	November	December
1	05:22	05:46	06:16	06:45	06:18	06:57 (10) 06:52 14:54 (7)
	20:23	20:05	19:23	18:33	16:47	49 07:46 (10) 16:24 50 15:58 (6)
2	05:23	05:47	06:17	06:46	06:19	06:59 (10) 06:53 14:55 (7)
	20:23	20:04	19:21	18:32	16:46	47 07:46 (10) 16:24 51 15:59 (6)
3	05:23	05:48	06:18	06:47	06:20	06:59 (10) 06:54 14:55 (7)
	20:23	20:03	19:20	18:30	16:45	47 07:46 (10) 16:23 52 15:59 (6)
4	05:24	05:49	06:19	06:48	06:21	06:59 (10) 06:55 14:54 (7)
	20:23	20:02	19:18	18:28	16:44	46 07:45 (10) 16:23 52 15:59 (6)
5	05:24	05:50	06:19	06:49	06:23	07:00 (10) 06:56 14:54 (7)
	20:23	20:01	19:16	18:27	16:43	44 07:44 (10) 16:23 53 15:59 (6)
6	05:25	05:50	06:20	06:50	06:24	07:01 (10) 06:57 14:54 (7)
	20:23	20:00	19:15	18:25	16:42	43 07:44 (10) 16:23 51 15:57 (6)
7	05:26	05:51	06:21	06:51	06:25	07:02 (10) 06:58 14:54 (7)
	20:22	19:58	19:13	18:23	16:41	41 07:43 (10) 16:23 52 15:57 (6)
8	05:26	05:52	06:22	06:52	06:26	07:03 (10) 06:59 14:54 (7)
	20:22	19:57	19:12	18:22	16:40	39 07:42 (10) 16:23 51 15:57 (6)
9	05:27	05:53	06:23	06:53	06:27	07:03 (10) 07:00 14:54 (7)
	20:22	19:56	19:10	18:20	16:38	38 07:41 (10) 16:23 51 15:57 (6)
10	05:28	05:54	06:24	06:54	06:28	07:05 (10) 07:01 14:55 (7)
	20:21	19:55	19:08	18:19	16:37	36 07:41 (10) 16:23 52 15:58 (6)
11	05:28	05:55	06:25	06:55	08:16 (10) 06:30	07:06 (10) 07:02 14:55 (7)
	20:21	19:53	19:07	18:17	16 08:32 (10) 16:37	33 07:39 (10) 16:23 52 15:58 (6)
12	05:29	05:56	06:26	06:56	08:12 (10) 06:31	07:08 (10) 07:02 14:56 (7)
	20:20	19:52	19:05	18:16	23 08:35 (10) 16:36	30 07:38 (10) 16:23 50 15:58 (6)
13	05:30	05:57	06:27	06:57	08:10 (10) 06:32	07:09 (10) 07:03 14:55 (7)
	20:20	19:51	19:03	18:14	27 08:37 (10) 16:35	27 07:36 (10) 16:23 50 15:57 (6)
14	05:30	05:58	06:28	06:58	08:07 (10) 06:33	07:12 (10) 07:04 14:56 (7)
	20:19	19:49	19:02	18:12	32 08:39 (10) 16:34	23 07:35 (10) 16:23 50 15:58 (6)
15	05:31	05:59	06:29	06:59	08:05 (10) 06:34	07:15 (10) 07:05 14:56 (7)
	20:19	19:48	19:00	18:11	35 08:40 (10) 16:33	18 07:33 (10) 16:23 51 15:58 (6)
16	05:32	06:00	06:30	07:00	08:04 (10) 06:35	07:18 (10) 07:05 14:57 (7)
	20:18	19:47	18:58	18:09	38 08:42 (10) 16:32	11 07:29 (10) 16:24 51 15:59 (6)
17	05:33	06:01	06:31	07:01	08:03 (10) 06:37	07:06 14:57 (7)
	20:18	19:45	18:57	18:08	40 08:43 (10) 16:31	16:24 49 15:58 (6)
18	05:33	06:02	06:32	07:02	08:02 (10) 06:38	07:07 14:58 (7)
	20:17	19:44	18:55	18:06	42 08:44 (10) 16:31	16:24 49 15:59 (6)
19	05:34	06:03	06:33	07:03	08:01 (10) 06:39	07:07 14:57 (7)
	20:16	19:43	18:53	18:05	44 08:45 (10) 16:30	16:25 50 15:59 (6)
20	05:35	06:04	06:34	07:05	08:00 (10) 06:40	15:42 (6) 07:08 14:58 (7)
	20:16	19:41	18:52	18:03	45 08:45 (10) 16:29	6 15:48 (6) 16:25 50 16:00 (6)
21	05:36	06:05	06:35	07:06	07:59 (10) 06:41	15:40 (6) 07:08 14:58 (7)
	20:15	19:40	18:50	18:02	47 08:46 (10) 16:28	10 15:50 (6) 16:26 50 16:00 (6)
22	05:37	06:06	06:36	07:07	07:58 (10) 06:42	15:38 (6) 07:09 14:59 (7)
	20:14	19:38	18:48	18:01	48 08:46 (10) 16:28	13 15:51 (6) 16:26 50 16:01 (6)
23	05:38	06:07	06:37	07:08	07:58 (10) 06:43	15:02 (7) 07:09 14:59 (7)
	20:13	19:37	18:46	17:59	48 08:46 (10) 16:27	23 15:52 (6) 16:27 50 16:01 (6)
24	05:38	06:08	06:38	07:09	07:58 (10) 06:45	15:00 (7) 07:10 15:00 (7)
	20:13	19:35	18:45	17:58	49 08:47 (10) 16:27	30 15:54 (6) 16:27 50 16:02 (6)
25	05:39	06:09	06:39	06:10	06:58 (10) 06:46	14:59 (7) 07:10 15:01 (7)
	20:12	19:34	18:43	16:56	49 07:47 (10) 16:26	35 15:55 (6) 16:28 49 16:02 (6)
26	05:40	06:10	06:40	06:11	06:57 (10) 06:47	14:57 (7) 07:11 15:01 (7)
	20:11	19:32	18:41	16:55	50 07:47 (10) 16:26	40 15:56 (6) 16:28 49 16:02 (6)
27	05:41	06:11	06:41	06:12	06:57 (10) 06:48	14:56 (7) 07:11 15:02 (7)
	20:10	19:31	18:40	16:54	50 07:47 (10) 16:25	42 15:56 (6) 16:29 51 16:04 (6)
28	05:42	06:12	06:42	06:13	06:57 (10) 06:49	14:55 (7) 07:11 15:02 (7)
	20:09	19:29	18:38	16:52	50 07:47 (10) 16:25	45 15:57 (6) 16:30 51 16:04 (6)
29	05:43	06:13	06:43	06:15	06:57 (10) 06:50	14:55 (7) 07:12 15:03 (7)
	20:08	19:28	18:36	16:51	50 07:47 (10) 16:24	46 15:57 (6) 16:30 51 16:05 (6)
30	05:44	06:14	06:44	06:16	06:57 (10) 06:51	14:54 (7) 07:12 15:03 (7)
	20:07	19:26	18:35	16:50	50 07:47 (10) 16:24	49 15:58 (6) 16:31 50 16:05 (6)
31	05:45	06:15	06:45	06:17	06:57 (10) 06:52	14:53 (7) 07:12 15:04 (7)
	20:06	19:24	18:33	16:49	50 07:47 (10) 16:23	51 16:32 51 16:07 (6)
Potential sun hours	457	427	375	346	299	290
Total, worst case				883	911	1569
Sun reduction				0,52	0,45	0,39
Oper. time red.				0,96	0,96	0,96
Wind dir. red.				0,60	0,58	0,55
Total reduction				0,30	0,25	0,21
Total, real				268	228	325

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

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

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: H - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (8)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June	July	August	September	October	November	December							
1	07:13	07:00	06:25	06:35	07:05 (6)	05:50	06:16 (7)	05:22	05:46	06:16	06:51 (6)	06:45	06:18	06:52					
16:33	17:07	17:40	19:13	24	07:29 (6)	19:44	21	06:37 (7)	20:13	20:24	20:05	19:23	44	07:35 (6)	18:33	16:48	16:24		
2	07:13	06:59	06:23	06:33	07:03 (6)	05:49	06:16 (7)	05:21	05:23	05:47	06:17	06:51 (6)	06:46	06:19	16:46	06:53			
16:34	17:08	17:41	19:14	29	07:32 (6)	19:45	21	06:37 (7)	20:13	20:23	20:04	19:21	44	07:35 (6)	18:32	16:46	16:24		
3	07:13	06:58	06:22	06:32	07:01 (6)	05:47	06:17 (7)	05:21	05:23	05:48	06:18	06:51 (6)	06:47	06:20	16:45	06:54			
16:35	17:09	17:42	19:15	32	07:33 (6)	19:46	19	06:36 (7)	20:14	20:23	20:03	19:20	43	07:34 (6)	18:30	16:45	16:23		
4	07:13	06:57	06:20	06:30	06:59 (6)	05:46	06:17 (7)	05:21	05:24	05:49	06:19	06:51 (6)	06:48	06:22	16:45	06:55			
16:36	17:10	17:43	19:16	34	07:33 (6)	19:47	17	06:34 (7)	20:15	20:23	20:02	19:18	42	07:33 (6)	18:28	16:44	16:23		
5	07:13	06:56	06:19	06:28	06:58 (6)	05:45	06:19 (7)	05:20	05:25	05:50	06:20	06:51 (6)	06:49	06:23	16:43	06:56			
16:37	17:12	17:44	19:17	37	07:35 (6)	19:48	14	06:33 (7)	20:16	20:23	20:01	19:17	41	07:32 (6)	18:27	16:43	16:23		
6	07:13	06:55	06:17	06:27	06:56 (6)	05:44	06:20 (7)	05:20	05:25	05:51	06:32 (7)	06:21	06:52 (6)	06:50	06:24	06:57			
16:37	17:13	17:45	19:18	39	07:35 (6)	19:49	11	06:31 (7)	20:16	20:23	20:00	7	06:39 (7)	19:15	39	07:31 (6)	18:25	16:42	16:23
7	07:13	06:54	06:15	06:25	06:54 (6)	05:43	06:24 (7)	05:20	05:26	05:52	06:29 (7)	06:22	06:53 (6)	06:51	06:25	06:58			
16:38	17:14	17:47	19:19	41	07:35 (6)	19:50	4	06:28 (7)	20:17	20:22	19:58	12	06:41 (7)	19:13	37	07:30 (6)	18:24	16:41	16:23
8	07:13	06:53	06:14	06:24	06:54 (6)	05:42	05:19	05:26	05:52	06:28 (7)	06:22	06:54 (6)	06:52	06:26	06:59				
16:39	17:15	17:48	19:20	42	07:36 (6)	19:51	20:17	20:22	19:57	15	06:43 (7)	19:12	35	07:29 (6)	18:22	16:40	16:23		
9	07:13	06:51	06:12	06:22	06:53 (6)	05:40	05:19	05:27	05:53	06:27 (7)	06:23	06:55 (6)	06:53	06:27	07:00				
16:40	17:16	17:49	19:21	43	07:36 (6)	19:52	20:18	20:22	19:56	17	06:44 (7)	19:10	32	07:27 (6)	18:20	16:39	16:23		
10	07:12	06:50	06:11	06:20	06:53 (6)	05:39	05:19	05:28	05:54	06:26 (7)	06:24	06:56 (6)	06:54	06:29	07:01				
16:41	17:18	17:50	19:22	44	07:37 (6)	19:53	20:19	20:21	19:55	19	06:45 (7)	19:08	29	07:25 (6)	18:19	16:38	16:23		
11	07:12	06:49	06:09	06:19	06:52 (6)	05:38	05:19	05:28	05:55	06:25 (7)	06:25	06:58 (6)	06:55	06:30	07:02				
16:42	17:19	17:51	19:23	44	07:36 (6)	19:54	20:19	20:21	19:53	21	06:46 (7)	19:07	25	07:23 (6)	18:17	16:37	16:23		
12	07:12	06:48	06:08	06:17	06:52 (6)	05:37	05:19	05:29	05:56	06:24 (7)	06:26	06:59 (6)	06:56	06:31	07:02				
16:43	17:20	17:52	19:24	44	07:36 (6)	19:55	20:20	20:21	19:52	22	06:46 (7)	19:05	19	07:18 (6)	18:16	16:36	16:23		
13	07:12	06:47	06:06	06:16	06:51 (6)	05:36	05:19	05:30	05:57	06:24 (7)	06:27	07:04 (6)	06:57	06:32	07:03				
16:44	17:21	17:53	19:25	45	07:36 (6)	19:56	20:20	20:20	19:51	33	07:23 (6)	19:03	10	07:14 (6)	18:14	16:35	16:23		
14	07:11	06:46	06:04	06:14	06:51 (6)	05:35	05:19	05:30	05:58	06:23 (7)	06:28	06:58	06:58	06:33	07:04				
16:46	17:22	17:54	19:26	45	07:36 (6)	19:57	20:20	20:20	19:50	42	07:26 (6)	19:02	18:13	16:34	16:23				
15	07:11	06:44	06:03	06:13	06:50 (6)	05:34	05:19	05:31	05:59	06:23 (7)	06:29	06:59	06:59	06:34	07:05				
16:47	17:24	17:55	19:27	45	07:35 (6)	19:58	20:21	20:19	19:48	47	07:29 (6)	19:00	18:11	16:33	16:24				
16	07:11	06:43	06:01	06:11	06:51 (6)	05:33	05:19	05:32	06:00	06:23 (7)	06:30	07:00	06:36	07:05					
16:48	17:25	17:56	19:28	44	07:35 (6)	19:59	20:21	20:18	19:47	50	07:31 (6)	18:58	18:09	16:32	16:24				
17	07:10	06:42	05:59	06:10	06:50 (6)	05:32	05:19	05:33	06:01	06:22 (7)	06:31	07:01	06:37	07:06					
16:49	17:26	17:57	19:30	44	07:34 (6)	20:00	20:22	20:18	19:45	53	07:31 (6)	18:57	18:08	16:31	16:24				
18	07:10	06:40	05:58	06:08	06:27 (8)	05:31	05:19	05:34	06:02	06:23 (8)	06:32	07:02	06:38	07:07					
16:50	17:27	17:58	19:31	48	07:34 (6)	20:01	20:22	20:17	19:44	54	07:32 (6)	18:55	18:07	16:31	16:25				
19	07:09	06:39	05:56	06:07	06:25 (8)	05:30	05:19	05:34	06:03	06:24 (8)	06:33	07:04	06:39	07:07					
16:51	17:28	17:59	19:32	51	07:33 (6)	20:02	20:22	20:16	19:43	54	07:33 (6)	18:53	18:05	16:30	16:25				
20	07:09	06:38	05:55	06:05	06:24 (8)	05:30	05:19	05:35	06:04	06:25 (8)	06:34	07:05	06:40	07:08					
16:52	17:30	18:01	19:33	51	07:32 (6)	20:03	20:23	20:16	19:41	55	07:34 (6)	18:52	18:04	16:29	16:25				
21	07:08	06:36	05:53	06:04	06:22 (8)	05:29	05:19	05:36	06:05	06:26 (8)	06:35	07:06	06:41	07:09					
16:53	17:31	18:02	19:34	53	07:31 (6)	20:04	20:23	20:15	19:40	55	07:35 (6)	18:50	18:02	16:29	16:26				
22	07:08	06:35	05:51	06:02	06:21 (8)	05:28	05:19	05:37	06:06	06:27 (8)	06:36	07:07	06:42	07:09					
16:55	17:32	18:03	19:35	54	07:30 (6)	20:04	20:23	20:14	19:38	53	07:36 (6)	18:48	18:01	16:28	16:26				
23	07:07	06:33	05:50	06:01	06:20 (8)	05:27	05:20	05:38	06:07	06:28 (8)	06:37	07:08	06:44	07:10					
16:56	17:33	18:04	19:36	54	07:29 (6)	20:05	20:23	20:14	19:37	51	07:36 (6)	18:47	17:59	16:27	16:27				
24	07:06	06:32	05:48	05:59	06:18 (8)	05:27	05:20	05:39	06:08	06:29 (8)	06:38	07:09	06:45	07:10					
16:57	17:34	18:05	19:37	54	07:27 (6)	20:06	20:23	20:13	19:35	49	07:36 (6)	18:45	17:58	16:27	16:27				
25	07:06	06:31	05:46	05:58	06:17 (8)	05:26	05:20	05:39	06:09	06:30 (8)	06:39	06:10	06:46	07:10					
16:58	17:35	18:06	19:38	54	07:26 (6)	20:07	20:24	20:12	19:34	48	07:37 (6)	18:43	16:57	16:26	16:28				
26	07:05	06:29	05:45	05:57	06:15 (7)	05:25	05:20	05:40	06:10	06:53 (6)	06:40	06:11	06:47	07:11					
16:59	17:37	18:07	19:39	52	07:24 (6)	20:08	20:24	20:11	19:32	44	07:37 (6)	18:42	16:55	16:26	16:28				
27	07:04	06:28	05:43	05:55	06:15 (7)	05:25	05:21	05:41	06:11	06:52 (6)	06:41	06:12	06:48	07:11					
17:01	17:38	18:08	19:40	49	07:22 (6)	20:09	20:24	20:10	19:31	45	07:37 (6)	18:40	16:54	16:25	16:29				
28	07:03	06:26	05:41	05:54	06:16 (7)	05:24	05:21	05:42	06:12	06:52 (6)	06:42	06:14	06:49	07:12					
16:53	17:39	18:09	19:41	45	07:21 (6)	20:10	20:24	20:09	19:29	45	07:37 (6)	18:38	16:53	16:25	16:30				
29	07:02	06:40	05:40	05:53	06:16 (7)	05:23	05:22	05:43	06:13	06:52 (6)	06:43	06:15	06:50	07:12					
17:03	17:42	19:10	19:42	40	07:18 (6)	20:10	20:24	20:08	19:28	45	07:37 (6)	18:37	16:51	16:25	16:30				
30	07:02	06:38	05:40	05:51	06:15 (7)	05:23	05:22	05:44	06:14	06:51 (6)	06:44	06:16	06:51	07:12					
17:04	17:41	19:09	19:11	8	07:21 (6)	19:43	31	07:13 (6)	20:11	19:26	45	07:36 (6)	18:35	16:50	16:24	16:31			
31	07:01	06:37	05:40	05:52	06:14 (7)	05:23	05:22	05:45	06:15	06:51 (6)	06:44	06:17	06:52	07:12					
17:05	17:41	19:09	19:12	18	07:27 (6)	19:47	20:12	20:06	19:25	44	07:35 (6)	18:35	16:49	16:24	16:32				
Potential sun hours	299	298	370	398	447	450	457	427	375	346	299	290							
Total, worst case			26	1312	107			1025	440										
Sun reduction			0,44	0,50	0,58			0,71	0,63										
Oper. time red.			0,96	0,96	0,96			0,96	0,96										
Wind dir. red.			0,43	0,41	0,37			0,40	0,43										
Total reduction			0,18	0,20	0,21			0,28	0,26										
Total, real			5	264	22			282	115										

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

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

Project:

San Pancrazio Salentino

Licensed user:

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: I - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (9)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June	July	August	September	October	November	December	
1	07:13 16:33	07:00 17:07	06:25 17:40	06:35 19:13	05:50 19:44	05:22 20:13	05:22 20:24	05:46 20:05	06:16 19:23	06:45 18:33	07:05 (2) 07:09 (2)	06:18 16:48	06:52 16:24
2	07:13 16:34	06:59 17:08	06:23 17:41	06:33 19:14	05:49 19:45	05:21 20:13	05:23 20:23	05:47 20:04	06:17 19:21	06:46 18:32		06:19 16:46	06:53 16:24
3	07:13 16:35	06:58 17:09	06:22 17:42	06:32 19:15	05:47 19:46	05:21 20:14	05:23 20:23	05:48 20:03	06:18 19:20	06:47 18:30		06:20 16:45	06:54 16:23
4	07:13 16:36	06:57 17:10	06:20 17:43	06:30 19:16	05:46 19:47	05:21 20:15	05:24 20:23	05:49 20:02	06:19 19:18	06:48 18:28		06:22 16:44	06:55 16:23
5	07:13 16:37	06:56 17:12	06:19 17:44	06:28 19:17	05:45 19:48	05:20 20:16	05:25 20:23	05:50 20:01	06:20 19:16	06:49 18:27		06:23 16:43	06:56 16:23
6	07:13 16:37	06:55 17:13	06:17 17:45	06:27 19:18	05:44 19:49	05:20 20:16	05:25 20:23	05:51 20:00	06:21 19:15	06:50 18:25		06:24 16:42	06:57 16:23
7	07:13 16:38	06:54 17:14	06:15 17:47	06:25 19:19	05:43 19:50	05:20 20:17	05:26 20:22	05:52 19:58	06:22 19:13	06:51 18:24		06:25 16:41	06:58 16:23
8	07:13 16:39	06:53 17:15	06:14 17:48	06:24 19:20	05:42 19:51	05:19 20:17	05:26 20:22	05:53 19:57	06:22 19:12	06:52 18:22		06:26 16:40	06:59 16:23
9	07:13 16:40	06:51 17:16	06:12 17:49	06:22 19:21	05:40 19:52	05:19 20:18	05:27 20:22	05:53 19:56	06:23 19:10	06:53 18:20		06:27 16:39	07:00 16:23
10	07:12 16:41	06:50 17:18	06:11 17:50	06:20 19:22	05:39 19:53	05:19 20:19	05:28 20:21	05:58 19:55	06:24 19:08	06:54 18:19		06:29 16:38	07:01 16:23
11	07:12 16:42	06:49 17:19	06:09 17:51	06:19 19:23	05:38 19:54	05:19 20:19	05:28 20:21	05:55 19:53	06:25 19:07	06:55 18:17		06:30 16:37	07:02 16:23
12	07:12 16:43	06:48 17:20	06:08 17:52	06:18 (2) 19:24	05:37 19:55	05:19 20:20	05:29 20:20	05:56 19:52	06:26 19:05	06:56 18:16		06:31 16:36	07:02 16:23
13	07:12 16:44	06:47 17:21	06:06 17:53	06:24 (2) 19:25	05:36 19:56	05:19 20:20	05:30 20:20	05:57 19:51	06:27 19:03	06:57 18:14		06:32 16:35	07:03 16:23
14	07:11 16:46	06:45 17:22	06:04 17:54	06:23 (2) 19:26	05:35 19:57	05:19 20:20	05:30 20:20	05:58 19:50	06:28 19:02	06:58 18:13		06:33 16:34	07:04 16:23
15	07:11 16:47	06:44 17:24	06:03 17:55	06:21 (2) 19:27	05:34 19:58	05:19 20:21	05:31 20:19	05:59 19:48	06:29 19:00	06:59 18:11		06:34 16:33	07:05 16:24
16	07:11 16:48	06:43 17:25	06:01 17:56	06:20 (2) 19:28	05:33 19:59	05:19 20:21	05:32 20:18	06:00 19:47	06:30 18:58	07:00 18:09		06:36 16:32	07:05 16:24
17	07:10 16:49	06:42 17:26	05:59 17:57	06:18 (2) 19:29	05:32 20:00	05:19 20:22	05:33 20:18	06:01 19:45	06:31 18:57	07:01 18:08		06:37 16:31	07:06 16:24
18	07:10 16:50	06:40 17:27	05:58 17:58	06:16 (2) 19:31	05:31 20:01	05:19 20:22	05:34 20:17	06:02 19:44	06:32 18:55	07:02 18:07		06:38 16:31	07:07 16:25
19	07:09 16:51	06:39 17:28	05:56 17:59	06:15 (2) 19:32	05:30 20:02	05:19 20:22	05:34 20:16	06:03 19:43	06:33 18:53	07:04 18:05		06:39 16:30	07:07 16:25
20	07:09 16:52	06:38 17:30	05:55 18:01	06:15 (2) 19:33	05:30 20:03	05:19 20:23	05:35 20:16	06:04 19:41	06:34 18:52	07:05 18:04		06:40 16:29	07:08 16:25
21	07:08 16:53	06:36 17:31	05:53 18:02	06:15 (2) 19:34	05:29 20:04	05:19 20:23	05:36 20:15	06:05 19:40	06:35 18:50	07:06 18:02		06:41 16:29	07:08 16:26
22	07:08 16:55	06:35 17:32	05:51 18:03	06:17 (2) 19:35	05:28 20:04	05:19 20:23	05:37 20:14	06:06 19:38	06:36 18:48	07:07 18:01		06:42 16:28	07:09 16:26
23	07:07 16:56	06:33 17:33	05:50 18:04	06:21 (2) 19:36	05:27 20:05	05:20 20:23	05:38 20:13	06:07 19:37	06:37 18:47	07:08 17:59		06:44 16:27	07:10 16:27
24	07:06 16:57	06:32 17:34	05:48 18:05	06:22 (2) 19:37	05:27 20:06	05:20 20:23	05:39 20:13	06:08 19:35	06:38 18:45	07:09 17:58		06:45 16:27	07:10 16:27
25	07:06 16:58	06:31 17:35	05:46 18:06	06:15 (2) 19:38	05:26 20:07	05:20 20:23	05:39 20:12	06:09 19:34	06:39 18:43	07:10 16:57		06:46 16:26	07:10 16:28
26	07:05 16:59	06:29 17:37	05:45 18:07	06:15 (2) 19:39	05:25 20:08	05:20 20:24	05:40 20:11	06:10 19:32	06:40 18:42	07:11 16:55		06:47 16:26	07:11 16:28
27	07:04 17:01	06:28 17:38	05:43 18:08	06:14 (2) 19:40	05:25 20:09	05:21 20:24	05:41 20:10	06:11 19:31	06:41 18:40	07:12 16:54		06:48 16:25	07:11 16:29
28	07:03 17:02	06:26 17:39	05:41 18:09	06:13 (2) 19:41	05:24 20:10	05:21 20:24	05:42 20:09	06:12 19:29	06:42 18:38	07:13 16:53		06:49 16:25	07:11 16:30
29	07:02 17:03	06:25 19:10	05:40 19:10	06:12 (2) 19:42	05:23 20:10	05:22 20:24	05:43 20:08	06:13 19:28	06:43 18:37	07:14 16:51		06:50 16:25	07:12 16:31
30	07:02 17:04	06:24 19:11	05:38 19:11	06:11 (2) 19:43	05:23 20:11	05:22 20:24	05:44 20:07	06:14 19:26	06:44 18:35	07:15 16:50		06:51 16:24	07:12 16:31
31	07:01 17:05	06:23 19:12	05:37 19:12		05:22 20:12		05:45 20:06	06:15 19:25		06:17 16:49			07:12 16:32
Potential sun hours	299	298	370	398	447	450	457	427	375	346		299	290
Total, worst case			129						129		4		
Sun reduction			0,44						0,63		0,52		
Oper. time red.			0,96						0,96		0,96		
Wind dir. red.			0,47						0,47		0,47		
Total reduction			0,20						0,29		0,24		
Total, real			25						37		1		

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: J - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (10)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June						
1	07:12	07:00	06:25	16:27 (1)	06:35	05:50	05:22					
	16:33	17:07	17:40	34	17:01 (1)	19:13	19:44	20:13				
2	07:13	06:59	06:23	16:26 (1)	06:33	05:49	05:21					
	16:34	17:08	17:41	37	17:03 (1)	19:14	19:45	20:13				
3	07:13	06:58	06:22	16:24 (1)	06:32	05:47	05:21					
	16:35	17:09	17:42	39	17:03 (1)	19:15	19:46	20:14				
4	07:13	06:57	06:20	16:23 (1)	06:30	05:46	05:21					
	16:36	17:10	17:43	42	17:05 (1)	19:16	19:47	20:15				
5	07:13	06:56	06:19	16:21 (1)	06:28	05:45	05:20	05:54 (2)				
	16:36	17:12	17:44	44	17:05 (1)	19:17	19:48	20:15	5	05:59 (2)		
6	07:13	06:55	06:17	16:21 (1)	06:27	05:44	05:20	05:51 (2)				
	16:37	17:13	17:45	46	17:07 (1)	19:18	19:49	20:16	10	06:01 (2)		
7	07:13	06:54	06:15	16:19 (1)	06:25	05:43	05:20	05:50 (2)				
	16:38	17:14	17:47	48	17:07 (1)	19:19	19:50	20:17	13	06:03 (2)		
8	07:13	06:53	06:14	16:18 (1)	06:24	05:41	05:19	05:50 (2)				
	16:39	17:15	17:48	49	17:07 (1)	19:20	19:51	20:17	15	06:05 (2)		
9	07:12	06:51	06:12	16:18 (1)	06:22	05:40	05:19	05:49 (2)				
	16:40	17:16	17:49	50	17:08 (1)	19:21	19:52	20:18	17	06:06 (2)		
10	07:12	06:50	06:11	16:17 (1)	06:20	05:39	05:19	05:49 (2)				
	16:41	17:18	17:50	50	17:07 (1)	19:22	19:53	20:18	18	06:07 (2)		
11	07:12	06:49	06:09	16:17 (1)	06:19	05:38	05:19	05:48 (2)				
	16:42	17:19	17:51	51	17:08 (1)	19:23	19:54	20:19	20	06:08 (2)		
12	07:12	06:48	06:08	16:16 (1)	06:17	05:37	05:19	05:48 (2)				
	16:43	17:20	17:52	52	17:08 (1)	19:24	19:55	20:19	21	06:09 (2)		
13	07:12	06:47	06:06	16:16 (1)	06:16	05:36	05:19	05:47 (2)				
	16:44	17:21	17:53	51	17:07 (1)	19:25	19:56	20:20	21	06:08 (2)		
14	07:11	06:45	06:04	16:16 (1)	06:14	05:35	05:19	05:47 (2)				
	16:46	17:22	17:54	51	17:07 (1)	19:26	19:57	20:20	22	06:09 (2)		
15	07:11	06:44	06:03	16:16 (1)	06:13	05:34	05:19	05:41 (4)				
	16:47	17:24	17:55	51	17:07 (1)	19:27	19:58	20:21	23	06:10 (2)		
16	07:11	06:43	06:01	16:15 (1)	06:11	05:33	05:19	05:41 (4)				
	16:48	17:25	17:56	51	17:06 (1)	19:28	19:59	20:21	25	06:11 (2)		
17	07:10	06:42	05:59	16:16 (1)	06:10	05:32	05:19	05:41 (4)				
	16:49	17:26	17:57	50	17:06 (1)	19:29	20:00	20:22	26	06:11 (2)		
18	07:10	06:40	05:58	16:16 (1)	06:08	05:31	05:19	05:41 (4)				
	16:50	17:27	17:58	49	17:05 (1)	19:30	20:01	20:22	27	06:11 (2)		
19	07:09	06:39	05:56	16:17 (1)	06:07	05:30	05:19	05:41 (4)				
	16:51	17:28	17:59	48	17:05 (1)	19:32	20:02	20:22	27	06:11 (2)		
20	07:09	06:38	05:55	16:17 (1)	06:05	05:30	05:19	05:41 (4)				
	16:52	17:30	18:00	47	17:04 (1)	19:33	20:03	20:23	28	06:12 (2)		
21	07:08	06:36	05:53	16:17 (1)	06:04	05:29	05:19	05:41 (4)				
	16:53	17:31	18:02	45	17:02 (1)	19:34	20:04	20:23	28	06:12 (2)		
22	07:07	06:35	05:51	16:19 (1)	06:02	05:28	05:19	05:41 (4)				
	16:55	17:32	18:03	43	17:02 (1)	19:35	20:04	20:23	28	06:12 (2)		
23	07:07	06:33	05:50	16:19 (1)	06:01	05:27	05:20	05:42 (4)				
	16:56	17:33	18:04	41	17:00 (1)	19:36	20:05	20:23	28	06:13 (2)		
24	07:06	06:32	05:48	16:20 (1)	05:59	05:27	05:20	05:42 (4)				
	16:57	17:34	18:05	38	16:58 (1)	19:37	20:06	20:23	27	06:12 (2)		
25	07:05	06:31	05:46	16:22 (1)	05:58	05:26	05:20	05:42 (4)				
	16:58	17:35	7	16:48 (1)	18:06	35	16:57 (1)	19:38	20:07	20:23	26	06:12 (2)
26	07:05	06:29	16:35 (1)	05:45	16:23 (1)	05:57	05:25	05:20	05:43 (4)			
	16:59	17:36	19	16:54 (1)	18:07	32	16:55 (1)	19:39	20:08	20:24	25	06:13 (2)
27	07:04	06:28	16:31 (1)	05:43	16:24 (1)	05:55	05:25	05:21	05:43 (4)			
	17:01	17:38	26	16:57 (1)	18:08	28	16:52 (1)	19:40	20:09	20:24	23	06:12 (2)
28	07:03	06:26	16:29 (1)	05:41	16:27 (1)	05:54	05:24	05:21	05:43 (4)			
	17:02	17:39	30	16:59 (1)	18:09	23	16:50 (1)	19:41	20:10	20:24	23	06:12 (2)
29	07:02		06:40	17:30 (1)	05:53	05:23	05:22	05:51 (2)				
	17:03		19:10	16	17:46 (1)	19:42	20:10	20:24	21	06:12 (2)		
30	07:02		06:38		05:51	05:23	05:22	05:51 (2)				
	17:04		19:11		19:43	20:11	20:24	21	06:12 (2)			
31	07:01		06:36			05:22						
	17:05		19:12			20:12						
Potential sun hours	299	298	370		398	447	450					
Total, worst case			82	1241			568					
Sun reduction			0,40	0,44			0,65					
Oper. time red.			0,96	0,96			0,96					
Wind dir. red.			0,38	0,38			0,48					
Total reduction			0,15	0,16			0,30					
Total, real			12	196			170					

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: J - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (10)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	July	August	September	October	November	December					
1	05:22	05:52 (2)	05:46	06:16	06:45	16:56 (1)	06:18	06:52			
	20	06:12 (2)	20:05	19:23	18:33	51	17:47 (1)	16:48	16:24		
2	05:23	05:52 (2)	05:47	06:17	06:46		16:56 (1)	06:19	06:53		
	19	06:11 (2)	20:04	19:21	18:32	51	17:47 (1)	16:46	16:24		
3	05:23	05:54 (2)	05:48	06:18	06:47		16:56 (1)	06:20	06:54		
	17	06:11 (2)	20:03	19:20	18:30	50	17:46 (1)	16:45	16:23		
4	05:24	05:54 (2)	05:49	06:19	06:48		16:55 (1)	06:21	06:55		
	16	06:10 (2)	20:02	19:18	18:28	50	17:45 (1)	16:44	16:23		
5	05:25	05:56 (2)	05:50	06:20	06:49		16:56 (1)	06:23	06:56		
	14	06:10 (2)	20:01	19:16	18:27	49	17:45 (1)	16:43	16:23		
6	05:25	05:57 (2)	05:51	06:21	06:50		16:56 (1)	06:24	06:57		
	11	06:08 (2)	20:00	19:15	18:25	48	17:44 (1)	16:42	16:23		
7	05:26	05:59 (2)	05:52	06:21	06:51		16:56 (1)	06:25	06:58		
	8	06:07 (2)	19:58	19:13	18:23	47	17:43 (1)	16:41	16:23		
8	05:26		05:52	06:22	06:52		16:56 (1)	06:26	06:59		
			19:57	19:12	18:22	46	17:42 (1)	16:40	16:23		
9	05:27		05:53	06:23	06:53		16:57 (1)	06:27	07:00		
			19:56	19:10	18:20	43	17:40 (1)	16:39	16:23		
10	05:28		05:54	06:24	06:54		16:58 (1)	06:28	07:01		
			19:55	19:08	18:19	41	17:39 (1)	16:38	16:23		
11	05:28		05:55	06:25	06:55		16:59 (1)	06:30	07:02		
			19:53	19:07	18:17	38	17:37 (1)	16:37	16:23		
12	05:29		05:56	06:26	06:56		17:00 (1)	06:31	07:02		
			19:52	19:05	18:16	35	17:35 (1)	16:36	16:23		
13	05:30		05:57	06:27	06:57		17:01 (1)	06:32	07:03		
			19:51	19:03	18:14	32	17:33 (1)	16:35	16:23		
14	05:30		05:58	06:28		17:21 (1)	06:58	17:03 (1)	06:33	07:04	
			19:49	19:02	14	17:35 (1)	18:12	28	17:31 (1)	16:34	16:23
15	05:31		05:59	06:29		17:17 (1)	06:59		17:05 (1)	06:34	07:05
			19:48	19:00	22	17:39 (1)	18:11	23	17:28 (1)	16:33	16:24
16	05:32		06:00	06:30		17:14 (1)	07:00		17:08 (1)	06:35	07:05
			19:47	18:58	27	17:41 (1)	18:09	16	17:24 (1)	16:32	16:24
17	05:33		06:01	06:31		17:11 (1)	07:01			06:37	07:06
			19:45	18:57	32	17:43 (1)	18:08			16:31	16:24
18	05:34		06:02	06:32		17:09 (1)	07:02			06:38	07:07
			19:44	18:55	35	17:44 (1)	18:06			16:31	16:24
19	05:34		06:03	06:33		17:07 (1)	07:03			06:39	07:07
			19:43	18:53	38	17:45 (1)	18:05			16:30	16:25
20	05:35		06:04	06:34		17:06 (1)	07:05			06:40	07:08
			19:41	18:52	40	17:46 (1)	18:04			16:29	16:25
21	05:36		06:05	06:35		17:04 (1)	07:06			06:41	07:08
			19:40	18:50	43	17:47 (1)	18:02			16:29	16:26
22	05:37		06:06	06:36		17:03 (1)	07:07			06:42	07:09
			19:38	18:48	44	17:47 (1)	18:01			16:28	16:26
23	05:38		06:07	06:37		17:02 (1)	07:08			06:43	07:09
			19:37	18:47	46	17:48 (1)	17:59			16:27	16:27
24	05:39		06:08	06:38		17:01 (1)	07:09			06:45	07:10
			19:35	18:45	47	17:48 (1)	17:58			16:27	16:27
25	05:39		06:09	06:39		17:00 (1)	06:10			06:46	07:10
			19:34	18:43	48	17:48 (1)	16:57			16:26	16:28
26	05:40		06:10	06:40		16:59 (1)	06:11			06:47	07:11
			19:32	18:42	49	17:48 (1)	16:55			16:26	16:28
27	05:41		06:11	06:41		16:58 (1)	06:12			06:48	07:11
			19:31	18:40	50	17:48 (1)	16:54			16:25	16:29
28	05:42		06:12	06:42		16:57 (1)	06:13			06:49	07:11
			19:29	18:38	51	17:48 (1)	16:53			16:25	16:30
29	05:43		06:13	06:43		16:57 (1)	06:15			06:50	07:12
			19:28	18:37	51	17:48 (1)	16:51			16:25	16:30
30	05:44		06:14	06:44		16:56 (1)	06:16			06:51	07:12
			19:26	18:35	52	17:48 (1)	16:50			16:24	16:31
31	05:45		06:15			06:17					07:12
			19:24			16:49					16:32
Potential sun hours	457	427	375		346		299		290		
Total, worst case	105		689		648						
Sun reduction	0,72		0,63		0,52						
Oper. time red.	0,96		0,96		0,96						
Wind dir. red.	0,48		0,38		0,38						
Total reduction	0,33		0,23		0,19						
Total, real	35		158		123						

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

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

Licensed user:
Kentec Denmark ApS
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+45 8663 8139
Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk
Calculated:
16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: K - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 0,0° (11)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
Idle start wind speed: Cut in wind speed from power curve

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

Project:

San Pancrazio Salentino

Licensed user:

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: L - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (12)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June						
1	07:12	07:00	06:25	16:50 (4)	06:35	05:50	19:01 (10)	05:22				
	16:33	17:06	17:40	17	17:07 (4)	19:13	19:44	20	19:21 (10)	20:13		
2	07:12	06:59	06:23	16:52 (4)	06:33	05:49	19:01 (10)	05:21				
	16:34	17:08	17:41	14	17:06 (4)	19:14	19:45	21	19:22 (10)	20:13		
3	07:13	06:58	06:21	16:54 (4)	06:31	05:47	18:59 (10)	05:21				
	16:35	17:09	17:42	8	17:02 (4)	19:15	19:46	24	19:23 (10)	20:14		
4	07:13	06:57	06:20	06:30	05:46	18:59 (10)	05:20					
	16:35	17:10	17:43	19:16	19:47	24	19:23 (10)	20:15				
5	07:13	06:56	06:18	06:28	05:45	18:59 (10)	05:20					
	16:36	17:11	17:44	19:17	19:48	24	19:23 (10)	20:15				
6	07:13	06:55	06:17	06:27	18:53 (9)	05:44	18:59 (10)	05:20				
	16:37	17:13	17:45	19:18	4	18:57 (9)	19:49	24	19:23 (10)	20:16		
7	07:13	06:54	06:15	06:25	18:50 (9)	05:42	18:59 (10)	05:20				
	16:38	17:14	17:46	19:19	7	18:57 (9)	19:50	24	19:23 (10)	20:17		
8	07:13	06:52	06:14	06:23	18:49 (9)	05:41	19:00 (10)	05:19				
	16:39	17:15	17:48	19:20	10	18:59 (9)	19:51	23	19:23 (10)	20:17		
9	07:12	06:51	06:12	06:22	18:47 (9)	05:40	19:00 (10)	05:19				
	16:40	17:16	17:49	19:21	13	19:00 (9)	19:52	23	19:23 (10)	20:18		
10	07:12	06:50	06:11	06:20	18:46 (9)	05:39	19:00 (10)	05:19				
	16:41	17:17	17:50	19:22	15	19:01 (9)	19:53	22	19:22 (10)	20:18		
11	07:12	06:49	06:09	06:19	18:45 (9)	05:38	19:01 (10)	05:19				
	16:42	17:19	17:51	19:23	17	19:02 (9)	19:54	21	19:22 (10)	20:19		
12	07:12	06:48	06:07	06:17	18:45 (9)	05:37	19:02 (10)	05:19				
	16:43	17:20	17:52	19:24	17	19:02 (9)	19:55	19	19:21 (10)	20:19		
13	07:11	06:47	06:06	06:16	18:45 (9)	05:36	19:02 (10)	05:19				
	16:44	17:21	17:53	19:25	19	19:04 (9)	19:56	18	19:20 (10)	20:20		
14	07:11	06:45	06:04	06:14	18:45 (9)	05:35	19:03 (10)	05:18				
	16:45	17:22	17:54	19:26	17	19:02 (9)	19:57	16	19:19 (10)	20:20		
15	07:11	06:44	16:56 (3)	06:03	06:12	18:45 (9)	05:34	19:05 (10)	05:18			
	16:46	17:23	5	17:01 (3)	17:55	19:27	17	19:02 (9)	19:58	13	19:18 (10)	20:21
16	07:10	06:43	16:55 (3)	06:01	06:11	18:46 (9)	05:33	19:06 (10)	05:18			
	16:48	17:25	8	17:03 (3)	17:56	19:28	14	19:00 (9)	19:59	10	19:16 (10)	20:21
17	07:10	06:41	16:54 (4)	05:59	06:09	18:47 (9)	05:32	19:05 (10)	05:18			
	16:49	17:26	10	17:04 (3)	17:57	19:29	12	18:59 (9)	20:00	20:22		
18	07:10	06:40	16:51 (4)	05:58	06:08	18:49 (9)	05:31	19:05 (10)	05:19			
	16:50	17:27	14	17:05 (3)	17:58	19:30	7	18:56 (9)	20:01	20:22		
19	07:09	06:39	16:50 (4)	05:56	06:06	18:45 (9)	05:30	19:05 (10)	05:19			
	16:51	17:28	16	17:06 (3)	17:59	19:31	20:02	20:22				
20	07:09	06:37	16:49 (4)	05:54	06:05	18:45 (9)	05:29	19:05 (10)	05:19			
	16:52	17:29	18	17:07 (3)	18:00	19:32	20:03	20:22				
21	07:08	06:36	16:48 (4)	05:53	06:04	18:45 (9)	05:29	19:05 (10)	05:19			
	16:53	17:31	21	17:09 (3)	18:01	19:33	20:03	20:23				
22	07:07	06:35	16:48 (4)	05:51	06:02	18:45 (9)	05:28	19:05 (10)	05:19			
	16:54	17:32	22	17:10 (3)	18:02	19:34	20:04	20:23				
23	07:07	06:33	16:47 (4)	05:49	06:01	18:45 (9)	05:27	19:05 (10)	05:19			
	16:56	17:33	24	17:11 (4)	18:03	19:36	20:05	20:23				
24	07:06	06:32	16:48 (4)	05:48	05:59	18:45 (9)	05:26	19:05 (10)	05:20			
	16:57	17:34	23	17:11 (4)	18:05	19:37	20:06	20:23				
25	07:05	06:30	16:47 (4)	05:46	05:58	18:45 (9)	05:26	19:05 (10)	05:20			
	16:58	17:35	23	17:10 (4)	18:06	19:38	20:07	20:23				
26	07:05	06:29	16:48 (4)	05:45	05:56	19:11 (10)	05:25	19:05 (10)	05:20			
	16:59	17:36	22	17:10 (4)	18:07	19:39	2	19:13 (10)	20:08	20:23		
27	07:04	06:27	16:48 (4)	05:43	05:55	19:07 (10)	05:24	19:05 (10)	05:21			
	17:00	17:37	21	17:09 (4)	18:08	19:40	10	19:17 (10)	20:09	20:23		
28	07:03	06:26	16:49 (4)	05:41	05:54	19:05 (10)	05:24	19:05 (10)	05:21			
	17:02	17:39	20	17:09 (4)	18:09	19:41	14	19:19 (10)	20:09	20:24		
29	07:02		06:40	05:52	05:52	19:03 (10)	05:23	19:03 (10)	05:23	05:21		
	17:03		19:10	19:42	16	19:19 (10)	20:10	19:19 (10)	20:10	20:23		
30	07:01		06:38	05:51	05:51	19:02 (10)	05:23	19:02 (10)	05:23	05:22		
	17:04		19:11	19:43	18	19:20 (10)	20:11	19:20 (10)	20:11	20:23		
31	07:01		06:36			05:22						
	17:05		19:12			20:12						
Potential sun hours	299	298	370	398	447	450						
Total, worst case		247	39	229	326							
Sun reduction		0,40	0,44	0,50	0,58							
Oper. time red.		0,96	0,96	0,96	0,96							
Wind dir. red.		0,40	0,40	0,48	0,51							
Total reduction		0,16	0,17	0,23	0,28							
Total, real		38	7	53	92							

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

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

Project:

San Pancrazio Salentino

Licensed user:

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: L - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (12)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	July	August	September	October	November	December
1	05:22	05:46	19:11 (10)	06:16	18:44 (9)	06:45
	20:23	20:05	19:31 (10)	19:23	18:47	16:24
2	05:23	05:47	19:10 (10)	06:17	18:44 (9)	06:46
	20:23	20:04	19:32 (10)	19:21	18:59 (9)	18:31
3	05:23	05:48	19:10 (10)	06:17	18:45 (9)	06:47
	20:23	20:03	19:32 (10)	19:20	18:58 (9)	18:30
4	05:24	05:48	19:09 (10)	06:18	18:46 (9)	06:48
	20:23	20:02	19:33 (10)	19:18	18:56 (9)	18:28
5	05:24	05:49	19:09 (10)	06:19	18:47 (9)	06:49
	20:23	20:01	19:33 (10)	19:16	18:54 (9)	18:27
6	05:25	05:50	19:09 (10)	06:20	18:49 (9)	06:50
	20:23	19:59	19:33 (10)	19:15	18:53 (9)	18:25
7	05:26	05:51	19:09 (10)	06:21		06:51
	20:22	19:58	19:33 (10)	19:13		18:23
8	05:26	05:52	19:09 (10)	06:22		06:52
	20:22	19:57	19:33 (10)	19:11		18:22
9	05:27	05:53	19:09 (10)	06:23		06:53
	20:22	19:56	19:33 (10)	19:10		18:20
10	05:27	05:54	19:09 (10)	06:24		06:54
	20:21	19:55	19:32 (10)	19:08	1	17:33 (4)
11	05:28	05:55	19:10 (10)	06:25		06:55
	20:21	19:53	19:31 (10)	19:06	11	17:38 (4)
12	05:29	05:56	19:10 (10)	06:26		06:56
	20:20	19:52	19:30 (10)	19:05	16	17:40 (4)
13	05:30	05:57	19:11 (10)	06:27		06:57
	20:20	19:51	19:28 (10)	19:03	19	17:41 (4)
14	05:30	05:58	19:11 (10)	06:28		06:58
	20:19	19:49	19:26 (10)	19:01	21	17:42 (4)
15	05:31	05:59	19:12 (10)	06:29		06:59
	20:19	19:48	19:25 (10)	19:00	22	17:42 (4)
16	05:32	06:00	19:14 (10)	06:30		07:00
	20:18	19:47	19:24 (10)	18:58	23	17:42 (4)
17	05:33	06:01		06:31		07:01
	20:18	19:45		18:56	23	17:42 (4)
18	05:33	06:02		06:32		07:02
	20:17	19:44		18:55	24	17:43 (4)
19	05:34	06:03		06:33		07:03
	20:16	19:42		18:53	23	17:42 (4)
20	05:35	06:04		06:34		07:04
	20:16	19:41		18:51	22	17:41 (3)
21	05:36	06:05		06:35		07:06
	20:15	19:40		18:50	20	17:39 (3)
22	05:37	06:06		06:36		07:07
	20:14	19:38		18:48	17	17:37 (3)
23	05:38	06:07		06:37		07:08
	20:13	19:37		18:46	16	17:36 (3)
24	05:38	06:08		06:38		07:09
	20:13	19:35		18:45	12	17:35 (3)
25	05:39	06:09	18:52 (9)	06:39		06:10
	20:12	19:34	8	19:00 (9)	10	16:34 (3)
26	05:40	06:10	18:50 (9)	06:40		06:11
	20:11	19:32	12	19:02 (9)	7	16:32 (3)
27	05:41	19:19 (10)	06:11	18:48 (9)	06:41	06:12
	20:10	5	19:24 (10)	19:31	15	19:03 (9)
28	05:42	19:16 (10)	06:12	18:46 (9)	06:42	06:13
	20:09	11	19:27 (10)	19:29	17	19:03 (9)
29	05:43	19:15 (10)	06:13	18:45 (9)	06:43	06:14
	20:08	14	19:29 (10)	19:27	18	19:03 (9)
30	05:44	19:14 (10)	06:14	18:45 (9)	06:44	06:16
	20:07	16	19:30 (10)	19:26	19	19:04 (9)
31	05:45	19:13 (10)	06:15	18:44 (9)		06:17
	20:06	18	19:31 (10)	19:24	18	19:02 (9)
Potential sun hours	457	427	375	346	299	290
Total, worst case	64	434	66	290		
Sun reduction	0,72	0,71	0,63	0,52		
Oper. time red.	0,96	0,96	0,96	0,96		
Wind dir. red.	0,51	0,50	0,48	0,40		
Total reduction	0,35	0,34	0,29	0,20		
Total, real	22	146	19	58		

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

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

Project:

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar

Shadow receptor: M - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (13)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:12 16:33	07:00 17:06	06:24 17:40	06:35 19:13	05:50 19:44	05:22 20:12	05:22 20:23	05:46 20:05	06:16 19:23	06:45 18:33	06:18 16:47	06:52 16:24
2	07:12 16:34	06:59 17:08	06:23 17:41	06:33 19:14	05:49 19:45	05:21 20:13	05:23 20:23	05:47 20:04	06:17 19:21	06:46 18:31	06:19 16:46	06:53 16:23
3	07:13 16:35	06:58 17:09	06:21 17:42	06:31 19:15	05:47 19:46	05:21 20:14	05:23 20:23	05:48 20:03	06:17 19:20	06:47 18:30	06:20 16:45	06:54 16:23
4	07:13 16:35	06:57 17:10	06:20 17:43	06:30 19:16	05:46 19:47	05:20 20:15	05:24 20:23	05:48 20:02	06:18 19:18	06:48 18:28	06:21 16:44	06:55 16:23
5	07:13 16:36	06:56 17:11	06:18 17:44	06:28 19:17	05:45 19:48	05:20 20:15	05:24 20:23	05:49 20:01	06:19 19:16	06:49 18:27	06:22 16:43	06:56 16:23
6	07:13 16:37	06:55 17:13	06:17 17:45	06:27 19:18	05:44 19:49	05:20 20:16	05:25 20:22	05:50 19:59	06:20 19:15	06:50 18:25	06:20 16:42	06:57 16:23
7	07:13 16:38	06:53 17:14	06:15 17:46	06:25 19:19	05:42 19:50	05:20 20:17	05:26 20:22	05:51 19:58	06:21 19:13	06:51 18:23	06:25 16:40	06:58 16:23
8	07:12 16:39	06:52 17:15	06:14 17:47	06:23 19:20	05:41 19:51	05:19 20:17	05:26 20:22	05:52 19:57	06:22 19:11	06:52 18:22	06:26 16:39	06:59 16:23
9	07:12 16:40	06:51 17:16	06:12 17:49	06:22 19:21	05:40 19:52	05:19 20:18	05:27 20:22	05:53 19:56	06:23 19:10	06:53 18:20	06:27 16:38	07:00 16:23
10	07:12 16:41	06:50 17:17	06:11 17:50	06:20 19:22	05:39 19:53	05:19 20:18	05:27 20:21	05:54 19:55	06:24 19:08	06:54 18:19	06:28 16:37	07:01 16:23
11	07:12 16:42	06:49 17:19	06:09 17:51	06:19 19:23	05:38 19:54	05:19 20:19	05:28 20:21	05:55 19:53	06:25 19:06	06:55 18:17	06:29 16:36	07:01 16:23
12	07:12 16:43	06:48 17:20	06:07 17:52	06:17 19:24	05:37 19:55	05:19 20:19	05:29 20:20	05:56 19:52	06:26 19:05	06:56 18:15	06:31 16:35	07:02 16:23
13	07:11 16:44	06:47 17:21	06:06 17:53	06:16 19:25	05:36 19:56	05:19 20:20	05:30 20:20	05:57 19:51	06:27 19:03	06:57 18:14	06:32 16:35	07:03 16:23
14	07:11 16:45	06:45 17:22	06:04 17:54	06:14 19:26	05:35 19:57	05:18 20:20	05:30 20:19	05:58 19:49	06:28 19:01	06:58 18:12	06:33 16:34	07:04 16:23
15	07:11 16:46	06:44 17:23	06:03 17:55	06:12 19:27	05:34 19:58	05:18 20:21	05:31 20:19	05:59 19:48	06:29 19:00	06:59 18:11	06:34 16:33	07:04 16:23
16	07:10 16:48	06:43 17:25	06:01 17:56	06:11 19:28	05:33 19:59	05:18 20:21	05:32 20:18	06:00 19:47	06:30 18:58	07:00 18:09	06:35 16:32	07:05 16:24
17	07:10 16:49	06:41 17:26	05:59 17:57	06:09 19:29	05:32 20:00	05:19 20:21	05:33 20:18	06:01 19:45	06:31 18:56	07:01 18:08	06:36 16:31	07:06 16:24
18	07:10 16:50	06:40 17:27	05:58 17:58	06:08 19:30	05:31 20:01	05:19 20:22	05:33 20:17	06:02 19:44	06:32 18:55	07:02 18:06	06:38 16:30	07:07 16:24
19	07:09 16:51	06:39 17:28	05:56 17:59	06:06 19:31	05:30 20:02	05:19 20:22	05:34 20:16	06:03 19:42	06:33 18:53	07:03 18:05	06:39 16:30	07:07 16:25
20	07:08 16:52	06:37 17:29	05:54 18:00	06:05 19:32	05:29 20:02	05:19 20:22	05:35 20:16	06:04 19:41	06:34 18:51	07:04 18:03	06:40 16:29	07:08 16:25
21	07:08 16:53	06:36 17:31	05:53 18:01	06:04 19:33	05:29 20:03	05:19 20:23	05:36 20:15	06:05 19:40	06:35 18:50	07:05 18:02	06:41 16:28	07:08 16:26
22	07:07 16:54	06:35 17:32	05:51 18:02	06:02 19:34	05:28 20:04	05:19 20:23	05:37 20:14	06:06 19:38	06:36 18:48	07:07 18:01	06:42 16:28	07:09 16:26
23	07:07 16:56	06:33 17:33	05:49 18:03	06:01 19:35	05:27 20:05	05:19 20:23	05:38 20:13	06:07 19:37	06:37 18:46	07:08 17:59	06:43 16:27	07:09 16:27
24	07:06 16:57	06:32 17:34	05:48 18:05	05:59 19:37	05:26 20:06	05:20 20:23	05:38 20:12	06:08 19:35	06:38 18:45	07:09 17:58	06:44 16:27	07:10 16:27
25	07:05 16:58	06:30 17:35	05:46 18:06	05:58 19:38	05:26 20:07	05:20 20:23	05:39 20:12	06:09 19:34	06:39 18:43	06:10 16:56	06:46 16:26	07:10 16:28
26	07:05 16:59	06:29 17:36	05:45 18:07	05:56 19:39	05:25 20:08	05:20 20:23	05:40 20:11	06:10 19:32	06:40 18:41	06:11 16:55	06:47 16:26	07:11 16:28
27	07:04 17:00	06:27 17:37	05:43 18:08	05:55 19:40	05:24 20:09	05:21 20:23	05:41 20:10	06:11 19:31	06:41 18:40	06:12 16:54	06:48 16:25	07:11 16:29
28	07:03 17:02	06:26 17:39	05:41 18:09	05:54 19:41	05:24 20:09	05:21 20:23	05:42 20:09	06:12 19:29	06:42 18:38	06:13 16:52	06:49 16:25	07:11 16:30
29	07:02 17:03		06:40 19:10	05:52 19:42	05:23 20:10	05:21 20:23	05:43 20:08	06:13 19:27	06:43 18:36	06:14 16:51	06:50 16:24	07:12 16:30
30	07:01 17:04		06:38 19:11	05:51 19:43	05:23 20:11	05:22 20:23	05:44 20:07	06:14 19:26	06:44 18:35	06:16 16:50	06:51 16:24	07:12 16:31
31	07:00 17:05		06:36 19:12		05:22 20:12		05:45 20:06	06:15 19:24		06:17 16:49		07:12 16:32
Potential sun hours	299	298	370	398	447	450	457	427	375	346	299	290
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)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

San Pancrazio Salentino

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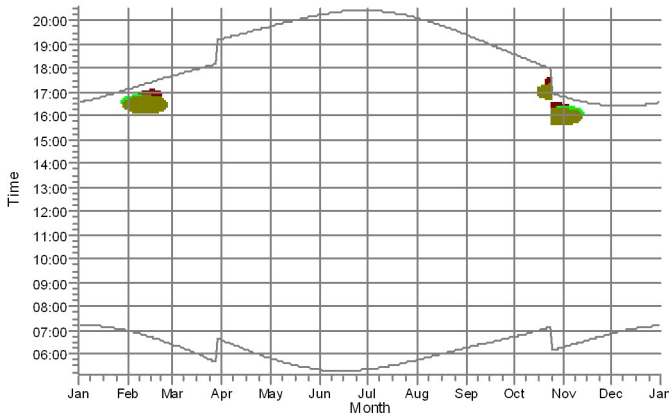
Calculated:

16-02-2018 12:27/3.1.633

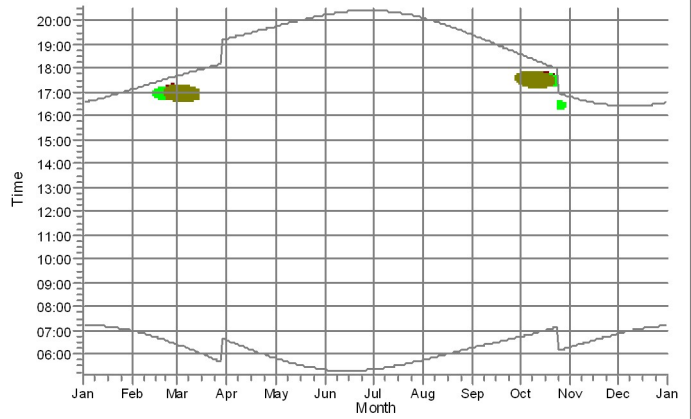


SHADOW - Calendar, graphical

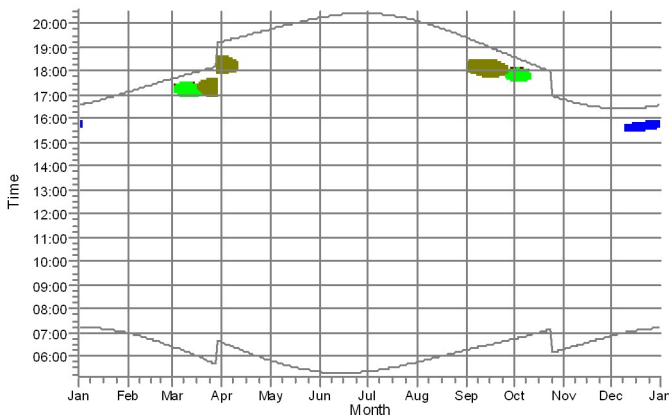
A: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (1)



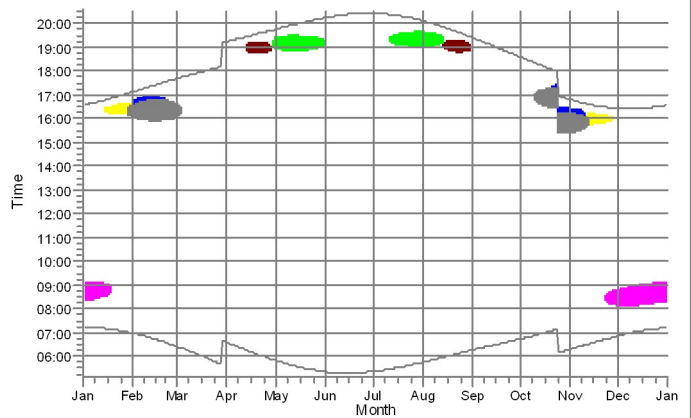
B: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (2)



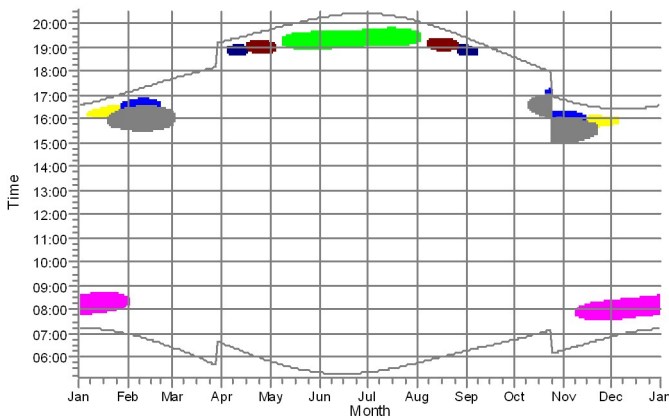
C: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (3)



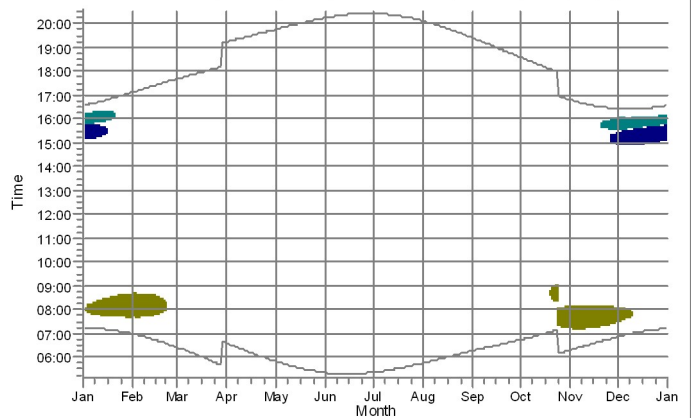
D: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (4)



E: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (5)



F: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (6)



WTGs

- 2: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (15)
- 3: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (16)
- 4: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (17)
- 5: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (18)
- 6: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (19)

- 7: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (20)
- 8: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (21)
- 9: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (22)
- 10: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (23)

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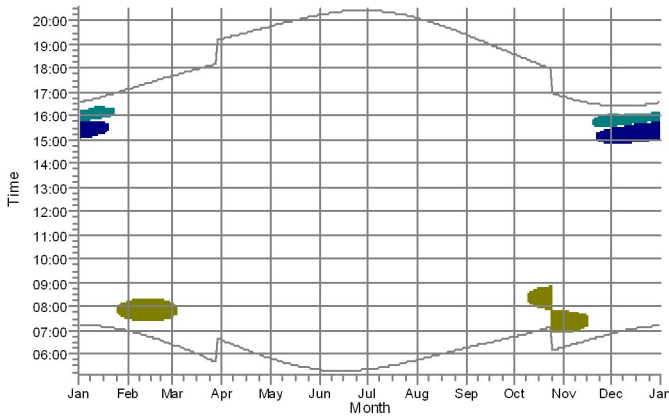
Calculated:

16-02-2018 12:27/3.1.633

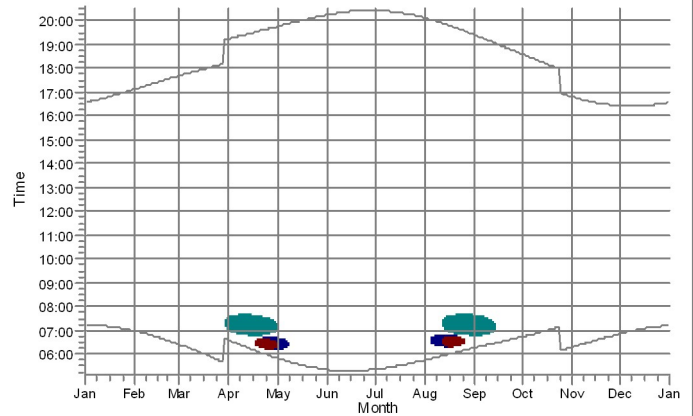


SHADOW - Calendar, graphical

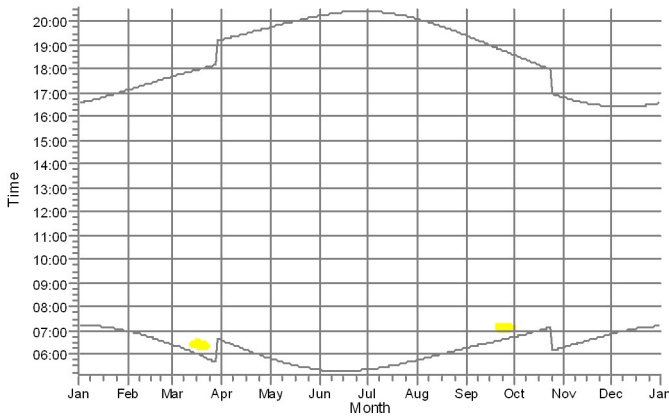
G: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (7)



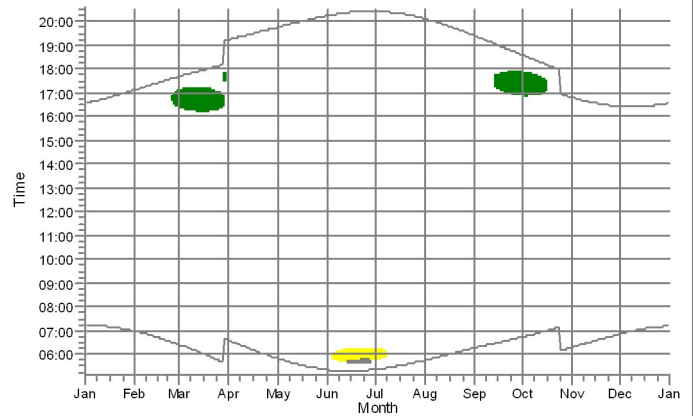
H: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (8)



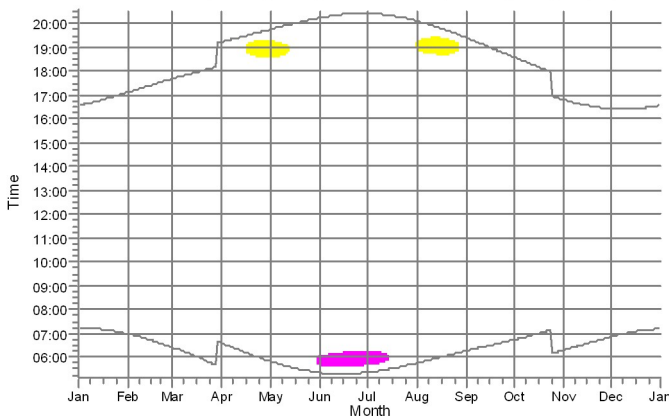
I: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (9)



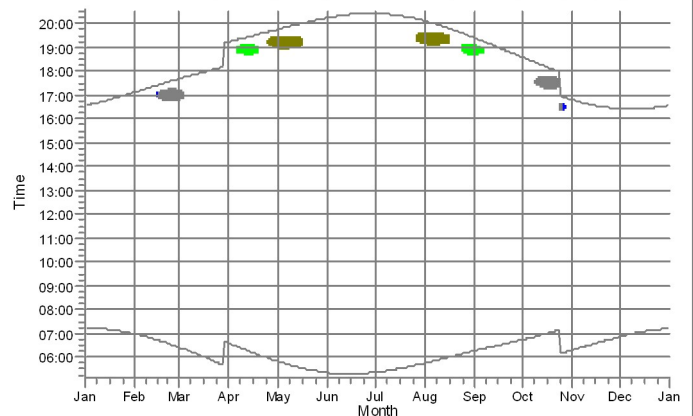
J: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (10)



K: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (11)



L: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (12)



WTGs

- 1: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (14)
- 2: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (15)
- 3: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (16)
- 4: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (17)
- 5: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (18)

- 6: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (19)
- 7: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (20)
- 8: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (21)
- 9: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (22)
- 10: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (23)

Project:

San Pancrazio Salentino

Licensed user:

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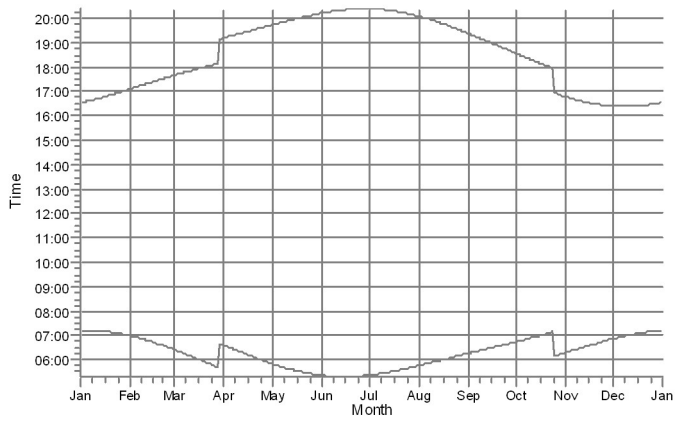
Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar, graphical

M: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (13)



WTGs

Project:

San Pancrazio Salentino

Licensed user:

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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 1 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (14)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June	July	August	September	October	November	December		
1	07:12 16:33	07:00 17:07	06:25 16:27-17:01/34	06:35 19:13	05:50 19:44	05:22 20:13	05:22 20:23	05:46 20:05	06:16 19:23	06:45 16:56-17:47/51	06:18 16:48	06:52 16:24		
2	07:13 16:34	06:59 17:08	06:23 16:26-17:03/37	06:33 19:14	05:49 19:45	05:21 20:13	05:23 20:23	05:47 20:04	06:17 19:21	06:46 16:56-17:47/51	06:19 16:46	06:53 16:24		
3	07:13 16:35	06:58 17:09	06:22 16:24-17:03/39	06:32 19:15	05:47 19:46	05:21 20:14	05:23 20:23	05:48 20:03	06:18 19:20	06:47 16:56-17:46/50	06:20 16:45	06:54 16:23		
4	07:13 16:36	06:57 17:10	06:20 16:23-17:05/42	06:30 19:16	05:46 19:47	05:21 20:15	05:24 20:23	05:49 20:02	06:19 19:18	06:48 16:55-17:45/50	06:22 16:44	06:55 16:23		
5	07:13 16:37	06:56 17:12	06:19 16:21-17:05/44	06:28 19:17	05:45 19:48	05:20 20:15	05:25 20:23	05:50 20:01	06:20 19:16	06:49 16:56-17:45/49	06:23 16:43	06:56 16:23		
6	07:13 16:37	06:55 17:13	06:17 16:21-17:07/46	06:27 19:18	05:44 19:49	05:20 20:16	05:25 20:23	05:51 20:00	06:21 19:15	06:50 16:56-17:44/48	06:24 16:42	06:57 16:23		
7	07:13 16:38	06:54 17:14	06:15 16:19-17:07/48	06:25 19:19	05:43 19:50	05:20 20:17	05:26 20:22	05:52 19:58	06:22 19:13	06:51 16:56-17:43/47	06:25 16:41	06:58 16:23		
8	07:13 16:39	06:53 17:15	06:14 16:18-17:07/49	06:24 19:20	05:42 19:51	05:19 20:17	05:26 20:22	05:52 19:57	06:22 19:12	06:52 16:56-17:42/46	06:26 16:40	06:59 16:23		
9	07:13 16:40	06:51 17:16	06:12 16:18-17:08/50	06:22 19:21	05:40 19:52	05:19 20:18	05:27 20:22	05:53 19:56	06:23 19:10	06:53 16:57-17:40/43	06:27 16:39	07:00 16:23		
10	07:12 16:41	06:50 17:18	06:11 16:17-17:07/50	06:20 19:22	05:39 19:53	05:19 20:18	05:28 20:21	05:54 19:55	06:24 19:08	06:54 16:58-17:39/41	06:29 16:38	07:01 16:23		
11	07:12 16:42	06:49 17:19	06:09 16:17-17:08/51	06:19 19:23	05:38 19:54	05:19 20:19	05:28 20:21	05:55 19:53	06:25 19:07	06:55 16:59-17:37/38	06:30 16:37	07:02 16:23		
12	07:12 16:43	06:48 17:20	06:08 16:16-17:08/52	06:17 19:24	05:37 19:55	05:19 20:20	05:29 20:20	05:56 19:52	06:26 19:05	06:56 17:00-17:35/35	06:31 16:36	07:02 16:23		
13	07:12 16:44	06:47 17:21	06:06 16:16-17:07/51	06:16 19:25	05:36 19:56	05:19 20:20	05:30 20:20	05:57 19:51	06:27 19:03	06:57 17:01-17:33/32	06:32 16:35	07:03 16:23		
14	07:11 16:46	06:45 17:22	06:04 16:16-17:07/51	06:14 19:26	05:35 19:57	05:19 20:20	05:30 20:19	05:58 19:49	06:28 19:02	17:21-17:35/14	06:58 17:03-17:31/28	06:33 16:34	07:04 16:23	
15	07:11 16:47	06:44 17:24	06:03 16:16-17:07/51	06:13 19:27	05:34 19:58	05:19 20:21	05:31 20:19	05:59 19:48	06:29 19:00	17:17-17:39/22	06:59 17:05-17:28/23	06:34 16:33	07:05 16:24	
16	07:11 16:48	06:43 17:25	06:01 16:15-17:06/51	06:11 19:28	05:33 19:59	05:19 20:21	05:32 20:18	06:00 19:47	06:30 18:58	17:14-17:41/27	07:00 17:08-17:24/16	06:35 16:32	07:05 16:24	
17	07:10 16:49	06:42 17:26	05:59 16:16-17:06/50	06:10 19:29	05:32 20:00	05:19 20:22	05:33 20:18	06:01 19:45	06:31 18:57	17:11-17:43/32	07:01 18:08	06:37 16:31	07:06 16:24	
18	07:10 16:50	06:40 17:27	05:58 16:16-17:05/49	06:08 19:31	05:31 20:01	05:19 20:22	05:34 20:17	06:02 19:44	06:32 18:55	17:09-17:44/35	07:02 18:07	06:38 16:31	07:07 16:25	
19	07:09 16:51	06:39 17:28	05:56 16:17-17:05/48	06:07 19:32	05:30 20:02	05:19 20:22	05:34 20:16	06:03 19:43	06:33 18:53	17:07-17:45/38	07:03 18:05	06:39 16:30	07:07 16:25	
20	07:09 16:52	06:38 17:30	05:55 16:17-17:04/47	06:05 19:33	05:30 20:03	05:19 20:23	05:35 20:16	06:04 19:41	06:34 18:52	17:06-17:46/40	07:05 18:04	06:40 16:29	07:08 16:25	
21	07:08 16:53	06:36 17:31	05:53 16:17-17:02/45	06:04 19:34	05:29 20:04	05:19 20:23	05:36 20:15	06:05 19:40	06:35 18:50	17:04-17:47/43	07:06 18:02	06:41 16:29	07:08 16:26	
22	07:07 16:55	06:35 17:32	05:51 16:19-17:02/43	06:02 19:35	05:28 20:04	05:19 20:23	05:37 20:14	06:06 19:38	06:36 18:48	17:03-17:47/44	07:07 18:01	06:42 16:28	07:09 16:26	
23	07:07 16:56	06:33 17:33	05:50 16:19-17:00/41	06:01 19:36	05:27 20:05	05:20 20:23	05:38 20:13	06:07 19:37	06:37 18:47	17:02-17:48/46	07:08 17:59	06:44 16:27	07:09 16:27	
24	07:06 16:57	06:32 17:34	05:48 16:20-16:58/38	05:59 19:37	05:26 20:06	05:20 20:23	05:39 20:13	06:08 19:35	06:38 18:45	17:01-17:48/47	07:09 17:58	06:45 16:27	07:10 16:27	
25	07:05 16:58	06:31 17:35	16:41-16:48/7	05:46 18:06	16:22-16:57/35	05:58 19:38	05:26 20:07	05:39 20:23	06:09 19:34	17:00-17:48/48	07:10 18:43	06:46 16:26	07:10 16:28	
26	07:05 16:59	06:29 17:37	16:35-16:54/19	05:45 18:07	16:23-16:55/32	05:57 19:39	05:25 20:08	05:20 20:24	06:10 19:32	16:59-17:48/49	06:11 18:42	06:47 16:25	07:11 16:28	
27	07:04 17:01	06:28 17:38	16:31-16:57/26	05:43 18:08	16:24-16:52/28	05:55 19:40	05:25 20:09	05:21 20:24	06:11 19:31	16:58-17:48/50	06:12 18:40	06:48 16:25	07:11 16:29	
28	07:03 17:02	06:26 17:39	16:29-16:59/30	05:41 18:09	16:27-16:50/23	05:54 19:41	05:24 20:10	05:21 20:24	06:12 19:29	16:57-17:48/51	06:13 18:38	06:49 16:25	07:11 16:30	
29	07:02 17:03	06:40 17:30-17:46/16	17:30-17:46/16	05:53 19:10	05:23 20:10	05:22 20:24	05:43 20:08	06:13 19:28	06:43 18:37	16:57-17:48/51	06:15 16:51	06:50 16:25	07:12 16:31	
30	07:02 17:04	06:38 19:11	17:04	06:38 19:11	05:23 20:11	05:22 20:24	05:44 20:07	06:14 19:26	06:44 18:35	16:56-17:48/52	06:16 16:50	06:51 16:24	07:12 16:31	
31	07:01 17:05	06:36 19:12	17:05	06:36 19:12	05:22 20:12	05:21 20:26	05:45 20:06	06:15 19:24	06:49 18:35	16:49	06:17 16:49	06:52 16:32	07:12 16:33	
Potential sun hours	299	298	370	398	447	450	457	427	375	689	346	648	299	290
Sum of minutes with flicker	0	82	1241	0	0	0	0	0	0	689	346	648	0	0

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

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

Project:

San Pancrazio Salentino

Licensed user:

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Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 2 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (15)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June
1	07:12 16:33	07:00 16:20-16:34/14 17:07	06:25 17:40	06:35 19:13	05:50 18:38-19:10/32 19:44	05:22 20:13
2	07:13 16:34	06:59 16:21-16:32/11 17:08	06:23 17:41	06:33 19:14	05:49 18:38-19:10/32 19:45	05:21 20:13
3	07:13 16:35	06:58 16:24-16:30/6 17:09	06:22 17:42	06:32 19:15	05:47 18:39-19:10/31 19:46	05:21 20:14
4	07:13 16:36	06:57 17:10	06:20 17:43	06:30 19:16	05:46 18:38-19:08/30 19:47	05:21 20:15
5	07:13 16:36	06:56 17:11	06:19 17:44	06:28 19:17	05:45 18:39-19:07/28 19:48	05:20 05:54-05:59/5 20:15
6	07:13 16:37	06:55 17:13	06:17 17:45	06:27 19:18	05:44 18:40-19:07/27 19:49	05:20 05:51-06:01/10 20:16
7	07:13 16:10-16:12/2 16:38	06:54 17:14	06:15 17:47	06:25 19:19	05:43 18:41-19:06/25 19:50	05:20 05:50-06:03/13 20:17
8	07:13 16:08-16:14/6 16:39	06:53 17:15	06:14 17:48	06:24 19:20	05:41 18:42-19:05/23 19:51	05:19 05:50-06:05/15 20:17
9	07:12 16:08-16:15/7 16:40	06:51 17:16	06:12 17:49	06:22 19:21	05:40 18:43-19:03/20 19:52	05:19 05:49-06:06/17 20:18
10	07:12 16:08-16:16/8 16:41	06:50 17:18	06:11 17:50	06:20 19:22	05:39 18:45-19:02/17 19:53	05:19 05:49-06:07/18 20:18
11	07:12 16:06-16:17/11 16:42	06:49 17:19	06:09 17:51	06:19 19:23	05:38 18:47-19:00/13 19:54	05:19 05:48-06:08/20 20:19
12	07:12 16:06-16:18/12 16:43	06:48 17:20	06:07 06:26-06:28/2 17:52	06:17 19:24	05:37 18:51-18:56/5 19:55	05:19 05:48-06:09/21 20:19
13	07:12 16:07-16:19/12 16:44	06:47 17:21	06:06 06:24-06:30/6 17:53	06:16 19:25	05:36 19:56	05:19 05:47-06:08/21 20:20
14	07:11 16:06-16:20/14 16:45	06:45 17:22	06:04 06:23-06:32/9 17:54	06:14 19:26	05:35 19:57	05:19 05:47-06:09/22 20:20
15	07:11 16:06-16:22/16 16:47	06:44 17:24	06:03 06:21-06:32/11 17:55	06:13 19:27	05:34 19:58	05:19 05:48-06:10/22 20:21
16	07:11 16:06-16:22/16 16:48	06:43 17:25	06:01 06:20-06:33/13 17:56	06:11 19:28	05:33 19:59	05:19 05:48-06:11/23 20:21
17	07:10 16:06-16:24/18 16:49	06:42 17:26	05:59 06:18-06:33/15 17:57	06:10 18:50-19:03/13 19:29	05:32 20:00	05:19 05:47-06:11/24 20:22
18	07:10 16:06-16:25/19 16:50	06:40 17:27	05:58 06:16-06:32/16 17:58	06:08 18:47-19:06/19 19:30	05:31 20:01	05:19 05:47-06:11/24 20:22
19	07:09 16:06-16:26/20 16:51	06:39 17:28	05:56 06:15-06:32/17 17:59	06:07 18:45-19:07/22 19:31	05:30 20:02	05:19 05:47-06:11/24 20:22
20	07:09 16:06-16:27/21 16:52	06:38 17:29	05:54 06:15-06:30/15 18:00	06:05 18:44-19:09/25 19:33	05:30 20:03	05:19 05:47-06:12/25 20:22
21	07:08 16:07-16:29/22 16:53	06:36 17:31	05:53 06:15-06:29/14 18:01	06:04 18:42-19:09/27 19:34	05:29 20:03	05:19 05:47-06:12/25 20:23
22	07:07 16:07-16:30/23 16:55	06:35 17:32	05:51 06:17-06:27/10 18:03	06:02 18:41-19:10/29 19:35	05:28 20:04	05:19 05:47-06:12/25 20:23
23	07:07 16:07-16:31/24 16:56	06:33 17:33	05:50 06:21-06:22/1 18:04	06:01 18:40-19:10/30 19:36	05:27 20:05	05:20 05:48-06:13/25 20:23
24	07:06 16:07-16:32/25 16:57	06:32 17:34	05:48 18:05	05:59 18:39-19:11/32 19:37	05:26 20:06	05:20 05:48-06:12/24 20:23
25	07:05 16:09-16:34/25 16:58	06:30 17:35	05:46 18:06	05:58 18:39-19:11/32 19:38	05:26 20:07	05:20 05:48-06:12/24 20:23
26	07:05 16:09-16:35/26 16:59	06:29 17:36	05:45 18:07	05:57 18:38-19:11/33 19:39	05:25 20:08	05:20 05:50-06:13/23 20:23
27	07:04 16:10-16:36/26 17:01	06:28 17:38	05:43 18:08	05:55 18:38-19:11/33 19:40	05:25 20:09	05:21 05:50-06:12/22 20:24
28	07:03 16:11-16:36/25 17:02	06:26 17:39	05:41 18:09	05:54 18:38-19:11/33 19:41	05:24 20:10	05:21 05:50-06:12/22 20:24
29	07:02 16:12-16:36/24 17:03		06:40 19:10	05:53 18:37-19:10/33 19:42	05:23 20:10	05:22 05:51-06:12/21 20:24
30	07:01 16:14-16:35/21 17:04		06:38 19:11	05:51 18:37-19:10/33 19:43	05:23 20:11	05:22 05:51-06:12/21 20:24
31	07:01 16:16-16:35/19 17:05		06:36 19:12		05:22 20:12	
Potential sun hours	299	298	370	398	447	450
Sum of minutes with flicker	442	31	129	394	283	536

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

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

Project:

San Pancrazio Salentino

Licensed user:

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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 2 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (15)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	July	August	September	October	November	December
1	05:22 05:52-06:12/20 20:23	05:46 19:00-19:08/8 20:05	06:16 19:23	06:45 07:05-07:09/4 18:33	06:18 16:47	06:52 15:48-15:59/11 16:24
2	05:23 05:52-06:11/19 20:23	05:47 18:56-19:10/14 20:04	06:17 19:21	06:46 18:32	06:19 16:46	06:53 15:50-15:58/8 16:24
3	05:23 05:54-06:11/17 20:23	05:48 18:54-19:12/18 20:03	06:18 19:20	06:47 18:30	06:20 16:45	06:54 15:51-15:58/7 16:23
4	05:24 05:54-06:10/16 20:23	05:49 18:53-19:14/21 20:02	06:19 19:18	06:48 18:28	06:21 16:44	06:55 15:52-15:58/6 16:23
5	05:24 05:56-06:10/14 20:23	05:50 18:51-19:15/24 20:01	06:20 19:16	06:49 18:27	06:23 16:43	06:56 15:54-15:58/4 16:23
6	05:25 05:57-06:08/11 20:23	05:51 18:50-19:16/26 19:59	06:20 19:15	06:50 18:25	06:24 16:42	06:57 16:23
7	05:26 05:59-06:07/8 20:22	05:51 18:49-19:17/28 19:58	06:21 19:13	06:51 18:23	06:25 16:41	06:58 16:23
8	05:26 20:22	05:52 18:49-19:17/28 19:57	06:22 19:12	06:52 18:22	06:26 15:54-16:01/7 16:40	06:59 16:23
9	05:27 20:22	05:53 18:48-19:18/30 19:56	06:23 19:10	06:53 18:20	06:27 15:52-16:04/12 16:39	07:00 16:23
10	05:28 20:21	05:54 18:47-19:18/31 19:55	06:24 19:08	06:54 18:19	06:28 15:50-16:05/15 16:38	07:01 16:23
11	05:28 20:21	05:55 18:47-19:19/32 19:53	06:25 19:07	06:55 18:17	06:30 15:48-16:07/19 16:37	07:01 16:23
12	05:29 20:20	05:56 18:46-19:19/33 19:52	06:26 19:05	06:56 18:16	06:31 15:46-16:07/21 16:36	07:02 16:23
13	05:30 20:20	05:57 18:46-19:19/33 19:51	06:27 19:03	06:57 18:14	06:32 15:44-16:08/24 16:35	07:03 16:23
14	05:30 20:19	05:58 18:46-19:19/33 19:49	06:28 19:02	06:58 18:12	06:33 15:43-16:08/25 16:34	07:04 16:23
15	05:31 20:19	05:59 18:45-19:18/33 19:48	06:29 19:00	06:59 18:11	06:34 15:43-16:09/26 16:33	07:05 16:24
16	05:32 20:18	06:00 18:45-19:18/33 19:47	06:30 18:58	07:00 18:09	06:35 15:42-16:08/26 16:32	07:05 16:24
17	05:33 20:18	06:01 18:45-19:17/32 19:45	06:31 18:57	07:01 18:08	06:37 15:42-16:07/25 16:31	07:06 16:24
18	05:33 20:17	06:02 18:45-19:17/32 19:44	06:32 18:55	07:02 18:06	06:38 15:41-16:06/25 16:31	07:07 16:24
19	05:34 20:16	06:03 18:45-19:16/31 19:43	06:33 18:53	07:03 18:05	06:39 15:42-16:06/24 16:30	07:07 16:25
20	05:35 20:16	06:04 18:45-19:16/31 19:41	06:34 18:52	07:05 18:04	06:40 15:42-16:05/23 16:29	07:08 16:25
21	05:36 20:15	06:05 18:46-19:15/29 19:40	06:35 07:03-07:12/9 18:50	07:06 18:02	06:41 15:42-16:04/22 16:28	07:08 16:26
22	05:37 20:14	06:06 18:47-19:14/27 19:38	06:36 07:01-07:14/13 18:48	07:07 18:01	06:42 15:42-16:03/21 16:28	07:09 16:26
23	05:38 20:13	06:07 18:48-19:12/24 19:37	06:37 06:59-07:15/16 18:46	07:08 17:59	06:43 15:42-16:03/21 16:27	07:09 16:27
24	05:39 20:13	06:08 18:49-19:11/22 19:35	06:38 06:58-07:15/17 18:45	07:09 17:58	06:45 15:44-16:03/19 16:27	07:10 16:27
25	05:39 20:12	06:09 18:51-19:09/18 19:34	06:39 06:59-07:15/16 18:43	07:10 16:56	06:46 15:44-16:02/18 16:26	07:10 16:28
26	05:40 20:11	06:10 18:53-19:06/13 19:32	06:40 07:00-07:15/15 18:41	07:11 16:55	06:47 15:45-16:01/16 16:26	07:11 16:28
27	05:41 20:10	06:11 19:31	06:41 07:01-07:15/14 18:40	07:12 16:54	06:48 15:45-16:01/16 16:25	07:11 16:29
28	05:42 20:09	06:12 19:29	06:42 07:02-07:14/12 18:38	07:13 16:53	06:49 15:46-16:00/14 16:25	07:11 16:30
29	05:43 20:08	06:13 19:28	06:43 07:03-07:13/10 18:37	07:14 16:51	06:50 15:47-16:00/13 16:24	07:12 16:30
30	05:44 20:07	06:14 19:26	06:44 07:04-07:11/7 18:35	07:15 16:50	06:51 15:48-15:59/11 16:24	07:12 16:31
31	05:45 20:06	06:15 19:24		07:16 16:49		07:12 16:32
Potential sun hours	457	427	375	346	299	290
Sum of minutes with flicker	105	684	129	4	443	36

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 3 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (16)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June	July	August	September	October	November	December
1	07:12 15:42-15:50/8 16:33	07:00 16:17-16:40/23 17:07	06:25 17:40 06:35	06:35 19:13 19:44	05:50 20:13 19:44	05:22 20:23 20:05	05:22 20:23 20:05	05:46 20:05 19:23	06:16 19:23 18:33	06:45 15:44-16:21/37 16:47	06:52 16:24 16:24	
2	07:13 15:43-15:49/6 16:34	06:59 16:17-16:41/24 17:08	06:23 17:41 06:33	06:33 19:14 19:45	05:49 20:13 19:45	05:21 20:23 20:04	05:23 20:23 20:04	05:47 19:21 18:32	06:17 19:21 18:32	06:19 15:44-16:21/37 16:46	06:53 16:24 16:24	
3	07:13 16:35 07:13	06:58 16:16-16:44/28 17:09	06:22 17:42 06:32	06:32 19:15 19:46	05:47 20:14 19:46	05:21 20:23 20:03	05:23 20:23 20:03	05:48 19:20 18:30	06:18 19:20 18:30	06:20 15:44-16:21/37 16:45	06:54 16:23 16:23	
4	07:13 16:36 07:13	06:57 16:15-16:46/31 17:10	06:20 17:43 06:30	06:30 19:16 19:47	05:46 20:15 19:47	05:21 20:23 20:02	05:24 20:23 20:02	05:49 19:18 18:28	06:19 19:18 18:28	06:21 15:45-16:20/35 16:44	06:55 16:23 16:23	
5	07:13 16:36 07:13	06:56 16:15-16:48/33 17:11	06:18 17:44 06:28	06:28 19:17 19:48	05:45 20:15 19:48	05:20 20:23 20:01	05:24 20:23 20:01	05:50 19:16 18:27	06:19 19:16 18:27	06:23 15:45-16:19/34 16:43	06:56 16:23 16:23	
6	07:13 16:37 07:13	06:55 16:15-16:49/34 17:13	06:17 17:45 06:27	06:27 19:18 19:49	05:44 20:16 19:49	05:20 20:23 20:02	05:25 20:23 19:59	05:50 19:15 18:25	06:20 19:15 18:25	06:24 15:45-16:18/33 16:42	06:57 16:23 16:23	
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8	07:13 16:39 07:13	06:53 16:15-16:51/36 17:15	06:14 17:48 06:24	06:24 19:20 19:51	05:41 20:17 19:51	05:19 20:22 20:02	05:26 19:57 19:12	05:52 18:22 18:22	06:22 18:22 18:22	06:26 15:47-16:15/28 16:40	06:59 16:23 16:23	
9	07:12 16:40 07:12	06:51 16:15-16:52/37 17:16	06:12 17:49 06:22	06:22 19:21 19:52	05:40 20:18 19:52	05:19 20:22 20:02	05:27 19:56 19:10	05:53 18:20 18:20	06:23 18:20 18:20	06:27 15:48-16:12/24 16:39	07:00 16:23 16:23	
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11	07:12 16:42 07:12	06:49 16:14-16:52/38 17:19	06:09 17:51 06:19	06:19 19:23 19:54	05:38 20:19 19:54	05:19 20:21 20:01	05:28 19:53 19:07	05:55 18:17 18:17	06:25 18:17 18:17	06:30 15:51-16:11/20 16:37	07:01 15:32-15:40/8 16:23	
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14	07:11 16:45 07:11	06:45 16:16-16:53/37 17:22	06:04 17:54 06:14	06:14 19:26 19:57	05:35 20:20 19:57	05:19 20:19 20:01	05:30 19:49 19:02	05:58 18:12 18:12	06:28 18:12 18:12	06:33 15:58-16:03/5 16:34	07:04 15:31-15:43/12 16:23	
15	07:11 16:47 07:11	06:44 16:16-16:52/36 17:24	06:03 17:55 06:13	06:13 19:27 19:58	05:34 20:21 19:58	05:19 20:19 20:01	05:31 19:48 19:00	05:59 18:11 18:11	06:29 18:11 18:11	06:34 17:31-17:35/4 16:33	07:05 15:32-15:44/12 16:24	
16	07:11 16:48 07:11	06:43 16:15-17:03/8 17:25	06:01 17:56 06:11	06:11 19:28 19:59	05:33 20:21 19:59	05:19 20:20 20:02	05:32 19:47 18:58	06:00 18:09 18:09	06:30 17:07 17:07	06:35 15:32-15:45/13 16:24	07:06 15:32-15:45/13 16:24	
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22	07:07 16:55 07:07	06:35 16:15-17:10/16 17:32	05:51 18:03 06:03	06:02 19:35 20:04	05:28 20:23 20:02	05:19 20:14 19:38	05:37 18:48 18:48	06:06 18:01 18:01	06:36 17:23-17:37/14 16:28	06:42 18:01 18:01	07:09 15:34-15:48/14 16:26	
23	07:07 16:56 07:07	06:33 16:16-17:09/15 17:33	05:50 18:04 06:01	06:01 19:36 20:05	05:27 20:23 20:02	05:20 20:13 19:37	05:38 18:46 18:46	06:07 17:59 16:51-17:19/28 16:27	06:37 18:09 18:09	06:43 17:24-17:35/11 16:27	07:09 15:34-15:48/14 16:27	
24	07:06 16:57 07:06	06:32 16:15-17:08/13 17:34	05:48 18:05 06:05	05:48 19:37 20:06	05:26 20:23 20:02	05:20 20:13 19:35	06:08 18:45 18:45	06:38 17:58 16:50-17:21/31 16:27	06:38 18:09 18:09	06:45 17:24-17:35/11 16:27	07:10 15:35-15:49/14 16:27	
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28	07:03 16:25-16:31/6 17:02	06:26 17:39 06:25	05:41 18:09 19:41	05:41 19:41 20:10	05:24 20:24 20:09	05:22 20:09 19:29	06:12 18:38 18:38	06:42 16:52 16:52	06:42 18:38 18:38	06:49 15:45-16:22/37 16:25	07:11 15:37-15:50/13 16:30	
29	07:02 16:22-16:35/13 17:03	06:25 17:38 06:24	05:40 19:10 19:42	05:40 19:42 20:10	05:23 20:24 20:08	05:21 20:08 19:28	06:13 18:36 18:36	06:43 16:51 15:45-16:23/38 16:24	06:43 18:36 18:36	06:50 15:45-16:23/38 16:24	07:12 15:38-15:50/12 16:30	
30	07:01 16:20-16:37/17 17:04	06:24 17:37 06:23	05:38 19:11 19:43	05:38 19:43 20:11	05:23 20:24 20:07	05:22 20:07 19:26	06:14 18:35 18:35	06:44 16:50 15:44-16:22/38 16:24	06:44 18:35 18:35	06:51 15:45-16:22/37 16:24	07:12 15:39-15:50/11 16:31	
31	07:01 16:19-16:39/20 17:05	06:23 17:36 06:22	05:36 19:12 19:44	05:36 19:44 20:12	05:22 20:24 20:06	05:21 20:06 19:24	06:15 18:49 18:49	06:45 16:49 16:49	06:45 18:49 18:49	06:52 15:44-16:22/38 16:24	07:12 15:40-15:49/9 16:32	
Potential sun hours	299	298	370	398	447	450	457	427	375	346	299	290
Sum of minutes with flicker	70	801	0	0	0	0	0	0	0	501	374	267

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 4 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (17)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June
1	07:12 16:33	07:00 15:35-16:29/54 17:07	06:25 16:50-17:07/17 17:40 15:49-16:30/41	06:35 19:13	05:50 19:44	05:22 20:13
2	07:13 16:34	06:59 15:35-16:31/56 17:08	06:23 16:52-17:06/14 16:10-16:28/18 17:41 15:53-16:09/16	06:33 19:14	05:49 19:45	05:21 20:13
3	07:13 16:35	06:58 15:34-16:33/59 17:09	06:22 16:54-17:02/8 17:42 16:15-16:22/7	06:32 19:15	05:47 19:46	05:21 20:14
4	07:13 16:35	06:57 15:34-16:35/61 17:10	06:20 17:43	06:30 19:16	05:46 19:47	05:21 20:15
5	07:13 16:36	06:56 15:33-16:36/63 17:11	06:18 17:44	06:28 19:17	05:45 19:48	05:20 20:15
6	07:13 16:37	06:55 15:33-16:37/64 17:13	06:17 17:45	06:27 19:18	05:44 19:49	05:20 20:16
7	07:13 16:38	06:54 15:33-16:38/65 17:14	06:15 17:46	06:25 19:19	05:43 19:50	05:20 20:17
8	07:13 16:39	06:52 15:33-16:39/66 17:15	06:14 17:48	06:23 19:20	05:41 19:51	05:19 20:17
9	07:12 16:40	06:51 15:33-16:40/67 17:16	06:12 17:49	06:22 19:21	05:40 19:52	05:19 20:18
10	07:12 16:41	06:50 15:33-16:41/68 17:18	06:11 17:50	06:20 19:22	05:39 19:53	05:19 20:18
11	07:12 16:42	06:49 15:33-16:41/68 17:19	06:09 17:51	06:19 19:23	05:38 19:54	05:19 20:19
12	07:12 16:43	06:48 15:33-16:42/69 17:20	06:07 17:52	06:17 19:24	05:37 19:55	05:19 20:19
13	07:12 16:44	06:47 15:33-16:42/69 17:21	06:06 17:53	06:16 19:25	05:36 19:56	05:19 20:20
14	07:11 16:45	06:45 15:34-16:43/69 17:22	06:04 17:54	06:14 19:26	05:35 19:57	05:19 20:20
15	07:11 16:47	06:44 15:33-16:42/69 17:24	06:03 17:55	06:13 19:27	05:34 19:58	05:19 05:41-05:42/1 20:21
16	07:10 16:48	06:43 16:57-17:02/5 17:25 15:34-16:42/68	06:01 17:56	06:11 19:28	05:33 19:59	05:19 05:41-05:43/2 20:21
17	07:10 16:49	06:42 16:54-17:04/10 17:26 15:35-16:43/68	05:59 17:57	06:10 19:29	05:32 20:00	05:19 05:41-05:43/2 20:22
18	07:10 16:50	06:40 16:51-17:05/14 17:27 15:34-16:42/68	05:58 17:58	06:08 19:30	05:31 20:01	05:19 05:41-05:44/3 20:22
19	07:09 16:51	06:39 16:50-17:06/16 17:28 15:35-16:42/67	05:56 17:59	06:07 19:31	05:30 20:02	05:19 05:41-05:44/3 20:22
20	07:09 15:50-16:02/12 16:52	06:38 16:49-17:07/18 17:29 15:36-16:42/66	05:54 18:00	06:05 19:32	05:30 20:03	05:19 05:41-05:44/3 20:22
21	07:08 15:48-16:06/18 16:53	06:36 16:48-17:09/21 17:31 15:37-16:41/64	05:53 18:01	06:04 19:34	05:29 20:03	05:19 05:41-05:44/3 20:23
22	07:07 15:45-16:09/24 16:55	06:35 16:48-17:10/22 17:32 15:38-16:41/63	05:51 18:03	06:02 19:35	05:28 20:04	05:19 05:41-05:44/3 20:23
23	07:07 15:43-16:11/28 16:56	06:33 16:47-17:11/24 17:33 15:38-16:39/61	05:50 18:04	06:01 19:36	05:27 20:05	05:19 05:42-05:45/3 20:23
24	07:06 15:42-16:12/30 16:57	06:32 16:48-17:11/23 17:34 15:40-16:39/59	05:48 18:05	05:59 19:37	05:26 20:06	05:20 05:42-05:45/3 20:23
25	07:05 15:41-16:15/34 16:58	06:30 16:47-17:10/23 17:35 15:41-16:37/56	05:46 18:06	05:58 19:38	05:26 20:07	05:20 05:42-05:44/2 20:23
26	07:05 15:40-16:16/36 16:59	06:29 16:48-17:10/22 17:36 15:43-16:37/54	05:45 18:07	05:57 19:39	05:25 20:08	05:20 05:43-05:45/2 20:23
27	07:04 15:39-16:17/38 17:00	06:28 16:48-17:09/21 17:38 15:44-16:34/50	05:43 18:08	05:55 19:40	05:24 20:09	05:21 05:43-05:44/1 20:24
28	07:03 15:38-16:19/41 17:02	06:26 16:49-17:09/20 17:39 15:46-16:33/47	05:41 18:09	05:54 19:41	05:24 20:09	05:21 05:43-05:44/1 20:24
29	07:02 15:37-16:20/43 17:03		06:40 19:10	05:52 19:42	05:23 20:10	05:21 20:24
30	07:01 15:36-16:24/48 17:04		06:38 19:11	05:51 19:43	05:23 20:11	05:22 20:23
31	07:01 15:36-16:27/51 17:05		06:36 19:12		05:22 20:12	
Potential sun hours	299	298	370	398	447	450
Sum of minutes with flicker	403	1997	121	0	0	32

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS
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DK-8800 Viborg
+45 8663 8139
Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk
Calculated:
16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 4 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (17)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October		November	December
1	05:22 20:23	05:46 20:05	06:16 19:23	06:45 18:33		06:18 16:47	15:02-16:10/68 16:24
2	05:23 20:23	05:47 20:04	06:17 19:21	06:46 18:32		06:19 16:46	15:02-16:09/67 16:24
3	05:23 20:23	05:48 20:03	06:18 19:20	06:47 18:30		06:20 16:45	15:03-16:09/66 16:23
4	05:24 20:23	05:49 20:02	06:19 19:18	06:48 18:28		06:21 16:44	15:03-16:08/65 16:23
5	05:24 20:23	05:50 20:01	06:19 19:16	06:49 18:27		06:23 16:43	15:03-16:07/64 16:23
6	05:25 20:23	05:50 19:59	06:20 19:15	06:50 18:25		06:24 16:42	15:03-16:06/63 16:23
7	05:26 20:22	05:51 19:58	06:21 19:13	06:51 18:23		06:25 16:41	15:05-16:05/60 16:23
8	05:26 20:22	05:52 19:57	06:22 19:11	06:52 18:22		06:26 16:40	15:05-16:04/59 16:23
9	05:27 20:22	05:53 19:56	06:23 19:10	06:53 18:20		06:27 16:38	15:05-16:02/57 16:23
10	05:28 20:21	05:54 19:55	06:24 19:08	06:54 18:19	17:32-17:33/1	06:28 16:37	15:06-16:00/54 16:23
11	05:28 20:21	05:55 19:53	06:25 19:07	06:55 18:17	17:27-17:38/11 16:46-17:00/14	06:30 16:37	15:08-15:59/51 16:23
12	05:29 20:20	05:56 19:52	06:26 19:05	06:56 18:15	17:24-17:40/16 16:24-17:03/39	06:31 16:36	15:08-15:55/47 16:23
13	05:30 20:20	05:57 19:51	06:27 19:03	06:57 18:14	17:22-17:41/19 16:21-17:05/44	06:32 16:35	15:09-15:52/43 16:23
14	05:30 20:19	05:58 19:49	06:28 19:02	06:58 18:12	17:21-17:42/21 16:18-17:06/48	06:33 16:34	15:10-15:50/40 16:23
15	05:31 20:19	05:59 19:48	06:29 19:00	06:59 18:11	17:20-17:42/22 16:15-17:08/53	06:34 16:33	15:12-15:50/38 16:23
16	05:32 20:18	06:00 19:47	06:30 18:58	07:00 18:09	17:19-17:42/23 16:13-17:08/55	06:35 16:32	15:13-15:49/36 16:24
17	05:33 20:18	06:01 19:45	06:31 18:57	07:01 18:08	17:19-17:42/23 16:13-17:09/56	06:37 16:31	15:14-15:48/34 16:24
18	05:33 20:17	06:02 19:44	06:32 18:55	07:02 18:06	17:19-17:43/24 16:11-17:11/60	06:38 16:31	15:16-15:46/30 16:24
19	05:34 20:16	06:03 19:42	06:33 18:53	07:03 18:05	17:19-17:42/23 16:09-17:11/62	06:39 16:30	15:18-15:46/28 16:25
20	05:35 20:16	06:04 19:41	06:34 18:51	07:04 18:03	17:19-17:41/22 16:08-17:11/63	06:40 16:29	15:20-15:44/24 16:25
21	05:36 20:15	06:05 19:40	06:35 18:50	07:06 18:02	17:19-17:39/20 16:07-17:12/65	06:41 16:28	15:23-15:41/18 16:26
22	05:37 20:14	06:06 19:38	06:36 18:48	07:07 18:01	17:20-17:37/17 16:06-17:12/66	06:42 16:28	15:26-15:38/12 16:26
23	05:38 20:13	06:07 19:37	06:37 18:46	07:08 17:59	17:20-17:36/16 16:05-17:12/67	06:43 16:27	16:27 16:27
24	05:38 20:13	06:08 19:35	06:38 18:45	07:09 17:58	17:23-17:35/12 16:05-17:13/68	06:45 16:27	07:10 16:27
25	05:39 20:12	06:09 19:34	06:39 18:43	06:10 16:56	16:24-16:34/10 15:04-16:12/68	06:46 16:26	07:10 16:28
26	05:40 20:11	06:10 19:32	06:40 18:41	06:11 16:55	15:03-16:12/69 15:03-16:12/69	06:47 16:26	07:11 16:28
27	05:41 20:10	06:11 19:31	06:41 18:40	06:12 16:54	15:03-16:12/69 16:54	06:48 16:25	07:11 16:29
28	05:42 20:09	06:12 19:29	06:42 18:38	06:13 16:52	15:02-16:11/69 16:52	06:49 16:25	07:11 16:30
29	05:43 20:08	06:13 19:28	06:43 18:36	06:15 16:51	15:03-16:12/69 16:51	06:50 16:24	07:12 16:30
30	05:44 20:07	06:14 19:26	06:44 18:35	06:16 16:50	15:03-16:11/68 16:50	06:51 16:24	07:12 16:31
31	05:45 20:06	06:15 19:24		06:17 16:49	15:02-16:11/69 16:49		07:12 16:32
Potential sun hours	457	427	375	346		299	290
Sum of minutes with flicker	0	0	0	1530		1024	0

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

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DK-8800 Viborg

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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 5 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (18)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June
1	07:12 07:52-09:05/73 16:33	07:00 08:18-08:26/8 17:06	06:25 17:40	06:35 19:13	05:50 19:44	05:22 05:46-05:58/12 20:13
2	07:12 07:52-09:05/73 16:34	06:59 17:08	06:23 17:41	06:33 19:14	05:49 19:45	05:21 05:46-06:00/14 20:13
3	07:13 07:53-09:05/72 16:35	06:58 17:09	06:21 17:42	06:31 19:15	05:47 19:46	05:21 05:44-06:00/16 20:14
4	07:13 07:53-09:05/72 16:35	06:57 17:10	06:20 17:43	06:30 19:16	05:46 19:47	05:20 05:44-06:02/18 20:15
5	07:13 07:53-09:05/72 16:36	06:56 17:11	06:18 17:44	06:28 19:17	05:45 19:48	05:20 05:43-06:03/20 20:15
6	07:13 07:53-09:04/71 16:37	06:55 17:13	06:17 17:45	06:27 19:18	05:44 19:49	05:20 05:42-06:03/21 20:16
7	07:13 07:53-09:04/71 16:38	06:54 17:14	06:15 17:46	06:25 19:19	05:42 19:50	05:20 05:42-06:04/22 20:17
8	07:13 07:54-09:04/70 16:39	06:52 17:15	06:14 17:48	06:23 19:20	05:41 19:51	05:19 05:42-06:05/23 20:17
9	07:12 07:55-09:04/69 16:40	06:51 17:16	06:12 17:49	06:22 19:21	05:40 19:52	05:19 05:42-06:05/23 20:18
10	07:12 07:55-09:04/69 16:41	06:50 17:17	06:11 17:50	06:20 19:22	05:39 19:53	05:19 05:42-06:06/24 20:18
11	07:12 07:55-09:03/68 16:42	06:49 17:19	06:09 17:51	06:19 19:23	05:38 19:54	05:19 05:42-06:07/25 20:19
12	07:12 07:56-09:03/67 16:43	06:48 17:20	06:07 17:52	06:17 19:24	05:37 19:55	05:19 05:41-06:06/25 20:19
13	07:11 07:56-09:03/67 16:44	06:47 17:21	06:06 17:53	06:16 19:25	05:36 19:56	05:19 05:41-06:07/26 20:20
14	07:11 07:56-09:01/65 16:45	06:45 17:22	06:04 17:54	06:14 19:26	05:35 19:57	05:18 05:41-06:07/26 20:20
15	07:11 07:57-09:01/64 16:46	06:44 17:23	06:03 17:55	06:13 19:27	05:34 19:58	05:18 05:41-06:07/26 20:21
16	07:10 07:57-08:59/62 16:48	06:43 17:25	06:01 17:56	06:11 19:28	05:33 19:59	05:18 05:41-06:08/27 20:21
17	07:10 07:58-08:40/42 16:49	06:41 17:26	05:59 17:57	06:09 19:29	05:32 20:00	05:19 05:42-06:09/27 20:21
18	07:10 07:58-08:39/41 16:50	06:40 17:27	05:58 17:58	06:08 19:30	05:31 20:01	05:19 05:42-06:09/27 20:22
19	07:09 08:00-08:40/40 16:51	06:39 17:28	05:56 17:59	06:06 19:31	05:30 20:02	05:19 05:42-06:09/27 20:22
20	07:09 08:00-08:39/39 16:52	06:37 17:29	05:54 18:00	06:05 19:32	05:29 20:03	05:19 05:42-06:09/27 20:22
21	07:08 08:01-08:40/39 16:53	06:36 17:31	05:53 18:01	06:04 19:33	05:29 20:03	05:19 05:42-06:09/27 20:23
22	07:07 08:02-08:39/37 16:54	06:35 17:32	05:51 18:02	06:02 19:34	05:28 20:04	05:19 05:42-06:09/27 20:23
23	07:07 08:02-08:39/37 16:56	06:33 17:33	05:49 18:03	06:01 19:36	05:27 20:05	05:19 05:43-06:10/27 20:23
24	07:06 08:03-08:38/35 16:57	06:32 17:34	05:48 18:05	05:59 19:37	05:26 20:06	05:20 05:43-06:10/27 20:23
25	07:05 08:05-08:38/33 16:58	06:30 17:35	05:46 18:06	05:58 19:38	05:26 20:07	05:20 05:43-06:10/27 20:23
26	07:05 08:05-08:37/32 16:59	06:29 17:36	05:45 18:07	05:56 19:39	05:25 20:08	05:20 05:44-06:11/27 20:23
27	07:04 08:07-08:36/29 17:00	06:27 17:37	05:43 18:08	05:55 19:40	05:24 20:09	05:21 05:44-06:10/26 20:23
28	07:03 08:08-08:35/27 17:02	06:26 17:39	05:41 18:09	05:54 19:41	05:24 20:09	05:21 05:44-06:10/26 20:23
29	07:02 08:09-08:34/25 17:03		06:40 19:10	05:52 19:42	05:23 20:10	05:21 05:45-06:11/26 20:23
30	07:01 08:11-08:32/21 17:04		06:38 19:11	05:51 19:43	05:23 20:11	05:22 05:45-06:10/25 20:23
31	07:01 08:14-08:30/16 17:05		06:36 19:12		05:22 05:48-05:56/8 20:12	
Potential sun hours	299	298	370	398	447	450
Sum of minutes with flicker	1624	8	0	0	8	721

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

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

Project:

San Pancrazio Salentino

Licensed user:

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 +45 8663 8139
 Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk
 Calculated:
 16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 5 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (18)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:22 05:46-06:11/25 20:23	05:46 20:05	06:16 19:23	06:45 18:33	06:18 16:47	06:52 07:37-08:45/68 16:24
2	05:23 05:46-06:10/24 20:23	05:47 20:04	06:17 19:21	06:46 18:31	06:19 16:46	06:53 07:37-08:46/69 16:23
3	05:23 05:47-06:11/24 20:23	05:48 20:03	06:18 19:20	06:47 18:30	06:20 16:45	06:54 07:38-08:47/69 16:23
4	05:24 05:47-06:10/23 20:23	05:49 20:02	06:18 19:18	06:48 18:28	06:21 16:44	06:55 07:38-08:48/70 16:23
5	05:24 05:48-06:10/22 20:23	05:49 20:01	06:19 19:16	06:49 18:27	06:23 16:43	06:56 07:38-08:49/71 16:23
6	05:25 05:48-06:09/21 20:22	05:50 19:59	06:20 19:15	06:50 18:25	06:24 16:42	06:57 07:39-08:50/71 16:23
7	05:26 05:49-06:09/20 20:22	05:51 19:58	06:21 19:13	06:51 18:23	06:25 16:41	06:58 07:39-08:51/72 16:23
8	05:26 05:51-06:09/18 20:22	05:52 19:57	06:22 19:11	06:52 18:22	06:26 16:39	06:59 07:40-08:52/72 16:23
9	05:27 05:51-06:08/17 20:22	05:53 19:56	06:23 19:10	06:53 18:20	06:27 16:38	07:00 07:41-08:53/72 16:23
10	05:27 05:52-06:08/16 20:21	05:54 19:55	06:24 19:08	06:54 18:19	06:28 07:48-07:57/9 16:37	07:01 07:41-08:54/73 16:23
11	05:28 05:53-06:06/13 20:21	05:55 19:53	06:25 19:06	06:55 18:17	06:30 07:45-08:02/17 16:36	07:01 07:42-08:55/73 16:23
12	05:29 05:55-06:05/10 20:20	05:56 19:52	06:26 19:05	06:56 18:15	06:31 07:43-08:04/21 16:36	07:02 07:43-08:56/73 16:23
13	05:30 05:58-06:03/5 20:20	05:57 19:51	06:27 19:03	06:57 18:14	06:32 07:41-08:06/25 16:35	07:03 07:42-08:56/74 16:23
14	05:30 05:58-06:03/5 20:19	05:58 19:49	06:28 19:01	06:58 18:12	06:33 07:40-08:07/27 16:34	07:04 07:43-08:56/73 16:23
15	05:31 05:59-06:02/3 20:19	05:59 19:48	06:29 19:00	06:59 18:11	06:34 07:39-08:09/30 16:33	07:05 07:44-08:57/73 16:23
16	05:32 05:59-06:01/2 20:18	06:00 19:47	06:30 18:58	07:00 18:09	06:35 07:38-08:10/32 16:32	07:05 07:45-08:58/73 16:24
17	05:33 05:59-06:01/2 20:18	06:01 19:45	06:31 18:56	07:01 18:08	06:37 07:38-08:11/33 16:31	07:06 07:45-08:58/73 16:24
18	05:33 05:59-06:01/2 20:17	06:02 19:44	06:32 18:55	07:02 18:06	06:38 07:37-08:12/35 16:30	07:07 07:45-08:59/74 16:24
19	05:34 05:59-06:01/2 20:16	06:03 19:42	06:33 18:53	07:03 18:05	06:39 07:37-08:14/37 16:30	07:07 07:45-08:59/74 16:25
20	05:35 05:59-06:01/2 20:16	06:04 19:41	06:34 18:51	07:04 18:03	06:40 07:37-08:14/37 16:29	07:08 07:46-09:00/74 16:25
21	05:36 05:59-06:01/2 20:15	06:05 19:40	06:35 18:50	07:06 18:02	06:41 07:36-08:15/39 16:28	07:08 07:46-09:00/74 16:26
22	05:37 05:59-06:01/2 20:14	06:06 19:38	06:36 18:48	07:07 18:01	06:42 07:36-08:15/39 16:28	07:09 07:47-09:01/74 16:26
23	05:38 05:59-06:01/2 20:13	06:07 19:37	06:37 18:46	07:08 17:59	06:43 07:36-08:16/40 16:27	07:09 07:47-09:01/74 16:27
24	05:38 05:59-06:01/2 20:13	06:08 19:35	06:38 18:45	07:09 17:58	06:45 07:36-08:17/41 16:27	07:10 07:48-09:02/74 16:27
25	05:39 05:59-06:01/2 20:12	06:09 19:34	06:39 18:43	06:10 16:56	06:46 07:36-08:18/42 16:26	07:10 07:48-09:02/74 16:28
26	05:40 05:59-06:01/2 20:11	06:10 19:32	06:40 18:41	06:11 16:55	06:47 07:36-08:38/62 16:26	07:11 07:49-09:02/73 16:28
27	05:41 05:59-06:01/2 20:10	06:11 19:31	06:41 18:40	06:12 16:54	06:48 07:36-08:40/64 16:25	07:11 07:50-09:03/73 16:29
28	05:42 05:59-06:01/2 20:09	06:12 19:29	06:42 18:38	06:13 16:52	06:49 07:36-08:41/65 16:25	07:11 07:50-09:03/73 16:30
29	05:43 05:59-06:01/2 20:08	06:13 19:27	06:43 18:36	06:14 16:51	06:50 07:36-08:43/67 16:24	07:12 07:50-09:03/73 16:30
30	05:44 05:59-06:01/2 20:07	06:14 19:26	06:44 18:35	06:16 16:50	06:51 07:37-08:44/67 16:24	07:12 07:50-09:03/73 16:31
31	05:45 05:59-06:01/2 20:06	06:15 19:24	06:17 16:49	06:17 16:49	06:17 16:49	07:12 07:50-09:04/74 16:32
Potential sun hours	457	427	375	346	299	290
Sum of minutes with flicker	238	0	0	0	854	2250

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

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

Project:

San Pancrazio Salentino

Licensed user:

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Rosenstien 12
DK-8800 Viborg
+45 8663 8139
Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk
Calculated:
16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 6 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (19)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	07:13 15:51-16:08/17 16:33	07:00 17:07	06:25 17:40	06:35 07:05-07:29/24 19:13	05:50 19:44	05:22 20:13
2	07:13 15:52-16:08/16 16:34	06:59 17:08	06:23 17:41	06:33 07:03-07:32/29 19:14	05:49 19:45	05:21 20:13
3	07:13 15:52-16:09/17 16:35	06:58 17:09	06:22 17:42	06:32 07:01-07:33/32 19:15	05:47 19:46	05:21 20:14
4	07:13 15:52-16:10/18 16:36	06:57 17:10	06:20 17:43	06:30 06:59-07:33/34 19:16	05:46 19:47	05:21 20:15
5	07:13 15:53-16:11/18 16:36	06:56 17:12	06:19 17:44	06:28 06:58-07:35/37 19:17	05:45 19:48	05:20 20:16
6	07:13 15:53-16:12/19 16:37	06:55 17:13	06:17 17:45	06:27 06:56-07:35/39 19:18	05:44 19:49	05:20 20:16
7	07:13 15:53-16:12/19 16:38	06:54 17:14	06:15 17:47	06:25 06:54-07:35/41 19:19	05:43 19:50	05:20 20:17
8	07:13 15:54-16:14/20 16:39	06:53 17:15	06:14 17:48	06:24 06:54-07:36/42 19:20	05:41 19:51	05:19 20:17
9	07:13 15:54-16:15/21 16:40	06:51 17:16	06:12 17:49	06:22 06:53-07:36/43 19:21	05:40 19:52	05:19 20:18
10	07:12 15:55-16:16/21 16:41	06:50 17:18	06:11 17:50	06:20 06:53-07:37/44 19:22	05:39 19:53	05:19 20:19
11	07:12 15:55-16:16/21 16:42	06:49 17:19	06:09 17:51	06:19 06:52-07:36/44 19:23	05:38 19:54	05:19 20:19
12	07:12 15:56-16:17/21 16:43	06:48 17:20	06:08 17:52	06:17 06:52-07:36/44 19:24	05:37 19:55	05:19 20:20
13	07:12 15:57-16:17/20 16:44	06:47 17:21	06:06 17:53	06:16 06:51-07:36/45 19:25	05:36 19:56	05:19 20:20
14	07:11 15:57-16:17/20 16:46	06:45 17:22	06:04 17:54	06:14 06:51-07:36/45 19:26	05:35 19:57	05:19 20:20
15	07:11 15:58-16:17/19 16:48	06:44 17:24	06:03 17:55	06:13 06:50-07:35/45 19:27	05:34 19:58	05:19 20:21
16	07:11 15:58-16:17/19 16:48	06:43 17:25	06:01 17:56	06:11 06:51-07:35/44 19:28	05:33 19:59	05:19 20:21
17	07:10 15:59-16:17/18 16:49	06:42 17:26	05:59 17:57	06:10 06:50-07:34/44 19:29	05:32 20:00	05:19 20:22
18	07:10 16:00-16:16/16 16:50	06:40 17:27	05:58 17:58	06:08 06:51-07:34/43 19:31	05:31 20:01	05:19 20:22
19	07:09 16:01-16:16/15 16:51	06:39 17:28	05:56 17:59	06:07 06:50-07:33/43 19:32	05:30 20:02	05:19 20:22
20	07:09 16:02-16:15/13 16:52	06:38 17:30	05:55 18:01	06:05 06:51-07:32/41 19:33	05:30 20:03	05:19 20:23
21	07:08 16:05-16:15/10 16:53	06:36 17:31	05:53 18:02	06:04 06:51-07:31/40 19:34	05:29 20:04	05:19 20:23
22	07:08 16:07-16:13/6 16:55	06:35 17:32	05:51 18:03	06:02 06:52-07:30/38 19:35	05:28 20:04	05:19 20:23
23	07:07 16:56	06:33 17:33	05:50 18:04	06:01 06:53-07:29/36 19:36	05:27 20:05	05:20 20:23
24	07:06 16:57	06:32 17:34	05:48 18:05	05:59 06:53-07:27/34 19:37	05:27 20:06	05:20 20:23
25	07:06 16:58	06:31 17:35	05:46 18:06	05:58 06:54-07:26/32 19:38	05:26 20:07	05:20 20:23
26	07:05 16:59	06:29 17:36	05:45 18:07	05:57 06:55-07:24/29 19:39	05:25 20:08	05:20 20:24
27	07:04 17:01	06:28 17:38	05:43 18:08	05:55 06:57-07:22/25 19:40	05:25 20:09	05:21 20:24
28	07:03 17:02	06:26 17:39	05:41 18:09	05:54 06:59-07:21/22 19:41	05:24 20:10	05:21 20:24
29	07:02 17:03		06:40 19:10	05:53 07:01-07:18/17 19:42	05:23 20:10	05:22 20:24
30	07:02 17:04		06:38 07:13-07:21/8 19:11	05:51 07:05-07:13/8 19:43	05:23 20:11	05:22 20:24
31	07:01 17:05		06:36 07:09-07:27/18 19:12		05:22 20:12	
Potential sun hours	299	298	370	398	447	450
Sum of minutes with flicker	384	0	26	1084	0	0

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS
Rosenstien 12
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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk
Calculated:
16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 6 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (19)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	July	August	September	October	November	December
1	05:22 20:24	05:46 20:05	06:16 06:51-07:35/44 19:23	06:45 18:33	06:18 16:48	06:52 15:37-15:58/21 16:24
2	05:23 20:23	05:47 20:04	06:17 06:51-07:35/44 19:21	06:46 18:32	06:19 16:46	06:53 15:38-15:59/21 16:24
3	05:23 20:23	05:48 20:03	06:18 06:51-07:34/43 19:20	06:47 18:30	06:20 16:45	06:54 15:38-15:59/21 16:23
4	05:24 20:23	05:49 20:02	06:19 06:51-07:33/42 19:18	06:48 18:28	06:22 16:44	06:55 15:39-15:59/20 16:23
5	05:25 20:23	05:50 20:01	06:20 06:51-07:32/41 19:16	06:49 18:27	06:23 16:43	06:56 15:39-15:59/20 16:23
6	05:25 20:23	05:51 20:00	06:21 06:52-07:31/39 19:15	06:50 18:25	06:24 16:42	06:57 15:38-15:57/19 16:23
7	05:26 20:22	05:51 19:58	06:21 06:53-07:30/37 19:13	06:51 18:23	06:25 16:41	06:58 15:39-15:57/18 16:23
8	05:26 20:22	05:52 19:57	06:22 06:54-07:29/35 19:12	06:52 18:22	06:26 16:40	06:59 15:39-15:57/18 16:23
9	05:27 20:22	05:53 19:56	06:23 06:55-07:27/32 19:10	06:53 18:20	06:27 16:39	07:00 15:40-15:57/17 16:23
10	05:28 20:21	05:54 19:55	06:24 06:56-07:25/29 19:08	06:54 18:19	06:29 16:38	07:01 15:41-15:58/17 16:23
11	05:28 20:21	05:55 19:53	06:25 06:58-07:23/25 19:07	06:55 18:17	06:30 16:37	07:02 15:41-15:58/17 16:23
12	05:29 20:20	05:56 19:52	06:26 06:59-07:18/19 19:05	06:56 18:16	06:31 16:36	07:02 15:42-15:58/16 16:23
13	05:30 20:20	05:57 07:12-07:23/11 19:51	06:27 07:04-07:14/10 19:03	06:57 18:14	06:32 16:35	07:03 15:42-15:57/15 16:23
14	05:30 20:19	05:58 07:08-07:26/18 19:49	06:28 19:02	06:58 18:12	06:33 16:34	07:04 15:42-15:58/16 16:23
15	05:31 20:19	05:59 07:06-07:29/23 19:48	06:29 19:00	06:59 18:11	06:34 16:33	07:05 15:43-15:58/15 16:24
16	05:32 20:18	06:00 07:04-07:31/27 19:47	06:30 18:58	07:00 18:09	06:36 16:32	07:05 15:44-15:59/15 16:24
17	05:33 20:18	06:01 07:01-07:31/30 19:45	06:31 18:57	07:01 18:08	06:37 16:31	07:06 15:44-15:58/14 16:24
18	05:34 20:17	06:02 07:00-07:32/32 19:44	06:32 18:55	07:02 18:06	06:38 16:31	07:07 15:45-15:59/14 16:24
19	05:34 20:16	06:03 06:59-07:33/34 19:43	06:33 18:53	07:03 18:05	06:39 16:30	07:07 15:45-15:59/14 16:25
20	05:35 20:16	06:04 06:57-07:34/37 19:41	06:34 18:52	07:05 18:04	06:40 15:42-15:48/6 16:29	07:08 15:46-16:00/14 16:25
21	05:36 20:15	06:05 06:56-07:35/39 19:40	06:35 18:50	07:06 18:02	06:41 15:40-15:50/10 16:29	07:08 15:46-16:00/14 16:26
22	05:37 20:14	06:06 06:56-07:36/40 19:38	06:36 18:48	07:07 18:01	06:42 15:38-15:51/13 16:28	07:09 15:47-16:01/14 16:26
23	05:38 20:13	06:07 06:55-07:36/41 19:37	06:37 18:47	07:08 17:59	06:44 15:37-15:52/15 16:27	07:09 15:47-16:01/14 16:27
24	05:39 20:13	06:08 06:54-07:36/42 19:35	06:38 18:45	07:09 17:58	06:45 15:38-15:54/16 16:27	07:10 15:48-16:02/14 16:27
25	05:39 20:12	06:09 06:53-07:37/44 19:34	06:39 18:43	06:10 16:57	06:46 15:37-15:55/18 16:26	07:10 15:48-16:02/14 16:28
26	05:40 20:11	06:10 06:53-07:37/44 19:32	06:40 18:42	06:11 16:55	06:47 15:37-15:56/19 16:26	07:11 15:48-16:02/14 16:28
27	05:41 20:10	06:11 06:52-07:37/45 19:31	06:41 18:40	06:12 16:54	06:48 15:37-15:56/19 16:25	07:11 15:49-16:04/15 16:29
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29	05:43 20:08	06:13 06:52-07:37/45 19:28	06:43 18:37	06:15 16:51	06:50 15:37-15:57/20 16:25	07:12 15:49-16:05/16 16:30
30	05:44 20:07	06:14 06:51-07:36/45 19:26	06:44 18:35	06:16 16:50	06:51 15:37-15:58/21 16:24	07:12 15:50-16:05/15 16:31
31	05:45 20:06	06:15 06:51-07:35/44 19:24		06:17 16:49		07:12 15:51-16:07/16 16:32
Potential sun hours	457	427	375	346	299	290
Sum of minutes with flicker	0	686	440	0	177	503

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

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

Project:

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Licensed user:

KenTec Denmark ApS

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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 7 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (20)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June
1	07:12 15:05-15:41/36 16:33	07:00 17:07	06:25 17:40	06:35 19:13	05:50 06:16-06:37/21 19:44	05:22 20:13
2	07:13 15:06-15:41/35 16:34	06:59 17:08	06:23 17:41	06:33 19:14	05:49 06:16-06:37/21 19:45	05:21 20:13
3	07:13 15:06-15:41/35 16:35	06:58 17:09	06:22 17:42	06:32 19:15	05:47 06:17-06:36/19 19:46	05:21 20:14
4	07:13 15:07-15:41/34 16:36	06:57 17:10	06:20 17:43	06:30 19:16	05:46 06:17-06:34/17 19:47	05:21 20:15
5	07:13 15:08-15:42/34 16:36	06:56 17:11	06:19 17:44	06:28 18:50-18:56/6 19:17	05:45 06:19-06:33/14 19:48	05:20 20:15
6	07:13 15:09-15:42/33 16:37	06:55 17:13	06:17 17:45	06:27 18:47-18:57/10 19:18	05:44 06:20-06:31/11 19:49	05:20 20:16
7	07:13 15:08-15:41/33 16:38	06:54 17:14	06:15 17:47	06:25 18:45-18:57/12 19:19	05:43 06:24-06:28/4 19:50	05:20 20:17
8	07:13 15:09-15:41/32 16:39	06:53 17:15	06:14 17:48	06:24 18:45-18:59/14 19:20	05:41 19:51	05:19 20:17
9	07:13 15:10-15:42/32 16:40	06:51 17:16	06:12 17:49	06:22 18:44-19:00/16 19:21	05:40 19:52	05:19 20:18
10	07:12 15:12-15:42/30 16:41	06:50 17:18	06:11 17:50	06:20 18:44-19:01/17 19:22	05:39 19:53	05:19 20:18
11	07:12 15:12-15:41/29 16:42	06:49 17:19	06:09 17:51	06:19 18:43-19:02/19 19:23	05:38 19:54	05:19 20:19
12	07:12 15:13-15:41/28 16:43	06:48 17:20	06:07 17:52	06:17 18:44-19:02/18 19:24	05:37 19:55	05:19 20:20
13	07:12 15:15-15:41/26 16:44	06:47 17:21	06:06 17:53	06:16 18:43-19:00/17 19:25	05:36 19:56	05:19 20:20
14	07:11 15:15-15:40/25 16:45	06:45 17:22	06:04 17:54	06:14 18:44-18:59/15 19:26	05:35 19:57	05:19 20:20
15	07:11 15:17-15:40/23 16:47	06:44 17:24	06:03 17:55	06:13 18:45-18:58/13 19:27	05:34 19:58	05:19 20:21
16	07:11 15:18-15:39/21 16:48	06:43 17:25	06:01 17:56	06:11 18:46-18:55/9 19:28	05:33 19:59	05:19 20:21
17	07:10 15:20-15:38/18 16:49	06:42 17:26	05:59 17:57	06:10 19:29	05:32 20:00	05:19 20:22
18	07:10 15:22-15:36/14 16:50	06:40 17:27	05:58 17:58	06:08 19:30	05:31 20:01	05:19 20:22
19	07:09 15:26-15:34/8 16:51	06:39 17:28	05:56 17:59	06:07 19:32	05:30 20:02	05:19 20:22
20	07:09 16:52	06:38 17:30	05:55 18:00	06:05 06:24-06:34/10 19:33	05:30 20:03	05:19 20:23
21	07:08 16:53	06:36 17:31	05:53 18:02	06:04 06:22-06:35/13 19:34	05:29 20:04	05:19 20:23
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29	07:02 17:03		06:40 19:10	05:53 06:16-06:39/23 19:42	05:23 20:10	05:22 20:24
30	07:02 17:04		06:38 19:11	05:51 06:15-06:38/23 19:43	05:23 20:11	05:22 20:24
31	07:01 17:05		06:36 19:12		05:22 20:12	
Potential sun hours	299	298	370	398	447	450
Sum of minutes with flicker	526	0	0	381	107	0

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

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

Project:

San Pancrazio Salentino

Licensed user:

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Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 7 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (20)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
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Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	July	August	September	October	November	December
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2	05:23 20:23	05:47 20:04	06:17 18:42-18:59/17 19:21	06:46 18:32	06:19 16:46	06:53 14:55-15:25/30 16:24
3	05:23 20:23	05:48 20:03	06:18 18:42-18:58/16 19:20	06:47 18:30	06:20 16:45	06:54 14:55-15:26/31 16:23
4	05:24 20:23	05:49 20:02	06:19 18:42-18:56/14 19:18	06:48 18:28	06:21 16:44	06:55 14:54-15:26/32 16:23
5	05:24 20:23	05:50 20:01	06:20 18:42-18:54/12 19:16	06:49 18:27	06:23 16:43	06:56 14:54-15:27/33 16:23
6	05:25 20:23	05:51 06:32-06:39/7 20:00	06:20 18:43-18:53/10 19:15	06:50 18:25	06:24 16:42	06:57 14:54-15:27/33 16:23
7	05:26 20:22	05:51 06:29-06:41/12 19:58	06:21 18:45-18:51/6 19:13	06:51 18:23	06:25 16:41	06:58 14:54-15:28/34 16:23
8	05:26 20:22	05:52 06:28-06:43/15 19:57	06:22 19:12	06:52 18:22	06:26 16:40	06:59 14:54-15:28/34 16:23
9	05:27 20:22	05:53 06:27-06:44/17 19:56	06:23 19:10	06:53 18:20	06:27 16:39	07:00 14:54-15:29/35 16:23
10	05:28 20:21	05:54 06:26-06:45/19 19:55	06:24 19:08	06:54 18:19	06:28 16:38	07:01 14:55-15:30/35 16:23
11	05:28 20:21	05:55 06:25-06:46/21 19:53	06:25 19:07	06:55 18:17	06:30 16:37	07:02 14:55-15:31/36 16:23
12	05:29 20:20	05:56 06:24-06:46/22 19:52	06:26 19:05	06:56 18:16	06:31 16:36	07:02 14:56-15:31/35 16:23
13	05:30 20:20	05:57 06:24-06:46/22 19:51	06:27 19:03	06:57 18:14	06:32 16:35	07:03 14:55-15:31/36 16:23
14	05:30 20:19	05:58 06:23-06:47/24 19:49	06:28 19:02	06:58 18:12	06:33 16:34	07:04 14:56-15:32/36 16:23
15	05:31 20:19	05:59 06:23-06:47/24 19:48	06:29 19:00	06:59 18:11	06:34 16:33	07:05 14:56-15:33/37 16:24
16	05:32 20:18	06:00 06:23-06:46/23 19:47	06:30 18:58	07:00 18:09	06:35 16:32	07:05 14:57-15:34/37 16:24
17	05:33 20:18	06:01 06:22-06:45/23 19:45	06:31 18:57	07:01 18:08	06:37 16:31	07:06 14:57-15:33/36 16:24
18	05:33 20:17	06:02 06:23-06:45/22 19:44	06:32 18:55	07:02 18:06	06:38 16:31	07:07 14:58-15:34/36 16:24
19	05:34 20:16	06:03 06:24-06:44/20 19:43	06:33 18:53	07:03 18:05	06:39 16:30	07:07 14:57-15:34/37 16:25
20	05:35 20:16	06:04 06:25-06:43/18 19:41	06:34 18:52	07:05 18:04	06:40 16:29	07:08 14:58-15:35/37 16:25
21	05:36 20:15	06:05 06:26-06:42/16 19:40	06:35 18:50	07:06 18:02	06:41 16:28	07:08 14:58-15:35/37 16:26
22	05:37 20:14	06:06 06:27-06:40/13 19:38	06:36 18:48	07:07 18:01	06:42 16:28	07:09 14:59-15:36/37 16:26
23	05:38 20:13	06:07 06:28-06:38/10 19:37	06:37 18:47	07:08 17:59	06:44 15:02-15:10/8 16:27	07:09 14:59-15:36/37 16:27
24	05:38 20:13	06:08 19:35	06:38 18:45	07:09 17:58	06:45 15:00-15:14/14 16:27	07:10 15:00-15:37/37 16:27
25	05:39 20:12	06:09 19:34	06:39 18:43	06:10 16:57	06:46 14:59-15:16/17 16:26	07:10 15:01-15:37/36 16:28
26	05:40 20:11	06:10 19:32	06:40 18:42	06:11 16:55	06:47 14:57-15:18/21 16:26	07:11 15:01-15:37/36 16:28
27	05:41 20:10	06:11 18:49-18:58/9 19:31	06:41 18:40	06:12 16:54	06:48 14:56-15:19/23 16:25	07:11 15:02-15:39/37 16:29
28	05:42 20:09	06:12 18:46-18:59/13 19:29	06:42 18:38	06:13 16:53	06:49 14:55-15:20/25 16:25	07:11 15:02-15:39/37 16:30
29	05:43 20:08	06:13 18:44-19:00/16 19:28	06:43 18:37	06:15 16:51	06:50 14:55-15:21/26 16:24	07:12 15:03-15:39/36 16:30
30	05:44 20:07	06:14 18:43-19:00/17 19:26	06:44 18:35	06:16 16:50	06:51 14:54-15:22/28 16:24	07:12 15:03-15:39/36 16:31
31	05:45 20:06	06:15 18:43-19:01/18 19:24		06:17 16:49		07:12 15:04-15:40/36 16:32
Potential sun hours	457	427	375	346	299	290
Sum of minutes with flicker	0	401	94	0	162	1091

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 8 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (21)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449

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

	January	February	March	April	May	June
1	07:12 16:33	07:00 17:07	06:25 16:59-17:12/13 17:40	06:35 19:13	05:50 18:49-19:08/19 19:44	05:22 20:13
2	07:13 16:34	06:59 17:08	06:23 17:01-17:10/9 17:41	06:33 19:14	05:49 18:50-19:07/17 19:45	05:21 20:13
3	07:13 16:35	06:58 17:09	06:22 17:17-17:21/4 17:42	06:32 19:15	05:47 18:51-19:05/14 19:46	05:21 20:14
4	07:13 16:36	06:57 17:10	06:20 17:14-17:22/8 17:43	06:30 19:16	05:46 18:53-19:03/10 19:47	05:21 20:15
5	07:13 16:36	06:56 17:11	06:19 17:12-17:23/11 17:44	06:28 19:17	05:45 19:48	05:20 20:15
6	07:13 16:37	06:55 17:13	06:17 17:11-17:25/14 17:45	06:27 19:18	05:44 19:49	05:20 20:16
7	07:13 16:38	06:54 17:14	06:15 17:10-17:25/15 17:47	06:25 19:19	05:43 19:50	05:20 20:17
8	07:13 16:39	06:53 16:48-16:52/4 17:15	06:14 17:09-17:26/17 17:48	06:24 19:20	05:41 19:51	05:19 20:17
9	07:12 16:40	06:51 16:46-16:54/8 17:16	06:12 17:09-17:28/19 17:49	06:22 19:21	05:40 19:52	05:19 20:18
10	07:12 16:41	06:50 16:45-16:55/10 17:18	06:11 17:08-17:28/20 17:50	06:20 19:22	05:39 19:53	05:19 20:18
11	07:12 16:42	06:49 16:44-16:56/12 17:19	06:09 17:09-17:28/19 17:51	06:19 19:23	05:38 19:54	05:19 20:19
12	07:12 16:43	06:48 16:43-16:57/14 17:20	06:07 17:09-17:26/17 17:52	06:17 19:24	05:37 19:55	05:19 20:20
13	07:12 16:44	06:47 16:43-16:59/16 17:21	06:06 17:09-17:25/16 17:53	06:16 18:54-19:04/10 19:25	05:36 19:56	05:19 20:20
14	07:11 16:45	06:45 16:43-17:00/17 17:22	06:04 17:11-17:24/13 17:54	06:14 18:51-19:04/13 19:26	05:35 19:57	05:19 20:20
15	07:11 16:47	06:44 16:42-17:01/19 17:24	06:03 17:14-17:20/6 17:55	06:13 18:50-19:06/16 19:27	05:34 19:58	05:19 20:21
16	07:11 16:48	06:43 16:43-17:01/18 17:25	06:01 17:09-17:25/16 17:56	06:11 18:48-19:06/18 19:28	05:33 19:59	05:19 20:21
17	07:10 16:49	06:42 16:44-17:01/17 17:26	05:59 17:57	06:10 18:48-19:08/20 19:29	05:32 20:00	05:19 20:22
18	07:10 16:50	06:40 16:44-17:00/16 17:27	05:58 17:58	06:08 06:27-06:32/5 19:30 18:46-19:09/23	05:31 20:01	05:19 20:22
19	07:09 16:51	06:39 17:03-17:06/3 17:28 16:45-16:59/14	05:56 17:59	06:07 06:25-06:33/8 19:31 18:46-19:09/23	05:30 20:02	05:19 20:22
20	07:09 16:52	06:38 17:01-17:08/7 17:29 16:47-16:58/11	05:54 18:00	06:05 06:24-06:34/10 19:33 18:47-19:11/24	05:30 20:03	05:19 20:23
21	07:08 16:53	06:36 16:59-17:09/10 17:31 16:51-16:53/2	05:53 18:01	06:04 06:22-06:34/12 19:34 18:46-19:11/25	05:29 20:04	05:19 20:23
22	07:07 16:55	06:35 16:59-17:10/11 17:32	05:51 18:03	06:02 06:21-06:34/13 19:35 18:46-19:12/26	05:28 20:04	05:19 20:23
23	07:07 16:56	06:33 16:58-17:11/13 17:33	05:50 18:04	06:01 06:20-06:35/15 19:36 18:46-19:12/26	05:27 20:05	05:20 20:23
24	07:06 16:57	06:32 16:58-17:13/15 17:34	05:48 18:05	05:59 06:18-06:34/16 19:37 18:47-19:12/25	05:26 20:06	05:20 20:23
25	07:05 16:58	06:31 16:57-17:13/16 17:35	05:46 18:06	05:58 06:17-06:34/17 19:38 18:48-19:12/24	05:26 20:07	05:20 20:23
26	07:05 16:59	06:29 16:57-17:15/18 17:36	05:45 18:07	05:57 06:16-06:33/17 19:39 18:47-19:11/24	05:25 20:08	05:20 20:24
27	07:04 17:00	06:28 16:57-17:14/17 17:38	05:43 18:08	05:55 06:17-06:32/15 19:40 18:47-19:11/24	05:24 20:09	05:21 20:24
28	07:03 17:02	06:26 16:58-17:14/16 17:39	05:41 18:09	05:54 06:18-06:31/13 19:41 18:48-19:11/23	05:24 20:10	05:21 20:24
29	07:02 17:03		06:40 19:10	05:53 06:20-06:30/10 19:42 18:47-19:10/23	05:23 20:10	05:21 20:24
30	07:01 17:04		06:38 19:11	05:51 06:22-06:26/4 19:43 18:48-19:09/21	05:23 20:11	05:22 20:24
31	07:01 17:05		06:36 19:12		05:22 20:12	
Potential sun hours	299	298	370	398	447	450
Sum of minutes with flicker	0	304	201	543	60	0

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS
Rosenstien 12
DK-8800 Viborg
+45 8663 8139
Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk
Calculated:
16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 8 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (21)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:22 20:23	05:46 20:05	06:16 19:23	06:45 17:48-18:05/17 18:33	06:18 16:14-16:24/10 16:47	06:52 16:24
2	05:23 20:23	05:47 20:04	06:17 19:21	06:46 17:47-18:05/18 18:32	06:19 16:15-16:22/7 16:46	06:53 16:24
3	05:23 20:23	05:48 20:03	06:18 19:20	06:47 17:47-18:06/19 18:30	06:20 16:19-16:22/3 16:45	06:54 16:23
4	05:24 20:23	05:49 20:02	06:19 19:18	06:48 17:46-18:06/20 18:28	06:21 16:44	06:55 16:23
5	05:24 20:23	05:50 20:01	06:20 19:16	06:49 17:46-18:04/18 18:27	06:23 16:43	06:56 16:23
6	05:25 20:23	05:50 20:00	06:20 19:15	06:50 17:46-18:03/17 18:25	06:24 16:42	06:57 16:23
7	05:26 20:22	05:51 19:58	06:21 19:13	06:51 17:46-18:01/15 18:23	06:25 16:41	06:58 16:23
8	05:26 20:22	05:52 19:06-19:09/3 19:57	06:22 19:12	06:52 17:47-17:59/12 18:22	06:26 16:40	06:59 16:23
9	05:27 20:22	05:53 19:02-19:13/11 19:56	06:23 19:10	06:53 17:48-17:58/10 18:20	06:27 16:39	07:00 16:23
10	05:28 20:21	05:54 19:00-19:15/15 19:55	06:24 19:08	06:54 17:50-17:56/6 18:19	06:28 16:38	07:01 16:23
11	05:28 20:21	05:55 18:59-19:16/17 19:53	06:25 19:07	06:55 17:37-17:42/5 18:17	06:30 16:37	07:02 16:23
12	05:29 20:20	05:56 18:58-19:17/19 19:52	06:26 19:05	06:56 17:34-17:45/11 18:16	06:31 16:36	07:02 16:23
13	05:30 20:20	05:57 06:30-06:36/6 19:51 18:57-19:18/21	06:27 19:03	06:57 17:32-17:46/14 18:14	06:32 16:35	07:03 16:23
14	05:30 20:19	05:58 06:27-06:38/11 19:49 18:56-19:18/22	06:28 19:02	06:58 17:31-17:47/16 18:12	06:33 16:34	07:04 16:23
15	05:31 20:19	05:59 06:26-06:39/13 19:48 18:54-19:18/24	06:29 19:00	06:59 17:29-17:47/18 18:11	06:34 16:33	07:05 16:24
16	05:32 20:18	06:00 06:25-06:40/15 19:47 18:54-19:18/24	06:30 18:58	07:00 17:29-17:46/17 18:09	06:35 16:32	07:05 16:24
17	05:33 20:18	06:01 06:23-06:39/16 19:45 18:53-19:18/25	06:31 18:57	07:01 17:28-17:44/16 18:08	06:37 16:31	07:06 16:24
18	05:33 20:17	06:02 06:23-06:40/17 19:44 18:53-19:18/25	06:32 18:55	07:02 17:29-17:44/15 18:06	06:38 16:31	07:07 16:24
19	05:34 20:16	06:03 06:24-06:40/16 19:43 18:53-19:18/25	06:33 18:53	07:03 17:29-17:42/13 18:05	06:39 16:30	07:07 16:25
20	05:35 20:16	06:04 06:25-06:40/15 19:41 18:52-19:17/25	06:34 18:52	07:05 17:30-17:41/11 18:04	06:40 16:29	07:08 16:25
21	05:36 20:15	06:05 06:26-06:39/13 19:40 18:51-19:17/26	06:35 18:50	07:06 17:30-17:39/9 18:02	06:41 16:28	07:08 16:26
22	05:37 20:14	06:06 06:27-06:39/12 19:38 18:51-19:16/25	06:36 18:48	07:07 17:32-17:37/5 18:01	06:42 16:28	07:09 16:26
23	05:38 20:13	06:07 06:28-06:38/10 19:37 18:50-19:15/25	06:37 18:46	07:08 17:34-17:36/2 17:59 17:15-17:29/14	06:43 16:27	07:09 16:27
24	05:38 20:13	06:08 06:29-06:36/7 19:35 18:50-19:13/23	06:38 18:45	07:09 17:14-17:31/17 17:58	06:45 16:27	07:10 16:27
25	05:39 20:12	06:09 06:30-06:34/4 19:34 18:50-19:12/22	06:39 18:43	06:10 16:13-16:31/18 16:56	06:46 16:26	07:10 16:28
26	05:40 20:11	06:10 18:51-19:10/19 19:32	06:40 18:41	06:11 16:13-16:31/18 16:55	06:47 16:26	07:11 16:28
27	05:41 20:10	06:11 18:51-19:09/18 19:31	06:41 18:40	06:12 16:12-16:30/18 16:54	06:48 16:25	07:11 16:29
28	05:42 20:09	06:12 18:51-19:06/15 19:29	06:42 17:57-17:58/1 18:38	06:13 16:12-16:29/17 16:52	06:49 16:25	07:11 16:30
29	05:43 20:08	06:13 18:52-19:05/13 19:28	06:43 17:52-18:02/10 18:36	06:15 16:13-16:28/15 16:51	06:50 16:24	07:12 16:30
30	05:44 20:07	06:14 18:54-19:04/10 19:26	06:44 17:50-18:04/14 18:35	06:16 16:13-16:27/14 16:50	06:51 16:24	07:12 16:31
31	05:45 20:06	06:15 19:24		06:17 16:13-16:25/12 16:49		07:12 16:32
Potential sun hours	457	427	375	346	299	290
Sum of minutes with flicker	0	607	25	465	20	0

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 9 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (22)

Assumptions for shadow calculations

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

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3,74	4,31	5,21	6,68	8,38	9,76	10,61	9,72	7,93	5,84	4,48	3,68

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
2.558	643	216	127	181	295	1.121	1.014	651	278	334	1.032	8.449

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

	January	February	March	April	May	June
1	07:12 16:33	07:00 16:26-16:42/16 17:07	06:25 16:49-17:01/12 17:40	06:35 19:13	05:50 19:01-19:17/16 19:44	05:22 18:58-19:34/36 20:13
2	07:13 16:34	06:59 16:25-16:44/19 17:08	06:23 16:55-16:56/1 17:41	06:33 19:14	05:49 18:59-19:19/20 19:45	05:21 18:58-19:33/35 20:13
3	07:13 16:35	06:58 16:24-16:45/21 17:09	06:22 17:07-17:19/12 17:42	06:32 19:15	05:47 18:57-19:19/22 19:46	05:21 18:58-19:34/36 20:14
4	07:13 16:35	06:57 16:24-16:46/22 17:10	06:20 17:05-17:21/16 17:43	06:30 19:16	05:46 18:56-19:20/24 19:47	05:21 18:59-19:34/35 20:15
5	07:13 16:36	06:56 16:24-16:47/23 17:11	06:18 17:03-17:22/19 17:44	06:28 19:17	05:45 18:55-19:21/26 19:48	05:20 18:59-19:35/36 20:15
6	07:13 16:37	06:55 16:23-16:48/25 17:13	06:17 17:02-17:24/22 17:45	06:27 18:53-18:57/4 19:18	05:44 18:54-19:22/28 19:49	05:20 18:59-19:34/35 20:16
7	07:13 16:38	06:54 16:23-16:48/25 17:14	06:15 17:00-17:24/24 17:46	06:25 18:50-18:57/7 19:19	05:43 18:54-19:23/29 19:50	05:20 18:59-19:34/35 20:17
8	07:13 16:39	06:53 16:24-16:49/25 17:15	06:14 16:59-17:24/25 17:48	06:23 18:49-18:59/10 19:20	05:41 18:53-19:23/30 19:51	05:19 19:00-19:35/35 20:17
9	07:12 16:40	06:51 16:24-16:49/25 17:16	06:12 16:59-17:25/26 17:49	06:22 18:47-19:00/13 19:21	05:40 18:53-19:23/30 19:52	05:19 19:00-19:35/35 20:18
10	07:12 16:41	06:50 16:24-16:49/25 17:18	06:11 16:58-17:24/26 17:50	06:20 18:46-19:01/15 19:22	05:39 18:53-19:24/31 19:53	05:19 19:01-19:35/34 20:18
11	07:12 16:42	06:49 16:24-16:48/24 17:19	06:09 16:58-17:25/27 17:51	06:19 18:45-19:02/17 19:23	05:38 18:52-19:24/32 19:54	05:19 19:00-19:34/34 20:19
12	07:12 16:43	06:48 16:25-16:47/22 17:20	06:07 16:58-17:24/26 17:52	06:17 18:45-19:02/17 19:24	05:37 18:52-19:25/33 19:55	05:19 19:01-19:34/33 20:19
13	07:12 16:44	06:47 16:26-16:47/21 17:21	06:06 16:58-17:23/25 17:53	06:16 18:45-19:04/19 19:25	05:36 18:52-19:26/34 19:56	05:19 19:01-19:34/33 20:20
14	07:11 16:45	06:45 16:54-17:00/6 17:22 16:27-16:46/19	06:04 16:59-17:23/24 17:54	06:14 18:45-19:02/17 19:26	05:35 18:52-19:27/35 19:57	05:19 19:01-19:35/34 20:20
15	07:11 16:47	06:44 16:50-17:01/11 17:24 16:28-16:44/16	06:03 16:59-17:21/22 17:55	06:13 18:45-19:02/17 19:27	05:34 18:52-19:28/36 19:58	05:19 19:02-19:35/33 20:21
16	07:11 16:48	06:43 16:48-17:03/15 17:25 16:30-16:43/13	06:01 17:00-17:19/19 17:56	06:11 18:46-19:00/14 19:28	05:33 18:52-19:29/37 19:59	05:19 19:02-19:35/33 20:21
17	07:10 16:49	06:42 16:47-17:04/17 17:26 16:34-16:39/5	05:59 17:02-17:18/16 17:57	06:10 18:47-18:59/12 19:29	05:32 18:53-19:29/36 20:00	05:19 19:03-19:36/33 20:22
18	07:10 16:50	06:40 16:45-17:05/20 17:27	05:58 17:03-17:15/12 17:58	06:08 18:49-18:56/7 19:30	05:31 18:53-19:30/37 20:01	05:19 19:03-19:36/33 20:22
19	07:09 16:51	06:39 16:45-17:06/21 17:28	05:56 17:59	06:07 19:31	05:30 18:54-19:31/37 20:02	05:19 19:03-19:36/33 20:22
20	07:09 16:52	06:38 16:45-17:08/23 17:29	05:54 18:00	06:05 19:33	05:30 18:54-19:31/37 20:03	05:19 19:03-19:36/33 20:23
21	07:08 16:53	06:36 16:44-17:08/24 17:31	05:53 18:01	06:04 19:34	05:29 18:54-19:32/38 20:04	05:19 19:03-19:36/33 20:23
22	07:07 16:55	06:35 16:44-17:08/24 17:32	05:51 18:03	06:02 19:35	05:28 18:55-19:32/37 20:04	05:19 19:03-19:36/33 20:23
23	07:07 16:56	06:33 16:44-17:08/24 17:33	05:50 18:04	06:01 19:36	05:27 18:56-19:33/37 20:05	05:19 19:04-19:37/33 20:23
24	07:06 16:57	06:32 16:44-17:08/24 17:34	05:48 18:05	05:59 19:37	05:26 18:57-19:33/36 20:06	05:20 19:04-19:37/33 20:23
25	07:05 16:58	06:30 16:44-17:06/22 17:35	05:46 18:06	05:58 19:38	05:26 18:57-19:32/35 20:07	05:20 19:04-19:37/33 20:23
26	07:05 16:59	06:29 16:45-17:06/21 17:36	05:45 18:07	05:57 19:39	05:25 18:57-19:33/36 20:08	05:20 19:05-19:38/33 20:24
27	07:04 17:00	06:28 16:46-17:04/18 17:38	05:43 18:08	05:55 19:40	05:24 18:57-19:33/36 20:09	05:21 19:05-19:38/33 20:24
28	07:03 17:02	06:26 16:47-17:03/16 17:39	05:41 18:09	05:54 19:41	05:24 18:57-19:34/37 20:10	05:21 19:04-19:38/34 20:24
29	07:02 16:33-16:36/3 17:03		06:40 19:10	05:52 19:42	05:23 18:57-19:33/36 20:10	05:21 19:05-19:39/34 20:24
30	07:01 16:29-16:40/11 17:04		06:38 19:11	05:51 19:03-19:14/11 19:43	05:23 18:58-19:34/36 20:11	05:22 19:05-19:38/33 20:24
31	07:01 16:27-16:41/14 17:05		06:36 19:12		05:22 18:57-19:33/36 20:12	
Potential sun hours	299	298	370	398	447	450
Sum of minutes with flicker	28	632	354	180	1010	1016

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS
Rosenstien 12
DK-8800 Viborg
+45 8663 8139
Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk
Calculated:
16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 9 - VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (22)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:22 19:05-19:39/34 20:23	05:46 19:03-19:35/32 20:05	06:16 18:44-19:01/17 19:23	06:45 17:37-18:02/25 18:33	06:18 15:53-16:18/25 16:47	06:52 16:24
2	05:23 19:05-19:39/34 20:23	05:47 19:02-19:33/31 20:04	06:17 18:44-18:59/15 19:21	06:46 17:36-18:02/26 18:32	06:19 15:53-16:18/25 16:46	06:53 16:24
3	05:23 19:06-19:40/34 20:23	05:48 19:02-19:33/31 20:03	06:18 18:45-18:58/13 19:20	06:47 17:37-18:03/26 18:30	06:20 15:53-16:18/25 16:45	06:54 16:23
4	05:24 19:05-19:40/35 20:23	05:49 19:03-19:33/30 20:02	06:19 18:46-18:56/10 19:18	06:48 17:36-18:03/27 18:28	06:21 15:53-16:18/25 16:44	06:55 16:23
5	05:24 19:06-19:40/34 20:23	05:50 19:03-19:33/30 20:01	06:19 18:47-18:54/7 19:16	06:49 17:36-18:02/26 18:27	06:23 15:53-16:18/25 16:43	06:56 16:23
6	05:25 19:05-19:40/35 20:23	05:50 19:03-19:32/29 19:59	06:20 18:49-18:53/4 19:15	06:50 17:37-18:01/24 18:25	06:24 15:53-16:17/24 16:42	06:57 16:23
7	05:26 19:06-19:41/35 20:22	05:51 19:04-19:31/27 19:58	06:21 19:12 19:13	06:51 17:37-18:00/23 18:23	06:25 15:55-16:17/22 16:41	06:58 16:23
8	05:26 19:05-19:40/35 20:22	05:52 19:05-19:31/26 19:57	06:22 19:12 19:12	06:52 17:38-17:59/21 18:22	06:26 15:55-16:16/21 16:40	06:59 16:23
9	05:27 19:05-19:41/36 20:22	05:53 19:06-19:30/24 19:56	06:23 19:10 19:10	06:53 17:39-17:57/18 18:20	06:27 15:56-16:15/19 16:38	07:00 16:23
10	05:28 19:06-19:42/36 20:21	05:54 19:07-19:28/21 19:55	06:24 19:08 19:08	06:54 17:40-17:55/15 18:19	06:28 15:57-16:13/16 16:37	07:01 16:23
11	05:28 19:05-19:41/36 20:21	05:55 19:08-19:27/19 19:53	06:25 19:07 19:07	06:55 17:43-17:51/8 18:17	06:30 15:59-16:13/14 16:37	07:01 16:23
12	05:29 19:06-19:42/36 20:20	05:56 19:10-19:25/15 19:52	06:26 19:05 19:05	06:56 17:25-17:32/7 18:16	06:31 16:01-16:12/11 16:36	07:02 16:23
13	05:30 19:06-19:42/36 20:20	05:57 19:13-19:22/9 19:51	06:27 19:03 19:03	06:57 17:21-17:35/14 18:14	06:32 16:05-16:07/2 16:35	07:03 16:23
14	05:30 19:06-19:43/37 20:19	05:58 19:49 19:49	06:28 19:02 19:02	06:58 17:19-17:36/17 18:12	06:33 16:34 16:34	07:04 16:23
15	05:31 19:06-19:42/36 20:19	05:59 19:48 19:48	06:29 19:00 19:00	06:59 17:18-17:37/19 18:11	06:34 16:33 16:33	07:05 16:23
16	05:32 19:06-19:42/36 20:18	06:00 19:47 19:47	06:30 18:58 18:58	07:00 17:16-17:38/22 18:09	06:35 16:32 16:32	07:05 16:24
17	05:33 19:07-19:43/36 20:18	06:01 19:45 19:45	06:31 18:57 18:57	07:01 17:15-17:38/23 18:08	06:37 16:31 16:31	07:06 16:24
18	05:33 19:07-19:43/36 20:17	06:02 19:44 19:44	06:32 18:55 18:55	07:02 17:16-17:39/23 18:06	06:38 16:31 16:31	07:07 16:24
19	05:34 19:06-19:42/36 20:16	06:03 19:43 19:43	06:33 18:53 18:53	07:03 17:15-17:39/24 18:05	06:39 16:30 16:30	07:07 16:25
20	05:35 19:06-19:42/36 20:16	06:04 19:41 19:41	06:34 18:52 18:52	07:04 17:15-17:39/24 18:03	06:40 16:29 16:29	07:08 16:25
21	05:36 19:06-19:42/36 20:15	06:05 19:40 19:40	06:35 18:50 18:50	07:06 17:15-17:38/23 18:02	06:41 16:28 16:28	07:08 16:26
22	05:37 19:05-19:42/37 20:14	06:06 19:38 19:38	06:36 18:48 18:48	07:07 17:15-17:37/22 18:01	06:42 16:28 16:28	07:09 16:26
23	05:38 19:05-19:42/37 20:13	06:07 19:37 19:37	06:37 18:46 18:46	07:08 17:15-17:36/21 17:59	06:43 16:27 16:27	07:09 16:27
24	05:38 19:04-19:41/37 20:13	06:08 19:35 19:35	06:38 18:45 18:45	07:09 17:16-17:35/19 17:58	06:45 16:27 16:27	07:10 16:27
25	05:39 19:03-19:41/38 20:12	06:09 18:52-19:00/8 19:34	06:39 17:48-17:58/10 18:43	06:10 16:17-16:33/16 16:56 16:02-16:10/8	06:46 16:26 16:26	07:10 16:28
26	05:40 19:03-19:40/37 20:11	06:10 18:50-19:02/12 19:32	06:40 17:45-18:00/15 18:41	06:11 16:18-16:32/14 16:55 15:59-16:13/14	06:47 16:26 16:26	07:11 16:28
27	05:41 19:03-19:40/37 20:10	06:11 18:48-19:03/15 19:31	06:41 17:43-18:01/18 18:40	06:12 16:20-16:30/10 16:54 15:57-16:14/17	06:48 16:25 16:25	07:11 16:29
28	05:42 19:03-19:39/36 20:09	06:12 18:46-19:03/17 19:29	06:42 17:40-18:01/21 18:38	06:13 16:24-16:27/3 16:52 15:56-16:15/19	06:49 16:25 16:25	07:11 16:30
29	05:43 19:03-19:38/35 20:08	06:13 18:45-19:03/18 19:28	06:43 17:39-18:02/23 18:36	06:15 15:55-16:17/22 16:51	06:50 16:24 16:24	07:12 16:30
30	05:44 19:03-19:37/34 20:07	06:14 18:45-19:04/19 19:26	06:44 17:38-18:02/24 18:35	06:16 15:54-16:17/23 16:50	06:51 16:24 16:24	07:12 16:31
31	05:45 19:03-19:36/33 20:06	06:15 18:44-19:02/18 19:24		06:17 15:54-16:18/24 16:49		07:12 16:32
Potential sun hours	457	427	375	346	299	290
Sum of minutes with flicker	1106	431	177	667	254	0

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

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

Project:

San Pancrazio Salentino

Licensed user:

KenTec Denmark ApS

Rosenstien 12

DK-8800 Viborg

+45 8663 8139

Kent Larsen / kent.larsen@kentec.dk / www.kentec.dk

Calculated:

16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 10 - VESTAS V136-3.45 3450 136.0 !OI! hub: 132,0 m (TOT: 200,0 m) (23)

Assumptions for shadow calculations

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

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	
1	07:12 16:33	07:00 07:34-08:37/63 17:07 16:17-16:36/19	06:25 07:37-08:03/26 17:40 16:39-17:12/33	06:35 17:56-18:33/37 19:13	05:50 19:01-19:21/20 19:44	05:22 20:13	
2	07:13 16:34	06:59 07:33-08:38/65 17:08 16:15-16:38/23	06:23 07:40-08:00/20 17:41 16:39-17:13/34	06:33 17:55-18:32/37 19:14	05:49 19:01-19:22/21 19:45	05:21 20:13	
3	07:13 08:00-08:03/3 16:35	06:58 07:32-08:37/65 17:09 16:14-16:39/25	06:22 07:44-07:55/11 17:42 16:38-17:12/34	06:32 17:56-18:32/36 19:15	05:47 18:59-19:23/24 19:46	05:21 20:14	
4	07:13 07:57-08:07/10 16:35	06:57 07:31-08:37/66 17:10 16:13-16:40/27	06:20 16:38-17:12/34 17:43	06:30 17:56-18:31/35 19:16	05:46 18:59-19:23/24 19:47	05:20 20:15	
5	07:13 07:56-08:10/14 16:36	06:56 07:30-08:37/67 17:11 16:12-16:42/30	06:18 16:38-17:12/34 17:44	06:28 17:58-18:30/32 19:17	05:45 18:59-19:23/24 19:48	05:20 20:15	
6	07:13 07:55-08:12/17 16:37	06:55 07:30-08:37/67 17:13 16:12-16:43/31	06:17 16:39-17:12/33 17:45	06:27 17:58-18:28/30 19:18	05:44 18:59-19:23/24 19:49	05:20 20:16	
7	07:13 07:53-08:13/20 16:38	06:54 07:29-08:37/68 17:14 16:11-16:44/33	06:15 16:38-17:11/33 17:46	06:25 17:59-18:26/27 19:19	05:43 18:59-19:23/24 19:50	05:20 20:17	
8	07:13 07:52-08:15/23 16:39	06:53 07:29-08:36/67 17:15 16:11-16:44/33	06:14 16:38-17:10/32 17:48	06:23 18:01-18:25/24 19:20	05:41 19:00-19:23/23 19:51	05:19 20:17	
9	07:12 07:52-08:17/25 16:40	06:51 07:29-08:36/67 17:16 16:11-16:45/34	06:12 16:40-17:09/29 17:49	06:22 18:02-18:22/20 19:21	05:40 19:00-19:23/23 19:52	05:19 20:18	
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11	07:12 07:50-08:19/29 16:42	06:49 07:28-08:35/67 17:19 16:10-16:45/35	06:09 16:42-17:07/25 17:51	06:19 17:57-18:22/14 19:23	05:38 19:01-19:22/21 19:54	05:19 20:19	
12	07:12 07:50-08:21/31 16:43	06:48 07:28-08:34/66 17:20 16:10-16:46/36	06:07 16:43-17:04/21 17:52	06:17 17:56-18:21/15 19:24	05:37 19:02-19:21/19 19:55	05:19 20:19	
13	07:12 07:49-08:22/33 16:44	06:47 07:28-08:33/65 17:21 16:10-16:46/36	06:06 16:44-17:02/18 17:53	06:16 17:55-18:20/16 19:25	05:36 19:02-19:20/18 19:56	05:19 20:20	
14	07:11 07:48-08:23/35 16:45	06:45 07:28-08:33/65 17:22 16:10-16:46/36	06:04 16:48-16:59/11 17:54	06:14 17:54-18:19/16 19:26	05:35 19:03-19:19/16 19:57	05:19 20:20	
15	07:11 07:48-08:25/37 16:47	06:44 07:27-08:31/64 17:24 16:10-16:45/35	06:03 17:55-18:20/16 17:55	06:13 17:53-18:18/17 19:27	05:34 19:05-19:18/13 19:58	05:18 20:21	
16	07:11 07:47-08:25/38 16:48	06:43 07:27-08:30/63 17:25 16:11-16:45/34	06:01 17:56-18:21/16 17:56	06:11 17:52-18:17/18 19:28	05:33 19:06-19:16/10 19:59	05:19 20:21	
17	07:10 07:47-08:27/40 16:49	06:42 07:28-08:29/61 17:26 16:11-16:45/34	05:59 17:16-17:23/7 17:57	06:10 17:51-18:16/19 19:29	05:32 19:07-19:17/11 20:00	05:19 20:22	
18	07:10 07:46-08:27/41 16:50	06:40 07:27-08:26/59 17:27 16:11-16:44/33	05:58 17:10-17:27/17 17:58	06:08 17:50-18:15/20 19:30	05:31 19:08-19:18/11 20:01	05:19 20:22	
19	07:09 07:47-08:29/42 16:51	06:39 07:28-08:24/56 17:28 16:12-16:44/32	05:56 17:07-17:29/22 17:59	06:07 17:49-18:14/21 19:31	05:30 20:02 20:02	05:19 20:22	
20	07:09 07:46-08:30/44 16:52	06:38 07:29-08:22/53 17:29 16:14-16:43/29	05:54 17:05-17:31/26 18:00	06:05 17:47-18:12/22 19:32	05:30 20:03 20:03	05:19 20:22	
21	07:08 07:46-08:31/45 16:53	06:36 07:29-08:17/48 16:14-16:41/27 17:31 16:51-17:02/11	05:53 17:03-17:32/29 18:01	06:04 17:45-18:10/23 19:34	05:29 20:04 20:03	05:19 20:23	
22	07:07 07:46-08:32/46 16:54	06:35 07:30-08:15/45 16:16-16:40/24 17:32 16:48-17:06/18	05:51 17:01-17:33/32 18:03	06:02 17:43-18:08/25 19:35	05:28 20:04 20:04	05:19 20:23	
23	07:07 07:45-08:32/47 16:56	06:33 07:30-08:13/43 16:17-16:38/21 17:33 16:45-17:07/22	05:50 17:00-17:34/34 18:04	06:01 17:41-18:06/28 19:36	05:27 20:05 20:05	05:19 20:23	
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27	07:04 07:41-08:35/54 17:00	06:28 07:34-08:07/33 17:38 16:40-17:11/31	05:43 16:57-17:35/38 18:08	05:55 19:07-19:17/10 19:40	05:24 20:09 20:09	05:21 20:24	
28	07:03 07:39-08:35/56 17:02	06:26 07:36-08:06/30 17:39 16:40-17:12/32	05:41 16:57-17:36/39 18:09	05:54 19:05-19:19/14 19:41	05:24 20:10 20:10	05:21 20:24	
29	07:02 07:37-08:36/59 17:03		06:40 17:56-18:35/39 19:10	05:52 19:03-19:19/16 19:42	05:23 20:10 20:10	05:21 20:24	
30	07:01 07:36-08:36/60 17:04		06:38 17:55-18:34/39 19:11	05:51 19:02-19:20/18 19:43	05:23 20:11 20:11	05:22 20:24	
31	07:01 07:34-08:36/62 17:05		06:36 17:56-18:34/38 19:12		05:22 20:12 20:12		
	Potential sun hours Sum of minutes with flicker	299 1105	298 2521	370 924	398 353	447 326	450 0

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

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

Project:

San Pancrazio Salentino

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Calculated:
16-02-2018 12:27/3.1.633



SHADOW - Calendar per WTG

WTG: 10 - VESTAS V136-3.45 3450 136.0 !OI! hub: 132,0 m (TOT: 200,0 m) (23)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [BRINDISI]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
3,74 4,31 5,21 6,68 8,38 9,76 10,61 9,72 7,93 5,84 4,48 3,68

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
2.558 643 216 127 181 295 1.121 1.014 651 278 334 1.032 8.449
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (July to December) and rows for days (1 to 31). Each cell contains a time range (hh:mm) indicating shadow periods. Summary rows at the bottom show 'Potential sun hours' and 'Sum of minutes with flicker' for each month.

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

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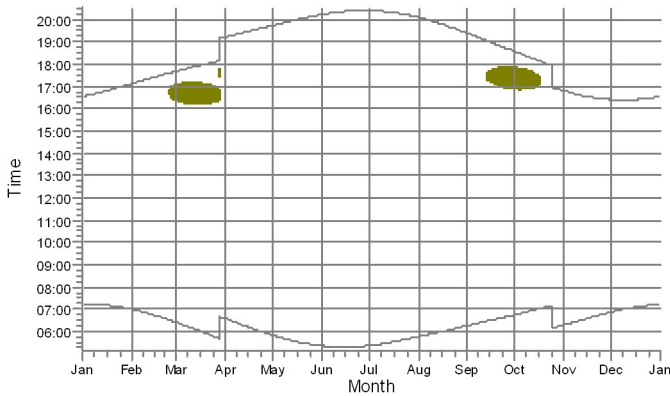
Calculated:

16-02-2018 12:27/3.1.633

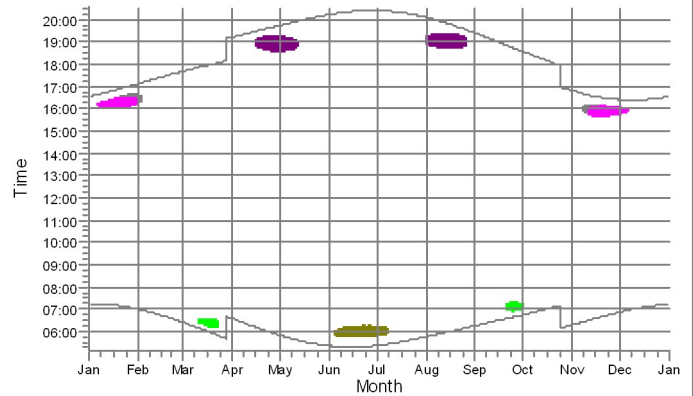


SHADOW - Calendar per WTG, graphical

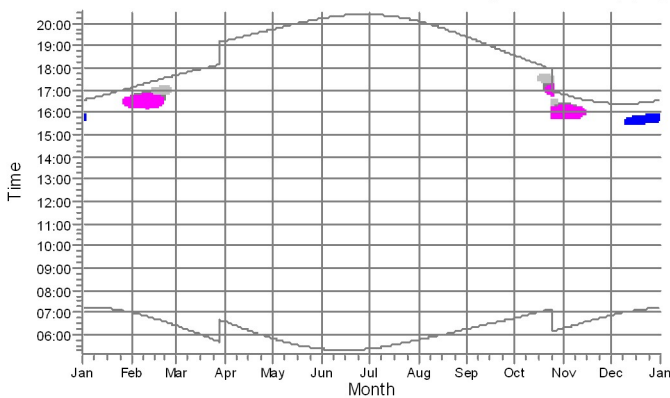
1: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (14)



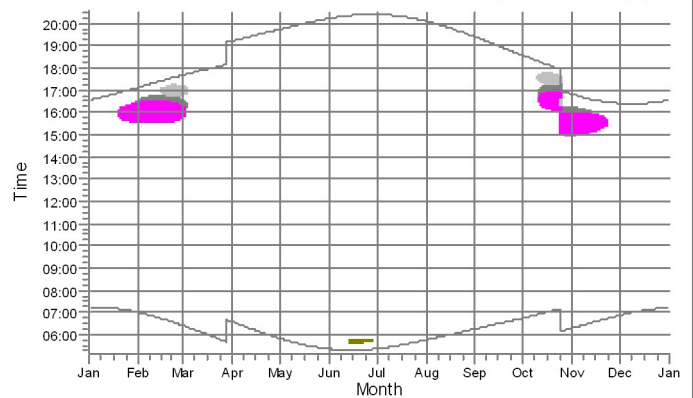
2: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (15)



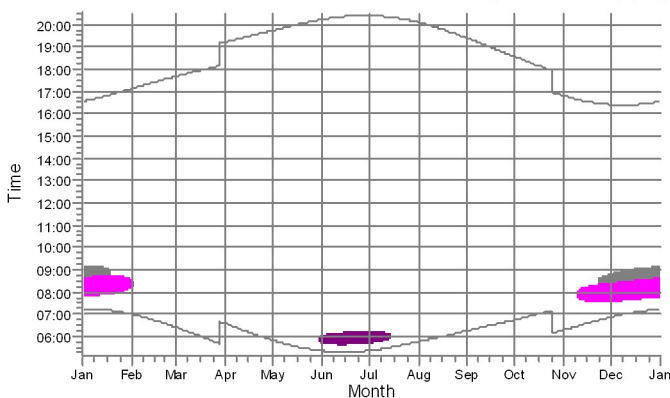
3: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (16)



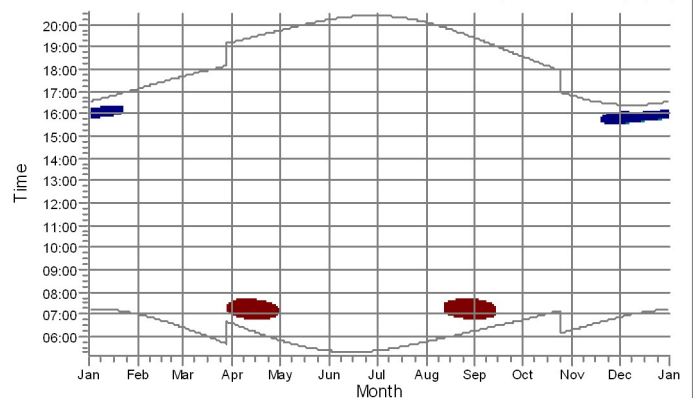
4: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (17)



5: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (18)



6: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (19)



Shadow receptors

- C: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (3)
- D: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (4)
- E: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (5)
- F: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (6)
- G: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (7)

- H: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (8)
- I: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (9)
- J: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (10)
- K: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (11)
- L: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (12)

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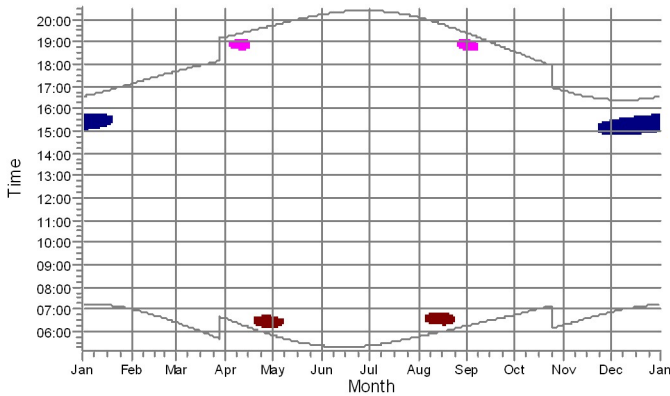
Calculated:

16-02-2018 12:27/3.1.633

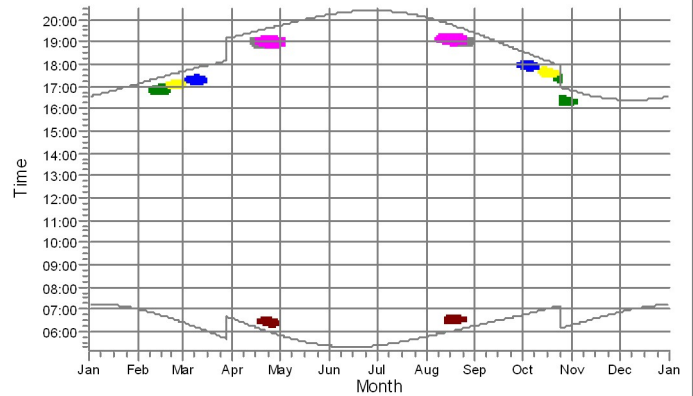


SHADOW - Calendar per WTG, graphical

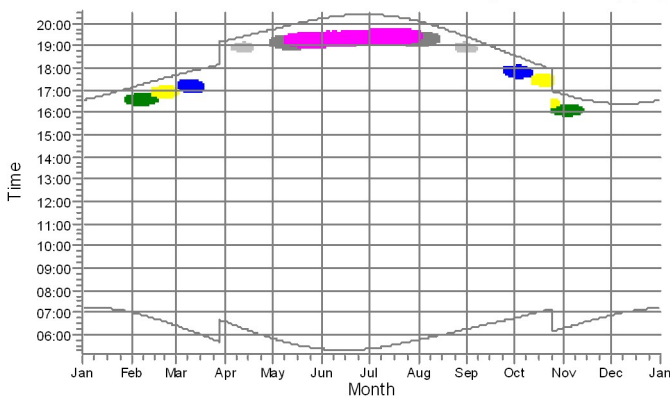
7: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (20)



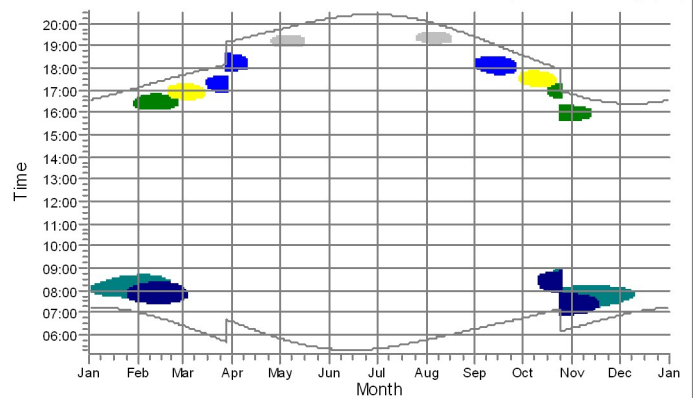
8: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (21)



9: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (22)



10: VESTAS V136-3.45 3450 136.0 !O! hub: 132,0 m (TOT: 200,0 m) (23)

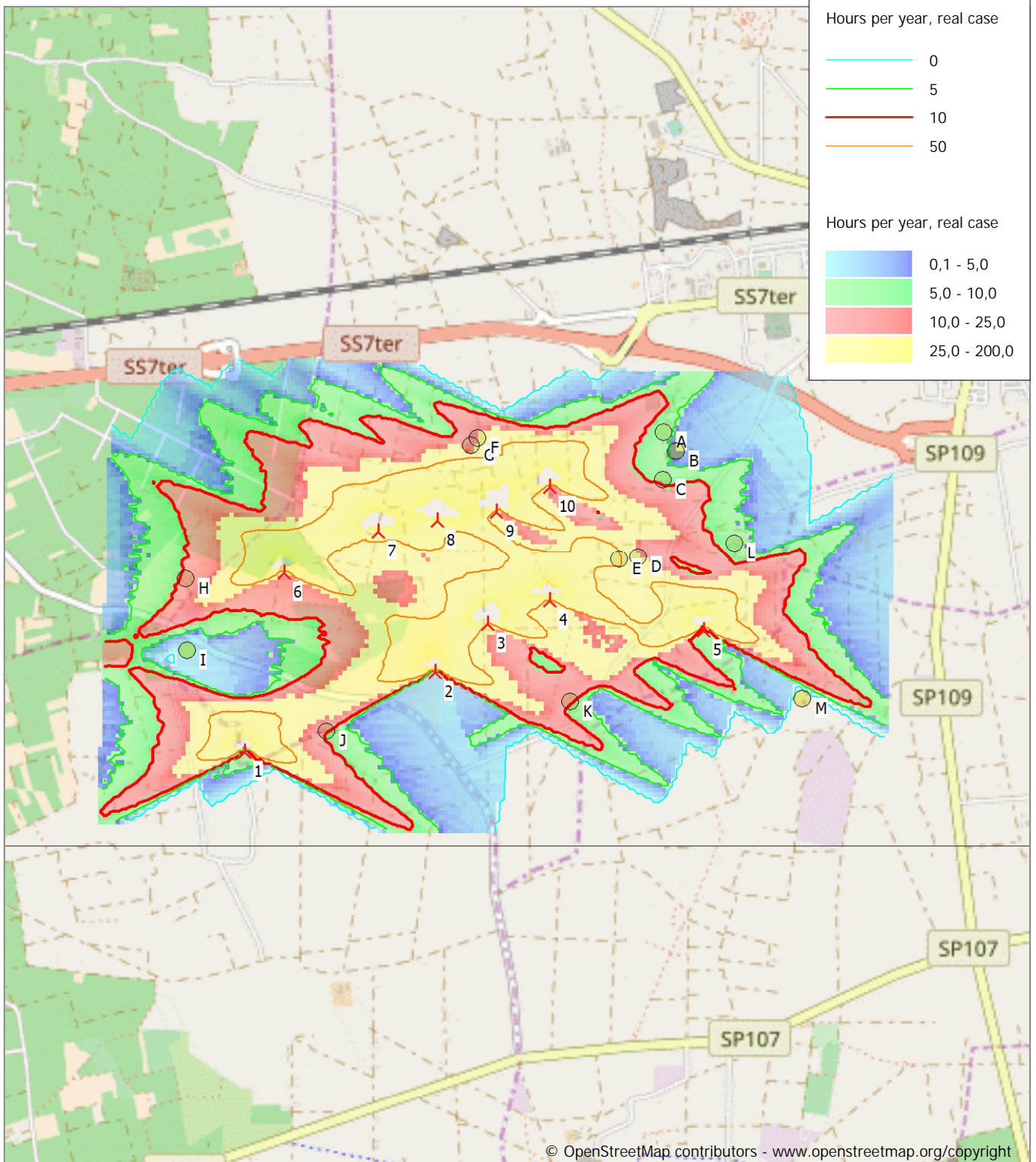


Shadow receptors

- A: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (1)
- B: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (2)
- C: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (3)
- D: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (4)
- E: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (5)

- F: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (6)
- G: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (7)
- H: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (8)
- L: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 0,0° (12)

SHADOW - Map



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0 500 1000 1500 2000 m

Map: Open Street Map 001 , Print scale 1:40.000, Map center UTM (north)-WGS84 Zone: 33 East: 737.520 North: 4.475.670

▲ New WTG

● Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_ONLINEDATA_0.wpo (1)