



Regione  
Molise



Comune di  
San Giovanni in Galdo



Comune di  
Campolieto



Comune di  
Morrone del Sannio



Provincia di  
Campobasso

**PROGETTO PER LA REALIZZAZIONE  
DI UN PARCO EOLICO PER LA PRODUZIONE DI ENERGIA ELETTRICA**  
della potenza di 33 MW alla località Fiego dei Comuni di San Giovanni in Galdo e  
Campolieto (aerogeneratori)  
**e DELLE OPERE CONNESSE E DELLE INFRASTRUTTURE INDISPENSABILI**  
nei Comuni di San Giovanni in Galdo, Campolieto e Morrone del Sannio.

**PROGETTO DEFINITIVO**

**GAL\_SHF**

Studio impatto Shadow Flickering

**Proponente**



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Formato

**A4**

Scala

-

**Progettista**

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Revisione	Descrizione	Data	Preparato	Controllato	Approvato
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## Sommario

1. PREMESSA.....	1
2. BREVE DESCRIZIONE DEL PROGETTO .....	2
3. INDIVIDUAZIONE DEI RECETTORI ED IPOTESI DI CALCOLO.....	4
4. ANALISI DEI RISULTATI – WTG DI PROGETTO .....	10
5. ANALISI DEI RISULTATI – EFFETTO CUMULO .....	12
6. CONCLUSIONI.....	14
7. ALLEGATO – TABULATI DI CALCOLO .....	14

## INDICE DELLE FIGURE

Figura 1 - Rappresentazione grafica dell'impatto dell'ombra generata da una turbina eolica .....	2
Figura 2 – Evoluzione annuale dell'ombra di una turbina .....	3
Figura 3 - Evoluzione annuale ombra con recettori convenzionali, WTG di progetto e WTG esistenti .....	4
Figura 4 - Mappa Shadow Flickering WTG di progetto .....	11
Figura 5 - Mappa Shadow Flickering WTG di Progetto e WTG preesistenti .....	13

## INDICE DELLE TABELLE

Tabella 1 - Coordinate aerogeneratori di progetto .....	1
Tabella 2 - Recettori con indicazioni catastali - Categoria A.....	6
Tabella 3 - Recettori con indicazioni catastali - Categoria D.....	8
Tabella 4 - Recettori con indicazioni catastali - Categoria E.....	8
Tabella 5 - Recettori con indicazioni catastali - Categoria F03. ....	8

## 1. PREMESSA

Il presente elaborato ha lo scopo di valutare in maniera tecnica l'eventuale impatto generato dall'evoluzione dell'ombra derivante dalla futura installazione di un di un parco eolico, costituito da 5 aerogeneratori, del tipo NORDEX N163/6.X-6000 di potenza 6.6 MW, per una potenza totale di 33,00 MW.

Gli aerogeneratori saranno ubicati presso le Località “Fiego” dei Comuni di San Giovanni in Galdo (CB) e Campolieto (CB), mentre le opere di connessione e le infrastrutture indispensabili interesseranno i comuni di San Giovanni in Galdo (CB), Campolieto (CB) e Morrone del Sannio (CB).

La valutazione tecnica è eseguita con l'ausilio di un software di simulazione specifico per la progettazione degli impianti eolici WIND PRO®, costituito da un insieme di moduli di elaborazione orientati alla simulazione di una moltitudine di aspetti che caratterizzano le diverse fasi progettuali. Il modulo SHADOW è quello specifico per la valutazione dell'evoluzione dell'ombra e del flickering. A seguire si riportano la tabella di riepilogo delle principali caratteristiche della turbina considerata nel layout di progetto ed inserita nel modello di simulazione per la valutazione del potenziale effetto di Shadow/Flickering cui i recettori potrebbero essere soggetti.

L'aerogeneratore preso come modello per lo studio è del tipo NORDEX N163, con altezza mozzo fino a 118 m e diametro rotore pari a 163 m.

Nella tabella seguente si riportano le coordinate degli aerogeneratori di progetto nel sistema di riferimento delle coordinate UTM WGS84 – 33N.

<b>Aerogeneratore</b>	<b>X [m]</b>	<b>Y [m]</b>
<b>WTG01</b>	<b>478150,954</b>	<b>4607380.778</b>
<b>WTG02</b>	<b>480201,069</b>	<b>4606956,010</b>
<b>WTG03</b>	<b>480781,329</b>	<b>4606796,248</b>
<b>WTG04</b>	<b>481367,431</b>	<b>4606766,142</b>
<b>WTG05</b>	<b>482466,080</b>	<b>4605987,938</b>

Tabella 1 - Coordinate aerogeneratori di progetto

## 2. BREVE DESCRIZIONE DEL PROGETTO

Le turbine eoliche, come altre strutture fortemente sviluppate in altezza, proiettano un'ombra sulle aree adiacenti in presenza della luce solare diretta, come si evince dalla seguente figura.

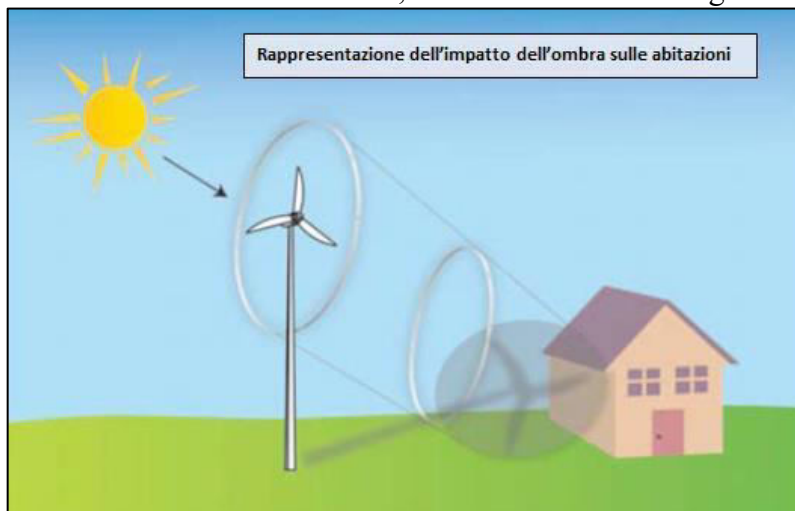


Figura 1 - Rappresentazione grafica dell'impatto dell'ombra generata da una turbina eolica.

Il cosiddetto fenomeno del “flickering”, che consiste in un effetto di lampeggiamento che si verifica quando le pale del rotore in movimento “tagliano” la luce solare in maniera intermittente, può provocare fastidio agli abitanti dei fabbricati situati nei pressi della turbina.

Alcune linee guida di paesi esteri raccomandano una velocità di flicker non superiore a 3 “tagli” al secondo. Per la classica turbina eolica provvista di tre pale, questo effetto corrisponde quindi ad una completa rotazione del rotore in un secondo, equivalente a 60 giri al minuto (60 rpm). Le attuali turbine in commercio hanno una velocità di rotazione ben inferiore a tali valori, di solito intorno ai 20-25 rpm a pieno regime.

Una progettazione attenta è comunque fondamentale per evitare questo spiacevole fenomeno semplicemente prevedendo il luogo di incidenza dell'ombra e disponendo le turbine in maniera tale che l'ombra sulle zone sensibili non superi un certo numero di ore all'anno.

In figura 2 si riporta l'evoluzione annuale dell'ombra di una turbina considerando il caso peggiore di pale sempre in rotazione intorno al mozzo, e orientate sempre ortogonalmente al sole durante la sua evoluzione giornaliera.

Come è evidente dal grafico e dalla legenda, le ore annue di ombra sono sempre minori con l'aumentare della distanza dal pilone secondo una particolare geometria dettata dalla posizione geografica; da osservare che l'ombra arriva a proiettarsi anche sino ad una distanza di 1 km, anche se solo per pochi minuti all'anno.

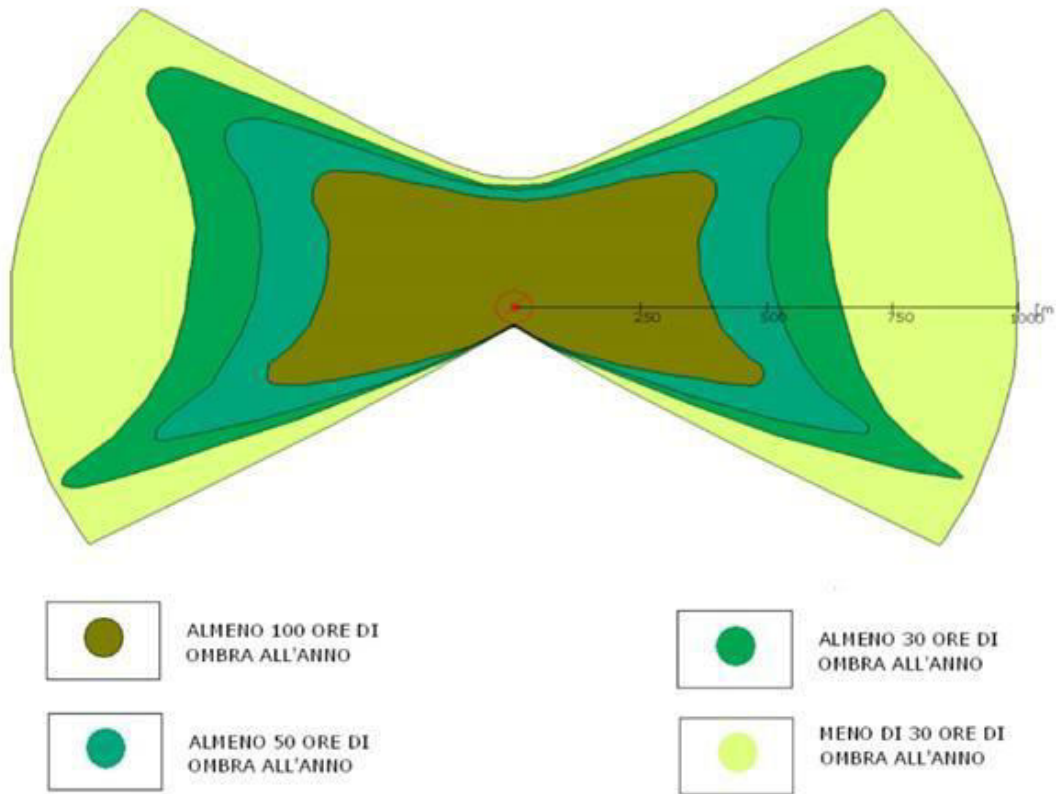


Figura 2 – Evoluzione annuale dell'ombra di una turbina

### 3. INDIVIDUAZIONE DEI RECETTORI ED IPOTESI DI CALCOLO

Ai fini della previsione degli impatti indotti dal parco eolico di progetto sono stati individuati i “recettori sensibili”. Nella tabella a seguire sono riportati i riferimenti geografici (coordinate) di tutti i fabbricati presenti in buffer di 1500m da ogni aerogeneratore di progetto. I fabbricati che possono essere considerati recettori sono riportati con un pallino colorato in funzione della categoria catastale.

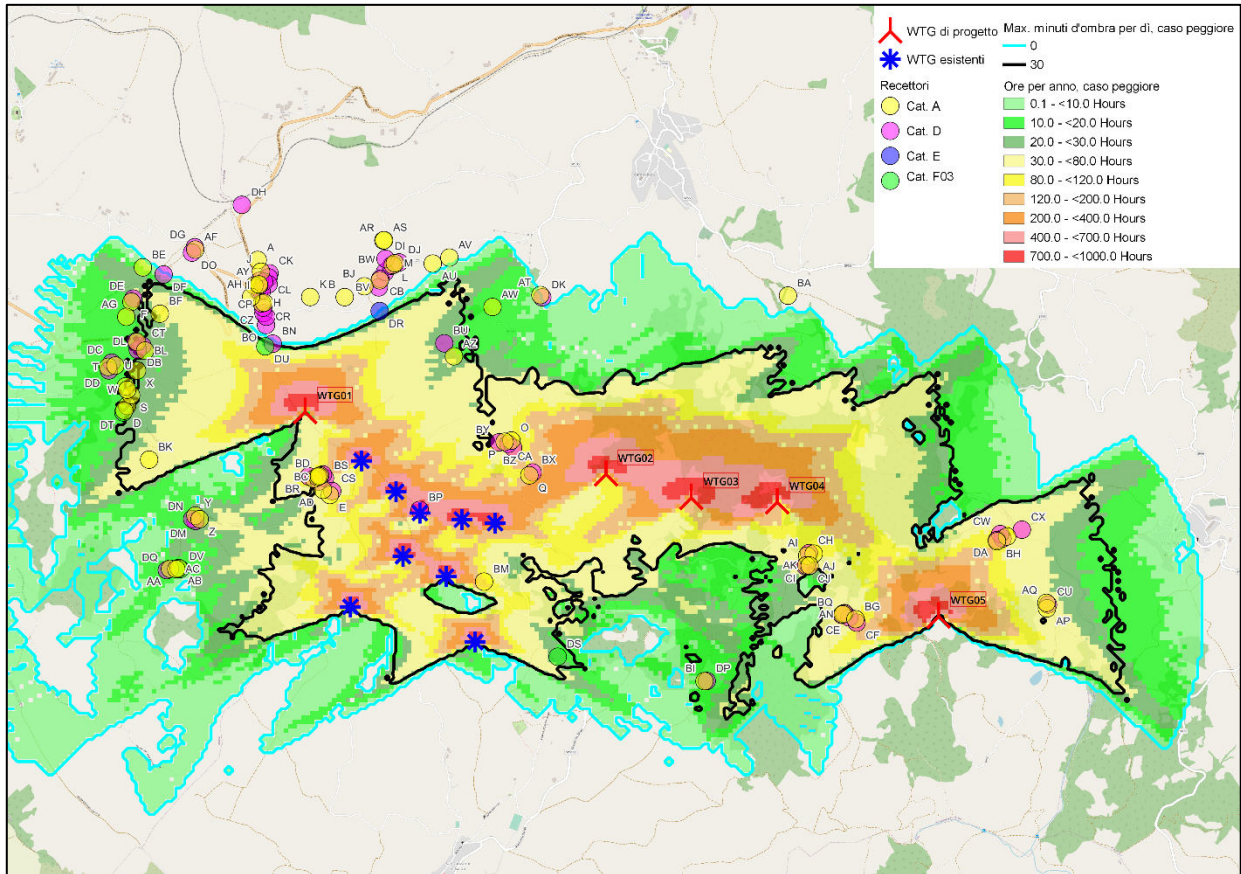


Figura 3 - Evoluzione annuale ombra con recettori convenzionali, WTG di progetto e WTG esistenti.

N	Nome	Comune	Fg.	P.IIa	Categoria	X	Y
1	A	Campolieto	13	306	A02	477828	4608417
2	B	Campolieto	18	260	A02	478420	4608164
3	C	Matrice	10	504	A02	476938	4607423
4	D	Matrice	10	736	A02	476918	4607391
5	E	Matrice	14	490	A02	478319	4606816
6	F	Matrice	8	283	A02	476968	4608132
7	G	Campolieto	18	266	A03	477856	4608122
8	H	Campolieto	18	268	A03	477871	4608126
9	I	Campolieto	18	278	A03	477838	4608245
10	J	Campolieto	18	302	A03	477850	4608337
11	K	Campolieto	18	307	A03	478185	4608165
12	L	Campolieto	18	333	A03	478748	4608382
13	M	Campolieto	18	334	A03	478762	4608395
14	N	Campolieto	18	5	A03	477804	4608243
15	O	Campolieto	21	60	A03	479556	4607187
16	P	Campolieto	21	60	A03	479510	4607179
17	Q	Campolieto	24	319	A03	479678	4606950
18	R	Matrice	10	459	A03	477005	4607859
19	S	Matrice	10	586	A03	476965	4607496
20	T	Matrice	10	608	A03	476808	4607689
21	U	Matrice	10	608	A03	476857	4607697
22	V	Matrice	10	637	A03	476928	4607556
23	W	Matrice	10	641	A03	476939	4607533
24	X	Matrice	10	711	A03	477006	4607664
25	Y	Matrice	13	548	A03	477403	4606676
26	Z	Matrice	13	548	A03	477431	4606651
27	AA	Matrice	14	443	A03	477230	4606313
28	AB	Matrice	14	444	A03	477289	4606318
29	AC	Matrice	14	482	A03	477273	4606312
30	AD	Matrice	14	507	A03	478272	4606852
31	AE	Matrice	14	510	A03	478210	4606926
32	AF	Matrice	8	196	A03	477402	4608488
33	AG	Matrice	8	298	A03	476932	4608029
34	AH	Matrice	9	320	A03	477782	4608165
35	AI	San Giovanni in Galdo	3	811	A03	481572	4606403
36	AJ	San Giovanni in Galdo	3	811	A03	481616	4606417
37	AK	San Giovanni in Galdo	3	821	A03	481565	4606336
38	AL	San Giovanni in Galdo	3	821	A03	481588	4606335



39	AM	San Giovandi in Galdo	8	507	A03	481818	4606009
40	AN	San Giovandi in Galdo	8	509	A03	481813	4606003
41	AO	San Giovanni in Galdo	4	418	A03	482933	4606534
42	AP	San Giovanni in Galdo	9	333	A03	483205	4606044
43	AQ	San Giovanni in Galdo	9	334	A03	483201	4606081
44	AR	Campolieto	13	278	A04	478683	4608550
45	AS	Campolieto	13	279	A04	478688	4608552
46	AT	Campolieto	14	197	A04	479753	4608178
47	AU	Campolieto	14	359	A04	479020	4608392
48	AV	Campolieto	14	371	A04	479134	4608433
49	AW	Campolieto	14	398	A04	479427	4608097
50	AX	Campolieto	18	150	A04	478660	4608279
51	AY	Campolieto	18	278	A04	477835	4608250
52	AZ	Campolieto	18	304	A04	479164	4607760
53	BA	Campolieto	19	514	A04	481440	4608174
54	BB	Matrice	14	495	A04	478254	4606949
55	BC	Matrice	14	501	A04	478236	4606939
56	BD	Matrice	14	513	A04	478245	4606945
57	BE	Matrice	8	291	A04	477045	4608367
58	BF	Matrice	8	66	A04	477161	4608051
59	BG	San Giovandi in Galdo	8	511	A04	481900	4605970
60	BH	San Giovanni in Galdo	4	284	A04	482864	4606501
61	BI	San Giovanni in Galdo	7	460	A04	480871	4605548
62	BJ	Campolieto	18	149	A06	478554	4608238
63	BK	Matrice	10	222	A07	477088	4607057
64	BL	Matrice	10	603	A07	477060	4607799
65	BM	San Giovanni in Galdo	1	70	A07	479370	4606226

Tabella 2 - Recettori con indicazioni catastali - Categoria A.





N	Nome	Comune	Fg.	P.IIa	Categoria	X	Y
66	BN	Campolieto	18	318	D01	477930	4607847
67	BO	Campolieto	18	238	D01	477884	4607974
68	BP	San Giovanni in Galdo	1	366	D01	478931	4606714
69	BQ	San Giovanni in Galdo	8	509	D10	481808	4605999
70	BR	Matrice	14	500	D10	478176	4606943
71	BS	Matrice	14	515	D10	478286	4606931
72	BT	Matrice	14	494	D10	478246	4606908
73	BU	Campolieto	18	226	D10	479099	4607849
74	BV	Campolieto	18	241	D10	478653	4608230
75	BW	Campolieto	18	331	D10	478694	4608334
76	BX	Campolieto	24	319	D10	479701	4606970
77	BY	Campolieto	21	60	D10	479471	4607175
78	BZ	Campolieto	21	60	D10	479568	4607138
79	CA	Campolieto	21	60	D10	479535	4607165
80	CB	Campolieto	18	150	D10	478663	4608289
81	CC	Campolieto	18	333	D10	478737	4608378
82	CD	Matrice	14	492	D10	478272	4606955
83	CE	San Giovanni in Galdo	8	511	D10	481859	4605981
84	CF	San Giovanni in Galdo	8	511	D10	481908	4605947
85	CG	San Giovanni in Galdo	8	507	D10	481825	4606011
86	CH	San Giovanni in Galdo	3	811	D10	481584	4606420
87	CI	San Giovanni in Galdo	3	821	D10	481556	4606333
88	CJ	San Giovanni in Galdo	3	821	D10	481581	4606331
89	CK	Campolieto	18	336	D10	477908	4608326
90	CL	Campolieto	18	298	D10	477902	4608298
91	CM	Campolieto	18	300	D10	477842	4608275
92	CN	Campolieto	18	285	D10	477902	4608252
93	CO	Campolieto	18	277	D10	477838	4608204
94	CP	Campolieto	18	273	D10	477854	4608201
95	CQ	Campolieto	18	264	D10	477867	4608055
96	CR	Campolieto	18	265	D10	477886	4608031
97	CS	Matrice	14	514	D10	478335	4606843
98	CT	Matrice	10	707	D10	477042	4607832
99	CU	San Giovanni in Galdo	9	334	D10	483212	4606070



100	CV	San Giovanni in Galdo	4	418	D10	482903	4606520
101	CW	San Giovanni in Galdo	4	418	D10	482886	4606550
102	CX	Monacilioni	17	227	D10	483034	4606580
103	CY	Campolieto	18	282	D10	477871	4608268
104	CZ	Campolieto	18	262	D10	477864	4608092
105	DA	San Giovanni in Galdo	4	284	D10	482864	4606509
106	DB	Matrice	10	706	D10	477011	4607804
107	DC	Matrice	10	608	D10	476833	4607718
108	DD	Matrice	10	655	D10	476814	4607665
109	DE	Matrice	8	296	D10	476979	4608154
110	DF	Matrice	8	320	D10	477186	4608318
111	DG	Matrice	8	197	D10	477399	4608504
112	DH	Campolieto	13	309	D10	477720	4608793
113	DI	Campolieto	18	328	D10	478699	4608425
114	DJ	Campolieto	18	334	D10	478791	4608400
115	DK	Campolieto	14	197	D10	479766	4608162
116	DL	Matrice	10	459	D10	476995	4607861
117	DM	Matrice	13	548	D10	477403	4606639
118	DN	Matrice	13	548	D10	477381	4606653
119	DO	Matrice	8	196	D10	477380	4608467
120	DP	San Giovanni in Galdo	7	460	D10	480887	4605549
121	DQ	Matrice	14	440	D10	477208	4606304

Tabella 3 - Recettori con indicazioni catastali - Categoria D.

N	Nome	Comune	Fg.	P.IIa	Categoria	X	Y
122	DR	Campolieto	18	A	E	478659	4608069

Tabella 4 - Recettori con indicazioni catastali - Categoria E.

N	Nome	Comune	Fg.	P.IIa	Categoria	X	Y
123	DS	San Giovanni in Galdo	2	476	F03	479871	4605714
124	DT	Matrice	10	736	F03	476912	4607378
125	DU	Matrice	9	324	F03	477879	4607828
126	DV	Matrice	14	444	F03	477299	4606311

Tabella 5 - Recettori con indicazioni catastali - Categoria F03.

In totale i recettori d'ombra risultano 126.

Per quanto riguarda l'effetto cumulo sono stati considerati gli aerogeneratori esistenti presenti in un buffer di 1500m dagli aerogeneratori di progetto. Si riporta di seguito il quadro di riferimento di tutti gli aerogeneratori considerati. È stata inoltre eseguita una valutazione che tiene in conto dei soli aerogeneratori in progetto.



Di seguito si elencano gli Aerogeneratori considerati:

- WTG 01 NORDEX N163/6.X-6000 163.0 m hub: 118,0 m (TOT: 200,0 m) (**progetto**)
- WTG 02 NORDEX N163/6.X-6000 163.0 m hub: 118,0 m (TOT: 200,0 m) (**progetto**)
- WTG 03 NORDEX N163/6.X-6000 163.0 m hub: 118,0 m (TOT: 200,0 m) (**progetto**)
- WTG 04 NORDEX N163/6.X-6000 163.0 m hub: 118,0 m (TOT: 200,0 m) (**progetto**)
- WTG 05 NORDEX N163/6.X-6000 163.0 m hub: 118,0 m (TOT: 200,0 m) (**progetto**)
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);
- Acciona AW 77/150/1500 CII-1.500 1.5 MW Drot:77 m hub: 60,0 m (**esistenti**);

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

I dati di input sono:

- DTM – Digital Terrain Model.
- Modello delle turbine e loro caratteristiche dimensionali;
- Definizione di aree sensibili o recettori;
- Definizione di dati meteorologici storici di una stazione di riferimento per il calcolo probabilistico delle ore di soleggiamento.

Allo scopo di analizzare l'effetto "flickering" indotto dagli aerogeneratori (di progetto ed esistenti) sui recettori, sono stati considerati i rappresentati dai nuclei abitativi presenti in un intorno di 1500 metri dalle turbine.

In relazione a ciò, si fa presente che già in fase di scelta delle aree sulle quali ubicare l'impianto si è cercato di allontanarsi il più possibile dall'area urbana e dalle masserie adibite ad abitazione.

Nello studio viene comunque calcolato un "worst case" ovvero la condizione più sfavorevole possibile, in quanto si considera che:

- Il sole splende per tutta la giornata, dall'alba al tramonto (cioè si è sempre in assenza di copertura nuvolosa);
- Il piano di rotazione delle pale è sempre perpendicolare alla direttrice sole-aerogeneratore (l'aerogeneratore "insegue" il sole);
- Gli aerogeneratori sono sempre operativi.

Inoltre, per le simulazioni, si è trascurata la presenza degli alberi e di altri ostacoli che bordano le strade "intercettando" l'ombra degli aerogeneratori riducendo quindi il fastidio del flickering.

Il numero di ore di ombreggiamento ricavato è ampiamente cautelativo. Di conseguenza i risultati ai quali si perverrà fanno riferimento al peggior caso possibile ("worst case").

Si riporta di seguito le tabelle dei risultati con riferimento alle ore equivalenti su ciascun recettore ed i tabulati dei calcoli.

Sono state eseguite due analisi:

- Analisi 1: solo aerogeneratori di progetto
- Analisi 2: solo aerogeneratori di progetto + aerogeneratori in esercizio in prossimità dei recettori analizzati;

#### 4. ANALISI DEI RISULTATI – WTG DI PROGETTO

Si riportano di seguito i risultati dei calcoli in forma tabellare per ciascun recettore d'ombra in considerazione dell'effetto dato dalle WTG di progetto.

Ombra, caso peggiore				Ombra, caso peggiore				Ombra, caso peggiore			
n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno
	[ore/anno]	[giorni/anno]	[ore/giorno]		[ore/anno]	[giorni/anno]	[ore/giorno]		[ore/anno]	[giorni/anno]	[ore/giorno]
A	0:00	0	0:00	T	12:11	35	0:27	CE	63:46	83	1:02
B	0:00	0	0:00	U	13:09	37	0:28	CF	84:41	99	1:07
C	15:58	40	0:31	V	14:52	39	0:30	CG	53:37	76	0:58
D	15:41	40	0:30	W	15:21	39	0:31	CH	79:24	153	0:46
E	0:00	0	0:00	X	16:27	41	0:32	CI	51:44	121	0:39
F	19:24	54	0:28	Y	0:00	0	0:00	CJ	27:45	70	0:27
G	0:00	0	0:00	Z	0:00	0	0:00	CK	0:00	0	0:00
H	0:00	0	0:00	AA	0:00	0	0:00	CL	0:00	0	0:00
I	0:00	0	0:00	AB	0:00	0	0:00	CM	0:00	0	0:00
J	0:00	0	0:00	AC	0:00	0	0:00	CN	0:00	0	0:00
K	0:00	0	0:00	AD	0:00	0	0:00	CO	0:00	0	0:00
L	0:00	0	0:00	AE	0:00	0	0:00	CP	0:00	0	0:00
M	0:00	0	0:00	AF	0:00	0	0:00	CQ	0:00	0	0:00
N	0:00	0	0:00	AG	15:55	44	0:28	CR	0:00	0	0:00
O	49:10	112	0:46	AH	0:00	0	0:00	CS	0:00	0	0:00
P	42:10	106	0:39	AI	71:45	145	0:43	CT	17:28	43	0:32
Q	88:47	158	1:06	AJ	82:59	160	0:45	CU	38:51	64	0:47
R	16:35	42	0:31	AK	53:06	126	0:39	CV	93:52	146	0:54
S	16:08	41	0:31	AL	29:26	72	0:30	CW	90:34	137	0:53
				AM	52:20	75	0:57	CX	70:07	139	0:46
				AN	51:42	75	0:57	CY	0:00	0	0:00
				AO	87:21	146	0:52	CZ	0:00	0	0:00
				AP	41:10	67	0:48	DA	100:33	146	0:57
				AQ	39:25	64	0:48	DB	16:33	42	0:31
				AR	0:00	0	0:00	DC	12:35	35	0:28
				AS	0:00	0	0:00	DD	12:24	35	0:28
				AT	0:00	0	0:00	DE	21:14	58	0:28
				AU	0:00	0	0:00	DF	2:04	15	0:10
				AV	0:00	0	0:00	DG	0:00	0	0:00
				AW	14:26	42	0:27	DH	0:00	0	0:00
				AX	0:00	0	0:00	DI	0:00	0	0:00
				AY	0:00	0	0:00	DJ	0:00	0	0:00
				AZ	24:08	71	0:35	DK	0:00	0	0:00
				BA	0:00	0	0:00	DL	16:21	42	0:30
				BB	0:00	0	0:00	DM	0:00	0	0:00
				BC	0:00	0	0:00	DN	0:00	0	0:00
				BD	0:00	0	0:00	DO	0:00	0	0:00
				BE	11:11	36	0:23	DP	12:06	40	0:24
				BF	27:06	64	0:33	DQ	0:00	0	0:00
				BG	77:22	93	1:06	DR	0:00	0	0:00
				BH	102:11	148	0:58	DS	0:00	0	0:00
				BI	11:46	38	0:24	DT	15:38	40	0:30
				BJ	0:00	0	0:00	DU	40:45	54	0:57
				BK	45:13	96	0:35	DV	0:00	0	0:00
				BL	17:53	43	0:32				
				BM	0:00	0	0:00				
				BN	9:43	25	0:30				
				BO	0:00	0	0:00				
				BP	0:00	0	0:00				
				BQ	51:02	76	0:57				
				BR	0:00	0	0:00				
				BS	0:00	0	0:00				
				BT	0:00	0	0:00				
				BU	23:44	51	0:36				
				BV	0:00	0	0:00				
				BW	0:00	0	0:00				
				BX	94:03	155	1:10				
				BY	38:21	101	0:35				
				BZ	52:08	112	0:49				
				CA	45:57	108	0:43				
				CB	0:00	0	0:00				
				CC	0:00	0	0:00				
				CD	0:00	0	0:00				

Dalle analisi condotte i recettori d'ombra maggiormente impattati risultano i seguenti:

- BH (Categoria A04),
- DA (Categoria D10).

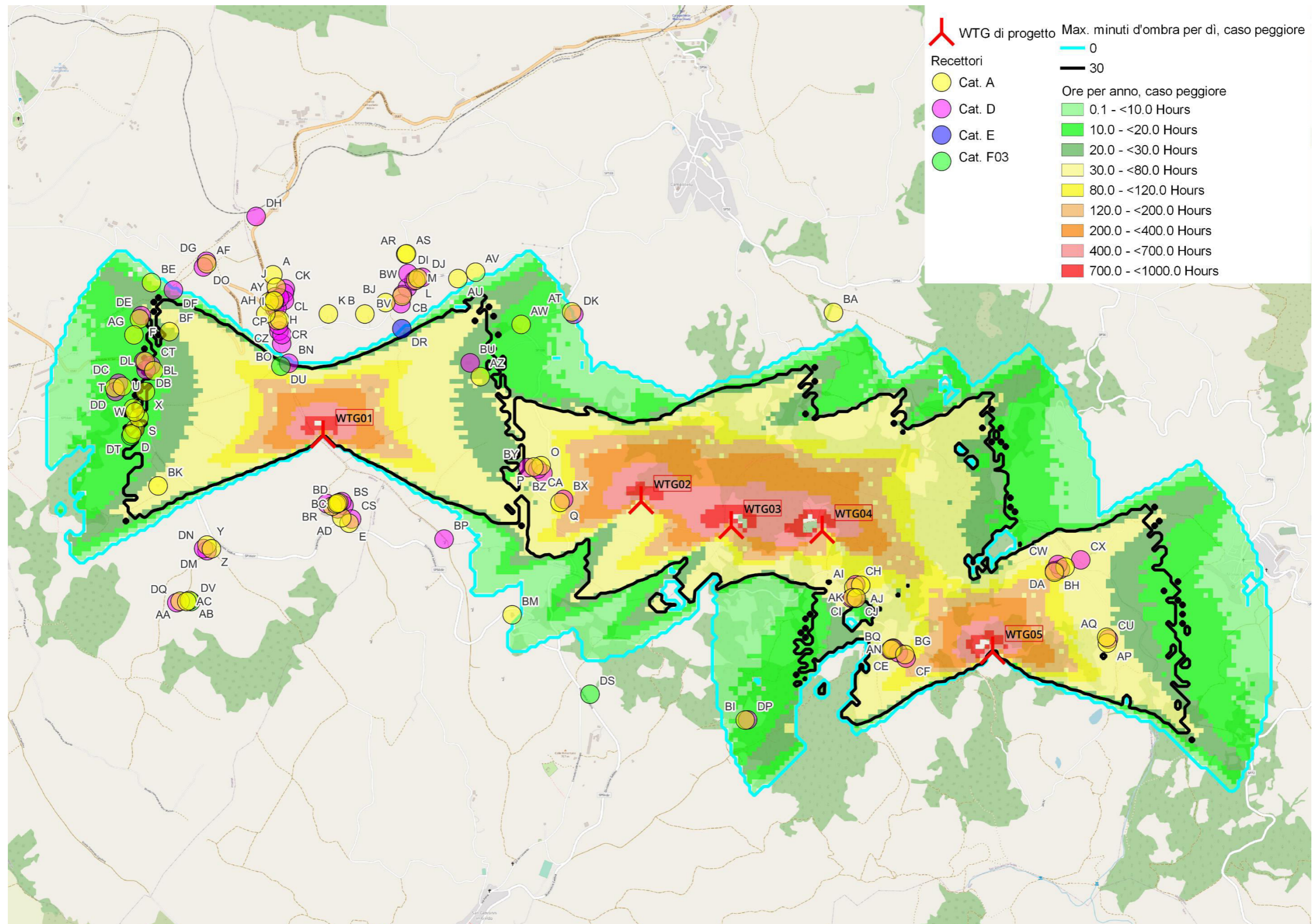


Figura 4 - Mappa Shadow Flickering WTG di progetto

## 5. ANALISI DEI RISULTATI – EFFETTO CUMULO

Si riportano di seguito i risultati dei calcoli in forma tabellare per ciascun recettore d'ombra in considerazione dell'effetto cumulo dato dalle WTG di progetto più nove WTG in esercizio.

Ombra, caso peggiore				Ombra, caso peggiore				Ombra, caso peggiore			
n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno
	[ore/anno]	[giorni/anno]	[ore/giorno]		[ore/anno]	[giorni/anno]	[ore/giorno]		[ore/anno]	[giorni/anno]	[ore/giorno]
A	0:00	0	0:00	J	0:00	0	0:00	BU	23:44	51	0:36
B	0:00	0	0:00	K	0:00	0	0:00	BV	0:00	0	0:00
C	20:50	89	0:31	L	0:00	0	0:00	BW	0:00	0	0:00
D	20:27	87	0:30	M	0:00	0	0:00	BX	166:54	288	1:24
E	66:26	146	0:40	N	0:00	0	0:00	BY	80:01	193	0:45
F	21:44	94	0:28	O	79:44	194	1:01	BZ	77:50	177	1:02
G	0:00	0	0:00	P	81:53	203	0:52	CA	77:24	189	0:56
H	0:00	0	0:00	Q	169:37	297	1:22	CB	0:00	0	0:00
I	0:00	0	0:00	R	19:48	74	0:31	CC	0:00	0	0:00
				S	21:20	92	0:31	CD	130:28	183	1:08
				T	14:56	67	0:27	CE	64:50	88	1:02
				U	16:18	75	0:28	CF	84:41	99	1:07
				V	19:35	88	0:30	CG	54:44	87	0:58
				W	20:20	89	0:31	CH	82:36	184	0:46
				X	20:55	98	0:32	CI	55:03	146	0:39
				Y	21:36	130	0:16	CJ	30:59	100	0:27
				Z	23:21	138	0:16	CK	0:00	0	0:00
				AA	13:00	96	0:15	CL	0:00	0	0:00
				AB	14:07	102	0:15	CM	0:00	0	0:00
				AC	13:51	103	0:15	CN	0:00	0	0:00
				AD	50:33	129	0:36	CO	0:00	0	0:00
				AE	102:53	189	0:55	CP	0:00	0	0:00
				AF	0:00	0	0:00	CQ	0:00	0	0:00
				AG	17:47	72	0:28	CR	0:00	0	0:00
				AH	0:00	0	0:00	CS	51:26	130	0:41
				AI	74:57	176	0:43	CT	19:43	63	0:32
				AJ	85:19	182	0:45	CU	38:51	64	0:47
				AK	56:22	150	0:39	CV	93:52	146	0:54
				AL	32:41	104	0:30	CW	90:34	137	0:53
				AM	53:28	86	0:57	CX	70:07	139	0:46
				AN	52:52	87	0:57	CY	0:00	0	0:00
				AO	87:21	146	0:52	CZ	0:00	0	0:00
				AP	41:10	67	0:48	DA	100:33	146	0:57
				AQ	39:25	64	0:48	DB	19:57	74	0:31
				AR	0:00	0	0:00	DC	15:18	69	0:28
				AS	0:00	0	0:00	DD	15:25	73	0:28
				AT	0:00	0	0:00	DE	23:36	92	0:28
				AU	0:00	0	0:00	DF	2:04	15	0:10
				AV	0:00	0	0:00	DG	0:00	0	0:00
				AW	14:26	42	0:27	DH	0:00	0	0:00
				AX	0:00	0	0:00	DI	0:00	0	0:00
				AY	0:00	0	0:00	DJ	0:00	0	0:00
				AZ	24:08	71	0:35	DK	0:00	0	0:00
				BA	0:00	0	0:00	DL	19:22	72	0:30
				BB	122:44	181	1:03	DM	22:13	132	0:16
				BC	112:25	174	1:00	DN	20:45	126	0:16
				BD	118:12	178	1:01	DO	0:00	0	0:00
				BE	11:11	36	0:23	DP	16:51	78	0:24
				BF	31:47	98	0:33	DQ	12:43	99	0:14
				BG	77:22	93	1:06	DR	0:00	0	0:00
				BH	102:11	148	0:58	DS	23:32	49	0:44
				BI	11:46	38	0:24	DT	20:17	87	0:30
				BJ	0:00	0	0:00	DU	40:45	54	0:57
				BK	56:04	181	0:35	DV	14:22	103	0:15
				BL	20:22	63	0:32				
				BM	156:42	160	1:39				
				BN	9:43	25	0:30				
				BO	0:00	0	0:00				
				BP	675:35	249	3:20				
				BQ	52:12	88	0:57				
				BR	98:02	209	0:50				
				BS	83:09	147	0:58				
				BT	72:18	161	0:51				

Dalle analisi condotte i recettori d'ombra maggiormente impattati risultano:

- Q (Categoria A03),
- AE (Categoria A03),
- BB (Categoria A04),
- BC (Categoria A04),
- BD (Categoria A04),
- BH (Categoria A04),
- BM (Categoria A07),
- BP (Categoria D01),
- BX (Categoria D10),
- CD (Categoria D10),
- DA (Categoria D10),

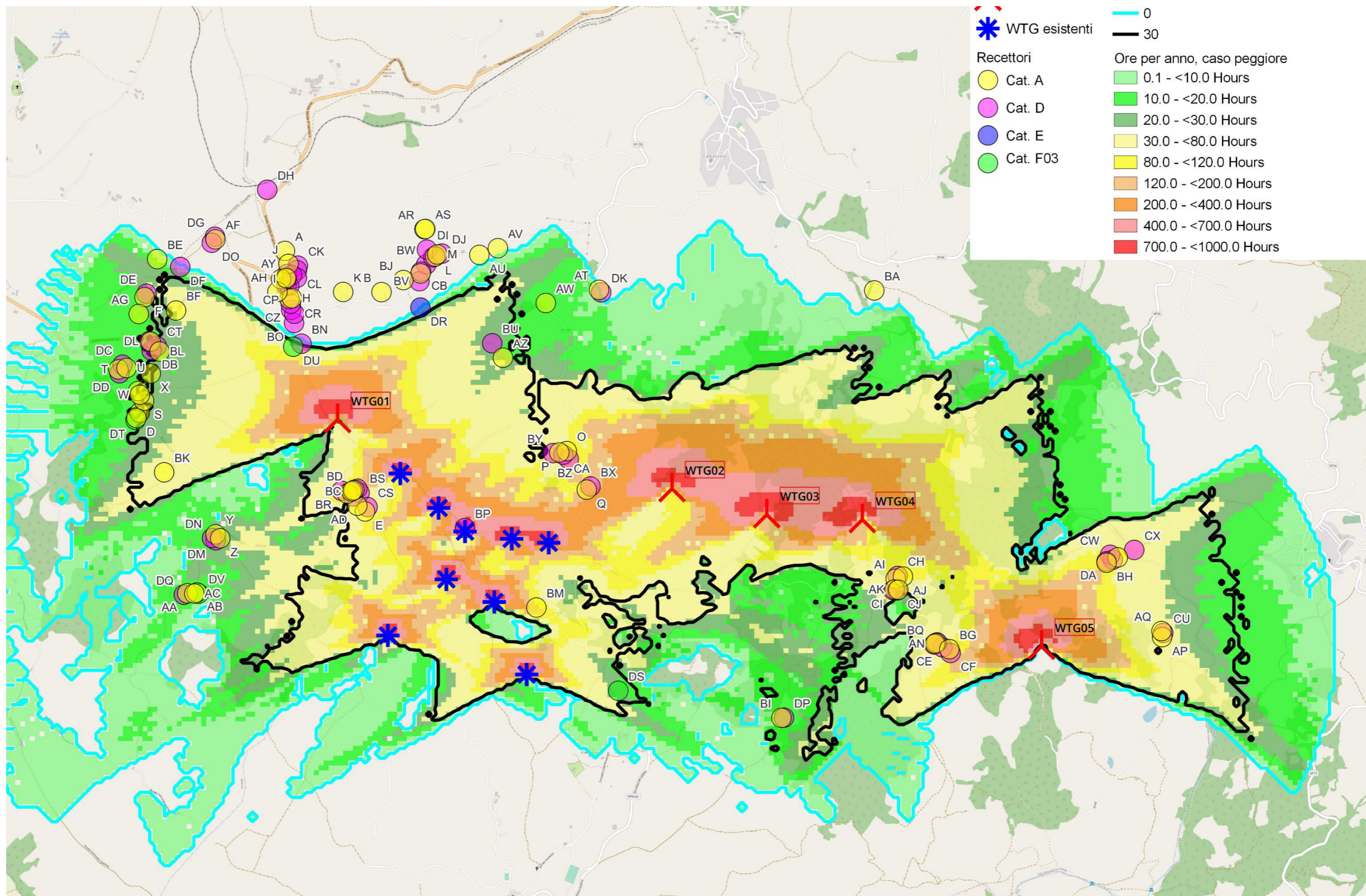


Figura 5 - Mappa Shadow Flickering WTG di Progetto e WTG preesistenti

## 6. CONCLUSIONI

In conclusione, si può asseverare che, nonostante l'alto numero di recettori d'ombra, il contesto risulta essere di carattere prevalentemente agricolo dell'area e solo la metà dei recettori risulta di categoria A; Tra questi, nessuno ricade in aree dove l'ombreggiamento supera le 200 ore/annue. Il resto dei recettori risulta appartenere alla categoria D, nello specifico fabbricati ad uso esclusivamente agricolo e non abitativo.

A quanto detto va rimarcato il grado di cautela utilizzato per la simulazione che non tiene conto di tutte le possibili fonti di attenuazione dell'effetto cui ogni recettore è (o può essere) soggetto, quali presenza di alberi, ostacoli, siepi e quant'altro possa attenuare il fenomeno dell'evoluzione giornaliera dell'ombra.

Per ulteriori dettagli si allegano di seguito i tabulati di calcolo ottenuti dalle elaborazioni effettuate tramite il software di simulazione specifico per la progettazione degli impianti eolici WIND PRO®.

## 7. ALLEGATO – TABULATI DI CALCOLO





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Risultato principale

### Calcolo: ShadowFlickering Progetto

#### Assunzioni sui calcoli d'ombra

Distanza massima di influenza  
 Calcola solo quando oltre il 20% del sole è coperto dalla pala  
 Consultare la tabella delle WTG

Altezza minima del sole sull'orizzonte 3 °  
 Passo giornaliero del calcolo 1 giorni  
 Passo temporale del calcolo 1 minuti

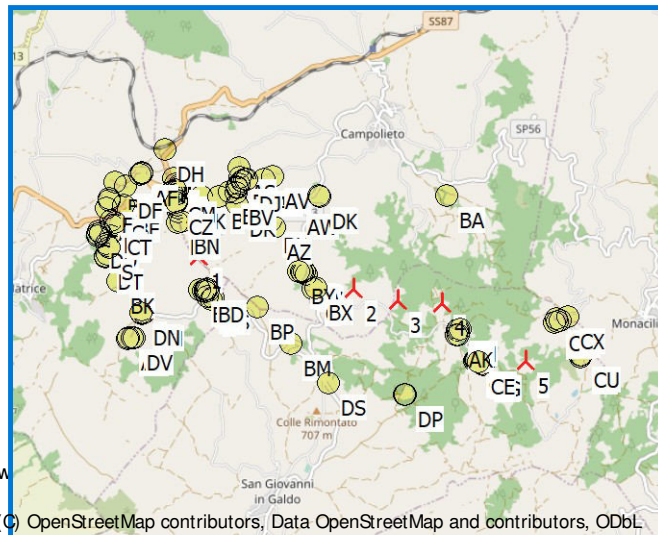
Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]  
 Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Per evitare di considerare l' ombreggiamento da WTG in realtà non direttamente visibili, prima del calcolo dell' ombra viene eseguito un calcolo ZVI. Quest' ultimo si basa sulle seguenti assunzioni.

Curve altimetriche usate: Height Contours: CONTOURLINE\_ONLINEDATA\_0.w  
 Risoluzione del grigliato: 1,0 m

Tutte le coordinate sono in UTM (north)-WGS84 Zona: 33



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

Scala 1:100.000

▲ Nuova WTG      ● Recettore d'ombra

#### WTG

Easting	Northing	Z	Dati/Descrizione	Tipo di WTG			Potenza nominale	Diametro rotore	Altezza mozzo	Dati di ombra	
				Valida	Produttore	Tipo generatore				Distanza di calcolo	giri/min
		[m]					[kW]	[m]	[m]	[m]	[giri/min]
1	478.151	4.607.381	823,6 NORDEX N163/6.X 6600 163...Si		NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0
2	480.201	4.606.956	650,0 NORDEX N163/6.X 6600 163...Si		NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0
3	480.781	4.606.796	621,2 NORDEX N163/6.X 6600 163...Si		NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0
4	481.367	4.606.766	576,4 NORDEX N163/6.X 6600 163...Si		NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0
5	482.466	4.605.988	579,0 NORDEX N163/6.X 6600 163...Si		NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0

#### Recettore d'ombra-Immissione dati

n.	Easting	Northing	Z	Ampiezza	Height	Altezza	Inclinazione della finestra	Modo orientazione	Altezza osservatore
			[m]	[m]	[m]	[m]	[°]		[m]
A	477.828	4.608.417	840,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
B	478.420	4.608.164	817,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
C	476.938	4.607.423	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
D	476.918	4.607.391	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
E	478.319	4.606.816	776,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
F	476.968	4.608.132	766,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
G	477.856	4.608.122	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
H	477.871	4.608.126	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
I	477.838	4.608.245	834,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
J	477.850	4.608.337	838,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
K	478.185	4.608.165	827,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
L	478.748	4.608.382	798,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
M	478.762	4.608.395	797,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
N	477.804	4.608.243	835,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
O	479.556	4.607.187	711,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
P	479.510	4.607.179	719,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
Q	479.678	4.606.950	700,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
R	477.005	4.607.859	750,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
S	476.965	4.607.496	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
T	476.808	4.607.689	740,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
U	476.857	4.607.697	740,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
V	476.928	4.607.556	730,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
W	476.939	4.607.533	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
X	477.006	4.607.664	737,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
Y	477.403	4.606.676	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
Z	477.431	4.606.651	722,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0

continua alla pagina successiva...

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering Progetto

...continua dalla pagina precedente

n.	Easting	Northing	Z	Ampiezza	Height	Altezza s.l.t.	Inclinazione della finestra	Modo orientazione	Altezza osservatore
		[m]	[m]	[m]	[m]	[m]	[°]		[m]
AA	477.230	4.606.313	710,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AB	477.289	4.606.318	715,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AC	477.273	4.606.312	713,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AD	478.272	4.606.852	780,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AE	478.210	4.606.926	794,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AF	477.402	4.608.488	824,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AG	476.932	4.608.029	760,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AH	477.782	4.608.165	829,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AI	481.572	4.606.403	600,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AJ	481.616	4.606.417	604,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AK	481.565	4.606.336	588,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AL	481.588	4.606.335	589,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AM	481.818	4.606.009	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AN	481.813	4.606.003	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AO	482.933	4.606.534	443,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AP	483.205	4.606.044	456,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AQ	483.201	4.606.081	450,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AR	478.683	4.608.550	810,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AS	478.688	4.608.552	810,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AT	479.753	4.608.178	729,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AU	479.020	4.608.392	778,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AV	479.134	4.608.433	786,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AW	479.427	4.608.097	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AX	478.660	4.608.279	809,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AY	477.835	4.608.250	834,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AZ	479.164	4.607.760	744,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BA	481.440	4.608.174	702,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BB	478.254	4.606.949	795,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BC	478.236	4.606.939	795,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BD	478.245	4.606.945	795,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BE	477.045	4.608.367	791,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BF	477.161	4.608.051	761,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BG	481.900	4.605.970	589,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BH	482.864	4.606.501	460,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BI	480.871	4.605.548	530,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BJ	478.554	4.608.238	820,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BK	477.088	4.607.057	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BL	477.060	4.607.799	744,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BM	479.370	4.606.226	740,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BN	477.930	4.607.847	829,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BO	477.884	4.607.974	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BP	478.931	4.606.714	790,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BQ	481.808	4.605.999	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BR	478.176	4.606.943	796,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BS	478.286	4.606.931	791,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BT	478.246	4.606.908	790,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BU	479.099	4.607.849	750,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BV	478.653	4.608.230	810,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BW	478.694	4.608.334	803,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BX	479.701	4.606.970	697,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BY	479.471	4.607.175	723,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BZ	479.568	4.607.138	708,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CA	479.535	4.607.165	714,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CB	478.663	4.608.289	809,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CC	478.737	4.608.378	799,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CD	478.272	4.606.955	795,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CE	481.859	4.605.981	595,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CF	481.908	4.605.947	585,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CG	481.825	4.606.011	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CH	481.584	4.606.420	605,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CI	481.556	4.606.333	587,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CJ	481.581	4.606.331	588,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CK	477.908	4.608.326	835,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CL	477.902	4.608.298	834,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0

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Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering Progetto

...continua dalla pagina precedente

n.	Easting	Northing	Z	Ampiezza	Height	Altezza s.l.t.	Inclinazione della finestra	Modo orientazione	Altezza osservatore
		[m]	[m]	[m]	[m]	[m]	[°]		[m]
CM	477.842	4.608.275	835,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CN	477.902	4.608.252	832,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CO	477.838	4.608.204	832,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CP	477.854	4.608.201	831,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CQ	477.867	4.608.055	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CR	477.886	4.608.031	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CS	478.335	4.606.843	780,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CT	477.042	4.607.832	748,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CJ	483.212	4.606.070	451,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CV	482.903	4.606.520	451,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CW	482.886	4.606.550	450,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CX	483.034	4.606.580	437,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CY	477.871	4.608.268	834,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CZ	477.864	4.608.092	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DA	482.864	4.606.509	459,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DB	477.011	4.607.804	747,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DC	476.833	4.607.718	742,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DD	476.814	4.607.665	737,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DE	476.979	4.608.154	768,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DF	477.186	4.608.318	802,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DG	477.399	4.608.504	827,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DH	477.720	4.608.793	863,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DI	478.699	4.608.425	802,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DJ	478.791	4.608.400	793,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DK	479.766	4.608.162	725,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DL	476.995	4.607.861	751,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DM	477.403	4.606.639	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DN	477.381	4.606.653	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DO	477.380	4.608.467	820,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DP	480.887	4.605.549	529,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DQ	477.208	4.606.304	710,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DR	478.659	4.608.069	802,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DS	479.871	4.605.714	688,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DT	476.912	4.607.378	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DU	477.879	4.607.828	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DV	477.299	4.606.311	715,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0

### Risultati dei calcoli

Recettore d'ombra

Ombra, caso peggiore

Ombra, valore atteso

n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	Ore d'ombra per anno
	[ore/anno]	[giorni/anno]	[ore/giorno]	[ore/anno]
A	0:00	0	0:00	0:00
B	0:00	0	0:00	0:00
C	15:58	40	0:31	8:20
D	15:41	40	0:30	8:19
E	0:00	0	0:00	0:00
F	19:24	54	0:28	8:14
G	0:00	0	0:00	0:00
H	0:00	0	0:00	0:00
I	0:00	0	0:00	0:00
J	0:00	0	0:00	0:00
K	0:00	0	0:00	0:00
L	0:00	0	0:00	0:00
M	0:00	0	0:00	0:00
N	0:00	0	0:00	0:00
O	49:10	112	0:46	23:30
P	42:10	106	0:39	20:34
Q	88:47	158	1:06	47:49
R	16:35	42	0:31	7:22
S	16:08	41	0:31	8:16

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14/11/2023 14:56/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering\_Progetto

...continua dalla pagina precedente

n.	Ombra, caso peggiore		Ombra, valore atteso	
	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	Ore d'ombra per anno
	[ore/anno]	[giorni/anno]	[ore/giorno]	[ore/anno]
T	12:11	35	0:27	5:36
U	13:09	37	0:28	5:59
V	14:52	39	0:30	7:33
W	15:21	39	0:31	7:50
X	16:27	41	0:32	7:40
Y	0:00	0	0:00	0:00
Z	0:00	0	0:00	0:00
AA	0:00	0	0:00	0:00
AB	0:00	0	0:00	0:00
AC	0:00	0	0:00	0:00
AD	0:00	0	0:00	0:00
AE	0:00	0	0:00	0:00
AF	0:00	0	0:00	0:00
AG	15:55	44	0:28	6:54
AH	0:00	0	0:00	0:00
AI	71:45	145	0:43	36:42
AJ	82:59	160	0:45	42:27
AK	53:06	126	0:39	26:32
AL	29:26	72	0:30	16:10
AM	52:20	75	0:57	27:36
AN	51:42	75	0:57	27:21
AO	87:21	146	0:52	37:50
AP	41:10	67	0:48	22:39
AQ	39:25	64	0:48	21:13
AR	0:00	0	0:00	0:00
AS	0:00	0	0:00	0:00
AT	0:00	0	0:00	0:00
AU	0:00	0	0:00	0:00
AV	0:00	0	0:00	0:00
AW	14:26	42	0:27	6:14
AX	0:00	0	0:00	0:00
AY	0:00	0	0:00	0:00
AZ	24:08	71	0:35	10:24
BA	0:00	0	0:00	0:00
BB	0:00	0	0:00	0:00
BC	0:00	0	0:00	0:00
BD	0:00	0	0:00	0:00
BE	11:11	36	0:23	4:12
BF	27:06	64	0:33	11:29
BG	77:22	93	1:06	42:27
BH	102:11	148	0:58	43:55
BI	11:46	38	0:24	6:41
BJ	0:00	0	0:00	0:00
BK	45:13	96	0:35	24:50
BL	17:53	43	0:32	7:55
BM	0:00	0	0:00	0:00
BN	9:43	25	0:30	3:33
BO	0:00	0	0:00	0:00
BP	0:00	0	0:00	0:00
BQ	51:02	76	0:57	27:03
BR	0:00	0	0:00	0:00
BS	0:00	0	0:00	0:00
BT	0:00	0	0:00	0:00
BU	23:44	51	0:36	10:29
BV	0:00	0	0:00	0:00
BW	0:00	0	0:00	0:00
BX	94:03	155	1:10	50:06
BY	38:21	101	0:35	18:59
BZ	52:08	112	0:49	25:03
CA	45:57	108	0:43	22:10
CB	0:00	0	0:00	0:00
CC	0:00	0	0:00	0:00
CD	0:00	0	0:00	0:00

continua alla pagina successiva...

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## SHADOW - Risultato principale

### Calcolo: ShadowFlickering\_Progetto

...continua dalla pagina precedente

n.	Ombra, caso peggiore		Ombra, valore atteso	
	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	Ore d'ombra per anno
	[ore/anno]	[giorni/anno]	[ore/giorno]	[ore/anno]
CE	63:46	83	1:02	34:29
CF	84:41	99	1:07	47:08
CG	53:37	76	0:58	28:14
CH	79:24	153	0:46	40:50
CI	51:44	121	0:39	25:51
CJ	27:45	70	0:27	15:16
CK	0:00	0	0:00	0:00
CL	0:00	0	0:00	0:00
CM	0:00	0	0:00	0:00
CN	0:00	0	0:00	0:00
CO	0:00	0	0:00	0:00
CP	0:00	0	0:00	0:00
CQ	0:00	0	0:00	0:00
CR	0:00	0	0:00	0:00
CS	0:00	0	0:00	0:00
CT	17:28	43	0:32	7:45
CJ	38:51	64	0:47	21:02
CV	93:52	146	0:54	40:28
CW	90:34	137	0:53	38:47
CX	70:07	139	0:46	30:31
CY	0:00	0	0:00	0:00
CZ	0:00	0	0:00	0:00
DA	100:33	146	0:57	43:10
DB	16:33	42	0:31	7:19
DC	12:35	35	0:28	5:39
DD	12:24	35	0:28	5:50
DE	21:14	58	0:28	8:58
DF	2:04	15	0:10	0:45
DG	0:00	0	0:00	0:00
DH	0:00	0	0:00	0:00
DI	0:00	0	0:00	0:00
DJ	0:00	0	0:00	0:00
DK	0:00	0	0:00	0:00
DL	16:21	42	0:30	7:16
DM	0:00	0	0:00	0:00
DN	0:00	0	0:00	0:00
DO	0:00	0	0:00	0:00
DP	12:06	40	0:24	6:52
DQ	0:00	0	0:00	0:00
DR	0:00	0	0:00	0:00
DS	0:00	0	0:00	0:00
DT	15:38	40	0:30	8:21
DU	40:45	54	0:57	15:45
DV	0:00	0	0:00	0:00

Ombreggiamento totale sui recettori d'ombra causato da ciascuna WTG

n.	Nome	Caso peggiore [ore/anno]	Atteso [ore/anno]
1	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)	301:06	141:16
2	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)	177:44	90:53
3	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)	63:51	33:57
4	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)	19:42	11:14
5	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)	342:37	165:46

I tempi totali possono differire tra le tabelle per turbina e quelle per recettore, in quanto ciascuna WTG può dare ombreggiamento su 2 o più recettori contemporaneamente, e/o un recettore può subire ombreggiamento da 2 o più WTGs contemporaneamente.

Total time as expected values at given receptor in case of cumulative (but not concurrent) flicker within a day from several turbines may deviate marginally from the individual flicker caused by each turbines separately

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14/11/2023 14:56/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: A - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:52 18:23	06:03 19:56	05:31 20:27	05:28 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:38 17:50	05:51 18:24	06:02 19:57	05:30 20:28	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:49	05:50 18:25	06:01 19:58	05:29 20:29	05:26 20:40	05:54 20:21	06:25 19:38	06:57 18:55	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: B - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:36 17:49	05:50 18:24	06:01 19:57	05:30 20:27	05:28 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:36 17:50	05:50 18:25	06:01 19:58	05:30 20:28	05:28 20:40	05:53 20:21	06:24 19:38	06:56 18:59	06:30 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)







Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



**SHADOW - Calendario**

Calcolo: ShadowFlickering Progetto Recettore d'ombra: E - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:32 19:30	06:40 20:03	05:55 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:44 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: F - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns (months) and rows for each day of the year, showing start and end times of shadow flickering. Includes summary rows for potential hours, probability, and effective hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



**SHADOW - Calendario**

Calcolo: ShadowFlickering Progetto Recettore d'ombra: G - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
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23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
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30	07:17 17:14	06:35 19:24	06:50 19:57	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:31 20:28	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	06:31 16:59	07:28 16:40
Ore potenziali eliofania Totale, caso peggiore	296	296	369	399	450	454	461	429	375	345	297	286
Probabilità di eliofania												
Tempo di operatività rid. Dir. del vento rid. Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
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+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:56/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: H - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (8)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
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12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 19:23	06:51 19:56	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:37 19:24	06:50 19:57	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	06:31 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: I - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (9)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: J - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (10)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: K - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (11)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:32
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28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 19:23	06:51 19:56	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:35 19:24	06:50 19:57	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:34 19:25	06:48 19:55	06:00 20:28	05:30 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:57 18:59	06:31 16:59	07:08 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il: 14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: L - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (12)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns (months) and 31 rows (days). Each cell contains two time values (hh:mm) separated by a vertical bar. Summary row at the bottom: Ore potenziali eliofania, Totale, caso peggiore, Probabilità di eliofania, Tempo di operatività rid., Dir. del vento rid., Totale ridotto, Totale effettivo.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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Schweizer Straße 3a
DE-01069 Dresden
+49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il: 14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: M - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (13)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns for months (Gennaio to Dicembre) and 31 rows of time slots (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofania', 'Totale, caso peggiore', and 'Probabilità di eliofania'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: O - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (15)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	07:35 (2) 06:38	06:57 (2) 06:46	06:00	05:30
2	07:29 16:42	07:14 17:17	07:34 (2) 06:36	06:57 (2) 06:45	05:58 05:30	20:29 05:30
3	07:29 16:43	07:12 17:19	07:33 (2) 06:35	06:59 (2) 06:43	20:00 05:57	20:29 05:29
4	07:29 16:44	07:11 17:20	07:32 (2) 06:33	07:00 (2) 06:41	20:01 05:56	20:30 05:29
5	07:29 16:45	07:10 17:21	07:30 (2) 06:32	07:02 (2) 06:40	20:02 05:54	20:31 05:28
6	07:29 16:46	07:09 17:22	07:29 (2) 06:30	07:03 (2) 06:38	20:03 05:53	20:32 05:28
7	07:29 16:47	07:08 17:23	07:28 (2) 06:28	07:05 (2) 06:36	20:04 05:52	20:32 05:28
8	07:28 16:48	07:07 17:25	07:27 (2) 06:27	07:09 (2) 06:35	20:05 05:51	20:33 05:28
9	07:28 16:49	07:06 17:26	07:26 (2) 06:25	07:16 (2) 06:33	20:06 05:50	20:33 05:27
10	07:28 16:50	07:05 17:28	07:24 (2) 06:23	07:20 (2) 06:31	20:07 05:48	20:34 05:27
11	07:28 16:51	07:03 17:29	07:23 (2) 06:22	06:30 06:30	20:08 05:47	20:35 05:27
12	07:28 16:52	07:02 17:30	07:22 (2) 06:20	06:28 06:28	20:09 05:46	20:35 05:27
13	07:27 16:53	07:01 17:31	07:21 (2) 06:18	06:26 06:26	7 18:58 (1) 20:10	20:36 05:27
14	07:27 16:54	07:00 17:33	07:19 (2) 06:17	06:25 06:25	14 19:01 (1) 20:11	20:36 05:27
15	07:26 16:55	06:58 17:34	07:18 (2) 06:15	06:23 06:23	18 18:45 (1) 20:12	20:37 05:27
16	07:26 16:56	06:57 17:35	07:16 (2) 06:13	06:22 06:22	21 19:04 (1) 20:13	20:37 05:27
17	07:26 16:58	06:56 17:36	07:15 (2) 06:12	06:20 06:20	23 18:41 (1) 05:41	20:38 05:27
18	07:25 16:59	06:54 17:38	07:14 (2) 06:10	06:19 06:19	24 19:05 (1) 20:15	20:38 05:27
19	07:25 17:00	06:53 17:39	07:12 (2) 06:08	06:17 06:17	25 18:40 (1) 05:39	20:39 05:27
20	07:24 17:01	06:51 17:40	07:11 (2) 06:07	06:15 06:15	26 19:06 (1) 20:17	20:39 05:27
21	07:23 17:02	06:50 17:41	07:09 (2) 06:05	06:14 06:14	26 18:39 (1) 05:38	20:39 05:27
22	07:23 17:04	06:48 17:42	07:08 (2) 06:03	06:12 06:12	26 19:05 (1) 20:19	20:39 05:27
23	07:22 17:05	06:47 17:44	07:07 (2) 06:02	06:11 06:11	27 18:38 (1) 05:37	20:39 05:28
24	07:21 17:06	06:45 17:45	07:05 (2) 06:00	06:09 06:09	26 19:05 (1) 20:21	20:39 05:28
25	07:21 17:07	06:44 17:46	07:03 (2) 05:58	06:08 06:08	25 18:39 (1) 05:34	20:40 05:28
26	07:20 17:09	06:42 17:47	07:02 (2) 05:56	06:07 06:07	24 19:03 (1) 20:23	20:40 05:28
27	07:19 17:10	06:41 17:49	07:00 (2) 05:55	06:05 06:05	23 18:40 (1) 05:33	20:40 05:29
28	07:18 17:11	06:39 17:50	06:59 (2) 05:53	06:04 06:04	21 19:01 (1) 20:25	20:40 05:29
29	07:17 17:12		07:44 (2) 18:21	19:55 19:55	18 19:00 (1) 20:25	20:40 05:30
30	07:16 17:14			06:02 19:56	16 18:43 (1) 20:26	05:30 20:40
31	07:15 17:15			06:01 19:57	11 18:45 (1) 20:27	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		779	284	401		
Probabilità di eliofania		0,46	0,44	0,48		
Tempo di operatività rid.		1,00	1,00	1,00		
Dir. del vento rid.		1,00	1,00	1,00		
Totale ridotto		0,46	0,44	0,48		
Totale effettivo		356	125	192		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Schweizer Straße 3a  
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 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: O - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (15)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30	05:55	06:26	06:57	06:32	06:54 (2)	07:08	
	20:40	20:20	19:36	18:45	16:57	22 07:16 (2)	16:32	
2	05:31	05:56	06:27	06:58	06:33	06:55 (2)	07:09	
	20:40	20:19	19:35	18:43	16:56	20 07:15 (2)	16:32	
3	05:31	05:57	06:28	06:59	06:35	06:57 (2)	07:10	
	20:39	20:18	19:33	18:42	16:55	18 07:15 (2)	16:32	
4	05:32	05:58	06:29	07:00	06:36	06:58 (2)	07:11	
	20:39	20:17	19:31	18:40	16:54	16 07:14 (2)	16:32	
5	05:33	05:59	06:31	07:01	07:48 (2)	06:37	06:59 (2)	07:12
	20:39	20:16	19:30	18:38	14 08:02 (2)	16:53	13 07:12 (2)	16:31
6	05:33	06:00	06:32	07:03	07:44 (2)	06:38	07:01 (2)	07:13
	20:39	20:14	19:28	18:37	22 08:06 (2)	16:51	11 07:12 (2)	16:31
7	05:34	06:01	06:33	07:04	07:40 (2)	06:40	07:02 (2)	07:14
	20:38	20:13	19:26	18:35	29 08:09 (2)	16:50	9 07:11 (2)	16:31
8	05:34	06:02	06:34	07:05	07:38 (2)	06:41	07:03 (2)	07:15
	20:38	20:12	19:25	18:33	32 08:10 (2)	16:49	6 07:09 (2)	16:31
9	05:35	06:03	06:35	07:06	07:35 (2)	06:42	07:04 (2)	07:16
	20:38	20:11	19:23	18:32	37 08:12 (2)	16:48	3 07:07 (2)	16:31
10	05:36	06:04	06:36	07:07	07:33 (2)	06:43		07:17
	20:37	20:09	19:21	18:30	40 08:13 (2)	16:47		16:31
11	05:37	06:05	06:37	07:08	07:32 (2)	06:44		07:17
	20:37	20:08	19:19	18:28	42 08:14 (2)	16:46		16:31
12	05:37	06:06	18:56 (1)	06:38	07:09	07:31 (2)	06:46	07:18
	20:36	20:07	6 19:02 (1)	19:18	18:27	45 08:16 (2)	16:45	16:31
13	05:38	06:07	18:53 (1)	06:39	07:10	07:31 (2)	06:47	07:19
	20:36	20:05	12 19:05 (1)	19:16	18:25	46 08:17 (2)	16:44	16:31
14	05:39	06:08	18:51 (1)	06:40	07:11	07:32 (2)	06:48	07:20
	20:35	20:04	16 19:07 (1)	19:14	18:23	45 08:17 (2)	16:43	16:32
15	05:40	06:09	18:49 (1)	06:41	07:12	07:33 (2)	06:49	07:21
	20:35	20:03	19 19:08 (1)	19:13	18:22	45 08:18 (2)	16:42	16:32
16	05:40	06:10	18:48 (1)	06:42	07:14	07:34 (2)	06:51	07:21
	20:34	20:01	21 19:09 (1)	19:11	18:20	44 08:18 (2)	16:41	16:32
17	05:41	06:11	18:47 (1)	06:43	07:15	07:35 (2)	06:52	07:22
	20:34	20:00	23 19:10 (1)	19:09	18:19	43 08:18 (2)	16:41	16:32
18	05:42	06:12	18:46 (1)	06:44	07:16	07:37 (2)	06:53	07:23
	20:33	19:58	24 19:10 (1)	19:07	18:17	42 08:19 (2)	16:40	16:33
19	05:43	06:13	18:45 (1)	06:45	07:17	07:38 (2)	06:54	07:23
	20:32	19:57	25 19:10 (1)	19:06	18:16	41 08:19 (2)	16:39	16:33
20	05:44	06:14	18:44 (1)	06:46	07:18	07:39 (2)	06:55	07:24
	20:31	19:55	26 19:10 (1)	19:04	18:14	40 08:19 (2)	16:38	16:33
21	05:45	06:15	18:44 (1)	06:47	07:19	07:40 (2)	06:57	07:24
	20:31	19:54	26 19:10 (1)	19:02	18:13	39 08:19 (2)	16:37	16:34
22	05:45	06:16	18:44 (1)	06:48	07:20	07:41 (2)	06:58	07:25
	20:30	19:52	26 19:10 (1)	19:00	18:11	38 08:19 (2)	16:37	16:34
23	05:46	06:17	18:43 (1)	06:49	07:22	07:43 (2)	06:59	07:25
	20:29	19:51	27 19:10 (1)	18:59	18:10	36 08:19 (2)	16:36	16:35
24	05:47	06:18	18:43 (1)	06:50	07:23	07:44 (2)	07:00	07:26
	20:28	19:49	26 19:09 (1)	18:57	18:08	35 08:19 (2)	16:36	16:35
25	05:48	06:19	18:43 (1)	06:51	06:24	06:45 (2)	07:01	07:26
	20:27	19:48	26 19:09 (1)	18:55	17:07	34 07:19 (2)	16:35	16:36
26	05:49	06:20	18:44 (1)	06:52	06:25	06:46 (2)	07:02	07:27
	20:26	19:46	24 19:08 (1)	18:54	17:05	32 07:18 (2)	16:35	16:37
27	05:50	06:21	18:44 (1)	06:53	06:26	06:48 (2)	07:03	07:27
	20:25	19:44	23 19:07 (1)	18:52	17:04	31 07:19 (2)	16:34	16:37
28	05:51	06:22	18:45 (1)	06:54	06:27	06:49 (2)	07:05	07:27
	20:24	19:43	21 19:06 (1)	18:50	17:03	29 07:18 (2)	16:34	16:38
29	05:52	06:23	18:46 (1)	06:55	06:29	06:50 (2)	07:06	07:28
	20:23	19:41	18 19:04 (1)	18:48	17:01	27 07:17 (2)	16:33	16:39
30	05:53	06:24	18:47 (1)	06:56	06:30	06:52 (2)	07:07	07:28
	20:22	19:40	14 19:01 (1)	18:47	17:00	26 07:18 (2)	16:33	16:39
31	05:54	06:25	18:50 (1)		06:31	06:53 (2)		07:28
	20:21	19:38	7 18:57 (1)		16:59	24 07:17 (2)		16:40
Ore potenziali eliofania	461	429		375	345		297	286
Totale, caso peggiore			410		958		118	
Probabilità di eliofania			0,67		0,44		0,40	
Tempo di operatività rid.			1,00		1,00		1,00	
Dir. del vento rid.			1,00		1,00		1,00	
Totale ridotto			0,67		0,44		0,40	
Totale effettivo			273		417		48	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: P - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (16)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (2) 07:35 (2)	06:46 19:26	06:00 19:58
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (2) 07:34 (2)	06:45 19:27	05:58 20:00
3	07:29 16:43	07:12 17:19	06:35 17:53	06:54 (2) 07:33 (2)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52 (2) 07:31 (2)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:32 17:56	06:53 (2) 07:30 (2)	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:22	07:29 (2) 06:30 17:57	06:54 (2) 07:28 (2)	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	07:28 (2) 06:28 17:58	06:56 (2) 07:25 (2)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	07:27 (2) 06:27 17:59	06:59 (2) 07:23 (2)	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	07:26 (2) 06:25 18:00	07:01 (2) 07:19 (2)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	07:24 (2) 06:23 18:01	07:09 (2) 07:11 (2)	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	07:23 (2) 06:22 18:03	06:30 07:36 (2)	06:30 19:37	05:47 20:09
12	07:28 16:52	07:02 17:30	07:22 (2) 06:20 18:04	06:28 07:37 (2)	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	07:21 (2) 06:18 18:05	06:26 07:38 (2)	06:26 19:39	05:45 20:11
14	07:27 16:54	07:00 17:33	07:19 (2) 06:17 18:06	06:25 07:38 (2)	06:25 19:40	05:44 20:12
15	07:26 16:55	06:58 17:34	07:18 (2) 06:15 18:07	06:23 07:39 (2)	06:23 19:41	05:43 20:13
16	07:26 16:56	06:57 17:35	07:16 (2) 06:13 18:08	06:22 07:39 (2)	06:22 19:42	05:42 20:14
17	07:26 16:58	06:56 17:36	07:15 (2) 06:12 18:09	06:20 07:39 (2)	06:20 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	07:14 (2) 06:10 18:10	06:19 07:40 (2)	06:19 19:44	05:40 20:16
19	07:25 17:00	06:53 17:39	07:12 (2) 06:08 18:12	06:17 07:39 (2)	06:17 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	07:11 (2) 06:07 18:13	06:15 07:40 (2)	06:15 19:47	05:38 20:18
21	07:23 17:02	06:50 17:41	07:09 (2) 06:05 18:14	06:14 07:39 (2)	06:14 19:48	05:38 20:19
22	07:23 17:04	06:48 17:43	07:08 (2) 06:03 18:15	06:12 07:40 (2)	06:12 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	07:06 (2) 06:02 18:16	06:11 07:39 (2)	06:11 19:50	05:36 20:21
24	07:21 17:06	06:45 17:45	07:05 (2) 06:00 18:17	06:09 07:39 (2)	06:09 19:51	05:35 20:22
25	07:21 17:07	06:44 17:46	07:03 (2) 05:58 18:18	06:08 07:38 (2)	06:08 19:52	05:34 20:23
26	07:20 17:09	06:42 17:47	07:02 (2) 05:56 18:19	06:07 07:38 (2)	06:07 19:53	05:34 20:24
27	07:19 17:10	06:41 17:49	07:00 (2) 05:55 18:20	06:05 07:37 (2)	06:05 19:54	05:33 20:25
28	07:18 17:11	06:39 17:50	06:59 (2) 05:53 18:21	06:04 07:37 (2)	06:04 19:55	05:32 20:26
29	07:17 17:12		06:51 19:23	06:02 19:56	06:02 19:56	05:32 20:26
30	07:16 17:14		06:50 19:24	06:01 19:57	06:01 19:57	05:31 20:27
31	07:15 17:15		06:48 19:25			05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		518	299	411	24	
Probabilità di eliofania		0,46	0,44	0,48	0,47	
Tempo di operatività rid.		1,00	1,00	1,00	1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00	
Totale ridotto		0,46	0,44	0,48	0,47	
Totale effettivo		236	132	197	11	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: P - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (16)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	06:26	06:57	06:32	06:54 (2)
	20:40	20:20	19:36	18:45	16:57	10 07:04 (2)
2	05:31	05:56	06:27	06:58	06:33	06:55 (2)
	20:40	20:19	19:35	18:43	16:56	8 07:03 (2)
3	05:31	05:57	06:28	06:59	06:35	06:57 (2)
	20:39	20:18	19:33	18:42	16:55	6 07:03 (2)
4	05:32	05:58	06:29	07:00	07:41 (2)	06:36
	20:39	20:17	19:31	18:40	14 07:55 (2)	16:54
5	05:33	05:59	06:31	07:02	07:37 (2)	06:37
	20:39	20:16	19:30	18:38	21 07:58 (2)	16:53
6	05:33	06:00	06:32	07:03	07:33 (2)	06:38
	20:39	20:14	19:28	18:37	28 08:01 (2)	16:51
7	05:34	06:01	06:33	07:04	07:31 (2)	06:40
	20:38	20:13	19:26	18:35	32 08:03 (2)	16:50
8	05:34	06:02	06:34	07:05	07:29 (2)	06:41
	20:38	20:12	19:25	18:33	35 08:04 (2)	16:49
9	05:35	06:03	06:35	07:06	07:27 (2)	06:42
	20:38	20:11	19:23	18:32	38 08:05 (2)	16:48
10	05:36	06:04	18:59 (1)	06:36	07:07	07:27 (2)
	20:37	20:09	4 19:03 (1)	19:21	18:30	39 08:06 (2)
11	05:37	06:05	18:55 (1)	06:37	07:08	07:28 (2)
	20:37	20:08	12 19:07 (1)	19:19	18:28	39 08:07 (2)
12	05:37	06:06	18:53 (1)	06:38	07:09	07:30 (2)
	20:36	20:07	16 19:09 (1)	19:18	18:27	39 08:09 (2)
13	05:38	06:07	18:51 (1)	06:39	07:10	07:31 (2)
	20:36	20:05	19 19:10 (1)	19:16	18:25	38 08:09 (2)
14	05:39	06:08	18:50 (1)	06:40	07:11	07:32 (2)
	20:35	20:04	21 19:11 (1)	19:14	18:23	37 08:09 (2)
15	05:40	06:09	18:49 (1)	06:41	07:12	07:33 (2)
	20:35	20:03	23 19:12 (1)	19:13	18:22	37 08:10 (2)
16	05:40	06:10	18:48 (1)	06:42	07:14	07:34 (2)
	20:34	20:01	24 19:12 (1)	19:11	18:20	36 08:10 (2)
17	05:41	06:11	18:47 (1)	06:43	07:15	07:35 (2)
	20:34	20:00	26 19:13 (1)	19:09	18:19	35 08:10 (2)
18	05:42	06:12	18:46 (1)	06:44	07:16	07:37 (2)
	20:33	19:58	27 19:13 (1)	19:07	18:17	34 08:11 (2)
19	05:43	06:13	18:46 (1)	06:45	07:17	07:38 (2)
	20:32	19:57	27 19:13 (1)	19:06	18:16	32 08:10 (2)
20	05:44	06:14	18:45 (1)	06:46	07:18	07:39 (2)
	20:31	19:55	28 19:13 (1)	19:04	18:14	31 08:10 (2)
21	05:45	06:15	18:45 (1)	06:47	07:19	07:40 (2)
	20:31	19:54	28 19:13 (1)	19:02	18:13	30 08:10 (2)
22	05:45	06:16	18:45 (1)	06:48	07:20	07:41 (2)
	20:30	19:52	27 19:12 (1)	19:00	18:11	29 08:10 (2)
23	05:46	06:17	18:45 (1)	06:49	07:22	07:43 (2)
	20:29	19:51	27 19:12 (1)	18:59	18:10	27 08:10 (2)
24	05:47	06:18	18:45 (1)	06:50	07:23	07:44 (2)
	20:28	19:49	26 19:11 (1)	18:57	18:08	26 08:10 (2)
25	05:48	06:19	18:45 (1)	06:51	06:24	06:45 (2)
	20:27	19:48	25 19:10 (1)	18:55	17:07	24 07:09 (2)
26	05:49	06:20	18:46 (1)	06:52	06:25	06:46 (2)
	20:26	19:46	23 19:09 (1)	18:54	17:05	22 07:08 (2)
27	05:50	06:21	18:47 (1)	06:53	06:26	06:48 (2)
	20:25	19:44	21 19:08 (1)	18:52	17:04	20 07:08 (2)
28	05:51	06:22	18:48 (1)	06:54	06:27	06:49 (2)
	20:24	19:43	18 19:06 (1)	18:50	17:03	19 07:08 (2)
29	05:52	06:23	18:49 (1)	06:55	06:29	06:50 (2)
	20:23	19:41	15 19:04 (1)	18:48	17:01	17 07:07 (2)
30	05:53	06:24	18:51 (1)	06:56	06:30	06:52 (2)
	20:22	19:40	8 18:59 (1)	18:47	17:00	15 07:07 (2)
31	05:54	06:25			06:31	06:53 (2)
	20:21	19:38			16:59	12 07:05 (2)
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		445		806	27	
Probabilità di eliofania		0,67		0,44	0,40	
Tempo di operatività rid.		1,00		1,00	1,00	
Dir. del vento rid.		1,00		1,00	1,00	
Totale ridotto		0,67		0,44	0,40	
Totale effettivo		297		351	11	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: Q - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (17)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	07:05 (2) 08:00 (2)	06:00 19:05 (1)
2	07:29 16:42	07:13 17:17	06:36 17:52	06:45 19:27	07:03 (2) 07:59 (2)	05:58 19:04 (1)
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	07:01 (2) 07:59 (2)	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52 (3) 06:54 (3)	06:41 19:29	05:56 19:01 (1)
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (3) 06:55 (3)	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:22	06:30 17:57	06:49 (3) 06:55 (3)	06:38 19:31	05:53 20:04
7	07:28 16:47	07:08 17:24	06:28 17:58	06:47 (3) 06:55 (3)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46 (3) 06:56 (3)	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	06:25 18:00	06:44 (3) 06:55 (3)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	06:23 18:01	06:42 (3) 06:55 (3)	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	06:22 18:03	06:41 (3) 06:55 (3)	06:30 19:37	05:47 20:09
12	07:28 16:52	07:02 17:30	06:20 18:04	06:39 (3) 06:54 (3)	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	06:18 18:05	06:37 (2) 06:53 (3)	06:26 19:39	05:45 20:11
14	07:27 16:54	07:00 17:33	06:17 18:06	06:36 (2) 06:52 (3)	06:25 19:40	05:44 20:12
15	07:26 16:55	06:58 17:34	06:15 18:07	06:34 (2) 06:51 (3)	06:23 19:41	05:43 20:13
16	07:26 16:56	06:57 17:35	06:13 18:08	06:32 (2) 06:51 (2)	06:22 19:42	05:42 20:14
17	07:26 16:58	06:56 17:36	06:12 18:09	06:30 (2) 06:52 (2)	06:20 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	06:10 18:10	06:29 (2) 06:54 (2)	06:19 19:44	05:40 20:16
19	07:25 17:00	06:53 17:39	06:08 18:12	06:27 (2) 06:55 (2)	06:17 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	06:07 18:13	06:25 (2) 06:56 (2)	06:15 19:47	05:38 20:18
21	07:23 17:02	06:50 17:41	06:05 18:14	06:24 (2) 06:58 (2)	06:14 19:48	05:38 20:19
22	07:23 17:04	06:48 17:42	06:03 18:15	06:22 (2) 06:58 (2)	06:12 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	06:02 18:16	06:20 (2) 06:58 (2)	06:11 19:50	05:36 20:21
24	07:21 17:06	06:45 17:45	06:00 18:17	06:18 (2) 06:59 (2)	06:09 19:51	05:35 20:22
25	07:21 17:07	06:44 17:46	05:58 18:18	06:17 (2) 07:00 (2)	06:08 19:52	05:34 20:23
26	07:20 17:09	06:42 17:47	05:56 18:19	06:15 (2) 07:00 (2)	06:07 19:53	05:34 20:24
27	07:19 17:10	06:41 17:49	05:55 18:20	06:13 (2) 07:00 (2)	06:05 19:54	05:33 20:25
28	07:18 17:11	06:39 17:50	05:53 18:21	06:12 (2) 07:00 (2)	06:04 19:55	05:32 20:26
29	07:17 17:12		06:51 19:23	07:10 (2) 08:00 (2)	06:02 19:56	05:32 20:26
30	07:16 17:14		06:50 19:24	07:08 (2) 08:00 (2)	06:01 19:57	05:31 20:27
31	07:15 17:15		06:48 19:25	07:07 (2) 08:00 (2)		05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore			744	1491	415	
Probabilità di eliofania			0,44	0,48	0,47	
Tempo di operatività rid.			1,00	1,00	1,00	
Dir. del vento rid.			1,00	1,00	1,00	
Totale ridotto			0,44	0,48	0,47	
Totale effettivo			327	713	193	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

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Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: Q - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (17)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	19:11 (1) 06:26	06:47 (2) 06:57	07:17 (2) 06:32	07:08
	20:40	20:20	23 19:34 (1) 19:36	66 07:53 (2) 18:45	15 07:32 (3) 16:57	16:32
2	05:31	05:56	19:10 (1) 06:27	06:48 (2) 06:58	07:19 (3) 06:33	07:09
	20:40	20:19	24 19:34 (1) 19:35	65 07:53 (2) 18:43	14 07:33 (3) 16:56	16:32
3	05:31	05:57	19:10 (1) 06:28	06:49 (2) 06:59	07:20 (3) 06:35	07:10
	20:39	20:18	25 19:35 (1) 19:33	64 07:53 (2) 18:42	13 07:33 (3) 16:55	16:32
4	05:32	05:58	19:10 (1) 06:29	06:50 (2) 07:00	07:21 (3) 06:36	07:11
	20:39	20:17	25 19:35 (1) 19:31	64 07:54 (2) 18:40	12 07:33 (3) 16:54	16:32
5	05:33	05:59	19:10 (1) 06:31	06:51 (2) 07:01	07:22 (3) 06:37	07:12
	20:39	20:16	24 19:34 (1) 19:30	63 07:54 (2) 18:38	10 07:32 (3) 16:53	16:31
6	05:33	06:00	19:10 (1) 06:32	06:52 (2) 07:03	07:23 (3) 06:38	07:13
	20:39	20:14	24 19:34 (1) 19:28	62 07:54 (2) 18:37	9 07:32 (3) 16:51	16:31
7	05:34	06:01	19:10 (1) 06:33	06:53 (2) 07:04	07:24 (3) 06:40	07:14
	20:38	20:13	24 19:34 (1) 19:26	60 07:53 (2) 18:35	7 07:31 (3) 16:50	16:31
8	05:34	06:02	19:11 (1) 06:34	06:54 (2) 07:05	07:25 (3) 06:41	07:15
	20:38	20:12	22 19:33 (1) 19:25	59 07:53 (2) 18:33	5 07:30 (3) 16:49	16:31
9	05:35	06:03	19:11 (1) 06:35	06:55 (2) 07:06	07:26 (3) 06:42	07:16
	20:38	20:11	21 19:32 (1) 19:23	58 07:53 (2) 18:32	3 07:29 (3) 16:48	16:31
10	05:36	06:04	19:12 (1) 06:36	06:56 (2) 07:07	07:27 (3) 06:43	07:17
	20:37	20:09	20 19:32 (1) 19:21	57 07:53 (2) 18:30	1 07:28 (3) 16:47	16:31
11	05:37	06:05	19:13 (1) 06:37	06:57 (2) 07:08		06:44 07:17
	20:37	20:08	17 19:30 (1) 19:19	55 07:52 (2) 18:28		16:46 16:31
12	05:37	06:06	19:14 (1) 06:38	06:58 (2) 07:09		06:46 07:18
	20:36	20:07	15 19:29 (1) 19:18	54 07:52 (2) 18:27		16:45 16:31
13	05:38	06:07	19:16 (1) 06:39	06:59 (2) 07:10		06:47 07:19
	20:36	20:05	10 19:26 (1) 19:16	52 07:51 (2) 18:25		16:44 16:31
14	05:39	06:08		06:40	07:00 (2) 07:11	06:48 07:20
	20:35	20:04		19:14	50 07:50 (2) 18:23	16:43 16:32
15	05:40	06:09	07:16 (2) 06:41	07:01 (2) 07:12	06:49	07:21
	20:35	20:03	16 07:32 (2) 19:13	49 07:50 (2) 18:22	16:42	16:32
16	05:40	06:10	07:12 (2) 06:42	07:02 (2) 07:14	06:51	07:21
	20:34	20:01	24 07:36 (2) 19:11	47 07:49 (2) 18:20	16:41	16:32
17	05:41	06:11	07:09 (2) 06:43	07:03 (2) 07:15	06:52	07:22
	20:34	20:00	30 07:39 (2) 19:09	45 07:48 (2) 18:19	16:41	16:32
18	05:42	06:12	07:06 (2) 06:44	07:04 (2) 07:16	06:53	07:23
	20:33	19:58	35 07:41 (2) 19:07	43 07:47 (2) 18:17	16:40	16:33
19	05:43	06:13	07:04 (2) 06:45	07:05 (2) 07:17	06:54	07:23
	20:32	19:57	39 07:43 (2) 19:06	41 07:46 (2) 18:16	16:39	16:33
20	05:44	06:14	07:02 (2) 06:46	07:06 (2) 07:18	06:55	07:24
	20:31	19:55	42 07:44 (2) 19:04	39 07:45 (2) 18:14	16:38	16:33
21	05:45	06:15	07:00 (2) 06:47	07:07 (2) 07:19	06:56	07:24
	20:31	19:54	46 07:46 (2) 19:02	37 07:44 (2) 18:13	16:37	16:34
22	05:45	06:16	06:58 (2) 06:48	07:08 (2) 07:20	06:58	07:25
	20:30	19:52	49 07:47 (2) 19:00	34 07:42 (2) 18:11	16:37	16:34
23	05:46	19:19 (1) 06:17	06:57 (2) 06:49	07:09 (2) 07:22	06:59	07:25
	20:29	8 19:27 (1) 19:51	51 07:48 (2) 18:59	32 07:41 (2) 18:10	16:36	16:35
24	05:47	19:17 (1) 06:18	06:55 (2) 06:50	07:10 (2) 07:23	07:00	07:26
	20:28	12 19:29 (1) 19:49	54 07:49 (2) 18:57	29 07:39 (2) 18:08	16:36	16:35
25	05:48	19:16 (1) 06:19	06:54 (2) 06:51	07:11 (2) 06:24	07:01	07:26
	20:27	14 19:30 (1) 19:48	56 07:50 (2) 18:55	26 07:37 (2) 17:07	16:35	16:36
26	05:49	19:15 (1) 06:20	06:53 (2) 06:52	07:12 (2) 06:25	07:02	07:27
	20:26	17 19:32 (1) 19:46	58 07:51 (2) 18:54	23 07:35 (2) 17:05	16:35	16:37
27	05:50	19:14 (1) 06:21	06:52 (2) 06:53	07:13 (2) 06:26	07:03	07:27
	20:25	18 19:32 (1) 19:44	60 07:52 (2) 18:52	20 07:33 (2) 17:04	16:34	16:37
28	05:51	19:12 (1) 06:22	06:51 (2) 06:54	07:14 (2) 06:27	07:05	07:27
	20:24	20 19:32 (1) 19:43	61 07:52 (2) 18:50	17 07:31 (3) 17:03	16:34	16:38
29	05:52	19:12 (1) 06:23	06:49 (2) 06:55	07:15 (2) 06:29	07:06	07:28
	20:23	21 19:33 (1) 19:41	64 07:53 (2) 18:48	16 07:31 (3) 17:01	16:33	16:39
30	05:53	19:11 (1) 06:24	06:48 (2) 06:56	07:16 (2) 06:30	07:07	07:28
	20:22	23 19:34 (1) 19:40	64 07:52 (2) 18:47	16 07:32 (3) 17:00	16:33	16:39
31	05:54	19:11 (1) 06:25	06:47 (2)	06:31		07:28
	20:21	23 19:34 (1) 19:38	66 07:53 (2)	16:59		16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	156	1089	1343	89		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	95	726	776	39		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: R - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (18)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	07:31 (1) 19:26	06:46 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	07:33 (1) 19:27	06:45 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	07:37 (1) 19:28	06:43 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	07:42 (1) 19:29	06:41 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56		06:40 19:30	05:29 20:03	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57		06:38 19:31	05:28 20:04	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58		06:36 19:33	05:28 20:05	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59		06:35 19:34	05:28 20:06	05:35 20:34	06:02 20:38	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00		06:33 19:35	05:27 20:07	05:38 20:34	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02		06:31 19:36	05:27 20:08	05:36 20:35	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03		06:30 19:37	05:27 20:09	05:37 20:35	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04		06:28 19:38	05:46 20:10	05:27 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:19 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05		06:27 19:39	05:45 20:11	05:27 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:20 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06		06:25 19:40	05:44 20:12	05:27 20:37	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:21 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07		06:23 19:41	05:43 20:13	05:27 20:37	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:22 16:32
16	07:26 16:57	06:57 17:35	06:14 18:08		06:22 19:42	05:42 20:14	05:27 20:38	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:23 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09		06:20 19:43	05:41 20:15	05:27 20:38	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:24 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11		06:19 19:44	05:40 20:16	05:27 20:38	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:25 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12		06:17 19:46	05:39 20:17	05:27 20:39	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:26 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13		06:16 19:47	05:38 20:18	05:27 20:39	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:27 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14		06:14 19:48	05:38 20:19	05:27 20:39	06:15 19:54	06:47 19:02	07:19 18:13	06:56 16:38	07:28 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15		06:13 19:49	05:37 20:20	05:27 20:39	06:16 19:52	06:48 19:01	07:21 18:11	06:57 16:37	07:29 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16		06:11 19:50	05:36 20:21	05:28 20:40	06:17 20:29	06:49 19:51	07:22 18:10	06:59 16:36	07:30 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17		06:10 19:51	05:35 20:22	05:28 20:40	06:18 20:28	06:50 19:49	07:23 18:07	07:00 16:36	07:31 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18		06:08 19:52	05:34 20:23	05:28 20:40	06:19 20:27	06:51 19:48	06:24 18:55	07:01 16:35	07:32 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19		06:07 19:53	05:34 20:24	05:29 20:40	06:20 20:26	06:52 19:46	06:25 18:54	07:02 16:35	07:33 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20		06:05 19:54	05:33 20:25	05:29 20:40	06:21 20:26	06:53 19:45	06:26 18:52	07:04 16:34	07:34 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22		06:04 19:55	05:32 20:26	05:29 20:40	06:22 20:25	06:54 19:43	06:28 18:50	07:05 16:34	07:35 16:38
29	07:17 17:12		06:51 19:23		06:02 19:56	05:32 20:26	05:30 20:40	06:23 20:24	06:55 19:41	06:29 18:49	07:06 16:33	07:36 16:39
30	07:17 17:14		06:50 19:24		06:01 19:58	05:31 20:27	05:30 20:40	06:25 20:23	06:56 19:40	06:30 18:47	07:07 16:33	07:37 16:40
31	07:16 17:15		06:48 19:25			05:31 20:28		06:26 20:21	06:26 19:38	06:31 18:59	07:19 (1) 16:40	07:38 16:40
Ore potenziali eliofanía	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore			457	37							501	
Probabilità di eliofanía			0,46	0,44							0,44	
Tempo di operatività rid.			1,00	1,00							1,00	
Dir. del vento rid.			1,00	1,00							1,00	
Totale ridotto			0,46	0,44							0,44	
Totale effettivo			209	16							218	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: S - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (19)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for days (1 to 31). It contains start and end times for shadow flickering and potential solar hours. Summary statistics are provided at the bottom of the table.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)
(WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: T - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (20)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51		06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36		06:57 18:45
2	07:29 16:42	07:14 17:17	06:36 17:52	07:11 (1) 07:14 (1)	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	26 27	08:02 (1) 08:02 (1)
3	07:29 16:43	07:13 17:19	06:35 17:53	07:05 (1) 07:18 (1)	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	27	07:35 (1) 08:02 (1)
4	07:29 16:44	07:12 17:20	06:33 17:55	07:03 (1) 07:20 (1)	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:32	26	07:35 (1) 08:01 (1)
5	07:29 16:45	07:11 17:21	06:32 17:56	07:01 (1) 07:22 (1)	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	27	07:34 (1) 08:01 (1)
6	07:29 16:46	07:09 17:23	06:30 17:57	07:00 (1) 07:23 (1)	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	25	07:03 08:00 (1)
7	07:29 16:47	07:08 17:24	06:28 17:58	06:58 (1) 07:23 (1)	06:36 19:33	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	24	07:04 07:59 (1)
8	07:29 16:48	07:07 17:25	06:27 17:59	06:58 (1) 07:24 (1)	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	22	07:05 07:57 (1)
9	07:28 16:49	07:06 17:26	06:25 18:00	06:57 (1) 07:24 (1)	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	20	07:06 07:56 (1)
10	07:28 16:50	07:05 17:28	06:24 18:02	06:56 (1) 07:23 (1)	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	15	07:07 07:53 (1)
11	07:28 16:51	07:03 17:29	06:22 18:03	06:57 (1) 07:24 (1)	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	10	07:08 07:51 (1)
12	07:28 16:52	07:02 17:30	06:20 18:04	06:56 (1) 07:23 (1)	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09	06:46 18:27
13	07:27 16:53	07:01 17:31	06:19 18:05	06:56 (1) 07:22 (1)	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10	06:47 18:25
14	07:27 16:54	07:00 17:33	06:17 18:06	06:57 (1) 07:22 (1)	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11	06:48 18:24
15	07:27 16:55	06:58 17:34	06:15 18:07	06:57 (1) 07:20 (1)	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13	06:49 18:22
16	07:26 16:57	06:57 17:35	06:14 18:08	06:58 (1) 07:18 (1)	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14	06:51 18:20
17	07:26 16:58	06:56 17:36	06:12 18:09	07:00 (1) 07:17 (1)	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15	06:52 18:19
18	07:25 16:59	06:54 17:38	06:10 18:11	07:01 (1) 07:14 (1)	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16	06:53 18:17
19	07:25 17:00	06:53 17:39	06:08 18:12	07:05 (1) 07:10 (1)	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17	06:54 18:16
20	07:24 17:01	06:51 17:40	06:07 18:13		06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18	06:55 18:14
21	07:24 17:02	06:50 17:41	06:05 18:14		06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19	06:57 18:13
22	07:23 17:04	06:49 17:43	06:03 18:15		06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21	06:58 18:11
23	07:22 17:05	06:47 17:44	06:02 18:16		06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22	06:59 18:10
24	07:21 17:06	06:46 17:45	06:00 18:17		06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23	07:00 18:08
25	07:21 17:07	06:44 17:46	05:58 18:18		06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	07:24	07:01 18:55
26	07:20 17:09	06:43 17:47	05:57 18:19		06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54	11	07:56 (1) 07:42 (1)
27	07:19 17:10	06:41 17:49	05:55 18:20		06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	16	07:40 (1) 07:59 (1)
28	07:18 17:11	06:40 17:50	05:53 18:22		06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	19	07:38 (1) 08:00 (1)
29	07:17 17:12		06:51 19:23		06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:49	22	08:00 (1) 07:38 (1)
30	07:17 17:14		06:50 19:24		06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:25 19:40	06:56 18:47	24	08:02 (1) 07:37 (1)
31	07:16 17:15		06:48 19:25			05:31 20:28		05:54 20:21	06:26 19:38		25	08:02 (1) 16:59
Ore potenziali eliofania		296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore			365						117	249		
Probabilità di eliofania			0,44						0,58	0,44		
Tempo di operatività rid.			1,00						1,00	1,00		
Dir. del vento rid.			1,00						1,00	1,00		
Totale ridotto			0,44						0,58	0,44		
Totale effettivo			161						68	108		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto Recettore d'ombra: U - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (21)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	9 07:20 (1)	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36		
2	07:29 16:42	07:14 17:17	06:36 17:52	15 07:23 (1)	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	26 08:05 (1)	16:38 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	20 07:25 (1)	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	27 08:05 (1)	16:56 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	22 07:25 (1)	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:32	27 08:05 (1)	16:36 16:32
5	07:29 16:45	07:11 17:21	06:32 17:56	24 07:27 (1)	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	28 08:05 (1)	16:37 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	26 07:27 (1)	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	27 08:04 (1)	16:38 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	27 07:27 (1)	06:36 19:33	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	26 08:03 (1)	16:40 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	28 07:28 (1)	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	25 08:02 (1)	16:41 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	28 07:27 (1)	06:33 19:35	05:50 20:07	05:27 20:34	05:36 20:38	06:03 20:11	06:35 19:23	23 08:01 (1)	16:42 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02	28 07:27 (1)	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	21 07:59 (1)	16:43 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	28 07:27 (1)	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	17 07:58 (1)	16:45 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	27 07:26 (1)	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	13 07:55 (1)	16:46 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	26 07:25 (1)	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	3 07:50 (1)	16:47 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	24 07:24 (1)	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14		16:48 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	22 07:23 (1)	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13		16:49 16:32
16	07:26 16:57	06:57 17:35	06:14 18:08	19 07:21 (1)	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11		16:51 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	15 07:19 (1)	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09		16:52 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	8 07:15 (1)	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08		16:53 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12		06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06		16:54 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13		06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04		16:55 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14		06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02		16:57 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15		06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01		16:58 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16		06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59		16:59 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17		06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57		17:00 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18		06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55		17:01 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19		06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54		17:02 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20		06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	12 07:59 (1)	17:06 16:38
28	07:18 17:11	06:40 17:50	05:53 18:22		06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	17 08:01 (1)	17:04 16:39
29	07:17 17:12	06:38 19:23	05:51 18:23		06:02 19:56	05:32 20:26	05:29 20:40	05:52 20:24	06:23 19:41	06:55 18:49	24 08:05 (1)	17:01 16:40
30	07:17 17:14	06:37 19:24	05:50 18:24		06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:25 19:40	06:56 18:47	25 08:05 (1)	17:00 16:40
31	07:16 17:15	06:36 19:25	05:48 18:25		06:00 19:59	05:30 20:28	05:29 20:41	05:54 20:21	06:26 19:38	06:57 18:46		17:00 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	291	286
Totale, caso peggiore			396						102		291	
Probabilità di eliofania			0,44						0,58		0,44	
Tempo di operatività rid.			1,00						1,00		1,00	
Dir. del vento rid.			1,00						1,00		1,00	
Totale ridotto			0,44						0,58		0,44	
Totale effettivo			174						59		127	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: X - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (24)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51		06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36		
2	07:29 16:42	07:14 17:17	06:36 17:52	11 07:25 (1)	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	32 08:12 (1)	16:58 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	17 07:27 (1)	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	31 08:11 (1)	16:56 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	17 07:29 (1)	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	31 08:11 (1)	16:55 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	24 07:31 (1)	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	30 08:10 (1)	16:54 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	24 07:05 (1)	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	30 08:10 (1)	16:53 16:32
7	07:29 16:47	07:08 17:24	06:28 17:58	29 07:03 (1)	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	29 08:09 (1)	16:52 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	29 07:03 (1)	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	27 08:07 (1)	16:50 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	30 07:33 (1)	06:33 19:34	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	25 08:06 (1)	16:49 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02	30 07:01 (1)	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	22 08:04 (1)	16:48 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	31 07:01 (1)	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	19 08:02 (1)	16:47 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	31 07:01 (1)	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	15 08:01 (1)	16:46 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	31 07:00 (1)	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	6 07:56 (1)	16:45 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	30 07:01 (1)	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14		16:44 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	29 07:01 (1)	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13		16:43 16:32
16	07:26 16:57	06:57 17:35	06:14 18:08	28 07:01 (1)	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11		16:42 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	25 07:03 (1)	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09		16:41 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	23 07:03 (1)	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08		16:40 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	20 07:04 (1)	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06		16:39 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	15 07:21 (1)	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04		16:38 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	8 07:10 (1)	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02		16:37 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15		06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	3 08:00 (1)	16:36 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16		06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	14 08:05 (1)	16:35 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17		06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	19 08:07 (1)	16:34 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18		06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	22 08:08 (1)	16:33 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19		06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54	25 08:09 (1)	16:32 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20		06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	27 08:10 (1)	16:31 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22		06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	28 08:10 (1)	16:30 16:38
29	07:17 17:12		06:51 19:23		06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:49	30 08:11 (1)	16:29 16:39
30	07:17 17:14		06:50 19:24		06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:25 19:40	06:56 18:47	31 08:12 (1)	16:28 16:40
31	07:16 17:15		06:48 19:25			05:31 20:28		05:54 20:21	06:26 19:38			16:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore			491						199		297	
Probabilità di eliofania			0,44						0,58		0,44	
Tempo di operatività rid.			1,00						1,00		1,00	
Dir. del vento rid.			1,00						1,00		1,00	
Totale ridotto			0,44						0,58		0,44	
Totale effettivo			216						115		129	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: Y - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (25)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
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8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:38 17:50	05:50 18:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:38 17:51	05:50 18:25	06:01 19:58	05:31 20:28	05:30 20:40	05:53 20:21	06:24 19:38	06:56 18:38	06:30 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (27)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:03	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:35 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:33 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:52 18:23	06:03 19:56	05:32 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:38 17:50	05:51 18:24	06:02 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:25 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:38 17:51	05:51 18:25	06:02 19:58	05:31 20:28	05:30 20:40	05:53 20:21	06:25 19:38	06:56 18:38	06:30 16:59	07:07 16:40	07:28 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (28)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns (months) and 31 rows (days). Each cell contains two time values (hh:mm) representing sunrise and sunset. Summary rows at the bottom show potential and effective hours of shadow.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (29)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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31	07:16 17:15	06:38 17:51	05:50 18:25	06:01 19:58	05:31 20:28	05:30 20:40	05:53 20:21	06:25 19:38	06:56 18:38	06:30 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (30)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
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31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AE - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (31)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (32)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
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4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
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13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:27 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:52 18:23	06:03 19:56	05:31 20:27	05:28 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:38 17:50	05:51 18:24	06:02 19:57	05:30 20:28	05:27 20:40	05:53 20:23	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:49	05:50 18:25	06:01 19:58	05:31 20:29	05:26 20:40	05:54 20:21	06:25 19:38	06:57 18:40	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)







### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AH - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (34)

#### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	06:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:38 17:52	06:50 18:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:53	06:48 18:25	06:48 19:59	05:31 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:31 18:40	06:31 16:59	07:28 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

#### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: Al - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno			
1	07:28	07:14	07:35 (5)	06:38	06:46	06:00	05:30	19:25 (3)	
	16:41	17:16	19 07:54 (5)	17:51	19:26	19:58	20:29	36 20:01 (3)	
2	07:28	07:13	07:34 (5)	06:36	06:44	05:58	05:30	19:24 (3)	
	16:42	17:17	21 07:55 (5)	17:52	19:27	19:59	20:29	37 20:01 (3)	
3	07:28	07:12	07:33 (5)	06:35	06:43	05:57	05:29	19:25 (3)	
	16:43	17:19	23 07:56 (5)	17:53	19:28	20:01	20:30	37 20:02 (3)	
4	07:29	07:11	07:31 (5)	06:33	06:41	05:56	05:29	19:25 (3)	
	16:44	17:20	25 07:56 (5)	17:54	19:29	20:02	20:31	38 20:03 (3)	
5	07:29	07:10	07:30 (5)	06:31	06:39	05:54	05:28	19:24 (3)	
	16:45	17:21	27 07:57 (5)	17:56	19:30	20:03	20:31	38 20:02 (3)	
6	07:28	07:09	07:29 (5)	06:30	06:38	05:53	05:28	19:24 (3)	
	16:46	17:22	28 07:57 (5)	17:57	19:31	20:04	20:32	39 20:03 (3)	
7	07:28	07:08	07:28 (5)	06:28	06:36	05:52	05:28	19:24 (3)	
	16:47	17:24	30 07:58 (5)	17:58	19:32	20:05	20:33	40 20:04 (3)	
8	07:28	07:07	07:27 (5)	06:27	06:34	05:51	05:27	19:24 (3)	
	16:48	17:25	31 07:58 (5)	17:59	19:33	20:06	20:33	41 20:05 (3)	
9	07:28	07:06	07:26 (5)	06:25	06:33	05:50	05:27	19:23 (3)	
	16:49	17:26	33 07:59 (5)	18:00	19:34	20:07	20:34	41 20:04 (3)	
10	07:28	07:04	07:24 (5)	06:23	06:31	05:48	19:30 (2)	05:27	19:24 (3)
	16:50	17:27	34 07:58 (5)	18:01	19:36	20:08	11 19:41 (2)	20:35	41 20:05 (3)
11	07:28	07:03	07:23 (5)	06:22	06:30	05:47	19:29 (2)	05:27	19:24 (3)
	16:51	17:29	35 07:58 (5)	18:02	19:37	20:09	14 19:43 (2)	20:35	41 20:05 (3)
12	07:27	07:02	07:22 (5)	06:20	06:28	05:46	19:27 (2)	05:27	19:24 (3)
	16:52	17:30	36 07:58 (5)	18:04	19:38	20:10	18 19:45 (2)	20:36	42 20:06 (3)
13	07:27	07:01	07:20 (5)	06:18	06:26	05:45	19:26 (2)	05:27	19:24 (3)
	16:53	17:31	37 07:57 (5)	18:05	19:39	20:11	20 19:46 (2)	20:36	42 20:06 (3)
14	07:27	06:59	07:20 (5)	06:17	06:25	05:44	19:25 (2)	05:27	19:24 (3)
	16:54	17:33	37 07:57 (5)	18:06	19:40	20:12	22 19:47 (2)	20:37	42 20:06 (3)
15	07:26	06:58	07:21 (5)	06:15	06:23	05:43	19:24 (2)	05:27	19:24 (3)
	16:55	17:34	36 07:57 (5)	18:07	19:41	20:13	23 19:47 (2)	20:37	43 20:07 (3)
16	07:26	06:57	07:21 (5)	06:13	06:22	05:42	19:24 (2)	05:27	19:24 (3)
	16:56	17:35	35 07:56 (5)	18:08	19:42	20:14	24 19:48 (2)	20:37	43 20:07 (3)
17	07:25	06:55	07:22 (5)	06:12	06:20	05:41	19:24 (2)	05:27	19:24 (3)
	16:58	17:36	34 07:56 (5)	18:09	19:43	20:15	25 19:49 (2)	20:38	43 20:07 (3)
18	07:25	06:54	07:23 (5)	06:10	06:18	05:40	19:24 (2)	05:27	19:24 (3)
	16:59	17:38	32 07:55 (5)	18:10	19:44	20:16	25 19:49 (2)	20:38	43 20:07 (3)
19	07:24	06:53	07:24 (5)	06:08	06:17	05:39	19:23 (2)	05:27	19:25 (3)
	17:00	17:39	29 07:53 (5)	18:11	19:45	20:17	27 19:50 (2)	20:38	42 20:07 (3)
20	07:24	06:51	07:26 (5)	06:07	06:15	05:38	19:23 (2)	05:27	19:26 (3)
	17:01	17:40	26 07:52 (5)	18:13	19:46	20:18	27 19:50 (2)	20:39	42 20:08 (3)
21	07:23	06:50	07:27 (5)	06:05	06:14	05:37	19:23 (2)	05:27	19:26 (3)
	17:02	17:41	23 07:50 (5)	18:14	19:48	20:19	27 19:50 (2)	20:39	42 20:08 (3)
22	07:23	06:48	07:29 (5)	06:03	06:12	05:37	19:24 (2)	05:27	19:26 (3)
	17:04	17:42	19 07:48 (5)	18:15	19:49	20:20	27 19:51 (2)	20:39	42 20:08 (3)
23	07:22	06:47	07:32 (5)	06:01	06:11	05:36	19:23 (2)	05:27	19:26 (3)
	17:05	17:44	11 07:43 (5)	18:16	19:50	20:21	28 19:51 (3)	20:39	42 20:08 (3)
24	07:21	06:45	06:00	06:09	06:09	05:35	19:23 (2)	05:28	19:26 (3)
	17:06	17:45	18:17	19:51	20:22	29 19:52 (3)	20:39	43 20:09 (3)	
25	07:20	06:44	05:58	06:08	06:08	05:34	19:23 (2)	05:28	19:26 (3)
	17:07	17:46	18:18	19:52	20:23	31 19:54 (3)	20:40	43 20:09 (3)	
26	07:20	07:40 (5)	06:42	05:56	06:06	05:34	19:24 (2)	05:28	19:26 (3)
	17:08	4 07:44 (5)	17:47	18:19	19:53	20:24	31 19:55 (3)	20:40	43 20:09 (3)
27	07:19	07:40 (5)	06:41	05:55	06:05	05:33	19:24 (2)	05:29	19:27 (3)
	17:10	7 07:47 (5)	17:48	18:20	19:54	20:24	32 19:56 (3)	20:40	43 20:10 (3)
28	07:18	07:39 (5)	06:39	05:53	06:04	05:32	19:25 (2)	05:29	19:27 (3)
	17:11	10 07:49 (5)	17:50	18:21	19:55	20:25	33 19:58 (3)	20:40	42 20:09 (3)
29	07:17	07:38 (5)	06:38	06:51	06:02	05:32	19:25 (2)	05:29	19:27 (3)
	17:12	13 07:51 (5)	17:52	19:22	19:56	20:26	33 19:58 (3)	20:40	42 20:09 (3)
30	07:16	07:37 (5)	06:37	06:50	06:01	05:31	19:25 (2)	05:30	19:28 (3)
	17:13	15 07:52 (5)	17:53	19:24	19:57	20:27	34 19:59 (3)	20:40	42 20:10 (3)
31	07:15	07:36 (5)	06:36	06:48	06:59	05:31	19:25 (2)	05:30	19:28 (3)
	17:15	17 07:53 (5)	17:54	19:25	19:58	20:28	35 20:00 (3)	20:40	42 20:10 (3)
Ore potenziali eliofania	296	296	369	399	450		454		
Totale, caso peggiore			661			578		1235	
Probabilità di eliofania	0,44		0,46			0,47		0,54	
Tempo di operatività rid.	1,00		1,00			1,00		1,00	
Dir. del vento rid.	1,00		1,00			1,00		1,00	
Totale ridotto	0,44		0,46			0,47		0,54	
Totale effettivo	29		302			269		667	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (36)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:14 17:16	07:35 (5) 08:03 (5)	06:38 17:51	06:46 19:26	06:00 19:58	19:18 (3) 20:00 (3)
2	07:28 16:42	07:13 17:17	07:34 (5) 08:04 (5)	06:36 17:52	06:44 19:27	05:58 19:59	19:17 (3) 20:00 (3)
3	07:28 16:43	07:12 17:19	07:33 (5) 08:04 (5)	06:35 17:53	06:43 19:28	05:57 20:01	19:18 (3) 20:01 (3)
4	07:29 16:44	07:11 17:20	07:31 (5) 08:04 (5)	06:33 17:54	06:41 19:29	05:56 20:02	19:18 (3) 20:01 (3)
5	07:29 16:45	07:10 17:21	07:30 (5) 08:04 (5)	06:31 17:56	06:39 19:30	05:54 20:03	19:18 (3) 20:01 (3)
6	07:28 16:46	07:09 17:22	07:29 (5) 08:04 (5)	06:30 17:57	06:38 19:31	05:53 20:04	19:18 (3) 20:01 (3)
7	07:28 16:47	07:08 17:24	07:28 (5) 08:04 (5)	06:28 17:58	06:36 19:32	05:52 20:05	19:18 (3) 20:02 (3)
8	07:28 16:48	07:07 17:25	07:27 (5) 08:04 (5)	06:27 17:59	06:34 19:33	05:51 20:06	19:19 (3) 20:02 (3)
9	07:28 16:49	07:06 17:26	07:26 (5) 08:04 (5)	06:25 18:00	06:33 19:34	05:50 20:07	19:18 (3) 20:02 (3)
10	07:28 16:50	07:04 17:27	07:24 (5) 08:03 (5)	06:23 18:01	06:31 19:36	05:48 20:08	19:18 (3) 20:02 (3)
11	07:28 16:51	07:03 17:29	07:25 (5) 08:03 (5)	06:22 18:02	06:30 19:37	05:47 20:09	19:19 (3) 20:02 (3)
12	07:27 16:52	07:02 17:30	07:26 (5) 08:03 (5)	06:20 18:04	06:28 19:38	05:46 20:10	19:19 (3) 20:03 (3)
13	07:27 16:53	07:01 17:31	07:26 (5) 08:02 (5)	06:18 18:05	06:26 19:39	05:45 20:11	19:19 (3) 20:03 (3)
14	07:27 16:54	06:59 17:33	07:27 (5) 08:01 (5)	06:17 18:06	06:25 19:40	05:44 20:12	19:19 (3) 20:03 (3)
15	07:26 16:55	06:58 17:34	07:29 (5) 08:00 (5)	06:15 18:07	06:23 19:41	05:43 20:13	19:19 (3) 20:04 (3)
16	07:26 16:56	06:57 17:35	07:29 (5) 07:58 (5)	06:13 18:08	06:22 19:42	05:42 20:14	19:20 (3) 20:04 (3)
17	07:25 16:57	06:55 17:36	07:31 (5) 07:57 (5)	06:12 18:09	06:20 19:43	05:41 20:15	19:20 (3) 20:04 (3)
18	07:25 16:59	06:54 17:37	07:33 (5) 07:56 (5)	06:10 18:10	06:18 19:44	05:40 20:16	19:20 (3) 20:04 (3)
19	07:24 17:00	07:46 (5) 07:47 (5)	06:53 17:39	07:35 (5) 18:11	06:17 19:45	05:39 20:17	19:20 (3) 20:04 (3)
20	07:24 17:01	07:45 (5) 07:49 (5)	06:51 17:40	07:39 (5) 18:13	06:15 19:46	05:38 20:18	19:21 (3) 20:05 (3)
21	07:23 17:02	07:44 (5) 07:51 (5)	06:50 17:41	07:49 (5) 18:14	06:14 19:48	05:37 20:19	19:21 (3) 20:05 (3)
22	07:23 17:04	07:44 (5) 07:53 (5)	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	19:21 (3) 20:05 (3)
23	07:22 17:05	07:43 (5) 07:55 (5)	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	19:21 (3) 20:05 (3)
24	07:21 17:06	07:42 (5) 07:56 (5)	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	19:22 (3) 20:06 (3)
25	07:20 17:07	07:41 (5) 07:57 (5)	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	19:22 (3) 20:06 (3)
26	07:20 17:08	07:40 (5) 07:58 (5)	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	19:22 (3) 20:06 (3)
27	07:19 17:10	07:40 (5) 08:00 (5)	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	19:23 (3) 20:07 (3)
28	07:18 17:11	07:39 (5) 08:01 (5)	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	19:22 (3) 20:06 (3)
29	07:17 17:12	07:38 (5) 08:01 (5)	06:38 17:51	06:51 19:22	06:02 19:56	05:32 20:26	19:22 (3) 20:06 (3)
30	07:16 17:13	07:37 (5) 08:02 (5)	06:37 17:52	06:50 19:24	06:01 19:57	05:31 20:27	19:23 (3) 20:07 (3)
31	07:15 17:15	07:36 (5) 08:03 (5)	06:36 17:53	06:48 19:25	05:31 20:28	05:30 19:59 (3)	19:23 (3) 20:07 (3)
Ore potenziali eliofania	296	296	369	399	450	454	
Totale, caso peggiore	198	623			760	1312	
Probabilità di eliofania	0,44	0,46			0,47	0,54	
Tempo di operatività rid.	1,00	1,00			1,00	1,00	
Dir. del vento rid.	1,00	1,00			1,00	1,00	
Totale ridotto	0,44	0,46			0,47	0,54	
Totale effettivo	87	284			354	708	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (37)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	07:16 (5) 07:42 (5)	06:46 19:26	06:00 19:58
2	07:28 16:42	07:13 17:17	06:36 17:52	07:17 (5) 07:39 (5)	06:44 19:27	05:58 19:59
3	07:28 16:43	07:12 17:19	06:35 17:53	07:20 (5) 07:37 (5)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	07:24 (5) 07:32 (5)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06	05:27 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:50 20:07	05:27 20:34
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	05:27 20:35
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:37
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38
18	07:25 16:59	06:54 17:38	06:10 18:10	06:18 19:44	05:40 20:16	19:39 (2) 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	05:27 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	19:35 (2) 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	19:33 (2) 20:39
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	19:33 (2) 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	05:27 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	19:31 (2) 20:39
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	19:31 (2) 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	19:31 (2) 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	19:30 (2) 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	19:31 (2) 20:40
29	07:17 17:12		06:51 19:22	06:02 19:56	05:32 20:26	19:30 (2) 20:40
30	07:16 17:13		06:50 19:24	06:01 19:57	05:31 20:27	19:31 (2) 20:40
31	07:15 17:15		06:48 19:25	05:31 20:28	19:30 (2) 19:56 (2)	20:40
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		681	73		289	790
Probabilità di eliofania		0,46	0,44		0,47	0,54
Tempo di operatività rid.		1,00	1,00		1,00	1,00
Dir. del vento rid.		1,00	1,00		1,00	1,00
Totale ridotto		0,46	0,44		0,47	0,54
Totale effettivo		311	32		135	426

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenza autorizzato:

VSB Neue Energien Deutschland GmbH  
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 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AK - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (37)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30	19:36 (2)	05:55	06:26	06:57	06:32	06:54 (5)	07:08
	20:40	27 20:03 (2)	20:20	19:36	18:45	16:57	20 07:14 (5)	16:32
2	05:31	19:37 (2)	05:56	06:27	06:58	06:33	06:55 (5)	07:09
	20:39	26 20:03 (2)	20:19	19:35	18:43	16:56	18 07:13 (5)	16:32
3	05:31	19:36 (2)	05:57	06:28	06:59	06:35	06:57 (5)	07:10
	20:39	27 20:03 (2)	20:18	19:33	18:41	16:55	15 07:12 (5)	16:32
4	05:32	19:37 (2)	05:58	06:29	07:00	06:36	06:58 (5)	07:11
	20:39	27 20:04 (2)	20:17	19:31	18:40	16:54	12 07:10 (5)	16:32
5	05:33	19:37 (2)	05:59	06:30	07:01	06:37	06:59 (5)	07:12
	20:39	26 20:03 (2)	20:16	19:30	18:38	16:52	8 07:07 (5)	16:31
6	05:33	19:37 (2)	06:00	06:31	07:02	06:38	07:00 (5)	07:13
	20:39	27 20:04 (2)	20:14	19:28	18:36	16:51	2 07:02 (5)	16:31
7	05:34	19:38 (2)	06:01	06:32	07:04	06:39		07:14
	20:38	27 20:05 (2)	20:13	19:26	18:35	16:50		16:31
8	05:34	19:37 (2)	06:02	06:33	07:05	06:41		07:15
	20:38	27 20:04 (2)	20:12	19:25	18:33	16:49		16:31
9	05:35	19:38 (2)	06:03	06:34	07:06	06:42		07:16
	20:38	27 20:05 (2)	20:11	19:23	18:31	16:48		16:31
10	05:36	19:38 (2)	06:04	06:36	07:07	07:56 (5)	06:43	07:16
	20:37	27 20:05 (2)	20:09	19:21	18:30	08:09 (5)	16:47	16:31
11	05:36	19:38 (2)	06:05	06:37	07:08	07:52 (5)	06:44	07:17
	20:37	26 20:04 (2)	20:08	19:19	18:28	08:12 (5)	16:46	16:31
12	05:37	19:38 (2)	06:06	06:38	07:09	07:51 (5)	06:46	07:18
	20:36	27 20:05 (2)	20:07	19:18	18:27	08:15 (5)	16:45	16:31
13	05:38	19:39 (2)	06:07	06:39	07:10	07:49 (5)	06:47	07:19
	20:36	26 20:05 (2)	20:05	19:16	18:25	08:16 (5)	16:44	16:31
14	05:39	19:38 (2)	06:08	06:40	07:11	07:47 (5)	06:48	07:20
	20:35	26 20:04 (2)	20:04	19:14	18:23	08:17 (5)	16:43	16:32
15	05:39	19:39 (2)	06:09	06:41	07:12	07:45 (5)	06:49	07:20
	20:35	25 20:04 (2)	20:02	19:12	18:22	08:18 (5)	16:42	16:32
16	05:40	19:40 (2)	06:10	06:42	07:13	07:44 (5)	06:50	07:21
	20:34	24 20:04 (2)	20:01	19:11	18:20	08:18 (5)	16:41	16:32
17	05:41	19:40 (2)	06:11	06:43	07:15	07:43 (5)	06:52	07:22
	20:33	24 20:04 (2)	20:00	19:09	18:19	08:19 (5)	16:40	16:32
18	05:42	19:41 (2)	06:12	06:44	07:16	07:43 (5)	06:53	07:23
	20:33	23 20:04 (2)	19:58	19:07	18:17	08:20 (5)	16:40	16:33
19	05:43	19:41 (2)	06:13	06:45	07:17	07:42 (5)	06:54	07:23
	20:32	22 20:03 (2)	19:57	19:06	18:16	08:20 (5)	16:39	16:33
20	05:44	19:41 (2)	06:14	06:46	07:18	07:41 (5)	06:55	07:24
	20:31	22 20:03 (2)	19:55	19:04	18:14	08:20 (5)	16:38	16:33
21	05:44	19:42 (2)	06:15	06:47	07:19	07:41 (5)	06:56	07:24
	20:31	20 20:02 (2)	19:54	19:02	18:13	08:20 (5)	16:37	16:34
22	05:45	19:43 (2)	06:16	06:48	07:20	07:41 (5)	06:58	07:25
	20:30	19 20:02 (2)	19:52	19:00	18:11	08:20 (5)	16:37	16:34
23	05:46	19:45 (2)	06:17	06:49	07:21	07:43 (5)	06:59	07:25
	20:29	16 20:01 (2)	19:51	18:59	18:10	08:20 (5)	16:36	16:35
24	05:47	19:46 (2)	06:18	06:50	07:23	07:44 (5)	07:00	07:26
	20:28	14 20:00 (2)	19:49	18:57	18:08	08:20 (5)	16:36	16:35
25	05:48	19:48 (2)	06:19	06:51	06:24	06:45 (5)	07:01	07:26
	20:27	10 19:58 (2)	19:47	18:55	17:07	07:19 (5)	16:35	16:36
26	05:49	19:52 (2)	06:20	06:52	06:25	06:46 (5)	07:02	07:27
	20:26	2 19:54 (2)	19:46	18:53	17:05	07:19 (5)	16:34	16:37
27	05:50		06:21	06:53	06:26	06:48 (5)	07:03	07:27
	20:25		19:44	18:52	17:04	07:19 (5)	16:34	16:37
28	05:51		06:22	06:54	06:27	06:49 (5)	07:04	07:27
	20:24		19:43	18:50	17:03	07:18 (5)	16:34	16:38
29	05:52		06:23	06:55	06:29	06:50 (5)	07:06	07:28
	20:23		19:41	18:48	17:01	07:17 (5)	16:33	16:39
30	05:53		06:24	06:56	06:30	06:51 (5)	07:07	07:28
	20:22		19:40	18:47	17:00	07:16 (5)	16:33	16:39
31	05:54		06:25		06:31	06:53 (5)		07:28
	20:21		19:38		16:59	07:16 (5)		16:40
Ore potenziali eliofania	461	429	375	345	297	75	286	
Totale, caso peggiore	594			684		75		
Probabilità di eliofania	0,61			0,44		0,40		
Tempo di operatività rid.	1,00			1,00		1,00		
Dir. del vento rid.	1,00			1,00		1,00		
Totale ridotto	0,61			0,44		0,40		
Totale effettivo	360			298		30		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Redatto il:  
14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (38)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	19:30 (2) 20:40	05:30 20:02 (2)	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	05:58 19:59	05:30 20:29	19:30 (2) 20:39	05:31 20:02 (2)	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	19:30 (2) 20:39	05:31 20:02 (2)	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	19:31 (2) 20:39	05:32 20:03 (2)	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31	19:30 (2) 20:39	05:33 20:02 (2)	05:59 20:16	06:30 19:30	07:01 18:38	06:37 16:52
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	19:31 (2) 20:39	05:33 20:03 (2)	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	19:31 (2) 20:38	05:34 20:04 (2)	06:01 20:13	06:32 19:26	07:04 18:35	06:39 16:50
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06	05:27 20:33	19:32 (2) 20:38	05:34 20:03 (2)	06:02 20:12	06:33 19:25	07:05 18:33	06:41 16:49
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:50 20:07	05:27 20:34	19:31 (2) 20:38	05:35 20:04 (2)	06:03 20:11	06:34 19:23	07:06 18:31	06:42 16:48
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	19:31 (2) 20:37	05:36 20:04 (2)	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	05:27 20:35	19:32 (2) 20:37	05:36 20:04 (2)	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	19:32 (2) 20:36	06:06 20:04 (2)	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	19:33 (2) 20:36	06:07 20:04 (2)	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	19:33 (2) 20:35	06:08 20:04 (2)	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	19:33 (2) 20:35	06:09 20:02 (2)	06:09 20:02	06:41 19:12	07:12 18:22	06:49 16:42
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:37	19:33 (2) 20:34	06:10 20:04 (2)	06:10 20:01	06:42 19:11	07:13 18:20	06:50 16:41
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 19:38 (2) 20:38	19:34 (2) 20:33	06:11 20:03 (3)	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:40
18	07:25 16:59	06:54 17:38	06:10 18:10	06:18 19:44	05:40 20:16	05:27 19:48 (2) 20:38	19:36 (2) 20:33	06:12 20:03 (3)	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	05:27 19:49 (2) 20:38	19:34 (2) 20:33	06:13 20:03 (2)	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	05:27 19:50 (2) 20:39	19:35 (2) 20:31	06:14 20:03 (2)	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 19:32 (2) 20:39	19:35 (2) 20:31	06:15 20:02 (2)	06:15 19:54	06:47 19:02	07:19 18:13	06:56 16:37
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 19:53 (2) 20:39	19:35 (2) 20:30	06:16 20:02 (2)	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	05:27 19:53 (2) 20:39	19:35 (2) 20:29	06:17 20:01 (2)	06:17 19:51	06:49 18:59	07:21 18:10	06:59 16:36
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 19:30 (2) 20:39	19:36 (2) 20:28	06:18 20:01 (2)	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 19:30 (2) 20:40	19:36 (2) 20:28	06:19 19:47 (2)	06:19 19:46	06:51 18:55	06:24 17:07	07:01 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	05:28 19:30 (2) 20:40	19:35 (2) 20:26	06:20 19:58 (2)	06:20 19:46	06:52 18:53	06:25 17:05	07:02 16:34
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	05:29 19:30 (2) 20:40	19:36 (2) 20:25	06:21 19:54 (2)	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 19:30 (2) 20:40	19:36 (2) 20:24	06:22 19:43	06:22 18:50	06:54 18:50	06:27 17:03	07:04 16:34
29	07:17 17:12	06:51 19:22	06:02 19:56	05:32 20:26	05:32 20:26	05:29 19:55 (2) 20:40	19:36 (2) 20:23	06:23 19:41	06:23 18:48	06:55 17:01	06:29 16:33	07:06 16:33
30	07:16 17:13	06:50 19:24	06:01 19:57	05:31 20:27	05:31 20:27	05:30 19:30 (2) 20:40	19:36 (2) 20:22	06:24 19:40	06:24 18:47	06:56 18:47	06:30 17:00	07:07 16:33
31	07:15 17:15	06:48 19:25	06:48 19:25	05:31 20:28	05:31 20:28	05:30 19:30 (2) 20:40	19:36 (2) 20:21	06:25 20:21	06:25 19:38	06:31 16:59	06:31 16:40	07:28 16:40
Ore potenziali eliofanìa	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore					315	834	617					
Probabilità di eliofanìa					0,47	0,54	0,61					
Tempo di operatività rid.					1,00	1,00	1,00					
Dir. del vento rid.					1,00	1,00	1,00					
Totale ridotto					0,47	0,54	0,61					
Totale effettivo					147	450	374					

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:56/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AM - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (39)

**Assunzioni sui calcoli d'ombra**

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	07:06 (5) 08:03 (5)	06:00 19:58	05:30 20:28	05:55 20:40	06:26 19:36	07:06 (5) 07:53 (5)	06:57 18:45	06:32 16:32
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	07:05 (5) 08:02 (5)	05:58 19:59	05:30 20:29	05:56 20:19	06:27 19:35	07:05 (5) 07:54 (5)	06:58 18:43	06:33 16:32
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	07:05 (5) 08:01 (5)	05:57 20:01	05:29 20:30	05:57 20:18	06:28 19:33	07:04 (5) 07:55 (5)	06:59 18:41	06:35 16:32
4	07:28 16:44	07:11 17:20	06:33 17:54	06:41 19:29	07:05 (5) 08:01 (5)	05:56 20:02	05:29 20:31	05:58 20:17	06:29 19:31	07:03 (5) 07:55 (5)	06:58 18:40	06:36 16:32
5	07:28 16:45	07:10 17:21	06:31 17:56	06:39 19:30	07:05 (5) 08:00 (5)	05:54 20:03	05:28 20:31	05:59 20:15	06:30 19:30	07:02 (5) 07:55 (5)	07:01 18:38	06:37 16:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	07:05 (5) 07:59 (5)	05:53 20:04	05:28 20:32	06:00 20:14	06:31 19:28	07:01 (5) 07:55 (5)	07:02 18:36	06:38 16:31
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	07:06 (5) 07:59 (5)	05:52 20:05	05:28 20:33	06:01 20:13	06:32 19:26	07:00 (5) 07:55 (5)	07:04 18:35	06:39 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	07:06 (5) 07:58 (5)	05:51 20:06	05:27 20:33	06:02 20:12	06:33 19:25	06:59 (5) 07:55 (5)	07:05 18:33	06:41 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	07:06 (5) 07:56 (5)	05:50 20:07	05:27 20:34	06:03 20:11	06:34 19:23	06:59 (5) 07:55 (5)	07:06 18:31	06:42 16:31
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	07:07 (5) 07:56 (5)	05:48 20:08	05:27 20:35	06:04 20:09	06:35 19:21	06:58 (5) 07:55 (5)	07:07 18:30	06:43 16:31
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	07:07 (5) 07:54 (5)	05:47 20:09	05:27 20:35	06:05 20:08	06:37 19:19	06:58 (5) 07:55 (5)	07:08 18:28	06:44 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	07:08 (5) 07:53 (5)	05:46 20:10	05:27 20:36	06:06 20:07	06:38 19:18	06:58 (5) 07:55 (5)	07:09 18:27	06:46 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	07:09 (5) 07:51 (5)	05:45 20:11	05:27 20:36	06:07 20:05	06:39 19:16	06:59 (5) 07:54 (5)	07:10 18:25	06:47 16:31
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	07:10 (5) 07:49 (5)	05:44 20:12	05:27 20:37	06:08 20:04	06:40 19:14	07:00 (5) 07:54 (5)	07:11 18:23	06:48 16:32
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	07:11 (5) 07:48 (5)	05:43 20:13	05:27 20:37	06:09 20:02	06:41 19:12	07:01 (5) 07:53 (5)	07:12 18:22	06:49 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	07:12 (5) 07:45 (5)	05:42 20:14	05:27 20:37	06:10 20:01	06:42 19:11	07:02 (5) 07:53 (5)	07:13 18:20	06:50 16:32
17	07:26 16:58	06:55 17:36	06:12 18:09	06:20 19:43	07:15 (5) 07:43 (5)	05:41 20:15	05:27 20:38	06:11 20:00	06:43 19:09	07:03 (5) 07:52 (5)	07:15 18:19	06:52 16:40
18	07:25 16:59	06:54 17:37	06:10 18:10	06:29 19:44	07:17 (5) 07:40 (5)	05:40 20:16	05:27 20:38	06:12 19:58	06:44 19:07	07:04 (5) 07:51 (5)	07:16 18:17	06:53 16:40
19	07:25 17:00	06:53 17:39	06:08 18:11	06:27 19:45	07:21 (5) 07:36 (5)	05:39 20:17	05:27 20:38	06:13 19:57	06:45 19:06	07:05 (5) 07:50 (5)	07:17 18:16	06:54 16:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:25 19:46	06:25 (5) 06:15 (5)	06:15 20:18	05:44 20:39	06:14 19:55	06:46 19:04	07:06 (5) 07:49 (5)	07:18 18:14	06:55 16:38
21	07:23 17:02	06:50 17:41	06:05 18:14	06:24 19:47	06:24 (5) 07:02 (5)	06:14 19:47	05:37 20:19	06:15 20:30	06:47 19:02	07:07 (5) 07:48 (5)	07:19 18:13	06:56 16:34
22	07:23 17:04	06:48 17:42	06:03 18:15	06:22 19:49	06:22 (5) 07:02 (5)	06:12 19:49	05:37 20:20	06:16 20:30	06:48 19:00	07:08 (5) 07:47 (5)	07:20 18:11	06:58 16:34
23	07:22 17:05	06:47 17:44	06:01 18:16	06:20 19:50	06:20 (5) 07:03 (5)	06:11 19:50	05:36 20:21	06:17 20:29	06:49 18:59	07:09 (5) 07:45 (5)	07:21 18:10	06:57 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:18 19:51	06:18 (5) 07:03 (5)	06:09 19:51	05:35 20:22	06:18 20:28	06:50 19:49	07:10 (5) 07:41 (5)	07:23 18:08	07:00 16:35
25	07:20 17:07	06:44 17:46	05:58 18:18	06:17 19:52	06:17 (5) 07:04 (5)	06:08 19:52	05:34 20:23	06:19 20:27	06:51 19:47	07:20 (5) 07:44 (5)	06:51 18:55	07:01 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:15 19:53	06:15 (5) 07:04 (5)	06:06 19:53	05:34 20:24	06:20 20:26	06:52 19:46	07:15 (5) 07:45 (5)	06:52 18:53	07:02 16:37
27	07:19 17:10	06:41 17:48	05:55 18:20	06:13 19:54	06:13 (5) 07:04 (5)	06:05 19:54	05:33 20:24	06:21 20:25	06:48 19:44	07:14 (5) 07:47 (5)	06:53 18:52	07:03 16:34
28	07:18 17:11	06:39 17:50	05:53 18:21	06:12 19:55	06:12 (5) 07:04 (5)	06:04 19:55	05:32 20:25	06:22 20:40	06:54 19:43	07:12 (5) 07:49 (5)	06:54 18:50	07:04 16:38
29	07:17 17:12	06:38 17:22	05:51 18:22	06:11 19:56	07:10 (5) 08:04 (5)	06:02 19:56	05:32 20:26	06:23 20:23	06:55 19:41	07:10 (5) 07:50 (5)	06:55 18:48	07:06 16:39
30	07:16 17:13	06:37 17:24	05:50 18:23	06:10 19:57	07:08 (5) 08:03 (5)	06:01 19:57	05:31 20:27	06:24 20:40	06:56 19:39	07:09 (5) 07:51 (5)	06:56 18:47	07:07 16:39
31	07:15 17:15	06:36 17:25	05:49 18:24	06:09 19:58	07:06 (5) 08:03 (5)	06:00 19:58	05:31 20:28	06:25 20:45	06:54 19:38	07:07 (5) 07:52 (5)	06:54 18:45	07:08 16:40
Ore potenziali eliofania												
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

**Legenda della tabella:**

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH
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DE-01069 Dresden
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AN - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (40)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for specific times of day, showing shadow flickering data and potential operational hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (41)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
1	07:28		14:26 (5)	07:14		14:30 (5)	06:38		06:46		05:59	05:30
	16:41	35	15:01 (5)	17:16	50	15:20 (5)	17:51		19:26		19:58	20:28
2	07:28		14:26 (5)	07:13		14:31 (5)	06:36		06:44		05:58	05:30
	16:42	36	15:02 (5)	17:17	49	15:20 (5)	17:52		19:27		19:59	20:29
3	07:28		14:26 (5)	07:12		14:31 (5)	06:35		06:43		05:57	05:29
	16:43	37	15:03 (5)	17:18	48	15:19 (5)	17:53		19:28		20:00	20:30
4	07:28		14:26 (5)	07:11		14:32 (5)	06:33		06:41		05:56	05:29
	16:44	38	15:04 (5)	17:20	46	15:18 (5)	17:54		19:29		20:02	20:31
5	07:28		14:26 (5)	07:10		14:33 (5)	06:31		06:39		05:54	05:28
	16:45	39	15:05 (5)	17:21	45	15:18 (5)	17:55		19:30		20:03	20:31
6	07:28		14:26 (5)	07:09		14:34 (5)	06:30		06:38		05:53	05:28
	16:46	40	15:06 (5)	17:22	44	15:18 (5)	17:57		19:31		20:04	20:32
7	07:28		14:26 (5)	07:08		14:35 (5)	06:28		06:36		05:52	05:28
	16:47	41	15:07 (5)	17:24	42	15:17 (5)	17:58		19:32		20:05	20:33
8	07:28		14:26 (5)	07:07		14:37 (5)	06:27		06:34		05:51	05:27
	16:48	41	15:07 (5)	17:25	40	15:17 (5)	17:59		19:33		20:06	20:33
9	07:28		14:26 (5)	07:06		14:37 (5)	06:25		06:33		05:49	05:27
	16:49	42	15:08 (5)	17:26	38	15:15 (5)	18:00		19:34		20:07	20:34
10	07:28		14:26 (5)	07:04		14:39 (5)	06:23		06:31		05:48	05:27
	16:50	43	15:09 (5)	17:27	35	15:14 (5)	18:01		19:35		20:08	20:34
11	07:28		14:26 (5)	07:03		14:41 (5)	06:22		06:29		05:47	05:27
	16:51	44	15:10 (5)	17:29	32	15:13 (5)	18:02		19:37		20:09	20:35
12	07:27		14:26 (5)	07:02		14:44 (5)	06:20		06:28		05:46	05:27
	16:52	44	15:10 (5)	17:30	28	15:12 (5)	18:04		19:38		20:10	20:36
13	07:27		14:26 (5)	07:01		14:46 (5)	06:18		06:26		05:45	05:27
	16:53	46	15:12 (5)	17:31	23	15:09 (5)	18:05		19:39		20:11	20:36
14	07:27		14:25 (5)	06:59		14:49 (5)	06:17		06:25		05:44	05:26
	16:54	47	15:12 (5)	17:32	17	15:06 (5)	18:06		19:40	9	19:00 (4)	20:12
15	07:26		14:26 (5)	06:58			06:15		06:23		18:49 (4)	05:43
	16:55	47	15:13 (5)	17:34			18:07		19:41	14	19:03 (4)	20:13
16	07:26		14:25 (5)	06:57			06:13		06:21		18:46 (4)	05:42
	16:56	48	15:13 (5)	17:35			18:08		19:42	18	19:04 (4)	20:14
17	07:25		14:26 (5)	06:55			06:12		06:20		18:45 (4)	05:41
	16:57	49	15:15 (5)	17:36			18:09		19:43	20	19:05 (4)	20:15
18	07:25		14:26 (5)	06:54			06:10		06:18		18:44 (4)	05:40
	16:59	49	15:15 (5)	17:37			18:10		19:44	21	19:05 (4)	20:16
19	07:24		14:26 (5)	06:53			06:08		06:17		18:44 (4)	05:39
	17:00	50	15:16 (5)	17:39			18:11		19:45	22	19:06 (4)	20:17
20	07:24		14:26 (5)	06:51			06:06		06:15		18:42 (4)	05:38
	17:01	50	15:16 (5)	17:40			18:12		19:46	24	19:06 (4)	20:18
21	07:23		14:26 (5)	06:50			06:05		06:14		18:42 (4)	05:37
	17:02	50	15:16 (5)	17:41			18:14		19:47	24	19:06 (4)	20:19
22	07:23		14:27 (5)	06:48			06:03		06:12		18:42 (4)	05:37
	17:03	51	15:18 (5)	17:42			18:15		19:49	24	19:06 (4)	20:20
23	07:22		14:27 (5)	06:47			06:01		06:11		18:42 (4)	05:36
	17:05	51	15:18 (5)	17:44			18:16		19:50	24	19:06 (4)	20:21
24	07:21		14:27 (5)	06:45			06:00		06:09		18:42 (4)	05:35
	17:06	51	15:18 (5)	17:45			18:17		19:51	23	19:05 (4)	20:22
25	07:20		14:27 (5)	06:44			05:58		06:08		18:42 (4)	05:34
	17:07	51	15:18 (5)	17:46			18:18		19:52	22	19:04 (4)	20:23
26	07:20		14:27 (5)	06:42			05:56		06:06		18:43 (4)	05:33
	17:08	51	15:18 (5)	17:47			18:19		19:53	21	19:04 (4)	20:24
27	07:19		14:27 (5)	06:41			05:55		06:05		18:43 (4)	05:33
	17:10	52	15:19 (5)	17:48			18:20		19:54	19	19:02 (4)	20:24
28	07:18		14:28 (5)	06:39			05:53		06:04		18:44 (4)	05:32
	17:11	52	15:20 (5)	17:50			18:21		19:55	18	19:02 (4)	20:25
29	07:17		14:29 (5)				06:51		06:02		18:46 (4)	05:32
	17:12	51	15:20 (5)				19:22		19:56	14	19:00 (4)	20:26
30	07:16		14:29 (5)				06:49		06:01		18:47 (4)	05:31
	17:13	51	15:20 (5)				19:23		19:57	10	18:57 (4)	20:27
31	07:15		14:30 (5)				06:48				05:31	
	17:15	50	15:20 (5)				19:25				20:28	
Ore potenziali eliofania	296		296			369		399			450	454
Totale, caso peggiore	1427		537			327						
Probabilità di eliofania	0,44		0,46			0,48						
Tempo di operatività rid.	1,00		1,00			1,00						
Dir. del vento rid.	1,00		1,00			1,00						
Totale ridotto	0,44		0,46			0,48						
Totale effettivo	630		245			156						

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (41)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	06:26	06:57	06:32	14:09 (5) 07:08 14:08 (5)
	20:40	20:20	19:36	18:45	16:57	35 14:44 (5) 16:32 44 14:52 (5)
2	05:31	05:56	06:27	06:58	06:33	14:07 (5) 07:09 14:09 (5)
	20:39	20:19	19:35	18:43	16:56	38 14:45 (5) 16:32 43 14:52 (5)
3	05:31	05:57	06:28	06:59	06:35	14:05 (5) 07:10 14:10 (5)
	20:39	20:18	19:33	18:41	16:55	41 14:46 (5) 16:32 42 14:52 (5)
4	05:32	05:58	06:29	07:00	06:36	14:05 (5) 07:11 14:11 (5)
	20:39	20:17	19:31	18:40	16:54	42 14:47 (5) 16:32 41 14:52 (5)
5	05:32	05:59	06:30	07:01	06:37	14:04 (5) 07:12 14:11 (5)
	20:39	20:15	19:30	18:38	16:52	44 14:48 (5) 16:31 41 14:52 (5)
6	05:33	06:00	06:31	07:02	06:38	14:02 (5) 07:13 14:12 (5)
	20:39	20:14	19:28	18:36	16:51	46 14:48 (5) 16:31 40 14:52 (5)
7	05:34	06:01	06:32	07:03	06:39	14:02 (5) 07:14 14:13 (5)
	20:38	20:13	19:26	18:35	16:50	47 14:49 (5) 16:31 39 14:52 (5)
8	05:34	06:02	06:33	07:05	06:41	14:02 (5) 07:15 14:14 (5)
	20:38	20:12	19:24	18:33	16:49	47 14:49 (5) 16:31 38 14:52 (5)
9	05:35	06:03	06:34	07:06	06:42	14:01 (5) 07:16 14:15 (5)
	20:38	20:10	19:23	18:31	16:48	49 14:50 (5) 16:31 37 14:52 (5)
10	05:36	06:04	06:35	07:07	06:43	14:01 (5) 07:16 14:15 (5)
	20:37	20:09	19:21	18:30	16:47	50 14:51 (5) 16:31 36 14:51 (5)
11	05:36	06:05	06:36	07:08	06:44	14:01 (5) 07:17 14:16 (5)
	20:37	20:08	19:19	18:28	16:46	50 14:51 (5) 16:31 35 14:51 (5)
12	05:37	06:06	18:59 (4) 06:37	07:09	06:45	14:00 (5) 07:18 14:17 (5)
	20:36	20:07	19:04 (4) 19:18	18:27	16:45	51 14:51 (5) 16:31 34 14:51 (5)
13	05:38	06:07	18:55 (4) 06:38	07:10	06:47	14:01 (5) 07:19 14:18 (5)
	20:36	20:05	19:07 (4) 19:16	18:25	16:44	51 14:52 (5) 16:31 34 14:52 (5)
14	05:39	06:08	18:53 (4) 06:40	07:11	06:48	14:00 (5) 07:20 14:19 (5)
	20:35	20:04	19:08 (4) 19:14	18:23	16:43	52 14:52 (5) 16:31 33 14:52 (5)
15	05:39	06:09	18:52 (4) 06:41	07:12	06:49	14:00 (5) 07:20 14:19 (5)
	20:35	20:02	19:10 (4) 19:12	18:22	16:42	52 14:52 (5) 16:32 33 14:52 (5)
16	05:40	06:10	18:51 (4) 06:42	07:13	06:50	14:00 (5) 07:21 14:20 (5)
	20:34	20:01	19:10 (4) 19:11	18:20	16:41	51 14:51 (5) 16:32 32 14:52 (5)
17	05:41	06:11	18:50 (4) 06:43	07:15	06:52	14:01 (5) 07:22 14:21 (5)
	20:33	20:00	19:11 (4) 19:09	18:19	16:40	51 14:52 (5) 16:32 32 14:53 (5)
18	05:42	06:12	18:49 (4) 06:44	07:16	06:53	14:01 (5) 07:22 14:21 (5)
	20:33	19:58	19:11 (4) 19:07	18:17	16:40	51 14:52 (5) 16:33 31 14:52 (5)
19	05:43	06:13	18:48 (4) 06:45	07:17	06:54	14:01 (5) 07:23 14:22 (5)
	20:32	19:57	19:11 (4) 19:06	18:16	16:39	51 14:52 (5) 16:33 31 14:53 (5)
20	05:44	06:14	18:48 (4) 06:46	07:18	06:55	14:01 (5) 07:24 14:22 (5)
	20:31	19:55	19:12 (4) 19:04	18:14	16:38	51 14:52 (5) 16:33 31 14:53 (5)
21	05:44	06:15	18:47 (4) 06:47	07:19	06:56	14:02 (5) 07:24 14:23 (5)
	20:30	19:54	19:11 (4) 19:02	18:13	16:37	50 14:52 (5) 16:34 31 14:54 (5)
22	05:45	06:16	18:47 (4) 06:48	07:20	06:58	14:02 (5) 07:25 14:23 (5)
	20:30	19:52	19:11 (4) 19:00	18:11	16:37	50 14:52 (5) 16:34 31 14:54 (5)
23	05:46	06:17	18:46 (4) 06:49	07:21	06:59	14:02 (5) 07:25 14:24 (5)
	20:29	19:51	19:10 (4) 18:59	18:10	16:36	50 14:52 (5) 16:35 31 14:55 (5)
24	05:47	06:18	18:46 (4) 06:50	07:23	07:00	14:03 (5) 07:26 14:24 (5)
	20:28	19:49	19:09 (4) 18:57	18:08	16:35	49 14:52 (5) 16:35 31 14:55 (5)
25	05:48	06:19	18:47 (4) 06:51	06:24	07:01	14:04 (5) 07:26 14:25 (5)
	20:27	19:47	19:08 (4) 18:55	17:07	16:35	49 14:53 (5) 16:36 31 14:56 (5)
26	05:49	06:20	18:47 (4) 06:52	06:25	07:02	14:05 (5) 07:27 14:25 (5)
	20:26	19:46	19:07 (4) 18:53	17:05	16:34	47 14:52 (5) 16:37 31 14:56 (5)
27	05:50	06:21	18:48 (4) 06:53	06:26	07:03	14:05 (5) 07:27 14:25 (5)
	20:25	19:44	19:05 (4) 18:52	17:04	14:32 (5) 16:34	47 14:52 (5) 16:37 32 14:57 (5)
28	05:51	06:22	18:50 (4) 06:54	06:27	07:04	14:18 (5) 07:04 14:06 (5) 07:27 14:25 (5)
	20:24	19:43	19:03 (4) 18:50	17:03	14:36 (5) 16:33	46 14:52 (5) 16:38 32 14:57 (5)
29	05:52	06:23	18:52 (4) 06:55	06:29	14:15 (5) 07:05	14:15 (5) 07:05 14:06 (5) 07:28 14:26 (5)
	20:23	19:41	19:00 (4) 18:48	17:01	14:39 (5) 16:33	46 14:52 (5) 16:39 33 14:59 (5)
30	05:53	06:24	06:56	06:30	14:12 (5) 07:07	14:12 (5) 07:07 14:07 (5) 07:28 14:26 (5)
	20:22	19:39	18:47	17:00	29 14:41 (5) 16:33	45 14:52 (5) 16:39 33 14:59 (5)
31	05:54	06:25	06:31	06:31	14:11 (5)	07:28 14:26 (5)
	20:21	19:38	16:59	32 14:43 (5)	16:40	34 15:00 (5)
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		333		111	1429	1077
Probabilità di eliofania		0,67		0,44	0,40	0,36
Tempo di operatività rid.		1,00		1,00	1,00	1,00
Dir. del vento rid.		1,00		1,00	1,00	1,00
Totale ridotto		0,67		0,44	0,40	0,36
Totale effettivo		222		48	578	391

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Pedatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (42)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for time slots (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofania', 'Probabilità di eliofania', and 'Tempo di operatività rid.'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AQ - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (43)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46	17:29 (5)	05:59	05:30	05:30	05:55	06:26	17:24 (5)	06:57	06:32	07:08
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44	17:28 (5)	05:58	05:30	05:31	05:56	06:27	17:24 (5)	06:58	06:33	07:09
3	07:28 16:43	07:12 17:18	06:35 17:53	06:43	17:27 (5)	05:57	05:29	05:31	05:57	06:28	17:23 (5)	06:59	06:35	07:10
4	07:28 16:44	07:11 17:20	06:33 17:54	06:41	17:27 (5)	05:56	05:29	05:32	05:58	06:29	17:22 (5)	07:00	06:36	07:11
5	07:28 16:45	07:10 17:21	06:31 17:55	06:39	17:26 (5)	05:54	05:28	05:32	05:59	06:30	17:22 (5)	07:01	06:37	07:12
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38	17:25 (5)	05:53	05:28	05:33	06:00	06:31	17:21 (5)	07:02	06:38	07:13
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36	17:26 (5)	05:52	05:28	05:34	06:01	06:32	17:21 (5)	07:03	06:39	07:14
8	07:28 16:48	07:07 17:25	06:26 17:59	06:34	17:25 (5)	05:51	05:27	05:34	06:02	06:33	17:21 (5)	07:05	06:41	07:15
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33	17:25 (5)	05:49	05:27	05:35	06:03	06:34	17:21 (5)	07:06	06:42	07:15
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31	17:26 (5)	05:48	05:27	05:36	06:04	06:35	17:21 (5)	07:07	06:43	07:16
11	07:28 16:51	07:03 17:29	06:22 18:02	06:29	17:26 (5)	05:47	05:27	05:36	06:05	06:36	17:21 (5)	07:08	06:44	07:17
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28	17:26 (5)	05:46	05:27	05:37	06:06	06:37	17:21 (5)	07:09	06:45	07:18
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26	17:26 (5)	05:45	05:27	05:38	06:07	06:38	17:21 (5)	07:10	06:47	07:19
14	07:27 16:54	06:59 17:32	06:17 18:06	06:25	17:27 (5)	05:44	05:26	05:39	06:08	06:39	17:22 (5)	07:11	06:48	07:20
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23	17:28 (5)	05:43	05:26	05:39	06:09	06:41	17:23 (5)	07:12	06:49	07:20
16	07:26 16:56	06:57 17:35	06:13 18:08	06:21	17:28 (5)	05:42	05:26	05:40	06:10	06:42	17:23 (5)	07:13	06:50	07:21
17	07:25 16:57	06:55 17:36	06:12 18:09	06:20	17:30 (5)	05:41	05:26	05:41	06:11	06:43	17:25 (5)	07:15	06:52	07:22
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18	17:30 (5)	05:40	05:27	05:42	06:12	06:44	17:26 (5)	07:16	06:53	07:22
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17	17:32 (5)	05:39	05:27	05:43	06:13	06:45	17:28 (5)	07:17	06:54	07:23
20	07:24 17:01	06:51 17:40	06:06 18:12	06:15	17:33 (5)	05:38	05:27	05:44	06:14	06:46	17:32 (5)	07:18	06:55	07:24
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14	17:36 (5)	05:37	05:27	05:44	06:15	06:47	17:43 (5)	07:19	06:56	07:24
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12	17:38 (5)	05:37	05:27	05:45	06:16	06:48	17:39 (5)	07:20	06:57	07:25
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11	17:43 (5)	05:36	05:27	05:46	06:17	06:49	18:01 (5)	07:21	06:58	07:25
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09	17:51 (5)	05:35	05:28	05:47	06:18	06:51	18:04 (5)	07:22	06:59	07:26
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08	17:03 (5)	05:34	05:28	05:48	06:19	06:52	17:35 (5)	07:23	07:00	07:26
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06	16:39 (5)	05:34	05:28	05:49	06:20	06:53	18:05 (5)	07:24	07:01	07:26
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05	17:06 (5)	05:33	05:29	05:50	06:21	06:54	18:06 (5)	07:25	07:02	07:27
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04	16:34 (5)	05:32	05:29	05:51	06:22	06:55	17:30 (5)	07:26	07:03	07:27
29	07:17 17:12	06:51 19:22	06:51 18:22	06:02	17:09 (5)	05:32	05:29	05:52	06:23	06:56	18:07 (5)	07:27	07:04	07:27
30	07:16 17:13	06:49 19:23	06:49 18:23	06:01	17:32 (5)	05:31	05:30	05:53	06:24	06:57	17:29 (5)	07:28	07:05	07:28
31	07:15 17:15	06:48 19:25	06:48 18:24	06:00	18:12 (5)	05:31	05:31	05:54	06:25	06:58	18:09 (5)	07:29	07:06	07:28
Ore potenziali eliofania	296	296	369	399	428	454	461	429		375	804		297	286
Totale, caso peggiore				288					386		804			
Probabilità di eliofania				0,44					0,67		0,58			
Tempo di operatività rid.				1,00					1,00		1,00			
Dir. del vento rid.				1,00					1,00		1,00			
Totale ridotto				0,44					0,67		0,58			
Totale effettivo			127	424					257		465			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (44)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (45)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 18:23	05:52 19:23	06:03 19:56	05:31 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 19:24	05:50 19:57	06:02 19:57	05:30 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:48 19:25	06:06 19:55	06:09 19:57	05:35 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:31 19:38	06:31 16:59	07:07 16:40	07:28 16:38
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (46)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

## Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AU - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (47)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (48)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
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19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:37	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AW - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (49)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for specific dates and times. Includes summary rows for 'Ore potenziali eliofania', 'Totale, caso peggiore', 'Probabilità di eliofania', 'Tempo di operatività rid.', 'Dir. del vento rid.', 'Totale ridotto', and 'Totale effettivo'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (50)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
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21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
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23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
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25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:25	06:02 19:58	05:30 20:28	05:27 20:40	05:53 20:21	06:24 19:38	06:56 18:35	06:30 16:59	07:07 16:40	07:28 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (51)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
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10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
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13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
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24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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31	07:16 17:15	06:33 17:52	06:48 18:25	06:00 19:59	05:30 20:28	05:29 20:40	05:54 20:21	06:25 19:38	06:57 18:40	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AZ - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (52)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:51 (2) 17:16	07:15 17:51	06:38 17:04 (1)	06:46 19:26	06:00 19:59
2	07:29 16:42	07:52 (2) 17:17	06:36 17:52	16:30 (1) 17:03 (1)	06:45 19:27	05:58 20:00
3	07:29 16:43	07:58 (2) 17:19	06:35 17:53	16:31 (1) 17:03 (1)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	16:31 (1) 17:02 (1)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:32 17:56	16:32 (1) 17:02 (1)	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:22	06:30 17:57	16:33 (1) 17:00 (1)	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	06:28 17:58	16:34 (1) 16:58 (1)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	06:27 17:59	16:36 (1) 16:57 (1)	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	06:25 18:00	16:37 (1) 16:54 (1)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	06:23 18:01	16:40 (1) 16:50 (1)	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37
16	07:26 16:56	06:57 17:35	16:44 (1) 16:51 (1)	06:13 18:08	06:22 19:42	05:27 20:38
17	07:26 16:58	06:56 17:36	16:41 (1) 16:56 (1)	06:12 18:09	06:20 19:43	05:27 20:38
18	07:25 16:59	06:54 17:38	16:39 (1) 16:59 (1)	06:10 18:10	06:19 19:44	05:27 20:38
19	07:25 17:00	06:53 17:39	16:36 (1) 17:00 (1)	06:08 18:12	06:17 19:45	05:27 20:39
20	07:24 17:01	06:51 17:40	16:35 (1) 17:02 (1)	06:07 18:13	06:15 19:47	05:27 20:39
21	07:23 17:02	06:50 17:41	16:34 (1) 17:02 (1)	06:05 18:14	06:14 19:48	05:27 20:39
22	07:23 17:04	06:48 17:43	16:33 (1) 17:03 (1)	06:03 18:15	06:12 19:49	05:27 20:39
23	07:22 17:05	06:47 17:44	16:32 (1) 17:04 (1)	06:02 18:16	06:11 19:50	05:28 20:39
24	07:21 17:06	06:46 17:45	16:32 (1) 17:04 (1)	06:00 18:17	06:09 19:51	05:28 20:40
25	07:21 17:07	06:44 17:46	16:31 (1) 17:04 (1)	05:58 18:18	06:08 19:52	05:28 20:40
26	07:20 17:09	06:42 17:47	16:31 (1) 17:05 (1)	05:56 18:19	06:07 19:53	05:28 20:40
27	07:19 17:10	06:41 17:49	16:30 (1) 17:05 (1)	05:55 18:20	06:05 19:54	05:29 20:40
28	07:18 17:11	06:39 17:50	16:31 (1) 17:05 (1)	05:53 18:21	06:04 19:55	05:29 20:40
29	07:17 17:12		06:51 19:23	06:51 19:56	06:02 20:26	05:30 20:40
30	07:16 17:14		06:50 19:24	06:50 19:57	06:01 20:27	05:30 20:40
31	07:15 17:15		06:48 19:25		05:31 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	14	351	259			
Probabilità di eliofania	0,44	0,46	0,44			
Tempo di operatività rid.	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44			
Totale effettivo	6	160	114			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: AZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (52)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:30	05:55	06:26	06:57	06:32	07:08	
	20:40	20:20	19:36	18:45	16:57	16:32	
2	05:31	05:56	06:27	06:58	06:34	07:09	
	20:40	20:19	19:35	18:43	16:56	16:32	
3	05:31	05:57	06:28	06:59	17:23 (1)	06:35	07:10
	20:39	20:18	19:33	18:42	2 17:25 (1)	16:55	16:32
4	05:32	05:58	06:30	07:00	17:16 (1)	06:36	07:11
	20:39	20:17	19:31	18:40	15 17:31 (1)	16:54	16:32
5	05:33	05:59	06:31	07:02	17:13 (1)	06:37	07:12
	20:39	20:16	19:30	18:38	20 17:33 (1)	16:53	16:32
6	05:33	06:00	06:32	07:03	17:11 (1)	06:38	07:13
	20:39	20:14	19:28	18:37	23 17:34 (1)	16:51	16:31
7	05:34	06:01	06:33	07:04	17:09 (1)	06:40	07:14
	20:38	20:13	19:26	18:35	26 17:35 (1)	16:50	16:31
8	05:34	06:02	06:34	07:05	17:08 (1)	06:41	07:15
	20:38	20:12	19:25	18:33	28 17:36 (1)	16:49	16:31
9	05:35	06:03	06:35	07:06	17:06 (1)	06:42	07:16
	20:38	20:11	19:23	18:32	31 17:37 (1)	16:48	16:31
10	05:36	06:04	06:36	07:07	17:05 (1)	06:43	07:17
	20:37	20:09	19:21	18:30	32 17:37 (1)	16:47	16:31
							4 07:47 (2)
11	05:37	06:05	06:37	07:08	17:05 (1)	06:44	07:17
	20:37	20:08	19:20	18:28	33 17:38 (1)	16:46	16:31
							8 07:49 (2)
12	05:37	06:06	06:38	07:09	17:04 (1)	06:46	07:18
	20:36	20:07	19:18	18:27	34 17:38 (1)	16:45	16:31
							8 07:50 (2)
13	05:38	06:07	06:39	07:10	17:04 (1)	06:47	07:19
	20:36	20:05	19:16	18:25	34 17:38 (1)	16:44	16:31
							9 07:52 (2)
14	05:39	06:08	06:40	07:11	17:03 (1)	06:48	07:20
	20:35	20:04	19:14	18:23	34 17:37 (1)	16:43	16:32
							9 07:53 (2)
15	05:40	06:09	06:41	07:12	17:03 (1)	06:49	07:21
	20:35	20:03	19:13	18:22	34 17:37 (1)	16:42	16:32
							9 07:54 (2)
16	05:40	06:10	06:42	07:14	17:02 (1)	06:51	07:21
	20:34	20:01	19:11	18:20	34 17:36 (1)	16:41	16:32
							10 07:55 (2)
17	05:41	06:11	06:43	07:15	17:02 (1)	06:52	07:22
	20:34	20:00	19:09	18:19	34 17:36 (1)	16:41	16:32
							10 07:56 (2)
18	05:42	06:12	06:44	07:16	17:03 (1)	06:53	07:23
	20:33	19:58	19:07	18:17	33 17:36 (1)	16:40	16:33
							10 07:57 (2)
19	05:43	06:13	06:45	07:17	17:03 (1)	06:54	07:23
	20:32	19:57	19:06	18:16	32 17:35 (1)	16:39	16:33
							10 07:57 (2)
20	05:44	06:14	06:46	07:18	17:04 (1)	06:55	07:24
	20:31	19:55	19:04	18:14	30 17:34 (1)	16:38	16:33
							10 07:58 (2)
21	05:45	06:15	06:47	07:19	17:04 (1)	06:57	07:24
	20:31	19:54	19:02	18:13	28 17:32 (1)	16:38	16:34
							10 07:58 (2)
22	05:45	06:16	06:48	07:20	17:06 (1)	06:58	07:25
	20:30	19:52	19:00	18:11	26 17:32 (1)	16:37	16:34
							10 07:59 (2)
23	05:46	06:17	06:49	07:22	17:07 (1)	06:59	07:26
	20:29	19:51	18:59	18:10	23 17:30 (1)	16:36	16:35
							10 07:59 (2)
24	05:47	06:18	06:50	07:23	17:09 (1)	07:00	07:26
	20:28	19:49	18:57	18:08	19 17:28 (1)	16:36	16:35
							10 07:59 (2)
25	05:48	06:19	06:51	06:24	16:11 (1)	07:01	07:26
	20:27	19:48	18:55	17:07	14 16:25 (1)	16:35	16:36
							10 08:00 (2)
26	05:49	06:20	06:52	06:25	16:17 (1)	07:02	07:27
	20:26	19:46	18:54	17:05	1 16:18 (1)	16:35	16:37
							10 08:00 (2)
27	05:50	06:21	06:53	06:26		07:03	07:27
	20:25	19:44	18:52	17:04		16:34	16:37
							10 08:00 (2)
28	05:51	06:22	06:54	06:28		07:05	07:27
	20:24	19:43	18:50	17:03		16:34	16:38
							10 08:01 (2)
29	05:52	06:23	06:55	06:29		07:06	07:28
	20:23	19:41	18:48	17:01		16:33	16:39
							9 08:00 (2)
30	05:53	06:24	06:56	06:30		07:07	07:28
	20:22	19:40	18:47	17:00		16:33	16:39
							9 08:00 (2)
31	05:54	06:25		06:31			07:28
	20:21	19:38		16:59			16:40
							9 08:00 (2)
Ore potenziali eliofania	461	429	375	345	297	286	
Totale, caso peggiore				620			204
Probabilità di eliofania				0,44			0,36
Tempo di operatività rid.				1,00			1,00
Dir. del vento rid.				1,00			1,00
Totale ridotto				0,44			0,36
Totale effettivo				270			74

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (53)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	05:58 19:59	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31	05:32 20:39	05:59 20:16	06:30 19:30	07:01 18:38	06:37 16:52	07:12 16:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	07:13 16:31
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:32 19:26	07:04 18:35	06:39 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06	05:27 20:33	05:34 20:38	06:02 20:12	06:33 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:49 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:34 19:23	07:06 18:31	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:27	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	05:27 20:35	05:36 20:37	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46	07:17 16:31
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:26 20:37	05:39 20:35	06:09 20:02	06:41 19:13	07:12 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:26 20:37	05:40 20:34	06:10 20:01	06:42 19:11	07:13 18:20	06:50 16:41	07:21 16:32
17	07:26 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:33	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:40	07:22 16:32
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	05:27 20:38	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:05 19:48	05:37 20:19	05:27 20:39	05:44 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:56 16:37	07:24 16:34
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	05:27 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:25 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:35	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:53	06:25 17:05	07:02 16:34	07:27 16:37
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	07:04 16:33	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:29 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:13	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:29 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:15 17:15	06:36 17:52	05:50 18:24	06:01 19:58	05:31 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:57 18:46	06:31 16:59	07:08 16:40	07:29 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

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+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (54)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:32 19:30	06:40 20:03	05:55 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:37 17:48	06:51 19:23	06:02 19:56	05:32 19:56	05:30 20:26	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:35 17:46	06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:35 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:21	05:54 20:21	06:25 19:38	06:31 16:59	06:31 16:59	06:31 16:59	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (55)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:29 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:29 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:29 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uente autorizzato:

VSB Neue Energien Deutschland GmbH
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (58)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for each day of the month, showing sunrise and sunset times and shadow reduction data. Includes summary rows at the bottom for total potential and effective shadow hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BG - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (59)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	07:05 (5) 08:01 (5)	06:00 19:58	07:04 (5) 07:41 (5)	05:30 20:28
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	07:03 (5) 08:01 (5)	05:58 19:59	07:06 (5) 07:39 (5)	05:30 20:29
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	07:01 (5) 08:01 (5)	05:57 20:01	07:07 (5) 07:36 (5)	05:29 20:30
4	07:28 16:44	07:11 17:20	06:33 17:54	06:41 19:29	07:00 (5) 08:02 (5)	05:56 20:02	07:10 (5) 07:34 (5)	05:29 20:31
5	07:28 16:45	07:10 17:21	06:31 17:56	06:39 19:30	06:59 (5) 08:01 (5)	05:54 20:03	07:14 (5) 07:30 (5)	05:28 20:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	06:57 (5) 08:01 (5)	05:53 20:04	07:21 (5) 07:23 (5)	05:28 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	06:57 (5) 08:02 (5)	05:52 20:05		05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	06:56 (5) 08:01 (5)	05:51 20:06		05:27 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	06:56 (5) 08:01 (5)	05:50 20:07		05:27 20:34
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	06:56 (5) 08:01 (5)	05:48 20:08		05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	06:55 (5) 08:01 (5)	05:47 20:09		05:27 20:35
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	06:55 (5) 08:01 (5)	05:46 20:10		05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	06:55 (5) 08:00 (5)	05:45 20:11		05:27 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	06:54 (5) 07:59 (5)	05:44 20:12		05:27 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:55 (5) 07:59 (5)	05:43 20:13		05:27 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	06:54 (5) 07:58 (5)	05:42 20:14		05:27 20:37
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	06:55 (5) 07:58 (5)	05:41 20:15		05:27 20:38
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18 19:44	06:54 (5) 07:57 (5)	05:40 20:16		05:27 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	06:55 (5) 07:56 (5)	05:39 20:17		05:27 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	06:55 (5) 07:55 (5)	05:38 20:18		05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:47	06:56 (5) 07:55 (5)	05:37 20:19		05:27 20:39
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12 19:49	06:56 (5) 07:53 (5)	05:37 20:20		05:27 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	06:57 (5) 07:53 (5)	05:36 20:21		05:27 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	06:57 (5) 07:51 (5)	05:35 20:22		05:28 20:39
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	06:58 (5) 07:50 (5)	05:34 20:23		05:28 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	06:59 (5) 07:49 (5)	05:34 20:24		05:28 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	06:59 (5) 07:47 (5)	05:33 20:24		05:29 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	07:01 (5) 07:46 (5)	05:32 20:25		05:29 20:40
29	07:17 17:12		06:51 19:22	06:02 19:56	07:02 (5) 07:45 (5)	05:32 20:26		05:29 20:40
30	07:16 17:13		06:50 19:24	06:01 19:57	07:03 (5) 07:43 (5)	05:31 20:27		05:30 20:40
31	07:15 17:15		06:48 19:25	07:06 (5) 07:59 (5)		05:31 20:28		
Ore potenziali eliofania	296	296	369	399	450	454		
Totale, caso peggiore			397	1763		141		
Probabilità di eliofania			0,44	0,48		0,47		
Tempo di operatività rid.			1,00	1,00		1,00		
Dir. del vento rid.			1,00	1,00		1,00		
Totale ridotto			0,44	0,48		0,47		
Totale effettivo			175	844		66		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BG - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (59)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:30 20:40	05:55 20:20	06:26 19:36	06:54 (5) 18:00 (5)	06:57 18:45	06:32 16:57	07:08 16:32
2	05:31 20:39	05:56 20:19	06:27 19:35	06:54 (5) 07:59 (5)	06:58 18:43	06:33 16:56	07:09 16:32
3	05:31 20:39	05:57 20:18	06:28 19:33	06:54 (5) 07:59 (5)	06:59 18:41	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:29 19:31	06:54 (5) 07:58 (5)	07:00 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:15	06:30 19:30	06:53 (5) 07:58 (5)	07:01 18:38	06:37 16:52	07:12 16:31
6	05:33 20:39	06:00 20:14	06:31 19:28	06:53 (5) 07:57 (5)	07:02 18:36	06:38 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	06:32 19:26	06:54 (5) 07:57 (5)	07:04 18:35	06:39 16:50	07:14 16:31
8	05:34 20:38	06:02 20:12	06:33 19:24	06:54 (5) 07:56 (5)	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:34 19:23	06:55 (5) 07:55 (5)	07:06 18:31	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:35 19:21	06:56 (5) 07:54 (5)	07:07 18:30	06:43 16:47	07:16 16:31
11	05:36 20:37	06:05 20:08	06:37 19:19	06:57 (5) 07:53 (5)	07:08 18:28	06:44 16:46	07:17 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	06:58 (5) 07:52 (5)	07:09 18:27	06:46 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	06:59 (5) 07:51 (5)	07:10 18:25	06:47 16:44	07:19 16:31
14	05:39 20:35	06:08 20:04	06:40 19:14	07:00 (5) 07:53 (5)	07:11 18:23	06:48 16:43	07:20 16:32
15	05:39 20:35	06:09 20:02	06:41 19:12	07:01 (5) 07:54 (5)	07:12 18:22	06:49 16:42	07:20 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:02 (5) 07:55 (5)	07:13 18:20	06:50 16:41	07:21 16:32
17	05:41 20:33	06:11 20:00	06:43 19:09	07:03 (5) 07:56 (5)	07:15 18:19	06:52 16:40	07:22 16:32
18	05:42 20:33	06:12 19:58	06:44 19:07	07:04 (5) 07:57 (5)	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:05 (5) 07:58 (5)	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	06:46 19:04	07:06 (5) 07:58 (5)	07:18 18:14	06:55 16:38	07:24 16:33
21	05:44 20:30	06:15 19:54	06:47 19:02	07:07 (5) 07:59 (5)	07:19 18:13	06:56 16:37	07:24 16:34
22	05:45 20:30	06:16 19:52	06:48 19:00	07:08 (5) 08:00 (5)	07:20 18:11	06:58 16:37	07:25 16:34
23	05:46 20:29	06:17 19:51	06:49 18:59	07:09 (5) 08:00 (5)	07:21 18:10	06:59 16:36	07:25 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:10 (5) 08:00 (5)	07:23 18:08	07:00 16:36	07:26 16:35
25	05:48 20:27	06:19 19:47	06:51 18:55	07:11 (5) 08:00 (5)	07:24 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 19:46	06:52 18:53	07:12 (5) 08:00 (5)	07:25 17:05	07:02 16:34	07:27 16:37
27	05:50 20:25	06:21 19:44	06:53 18:52	07:13 (5) 08:00 (5)	07:26 17:04	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	06:54 18:50	07:14 (5) 08:00 (5)	07:27 17:03	07:04 16:33	07:27 16:38
29	05:52 20:23	06:23 19:41	06:55 18:48	07:15 (5) 08:00 (5)	07:28 17:01	07:06 16:33	07:28 16:39
30	05:53 20:22	06:24 19:39	06:56 18:47	07:16 (5) 08:00 (5)	07:29 17:00	07:07 16:33	07:28 16:39
31	05:54 20:21	06:25 19:38	06:54 (5) 08:00 (5)	06:31 16:59	06:31 16:59	07:28 16:40	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286	
Totale, caso peggiore		1240		1101			
Probabilità di eliofania		0,67		0,58			
Tempo di operatività rid.		1,00		1,00			
Dir. del vento rid.		1,00		1,00			
Totale ridotto		0,67		0,58			
Totale effettivo		827		636			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BH - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (60)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	13:59 (5) 16:32	07:08 54	13:53 (5) 14:47 (5)	
2	05:31 20:39	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	13:56 (5) 14:35 (5)	07:09 53	13:54 (5) 14:47 (5)	
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	13:55 (5) 14:36 (5)	07:10 53	13:54 (5) 14:47 (5)	
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	13:54 (5) 14:38 (5)	07:11 52	13:55 (5) 14:47 (5)	
5	05:32 20:39	05:59 20:15	06:30 19:30	07:01 18:38	06:37 16:52	13:52 (5) 14:38 (5)	07:12 52	13:55 (5) 14:47 (5)	
6	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	13:51 (5) 14:39 (5)	07:13 51	13:56 (5) 14:47 (5)	
7	05:34 20:38	06:01 20:13	06:32 19:26	07:03 18:35	06:39 16:50	13:51 (5) 14:40 (5)	07:14 50	13:57 (5) 14:47 (5)	
8	05:34 20:38	06:02 20:12	19:05 (4) 19:09 (4)	06:33 19:24	07:05 18:33	06:41 16:49	13:50 (5) 14:41 (5)	07:15 50	13:57 (5) 14:47 (5)
9	05:35 20:38	06:03 20:10	19:01 (4) 19:12 (4)	06:34 19:23	07:06 18:31	06:42 16:48	13:49 (5) 14:41 (5)	07:16 50	13:58 (5) 14:48 (5)
10	05:36 20:37	06:04 20:09	18:59 (4) 19:14 (4)	06:35 19:21	07:07 18:30	06:43 16:47	13:49 (5) 14:42 (5)	07:16 49	13:58 (5) 14:47 (5)
11	05:36 20:37	06:05 20:08	18:57 (4) 19:15 (4)	06:36 19:19	07:08 18:28	06:44 16:46	13:48 (5) 14:42 (5)	07:17 48	13:59 (5) 14:47 (5)
12	05:37 20:36	06:06 20:07	18:56 (4) 19:16 (4)	06:37 19:18	07:09 18:27	06:45 16:45	13:48 (5) 14:42 (5)	07:18 48	14:00 (5) 14:48 (5)
13	05:38 20:36	06:07 20:05	18:55 (4) 19:17 (4)	06:38 19:16	07:10 18:25	06:47 16:44	13:48 (5) 14:43 (5)	07:19 47	14:01 (5) 14:48 (5)
14	05:39 20:35	06:08 20:04	18:54 (4) 19:17 (4)	06:40 19:14	07:11 18:23	06:48 16:43	13:48 (5) 14:44 (5)	07:20 48	14:01 (5) 14:49 (5)
15	05:39 20:35	06:09 20:02	18:54 (4) 19:18 (4)	06:41 19:12	07:12 18:22	06:49 16:42	13:47 (5) 14:44 (5)	07:20 47	14:01 (5) 14:48 (5)
16	05:40 20:34	06:10 20:01	18:53 (4) 19:18 (4)	06:42 19:11	07:13 18:20	06:50 16:41	13:47 (5) 14:44 (5)	07:21 47	14:02 (5) 14:49 (5)
17	05:41 20:33	06:11 20:00	18:53 (4) 19:18 (4)	06:43 19:09	07:15 18:19	06:52 16:40	13:48 (5) 14:45 (5)	07:22 46	14:03 (5) 14:49 (5)
18	05:42 20:33	06:12 19:58	18:53 (4) 19:18 (4)	06:44 19:07	07:16 18:17	06:53 16:40	13:47 (5) 14:45 (5)	07:22 46	14:03 (5) 14:49 (5)
19	05:43 20:32	06:13 19:57	18:52 (4) 19:17 (4)	06:45 19:06	07:17 18:16	06:54 16:39	13:47 (5) 14:44 (5)	07:23 46	14:04 (5) 14:50 (5)
20	05:44 20:31	06:14 19:55	18:52 (4) 19:17 (4)	06:46 19:04	07:18 18:14	06:55 16:38	13:48 (5) 14:45 (5)	07:24 46	14:04 (5) 14:50 (5)
21	05:44 20:30	06:15 19:54	18:53 (4) 19:16 (4)	06:47 19:02	07:19 18:13	06:56 16:37	13:48 (5) 14:45 (5)	07:24 46	14:05 (5) 14:51 (5)
22	05:45 20:30	06:16 19:52	18:53 (4) 19:15 (4)	06:48 19:00	07:20 18:11	06:58 16:37	13:48 (5) 14:45 (5)	07:25 46	14:05 (5) 14:51 (5)
23	05:46 20:29	06:17 19:51	18:53 (4) 19:13 (4)	06:49 18:59	07:21 18:10	06:59 16:36	13:48 (5) 14:45 (5)	07:25 46	14:06 (5) 14:52 (5)
24	05:47 20:28	06:18 19:49	18:53 (4) 19:12 (4)	06:50 18:57	07:23 18:08	07:00 16:35	13:49 (5) 14:45 (5)	07:26 46	14:06 (5) 14:52 (5)
25	05:48 20:27	06:19 19:47	18:55 (4) 19:10 (4)	06:51 18:55	06:24 17:07	07:01 16:35	13:50 (5) 14:46 (5)	07:26 46	14:07 (5) 14:53 (5)
26	05:49 20:26	06:20 19:46	18:57 (4) 19:08 (4)	06:52 18:53	06:25 17:05	07:02 16:34	13:50 (5) 14:46 (5)	07:27 46	14:07 (5) 14:53 (5)
27	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:03 16:34	13:50 (5) 14:46 (5)	07:27 47	14:07 (5) 14:54 (5)
28	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	14:11 (5) 14:24 (5)	07:04 16:33	13:51 (5) 14:46 (5)	07:27 47	14:07 (5) 14:54 (5)
29	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	14:06 (5) 14:27 (5)	07:05 16:33	13:51 (5) 14:46 (5)	07:28 47	14:08 (5) 14:55 (5)
30	05:53 20:22	06:24 19:39	06:56 18:47	06:30 17:00	14:03 (5) 14:30 (5)	07:07 16:33	13:52 (5) 14:46 (5)	07:28 48	14:08 (5) 14:56 (5)
31	05:54 20:21	06:25 19:38	06:31 16:59	06:32 14:33 (5)	14:01 (5) 14:33 (5)	07:08 16:40	07:28 16:40	14:09 (5) 47	14:09 (5) 14:56 (5)
Ore potenziali eliofania	461	429	375	345	297	286	1495		
Totale, caso peggiore		372		93	1579		0,36		
Probabilità di eliofania		0,67		0,44	0,40		1,00		
Tempo di operatività rid.		1,00		1,00	1,00		1,00		
Dir. del vento rid.		1,00		1,00	1,00		1,00		
Totale ridotto		0,67		0,44	0,40		0,36		
Totale effettivo		248		40	639		543		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (62)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BM - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (65)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns (Gennaio to Dicembre) and 31 rows of shadow data. Includes summary rows for potential hours, worst case, and effective hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)







Progetto:

231114\_Shadow flickering\_Galdo\_rev01

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (67)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:32 19:30	06:40 20:03	05:55 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 19:23	06:51 19:56	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:35 19:24	06:50 19:57	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:28	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (68)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns representing months (Gennaio to Dicembre) and 31 rows of time slots (07:28 to 17:15). Includes summary rows for potential hours of shadow, worst case, and effective hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il: 14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (69)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for time slots (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofania', 'Probabilità di eliofania', and 'Tempo di operatività rid.'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)
(WTC che provoca l'inizio dell'ombreggiamento) (WTC che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (71)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:32 19:30	06:40 20:03	05:55 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 18:19	06:51 19:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:36 19:24	06:50 19:57	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25	06:48 19:25
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il: 14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BU - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (73)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for time intervals (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofanía', 'Totale, caso peggiore', and 'Probabilità di eliofanía'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (74)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
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23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BW - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (75)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
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18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
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20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:25	06:02 19:58	05:30 20:28	05:27 20:40	05:53 20:21	06:24 19:38	06:56 18:35	06:30 16:59	07:07 16:40	07:28 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (76)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile		Maggio		Giugno	
1	07:28 16:41	07:14 17:16	06:38 17:51	06:57 (3) 06:58 (3)	06:46 19:26	07:05 (2) 08:09 (2)	06:00 19:58	19:00 (1) 19:20 (1)	05:30 20:29
2	07:29 16:42	07:13 17:17	06:36 17:52	06:55 (3) 06:58 (3)	06:45 19:27	07:03 (2) 08:08 (2)	05:58 20:00	19:00 (1) 19:21 (1)	05:30 20:29
3	07:29 16:43	07:12 17:19	06:35 17:53	06:54 (3) 07:00 (3)	06:43 19:28	07:01 (2) 08:07 (2)	05:57 20:01	18:59 (1) 19:22 (1)	05:29 20:30
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52 (3) 06:59 (3)	06:41 19:29	07:00 (2) 08:07 (2)	05:56 20:02	18:58 (1) 19:22 (1)	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (3) 07:00 (3)	06:40 19:30	06:58 (2) 08:06 (2)	05:54 20:03	18:58 (1) 19:22 (1)	05:28 20:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:49 (3) 07:00 (3)	06:38 19:31	06:56 (2) 08:05 (2)	05:53 20:04	18:58 (1) 19:22 (1)	05:28 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:47 (3) 06:59 (3)	06:36 19:32	06:55 (2) 08:05 (2)	05:52 20:05	18:58 (1) 19:22 (1)	05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46 (2) 07:00 (3)	06:35 19:33	06:54 (2) 08:04 (2)	05:51 20:06	18:58 (1) 19:22 (1)	05:28 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:44 (2) 06:59 (3)	06:33 19:35	06:55 (2) 08:04 (2)	05:50 20:07	18:59 (1) 19:22 (1)	05:27 20:34
10	07:28 16:50	07:05 17:28	06:23 18:01	06:42 (2) 06:58 (3)	06:31 19:36	06:55 (2) 08:02 (2)	05:48 20:08	18:58 (1) 19:21 (1)	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:41 (2) 06:59 (2)	06:30 19:37	06:55 (2) 08:01 (2)	05:47 20:09	18:58 (1) 19:20 (1)	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:39 (2) 07:01 (2)	06:28 19:38	06:56 (2) 08:00 (2)	05:46 20:10	18:59 (1) 19:20 (1)	05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:37 (2) 07:02 (2)	06:26 19:39	06:56 (2) 07:59 (2)	05:45 20:11	19:00 (1) 19:19 (1)	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:36 (2) 07:04 (2)	06:25 19:40	06:57 (2) 07:58 (2)	05:44 20:12	19:01 (1) 19:18 (1)	05:27 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:34 (2) 07:05 (2)	06:23 19:41	06:58 (2) 07:56 (2)	05:43 20:13	19:02 (1) 19:17 (1)	05:27 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:32 (2) 07:06 (2)	06:22 19:42	06:58 (2) 07:54 (2)	05:42 20:14	19:04 (1) 19:17 (1)	05:27 20:37
17	07:26 16:58	06:56 17:36	06:12 18:09	06:30 (2) 07:07 (2)	06:20 19:43	07:00 (2) 07:53 (2)	05:41 20:15	19:05 (1) 19:15 (1)	05:27 20:38
18	07:25 16:59	06:54 17:38	06:10 18:10	06:29 (2) 07:08 (2)	06:19 19:44	07:00 (2) 07:51 (2)	05:40 20:16	19:09 (1) 19:11 (1)	05:27 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12	06:27 (2) 07:08 (2)	06:17 19:45	07:02 (2) 07:50 (2)	05:39 20:17		05:27 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:25 (2) 07:09 (2)	06:15 19:47	07:03 (2) 07:47 (2)	05:38 20:18		05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:24 (2) 07:10 (2)	06:14 19:48	07:05 (2) 07:46 (2)	05:37 20:19		05:27 20:39
22	07:23 17:04	06:48 17:42	06:03 18:15	06:22 (2) 07:10 (2)	06:12 19:49	07:06 (2) 07:43 (2)	05:37 20:20		05:27 20:39
23	07:22 17:05	06:47 17:44	06:02 18:16	06:20 (2) 07:10 (2)	06:11 19:50	07:09 (2) 07:40 (2)	05:36 20:21		05:28 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:18 (2) 07:10 (2)	06:09 19:51	07:12 (2) 07:37 (2)	05:35 20:22		05:28 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:17 (2) 07:11 (2)	06:08 19:52	07:16 (2) 07:32 (2)	05:34 20:23		05:28 20:40
26	07:20 17:09	06:42 17:47	05:56 18:19	06:15 (2) 07:10 (2)	06:07 19:53		05:34 20:24		05:28 20:40
27	07:19 17:10	06:41 17:49	05:55 18:20	06:13 (2) 07:10 (2)	06:05 19:54	19:09 (1) 19:13 (1)	05:33 20:25		05:29 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:12 (2) 07:11 (2)	06:04 19:55	19:05 (1) 19:17 (1)	05:32 20:25		05:29 20:40
29	07:17 17:12		06:51 19:23	07:10 (2) 08:10 (2)	06:02 19:56	19:03 (1) 19:19 (1)	05:32 20:26		05:30 20:40
30	07:16 17:14		06:50 19:24	07:08 (2) 08:09 (2)	06:01 19:57	19:01 (1) 19:19 (1)	05:31 20:27		05:30 20:40
31	07:15 17:15		06:48 19:25	07:07 (2) 08:10 (2)			05:31 20:28		
Ore potenziali eliofania	296	296	369	399	439	450	349	454	
Totale, caso peggiore			1018	1439			349		
Probabilità di eliofania			0,44	0,48			0,47		
Tempo di operatività rid.			1,00	1,00			1,00		
Dir. del vento rid.			1,00	1,00			1,00		
Totale ridotto			0,44	0,48			0,47		
Totale effettivo			448	689			163		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Schweizer Straße 3a  
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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (76)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	19:09 (1) 06:26	06:54 (2) 06:57	07:17 (2) 06:32	07:08
	20:40	20:20	22 19:31 (1) 19:36	66 08:00 (2) 18:45	23 07:40 (2) 16:57	16:32
2	05:31	05:56	19:09 (1) 06:27	06:53 (2) 06:58	07:19 (2) 06:33	07:09
	20:40	20:19	22 19:31 (1) 19:35	67 08:00 (2) 18:43	20 07:39 (2) 16:56	16:32
3	05:31	05:57	19:08 (1) 06:28	06:52 (2) 06:59	07:20 (2) 06:35	07:10
	20:39	20:18	23 19:31 (1) 19:33	69 08:01 (2) 18:42	16 07:36 (2) 16:55	16:32
4	05:32	05:58	19:08 (1) 06:29	06:51 (2) 07:00	07:21 (2) 06:36	07:11
	20:39	20:17	24 19:32 (1) 19:31	70 08:01 (2) 18:40	15 07:36 (3) 16:54	16:32
5	05:33	05:59	19:08 (1) 06:31	06:51 (2) 07:01	07:22 (2) 06:37	07:12
	20:39	20:16	24 19:32 (1) 19:30	70 08:01 (2) 18:38	14 07:36 (3) 16:53	16:31
6	05:33	06:00	19:08 (1) 06:32	06:52 (2) 07:03	07:23 (3) 06:38	07:13
	20:39	20:14	24 19:32 (1) 19:28	69 08:01 (2) 18:37	13 07:36 (3) 16:51	16:31
7	05:34	06:01	19:08 (1) 06:33	06:53 (2) 07:04	07:24 (3) 06:40	07:14
	20:38	20:13	24 19:32 (1) 19:26	69 08:02 (2) 18:35	12 07:36 (3) 16:50	16:31
8	05:34	06:02	19:08 (1) 06:34	06:54 (2) 07:05	07:25 (3) 06:41	07:15
	20:38	20:12	23 19:31 (1) 19:25	68 08:02 (2) 18:33	10 07:35 (3) 16:49	16:31
9	05:35	06:03	19:08 (1) 06:35	06:55 (2) 07:06	07:26 (3) 06:42	07:16
	20:38	20:11	23 19:31 (1) 19:23	66 08:01 (2) 18:32	8 07:34 (3) 16:48	16:31
10	05:36	06:04	19:08 (1) 06:36	06:56 (2) 07:07	07:27 (3) 06:43	07:17
	20:37	20:09	23 19:31 (1) 19:21	65 08:01 (2) 18:30	7 07:34 (3) 16:47	16:31
11	05:37	06:05	19:09 (1) 06:37	06:57 (2) 07:08	07:28 (3) 06:44	07:17
	20:37	20:08	21 19:30 (1) 19:19	64 08:01 (2) 18:28	5 07:33 (3) 16:46	16:31
12	05:37	06:06	19:09 (1) 06:38	06:58 (2) 07:09	07:30 (3) 06:46	07:18
	20:36	20:07	20 19:29 (1) 19:18	63 08:01 (2) 18:27	2 07:32 (3) 16:45	16:31
13	05:38	06:07	19:10 (1) 06:39	06:59 (2) 07:10	06:47	07:19
	20:36	20:05	18 19:28 (1) 19:16	62 08:01 (2) 18:25	16:44	16:31
14	05:39	06:08	19:12 (1) 06:40	07:00 (2) 07:11	06:48	07:20
	20:35	20:04	14 19:26 (1) 19:14	60 08:00 (2) 18:23	16:43	16:32
15	05:40	06:09	19:13 (1) 06:41	07:01 (2) 07:12	06:49	07:21
	20:35	20:03	11 19:24 (1) 19:13	59 08:00 (2) 18:22	16:42	16:32
16	05:40	06:10	06:42	07:02 (2) 07:14	06:51	07:21
	20:34	20:01	19:11	57 07:59 (2) 18:20	16:41	16:32
17	05:41	06:11	06:43	07:03 (2) 07:15	06:52	07:22
	20:34	20:00	19:09	56 07:59 (2) 18:19	16:41	16:32
18	05:42	06:12	07:22 (2) 06:44	07:04 (2) 07:16	06:53	07:23
	20:33	19:58	18 07:40 (2) 19:07	54 07:58 (2) 18:17	16:40	16:33
19	05:43	06:13	07:17 (2) 06:45	07:05 (2) 07:17	06:54	07:23
	20:32	19:57	27 07:44 (2) 19:06	52 07:57 (2) 18:16	16:39	16:33
20	05:44	06:14	07:14 (2) 06:46	07:06 (2) 07:18	06:55	07:24
	20:31	19:55	33 07:47 (2) 19:04	50 07:56 (2) 18:14	16:38	16:33
21	05:45	06:15	07:12 (2) 06:47	07:07 (2) 07:19	06:56	07:24
	20:31	19:54	37 07:49 (2) 19:02	48 07:55 (2) 18:13	16:37	16:34
22	05:45	06:16	07:10 (2) 06:48	07:08 (2) 07:20	06:58	07:25
	20:30	19:52	41 07:51 (2) 19:00	46 07:54 (2) 18:11	16:37	16:34
23	05:46	06:17	07:08 (2) 06:49	07:09 (2) 07:22	06:59	07:25
	20:29	19:51	44 07:52 (2) 18:59	44 07:53 (2) 18:10	16:36	16:35
24	05:47	06:18	07:06 (2) 06:50	07:10 (2) 07:23	07:00	07:26
	20:28	19:49	48 07:54 (2) 18:57	42 07:52 (2) 18:08	16:36	16:35
25	05:48	06:19	07:04 (2) 06:51	07:11 (2) 06:24	07:01	07:26
	20:27	19:48	51 07:55 (2) 18:55	40 07:51 (2) 17:07	16:35	16:36
26	05:49	19:17 (1) 06:20	07:02 (2) 06:52	07:12 (2) 06:25	07:02	07:27
	20:26	7 19:24 (1) 19:46	54 07:56 (2) 18:54	37 07:49 (2) 17:05	16:35	16:37
27	05:50	19:15 (1) 06:21	07:01 (2) 06:53	07:13 (2) 06:26	07:03	07:27
	20:25	11 19:26 (1) 19:44	56 07:57 (2) 18:52	35 07:48 (2) 17:04	16:34	16:37
28	05:51	19:13 (1) 06:22	07:00 (2) 06:54	07:14 (2) 06:27	07:05	07:27
	20:24	14 19:27 (1) 19:43	58 07:58 (2) 18:50	32 07:46 (2) 17:03	16:34	16:38
29	05:52	19:12 (1) 06:23	06:58 (2) 06:55	07:15 (2) 06:29	07:06	07:28
	20:23	16 19:28 (1) 19:41	61 07:59 (2) 18:48	29 07:44 (2) 17:01	16:33	16:39
30	05:53	19:11 (1) 06:24	06:56 (2) 06:56	07:16 (2) 06:30	07:07	07:28
	20:22	18 19:29 (1) 19:40	63 07:59 (2) 18:47	26 07:42 (2) 17:00	16:33	16:39
31	05:54	19:10 (1) 06:25	06:55 (2)	06:31		07:28
	20:21	20 19:30 (1) 19:38	64 07:59 (2)	16:59		16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	86	971	1635	145		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	52	648	945	63		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (77)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (2) 07:30 (2)	06:46 19:26	06:00 19:58
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (2) 07:29 (2)	06:45 19:27	05:58 20:00
3	07:29 16:43	07:12 17:19	06:35 17:53	06:54 (2) 07:28 (2)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52 (2) 07:27 (2)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (2) 07:26 (2)	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:22	06:30 17:57	06:49 (2) 07:24 (2)	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	06:28 17:58	06:50 (2) 07:21 (2)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	06:27 17:59	06:53 (2) 07:20 (2)	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	06:25 18:00	06:55 (2) 07:16 (2)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	06:23 (2) 07:27 (2)	06:58 (2) 18:01	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	06:22 (2) 07:28 (2)	06:30 18:03	06:30 19:37	05:47 20:09
12	07:28 16:52	07:02 17:30	06:20 (2) 07:29 (2)	06:28 18:04	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	06:18 (2) 07:31 (2)	06:18 18:05	06:26 19:39	05:45 20:11
14	07:27 16:54	07:00 17:33	06:17 (2) 07:31 (2)	06:17 18:06	06:25 19:40	05:44 20:12
15	07:26 16:55	06:58 17:34	06:15 (2) 07:32 (2)	06:15 18:07	06:23 19:41	05:43 20:13
16	07:26 16:56	06:57 17:35	06:13 (2) 07:32 (2)	06:13 18:08	06:22 19:42	05:42 20:14
17	07:26 16:58	06:56 17:36	06:12 (2) 07:33 (2)	06:12 18:09	06:20 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	06:10 (2) 07:34 (2)	06:10 18:10	06:19 19:44	05:40 20:16
19	07:25 17:00	06:53 17:39	06:08 (2) 07:33 (2)	06:08 18:12	06:17 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	06:07 (2) 07:34 (2)	06:07 18:13	06:15 19:47	05:38 20:18
21	07:23 17:02	06:50 17:41	06:05 (2) 07:33 (2)	06:05 18:14	06:14 19:48	05:38 20:19
22	07:23 17:04	06:48 17:43	06:03 (2) 07:34 (2)	06:03 18:15	06:12 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	06:02 (2) 07:33 (2)	06:02 18:16	06:11 19:50	05:36 20:21
24	07:21 17:06	06:45 17:45	06:00 (2) 07:33 (2)	06:00 18:17	06:09 19:51	05:35 20:22
25	07:21 17:07	06:44 17:46	05:58 (2) 07:33 (2)	05:58 18:18	06:08 19:52	05:34 20:23
26	07:20 17:09	06:42 17:47	05:56 (2) 07:33 (2)	05:56 18:19	06:07 19:53	05:34 20:24
27	07:19 17:10	06:41 17:49	05:55 (2) 07:32 (2)	05:55 18:20	06:05 19:54	05:33 20:25
28	07:18 17:11	06:39 17:50	05:53 (2) 07:32 (2)	05:53 18:21	06:04 19:55	05:32 20:26
29	07:17 17:12		05:51 (2) 19:23	05:51 19:24	06:02 19:56	05:32 20:27
30	07:16 17:14		05:50 (2) 19:24	05:50 19:25	06:01 19:57	05:31 20:28
31	07:15 17:15		05:48 (2) 19:25	05:48 19:26	06:00 19:58	05:30 20:29
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		380	299	409	56	
Probabilità di eliofania		0,46	0,44	0,48	0,47	
Tempo di operatività rid.		1,00	1,00	1,00	1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00	
Totale ridotto		0,46	0,44	0,48	0,47	
Totale effettivo		173	132	196	26	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (77)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	06:54 (2) 06:56 (2)
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	18:57 (1) 19:06 (1)	06:35 19:23	07:06 18:32	06:42 16:48
10	05:36 20:37	06:04 20:09	18:55 (1) 19:09 (1)	06:36 19:21	07:07 18:30	06:43 16:47
11	05:37 20:37	06:05 20:08	18:53 (1) 19:10 (1)	06:37 19:19	07:08 18:28	06:44 16:46
12	05:37 20:36	06:06 20:07	18:51 (1) 19:12 (1)	06:38 19:18	07:09 18:27	06:46 16:45
13	05:38 20:36	06:07 20:05	18:50 (1) 19:13 (1)	06:39 19:16	07:10 18:25	06:47 16:44
14	05:39 20:35	06:08 20:04	18:49 (1) 19:13 (1)	06:40 19:14	07:11 18:23	06:48 16:43
15	05:40 20:35	06:09 20:03	18:48 (1) 19:14 (1)	06:41 19:13	07:12 18:22	06:49 16:42
16	05:40 20:34	06:10 20:01	18:47 (1) 19:14 (1)	06:42 19:11	07:14 18:20	06:51 16:41
17	05:41 20:34	06:11 20:00	18:47 (1) 19:14 (1)	06:43 19:09	07:15 18:19	06:52 16:41
18	05:42 20:33	06:12 19:58	18:46 (1) 19:14 (1)	06:44 19:07	07:16 18:17	06:53 16:40
19	05:43 20:32	06:13 19:57	18:46 (1) 19:14 (1)	06:45 19:06	07:17 18:16	06:54 16:39
20	05:44 20:31	06:14 19:55	18:46 (1) 19:14 (1)	06:46 19:04	07:18 18:14	06:55 16:38
21	05:45 20:31	06:15 19:54	18:46 (1) 19:14 (1)	06:47 19:02	07:19 18:13	06:57 16:38
22	05:45 20:30	06:16 19:52	18:46 (1) 19:13 (1)	06:48 19:00	07:20 18:11	06:58 16:37
23	05:46 20:29	06:17 19:51	18:46 (1) 19:13 (1)	06:49 18:59	07:22 18:10	06:59 16:36
24	05:47 20:28	06:18 19:49	18:46 (1) 19:12 (1)	06:50 18:57	07:23 18:08	07:00 16:36
25	05:48 20:27	06:19 19:48	18:47 (1) 19:11 (1)	06:51 18:55	06:24 17:07	07:01 16:35
26	05:49 20:26	06:20 19:46	18:47 (1) 19:09 (1)	06:52 18:54	06:25 17:05	07:02 16:35
27	05:50 20:25	06:21 19:44	18:48 (1) 19:08 (1)	06:53 18:52	06:26 17:04	07:03 16:34
28	05:51 20:24	06:22 19:43	18:50 (1) 19:06 (1)	06:54 18:50	06:27 17:03	07:05 16:34
29	05:52 20:23	06:23 19:41	18:52 (1) 19:03 (1)	06:55 18:48	06:29 17:01	07:06 16:33
30	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	06:52 (2) 06:59 (2)	07:07 16:33
31	05:54 20:21	06:25 19:38		06:31 16:59	06:53 (2) 06:58 (2)	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		473		682	2	
Probabilità di eliofania		0,67		0,44	0,40	
Tempo di operatività rid.		1,00		1,00	1,00	
Dir. del vento rid.		1,00		1,00	1,00	
Totale ridotto		0,67		0,44	0,40	
Totale effettivo		315		297	1	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (78)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (2) 07:39 (2)	06:46 19:26	06:00 19:58
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (2) 07:39 (2)	06:45 19:27	05:58 20:00
3	07:29 16:43	07:12 17:19	06:35 17:53	06:54 (2) 07:39 (2)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52 (2) 07:38 (2)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (2) 07:38 (2)	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:22	06:30 17:57	06:49 (2) 07:36 (2)	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	06:28 17:58	06:47 (2) 07:35 (2)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46 (2) 07:35 (2)	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	06:25 18:00	06:45 (2) 07:33 (2)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	07:24 (2) 07:28 (2)	06:23 18:01	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	07:23 (2) 07:30 (2)	06:22 18:03	06:30 19:37	05:47 20:09
12	07:28 16:52	07:02 17:30	07:22 (2) 07:32 (2)	06:20 18:04	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	07:21 (2) 07:34 (2)	06:18 18:05	06:26 19:39	05:45 20:11
14	07:27 16:54	07:00 17:33	07:19 (2) 07:34 (2)	06:17 18:06	06:25 19:40	05:44 20:12
15	07:26 16:55	06:58 17:34	07:18 (2) 07:36 (2)	06:15 18:07	06:23 19:41	05:43 20:13
16	07:26 16:56	06:57 17:35	07:16 (2) 07:36 (2)	06:13 18:08	06:22 19:42	05:42 20:14
17	07:26 16:58	06:56 17:36	07:15 (2) 07:37 (2)	06:12 18:09	06:20 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	07:14 (2) 07:38 (2)	06:10 18:10	06:19 19:44	05:40 20:16
19	07:25 17:00	06:53 17:39	07:12 (2) 07:39 (2)	06:08 18:12	06:17 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	07:11 (2) 07:39 (2)	06:07 18:13	06:15 19:47	05:38 20:18
21	07:23 17:02	06:50 17:41	07:09 (2) 07:39 (2)	06:05 18:14	06:14 19:48	05:38 20:19
22	07:23 17:04	06:48 17:42	07:08 (2) 07:40 (2)	06:03 18:15	06:12 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	07:06 (2) 07:40 (2)	06:02 18:16	06:11 19:50	05:36 20:21
24	07:21 17:06	06:45 17:45	07:05 (2) 07:40 (2)	06:00 18:17	06:09 19:51	05:35 20:22
25	07:21 17:07	06:44 17:46	07:03 (2) 07:40 (2)	05:58 18:18	06:08 19:52	05:34 20:23
26	07:20 17:09	06:42 17:47	07:02 (2) 07:41 (2)	05:56 18:19	06:07 19:53	05:34 20:24
27	07:19 17:10	06:41 17:49	07:00 (2) 07:40 (2)	05:55 18:20	06:05 19:54	05:33 20:25
28	07:18 17:11	06:39 17:50	06:59 (2) 07:40 (2)	05:53 18:21	06:04 19:55	05:32 20:25
29	07:17 17:12		06:51 19:23	06:02 19:56	06:02 19:56	05:32 20:26
30	07:16 17:14		06:50 19:24	06:01 19:57	06:01 19:57	05:31 20:27
31	07:15 17:15		06:48 19:25		05:31 20:28	05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		476	667	332	79	
Probabilità di eliofania		0,46	0,44	0,48	0,47	
Tempo di operatività rid.		1,00	1,00	1,00	1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00	
Totale ridotto		0,46	0,44	0,48	0,47	
Totale effettivo		217	293	159	37	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: BZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (78)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	07:28 (2) 08:06 (2)	06:32 06:57 (2)
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	07:27 (2) 08:08 (2)	06:33 16:56
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	07:25 (2) 08:09 (2)	06:35 16:55
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	07:23 (2) 08:10 (2)	06:36 16:54
5	05:33 20:39	05:59 20:16	06:31 19:30	07:01 18:38	07:22 (2) 08:11 (2)	06:37 16:53
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	07:23 (2) 08:11 (2)	06:38 16:51
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	07:24 (2) 08:12 (2)	06:40 16:50
8	05:34 20:38	06:02 20:12	18:59 (1) 19:10 (1)	06:34 19:25	07:05 18:33	06:41 16:49
9	05:35 20:38	06:03 20:11	18:57 (1) 19:12 (1)	06:35 19:23	07:06 18:32	06:42 16:48
10	05:36 20:37	06:04 20:09	18:55 (1) 19:13 (1)	06:36 19:21	07:07 18:30	06:43 16:47
11	05:37 20:37	06:05 20:08	18:54 (1) 19:14 (1)	06:37 19:19	07:08 18:28	06:44 16:46
12	05:37 20:36	06:06 20:07	18:53 (1) 19:15 (1)	06:38 19:18	07:09 18:27	06:46 16:45
13	05:38 20:36	06:07 20:05	18:52 (1) 19:15 (1)	06:39 19:16	07:10 18:25	06:47 16:44
14	05:39 20:35	06:08 20:04	18:51 (1) 19:16 (1)	06:40 19:14	07:11 18:23	06:48 16:43
15	05:40 20:34	06:09 20:03	18:51 (1) 19:16 (1)	06:41 19:13	07:12 18:22	06:49 16:42
16	05:40 20:34	06:10 20:01	18:50 (1) 19:16 (1)	06:42 19:11	07:14 18:20	06:51 16:41
17	05:41 20:34	06:11 20:00	18:50 (1) 19:16 (1)	06:43 19:09	07:15 18:19	06:52 16:41
18	05:42 20:33	06:12 19:58	18:50 (1) 19:16 (1)	06:44 19:07	07:16 18:17	06:53 16:40
19	05:43 20:32	06:13 19:57	18:49 (1) 19:16 (1)	06:45 19:06	07:17 18:16	06:54 16:39
20	05:44 20:31	06:14 19:55	18:49 (1) 19:15 (1)	06:46 19:04	07:18 18:14	06:55 16:38
21	05:45 20:31	06:15 19:54	18:50 (1) 19:14 (1)	06:47 19:02	07:19 18:13	06:56 16:38
22	05:45 20:30	06:16 19:52	18:50 (1) 19:14 (1)	06:48 19:00	07:20 18:11	06:58 16:37
23	05:46 20:29	06:17 19:51	18:50 (1) 19:13 (1)	06:49 18:59	07:22 18:10	06:59 16:36
24	05:47 20:28	06:18 19:49	18:51 (1) 19:11 (1)	06:50 18:57	07:23 18:08	07:00 16:36
25	05:48 20:27	06:19 19:48	18:52 (1) 19:10 (1)	06:51 18:55	06:24 17:07	07:01 16:35
26	05:49 20:26	06:20 19:46	18:54 (1) 19:08 (1)	06:52 18:54	06:25 17:05	07:02 16:35
27	05:50 20:25	06:21 19:44	18:57 (1) 19:04 (1)	06:53 18:52	06:26 17:04	07:03 16:34
28	05:51 20:24	06:22 19:43	06:54 18:50	07:36 (2) 08:00 (2)	06:27 17:03	07:05 16:34
29	05:52 20:23	06:23 19:41	06:55 18:48	07:32 (2) 08:03 (2)	06:29 17:01	07:06 16:33
30	05:53 20:22	06:24 19:40	06:56 18:47	07:30 (2) 08:05 (2)	06:30 17:00	07:07 16:33
31	05:54 20:21	06:25 19:38		06:31 16:59	06:53 (2) 06:59 (2)	
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		420	107	1044	3	
Probabilità di eliofania		0,67	0,58	0,44	0,40	
Tempo di operatività rid.		1,00	1,00	1,00	1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00	
Totale ridotto		0,67	0,58	0,44	0,40	
Totale effettivo		280	62	454	1	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (79)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (2) 07:38 (2)	06:46 19:26	06:00 19:58
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (2) 07:37 (2)	06:45 19:27	05:58 20:00
3	07:29 16:43	07:12 17:19	06:35 17:53	06:54 (2) 07:36 (2)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52 (2) 07:35 (2)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (2) 07:34 (2)	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:22	06:30 17:57	06:51 (2) 07:32 (2)	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	07:28 (2) 06:28	06:51 (2) 07:30 (2)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	07:27 (2) 06:27	06:53 (2) 07:29 (2)	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	07:26 (2) 06:25	06:55 (2) 07:26 (2)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	07:24 (2) 06:23	06:56 (2) 07:23 (2)	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	07:23 (2) 06:22	07:00 (2) 07:21 (2)	06:30 19:37	05:47 20:09
12	07:28 16:52	07:02 17:30	07:22 (2) 06:20	07:04 (2) 07:15 (2)	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	07:21 (2) 06:18	07:19 (2) 06:17	06:18 19:39	05:45 20:11
14	07:27 16:54	07:00 17:33	07:19 (2) 06:17	07:38 (2) 06:15	06:25 19:40	18:53 (1) 19:01 (1)
15	07:26 16:55	06:58 17:34	07:18 (2) 06:15	07:39 (2) 06:13	06:23 19:41	18:49 (1) 19:03 (1)
16	07:26 16:56	06:57 17:35	07:16 (2) 06:13	07:39 (2) 06:12	06:22 19:42	18:46 (1) 19:05 (1)
17	07:26 16:58	06:56 17:36	07:15 (2) 06:12	07:40 (2) 06:10	06:20 19:43	18:45 (1) 19:06 (1)
18	07:25 16:59	06:54 17:38	07:14 (2) 06:10	07:41 (2) 06:08	06:19 19:44	18:43 (1) 19:06 (1)
19	07:25 17:00	06:53 17:39	07:12 (2) 06:08	07:40 (2) 06:07	06:17 19:45	18:43 (1) 19:08 (1)
20	07:24 17:01	06:51 17:40	07:11 (2) 06:07	07:41 (2) 06:05	06:15 19:46	18:42 (1) 19:07 (1)
21	07:23 17:02	06:50 17:41	07:09 (2) 06:05	07:40 (2) 06:03	06:14 19:47	18:42 (1) 19:08 (1)
22	07:23 17:04	06:48 17:42	07:08 (2) 06:03	07:41 (2) 06:02	06:12 19:48	18:41 (1) 19:07 (1)
23	07:22 17:05	06:47 17:44	07:06 (2) 06:02	07:40 (2) 06:00	06:11 19:49	18:41 (1) 19:08 (1)
24	07:21 17:06	06:45 17:45	07:05 (2) 06:00	07:41 (2) 05:58	06:09 19:50	18:41 (1) 19:08 (1)
25	07:21 17:07	06:44 17:46	07:03 (2) 05:58	07:40 (2) 05:56	06:08 19:51	18:41 (1) 19:07 (1)
26	07:20 17:09	06:42 17:47	07:02 (2) 05:56	07:40 (2) 05:55	06:07 19:52	18:41 (1) 19:07 (1)
27	07:19 17:10	06:41 17:49	07:00 (2) 05:55	07:39 (2) 05:53	06:05 19:53	18:41 (1) 19:06 (1)
28	07:18 17:11	06:39 17:50	06:59 (2) 05:53	07:39 (2) 05:51	06:04 19:54	18:42 (1) 19:05 (1)
29	07:17 17:12		07:39 (2) 05:51		06:02 19:55	18:43 (1) 19:05 (1)
30	07:16 17:14				06:01 19:56	18:43 (1) 19:05 (1)
31	07:15 17:15				06:00 19:57	18:43 (1) 19:03 (1)
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		530	417	383	41	
Probabilità di eliofania		0,46	0,44	0,48	0,47	
Tempo di operatività rid.		1,00	1,00	1,00	1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00	
Totale ridotto		0,46	0,44	0,48	0,47	
Totale effettivo		242	183	183	19	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (79)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	06:26	06:57	06:32	06:54 (2)
	20:40	20:20	19:36	18:45	16:57	10 07:04 (2)
2	05:31	05:56	06:27	06:58	07:40 (2)	06:33
	20:40	20:19	19:35	18:43	17 07:57 (2)	16:56
3	05:31	05:57	06:28	06:59	07:36 (2)	06:35
	20:39	20:18	19:33	18:42	25 08:01 (2)	16:55
4	05:32	05:58	06:29	07:00	07:33 (2)	06:36
	20:39	20:17	19:31	18:40	30 08:03 (2)	16:54
5	05:33	05:59	06:31	07:01	07:31 (2)	06:37
	20:39	20:16	19:30	18:38	34 08:05 (2)	16:53
6	05:33	06:00	06:32	07:03	07:29 (2)	06:38
	20:39	20:14	19:28	18:37	37 08:06 (2)	16:51
7	05:34	06:01	06:33	07:04	07:27 (2)	06:40
	20:38	20:13	19:26	18:35	40 08:07 (2)	16:50
8	05:34	06:02	06:34	07:05	07:25 (2)	06:41
	20:38	20:12	19:25	18:33	43 08:08 (2)	16:49
9	05:35	06:03	06:35	07:06	07:26 (2)	06:42
	20:38	20:11	19:23	18:32	43 08:09 (2)	16:48
10	05:36	06:04	18:57 (1)	06:36	07:07	07:27 (2)
	20:37	20:09	19:07 (1)	19:21	18:30	42 08:09 (2)
11	05:37	06:05	18:54 (1)	06:37	07:08	07:28 (2)
	20:37	20:08	19:09 (1)	19:19	18:28	42 08:10 (2)
12	05:37	06:06	18:53 (1)	06:38	07:09	07:30 (2)
	20:36	20:07	19:11 (1)	19:18	18:27	41 08:11 (2)
13	05:38	06:07	18:51 (1)	06:39	07:10	07:31 (2)
	20:36	20:05	19:12 (1)	19:16	18:25	40 08:11 (2)
14	05:39	06:08	18:50 (1)	06:40	07:11	07:32 (2)
	20:35	20:04	19:13 (1)	19:14	18:23	40 08:12 (2)
15	05:40	06:09	18:49 (1)	06:41	07:12	07:33 (2)
	20:35	20:03	19:13 (1)	19:13	18:22	39 08:12 (2)
16	05:40	06:10	18:48 (1)	06:42	07:14	07:34 (2)
	20:34	20:01	19:14 (1)	19:11	18:20	38 08:12 (2)
17	05:41	06:11	18:48 (1)	06:43	07:15	07:35 (2)
	20:34	20:00	19:14 (1)	19:09	18:19	36 08:11 (2)
18	05:42	06:12	18:47 (1)	06:44	07:16	07:37 (2)
	20:33	19:58	19:14 (1)	19:07	18:17	35 08:12 (2)
19	05:43	06:13	18:47 (1)	06:45	07:17	07:38 (2)
	20:32	19:57	19:14 (1)	19:06	18:16	34 08:12 (2)
20	05:44	06:14	18:47 (1)	06:46	07:18	07:39 (2)
	20:31	19:55	19:14 (1)	19:04	18:14	32 08:11 (2)
21	05:45	06:15	18:46 (1)	06:47	07:19	07:40 (2)
	20:31	19:54	19:13 (1)	19:02	18:13	31 08:11 (2)
22	05:45	06:16	18:46 (1)	06:48	07:20	07:41 (2)
	20:30	19:52	19:13 (1)	19:00	18:11	29 08:10 (2)
23	05:46	06:17	18:47 (1)	06:49	07:22	07:43 (2)
	20:29	19:51	19:12 (1)	18:59	18:10	28 08:11 (2)
24	05:47	06:18	18:47 (1)	06:50	07:23	07:44 (2)
	20:28	19:49	19:11 (1)	18:57	18:08	26 08:10 (2)
25	05:48	06:19	18:47 (1)	06:51	06:24	06:45 (2)
	20:27	19:48	19:10 (1)	18:55	17:07	24 07:09 (2)
26	05:49	06:20	18:48 (1)	06:52	06:25	06:46 (2)
	20:26	19:46	19:09 (1)	18:54	17:05	23 07:09 (2)
27	05:50	06:21	18:49 (1)	06:53	06:26	06:48 (2)
	20:25	19:44	19:07 (1)	18:52	17:04	21 07:09 (2)
28	05:51	06:22	18:51 (1)	06:54	06:27	06:49 (2)
	20:24	19:43	19:05 (1)	18:50	17:03	19 07:08 (2)
29	05:52	06:23	18:54 (1)	06:55	06:29	06:50 (2)
	20:23	19:41	8 19:02 (1)	18:48	17:01	17 07:07 (2)
30	05:53	06:24	06:56	06:30	06:52 (2)	07:07
	20:22	19:40	18:47	17:00	14 07:06 (2)	16:33
31	05:54	06:25	06:31	06:31	06:53 (2)	07:28
	20:21	19:38	16:59	12 07:05 (2)	16:40	16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		431		932	23	
Probabilità di eliofania		0,67		0,44	0,40	
Tempo di operatività rid.		1,00		1,00	1,00	
Dir. del vento rid.		1,00		1,00	1,00	
Totale ridotto		0,67		0,44	0,40	
Totale effettivo		287		406	9	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (80)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Schweizer Straße 3a  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (81)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
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15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
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23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
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26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
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30	07:16 17:14	06:35 17:47	05:50 18:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:34 17:46	05:49 18:25	06:00 19:58	05:30 20:28	05:29 20:40	05:54 20:21	06:25 19:38	06:57 18:36	06:31 16:59	07:08 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (82)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
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31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (84)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	07:05 (5) 19:58	06:00 06:51 (5)
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	07:03 (5) 19:59	06:52 (5) 20:29
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	07:01 (5) 19:58	06:52 (5) 20:30
4	07:28 16:44	07:11 17:20	06:33 17:54	06:41 19:29	07:00 (5) 19:59	06:53 (5) 20:31
5	07:28 16:45	07:10 17:21	06:31 17:56	06:39 19:30	06:58 (5) 20:03	06:54 (5) 20:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	06:56 (5) 20:04	06:55 (5) 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	06:56 (5) 20:05	06:56 (5) 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	06:54 (5) 20:06	06:58 (5) 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	06:53 (5) 20:07	06:58 (5) 20:34
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	06:53 (5) 20:08	07:00 (5) 20:35
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	06:51 (5) 20:09	07:02 (5) 20:35
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	06:51 (5) 20:10	07:04 (5) 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	06:50 (5) 20:11	07:07 (5) 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	06:49 (5) 20:12	07:10 (5) 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:49 (5) 20:13	07:10 (5) 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	06:49 (5) 20:14	07:10 (5) 20:37
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	06:49 (5) 20:15	07:10 (5) 20:38
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18 19:44	06:48 (5) 20:16	07:10 (5) 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	06:48 (5) 20:17	07:10 (5) 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	06:48 (5) 20:18	07:10 (5) 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:47	06:48 (5) 20:19	07:10 (5) 20:39
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12 19:49	06:48 (5) 20:20	07:10 (5) 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	06:48 (5) 20:21	07:10 (5) 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	06:48 (5) 20:22	07:10 (5) 20:39
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	06:48 (5) 20:23	07:10 (5) 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	06:49 (5) 20:24	07:10 (5) 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	06:49 (5) 20:24	07:10 (5) 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	06:49 (5) 20:25	07:10 (5) 20:40
29	07:17 17:12	06:39 19:22	05:51 07:12 (5)	06:02 07:12 (5)	06:50 (5) 06:50 (5)	07:10 (5) 07:10 (5)
30	07:16 17:13	06:50 19:24	07:09 (5) 07:46 (5)	06:01 07:46 (5)	06:50 (5) 07:47 (5)	07:10 (5) 20:27
31	07:15 17:15	06:48 19:25	07:06 (5) 07:47 (5)	06:00 07:47 (5)	06:50 (5) 07:47 (5)	07:10 (5) 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore			151	1831	542	
Probabilità di eliofania			0,44	0,48	0,47	
Tempo di operatività rid.			1,00	1,00	1,00	
Dir. del vento rid.			1,00	1,00	1,00	
Totale ridotto			0,44	0,48	0,47	
Totale effettivo			66	876	253	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (84)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40	05:55 20:20	07:14 (5) 07:41 (5)	06:26 19:36	06:50 (5) 07:54 (5)	06:57 18:45	06:32 16:57	07:08 16:32
2	05:31 20:39	05:56 20:19	07:12 (5) 07:43 (5)	06:27 19:35	06:51 (5) 07:54 (5)	06:58 18:43	06:33 16:56	07:09 16:32
3	05:31 20:39	05:57 20:18	07:10 (5) 07:45 (5)	06:28 19:33	06:51 (5) 07:53 (5)	06:59 18:41	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	07:08 (5) 07:46 (5)	06:29 19:31	06:51 (5) 07:52 (5)	07:00 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:15	07:07 (5) 07:48 (5)	06:30 19:30	06:52 (5) 07:51 (5)	07:01 18:38	06:37 16:52	07:12 16:31
6	05:33 20:39	06:00 20:14	07:06 (5) 07:49 (5)	06:31 19:28	06:52 (5) 07:50 (5)	07:02 18:36	06:38 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	07:04 (5) 07:50 (5)	06:32 19:26	06:53 (5) 07:49 (5)	07:04 18:35	06:39 16:50	07:14 16:31
8	05:34 20:38	06:02 20:12	07:03 (5) 07:51 (5)	06:33 19:24	06:54 (5) 07:47 (5)	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	07:02 (5) 07:52 (5)	06:34 19:23	06:55 (5) 07:46 (5)	07:06 18:31	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	07:01 (5) 07:53 (5)	06:35 19:21	06:56 (5) 07:44 (5)	07:07 18:30	06:43 16:47	07:16 16:31
11	05:36 20:37	06:05 20:08	07:00 (5) 07:54 (5)	06:37 19:19	06:57 (5) 07:42 (5)	07:08 18:28	06:44 16:46	07:17 16:31
12	05:37 20:36	06:06 20:07	06:59 (5) 07:55 (5)	06:38 19:18	06:58 (5) 07:40 (5)	07:09 18:27	06:46 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:58 (5) 07:55 (5)	06:39 19:16	06:58 (5) 07:38 (5)	07:10 18:25	06:47 16:44	07:19 16:31
14	05:39 20:35	06:08 20:04	06:58 (5) 07:56 (5)	06:40 19:14	07:02 (5) 07:35 (5)	07:11 18:23	06:48 16:43	07:20 16:32
15	05:39 20:35	06:09 20:02	06:57 (5) 07:57 (5)	06:41 19:12	07:04 (5) 07:31 (5)	07:12 18:22	06:49 16:42	07:20 16:32
16	05:40 20:34	06:10 20:01	06:56 (5) 07:57 (5)	06:42 19:11	07:08 (5) 07:27 (5)	07:13 18:20	06:50 16:41	07:21 16:32
17	05:41 20:33	06:11 20:00	06:55 (5) 07:57 (5)	06:43 19:09	07:15 18:19	07:15 18:19	06:52 16:40	07:22 16:32
18	05:42 20:33	06:12 19:58	06:55 (5) 07:58 (5)	06:44 19:07	07:16 18:17	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:54 (5) 07:58 (5)	06:45 19:06	07:17 18:16	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	06:54 (5) 07:58 (5)	06:46 19:04	07:18 18:14	07:18 18:14	06:55 16:38	07:24 16:33
21	05:44 20:30	06:15 19:54	06:53 (5) 07:58 (5)	06:47 19:02	07:19 18:13	07:19 18:13	06:56 16:37	07:24 16:34
22	05:45 20:30	06:16 19:52	06:53 (5) 07:58 (5)	06:48 19:00	07:20 18:11	07:20 18:11	06:58 16:37	07:25 16:34
23	05:46 20:29	06:17 19:51	06:52 (5) 07:59 (5)	06:49 18:59	07:21 18:10	07:21 18:10	06:59 16:36	07:25 16:35
24	05:47 20:28	06:18 19:49	06:52 (5) 07:58 (5)	06:50 18:57	07:23 18:08	07:23 18:08	07:00 16:36	07:26 16:35
25	05:48 20:27	06:19 19:47	06:51 (5) 07:57 (5)	06:51 18:55	06:24 17:07	06:24 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 19:46	06:51 (5) 07:57 (5)	06:52 18:53	06:25 17:05	06:25 17:05	07:02 16:34	07:27 16:37
27	05:50 20:25	06:21 19:44	06:50 (5) 07:57 (5)	06:53 18:52	06:26 17:04	06:26 17:04	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	06:50 (5) 07:57 (5)	06:54 18:50	06:27 17:03	06:27 17:03	07:04 16:33	07:27 16:38
29	05:52 20:23	07:25 (5) 07:29 (5)	06:23 19:41	06:50 (5) 07:56 (5)	06:29 18:48	06:29 17:01	07:05 16:33	07:28 16:39
30	05:53 20:22	07:19 (5) 07:35 (5)	06:24 19:39	06:50 (5) 07:56 (5)	06:30 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	05:54 20:21	07:16 (5) 07:38 (5)	06:25 19:38	06:50 (5) 07:55 (5)	06:31 16:59	06:31 16:59	07:28 16:40	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286		
Totale, caso peggiore			1736	779				
Probabilità di eliofania	0,61		0,67	0,58				
Tempo di operatività rid.	1,00		1,00	1,00				
Dir. del vento rid.	1,00		1,00	1,00				
Totale ridotto	0,61		0,67	0,58				
Totale effettivo	25		1158	450				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (85)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for specific dates, showing start/end times and shadow reduction data. Includes summary rows at the bottom for total potential and effective shadow hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CH - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (86)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:14 17:16	07:35 (5) 08:00 (5)	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	19:19 (3) 20:01 (3)
2	07:28 16:42	07:13 17:17	07:34 (5) 08:00 (5)	06:36 17:52	06:44 19:27	05:58 19:59	05:30 20:29	19:19 (3) 20:01 (3)
3	07:28 16:43	07:12 17:19	07:33 (5) 08:01 (5)	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	19:19 (3) 20:02 (3)
4	07:29 16:44	07:11 17:20	07:31 (5) 08:00 (5)	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	19:19 (3) 20:02 (3)
5	07:29 16:45	07:10 17:21	07:30 (5) 08:01 (5)	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31	19:19 (3) 20:02 (3)
6	07:28 16:46	07:09 17:22	07:29 (5) 08:01 (5)	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	19:19 (3) 20:03 (3)
7	07:28 16:47	07:08 17:24	07:28 (5) 08:01 (5)	06:28 17:58	06:36 19:32	05:52 20:05	05:28 19:40 (2)	19:19 (3) 20:03 (3)
8	07:28 16:48	07:07 17:25	07:27 (5) 08:01 (5)	06:27 17:59	06:34 19:33	05:51 20:06	05:27 19:42 (2)	19:19 (3) 20:04 (3)
9	07:28 16:49	07:06 17:26	07:26 (5) 08:02 (5)	06:25 18:00	06:33 19:34	05:50 20:07	05:27 19:43 (2)	19:19 (3) 20:03 (3)
10	07:28 16:50	07:04 17:27	07:24 (5) 08:01 (5)	06:23 18:01	06:31 19:36	05:48 20:08	05:27 19:44 (2)	19:19 (3) 20:04 (3)
11	07:28 16:51	07:03 17:29	07:23 (5) 08:00 (5)	06:22 18:02	06:30 19:37	05:47 20:09	05:27 19:45 (2)	19:19 (3) 20:04 (3)
12	07:27 16:52	07:02 17:30	07:24 (5) 08:00 (5)	06:20 18:04	06:28 19:38	05:46 20:10	05:27 19:46 (2)	19:19 (3) 20:04 (3)
13	07:27 16:53	07:01 17:31	07:24 (5) 07:59 (5)	06:18 18:05	06:26 19:39	05:45 20:11	05:27 19:46 (2)	19:20 (3) 20:05 (3)
14	07:27 16:54	06:59 17:33	07:25 (5) 07:59 (5)	06:17 18:06	06:25 19:40	05:44 20:12	05:27 19:47 (2)	19:20 (3) 20:05 (3)
15	07:26 16:55	06:58 17:34	07:26 (5) 07:58 (5)	06:15 18:07	06:23 19:41	05:43 20:13	05:27 19:47 (2)	19:20 (3) 20:05 (3)
16	07:26 16:56	06:57 17:35	07:26 (5) 07:56 (5)	06:13 18:08	06:22 19:42	05:42 20:14	05:27 19:47 (2)	19:20 (3) 20:05 (3)
17	07:25 16:58	06:55 17:36	07:28 (5) 07:55 (5)	06:12 18:09	06:20 19:43	05:41 20:15	05:27 19:48 (2)	19:20 (3) 20:05 (3)
18	07:25 16:59	06:54 17:37	07:30 (5) 07:54 (5)	06:10 18:10	06:18 19:44	05:40 20:16	05:27 19:49 (3)	19:20 (3) 20:06 (3)
19	07:24 17:00	06:53 17:39	07:31 (5) 07:51 (5)	06:08 18:11	06:17 19:45	05:39 20:17	05:27 19:51 (3)	19:20 (3) 20:06 (3)
20	07:24 17:01	06:51 17:40	07:35 (5) 07:48 (5)	06:07 18:13	06:15 19:46	05:38 20:18	05:27 19:52 (3)	19:22 (3) 20:07 (3)
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:37 19:53 (3)	05:27 20:39	19:22 (3) 20:07 (3)
22	07:23 17:04	07:44 (5) 07:48 (5)	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 19:55 (3)	19:22 (3) 20:07 (3)
23	07:22 17:05	07:43 (5) 07:49 (5)	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	05:27 19:55 (3)	19:21 (3) 20:07 (3)
24	07:21 17:06	07:42 (5) 07:51 (5)	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 19:56 (3)	19:22 (3) 20:08 (3)
25	07:20 17:07	07:41 (5) 07:52 (5)	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 19:56 (3)	19:22 (3) 20:08 (3)
26	07:20 17:08	07:40 (5) 07:53 (5)	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	05:28 19:58 (3)	19:22 (3) 20:07 (3)
27	07:19 17:10	07:40 (5) 07:55 (5)	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	05:29 19:58 (3)	19:23 (3) 20:08 (3)
28	07:18 17:11	07:39 (5) 07:56 (5)	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 19:59 (3)	19:23 (3) 20:08 (3)
29	07:17 17:12	07:38 (5) 07:57 (5)	06:38 17:51	06:51 19:22	06:02 19:56	05:32 20:26	05:29 19:59 (3)	19:23 (3) 20:08 (3)
30	07:16 17:13	07:37 (5) 07:58 (5)	06:37 17:52	06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:00 (3)	19:24 (3) 20:08 (3)
31	07:15 17:15	07:36 (5) 07:59 (5)	06:36 17:53	06:48 19:25	05:31 20:28	05:31 20:28	05:30 20:00 (3)	19:24 (3) 20:08 (3)
Ore potenziali eliofania	296	296	369	399	450	454	1339	0,54
Totale, caso peggiore	138	599			717		1339	0,54
Probabilità di eliofania	0,44	0,46			0,47		0,54	0,54
Tempo di operatività rid.	1,00	1,00			1,00		1,00	1,00
Dir. del vento rid.	1,00	1,00			1,00		1,00	1,00
Totale ridotto	0,44	0,46			0,47		0,54	0,54
Totale effettivo	61	273			334		723	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CH - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (86)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio		Agosto		Settembre		Ottobre		Novembre		Dicembre	
1	05:30		19:23 (3)	05:55		19:34 (2)	06:26	06:57	06:32		06:54 (5)	07:08
	20:40	45	20:08 (3)	20:20	22	19:56 (2)	19:36	18:45	16:57	36	07:30 (5)	16:32
2	05:31		19:24 (3)	05:56		19:35 (2)	06:27	06:58	06:33		06:55 (5)	07:09
	20:39	45	20:09 (3)	20:19	20	19:55 (2)	19:35	18:43	16:56	35	07:30 (5)	16:32
3	05:31		19:24 (3)	05:57		19:36 (2)	06:28	06:59	06:35		06:57 (5)	07:10
	20:39	44	20:08 (3)	20:18	18	19:54 (2)	19:33	18:41	16:55	34	07:31 (5)	16:32
4	05:32		19:25 (3)	05:58		19:37 (2)	06:29	07:00	06:36		06:58 (5)	07:11
	20:39	44	20:09 (3)	20:17	16	19:53 (2)	19:31	18:40	16:54	33	07:31 (5)	16:32
5	05:33		19:24 (3)	05:59		19:39 (2)	06:30	07:01	06:37		06:59 (5)	07:12
	20:39	44	20:08 (3)	20:16	12	19:51 (2)	19:30	18:38	16:52	32	07:31 (5)	16:31
6	05:33		19:25 (3)	06:00		19:42 (2)	06:31	07:02	06:38		07:00 (5)	07:13
	20:39	44	20:09 (3)	20:14	6	19:48 (2)	19:28	18:36	16:51	30	07:30 (5)	16:31
7	05:34		19:26 (3)	06:01			06:32	07:04	06:39		07:02 (5)	07:14
	20:38	43	20:09 (3)	20:13			19:26	18:35	16:50	29	07:31 (5)	16:31
8	05:34		19:25 (3)	06:02			06:33	07:05	06:41		07:03 (5)	07:15
	20:38	44	20:09 (3)	20:12			19:25	18:33	16:49	28	07:31 (5)	16:31
9	05:35		19:26 (3)	06:03			06:34	07:06	06:42		07:04 (5)	07:16
	20:38	43	20:09 (3)	20:11			19:23	18:31	16:48	26	07:30 (5)	16:31
10	05:36		19:27 (3)	06:04			06:36	07:07	06:43		07:06 (5)	07:16
	20:37	42	20:09 (3)	20:09			19:21	18:30	16:47	24	07:30 (5)	16:31
11	05:36		19:27 (3)	06:05			06:37	07:08	06:44		07:07 (5)	07:17
	20:37	41	20:08 (3)	20:08			19:19	18:28	16:46	23	07:30 (5)	16:31
12	05:37		19:27 (3)	06:06			06:38	07:09	06:46		07:08 (5)	07:18
	20:36	42	20:09 (3)	20:07			19:18	18:27	16:45	21	07:29 (5)	16:31
13	05:38		19:28 (3)	06:07			06:39	07:10	06:47		07:10 (5)	07:19
	20:36	41	20:09 (3)	20:05			19:16	18:25	16:44	19	07:29 (5)	16:31
14	05:39		19:28 (3)	06:08			06:40	07:11	06:48		07:11 (5)	07:20
	20:35	40	20:08 (3)	20:04			19:14	18:23	16:43	17	07:28 (5)	16:32
15	05:39		19:28 (3)	06:09			06:41	07:12	06:49		07:12 (5)	07:20
	20:35	40	20:08 (3)	20:02			19:12	18:22	16:42	15	07:27 (5)	16:32
16	05:40		19:29 (3)	06:10			06:42	07:13	06:50		07:13 (5)	07:21
	20:34	39	20:08 (3)	20:01			19:11	18:20	16:41	13	07:26 (5)	16:32
17	05:41		19:30 (3)	06:11			06:43	07:15	06:52		07:15 (5)	07:22
	20:33	37	20:07 (3)	20:00			19:09	18:19	16:40	11	07:26 (5)	16:32
18	05:42		19:31 (3)	06:12			06:44	07:16	06:53		07:16 (5)	07:23
	20:33	36	20:07 (3)	19:58			19:07	18:17	16:40	9	07:25 (5)	16:33
19	05:43		19:31 (3)	06:13			06:45	07:17	06:54		07:17 (5)	07:23
	20:32	35	20:06 (3)	19:57			19:06	18:16	16:39	6	07:23 (5)	16:33
20	05:44		19:32 (2)	06:14			06:46	07:18	06:55		07:19 (5)	07:24
	20:31	33	20:05 (3)	19:55			19:04	18:14	16:38	4	07:23 (5)	16:33
21	05:44		19:32 (2)	06:15			06:47	07:19	06:56			07:24
	20:31	33	20:05 (3)	19:54			19:02	18:13	5	08:14 (5)	16:37	16:34
22	05:45		19:32 (2)	06:16			06:48	07:20	06:58			07:25
	20:30	32	20:04 (3)	19:52			19:00	18:11	16	08:19 (5)	16:37	16:34
23	05:46		19:32 (2)	06:17			06:49	07:21	06:59			07:25
	20:29	31	20:03 (3)	19:51			18:59	18:10	21	08:22 (5)	16:36	16:35
24	05:47		19:32 (2)	06:18			06:50	07:23	07:59 (5)	07:00		07:26
	20:28	30	20:02 (3)	19:49			18:57	18:08	25	08:24 (5)	16:36	16:35
25	05:48		19:32 (2)	06:19			06:51	06:24	06:57 (5)	07:01		07:26
	20:27	29	20:01 (3)	19:47			18:55	17:07	28	07:25 (5)	16:35	16:36
26	05:49		19:32 (2)	06:20			06:52	06:25	06:56 (5)	07:02		07:27
	20:26	27	19:59 (2)	19:46			18:53	17:05	30	07:26 (5)	16:34	16:37
27	05:50		19:32 (2)	06:21			06:53	06:26	06:55 (5)	07:03		07:27
	20:25	26	19:58 (2)	19:44			18:52	17:04	33	07:28 (5)	16:34	16:37
28	05:51		19:32 (2)	06:22			06:54	06:27	06:54 (5)	07:04		07:27
	20:24	26	19:58 (2)	19:43			18:50	17:03	34	07:28 (5)	16:33	16:38
29	05:52		19:32 (2)	06:23			06:55	06:29	06:53 (5)	07:06		07:28
	20:23	26	19:58 (2)	19:41			18:48	17:01	36	07:29 (5)	16:33	16:39
30	05:53		19:33 (2)	06:24			06:56	06:30	06:52 (5)	07:07		07:28
	20:22	24	19:57 (2)	19:40			18:47	17:00	37	07:29 (5)	16:33	16:39
31	05:54		19:33 (2)	06:25				06:31	06:53 (5)			07:28
	20:21	24	19:57 (2)	19:38				16:59	37	07:30 (5)		16:40
Ore potenziali eliofanía	461		429			375	345		297		286	
Totale, caso peggiore	1130			94				302		445		
Probabilità di eliofanía	0,61			0,67				0,44		0,40		
Tempo di operatività rid.	1,00			1,00				1,00		1,00		
Dir. del vento rid.	1,00			1,00				1,00		1,00		
Totale ridotto	0,61			0,67				0,44		0,40		
Totale effettivo	685			63				131		180		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CI - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (87)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	07:14 (5) 07:42 (5)	06:46 19:26	06:00 19:58
2	07:28 16:42	07:13 17:17	06:36 17:52	07:15 (5) 07:40 (5)	06:44 19:27	05:58 19:59
3	07:28 16:43	07:12 17:19	06:35 17:53	07:17 (5) 07:38 (5)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	07:20 (5) 07:35 (5)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31
6	07:28 16:46	07:09 17:22	07:29 (5) 07:31 (5)	06:30 19:31	05:53 20:04	05:28 20:32
7	07:28 16:47	07:08 17:24	07:28 (5) 07:36 (5)	06:28 19:32	05:52 20:05	05:28 20:33
8	07:28 16:48	07:07 17:25	07:27 (5) 07:39 (5)	06:27 17:59	05:51 19:33	05:27 20:06
9	07:28 16:49	07:06 17:26	07:26 (5) 07:42 (5)	06:25 18:00	05:50 19:34	05:27 20:07
10	07:28 16:50	07:04 17:27	07:24 (5) 07:42 (5)	06:23 18:01	05:48 19:36	05:27 20:08
11	07:28 16:51	07:03 17:29	07:23 (5) 07:44 (5)	06:22 18:02	05:47 19:37	05:27 20:09
12	07:27 16:52	07:02 17:30	07:22 (5) 07:46 (5)	06:20 18:04	05:46 19:38	05:27 20:10
13	07:27 16:53	07:01 17:31	07:20 (5) 07:46 (5)	06:18 18:05	05:45 19:39	05:27 20:11
14	07:27 16:54	06:59 17:33	07:19 (5) 07:47 (5)	06:17 18:06	05:44 19:40	05:27 20:12
15	07:26 16:55	06:58 17:34	07:18 (5) 07:48 (5)	06:15 18:07	05:43 19:41	05:27 20:13
16	07:26 16:56	06:57 17:35	07:16 (5) 07:48 (5)	06:13 18:08	05:42 19:42	05:27 20:14
17	07:25 16:58	06:55 17:36	07:15 (5) 07:48 (5)	06:12 18:09	05:41 19:43	05:27 20:15
18	07:25 16:59	06:54 17:38	07:14 (5) 07:49 (5)	06:10 18:10	05:40 19:44	05:27 20:16
19	07:24 17:00	06:53 17:39	07:12 (5) 07:49 (5)	06:08 18:11	05:39 19:45	19:40 (2) 20:17
20	07:24 17:01	06:51 17:40	07:11 (5) 07:49 (5)	06:07 18:13	05:38 19:46	19:46 (2) 19:37 (2)
21	07:23 17:02	06:50 17:41	07:09 (5) 07:48 (5)	06:05 18:14	05:37 19:48	20:39 20:19
22	07:23 17:04	06:48 17:42	07:10 (5) 07:49 (5)	06:03 18:15	05:37 19:49	19:35 (2) 20:20
23	07:22 17:05	06:47 17:44	07:10 (5) 07:48 (5)	06:01 18:16	05:36 19:50	05:27 20:21
24	07:21 17:06	06:45 17:45	07:10 (5) 07:48 (5)	06:00 18:17	05:35 19:51	20:39 20:53 (2)
25	07:20 17:07	06:44 17:46	07:10 (5) 07:46 (5)	05:58 18:18	05:34 19:52	05:28 20:23
26	07:20 17:08	06:42 17:47	07:11 (5) 07:46 (5)	05:56 18:19	05:34 19:53	20:40 20:24
27	07:19 17:10	06:41 17:48	07:12 (5) 07:45 (5)	05:55 18:20	05:33 19:54	05:29 20:24
28	07:18 17:11	06:39 17:50	07:12 (5) 07:43 (5)	05:53 18:21	05:32 19:55	19:32 (2) 20:25
29	07:17 17:12		06:51 19:22	06:02 19:56	05:32 20:26	19:31 (2) 20:56 (2)
30	07:16 17:13		06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40
31	07:15 17:15		06:48 19:25	05:31 20:28	19:31 (2) 20:28	19:37 (2) 19:57 (2)
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		649	89		258	802
Probabilità di eliofania		0,46	0,44		0,47	0,54
Tempo di operatività rid.		1,00	1,00		1,00	1,00
Dir. del vento rid.		1,00	1,00		1,00	1,00
Totale ridotto		0,46	0,44		0,47	0,54
Totale effettivo		296	39		120	433

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenza autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CI - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (87)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	19:36 (2)	05:55	06:26	06:57	06:32
	20:40	27 20:03 (2)	20:20	19:36	18:45	16:57
2	05:31	19:37 (2)	05:56	06:27	06:58	06:33
	20:39	27 20:04 (2)	20:19	19:35	18:43	16:56
3	05:31	19:37 (2)	05:57	06:28	06:59	06:35
	20:39	27 20:04 (2)	20:18	19:33	18:41	16:55
4	05:32	19:37 (2)	05:58	06:29	07:00	06:36
	20:39	27 20:04 (2)	20:17	19:31	18:40	16:54
5	05:33	19:37 (2)	05:59	06:30	07:01	06:37
	20:39	27 20:04 (2)	20:16	19:30	18:38	16:53
6	05:33	19:38 (2)	06:00	06:31	07:02	06:38
	20:39	27 20:05 (2)	20:14	19:28	18:36	16:51
7	05:34	19:38 (2)	06:01	06:32	07:04	06:39
	20:38	27 20:05 (2)	20:13	19:26	18:35	16:50
8	05:34	19:38 (2)	06:02	06:33	07:05	06:41
	20:38	27 20:05 (2)	20:12	19:25	18:33	16:49
9	05:35	19:38 (2)	06:03	06:34	07:06	06:42
	20:38	27 20:05 (2)	20:11	19:23	18:31	16:48
10	05:36	19:39 (2)	06:04	06:36	07:07	06:43
	20:37	26 20:05 (2)	20:09	19:21	18:30	16:47
11	05:36	19:38 (2)	06:05	06:37	07:08	06:44
	20:37	27 20:05 (2)	20:08	19:19	18:28	16:46
12	05:37	19:39 (2)	06:06	06:38	07:09	06:46
	20:36	26 20:05 (2)	20:07	19:18	18:27	16:45
13	05:38	19:40 (2)	06:07	06:39	07:10	06:47
	20:36	25 20:05 (2)	20:05	19:16	18:25	16:44
14	05:39	19:39 (2)	06:08	06:40	07:11	06:48
	20:35	25 20:04 (2)	20:04	19:14	18:23	16:43
15	05:39	19:40 (2)	06:09	06:41	07:12	06:49
	20:35	24 20:04 (2)	20:02	19:13	18:22	16:42
16	05:40	19:40 (2)	06:10	06:42	07:13	06:50
	20:34	24 20:04 (2)	20:01	19:11	18:20	16:41
17	05:41	19:41 (2)	06:11	06:43	07:15	06:52
	20:33	23 20:04 (2)	20:00	19:09	18:19	16:40
18	05:42	19:42 (2)	06:12	06:44	07:16	06:53
	20:33	22 20:04 (2)	19:58	19:07	18:17	16:40
19	05:43	19:42 (2)	06:13	06:45	07:17	06:54
	20:32	21 20:03 (2)	19:57	19:06	18:16	16:39
20	05:44	19:43 (2)	06:14	06:46	07:18	06:55
	20:31	19 20:02 (2)	19:55	19:04	18:14	16:38
21	05:44	19:44 (2)	06:15	06:47	07:19	06:56
	20:31	18 20:02 (2)	19:54	19:02	18:13	16:37
22	05:45	19:45 (2)	06:16	06:48	07:20	06:57
	20:30	16 20:01 (2)	19:52	19:00	18:11	16:37
23	05:46	19:47 (2)	06:17	06:49	07:21	06:59
	20:29	13 20:00 (2)	19:51	18:59	18:10	16:36
24	05:47	19:49 (2)	06:18	06:50	07:23	07:00
	20:28	9 19:58 (2)	19:49	18:57	18:08	16:36
25	05:48		06:19	06:51	06:24	06:45
	20:27		19:47	18:55	17:07	16:35
26	05:49		06:20	06:52	06:25	06:46
	20:26		19:46	18:53	17:05	16:34
27	05:50		06:21	06:53	06:26	06:48
	20:25		19:44	18:52	17:04	16:33
28	05:51		06:22	06:54	06:27	06:49
	20:24		19:43	18:50	17:03	16:34
29	05:52		06:23	06:55	06:29	06:50
	20:23		19:41	18:48	17:01	16:33
30	05:53		06:24	06:56	06:30	06:51
	20:22		19:40	18:47	17:00	16:33
31	05:54		06:25		06:31	06:53
	20:21		19:38		16:59	16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	561				53	
Probabilità di eliofania	0,61				0,44	
Tempo di operatività rid.	1,00				1,00	
Dir. del vento rid.	1,00				1,00	
Totale ridotto	0,61				0,44	
Totale effettivo	340				21	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CJ - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (88)

#### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	19:31 (2) 20:40	05:55 20:02 (2)	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	05:58 19:59	05:30 20:29	19:30 (2) 20:39	05:56 20:03 (2)	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	19:31 (2) 20:39	05:57 20:03 (2)	06:28 19:33	06:59 18:41	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	19:31 (2) 20:39	05:58 20:04 (2)	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31	19:31 (2) 20:39	05:59 20:03 (2)	06:30 19:30	07:01 18:38	06:37 16:52	07:12 16:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	19:31 (2) 20:39	06:00 20:04 (2)	06:31 19:28	07:02 18:36	06:38 16:51	07:13 16:31
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	19:31 (2) 20:38	06:01 20:04 (2)	06:32 19:26	07:04 18:35	06:39 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06	05:27 20:33	19:32 (2) 20:38	06:02 20:04 (2)	06:33 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:50 20:07	05:27 20:34	19:31 (2) 20:38	06:03 20:04 (2)	06:34 19:23	07:06 18:31	06:42 16:48	07:16 16:31
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	19:32 (2) 20:37	06:04 20:05 (2)	06:36 19:21	07:07 18:30	06:43 16:47	07:16 16:31
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	05:27 20:35	19:32 (2) 20:37	06:05 20:04 (2)	06:37 19:19	07:08 18:28	06:44 16:46	07:17 16:31
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	19:32 (2) 20:36	06:06 20:05 (2)	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	19:33 (2) 20:36	06:07 20:05 (2)	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	19:33 (2) 20:35	06:08 20:04 (2)	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	19:33 (2) 20:35	06:09 20:04 (2)	06:41 19:12	07:12 18:22	06:49 16:42	07:20 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:37	19:34 (2) 20:34	06:10 20:04 (2)	06:42 19:11	07:13 18:20	06:50 16:41	07:21 16:32
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	19:34 (2) 20:33	06:11 20:04 (2)	06:43 19:09	07:15 18:19	06:52 16:40	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:18 19:44	05:40 20:16	19:38 (2) 20:38	05:27 20:33	06:12 19:41 (2)	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	19:49 (2) 20:38	05:27 20:38	06:13 19:42 (2)	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	19:50 (2) 20:39	05:27 20:39	06:14 19:41 (2)	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	19:51 (2) 20:39	05:27 20:39	06:15 20:02 (2)	06:47 19:02	07:19 18:13	06:56 16:37	07:24 16:34
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	19:53 (2) 20:39	05:27 20:39	06:16 19:43 (2)	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	19:32 (2) 20:39	05:27 20:39	06:17 20:01 (2)	06:49 18:59	07:21 18:10	06:59 16:36	07:25 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	19:31 (2) 20:39	05:28 20:39	06:18 20:00 (2)	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	19:31 (2) 20:40	05:28 20:40	06:19 19:58 (2)	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	19:31 (2) 20:40	05:28 20:40	06:20 19:51 (2)	06:52 18:53	06:25 17:05	07:02 16:34	07:27 16:37
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	19:30 (2) 20:40	05:29 20:40	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	19:31 (2) 20:40	05:29 20:40	06:22 19:43	06:54 18:50	06:27 17:03	07:04 16:34	07:27 16:38
29	07:17 17:12	06:37 18:22	05:51 19:56	06:02 20:26	05:32 20:26	19:30 (2) 20:40	05:29 20:40	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:13	06:50 19:24	06:01 19:57	06:31 20:27	05:31 20:27	19:31 (2) 20:40	05:30 20:40	06:24 20:03 (2)	06:56 19:40	06:30 18:47	07:07 16:33	07:28 16:39
31	07:15 17:15	06:48 19:25	06:48 19:25	06:48 20:28	05:48 20:28	19:30 (2) 20:40	05:30 20:40	06:25 20:21	06:57 19:38	06:31 16:59	07:08 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore					294	777	594					
Probabilità di eliofania					0,47	0,54	0,61					
Tempo di operatività rid.					1,00	1,00	1,00					
Dir. del vento rid.					1,00	1,00	1,00					
Totale ridotto					0,47	0,54	0,61					
Totale effettivo					137	419	360					

Legenda della tabella:

Giorno del mese	Alba (hh:mm)	Inizio ombreggiamento (hh:mm)	(WTG che provoca l'inizio dell'ombreggiamento)
	Tramonto (hh:mm)	Fine ombreggiamento (hh:mm)	(WTG che provoca l'ultimo ombreggiamento)
	Minuti d'ombra		

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (89)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
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18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
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23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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29	07:17 17:12	06:37 17:51	06:51 19:23	06:02 19:56	05:32 19:56	05:30 20:26	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 17:49	06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:34 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:28	05:54 20:21	06:25 19:38	06:57 18:59	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (90)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
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12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
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20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
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26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CM - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (91)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CN - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (92)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
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Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

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## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (93)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

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16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (94)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (95)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (96)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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30	07:16 17:14	06:35 17:49	06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:34 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:21	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (97)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:44 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CU - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (99)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	17:33 (5) 18:15 (5)	05:59 19:58	05:30 20:28	05:55 20:20	06:26 19:36	17:27 (5) 18:13 (5)	06:57 18:45	06:32 16:57
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	17:32 (5) 18:15 (5)	05:58 19:59	05:30 20:29	05:56 20:19	06:27 19:35	17:27 (5) 18:13 (5)	06:58 18:43	06:33 16:56
3	07:28 16:43	07:12 17:18	06:35 17:53	06:43 19:28	17:31 (5) 18:15 (5)	05:57 20:00	05:29 20:30	05:57 20:18	06:28 19:33	17:26 (5) 18:13 (5)	06:59 18:41	06:35 16:55
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5	07:28 16:45	07:10 17:21	06:31 17:55	06:39 19:30	17:30 (5) 18:16 (5)	05:54 20:03	05:28 20:31	05:59 20:15	06:30 19:30	17:25 (5) 18:12 (5)	07:01 18:38	06:37 16:52
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	17:29 (5) 18:15 (5)	05:53 20:04	05:28 20:32	06:00 20:14	06:31 19:28	17:25 (5) 18:11 (5)	07:02 18:36	06:38 16:51
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	17:29 (5) 18:16 (5)	05:52 20:05	05:28 20:33	06:01 20:13	06:32 19:26	17:25 (5) 18:11 (5)	07:03 18:35	06:39 16:50
8	07:28 16:48	07:07 17:25	06:26 17:59	06:34 19:33	17:29 (5) 18:15 (5)	05:51 20:06	05:27 20:33	06:02 20:12	06:33 19:24	17:25 (5) 18:10 (5)	07:05 18:33	06:41 16:49
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	17:28 (5) 18:15 (5)	05:49 20:07	05:27 20:34	06:03 20:10	06:34 19:23	17:25 (5) 18:09 (5)	07:06 18:31	06:42 16:48
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:35	17:29 (5) 18:15 (5)	05:48 20:08	05:27 20:34	06:04 20:09	06:35 19:21	17:25 (5) 18:08 (5)	07:07 18:30	06:43 16:47
11	07:28 16:51	07:03 17:29	06:22 18:02	06:29 19:37	17:28 (5) 18:14 (5)	05:47 20:09	05:27 20:35	06:05 20:08	06:36 19:19	17:25 (5) 18:07 (5)	07:08 18:28	06:44 16:46
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	17:29 (5) 18:14 (5)	05:46 20:10	05:27 20:36	06:06 20:06	06:37 19:18	17:26 (5) 18:06 (5)	07:09 18:27	06:45 16:45
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	17:29 (5) 18:13 (5)	05:45 20:11	05:27 20:36	06:07 20:05	06:38 19:16	17:26 (5) 18:05 (5)	07:10 18:25	06:47 16:44
14	07:27 16:54	06:59 17:32	06:17 18:06	06:25 19:40	17:29 (5) 18:12 (5)	05:44 20:12	05:26 20:36	06:08 20:04	06:39 19:14	17:27 (5) 18:03 (5)	07:11 18:23	06:48 16:43
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	17:30 (5) 18:12 (5)	05:43 20:13	05:26 20:37	06:09 20:02	06:41 19:12	17:28 (5) 18:01 (5)	07:12 18:22	06:49 16:42
16	07:26 16:56	06:57 17:35	06:13 18:08	06:21 19:42	17:30 (5) 18:10 (5)	05:42 20:14	05:26 20:37	06:10 20:01	06:42 19:11	17:29 (5) 17:59 (5)	07:13 18:20	06:50 16:41
17	07:25 16:57	06:55 17:36	06:12 18:09	06:20 19:43	17:31 (5) 18:10 (5)	05:41 20:15	05:26 20:38	06:11 19:59	06:43 19:09	17:31 (5) 17:56 (5)	07:15 18:19	06:52 16:40
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18 19:44	17:32 (5) 18:08 (5)	05:40 20:16	05:27 20:38	06:12 19:58	06:44 19:07	17:34 (5) 17:53 (5)	07:16 18:17	06:53 16:40
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	17:33 (5) 18:07 (5)	05:39 20:17	05:27 20:38	06:13 19:57	17:49 (5) 18:03 (5)	06:45 19:05	07:17 18:16	06:54 16:39
20	07:24 17:01	06:51 17:40	06:06 18:12	06:15 19:46	17:34 (5) 18:05 (5)	05:38 20:18	05:27 20:39	06:14 19:55	17:45 (5) 18:06 (5)	06:46 19:04	07:18 18:14	06:55 16:38
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:47	17:36 (5) 18:04 (5)	05:37 20:19	05:27 20:39	06:15 19:54	17:43 (5) 18:08 (5)	06:47 19:02	07:19 18:13	06:56 16:37
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12 19:49	17:37 (5) 18:01 (5)	05:37 20:20	05:27 20:39	06:16 19:52	17:40 (5) 18:08 (5)	06:48 19:00	07:20 18:11	06:57 16:36
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	17:40 (5) 17:59 (5)	05:36 20:21	05:27 20:39	06:17 19:51	17:38 (5) 18:09 (5)	06:49 18:59	07:21 18:10	06:59 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:10 19:51	16:53 (5) 16:58 (5)	05:35 20:22	05:28 20:39	06:18 19:49	17:36 (5) 18:10 (5)	06:50 18:57	07:23 18:08	07:00 16:35
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	16:47 (5) 17:05 (5)	05:34 20:23	05:28 20:39	06:19 19:47	17:35 (5) 18:11 (5)	06:51 18:55	06:24 17:07	07:01 16:35
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	16:43 (5) 17:08 (5)	05:34 20:23	05:28 20:40	06:20 19:46	17:33 (5) 18:12 (5)	06:52 18:53	06:25 17:05	07:02 16:34
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	16:40 (5) 17:09 (5)	05:33 20:24	05:29 20:40	06:21 19:44	17:32 (5) 18:12 (5)	06:53 18:52	06:26 17:04	07:03 16:34
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	16:38 (5) 17:11 (5)	05:32 20:25	05:29 20:40	06:22 19:43	17:31 (5) 18:13 (5)	06:54 18:50	06:27 17:03	07:04 16:33
29	07:17 17:12	06:38 19:22	05:51 18:22	06:02 19:56	17:37 (5) 18:12 (5)	05:32 20:26	05:29 20:40	06:23 19:41	17:30 (5) 18:13 (5)	06:55 18:48	06:28 17:01	07:05 16:33
30	07:16 17:13	06:49 19:23	06:01 18:13	06:01 19:57	17:35 (5) 18:13 (5)	05:31 20:27	05:30 20:40	06:24 19:39	17:29 (5) 18:13 (5)	06:56 18:47	06:30 17:00	07:07 16:33
31	07:15 17:15	06:48 19:25	06:04 18:14	06:04 19:57	17:33 (5) 18:14 (5)	05:31 20:28	05:31 20:21	06:25 19:38	17:28 (5) 18:13 (5)	06:54 18:45	06:31 16:59	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	730	297	286
Totale, caso peggiore			224	935						0,58		
Probabilità di eliofania			0,44	0,48					0,67	1,00		
Tempo di operatività rid.			1,00	1,00					1,00	1,00		
Dir. del vento rid.			1,00	1,00					1,00	1,00		
Totale ridotto			0,44	0,48					0,67	0,58		
Totale effettivo			99	447				295	422			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (100)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
1	07:28	14:18 (5)	07:14	14:25 (5)	06:38	06:46	05:59	18:48 (4)	05:30			
	16:41	42	15:00 (5)	17:16	51	15:16 (5)	17:51	19:26	19:58	13	19:01 (4)	20:28
2	07:28	14:18 (5)	07:13	14:26 (5)	06:36	06:44	05:58	18:51 (4)	05:30			
	16:42	43	15:01 (5)	17:17	50	15:16 (5)	17:52	19:27	19:59	7	18:58 (4)	20:29
3	07:28	14:18 (5)	07:12	14:26 (5)	06:35	06:43	05:57	18:58 (4)	05:29			
	16:43	44	15:02 (5)	17:18	49	15:15 (5)	17:53	19:28	20:00			20:30
4	07:28	14:19 (5)	07:11	14:27 (5)	06:33	06:41	05:56	18:58 (4)	05:29			
	16:44	43	15:02 (5)	17:20	47	15:14 (5)	17:54	19:29	20:02			20:31
5	07:28	14:19 (5)	07:10	14:28 (5)	06:31	06:39	05:54	18:58 (4)	05:28			
	16:45	44	15:03 (5)	17:21	46	15:14 (5)	17:55	19:30	20:03			20:31
6	07:28	14:19 (5)	07:09	14:29 (5)	06:30	06:38	05:53	18:58 (4)	05:28			
	16:46	45	15:04 (5)	17:22	45	15:14 (5)	17:57	19:31	20:04			20:32
7	07:28	14:19 (5)	07:08	14:31 (5)	06:28	06:36	05:52	18:58 (4)	05:28			
	16:47	46	15:05 (5)	17:24	42	15:13 (5)	17:58	19:32	20:05			20:33
8	07:28	14:19 (5)	07:07	14:33 (5)	06:27	06:34	05:51	18:58 (4)	05:27			
	16:48	46	15:05 (5)	17:25	39	15:12 (5)	17:59	19:33	20:06			20:33
9	07:28	14:19 (5)	07:06	14:33 (5)	06:25	06:33	05:49	18:58 (4)	05:27			
	16:49	47	15:06 (5)	17:26	38	15:11 (5)	18:00	19:34	20:07			20:34
10	07:28	14:19 (5)	07:04	14:35 (5)	06:23	06:31	05:48	18:58 (4)	05:27			
	16:50	48	15:07 (5)	17:27	35	15:10 (5)	18:01	19:35	20:08			20:34
11	07:28	14:20 (5)	07:03	14:38 (5)	06:22	06:29	05:47	18:58 (4)	05:27			
	16:51	48	15:08 (5)	17:29	30	15:08 (5)	18:02	19:37	20:09			20:35
12	07:27	14:19 (5)	07:02	14:40 (5)	06:20	06:28	05:46	18:58 (4)	05:27			
	16:52	49	15:08 (5)	17:30	27	15:07 (5)	18:04	19:38	20:10			20:36
13	07:27	14:20 (5)	07:01	14:43 (5)	06:18	06:26	05:45	18:58 (4)	05:27			
	16:53	49	15:09 (5)	17:31	20	15:03 (5)	18:05	19:39	20:11			20:36
14	07:27	14:19 (5)	06:59	14:48 (5)	06:17	06:25	05:44	18:58 (4)	05:26			
	16:54	51	15:10 (5)	17:32	11	14:59 (5)	18:06	19:40	20:12			20:36
15	07:26	14:20 (5)	06:58	15:05 (5)	06:15	06:23	18:53 (4)	05:43	05:26			
	16:55	51	15:11 (5)	17:34	18:07	19:41	9	19:02 (4)	20:13			20:37
16	07:26	14:19 (5)	06:57	15:06 (5)	06:13	06:21	18:50 (4)	05:42	05:26			
	16:56	52	15:11 (5)	17:35	18:08	19:42	14	19:04 (4)	20:14			20:37
17	07:25	14:20 (5)	06:55	15:07 (5)	06:12	06:20	18:49 (4)	05:41	05:26			
	16:57	52	15:12 (5)	17:36	18:09	19:43	17	19:06 (4)	20:15			20:38
18	07:25	14:20 (5)	06:54	15:08 (5)	06:10	06:18	18:47 (4)	05:40	05:27			
	16:59	52	15:12 (5)	17:37	18:10	19:44	20	19:07 (4)	20:16			20:38
19	07:24	14:20 (5)	06:53	15:09 (5)	06:08	06:17	18:46 (4)	05:39	05:27			
	17:00	53	15:13 (5)	17:39	18:11	19:45	22	19:08 (4)	20:17			20:38
20	07:24	14:20 (5)	06:51	15:10 (5)	06:06	06:15	18:45 (4)	05:38	05:27			
	17:01	53	15:13 (5)	17:40	18:12	19:46	23	19:08 (4)	20:18			20:39
21	07:23	14:20 (5)	06:50	15:11 (5)	06:05	06:14	18:45 (4)	05:37	05:27			
	17:02	54	15:14 (5)	17:41	18:14	19:47	23	19:08 (4)	20:19			20:39
22	07:23	14:21 (5)	06:48	15:12 (5)	06:03	06:12	18:44 (4)	05:37	05:27			
	17:03	54	15:15 (5)	17:42	18:15	19:49	24	19:08 (4)	20:20			20:39
23	07:22	14:21 (5)	06:47	15:14 (5)	06:01	06:11	18:44 (4)	05:36	05:27			
	17:05	54	15:15 (5)	17:44	18:16	19:50	24	19:08 (4)	20:21			20:39
24	07:21	14:21 (5)	06:45	15:13 (5)	06:00	06:09	18:43 (4)	05:35	05:28			
	17:06	54	15:15 (5)	17:45	18:17	19:51	24	19:07 (4)	20:22			20:39
25	07:20	14:21 (5)	06:44	15:14 (5)	05:58	06:08	18:44 (4)	05:34	05:28			
	17:07	54	15:15 (5)	17:46	18:18	19:52	23	19:07 (4)	20:23			20:40
26	07:20	14:21 (5)	06:42	15:14 (5)	05:56	06:06	18:44 (4)	05:33	05:28			
	17:08	54	15:15 (5)	17:47	18:19	19:53	23	19:07 (4)	20:23			20:40
27	07:19	14:22 (5)	06:41	15:14 (5)	05:55	06:05	18:44 (4)	05:33	05:29			
	17:10	53	15:15 (5)	17:48	18:20	19:54	22	19:06 (4)	20:24			20:40
28	07:18	14:23 (5)	06:39	15:14 (5)	05:53	06:04	18:45 (4)	05:32	05:29			
	17:11	53	15:16 (5)	17:50	18:21	19:55	20	19:05 (4)	20:25			20:40
29	07:17	14:24 (5)	06:38	15:14 (5)	05:51	06:02	18:46 (4)	05:32	05:29			
	17:12	52	15:16 (5)	17:51	19:22	19:56	19	19:05 (4)	20:26			20:40
30	07:16	14:24 (5)	06:37	15:14 (5)	06:49	06:01	18:47 (4)	05:31	05:30			
	17:13	52	15:16 (5)	17:52	19:23	19:57	16	19:03 (4)	20:27			20:40
31	07:15	14:25 (5)	06:36	15:14 (5)	06:48	06:00	18:48 (4)	05:31	05:30			
	17:15	51	15:16 (5)	17:53	19:25	19:59	20:28	20:28	20:28			
Ore potenziali eliofania	296		296		369	399		450				454
Totale, caso peggiore	1543		530			323		20				
Probabilità di eliofania	0,44		0,46			0,48		0,47				
Tempo di operatività rid.	1,00		1,00			1,00		1,00				
Dir. del vento rid.	1,00		1,00			1,00		1,00				
Totale ridotto	0,44		0,46			0,48		0,47				
Totale effettivo	681		242			155		9				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (100)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	14:05 (5) 16:32	07:08 48	14:02 (5) 14:50 (5)
2	05:31 20:39	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	14:03 (5) 14:41 (5)	07:09 48	14:02 (5) 14:50 (5)
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	14:01 (5) 14:41 (5)	07:10 47	14:03 (5) 14:50 (5)
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	14:01 (5) 14:43 (5)	07:11 46	14:04 (5) 14:50 (5)
5	05:32 20:39	05:59 20:15	06:30 19:30	07:01 18:38	06:37 16:52	13:59 (5) 14:44 (5)	07:12 46	14:04 (5) 14:50 (5)
6	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	13:58 (5) 14:44 (5)	07:13 45	14:05 (5) 14:50 (5)
7	05:34 20:38	06:01 20:13	06:32 19:26	07:03 18:35	06:39 16:50	13:58 (5) 14:45 (5)	07:14 44	14:06 (5) 14:50 (5)
8	05:34 20:38	06:02 20:12	06:33 19:24	07:05 18:33	06:41 16:49	13:57 (5) 14:46 (5)	07:15 44	14:07 (5) 14:51 (5)
9	05:35 20:38	06:03 20:10	06:34 19:23	07:06 18:31	06:42 16:48	13:56 (5) 14:46 (5)	07:16 44	14:07 (5) 14:51 (5)
10	05:36 20:37	06:04 20:09	06:35 19:21	07:07 18:30	06:43 16:47	13:56 (5) 14:47 (5)	07:16 43	14:07 (5) 14:50 (5)
11	05:36 20:37	06:05 20:08	18:59 (4) 19:08 (4)	06:36 19:19	07:08 18:28	06:44 16:46	07:17 42	14:08 (5) 14:50 (5)
12	05:37 20:36	06:06 20:07	18:57 (4) 19:10 (4)	06:37 19:18	07:09 18:27	06:45 16:45	07:18 41	14:09 (5) 14:50 (5)
13	05:38 20:36	06:07 20:05	18:55 (4) 19:12 (4)	06:38 19:16	07:10 18:25	06:47 16:44	07:19 41	14:10 (5) 14:51 (5)
14	05:39 20:35	06:08 20:04	18:54 (4) 19:13 (4)	06:40 19:14	07:11 18:23	06:48 16:43	07:20 40	14:11 (5) 14:51 (5)
15	05:39 20:35	06:09 20:02	18:52 (4) 19:13 (4)	06:41 19:12	07:12 18:22	06:49 16:42	07:20 40	14:11 (5) 14:51 (5)
16	05:40 20:34	06:10 20:01	18:52 (4) 19:14 (4)	06:42 19:11	07:13 18:20	06:50 16:41	07:21 39	14:12 (5) 14:51 (5)
17	05:41 20:33	06:11 20:00	18:51 (4) 19:14 (4)	06:43 19:09	07:15 18:19	06:52 16:40	07:22 39	14:13 (5) 14:52 (5)
18	05:42 20:33	06:12 19:58	18:50 (4) 19:14 (4)	06:44 19:07	07:16 18:17	06:53 16:40	07:22 39	14:13 (5) 14:52 (5)
19	05:43 20:32	06:13 19:57	18:50 (4) 19:14 (4)	06:45 19:06	07:17 18:16	06:54 16:39	07:23 38	14:14 (5) 14:52 (5)
20	05:44 20:31	06:14 19:55	18:50 (4) 19:14 (4)	06:46 19:04	07:18 18:14	06:55 16:38	07:24 38	14:14 (5) 14:52 (5)
21	05:44 20:30	06:15 19:54	18:49 (4) 19:14 (4)	06:47 19:02	07:19 18:13	06:56 16:37	07:24 38	14:15 (5) 14:53 (5)
22	05:45 20:30	06:16 19:52	18:50 (4) 19:13 (4)	06:48 19:00	07:20 18:11	06:58 16:37	07:25 38	14:15 (5) 14:53 (5)
23	05:46 20:29	06:17 19:51	18:49 (4) 19:11 (4)	06:49 18:59	07:21 18:10	06:59 16:36	07:25 38	14:16 (5) 14:54 (5)
24	05:47 20:28	06:18 19:49	18:49 (4) 19:11 (4)	06:50 18:57	07:23 18:08	07:00 16:35	07:26 38	14:16 (5) 14:54 (5)
25	05:48 20:27	06:19 19:47	18:50 (4) 19:09 (4)	06:51 18:55	06:24 17:07	07:01 16:35	07:26 39	14:17 (5) 14:56 (5)
26	05:49 20:26	06:20 19:46	18:51 (4) 19:08 (4)	06:52 18:53	06:25 17:05	07:02 16:34	07:27 39	14:17 (5) 14:56 (5)
27	05:50 20:25	06:21 19:44	18:52 (4) 19:06 (4)	06:53 18:52	06:26 17:04	07:03 16:34	07:27 39	14:17 (5) 14:56 (5)
28	05:51 20:24	06:22 19:43	18:55 (4) 19:03 (4)	06:54 18:50	06:27 17:03	07:04 14:16 (5) 16:33	07:27 40	14:17 (5) 14:57 (5)
29	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	14:12 (5) 14:34 (5)	16:33 16:33	07:28 40	14:18 (5) 14:58 (5)
30	05:53 20:22	06:24 19:39	06:56 18:47	06:30 17:00	14:09 (5) 14:36 (5)	07:07 16:33	07:28 41	14:18 (5) 14:59 (5)
31	05:54 20:21	06:25 19:38	06:31 16:59	06:31 14:38 (5)	14:07 (5)	07:28 16:40	07:28 41	14:18 (5) 14:59 (5)
Ore potenziali eliofania	461	429	375	345	297	286	1283	
Totale, caso peggiore		346		94	1493		0,36	
Probabilità di eliofania		0,67		0,44	0,40		1,00	
Tempo di operatività rid.		1,00		1,00	1,00		1,00	
Dir. del vento rid.		1,00		1,00	1,00		1,00	
Totale ridotto		0,67		0,44	0,40		0,36	
Totale effettivo		231		41	604		466	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CW - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (101)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
1	07:28		14:06 (5)	07:14		14:21 (5)	06:38		06:46		05:59	05:30
	16:41	49	14:55 (5)	17:16	44	15:05 (5)	17:51		19:26		19:58	20:28
2	07:28		14:07 (5)	07:13		14:22 (5)	06:36		06:44		05:58	05:30
	16:42	49	14:56 (5)	17:17	42	15:04 (5)	17:52		19:27		19:59	20:29
3	07:28		14:07 (5)	07:12		14:22 (5)	06:35		06:43		05:57	05:29
	16:43	49	14:56 (5)	17:18	40	15:02 (5)	17:53		19:28		20:00	20:30
4	07:28		14:07 (5)	07:11		14:24 (5)	06:33		06:41		05:56	05:29
	16:44	50	14:57 (5)	17:20	38	15:02 (5)	17:54		19:29		20:02	20:31
5	07:28		14:07 (5)	07:10		14:26 (5)	06:31		06:39		05:54	05:28
	16:45	51	14:58 (5)	17:21	35	15:01 (5)	17:55		19:30		20:03	20:31
6	07:28		14:08 (5)	07:09		14:28 (5)	06:30		06:38		05:53	05:28
	16:46	50	14:58 (5)	17:22	32	15:00 (5)	17:57		19:31		20:04	20:32
7	07:28		14:08 (5)	07:08		14:30 (5)	06:28		06:36		05:52	05:28
	16:47	51	14:59 (5)	17:24	28	14:58 (5)	17:58		19:32		20:05	20:33
8	07:28		14:08 (5)	07:07		14:33 (5)	06:27		06:34		05:51	05:27
	16:48	51	14:59 (5)	17:25	23	14:56 (5)	17:59		19:33		20:06	20:33
9	07:28		14:08 (5)	07:06		14:36 (5)	06:25		06:33		05:49	05:27
	16:49	52	15:00 (5)	17:26	16	14:52 (5)	18:00		19:34		20:07	20:34
10	07:28		14:09 (5)	07:04			06:23		06:31		05:48	05:27
	16:50	52	15:01 (5)	17:27			18:01		19:35		20:08	20:34
11	07:28		14:09 (5)	07:03			06:22		06:29		05:47	05:27
	16:51	53	15:02 (5)	17:29			18:02		19:37		20:09	20:35
12	07:27		14:09 (5)	07:02			06:20		06:28		05:46	05:27
	16:52	53	15:02 (5)	17:30			18:04		19:38		20:10	20:36
13	07:27		14:10 (5)	07:01			06:18		06:26		05:45	05:27
	16:53	52	15:02 (5)	17:31			18:05		19:39	8	18:59 (4)	20:11
14	07:27		14:09 (5)	06:59			06:17		06:25		18:47 (4)	05:44
	16:54	53	15:02 (5)	17:32			18:06		19:40	14	19:01 (4)	20:12
15	07:26		14:10 (5)	06:58			06:15		06:23		18:46 (4)	05:43
	16:55	53	15:03 (5)	17:34			18:07		19:41	17	19:03 (4)	20:13
16	07:26		14:10 (5)	06:57			06:13		06:21		18:44 (4)	05:42
	16:56	53	15:03 (5)	17:35			18:08		19:42	20	19:04 (4)	20:14
17	07:25		14:11 (5)	06:55			06:12		06:20		18:43 (4)	05:41
	16:57	53	15:04 (5)	17:36			18:09		19:43	22	19:05 (4)	20:15
18	07:25		14:11 (5)	06:54			06:10		06:18		18:42 (4)	05:40
	16:59	53	15:04 (5)	17:37			18:10		19:44	23	19:05 (4)	20:16
19	07:24		14:12 (5)	06:53			06:08		06:17		18:42 (4)	05:39
	17:00	53	15:05 (5)	17:39			18:11		19:45	24	19:06 (4)	20:17
20	07:24		14:12 (5)	06:51			06:06		06:15		18:41 (4)	05:38
	17:01	53	15:05 (5)	17:40			18:12		19:46	24	19:05 (4)	20:18
21	07:23		14:12 (5)	06:50			06:05		06:14		18:41 (4)	05:37
	17:02	53	15:05 (5)	17:41			18:14		19:47	25	19:06 (4)	20:19
22	07:23		14:13 (5)	06:48			06:03		06:12		18:40 (4)	05:37
	17:03	53	15:06 (5)	17:42			18:15		19:49	25	19:05 (4)	20:20
23	07:22		14:13 (5)	06:47			06:01		06:11		18:41 (4)	05:36
	17:05	53	15:06 (5)	17:44			18:16		19:50	24	19:05 (4)	20:21
24	07:21		14:14 (5)	06:45			06:00		06:09		18:40 (4)	05:35
	17:06	52	15:06 (5)	17:45			18:17		19:51	24	19:04 (4)	20:22
25	07:20		14:14 (5)	06:44			05:58		06:08		18:41 (4)	05:34
	17:07	52	15:06 (5)	17:46			18:18		19:52	22	19:03 (4)	20:23
26	07:20		14:15 (5)	06:42			05:56		06:06		18:42 (4)	05:34
	17:08	51	15:06 (5)	17:47			18:19		19:53	21	19:03 (4)	20:23
27	07:19		14:15 (5)	06:41			05:55		06:05		18:42 (4)	05:33
	17:10	50	15:05 (5)	17:48			18:20		19:54	19	19:01 (4)	20:24
28	07:18		14:17 (5)	06:39			05:53		06:04		18:44 (4)	05:32
	17:11	49	15:06 (5)	17:50			18:21		19:55	16	19:00 (4)	20:25
29	07:17		14:18 (5)				06:51		06:02		18:46 (4)	05:32
	17:12	48	15:06 (5)				19:22		19:56	13	18:59 (4)	20:26
30	07:16		14:18 (5)				06:49		06:01		18:48 (4)	05:31
	17:13	48	15:06 (5)				19:23		19:57	7	18:55 (4)	20:27
31	07:15		14:19 (5)				06:48					05:31
	17:15	46	15:05 (5)				19:25					20:28
Ore potenziali eliofania	296		296			369		399			450	454
Totale, caso peggiore	1588		298					348				
Probabilità di eliofania	0,44		0,46					0,48				
Tempo di operatività rid.	1,00		1,00					1,00				
Dir. del vento rid.	1,00		1,00					1,00				
Totale ridotto	0,44		0,46					0,48				
Totale effettivo	701		136					167				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CW - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (101)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	14:11 (5) 14:18 (5)	07:08 16:32	13:51 (5) 14:44 (5)
2	05:31 20:39	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	14:05 (5) 14:23 (5)	07:09 16:32	13:52 (5) 14:44 (5)
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	14:01 (5) 14:25 (5)	07:10 16:32	13:52 (5) 14:44 (5)
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	14:00 (5) 14:28 (5)	07:11 16:32	13:53 (5) 14:44 (5)
5	05:32 20:39	05:59 20:15	06:30 19:30	07:01 18:38	06:37 16:52	13:57 (5) 14:30 (5)	07:12 16:31	13:53 (5) 14:44 (5)
6	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	13:55 (5) 14:31 (5)	07:13 16:31	13:54 (5) 14:44 (5)
7	05:34 20:38	06:01 20:13	06:32 19:26	07:03 18:35	06:39 16:50	13:55 (5) 14:33 (5)	07:14 16:31	13:55 (5) 14:45 (5)
8	05:34 20:38	06:02 20:12	06:33 19:24	07:05 18:33	06:41 16:49	13:53 (5) 14:33 (5)	07:15 16:31	13:55 (5) 14:45 (5)
9	05:35 20:38	06:03 20:10	06:34 19:23	07:06 18:31	06:42 16:48	13:52 (5) 14:34 (5)	07:16 16:31	13:56 (5) 14:45 (5)
10	05:36 20:37	06:04 20:09	06:35 19:21	07:07 18:30	06:43 16:47	13:51 (5) 14:36 (5)	07:16 16:31	13:56 (5) 14:45 (5)
11	05:36 20:37	06:05 20:08	06:36 19:19	07:08 18:28	06:44 16:46	13:50 (5) 14:36 (5)	07:17 16:31	13:56 (5) 14:45 (5)
12	05:37 20:36	06:06 20:07	06:37 19:18	07:09 18:27	06:45 16:45	13:49 (5) 14:37 (5)	07:18 16:31	13:57 (5) 14:46 (5)
13	05:38 20:36	06:07 20:05	18:55 (4) 19:05 (4)	06:38 19:16	07:10 18:25	06:47 16:44	07:19 16:31	13:58 (5) 14:46 (5)
14	05:39 20:35	06:08 20:04	18:53 (4) 19:07 (4)	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:31	13:59 (5) 14:47 (5)
15	05:39 20:35	06:09 20:02	18:51 (4) 19:08 (4)	06:41 19:12	07:12 18:22	06:49 16:42	07:20 16:32	13:59 (5) 14:46 (5)
16	05:40 20:34	06:10 20:01	18:50 (4) 19:09 (4)	06:42 19:11	07:13 18:20	06:50 16:41	07:21 16:32	13:59 (5) 14:47 (5)
17	05:41 20:33	06:11 20:00	18:49 (4) 19:10 (4)	06:43 19:09	07:15 18:19	06:52 16:40	07:22 16:32	14:00 (5) 14:48 (5)
18	05:42 20:33	06:12 19:58	18:48 (4) 19:10 (4)	06:44 19:07	07:16 18:17	06:53 16:40	07:22 16:33	14:00 (5) 14:47 (5)
19	05:43 20:32	06:13 19:57	18:47 (4) 19:11 (4)	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33	14:01 (5) 14:48 (5)
20	05:44 20:31	06:14 19:55	18:47 (4) 19:11 (4)	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33	14:01 (5) 14:48 (5)
21	05:44 20:30	06:15 19:54	18:46 (4) 19:11 (4)	06:47 19:02	07:19 18:13	06:56 16:37	07:24 16:34	14:02 (5) 14:49 (5)
22	05:45 20:30	06:16 19:52	18:46 (4) 19:10 (4)	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34	14:02 (5) 14:49 (5)
23	05:46 20:29	06:17 19:51	18:45 (4) 19:09 (4)	06:49 18:59	07:21 18:10	06:59 16:36	07:25 16:35	14:03 (5) 14:50 (5)
24	05:47 20:28	06:18 19:49	18:45 (4) 19:09 (4)	06:50 18:57	07:23 18:08	07:00 16:35	07:26 16:35	14:03 (5) 14:50 (5)
25	05:48 20:27	06:19 19:47	18:45 (4) 19:08 (4)	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36	14:04 (5) 14:51 (5)
26	05:49 20:26	06:20 19:46	18:45 (4) 19:07 (4)	06:52 18:53	06:25 17:05	07:02 16:34	07:27 16:37	14:04 (5) 14:51 (5)
27	05:50 20:25	06:21 19:44	18:46 (4) 19:06 (4)	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37	14:04 (5) 14:52 (5)
28	05:51 20:24	06:22 19:43	18:47 (4) 19:04 (4)	06:54 18:50	06:27 17:03	07:04 16:33	07:27 16:38	14:05 (5) 14:52 (5)
29	05:52 20:23	06:23 19:41	18:48 (4) 19:02 (4)	06:55 18:48	06:29 17:01	07:05 16:33	07:28 16:39	14:06 (5) 14:53 (5)
30	05:53 20:22	06:24 19:39	18:51 (4) 18:59 (4)	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39	14:06 (5) 14:54 (5)
31	05:54 20:21	06:25 19:38			06:31 16:59		07:28 16:40	14:06 (5) 14:54 (5)
Ore potenziali eliofania	461	429	375	345	297		286	1505
Totale, caso peggiore		352			1343			0,36
Probabilità di eliofania		0,67			0,40			1,00
Tempo di operatività rid.		1,00			1,00			1,00
Dir. del vento rid.		1,00			1,00			1,00
Totale ridotto		0,67			0,40			0,36
Totale effettivo		235			543			546

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (102)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
1	07:28		14:46 (5)	07:14	14:48 (5)	06:38	06:46		05:59	05:30		
	16:41	25	15:11 (5)	17:16	44	15:32 (5)	17:51	19:26	19:58	20:28		
2	07:28		14:46 (5)	07:13		14:49 (5)	06:36	06:44	05:58	05:30		
	16:42	26	15:12 (5)	17:17	43	15:32 (5)	17:52	19:27	19:59	20:29		
3	07:28		14:46 (5)	07:12		14:49 (5)	06:35	06:43	05:57	05:29		
	16:43	27	15:13 (5)	17:18	42	15:31 (5)	17:53	19:28	20:00	20:30		
4	07:28		14:46 (5)	07:11		14:50 (5)	06:33	06:41	05:56	05:29		
	16:44	28	15:14 (5)	17:20	40	15:30 (5)	17:54	19:29	20:02	20:31		
5	07:28		14:46 (5)	07:10		14:51 (5)	06:31	06:39	05:54	05:28		
	16:45	29	15:15 (5)	17:21	39	15:30 (5)	17:55	19:30	20:03	20:31		
6	07:28		14:46 (5)	07:09		14:52 (5)	06:30	06:38	05:53	05:28		
	16:46	31	15:17 (5)	17:22	38	15:30 (5)	17:57	19:31	20:04	20:32		
7	07:28		14:46 (5)	07:08		14:53 (5)	06:28	06:36	05:52	05:28		
	16:47	32	15:18 (5)	17:24	36	15:29 (5)	17:58	19:32	20:05	20:33		
8	07:28		14:45 (5)	07:07		14:55 (5)	06:27	06:34	05:51	05:27		
	16:48	33	15:18 (5)	17:25	33	15:28 (5)	17:59	19:33	20:06	20:33		
9	07:28		14:45 (5)	07:06		14:56 (5)	06:25	06:33	05:49	05:27		
	16:49	34	15:19 (5)	17:26	30	15:26 (5)	18:00	19:34	20:07	20:34		
10	07:28		14:45 (5)	07:04		14:58 (5)	06:23	06:31	18:47 (4)	05:48	05:27	
	16:50	35	15:20 (5)	17:27	27	15:25 (5)	18:01	19:35	11	18:58 (4)	20:08	20:34
11	07:28		14:45 (5)	07:03		15:00 (5)	06:22	06:29	18:45 (4)	05:47	05:27	
	16:51	37	15:22 (5)	17:29	24	15:24 (5)	18:02	19:37	14	18:59 (4)	20:09	20:35
12	07:27		14:45 (5)	07:02		15:03 (5)	06:20	06:28	18:43 (4)	05:46	05:27	
	16:52	37	15:22 (5)	17:30	19	15:22 (5)	18:04	19:38	18	19:01 (4)	20:10	20:36
13	07:27		14:45 (5)	07:01		15:07 (5)	06:18	06:26	18:42 (4)	05:45	05:27	
	16:53	38	15:23 (5)	17:31	10	15:17 (5)	18:05	19:39	19	19:01 (4)	20:11	20:36
14	07:27		14:44 (5)	06:59		06:17	06:25	06:25	18:40 (4)	05:44	05:26	
	16:54	40	15:24 (5)	17:32		18:06	19:40	21	19:01 (4)	20:12	20:36	
15	07:26		14:45 (5)	06:58		06:15	06:23	06:23	18:40 (4)	05:43	05:26	
	16:55	40	15:25 (5)	17:34		18:07	19:41	22	19:02 (4)	20:13	20:37	
16	07:26		14:44 (5)	06:57		06:13	06:21	06:21	18:39 (4)	05:42	05:26	
	16:56	41	15:25 (5)	17:35		18:08	19:42	23	19:02 (4)	20:14	20:37	
17	07:25		14:45 (5)	06:55		06:12	06:20	06:20	18:40 (4)	05:41	05:26	
	16:57	41	15:26 (5)	17:36		18:09	19:43	22	19:02 (4)	20:15	20:38	
18	07:25		14:44 (5)	06:54		06:10	06:18	06:18	18:39 (4)	05:40	05:27	
	16:59	43	15:27 (5)	17:37		18:10	19:44	22	19:01 (4)	20:16	20:38	
19	07:24		14:45 (5)	06:53		06:08	06:17	06:17	18:40 (4)	05:39	05:27	
	17:00	43	15:28 (5)	17:39		18:11	19:45	21	19:01 (4)	20:17	20:38	
20	07:24		14:45 (5)	06:51		06:06	06:15	06:15	18:39 (4)	05:38	05:27	
	17:01	43	15:28 (5)	17:40		18:12	19:46	21	19:00 (4)	20:18	20:39	
21	07:23		14:44 (5)	06:50		06:05	06:14	06:14	18:40 (4)	05:37	05:27	
	17:02	45	15:29 (5)	17:41		18:14	19:47	19	18:59 (4)	20:19	20:39	
22	07:23		14:45 (5)	06:48		06:03	06:12	06:12	18:41 (4)	05:37	05:27	
	17:03	45	15:30 (5)	17:42		18:15	19:49	17	18:58 (4)	20:20	20:39	
23	07:22		14:45 (5)	06:47		06:01	06:11	06:11	18:42 (4)	05:36	05:27	
	17:05	45	15:30 (5)	17:44		18:16	19:50	14	18:56 (4)	20:21	20:39	
24	07:21		14:45 (5)	06:45		06:00	06:09	06:09	18:44 (4)	05:35	05:28	
	17:06	45	15:30 (5)	17:45		18:17	19:51	10	18:54 (4)	20:22	20:39	
25	07:20		14:45 (5)	06:44		05:58	06:08	06:08	05:34	05:28		
	17:07	46	15:31 (5)	17:46		18:18	19:52		20:23	20:40		
26	07:20		14:45 (5)	06:42		05:56	06:06	06:06	05:33	05:28		
	17:08	46	15:31 (5)	17:47		18:19	19:53		20:23	20:40		
27	07:19		14:45 (5)	06:41		05:55	06:05	06:05	05:33	05:29		
	17:10	46	15:31 (5)	17:48		18:20	19:54		20:24	20:40		
28	07:18		14:46 (5)	06:39		05:53	06:04	06:04	05:32	05:29		
	17:11	46	15:32 (5)	17:50		18:21	19:55		20:25	20:40		
29	07:17		14:47 (5)			06:51	06:02	06:02	05:32	05:29		
	17:12	45	15:32 (5)			19:22	19:56		20:26	20:40		
30	07:16		14:47 (5)			06:49	06:01	06:01	05:31	05:30		
	17:13	45	15:32 (5)			19:23	19:57		20:27	20:40		
31	07:15		14:48 (5)			06:48			05:30			
	17:15	44	15:32 (5)			19:25			20:28			
Ore potenziali eliofania	296		296		369	399			450	454		
Totale, caso peggiore	1201		425			274						
Probabilità di eliofania	0,44		0,46			0,48						
Tempo di operatività rid.	1,00		1,00			1,00						
Dir. del vento rid.	1,00		1,00			1,00						
Totale ridotto	0,44		0,46			0,48						
Totale effettivo	530		194			131						

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uternte autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (102)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:30 20:40	05:55 20:20	06:26 19:36	18:44 (4) 18:58 (4)	06:57 18:45	06:32 16:57	14:27 (5) 14:55 (5)	07:08 16:32	14:27 (5) 15:04 (5)
2	05:31 20:39	05:56 20:19	06:27 19:35	18:45 (4) 18:56 (4)	06:58 18:43	06:33 16:56	14:25 (5) 14:56 (5)	07:09 16:32	14:28 (5) 15:03 (5)
3	05:31 20:39	05:57 20:18	06:28 19:33		06:59 18:41	06:35 16:55	14:23 (5) 14:57 (5)	07:10 16:32	14:29 (5) 15:03 (5)
4	05:32 20:39	05:58 20:17	06:29 19:31		07:00 18:40	06:36 16:54	14:23 (5) 14:59 (5)	07:11 16:32	14:30 (5) 15:03 (5)
5	05:32 20:39	05:59 20:15	06:30 19:30		07:01 18:38	06:37 16:52	14:22 (5) 15:00 (5)	07:12 16:31	14:31 (5) 15:03 (5)
6	05:33 20:39	06:00 20:14	06:31 19:28		07:02 18:36	06:38 16:51	14:21 (5) 15:00 (5)	07:13 16:31	14:32 (5) 15:03 (5)
7	05:34 20:38	06:01 20:13	06:32 19:26		07:03 18:35	06:39 16:50	14:21 (5) 15:01 (5)	07:14 16:31	14:33 (5) 15:02 (5)
8	05:34 20:38	06:02 20:12	06:33 19:24		07:05 18:33	06:41 16:49	14:20 (5) 15:02 (5)	07:15 16:31	14:34 (5) 15:02 (5)
9	05:35 20:38	06:03 20:10	06:34 19:23		07:06 18:31	06:42 16:48	14:19 (5) 15:02 (5)	07:15 16:31	14:35 (5) 15:02 (5)
10	05:36 20:37	06:04 20:09	06:35 19:21		07:07 18:30	06:43 16:47	14:19 (5) 15:03 (5)	07:16 16:31	14:35 (5) 15:01 (5)
11	05:36 20:37	06:05 20:08	06:36 19:19		07:08 18:28	06:44 16:46	14:19 (5) 15:03 (5)	07:17 16:31	14:36 (5) 15:01 (5)
12	05:37 20:36	06:06 20:07	06:37 19:18		07:09 18:27	06:45 16:45	14:18 (5) 15:03 (5)	07:18 16:31	14:38 (5) 15:01 (5)
13	05:38 20:36	06:07 20:05	06:38 19:16		07:10 18:25	06:47 16:44	14:19 (5) 15:04 (5)	07:19 16:31	14:39 (5) 15:01 (5)
14	05:39 20:35	06:08 20:04	06:40 19:14		07:11 18:23	06:48 16:43	14:18 (5) 15:04 (5)	07:20 16:31	14:40 (5) 15:02 (5)
15	05:39 20:35	06:09 20:02	06:41 19:12		07:12 18:22	06:49 16:42	14:18 (5) 15:04 (5)	07:20 16:32	14:40 (5) 15:01 (5)
16	05:40 20:34	06:10 20:01	06:42 19:11		07:13 18:20	06:50 16:41	14:18 (5) 15:04 (5)	07:21 16:32	14:41 (5) 15:01 (5)
17	05:41 20:33	06:11 20:00	06:43 19:09		07:15 18:19	06:52 16:40	14:19 (5) 15:05 (5)	07:22 16:32	14:43 (5) 15:02 (5)
18	05:42 20:33	06:12 19:58	18:54 (4) 18:58 (4)	06:44 19:07	07:16 18:17	06:53 16:40	14:19 (5) 15:04 (5)	07:22 16:33	14:43 (5) 15:01 (5)
19	05:43 20:32	06:13 19:57	18:50 (4) 19:01 (4)	06:45 19:05	07:17 18:16	06:54 16:39	14:19 (5) 15:04 (5)	07:23 16:33	14:44 (5) 15:02 (5)
20	05:44 20:31	06:14 19:55	18:48 (4) 19:03 (4)	06:46 19:04	07:18 18:14	06:55 16:38	14:19 (5) 15:04 (5)	07:24 16:33	14:44 (5) 15:01 (5)
21	05:44 20:30	06:15 19:54	18:46 (4) 19:04 (4)	06:47 19:02	07:19 18:13	06:56 16:37	14:20 (5) 15:05 (5)	07:24 16:34	14:45 (5) 15:02 (5)
22	05:45 20:30	06:16 19:52	18:44 (4) 19:03 (4)	06:48 19:00	07:20 18:11	06:57 16:37	14:21 (5) 15:04 (5)	07:25 16:34	14:45 (5) 15:02 (5)
23	05:46 20:29	06:17 19:51	18:43 (4) 19:04 (4)	06:49 18:59	07:21 18:10	06:59 16:36	14:21 (5) 15:04 (5)	07:25 16:35	14:46 (5) 15:03 (5)
24	05:47 20:28	06:18 19:49	18:42 (4) 19:04 (4)	06:50 18:57	07:23 18:08	07:00 16:35	14:21 (5) 15:04 (5)	07:26 16:35	14:46 (5) 15:04 (5)
25	05:48 20:27	06:19 19:47	18:42 (4) 19:04 (4)	06:51 18:55	07:24 17:07	07:01 16:35	14:23 (5) 15:04 (5)	07:26 16:36	14:47 (5) 15:05 (5)
26	05:49 20:26	06:20 19:46	18:41 (4) 19:04 (4)	06:52 18:53	07:25 17:05	07:02 16:34	14:23 (5) 15:04 (5)	07:27 16:37	14:47 (5) 15:05 (5)
27	05:50 20:25	06:21 19:44	18:41 (4) 19:03 (4)	06:53 18:52	07:26 17:04	07:03 16:34	14:24 (5) 15:04 (5)	07:27 16:37	14:46 (5) 15:06 (5)
28	05:51 20:24	06:22 19:43	18:41 (4) 19:03 (4)	06:54 18:50	07:27 17:03	07:04 16:33	14:24 (5) 15:04 (5)	07:27 16:38	14:46 (5) 15:07 (5)
29	05:52 20:23	06:23 19:41	18:41 (4) 19:02 (4)	06:55 18:48	07:29 17:01	07:05 16:33	14:25 (5) 15:03 (5)	07:28 16:39	14:47 (5) 15:08 (5)
30	05:53 20:22	06:24 19:39	18:42 (4) 19:01 (4)	06:56 18:47	07:30 17:00	07:07 16:33	14:31 (5) 14:51 (5)	07:28 16:39	14:47 (5) 15:09 (5)
31	05:54 20:21	06:25 19:38	18:42 (4) 19:00 (4)		06:31 16:59	14:30 (5) 14:54 (5)		07:28 16:40	14:47 (5) 15:10 (5)
Ore potenziali eliofania	461	429	375	345	297	1239	286	729	
Totale, caso peggiore		257	25	57	0,44	0,40		0,36	
Probabilità di eliofania		0,67	1,00	1,00	1,00	1,00		1,00	
Tempo di operatività rid.		1,00	1,00	1,00	1,00	1,00		1,00	
Dir. del vento rid.		1,00	0,58	0,44	0,40			0,36	
Totale ridotto		0,67	14	25	501			265	
Totale effettivo		171							

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (103)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 19:23	06:51 19:56	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 19:24	06:50 19:58	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:31 20:28	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	06:31 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: CZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (104)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 17:51	06:51 19:23	06:02 19:56	05:32 19:56	05:30 20:26	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 17:49	06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:34 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:21	05:54 20:21	06:25 19:38	06:31 16:59	06:31 16:59	06:31 16:59	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (105)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
1	07:28		14:07 (5)	07:14	14:18 (5)	06:38	06:46		05:59		18:48 (4)	05:30
	16:41	49	14:56 (5)	17:16	51	15:09 (5)	17:51	19:26	19:58	18	19:06 (4)	20:28
2	07:28		14:07 (5)	07:13		14:19 (5)	06:36	06:44	05:58		18:49 (4)	05:30
	16:42	50	14:57 (5)	17:17	50	15:09 (5)	17:52	19:27	19:59	15	19:04 (4)	20:29
3	07:28		14:07 (5)	07:12		14:19 (5)	06:35	06:43	05:57		18:50 (4)	05:29
	16:43	51	14:58 (5)	17:18	48	15:07 (5)	17:53	19:28	20:00	12	19:02 (4)	20:30
4	07:28		14:08 (5)	07:11		14:20 (5)	06:33	06:41	05:56		18:54 (4)	05:29
	16:44	50	14:58 (5)	17:20	47	15:07 (5)	17:54	19:29	20:02	4	18:58 (4)	20:31
5	07:28		14:08 (5)	07:10		14:21 (5)	06:31	06:39	05:54			05:28
	16:45	51	14:59 (5)	17:21	45	15:06 (5)	17:55	19:30	20:03			20:31
6	07:28		14:08 (5)	07:09		14:23 (5)	06:30	06:38	05:53			05:28
	16:46	52	15:00 (5)	17:22	43	15:06 (5)	17:57	19:31	20:04			20:32
7	07:28		14:09 (5)	07:08		14:25 (5)	06:28	06:36	05:52			05:28
	16:47	52	15:01 (5)	17:24	40	15:05 (5)	17:58	19:32	20:05			20:33
8	07:28		14:08 (5)	07:07		14:26 (5)	06:27	06:34	05:51			05:27
	16:48	53	15:01 (5)	17:25	38	15:04 (5)	17:59	19:33	20:06			20:33
9	07:28		14:08 (5)	07:06		14:28 (5)	06:25	06:33	05:49			05:27
	16:49	54	15:02 (5)	17:26	34	15:02 (5)	18:00	19:34	20:07			20:34
10	07:28		14:09 (5)	07:04		14:30 (5)	06:23	06:31	05:48			05:27
	16:50	53	15:02 (5)	17:27	31	15:01 (5)	18:01	19:35	20:08			20:34
11	07:28		14:09 (5)	07:03		14:33 (5)	06:22	06:29	05:47			05:27
	16:51	54	15:03 (5)	17:29	26	14:59 (5)	18:02	19:37	20:09			20:35
12	07:27		14:09 (5)	07:02		14:37 (5)	06:20	06:28	05:46			05:27
	16:52	54	15:03 (5)	17:30	19	14:56 (5)	18:04	19:38	20:10			20:36
13	07:27		14:10 (5)	07:01		14:42 (5)	06:18	06:26	05:45			05:27
	16:53	54	15:04 (5)	17:31	8	14:50 (5)	18:05	19:39	20:11			20:36
14	07:27		14:09 (5)	06:59			06:17	06:25	05:44			05:26
	16:54	55	15:04 (5)	17:32			18:06	19:40	20:12			20:36
15	07:26		14:10 (5)	06:58			06:15	06:23	05:43			05:26
	16:55	55	15:05 (5)	17:34			18:07	19:41	20:13			20:37
16	07:26		14:10 (5)	06:57			06:13	06:21	05:42			05:26
	16:56	56	15:06 (5)	17:35			18:08	19:42	20:14			20:37
17	07:25		14:10 (5)	06:55			06:12	06:20	05:41			05:27
	16:57	57	15:07 (5)	17:36			18:09	19:43	20:15			20:38
18	07:25		14:10 (5)	06:54			06:10	06:18	05:40			05:27
	16:59	57	15:07 (5)	17:37			18:10	19:44	20:16			20:38
19	07:24		14:11 (5)	06:53			06:08	06:17	05:39			05:27
	17:00	57	15:08 (5)	17:39			18:11	19:45	20:17			20:38
20	07:24		14:11 (5)	06:51			06:06	06:15	05:38			05:27
	17:01	57	15:08 (5)	17:40			18:12	19:46	20:18			20:39
21	07:23		14:11 (5)	06:50			06:05	06:14	05:37			05:27
	17:02	57	15:08 (5)	17:41			18:14	19:47	20:19			20:39
22	07:23		14:12 (5)	06:48			06:03	06:12	05:36			05:27
	17:03	57	15:09 (5)	17:42			18:15	19:49	20:20			20:39
23	07:22		14:12 (5)	06:47			06:01	06:11	05:36			05:27
	17:05	57	15:09 (5)	17:44			18:16	19:50	20:21			20:39
24	07:21		14:12 (5)	06:45			06:00	06:09	05:35			05:28
	17:06	57	15:09 (5)	17:45			18:17	19:51	20:22			20:39
25	07:20		14:13 (5)	06:44			05:58	06:08	05:34			05:28
	17:07	56	15:09 (5)	17:46			18:18	19:52	20:23			20:40
26	07:20		14:13 (5)	06:42			05:56	06:06	05:33			05:28
	17:08	56	15:09 (5)	17:47			18:19	19:53	20:23			20:40
27	07:19		14:13 (5)	06:41			05:55	06:05	05:33			05:29
	17:10	56	15:09 (5)	17:48			18:20	19:54	20:24			20:40
28	07:18		14:15 (5)	06:39			05:53	06:04	05:32			05:29
	17:11	55	15:10 (5)	17:50			18:21	19:55	20:25			20:40
29	07:17		14:15 (5)				06:51	06:02	05:32			05:29
	17:12	55	15:10 (5)				19:22	19:56	20:26			20:40
30	07:16		14:16 (5)				06:49	06:01	05:31			05:30
	17:13	54	15:10 (5)				19:23	19:57	20:27			20:40
31	07:15		14:17 (5)				06:48		05:31			
	17:15	52	15:09 (5)				19:25		20:28			
Ore potenziali eliofania	296		296		369	399		450			454	
Totale, caso peggiore	1683		480			319		49				
Probabilità di eliofania	0,44		0,46			0,48		0,47				
Tempo di operatività rid.	1,00		1,00			1,00		1,00				
Dir. del vento rid.	1,00		1,00			1,00		1,00				
Totale ridotto	0,44		0,46			0,48		0,47				
Totale effettivo	743		219			153		23				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (105)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	06:26	06:57	06:32	13:59 (5) 07:08 13:51 (5)
	20:40	20:20	19:36	18:45	16:57	32 14:31 (5) 16:32 54 14:45 (5)
2	05:31	05:56	06:27	06:58	06:33	13:57 (5) 07:09 13:52 (5)
	20:39	20:19	19:35	18:43	16:56	35 14:32 (5) 16:32 54 14:46 (5)
3	05:31	05:57	06:28	06:59	06:35	13:55 (5) 07:10 13:52 (5)
	20:39	20:18	19:33	18:41	16:55	38 14:33 (5) 16:32 54 14:46 (5)
4	05:32	05:58	06:29	07:00	06:36	13:54 (5) 07:11 13:53 (5)
	20:39	20:17	19:31	18:40	16:54	41 14:35 (5) 16:32 53 14:46 (5)
5	05:32	05:59	06:30	07:01	06:37	13:52 (5) 07:12 13:54 (5)
	20:39	20:15	19:30	18:38	16:52	44 14:36 (5) 16:31 52 14:46 (5)
6	05:33	06:00	06:31	07:02	06:38	13:51 (5) 07:13 13:54 (5)
	20:39	20:14	19:28	18:36	16:51	45 14:36 (5) 16:31 52 14:46 (5)
7	05:34	06:01	06:32	07:03	06:39	13:51 (5) 07:14 13:55 (5)
	20:38	20:13	19:26	18:35	16:50	47 14:38 (5) 16:31 51 14:46 (5)
8	05:34	06:02	06:33	07:05	06:41	13:50 (5) 07:15 13:56 (5)
	20:38	20:12	19:24	18:33	16:49	48 14:38 (5) 16:31 50 14:46 (5)
9	05:35	06:03	19:02 (4) 06:34	07:06	06:42	13:49 (5) 07:16 13:56 (5)
	20:38	20:10	7 19:09 (4) 19:23	18:31	16:48	50 14:39 (5) 16:31 51 14:47 (5)
10	05:36	06:04	18:59 (4) 06:35	07:07	06:43	13:49 (5) 07:16 13:56 (5)
	20:37	20:09	13 19:12 (4) 19:21	18:30	16:47	51 14:40 (5) 16:31 50 14:46 (5)
11	05:36	06:05	18:57 (4) 06:36	07:08	06:44	13:48 (5) 07:17 13:57 (5)
	20:37	20:08	16 19:13 (4) 19:19	18:28	16:46	52 14:40 (5) 16:31 49 14:46 (5)
12	05:37	06:06	18:56 (4) 06:37	07:09	06:45	13:47 (5) 07:18 13:58 (5)
	20:36	20:07	19 19:15 (4) 19:18	18:27	16:45	53 14:40 (5) 16:31 49 14:47 (5)
13	05:38	06:07	18:55 (4) 06:38	07:10	06:47	13:47 (5) 07:19 13:59 (5)
	20:36	20:05	20 19:15 (4) 19:16	18:25	16:44	55 14:42 (5) 16:31 48 14:47 (5)
14	05:39	06:08	18:54 (4) 06:40	07:11	06:48	13:47 (5) 07:20 13:59 (5)
	20:35	20:04	22 19:16 (4) 19:14	18:23	16:43	55 14:42 (5) 16:32 49 14:48 (5)
15	05:39	06:09	18:53 (4) 06:41	07:12	06:49	13:46 (5) 07:20 13:59 (5)
	20:35	20:02	23 19:16 (4) 19:12	18:22	16:42	56 14:42 (5) 16:32 48 14:47 (5)
16	05:40	06:10	18:53 (4) 06:42	07:13	06:50	13:46 (5) 07:21 14:00 (5)
	20:34	20:01	24 19:17 (4) 19:11	18:20	16:41	56 14:42 (5) 16:32 48 14:48 (5)
17	05:41	06:11	18:52 (4) 06:43	07:15	06:52	13:47 (5) 07:22 14:01 (5)
	20:33	20:00	25 19:17 (4) 19:09	18:19	16:40	56 14:43 (5) 16:32 48 14:49 (5)
18	05:42	06:12	18:52 (4) 06:44	07:16	06:53	13:46 (5) 07:22 14:01 (5)
	20:33	19:58	25 19:17 (4) 19:07	18:17	16:40	57 14:43 (5) 16:33 47 14:48 (5)
19	05:43	06:13	18:51 (4) 06:45	07:17	06:54	13:46 (5) 07:23 14:02 (5)
	20:32	19:57	25 19:16 (4) 19:06	18:16	16:39	57 14:43 (5) 16:33 47 14:49 (5)
20	05:44	06:14	18:51 (4) 06:46	07:18	06:55	13:47 (5) 07:24 14:02 (5)
	20:31	19:55	25 19:16 (4) 19:04	18:14	16:38	57 14:44 (5) 16:33 47 14:49 (5)
21	05:44	06:15	18:51 (4) 06:47	07:19	06:56	13:47 (5) 07:24 14:03 (5)
	20:30	19:54	24 19:15 (4) 19:02	18:13	16:37	57 14:44 (5) 16:34 47 14:50 (5)
22	05:45	06:16	18:52 (4) 06:48	07:20	06:58	13:47 (5) 07:25 14:03 (5)
	20:30	19:52	23 19:15 (4) 19:00	18:11	16:37	57 14:44 (5) 16:34 47 14:50 (5)
23	05:46	06:17	18:51 (4) 06:49	07:21	06:59	13:47 (5) 07:25 14:04 (5)
	20:29	19:51	22 19:13 (4) 18:59	18:10	16:36	57 14:44 (5) 16:35 47 14:51 (5)
24	05:47	06:18	18:52 (4) 06:50	07:23	07:00	13:47 (5) 07:26 14:04 (5)
	20:28	19:49	20 19:12 (4) 18:57	18:08	16:35	57 14:44 (5) 16:35 47 14:51 (5)
25	05:48	06:19	18:53 (4) 06:51	06:24	07:01	13:48 (5) 07:26 14:05 (5)
	20:27	19:47	17 19:10 (4) 18:55	17:07	16:35	57 14:45 (5) 16:36 47 14:52 (5)
26	05:49	06:20	18:54 (4) 06:52	06:25	07:02	13:49 (5) 07:27 14:05 (5)
	20:26	19:46	14 19:08 (4) 18:53	17:05	16:34	56 14:45 (5) 16:37 47 14:52 (5)
27	05:50	06:21	18:57 (4) 06:53	06:26	07:03	13:49 (5) 07:27 14:05 (5)
	20:25	19:44	8 19:05 (4) 18:52	17:04	16:34	56 14:45 (5) 16:37 48 14:53 (5)
28	05:51	06:22	06:54	06:27	07:04	13:49 (5) 07:27 14:05 (5)
	20:24	19:43	18:50	17:03	16:33	55 14:44 (5) 16:38 48 14:53 (5)
29	05:52	06:23	06:55	06:29	14:10 (5) 07:05	13:50 (5) 07:28 14:06 (5)
	20:23	19:41	18:48	17:01	12 14:22 (5) 16:33	54 14:44 (5) 16:39 49 14:55 (5)
30	05:53	06:24	06:56	06:30	14:05 (5) 07:07	13:50 (5) 07:28 14:07 (5)
	20:22	19:39	18:47	17:00	21 14:26 (5) 16:33	54 14:44 (5) 16:39 48 14:55 (5)
31	05:54	06:25	06:31	06:31	14:02 (5) 07:08	13:51 (5) 07:28 14:07 (5)
	20:21	19:38	16:59	27 14:29 (5) 16:40	49 14:56 (5)	
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		372		60	1545	1525
Probabilità di eliofania		0,67		0,44	0,40	0,36
Tempo di operatività rid.		1,00		1,00	1,00	1,00
Dir. del vento rid.		1,00		1,00	1,00	1,00
Totale ridotto		0,67		0,44	0,40	0,36
Totale effettivo		248		26	625	554

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

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Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (106)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	07:20 (1) 07:49 (1)	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58
2	07:29 16:42	07:14 17:17	06:36 17:52	07:21 (1) 07:49 (1)	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56
3	07:29 16:43	07:13 17:19	06:35 17:53	07:21 (1) 07:48 (1)	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55
4	07:29 16:44	07:12 17:20	06:33 17:55	07:21 (1) 07:46 (1)	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54
5	07:29 16:45	07:10 17:21	06:32 17:56	07:23 (1) 07:45 (1)	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53
6	07:29 16:46	07:09 17:23	06:30 17:57	07:24 (1) 07:43 (1)	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52
7	07:29 16:47	07:08 17:24	06:28 17:58	07:26 (1) 07:40 (1)	06:36 19:33	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50
8	07:29 16:48	07:07 17:25	06:27 17:59	07:32 (1) 07:34 (1)	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 18:00	05:50 19:35	05:27 20:07	05:38 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 18:02	05:49 19:36	05:27 20:08	05:36 20:35	06:04 20:37	06:06 20:09	06:36 19:21	07:07 18:30	06:43 16:47
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 18:03	05:47 19:37	05:27 20:09	05:37 20:35	06:05 20:37	06:07 20:08	06:37 19:20	07:08 18:28	06:45 16:46
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	07:54 (1) 18:27	06:46 16:45
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	07:53 (1) 18:25	06:47 16:44
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	07:52 (1) 18:24	06:48 16:43
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	07:52 (1) 18:22	06:49 16:42
16	07:26 16:57	06:57 17:35	06:14 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	07:52 (1) 18:20	06:51 16:41
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	07:52 (1) 18:19	06:52 16:41
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	07:52 (1) 18:17	06:53 16:40
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	07:52 (1) 18:16	06:54 16:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	07:53 (1) 18:14	06:55 16:38
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	07:53 (1) 18:13	06:57 16:38
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	07:55 (1) 18:11	06:58 16:37
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	07:55 (1) 18:10	06:59 16:36
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:57 (1) 18:08	07:00 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	06:59 (1) 17:07	07:01 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	06:52 (1) 17:06	07:02 16:35
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	06:26 17:04	06:53 (1) 17:04	07:04 16:34
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	06:54 (1) 17:03	07:05 16:33
29	07:17 17:12	06:39 17:49	05:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:49	06:29 17:01	06:55 (1) 17:01	07:06 16:33
30	07:17 17:14	06:38 17:48	05:50 18:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:25 19:40	06:56 18:47	06:30 17:00	06:56 (1) 17:00	07:07 16:40
31	07:16 17:15	06:37 17:47	05:49 18:25	06:00 19:59	05:30 20:28	05:29 20:40	05:54 20:21	06:26 19:38	06:57 18:45	06:31 16:59	06:57 (1) 16:59	07:08 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	500	297
Totale, caso peggiore		327	166								500	
Probabilità di eliofania		0,46	0,44								0,44	
Tempo di operatività rid.		1,00	1,00								1,00	
Dir. del vento rid.		1,00	1,00								1,00	
Totale ridotto		0,46	0,44								0,44	
Totale effettivo		149	73								218	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (107)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for hourly solar radiation data. Includes summary rows for 'Ore potenziali eliofania', 'Totale, caso peggiore', and 'Probabilità di eliofania'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)
(WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

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Redatto il:

14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (108)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	07:34 (1) 08:01 (1)	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	07:33 (1) 08:00 (1)	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	07:33 (1) 08:00 (1)	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	07:07 (1) 07:11 (1)	06:41 19:29	05:56 20:02	05:29 20:31	05:58 20:17	06:30 19:32	07:01 18:40	07:33 (1) 07:59 (1)	06:36 16:54	07:11 16:32
5	07:29 16:45	07:11 17:21	06:32 17:56	07:03 (1) 07:16 (1)	06:40 19:30	05:55 20:03	05:29 20:32	05:59 20:16	06:31 19:30	07:02 18:38	07:34 (1) 07:58 (1)	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	07:00 (1) 07:18 (1)	06:38 19:31	05:53 20:04	05:28 20:32	06:00 20:15	06:32 19:28	07:03 18:37	07:34 (1) 07:56 (1)	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:58 (1) 07:19 (1)	06:36 19:33	05:52 20:05	05:28 20:33	06:01 20:13	06:33 19:26	07:04 18:35	07:35 (1) 07:54 (1)	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:57 (1) 07:20 (1)	06:35 19:34	05:51 20:06	05:28 20:34	06:02 20:12	06:34 19:25	07:05 18:33	07:37 (1) 07:52 (1)	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:56 (1) 07:21 (1)	06:33 19:35	05:50 20:07	05:27 20:34	06:03 20:11	06:35 19:23	07:06 18:32	07:39 (1) 07:49 (1)	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02	06:55 (1) 07:21 (1)	06:31 19:36	05:49 20:08	05:27 20:35	06:04 20:09	06:36 19:21	07:07 18:30	07:49 (1)	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:55 (1) 07:22 (1)	06:30 19:37	05:47 20:09	05:27 20:35	06:05 20:08	06:37 19:20	07:08 18:28		06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:54 (1) 07:21 (1)	06:28 19:38	05:46 20:10	05:27 20:36	06:06 20:07	06:38 19:18	07:09 18:27		06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:53 (1) 07:21 (1)	06:27 19:39	05:45 20:11	05:27 20:36	06:07 20:05	06:39 19:16	07:10 18:25		06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:54 (1) 07:21 (1)	06:25 19:40	05:44 20:12	05:27 20:37	06:08 20:04	06:40 19:14	07:11 18:24		06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:54 (1) 07:20 (1)	06:23 19:41	05:43 20:13	05:27 20:37	06:09 20:03	06:41 19:13	07:13 18:22		06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:14 18:08	06:54 (1) 07:19 (1)	06:22 19:42	05:42 20:14	05:27 20:38	06:10 20:01	06:42 19:11	07:14 18:20		06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:55 (1) 07:18 (1)	06:20 19:43	05:41 20:15	05:27 20:38	06:11 20:00	06:43 19:09	07:15 18:19		06:52 16:41	07:22 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	06:55 (1) 07:16 (1)	06:19 19:44	05:40 20:16	05:27 20:38	06:12 20:33	06:44 19:08	07:16 18:17		06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:56 (1) 07:14 (1)	06:17 19:46	05:39 20:17	05:27 20:39	06:13 19:57	06:45 19:06	07:17 18:16		06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:58 (1) 07:12 (1)	06:16 19:47	05:38 20:18	05:27 20:39	06:14 19:55	06:46 19:04	07:18 18:14		06:55 16:38	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	07:02 (1) 07:08 (1)	06:14 19:48	05:38 20:19	05:27 20:39	06:15 20:31	06:47 19:02	07:19 18:13		06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:37 20:39	05:27 20:30	06:16 19:52	06:48 19:01	07:21 18:11		06:58 16:37	07:25 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:43 (1) 07:55 (1)	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:40 (1) 07:57 (1)	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	07:38 (1) 07:58 (1)	06:24 17:07	07:01 16:35	07:27 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54	07:37 (1) 07:59 (1)	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	07:35 (1) 08:00 (1)	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	07:34 (1) 08:00 (1)	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 18:23	05:51 19:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:49	07:35 (1) 08:01 (1)	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:37 19:24	05:50 19:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:25 19:40	06:56 18:47	07:34 (1) 08:01 (1)	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	05:31 20:28	05:31 20:28	05:54 20:21	06:26 19:38	06:26 19:38	06:26 18:47	06:31 16:59		06:40 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286	
Totale, caso peggiore			372						175		197		
Probabilità di eliofania			0,44						0,58		0,44		
Tempo di operatività rid.			1,00						1,00		1,00		
Dir. del vento rid.			1,00						1,00		1,00		
Totale ridotto			0,44						0,58		0,44		
Totale effettivo			164						101		86		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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Redatto il:  
14/11/2023 14:56/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (110)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	07:29 16:44	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33	
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32	
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32	
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32	
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32	
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31	
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31	
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31	
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31	
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31	
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31	
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31	
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32	
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32	
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32	5 08:20 (1) 08:25 (1)
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32	7 08:26 (1) 08:19 (1)
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32	9 08:28 (1) 08:20 (1)
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33	9 08:29 (1) 08:19 (1)
19	07:25 17:00	06:53 17:39	06:08 18:12	06:08 19:46	06:17 20:17	05:39 20:39	05:27 20:32	05:43 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33	10 08:29 (1) 08:20 (1)
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34	10 08:30 (1) 08:20 (1)
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34	10 08:30 (1) 08:21 (1)
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34	10 08:31 (1) 08:21 (1)
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35	10 08:31 (1) 08:22 (1)
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36	10 08:32 (1) 08:22 (1)
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	07:24 17:07	07:01 16:35	07:27 16:36	10 08:32 (1) 08:23 (1)
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	07:25 17:06	07:02 16:35	07:27 16:37	9 08:32 (1) 08:25 (1)
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	07:26 17:04	07:04 16:34	07:27 16:37	7 08:32 (1) 08:26 (1)
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	07:27 17:03	07:05 16:34	07:28 16:38	6 08:32 (1) 08:28 (1)
29	07:17 17:12		06:51 19:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	07:29 17:01	07:06 16:33	07:28 16:39	2 08:30 (1)
30	07:17 17:14		06:50 19:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:24 19:40	06:56 18:47	07:30 17:00	07:07 16:33	07:28 16:40	
31	07:16 17:15		06:48 19:25		05:31 20:28		05:54 20:21	06:26 19:38		06:31 16:59		07:28 16:40	
Ore potenziali eliofanìa	296	296	369	399	450	454	461	429	375	345	297	286	
Totale, caso peggiore													124
Probabilità di eliofanìa													0,36
Tempo di operatività rid.													1,00
Dir. del vento rid.													1,00
Totale ridotto													0,36
Totale effettivo													45

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (11)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:52 18:23	06:03 19:56	05:31 20:27	05:28 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:38 17:52	05:51 18:24	06:02 19:57	05:30 20:28	05:27 20:40	05:53 20:23	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:53	05:50 18:25	06:01 19:58	05:29 20:29	05:26 20:40	05:54 20:21	06:25 19:38	06:57 18:46	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DH - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (112)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DI - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (113)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (114)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
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18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (115)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:39 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:30 19:30	07:01 18:38	06:37 16:53	07:12 16:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:33	05:51 20:06	05:27 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:36 20:37	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:39 20:35	06:09 20:03	06:41 19:13	07:12 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:40	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:18 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:37	07:24 16:34
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
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24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
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26	07:20 17:08	06:42 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:34	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:15 17:15	06:36 17:49	05:50 18:24	06:01 19:58	05:29 20:28	05:26 20:40	05:54 20:21	06:25 19:38	06:57 18:46	06:31 16:59	07:08 16:40	07:29 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (116)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	07:30 (1) 19:26	06:46 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	07:33 (1) 19:27	06:45 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	07:38 (1) 19:28	06:43 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	07:41 (1) 19:28	06:41 19:29	05:29 20:02	05:32 20:31	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56		06:40 19:30	05:29 20:03	05:33 20:32	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57		06:38 19:31	05:28 20:04	05:33 20:32	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
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12	07:28 16:52	07:02 17:30	06:20 18:04		06:28 19:38	05:27 20:10	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:19 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05		06:27 19:39	05:27 20:11	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:20 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06		06:25 19:40	05:27 20:12	05:39 20:37	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:21 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07		06:23 19:41	05:27 20:13	05:40 20:37	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:22 16:32
16	07:26 16:57	06:57 17:35	06:14 18:08		06:22 19:42	05:27 20:14	05:40 20:38	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09		06:20 19:43	05:27 20:15	05:41 20:38	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11		06:19 19:44	05:27 20:16	05:42 20:38	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12		06:17 19:46	05:27 20:17	05:43 20:39	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13		06:16 19:47	05:27 20:18	05:44 20:39	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14		06:14 19:48	05:27 20:19	05:45 20:39	06:15 19:54	06:47 19:02	07:19 18:13	06:56 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15		06:13 19:49	05:27 20:20	05:46 20:39	06:16 19:52	06:48 19:01	07:21 18:11	06:57 16:37	07:26 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16		06:11 19:50	05:28 20:21	05:46 20:40	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17		06:10 19:51	05:28 20:22	05:47 20:40	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18		06:08 19:52	05:28 20:23	05:48 20:40	06:19 19:48	06:51 18:55	06:24 17:07	06:57 16:35	07:01 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19		06:07 19:53	05:29 20:24	05:49 20:40	06:20 19:46	06:52 18:54	06:25 17:06	06:58 16:35	07:02 16:37
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28	07:18 17:11	06:40 17:50	05:53 18:22		06:04 19:55	05:29 20:26	05:51 20:40	06:22 19:43	06:54 18:50	06:28 17:03	07:00 16:34	07:05 16:38
29	07:17 17:12		06:51 19:23		06:02 19:56	05:30 20:26	05:52 20:40	06:23 19:41	06:55 18:49	06:29 17:01	07:01 16:33	07:06 16:39
30	07:17 17:14		06:50 19:24		06:01 19:58	05:30 20:27	05:53 20:40	06:25 20:23	06:56 19:40	06:30 17:00	07:04 16:33	07:07 16:40
31	07:16 17:15		06:48 19:25		06:01 20:28	05:31 20:28	05:54 20:21	06:26 19:38	06:26 18:47	06:31 17:00	07:07 16:33	07:08 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore		453	35								493	
Probabilità di eliofania		0,46	0,44								0,44	
Tempo di operatività rid.		1,00	1,00								1,00	
Dir. del vento rid.		1,00	1,00								1,00	
Totale ridotto		0,46	0,44								0,44	
Totale effettivo		207	15								215	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Ute autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DM - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (117)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
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31	07:16 17:15	06:38 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DN - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (118)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (119)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (121)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (122)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (123)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:28 16:42	07:13 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:31	05:33 20:39	05:59 20:16	06:31 19:30	07:01 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:33	05:51 20:06	05:28 20:33	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46	07:17 16:31
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:02	06:41 19:13	07:12 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:37	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:50 16:41	07:21 16:32
17	07:26 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:33	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:38	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:05 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:56 16:38	07:24 16:34
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	05:28 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:25 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:42 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:24	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	07:04 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:15 17:15	06:36 17:49	05:50 18:24	06:01 19:58	05:29 20:28	05:26 20:40	05:54 20:21	06:25 19:38	06:57 18:46	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (124)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	07:21 (1) 07:46 (1)	06:00 19:59	05:30 20:29	05:55 20:40	06:27 19:36	07:16 (1) 07:43 (1)	06:57 18:45	06:32 16:58
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	07:19 (1) 07:46 (1)	05:58 20:00	05:30 20:30	05:56 20:19	06:28 19:35	07:15 (1) 07:43 (1)	06:58 18:43	06:34 16:56
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	07:19 (1) 07:47 (1)	05:57 20:01	05:29 20:30	05:57 20:18	06:29 19:33	07:14 (1) 07:42 (1)	06:59 18:42	06:35 16:55
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	07:18 (1) 07:47 (1)	05:56 20:02	05:29 20:31	05:58 20:17	06:30 19:31	07:13 (1) 07:42 (1)	07:01 18:40	06:36 16:54
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	07:17 (1) 07:46 (1)	05:55 20:03	05:29 20:32	05:59 20:16	06:31 19:30	07:12 (1) 07:42 (1)	07:02 18:38	06:37 16:53
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	07:17 (1) 07:47 (1)	05:53 20:04	05:28 20:32	06:00 20:15	06:32 19:28	07:12 (1) 07:42 (1)	07:03 18:37	06:38 16:52
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:33	07:16 (1) 07:46 (1)	05:52 20:05	05:28 20:33	06:01 20:13	06:33 19:26	07:12 (1) 07:42 (1)	07:04 18:35	06:40 16:50
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	07:16 (1) 07:45 (1)	05:51 20:06	05:28 20:34	06:02 20:12	06:34 19:25	07:12 (1) 07:41 (1)	07:05 18:33	06:41 16:49
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	07:16 (1) 07:45 (1)	05:50 20:07	05:27 20:34	06:03 20:11	06:35 19:23	07:12 (1) 07:40 (1)	07:06 18:32	06:42 16:48
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	07:16 (1) 07:44 (1)	05:49 20:08	05:27 20:35	06:04 20:09	06:36 19:21	07:12 (1) 07:39 (1)	07:07 18:30	06:43 16:47
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	07:16 (1) 07:43 (1)	05:47 20:09	05:27 20:35	06:05 20:08	06:37 19:20	07:13 (1) 07:38 (1)	07:08 18:28	06:45 16:46
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	07:17 (1) 07:42 (1)	05:46 20:10	05:27 20:36	06:06 20:07	06:38 19:18	07:14 (1) 07:37 (1)	07:09 18:27	06:46 16:45
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	07:18 (1) 07:40 (1)	05:45 20:11	05:27 20:36	06:07 20:05	06:39 19:16	07:15 (1) 07:35 (1)	07:10 18:25	06:47 16:44
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	07:20 (1) 07:39 (1)	05:44 20:12	05:27 20:37	06:08 20:04	06:40 19:14	07:16 (1) 07:32 (1)	07:11 18:24	06:48 16:43
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	07:21 (1) 07:36 (1)	05:43 20:13	05:27 20:37	06:09 20:03	06:41 19:13	07:19 (1) 07:29 (1)	07:13 18:22	06:49 16:42
16	07:26 16:57	06:57 17:35	06:14 18:08	06:22 19:42	07:24 (1) 07:34 (1)	05:42 20:14	05:27 20:38	06:10 20:01	06:42 19:11	07:14 (1) 07:15	07:14 18:20	06:51 16:41
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	07:24 (1) 07:34 (1)	05:41 20:15	05:27 20:38	06:11 20:00	06:43 19:09	07:15 (1) 07:19	07:15 18:19	06:52 16:41
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	07:25 (1) 07:35 (1)	05:40 20:16	05:27 20:38	06:12 19:58	06:44 19:08	07:16 (1) 07:17	07:16 18:17	06:53 16:40
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	07:26 (1) 07:36 (1)	05:39 20:17	05:27 20:39	06:13 19:57	06:45 19:06	07:17 (1) 07:18	07:17 18:16	06:54 16:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	07:27 (1) 07:37 (1)	05:38 20:18	05:27 20:39	06:14 19:55	06:46 19:04	07:18 (1) 07:19	07:18 18:14	06:55 16:38
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	07:28 (1) 07:38 (1)	05:38 20:19	05:27 20:39	06:15 19:54	06:47 19:02	07:19 (1) 07:20 (1)	07:19 18:13	06:57 16:38
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	07:29 (1) 07:39 (1)	05:37 20:20	05:27 20:39	06:16 19:52	06:48 19:01	07:21 (1) 07:22	07:21 18:11	06:58 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	07:30 (1) 07:40 (1)	05:36 20:21	05:28 20:40	06:17 19:51	06:49 18:59	07:22 (1) 07:23	07:22 18:10	06:59 16:36
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	07:31 (1) 07:41 (1)	05:35 20:22	05:28 20:40	06:18 19:49	06:50 18:57	07:23 (1) 07:24	07:23 18:08	07:00 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	07:32 (1) 07:42 (1)	05:34 20:23	05:28 20:40	06:19 19:48	06:51 18:55	07:24 (1) 07:25	07:24 18:06	07:01 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	07:33 (1) 07:43 (1)	05:34 20:24	05:29 20:40	06:20 19:46	06:52 18:54	07:25 (1) 07:26 (1)	07:25 18:04	07:02 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	07:34 (1) 07:44 (1)	05:33 20:25	05:29 20:40	06:21 19:45	06:53 18:52	07:26 (1) 07:27 (1)	07:26 18:04	07:04 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	07:35 (1) 07:45 (1)	05:32 20:26	05:29 20:40	06:22 19:43	06:54 18:50	07:27 (1) 07:28 (1)	07:27 18:04	07:05 16:37
29	07:17 17:12	06:51 19:23	05:51 18:23	06:02 19:56	07:36 (1) 07:46 (1)	05:32 20:27	05:30 20:40	06:23 19:41	06:55 18:49	07:28 (1) 07:29 (1)	07:28 18:04	07:06 16:33
30	07:17 17:13	06:50 19:24	05:50 18:24	06:01 19:58	07:37 (1) 07:47 (1)	05:31 20:28	05:30 20:40	06:24 19:40	06:56 18:47	07:29 (1) 07:30 (1)	07:29 18:04	07:07 16:33
31	07:16 17:15	06:48 19:25	05:49 18:25	06:00 19:59	07:38 (1) 07:48 (1)	05:31 20:29	05:30 20:40	06:25 19:40	06:57 18:48	07:30 (1) 07:31 (1)	07:30 18:04	07:08 16:40
Ore potenziali eliofanía	296	296	369	399	450	454	461	429	375	381	297	286
Totale, caso peggiore			63	402				92		58		
Probabilità di eliofanía			0,44	0,48				0,67		0,58		
Tempo di operatività rid.			1,00	1,00				1,00		1,00		
Dir. del vento rid.			1,00	1,00				1,00		1,00		
Totale ridotto			0,44	0,48				0,67		0,58		
Totale effettivo			28	192				61		220		

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto Recettore d'ombra: DV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (126)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:33
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:35 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:29 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:38 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:25 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:38 17:51	05:51 18:25	06:02 19:58	05:30 20:28	05:27 20:40	05:53 20:21	06:25 19:38	06:56 18:38	06:30 16:59	07:07 16:40	07:28 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

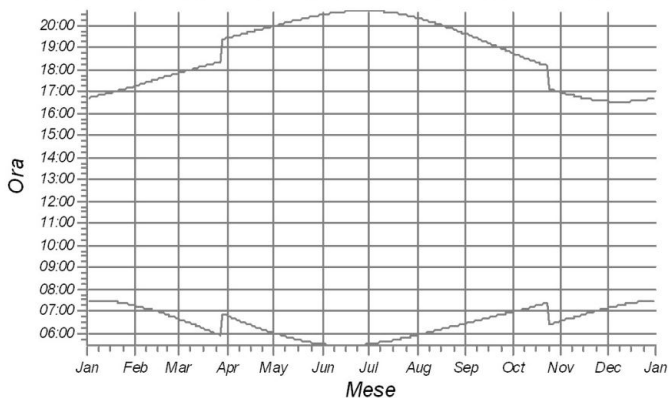
VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Pedatto il:  
14/11/2023 14:56/3.6.355



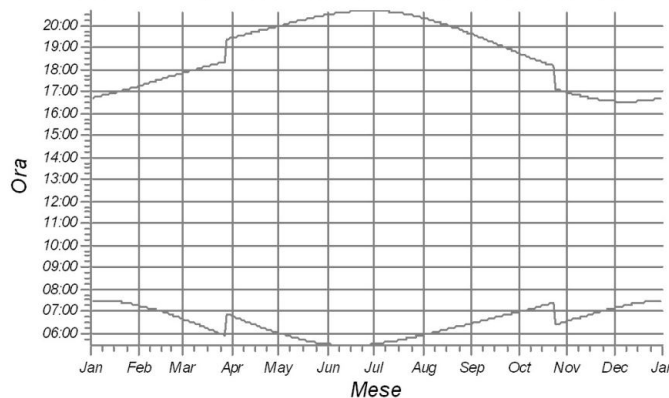
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

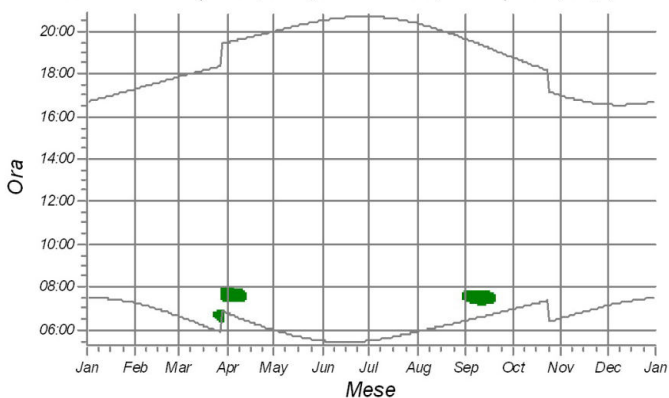
A: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)



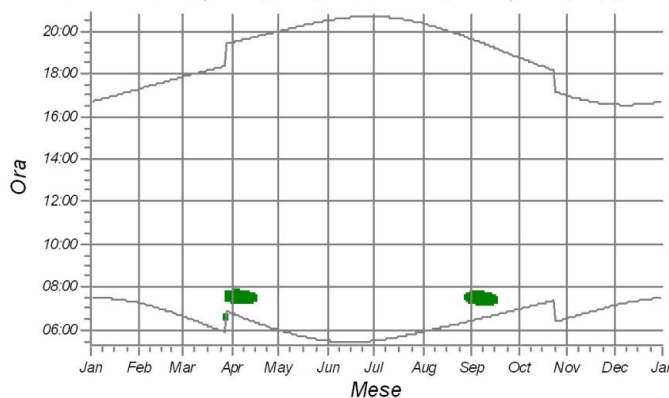
B: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)



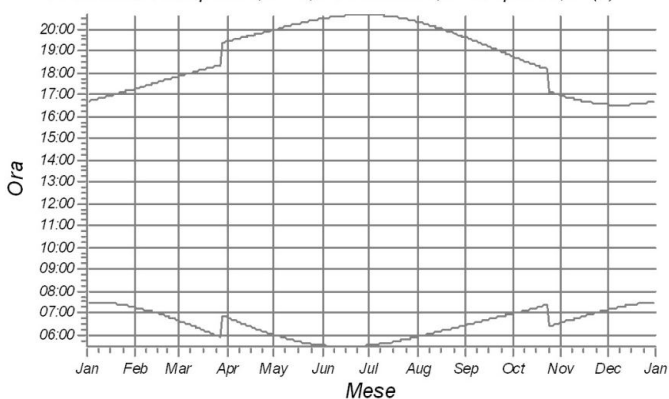
C: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)



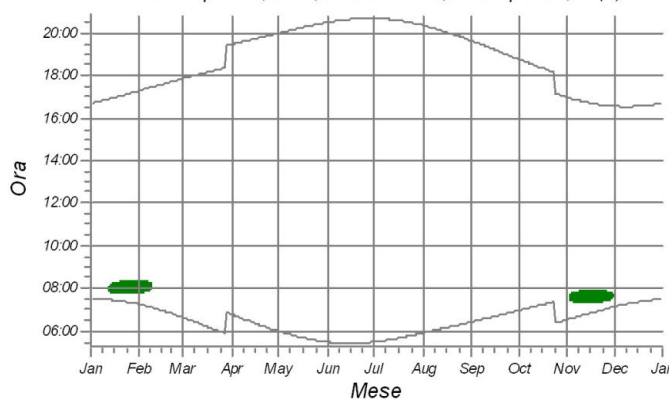
D: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (4)



E: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5)



F: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6)



WTG

1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

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Redatto il:

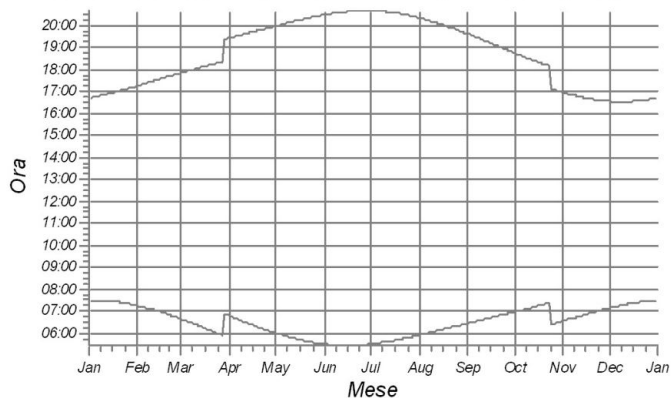
14/11/2023 14:56/3.6.355



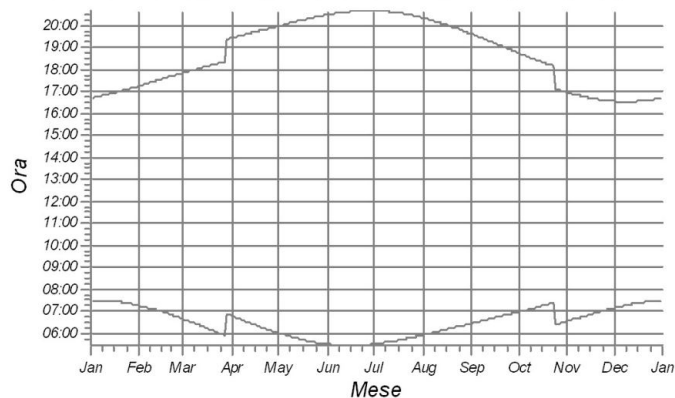
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

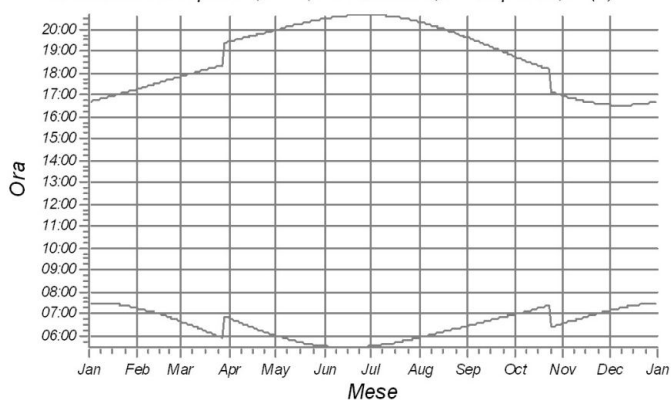
G: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)



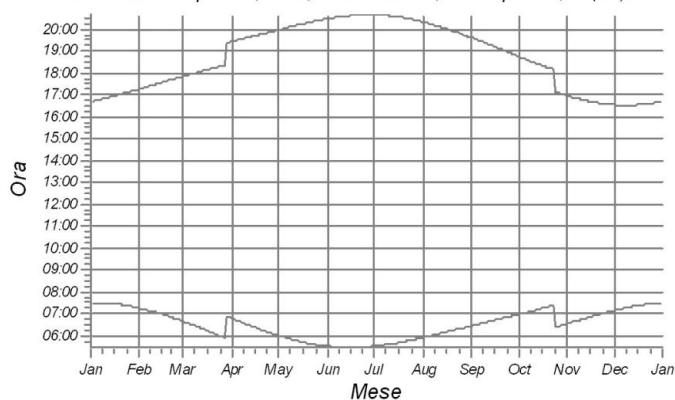
H: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)



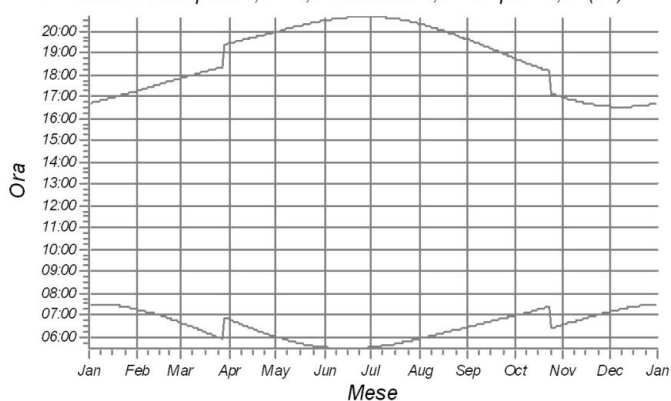
I: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (9)



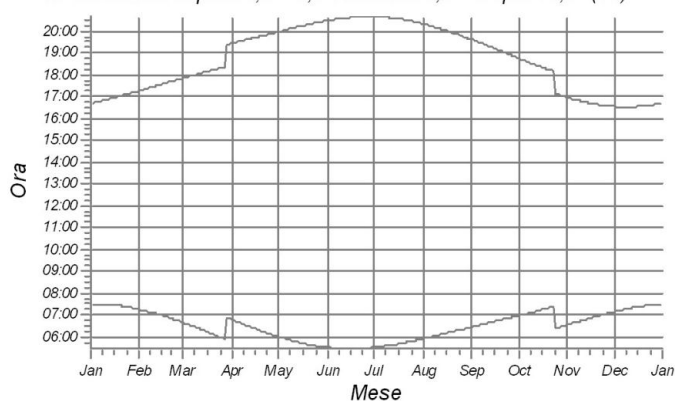
J: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (10)



K: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (11)



L: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (12)



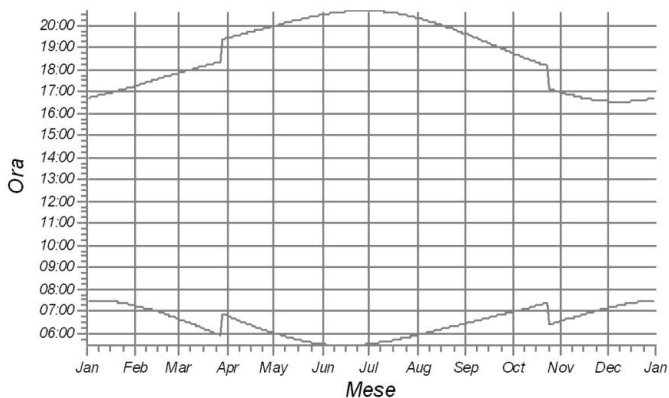
WTG



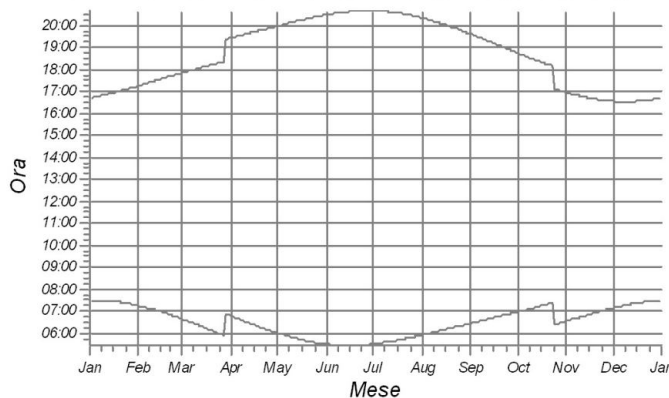
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

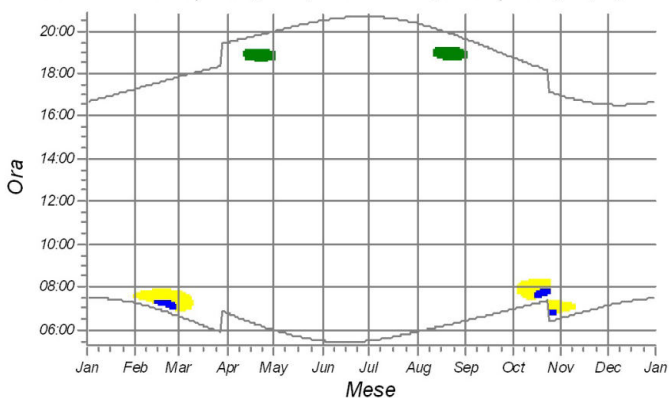
M: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (13)



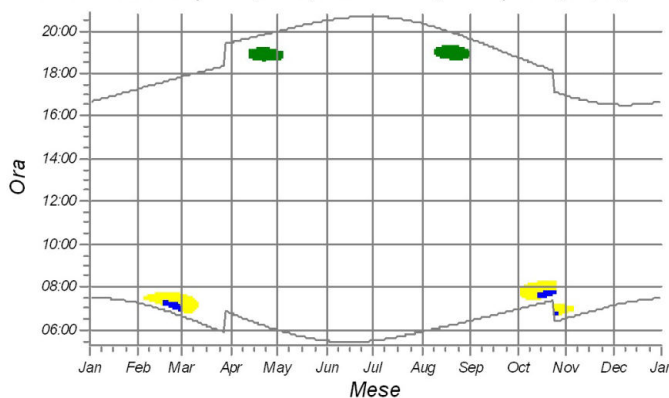
N: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)



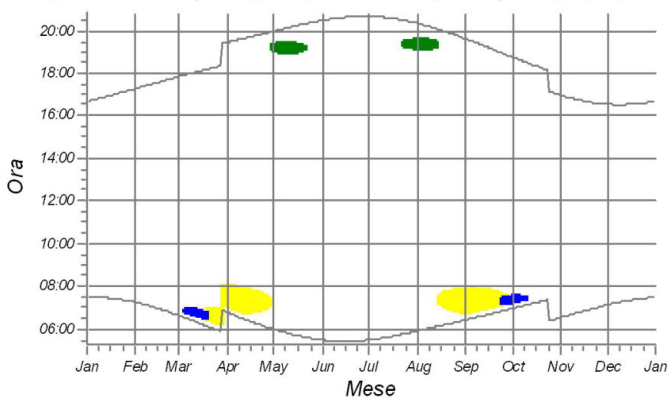
O: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)



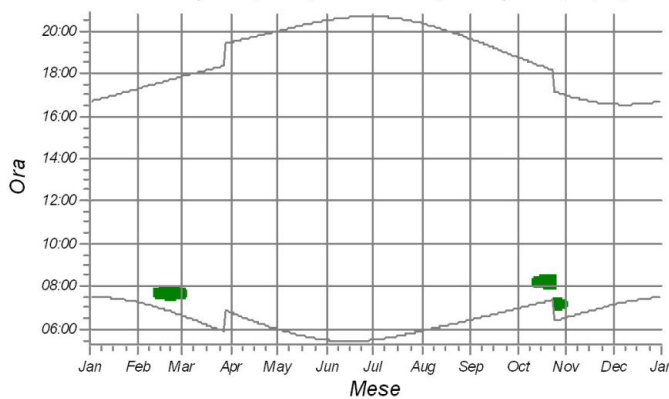
P: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (16)



Q: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)



R: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (18)



### WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

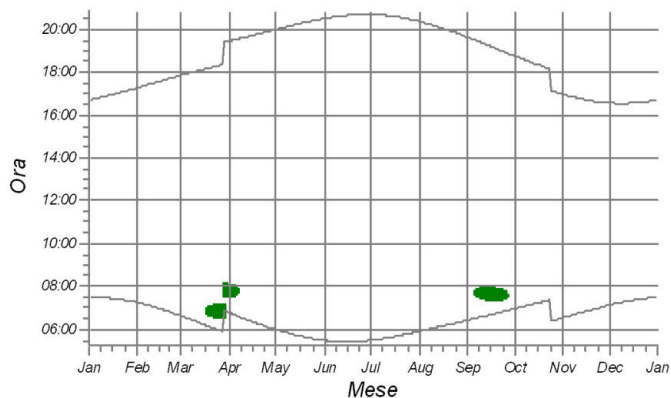
14/11/2023 14:56/3.6.355



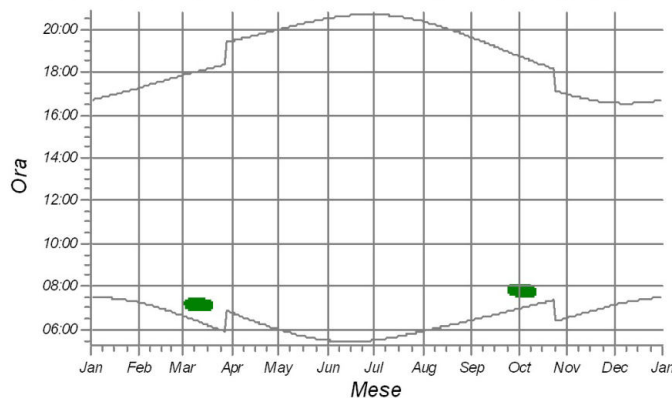
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

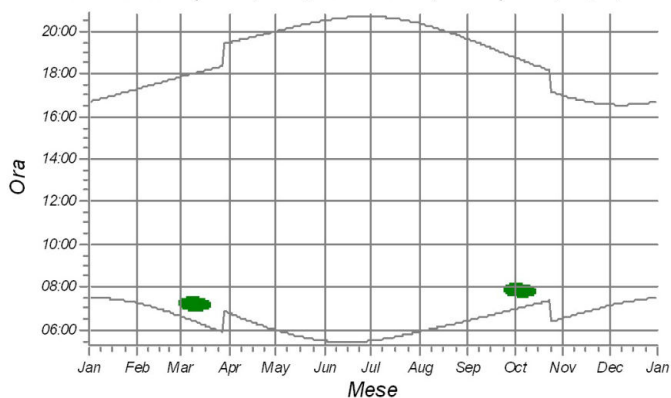
S: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)



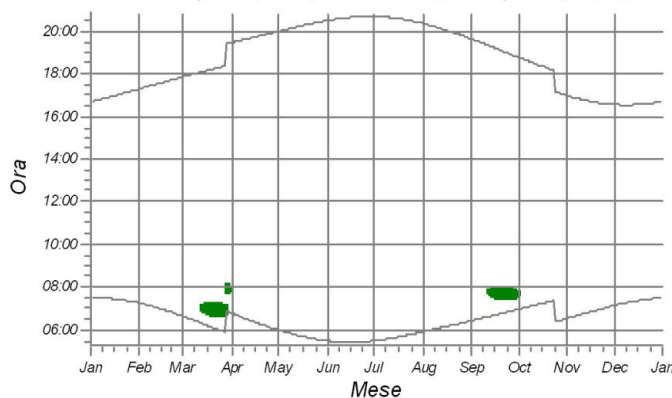
T: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (20)



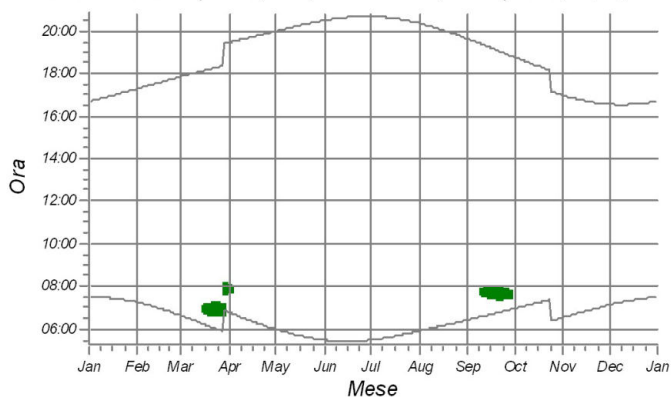
U: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (21)



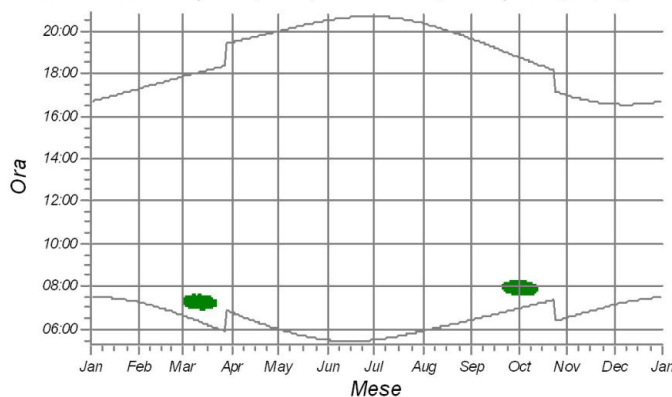
V: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)



W: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (23)



X: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (24)



WTG



1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uteente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

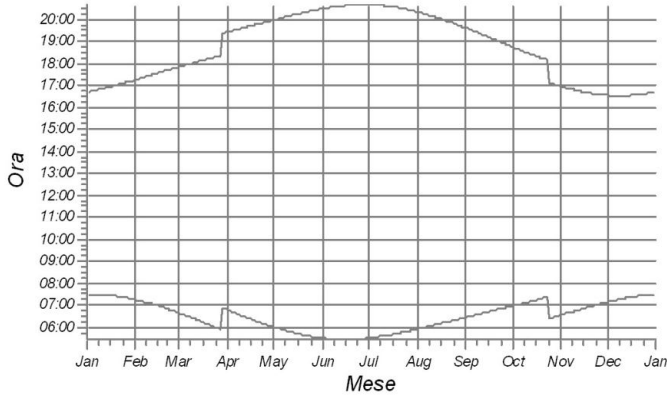
14/11/2023 14:56/3.6.355



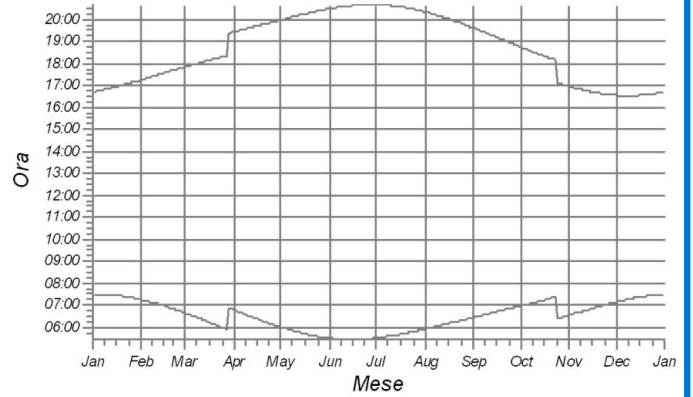
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

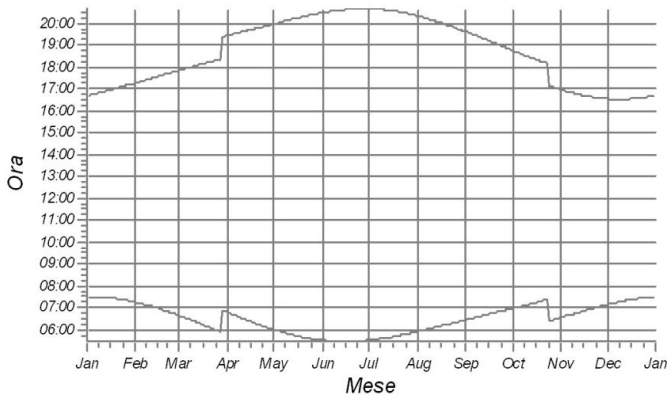
Y: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (25)



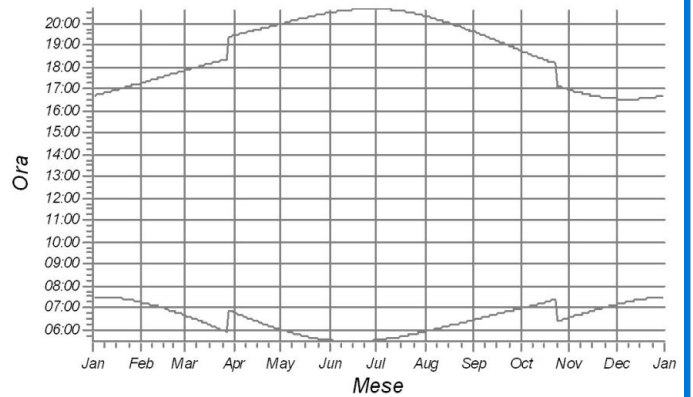
Z: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)



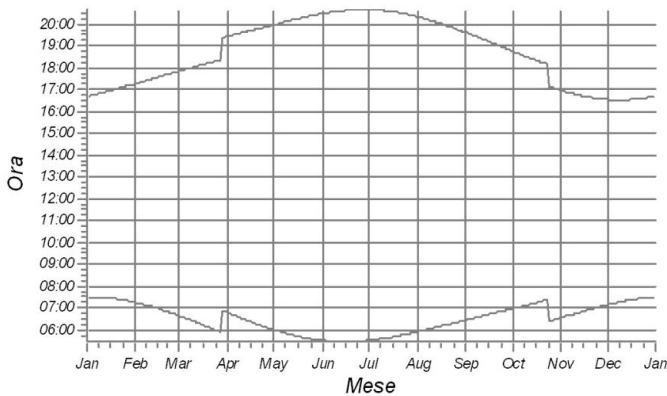
AA: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (27)



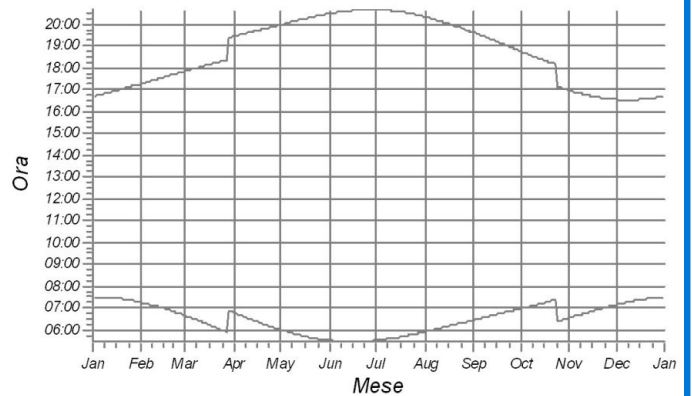
AB: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (28)



AC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (29)



AD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (30)



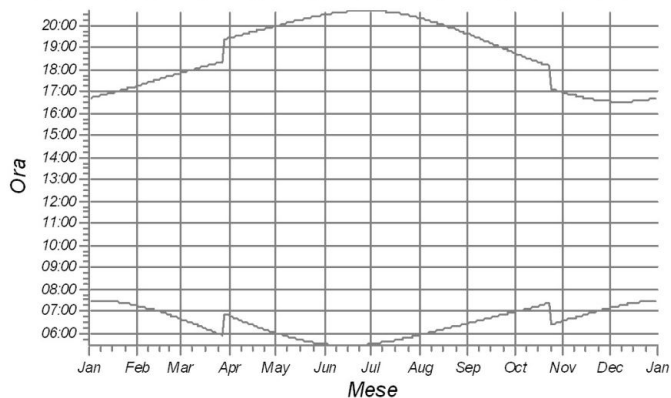
WTG



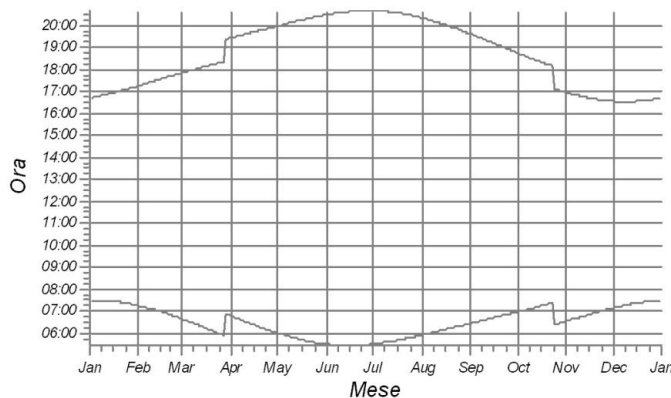
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

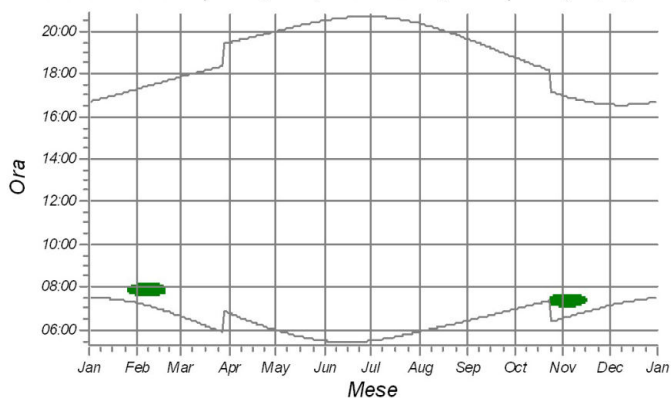
AE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)



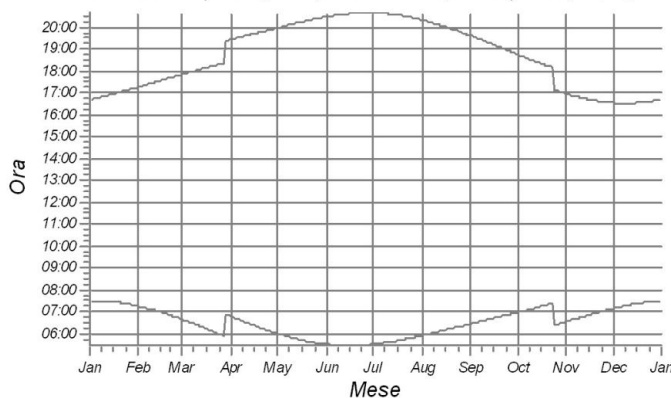
AF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (32)



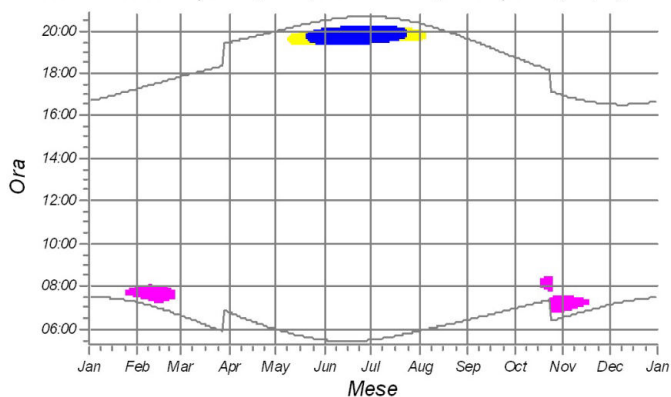
AG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (33)



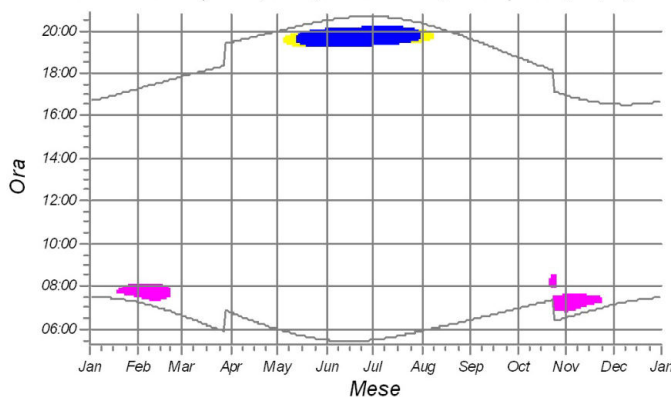
AH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (34)



AI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)



AJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (36)



### WTG

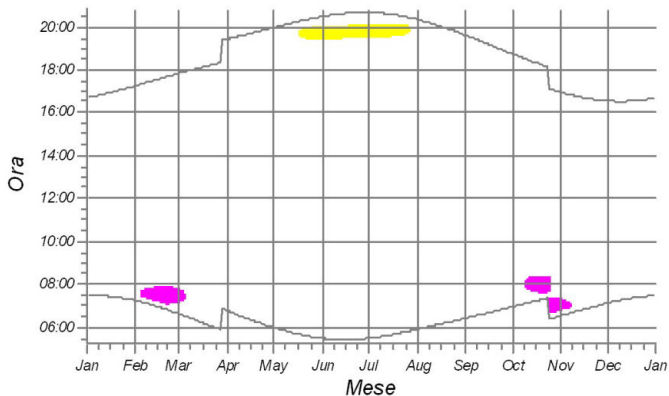
- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)



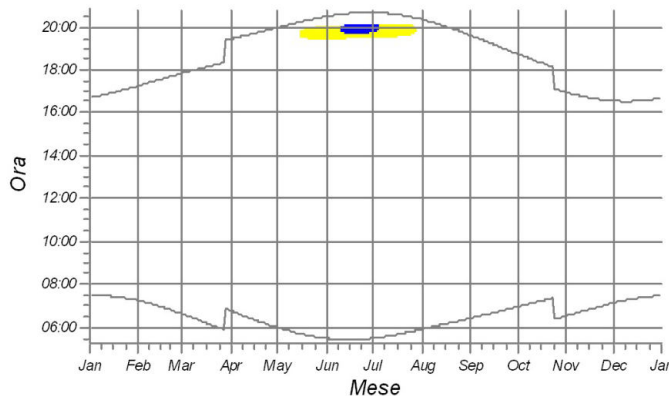
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto

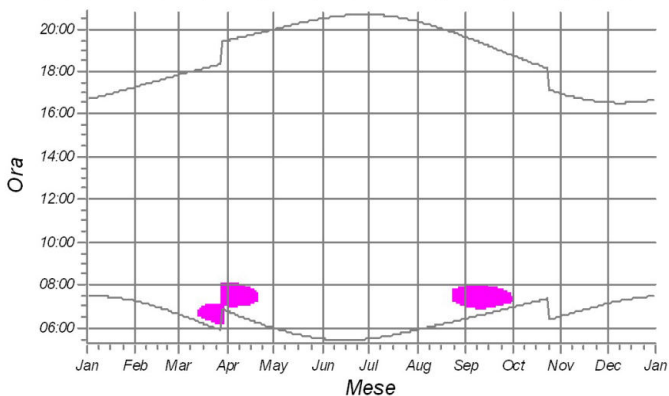
AK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (37)



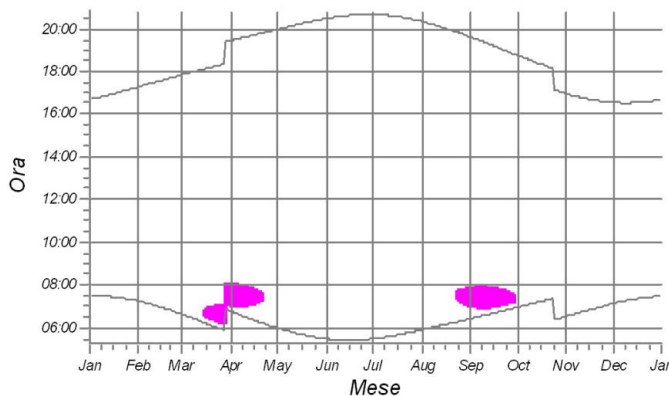
AL: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (38)



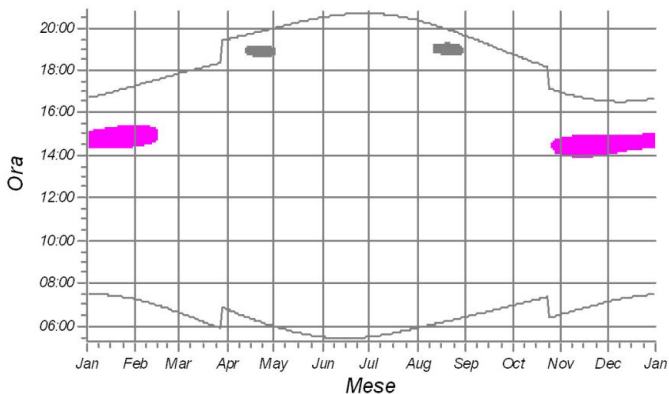
AM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (39)



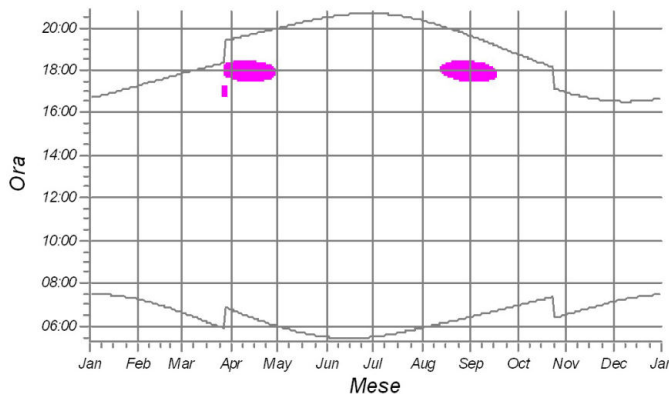
AN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (40)



AO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (41)



AP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (42)



### WTG

- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)
- 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uteente autorizzato:

VSB Neue Energien Deutschland GmbH

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DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

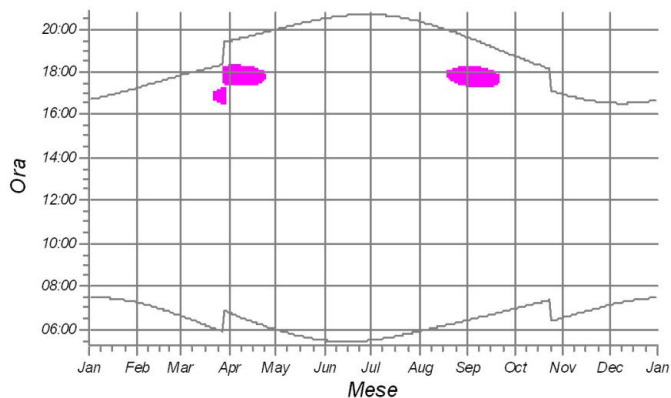
14/11/2023 14:56/3.6.355



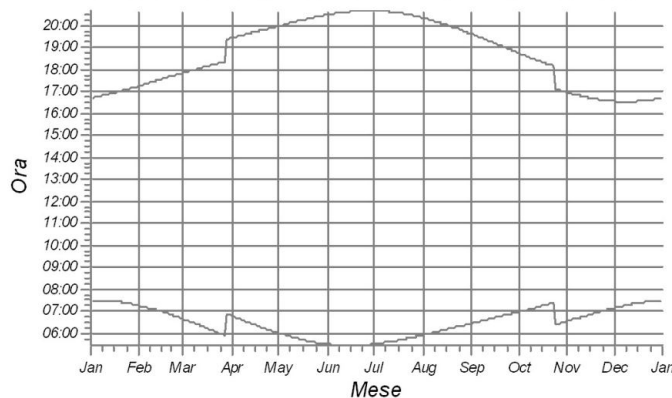
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

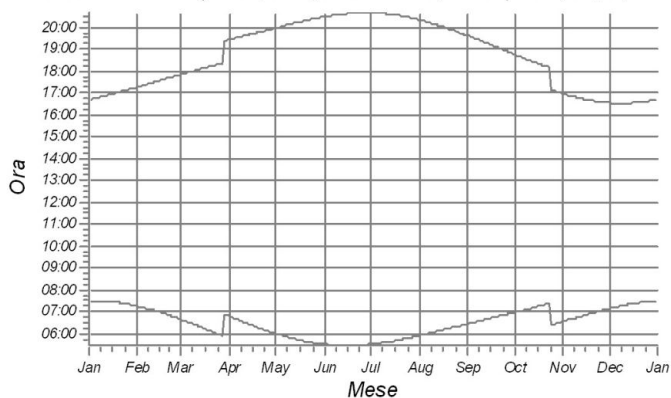
AQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (43)



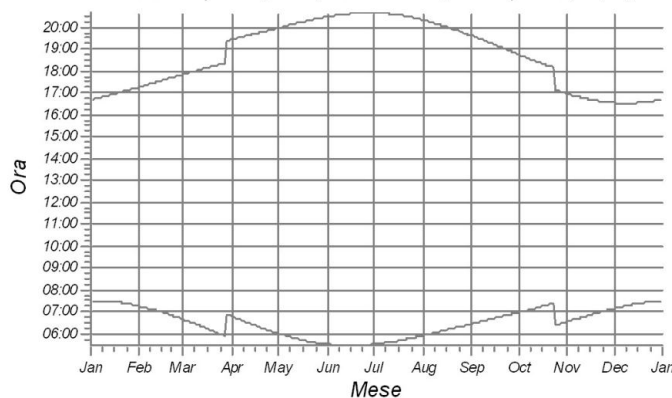
AR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (44)



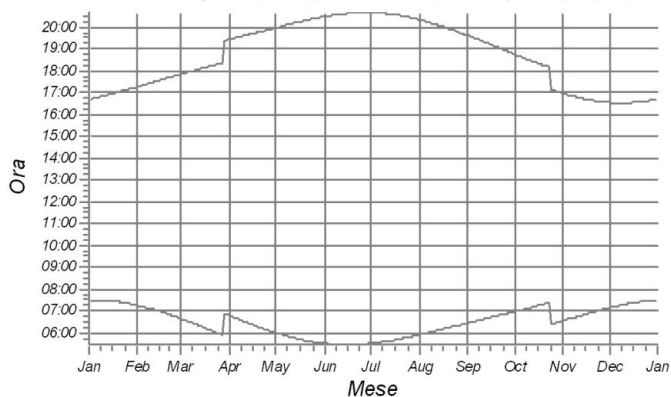
AS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (45)



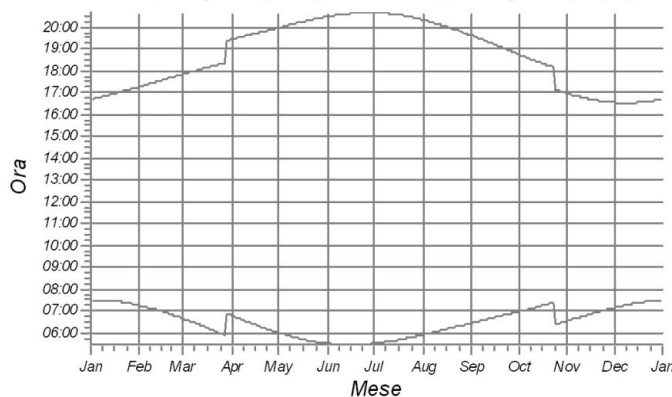
AT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (46)



AU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (47)



AV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (48)



WTG



5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uteente autorizzato:

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DE-01069 Dresden

+49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

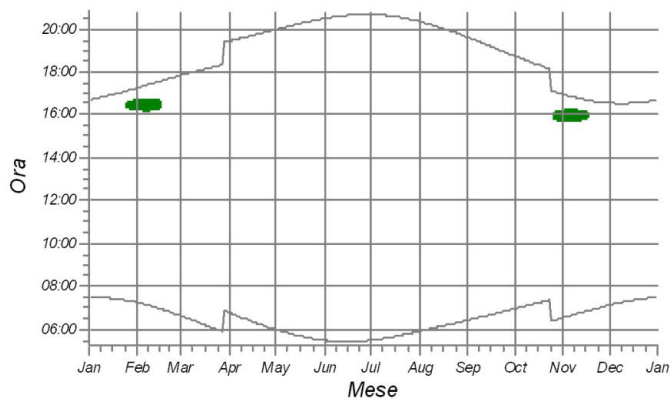
14/11/2023 14:56/3.6.355



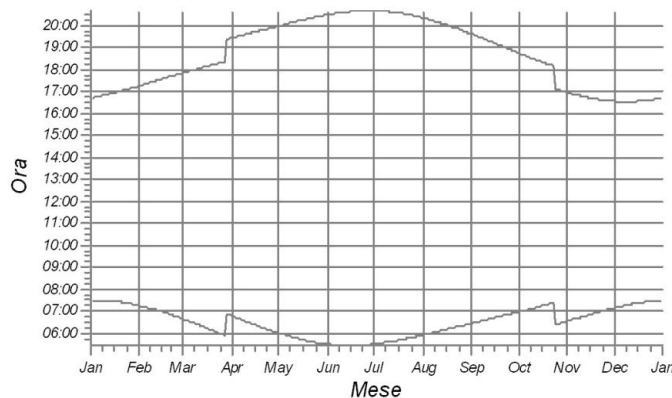
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

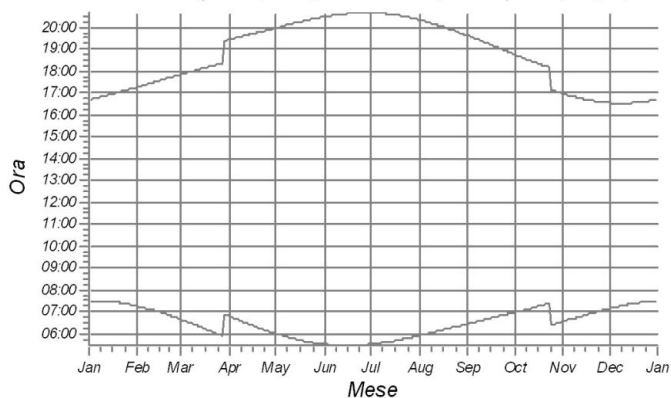
AW: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (49)



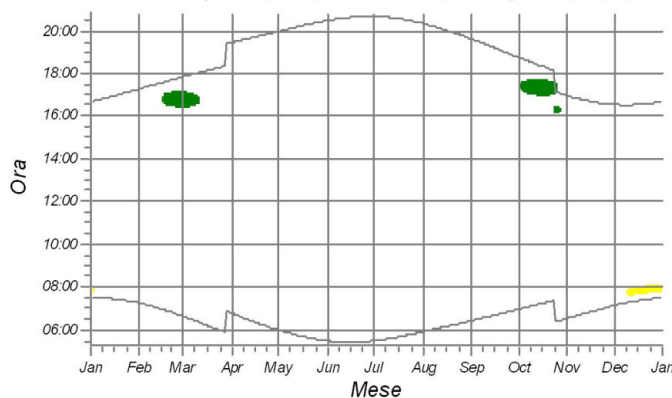
AX: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (50)



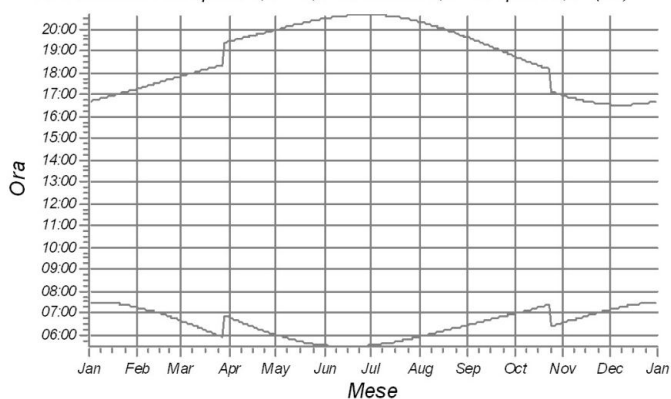
AY: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (51)



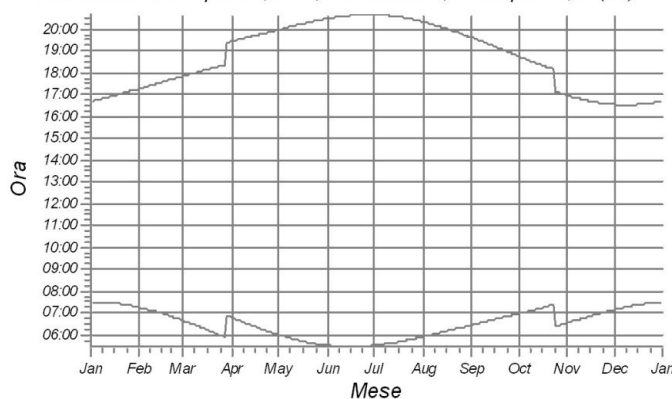
AZ: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (52)



BA: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (53)



BB: Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (54)



WTG



1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

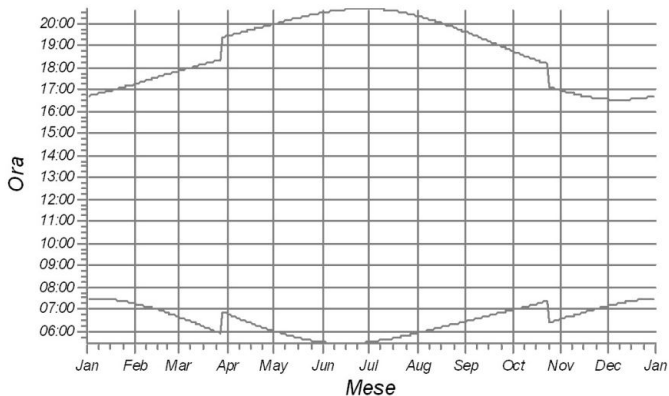
2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)



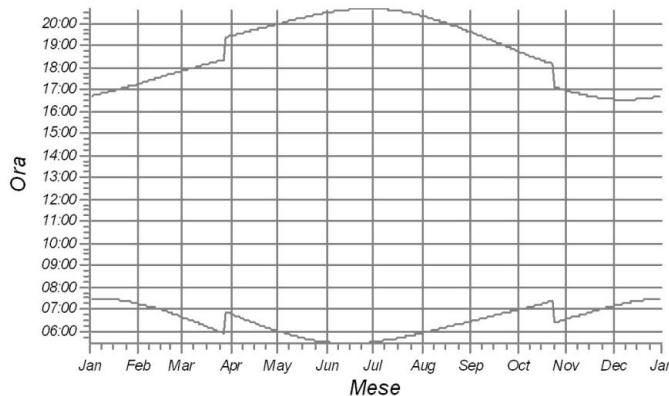
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

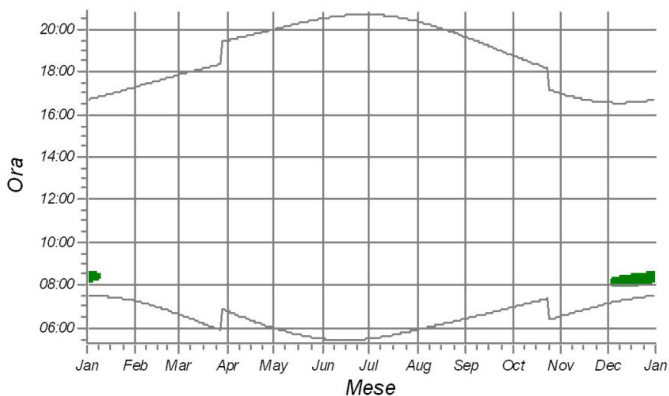
BC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (55)



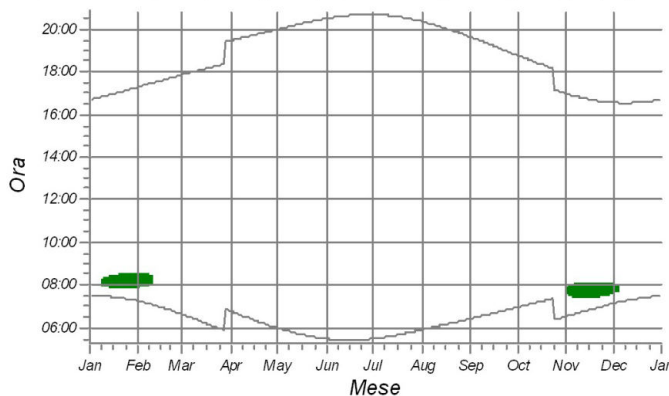
BD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (56)



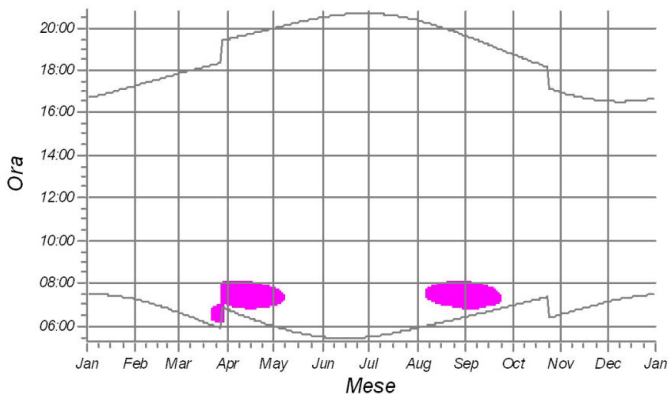
BE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (57)



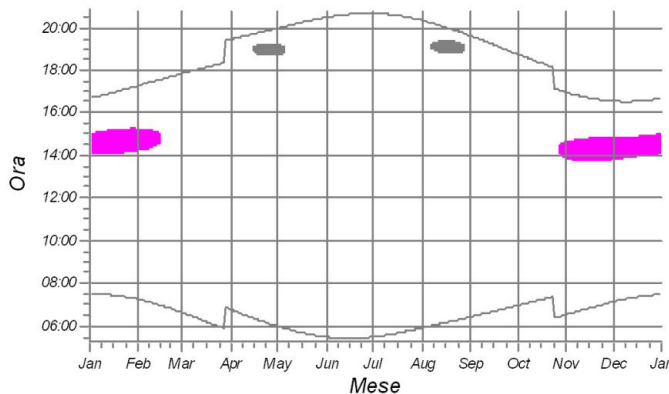
BF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (58)



BG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (59)



BH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (60)



### WTG

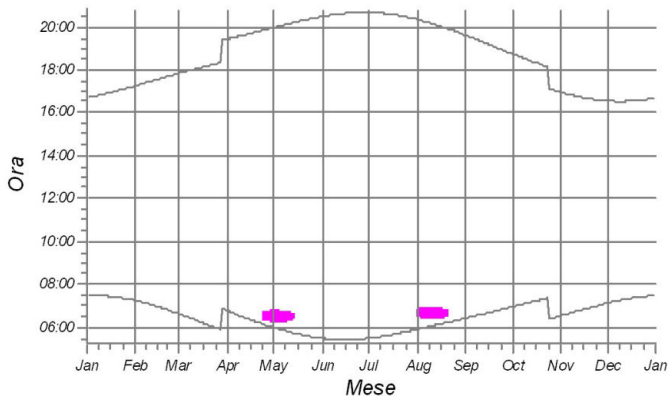
- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)



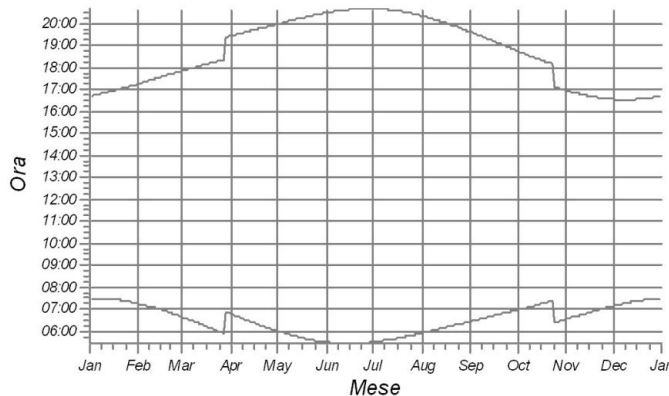
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

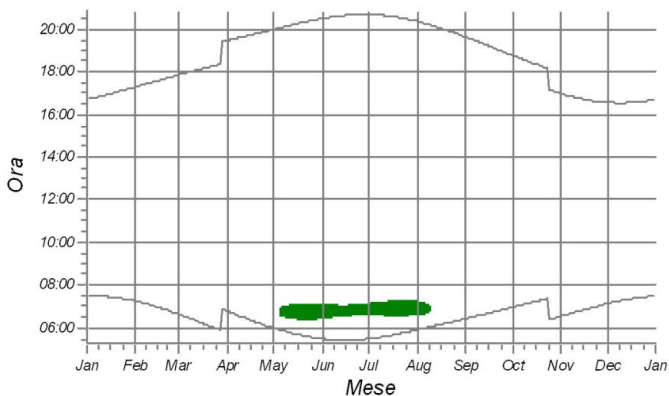
BI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (61)



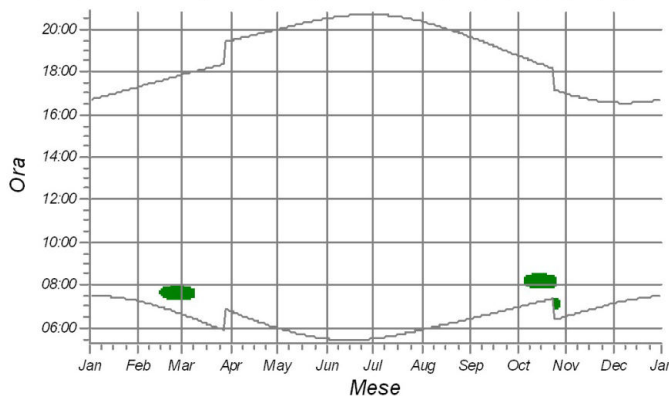
BJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (62)



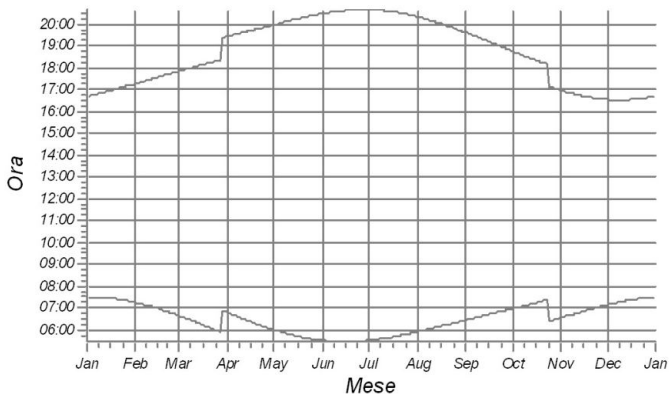
BK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (63)



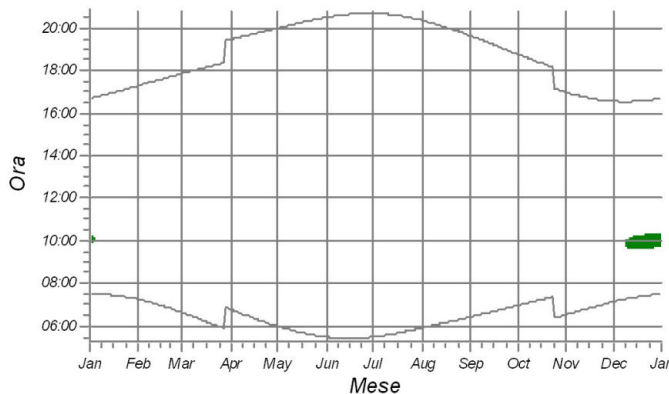
BL: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (64)



BM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (65)



BN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (66)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uteente autorizzato:

VSB Neue Energien Deutschland GmbH

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Redatto il:

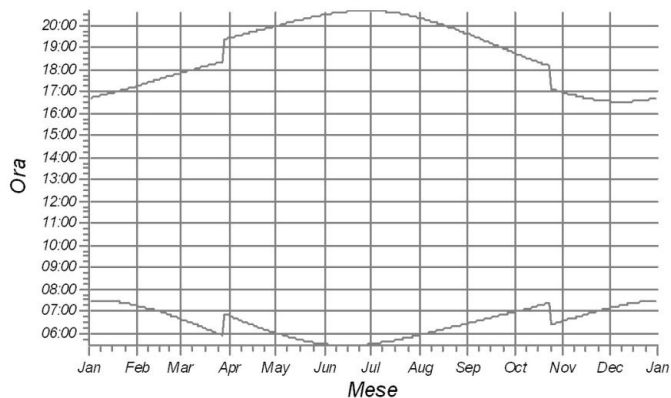
14/11/2023 14:56/3.6.355



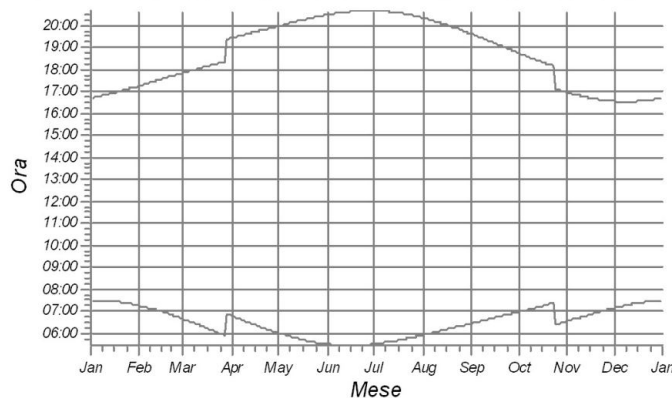
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

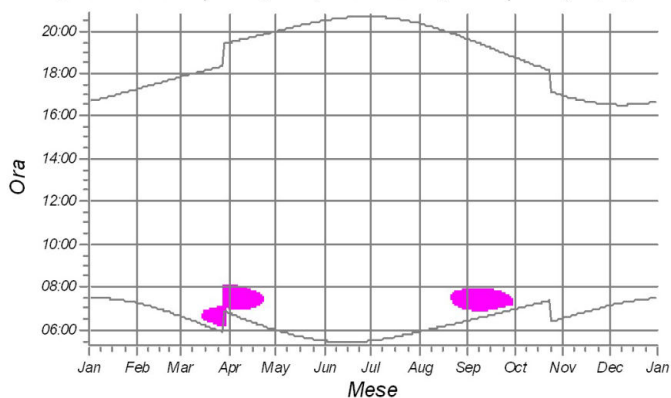
BO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (67)



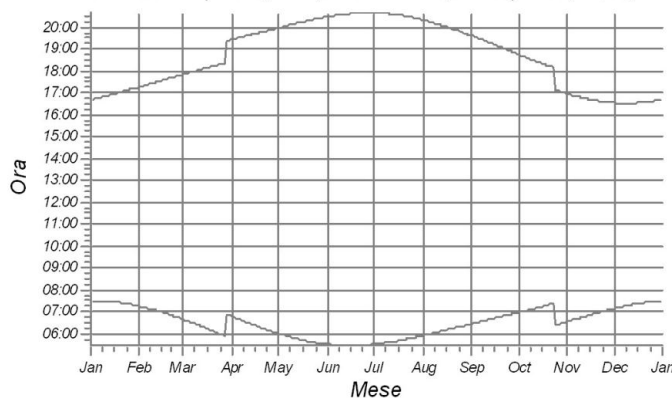
BP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (68)



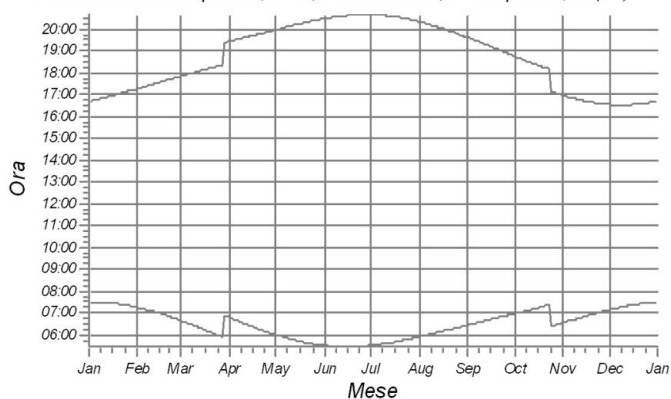
BQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (69)



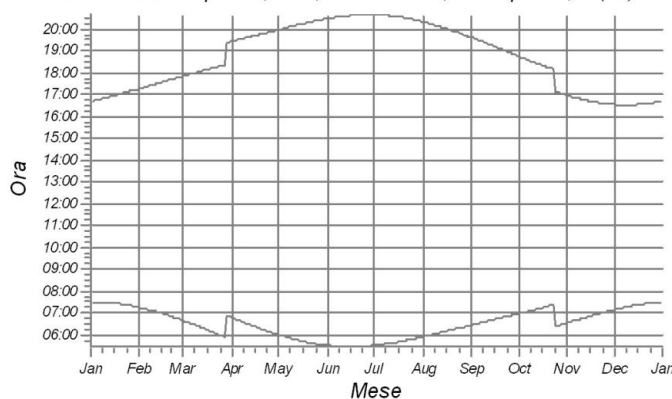
BR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (70)



BS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (71)



BT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (72)



WTG



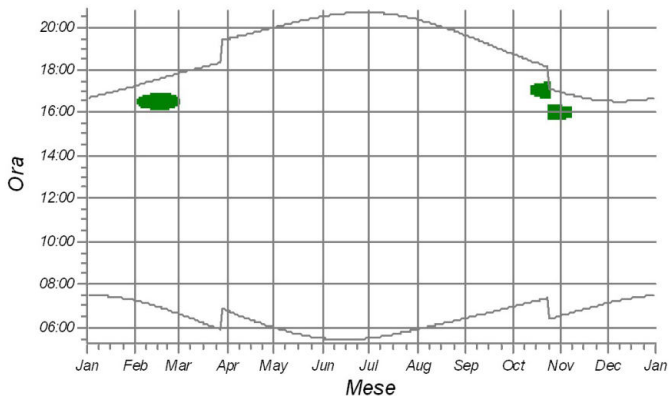
5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)



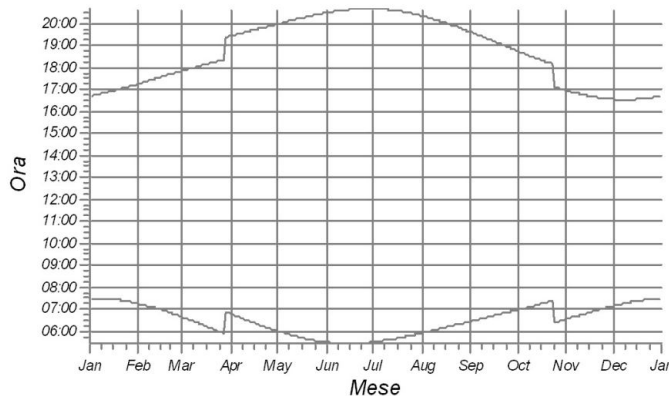
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

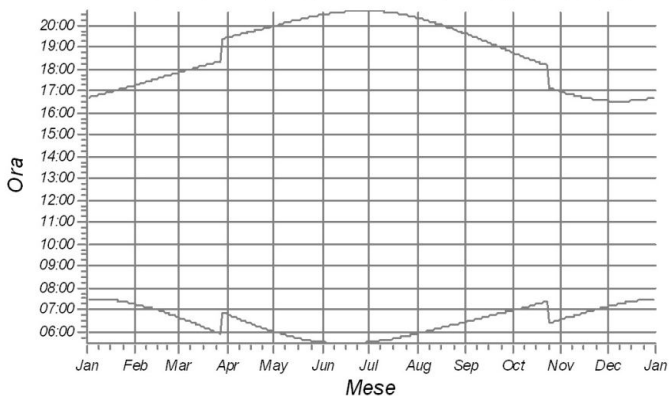
**BU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (73)**



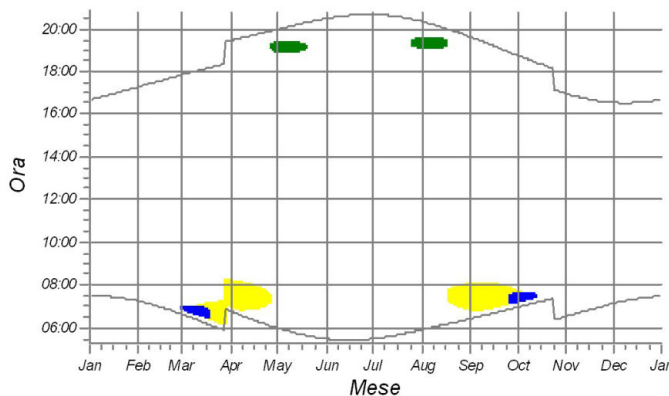
**BV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (74)**



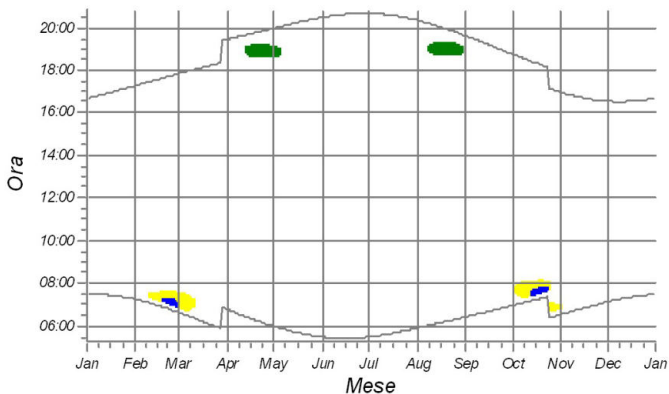
**BW: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (75)**



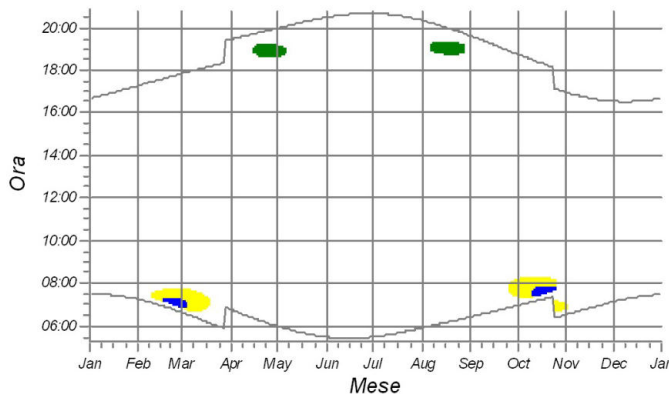
**BX: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (76)**



**BY: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (77)**



**BZ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (78)**



### WTG

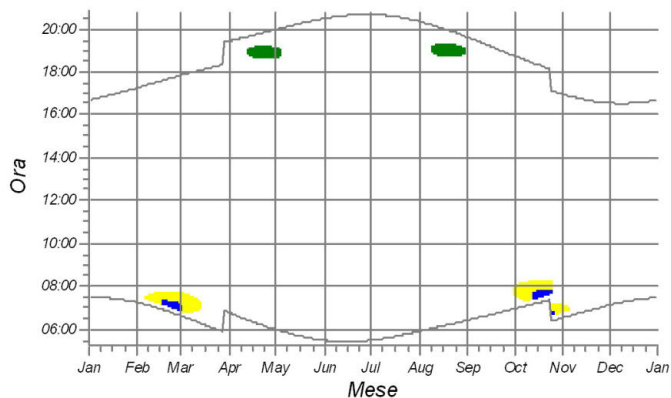
- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)



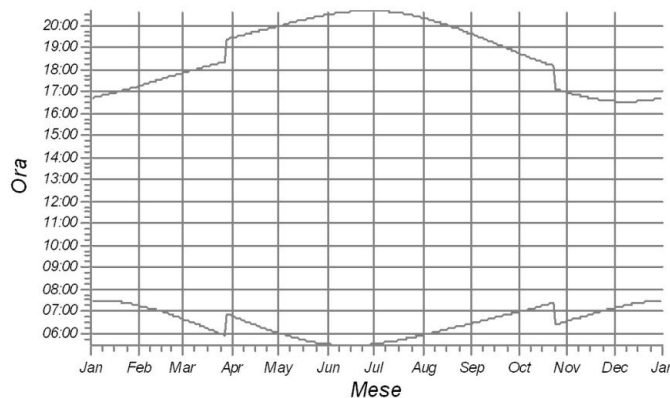
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

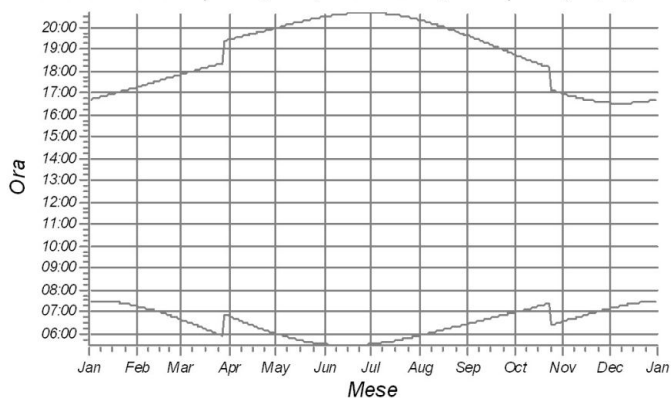
CA: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (79)



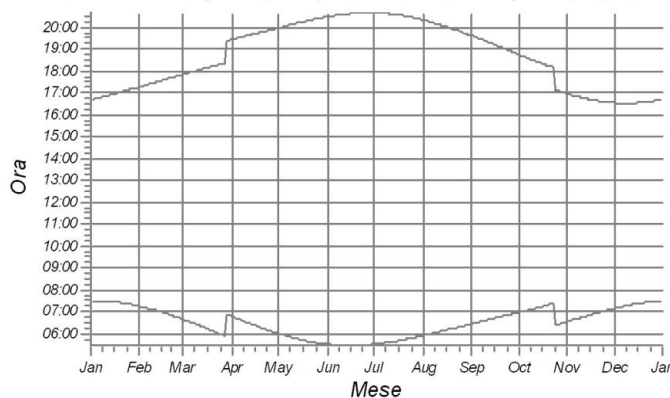
CB: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (80)



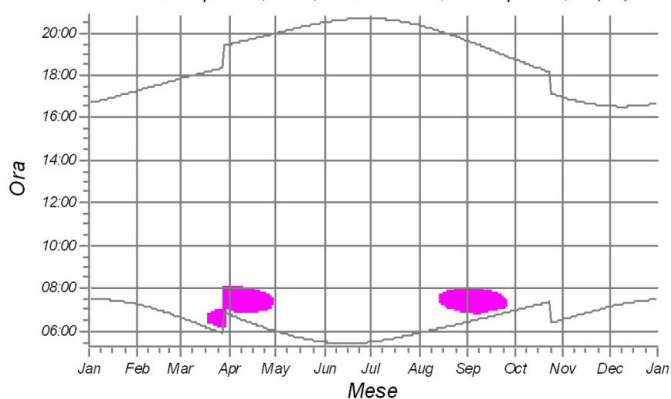
CC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (81)



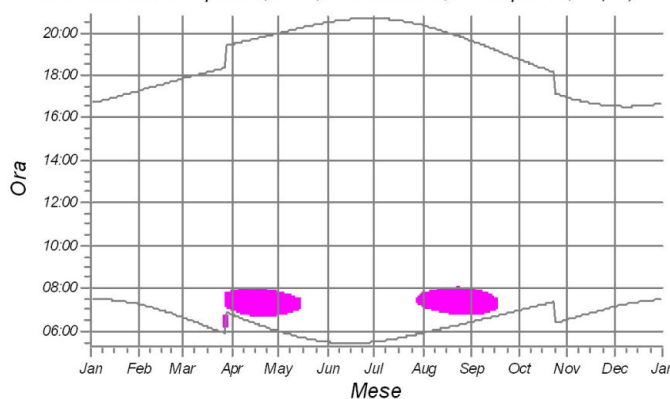
CD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (82)



CE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (83)



CF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (84)



### WTG

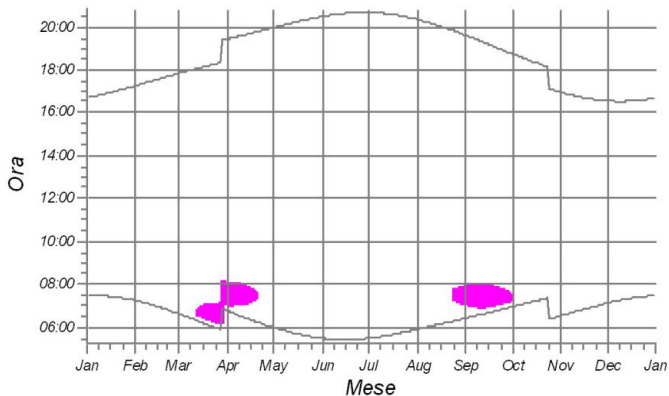
- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)



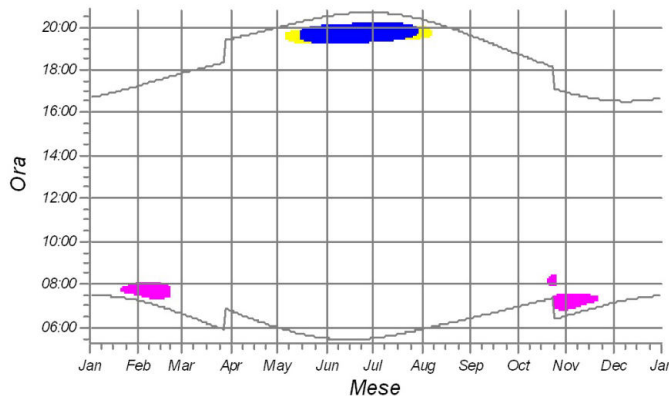
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

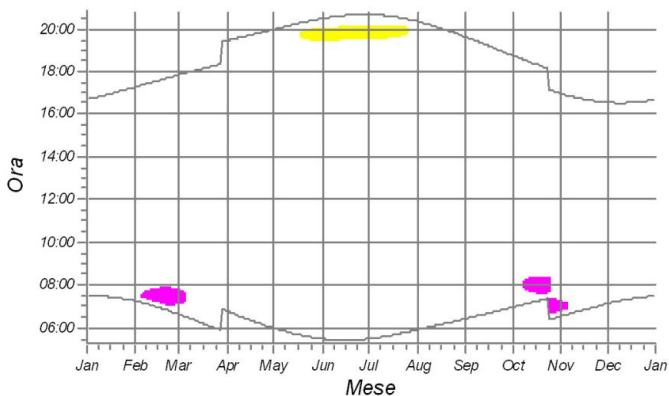
CG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (85)



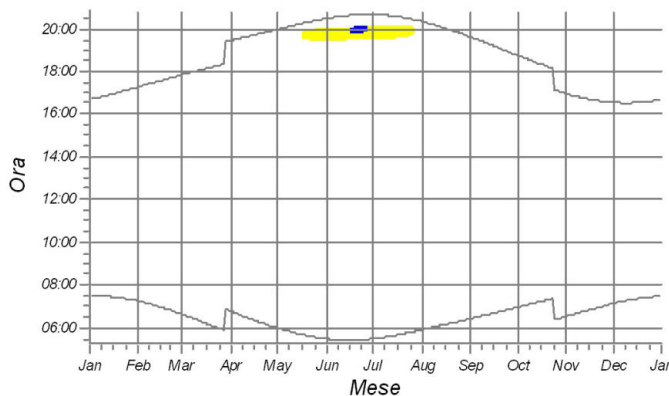
CH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (86)



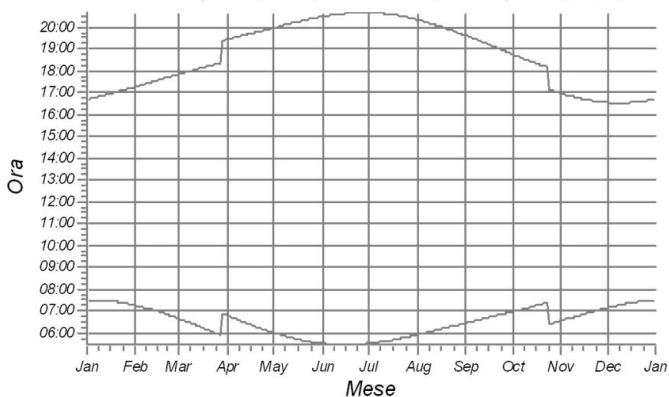
CI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (87)



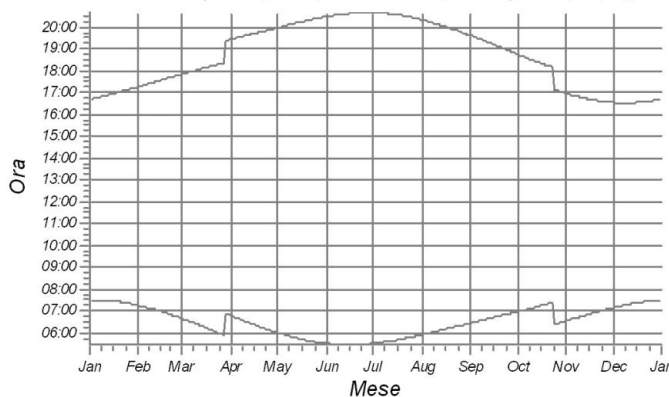
CJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (88)



CK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (89)



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



### WTG

- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uteente autorizzato:

VSB Neue Energien Deutschland GmbH

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Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

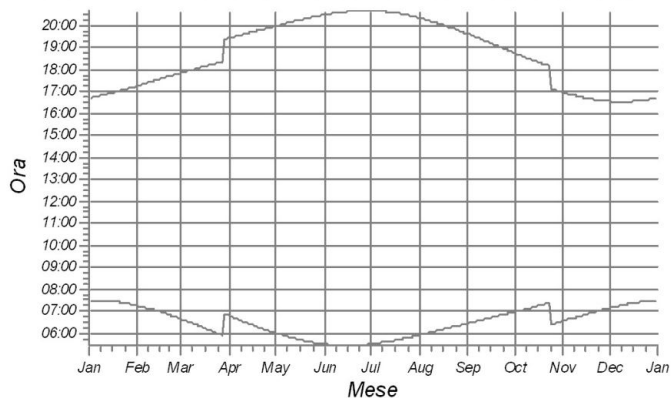
14/11/2023 14:56/3.6.355



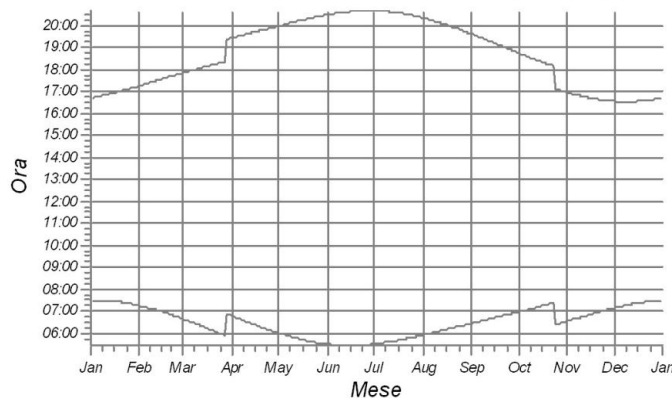
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

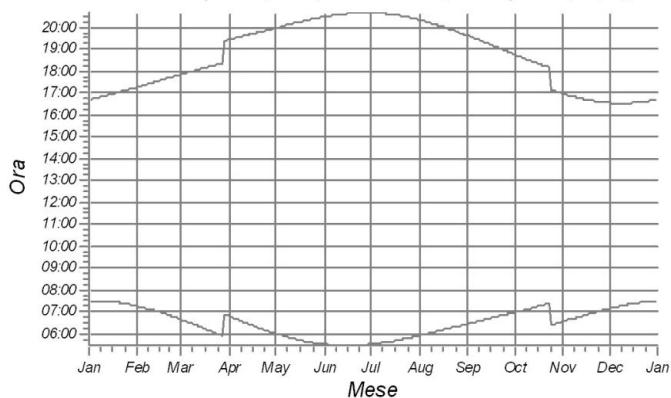
CM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (91)



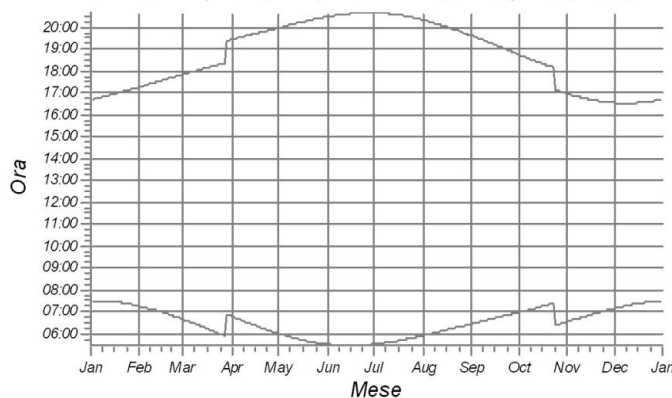
CN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (92)



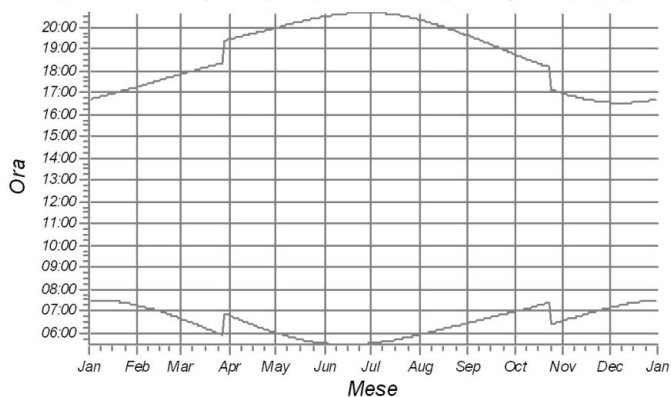
CO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (93)



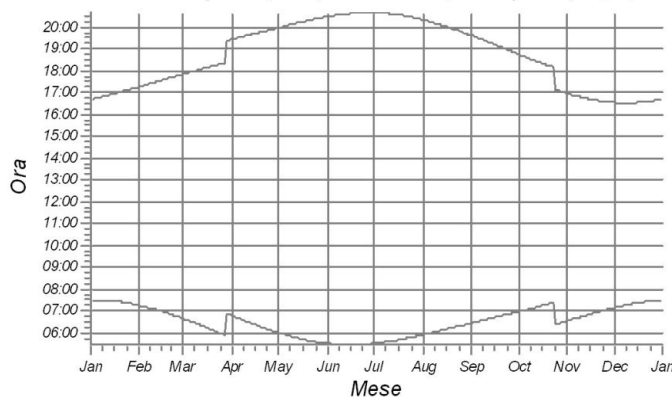
CP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (94)



CQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (95)



CR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (96)



WTG

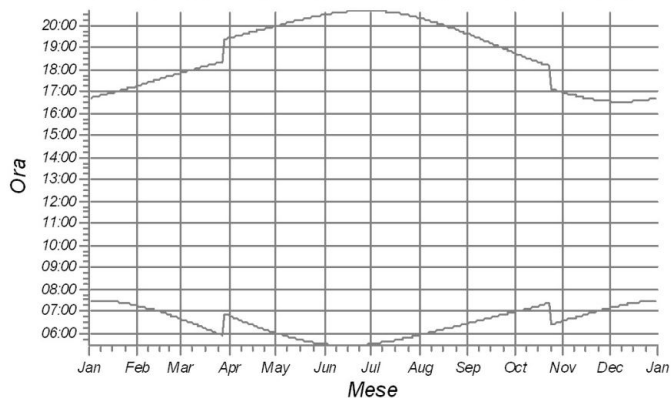




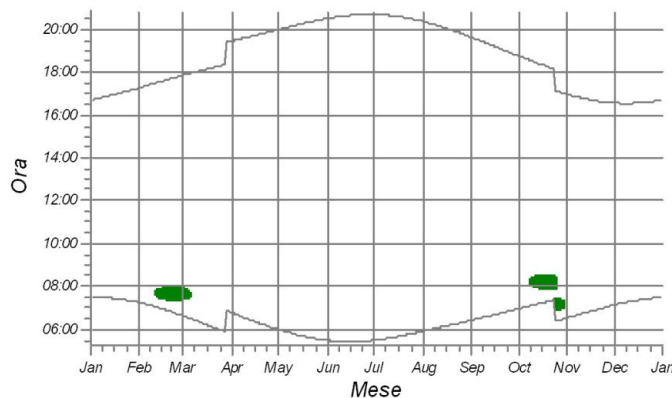
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

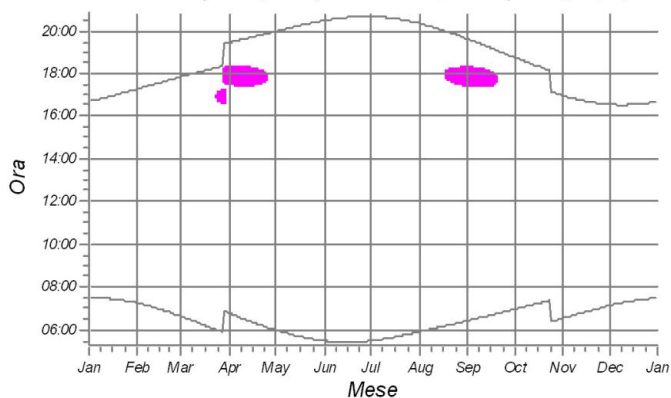
CS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (97)



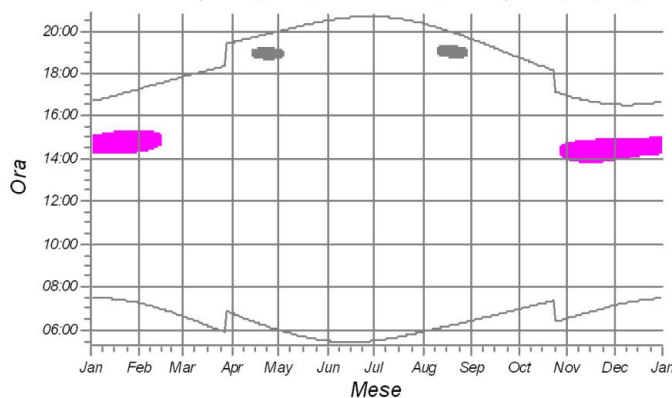
CT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (98)



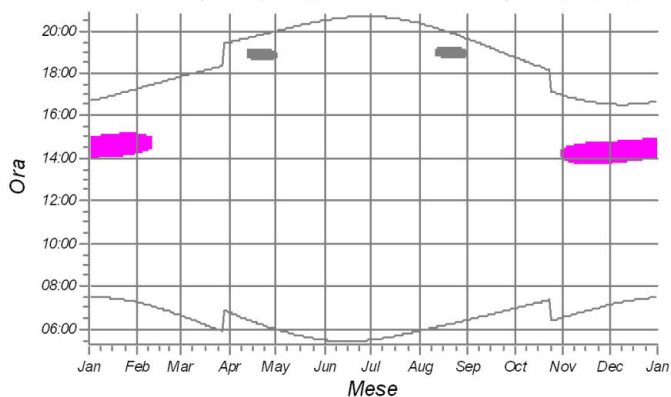
CU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (99)



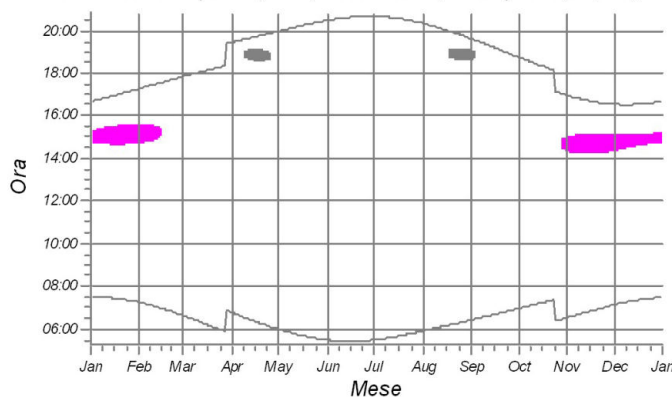
CV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (100)



CW: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (101)



CX: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (102)



### WTG

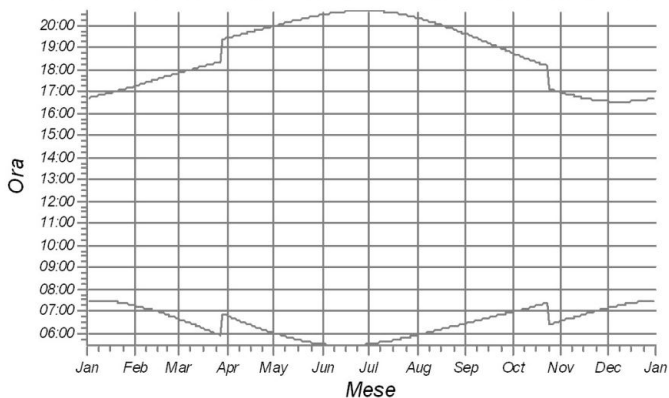
- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)



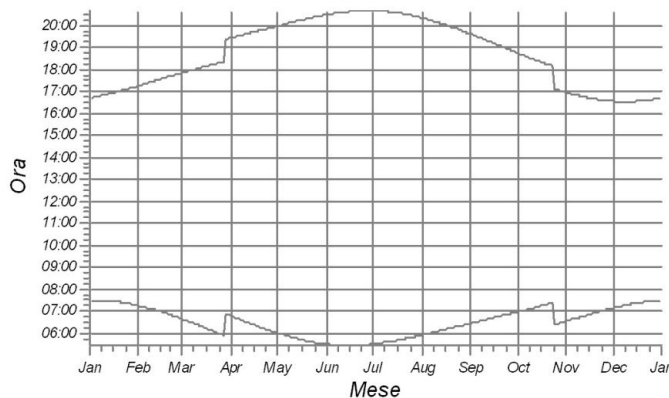
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

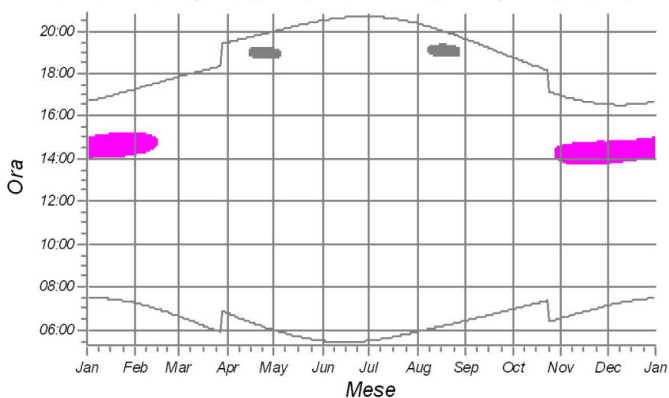
CY: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (103)



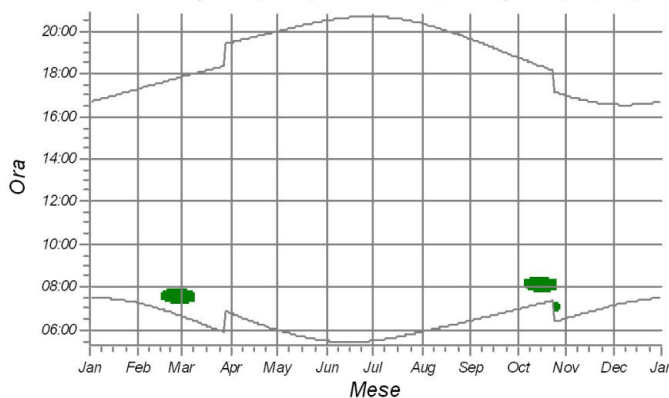
CZ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (104)



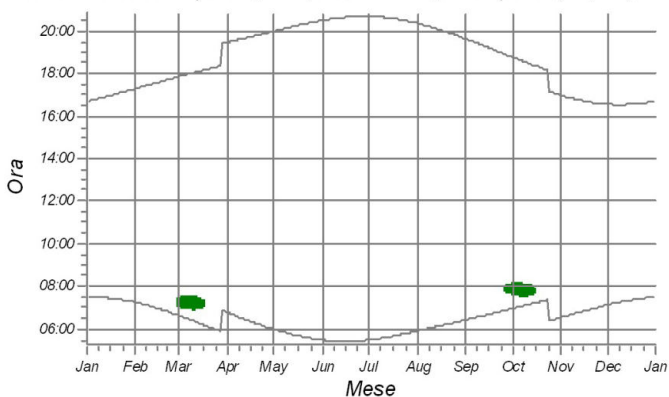
DA: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (105)



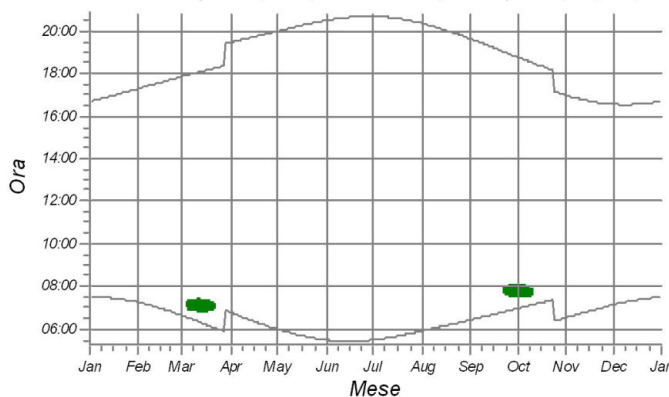
DB: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (106)



DC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (107)



DD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (108)



### WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

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Redatto il:

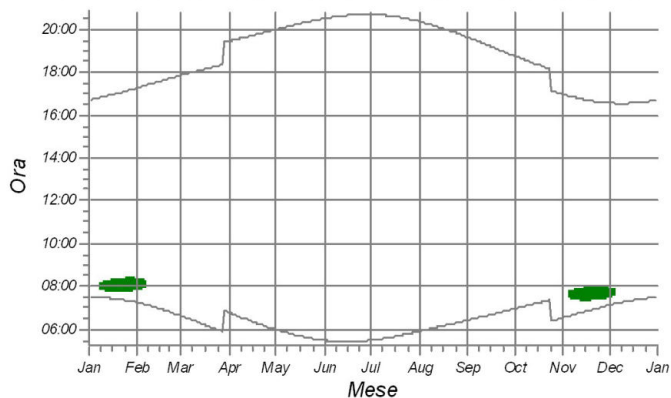
14/11/2023 14:56/3.6.355



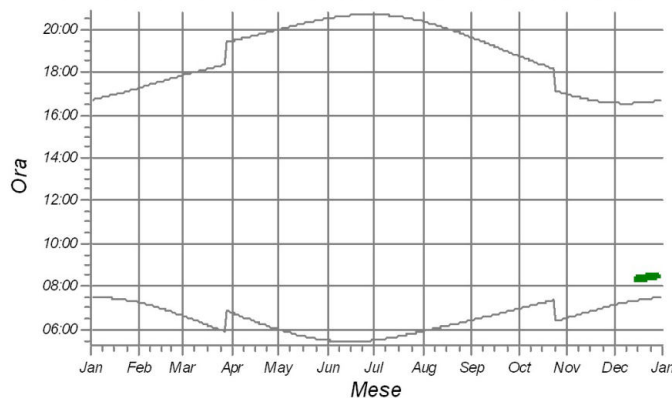
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

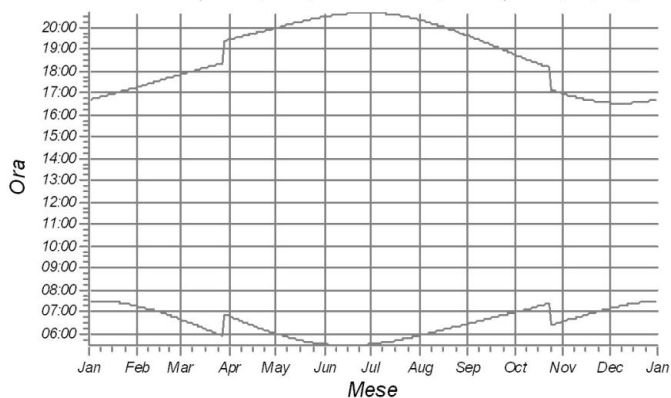
DE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (109)



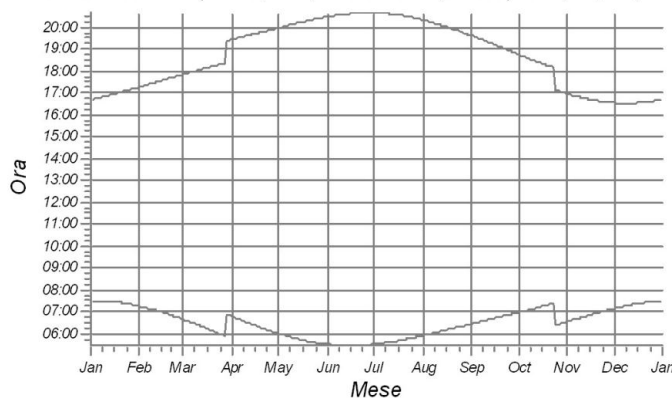
DF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (110)



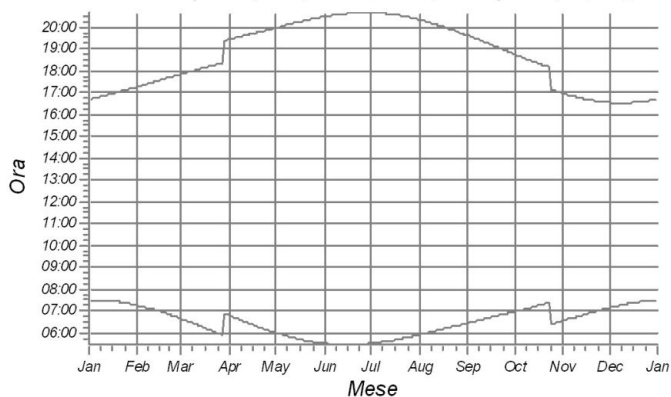
DG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (111)



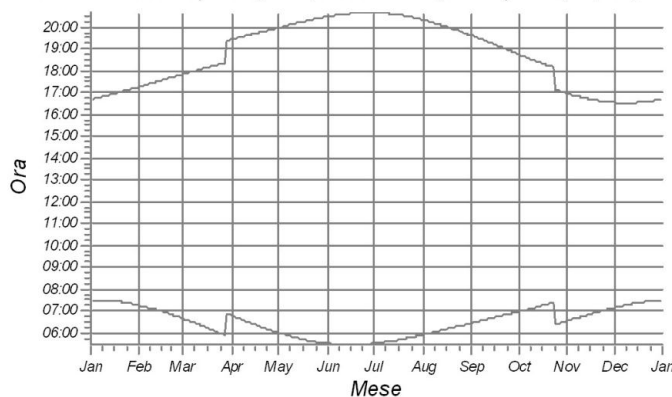
DH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (112)



DI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (113)



DJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (114)



WTG



1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Redatto il:

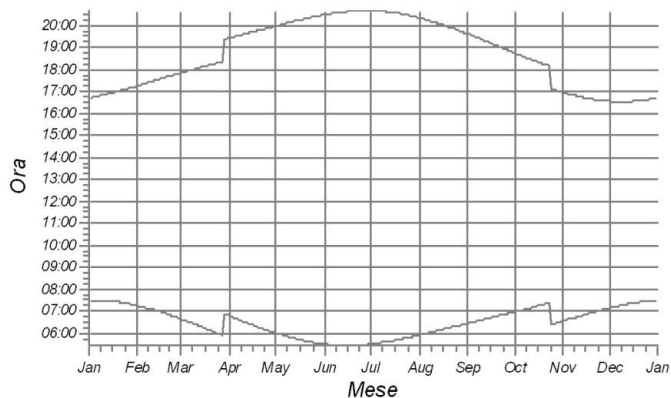
14/11/2023 14:56/3.6.355



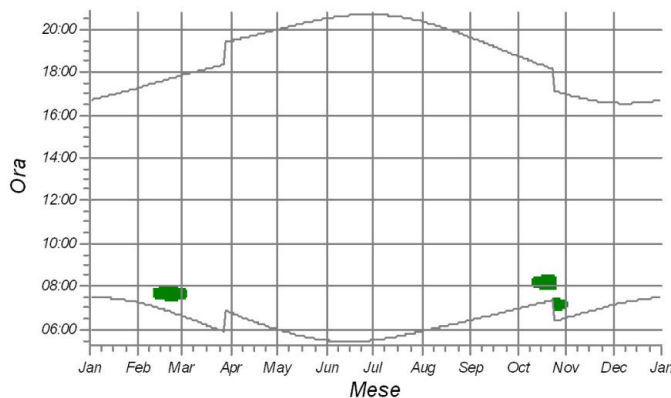
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

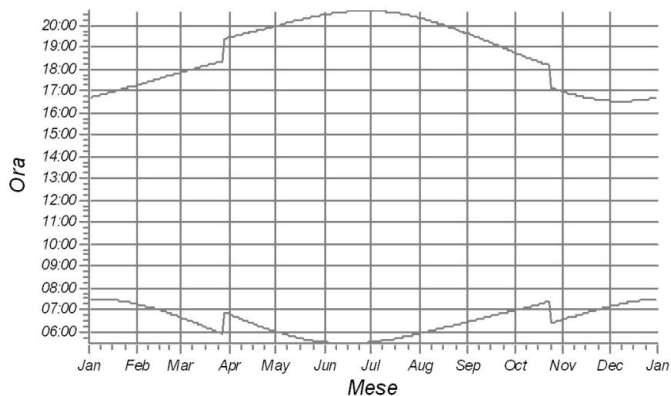
DK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (115)



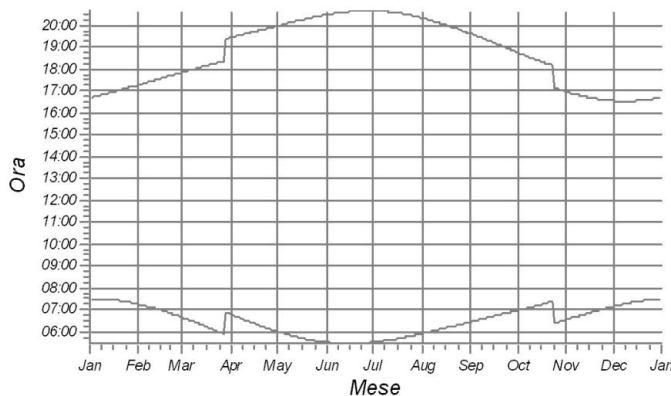
DL: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (116)



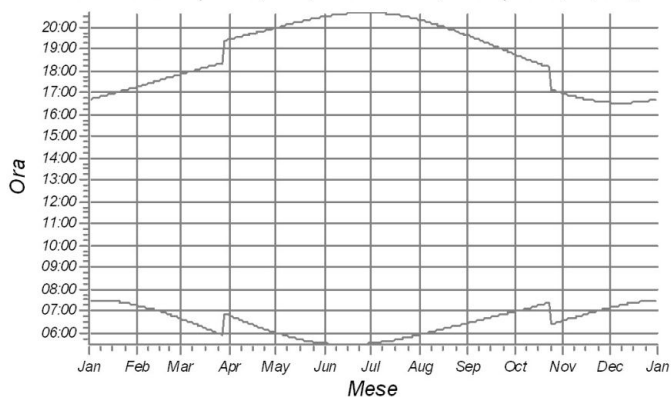
DM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (117)



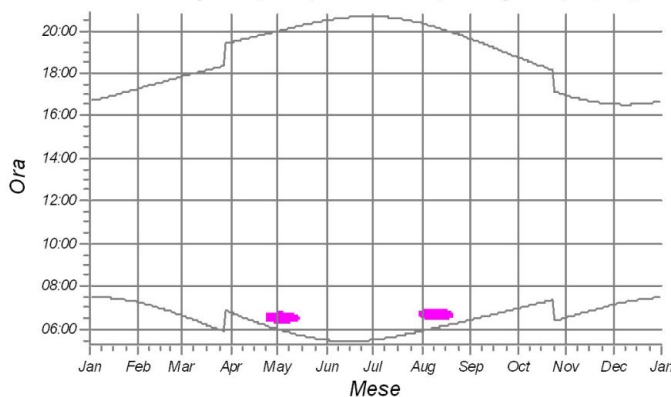
DN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (118)



DO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (119)



DP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (120)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Redatto il:

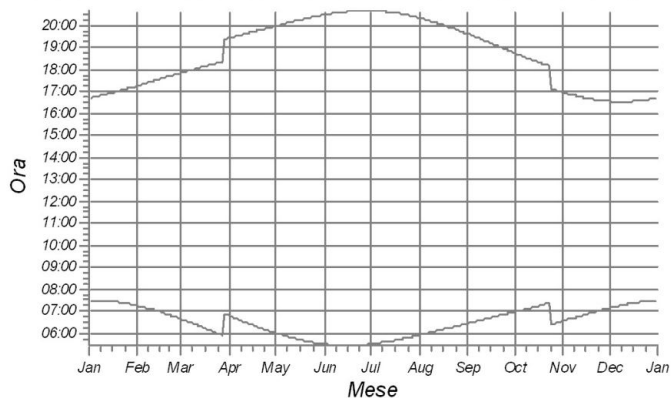
14/11/2023 14:56/3.6.355



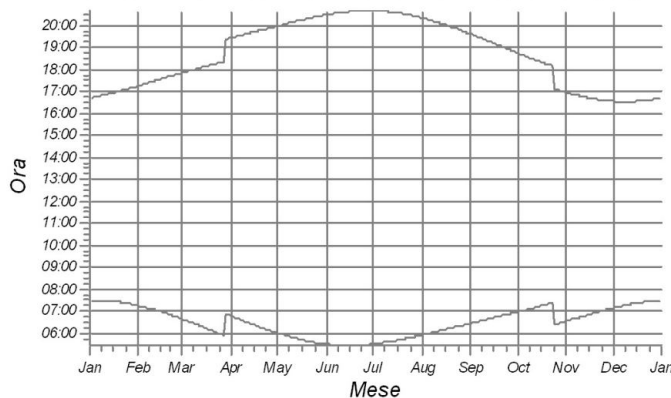
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto

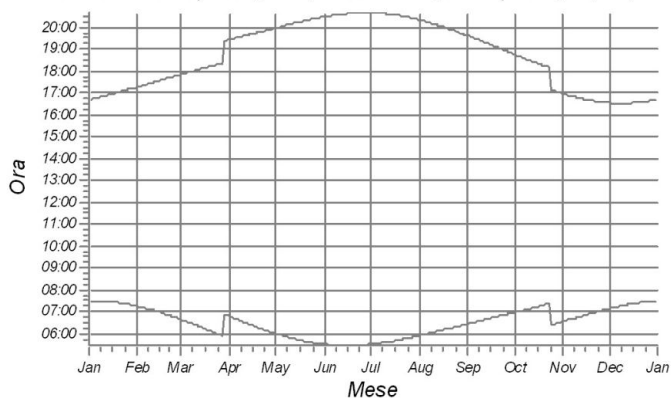
DQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (121)



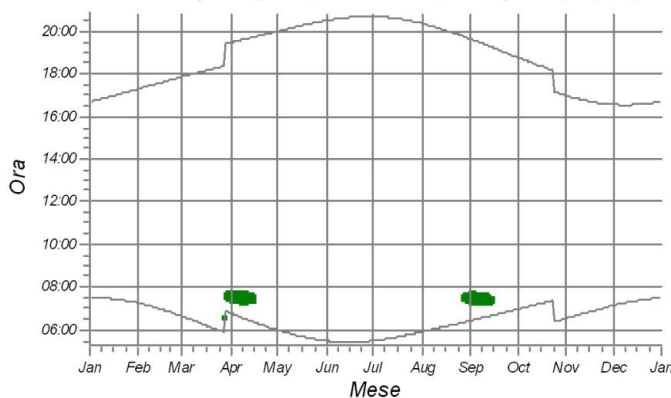
DR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (122)



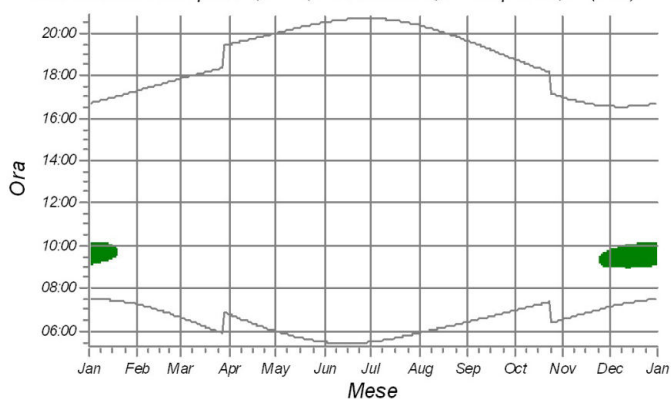
DS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (123)



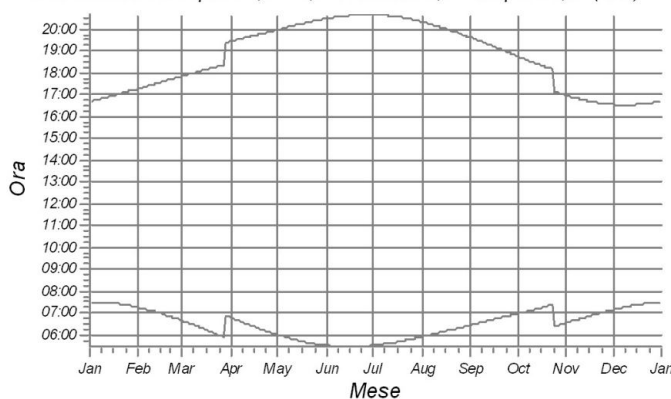
DT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (124)




DU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (125)



DV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (126)



WTG

 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 1 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 09:12-10:10/58 16:41 08:12-08:31/19	07:15 07:41-08:30/49 17:16 16:16-16:40/24	06:38 07:08-07:53/45 17:51 16:30-17:04/34	06:46 07:21-08:02/41 19:26	06:00 18:43-19:21/38 19:59	05:30 06:31-07:02/31 20:29
2	07:29 09:13-10:08/55 16:42 08:13-08:31/18	07:14 07:41-08:30/49 17:17 16:16-16:40/24	06:36 07:06-07:53/47 17:52 16:30-17:03/33	06:45 07:19-08:01/42 19:27	05:58 18:45-19:22/37 20:00	05:30 06:32-07:02/30 20:29
3	07:29 09:14-10:05/51 16:43 08:13-08:31/18	07:13 07:40-08:29/49 17:19 16:16-16:41/25	06:35 07:05-07:51/46 17:53 16:31-17:03/32	06:43 07:19-08:00/41 19:28	05:57 18:47-19:23/36 20:01	05:29 06:31-07:01/30 20:30
4	07:29 09:14-10:05/51 16:44 08:15-08:31/16	07:12 07:40-08:29/49 17:20 16:16-16:42/26	06:33 07:03-07:50/47 17:55 16:31-17:02/31	06:41 07:18-07:57/39 19:29	05:56 18:48-19:23/35 20:02	05:29 06:32-07:02/30 20:31
5	07:29 09:14-10:05/49 16:45 08:16-08:31/15	07:10 07:40-08:28/48 17:21 16:15-16:41/27	06:32 07:01-07:49/48 17:56 16:32-17:02/30	06:40 07:17-07:54/37 19:30	05:55 18:51-19:24/33 20:03	05:29 06:33-07:02/29 20:32
6	07:29 09:14-10:05/48 16:46 08:17-08:30/13	07:09 16:15-16:42/27 17:23 07:39-08:26/47	06:30 07:00-07:47/47 17:57 16:33-17:00/27	06:38 07:17-07:52/35 19:31	05:53 18:58-19:24/26 20:04	05:28 06:33-07:01/28 20:32
7	07:29 09:18-10:04/46 16:47 08:19-08:30/11	07:08 16:15-16:44/29 17:24 07:39-08:25/46	06:28 06:58-07:44/46 17:58 16:34-16:58/24	06:36 07:16-07:51/35 19:32	05:52 18:58-19:25/27 20:05	05:28 06:34-07:01/27 20:33
8	07:28 09:19-10:04/45 16:48 07:58-08:05/7	08:21-08:29/8 07:07 16:16-16:46/30 17:25 07:40-08:23/43	06:27 06:57-07:40/43 17:59 16:36-16:57/21	06:35 07:16-07:49/33 19:34	05:51 18:58-19:25/27 20:06	05:28 06:34-07:01/27 20:34
9	07:28 09:20-10:03/43 16:49 07:56-08:10/14	07:06 16:17-16:47/30 17:26 08:10-08:21/11	06:25 06:56-07:32/36 18:00 16:37-16:54/17	06:33 07:16-07:49/33 19:35	05:50 18:59-19:25/26 20:07	05:27 06:35-07:01/26 20:34
10	07:28 09:22-10:02/40 16:50 07:55-08:13/18	07:05 16:16-16:47/31 17:28 07:41-08:08/27	06:23 06:55-07:32/37 18:01 16:40-16:50/10	06:31 07:16-07:46/30 19:36	05:49 18:58-19:24/26 20:08	05:27 06:35-07:00/25 20:35
11	07:28 09:23-10:02/39 16:51 07:54-08:16/22	07:03 07:36-08:07/31 17:29 16:16-16:48/32	06:22 06:55-07:33/38 18:03	06:30 07:16-07:44/28 19:37	05:47 18:58-19:24/26 20:09	05:27 06:35-07:00/25 20:35
12	07:28 09:24-10:00/36 16:52 07:53-08:17/24	07:02 07:34-08:06/32 17:30 16:15-16:49/34	06:20 06:54-07:32/38 18:04	06:28 07:17-07:42/25 19:38	05:46 18:59-19:24/25 20:10	05:27 06:36-07:00/24 20:36
13	07:27 09:27-09:59/32 16:53 07:53-08:19/26	07:01 07:32-08:06/34 17:31 16:15-16:50/35	06:18 06:53-07:31/38 18:05	06:26 07:18-07:40/22 19:39	05:45 19:00-19:23/23 20:11	05:27 06:36-07:00/24 20:36
14	07:27 09:29-09:58/29 16:54 07:53-08:20/27	07:00 07:30-08:04/34 17:33 16:14-16:49/35	06:17 06:52-07:31/39 18:06	06:25 07:20-07:39/19 19:40	05:44 19:01-19:23/22 20:12	05:27 06:37-07:00/23 20:37
15	07:27 09:31-09:55/24 16:55 07:52-08:21/29	06:58 07:29-08:03/34 17:34 16:15-16:50/35	06:15 06:50-07:30/40 18:07	06:23 07:21-07:36/15 19:41	05:43 19:01-19:22/21 20:13	05:27 06:37-07:00/23 20:37
16	07:26 09:35-09:53/18 16:57 07:53-08:23/30	06:57 07:28-08:02/34 17:35 16:14-16:51/37	06:13 06:48-07:29/41 18:08	06:22 07:24-07:34/10 19:42	05:42 19:03-19:22/19 20:14	05:27 06:38-07:00/22 20:38
17	07:26 09:40-09:48/8 16:58 07:52-08:23/31	06:56 07:27-07:58/31 17:36 16:14-16:56/42	06:12 06:47-07:28/41 18:09	06:20 18:41-19:07/26 19:43	05:41 19:04-19:22/18 20:15	05:27 06:38-07:00/22 20:38
18	07:25 07:52-08:25/33 16:59	06:54 07:27-07:56/29 17:38 16:15-16:59/44	06:10 06:45-07:26/41 18:11	06:19 18:40-19:07/27 19:44	05:40 19:05-19:20/15 20:16	05:27 06:38-07:00/22 20:38
19	07:25 07:51-08:25/34 17:00	06:53 07:24-07:56/32 17:39 16:14-17:00/46	06:08 06:43-07:24/41 18:12	06:17 18:40-19:08/28 19:46	05:39 06:28-07:03/35 20:17	05:27 06:39-07:01/22 20:39
20	07:24 07:50-08:26/36 17:01	06:51 07:24-07:57/33 17:40 16:15-17:02/47	06:07 06:42-07:21/39 18:13	06:16 18:39-19:08/29 19:47	05:38 06:28-07:03/35 20:18	05:27 06:39-07:01/22 20:39
21	07:23 07:51-08:27/36 17:02	06:50 07:22-07:56/34 17:41 16:15-17:02/47	06:05 06:41-07:18/37 18:14	06:14 18:39-19:09/30 19:48	05:38 06:27-07:02/35 20:19	05:27 06:39-07:01/22 20:39
22	07:23 07:50-08:28/38 17:04	06:49 07:22-07:57/35 17:43 16:16-17:03/47	06:03 06:39-07:13/34 18:15	06:12 18:38-19:09/31 19:49	05:37 06:28-07:03/35 20:20	05:27 06:39-07:01/22 20:39
23	07:22 07:50-08:28/38 17:05	06:47 07:21-07:56/35 17:44 16:17-17:04/47	06:02 06:38-07:12/34 18:16	06:11 18:39-19:09/30 19:50	05:36 06:28-07:03/35 20:21	05:28 06:39-07:01/22 20:40
24	07:21 07:50-08:28/38 17:06	06:46 07:21-07:57/36 17:45 16:18-17:04/46	06:00 06:37-07:12/35 18:17	06:10 18:39-19:10/31 19:51	05:35 06:28-07:02/34 20:22	05:28 06:40-07:02/22 20:40
25	07:21 07:50-08:29/39 17:07	06:44 07:20-07:56/36 17:46 16:19-17:04/45	05:58 06:35-07:11/36 18:18	06:08 18:39-19:09/30 19:52	05:34 06:29-07:03/34 20:23	05:28 06:40-07:02/22 20:40
26	07:20 07:50-08:30/40 17:09 16:24-16:30/6	06:43 07:20-07:56/36 17:47 16:21-17:05/44	05:56 06:31-07:10/39 18:19	06:07 18:40-19:09/29 19:53	05:34 06:29-07:03/34 20:24	05:28 06:40-07:02/22 20:40
27	07:19 07:50-08:30/40 17:10 16:21-16:33/12	06:41 07:20-07:54/34 17:49 16:23-17:05/42	05:55 06:29-07:08/39 18:20	06:05 18:40-19:08/28 19:54	05:33 06:28-07:02/34 20:25	05:29 06:40-07:03/23 20:40
28	07:18 07:46-08:30/44 17:11 16:19-16:35/16	06:39 07:11-07:54/43 17:50 16:27-17:05/38	05:53 06:28-07:07/39 18:22	06:04 18:41-19:17/36 19:55	05:32 06:29-07:03/34 20:25	05:29 06:40-07:03/23 20:40
29	07:17 07:45-08:30/45 17:12 16:18-16:36/18		06:51 07:26-08:06/40 19:23	06:02 18:42-19:19/37 19:56	05:32 06:29-07:02/33 20:26	05:30 06:41-07:04/23 20:40
30	07:16 07:43-08:30/47 17:14 16:17-16:38/21		06:50 07:24-08:04/40 19:24	06:01 18:42-19:19/37 19:57	05:31 06:30-07:02/32 20:27	05:30 06:40-07:04/24 20:40
31	07:16 07:42-08:30/48 17:15 16:17-16:39/22		06:48 07:23-08:04/41 19:25		05:31 06:30-07:02/32 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	1669	2074	1511	1002	1334	737

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 1 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 06:39-07:04/25 20:40	05:55 19:09-19:34/25 20:20 06:41-07:10/29	06:26 07:16-07:44/28 19:36	06:57 07:34-08:12/38 18:45	06:32 15:46-16:17/31 16:58 07:09-07:36/27	07:08 09:06-09:44/38 16:33 07:36-07:58/22
2	05:31 06:40-07:05/25 20:40	05:56 19:09-19:34/25 20:19 06:41-07:10/29	06:28 07:15-07:45/30 19:35	06:58 07:33-08:11/38 18:43	06:34 15:45-16:15/30 16:56 07:39-07:51/12	07:09 09:05-09:45/40 16:32 07:38-07:57/19
3	05:32 06:40-07:06/26 20:39	05:57 19:08-19:35/27 20:18 06:42-07:09/27	06:29 07:14-07:47/33 19:33	06:59 07:33-08:11/38 18:42 17:23-17:25/2	06:35 15:46-16:15/29 16:55 07:09-07:53/44	07:10 09:04-09:47/43 16:32 07:39-07:55/16
4	05:32 06:40-07:06/26 20:39	05:58 19:08-19:35/27 20:17 06:43-07:08/25	06:30 07:13-07:46/33 19:31	07:00 07:33-08:10/37 18:40 17:16-17:31/15	06:36 15:45-16:14/29 16:54 07:09-07:55/46	07:11 09:04-09:48/44 16:32 07:42-07:49/7
5	05:33 06:40-07:07/27 20:39	05:59 19:08-19:34/26 20:16 06:44-07:06/22	06:31 07:12-07:47/35 19:30	07:02 07:34-08:10/36 18:38 17:13-17:33/20	06:37 15:45-16:12/27 16:53 07:09-07:56/47	07:12 09:03-09:49/46 16:32 08:04-08:15/11
6	05:33 06:39-07:07/28 20:39	06:00 19:08-19:34/26 20:14 06:46-07:05/19	06:32 07:12-07:47/35 19:28	07:03 07:34-08:19/45 18:37 17:11-17:34/23	06:38 07:10-07:58/48 16:51 15:46-16:12/26	07:13 09:03-09:51/48 16:31 08:03-08:16/13
7	05:34 06:39-07:08/29 20:38	06:01 19:08-19:34/26 20:13 06:48-07:03/15	06:33 07:12-07:49/37 19:26	07:04 07:35-08:21/46 18:35 17:09-17:35/26	06:40 07:10-07:59/49 16:50 15:45-16:11/26	07:14 09:03-09:52/49 16:31 08:03-08:18/15
8	05:35 06:39-07:08/29 20:38	06:02 18:59-19:33/34 20:12 06:51-06:59/8	06:34 07:12-07:51/39 19:25	07:05 07:35-08:23/48 18:33 17:08-17:36/28	06:41 07:10-07:59/49 16:49 15:46-16:11/25	07:15 09:03-09:53/50 16:31 08:03-08:19/16
9	05:35 06:39-07:08/29 20:38	06:03 18:57-19:32/35 20:11	06:35 07:12-07:53/41 19:23	07:06 07:36-08:24/48 18:32 17:06-17:37/31	06:42 07:12-08:00/48 16:48 15:47-16:11/24	07:16 09:03-09:54/51 16:31 08:03-08:20/17
10	05:36 06:39-07:09/30 20:37	06:04 18:55-19:32/37 20:09	06:36 07:12-07:54/42 19:21	07:07 07:38-08:25/47 18:30 17:05-17:37/32	06:43 07:12-08:01/49 16:47 15:47-16:10/23	07:17 09:03-09:58/55 16:31 08:03-08:21/18
11	05:37 06:39-07:10/31 20:37	06:05 18:53-19:30/37 20:08	06:37 07:13-07:54/41 19:20	07:08 07:39-08:26/47 18:28 17:05-17:38/33	06:45 07:13-08:01/48 16:46 15:48-16:10/22	07:17 09:03-10:01/58 16:31 08:03-08:22/19
12	05:37 06:38-07:10/32 20:36	06:06 18:51-19:29/38 20:07	06:38 07:14-07:55/41 19:18	07:09 07:40-08:26/46 18:27 17:04-17:38/34	06:46 07:15-08:02/47 16:45 15:48-16:09/21	07:18 09:02-10:02/60 16:31 08:02-08:22/20
13	05:38 06:38-07:10/32 20:36	06:07 18:50-19:28/38 20:05	06:39 07:15-07:55/40 19:16	07:10 07:42-08:27/45 18:25 17:04-17:38/34	06:47 07:17-08:02/45 16:44 15:50-16:08/18	07:19 09:02-10:04/62 16:32 08:02-08:23/21
14	05:39 06:39-07:11/32 20:35	06:08 18:49-19:26/37 20:04	06:40 07:16-07:56/40 19:14	07:11 07:45-08:27/42 18:24 16:58-17:37/39	06:48 07:19-08:02/43 16:43 15:51-16:07/16	07:20 09:03-10:06/63 16:32 08:03-08:24/21
15	05:40 06:38-07:11/33 20:35	06:09 18:48-19:24/36 20:03	06:41 07:17-07:56/39 19:13	07:13 07:52-08:27/35 18:22 16:55-17:37/42	06:49 07:22-08:02/40 16:42 15:53-16:05/12	07:21 09:03-10:08/65 16:32 08:03-08:25/22
16	05:40 06:38-07:11/33 20:34	06:10 18:47-19:16/29 20:01	06:42 07:18-07:57/39 19:11	07:14 07:52-08:27/35 18:20 16:52-17:36/44	06:51 07:23-08:03/40 16:41 15:57-16:03/6	07:21 09:03-10:08/65 16:32 08:03-08:26/23
17	05:41 06:38-07:12/34 20:34	06:11 18:47-19:16/29 20:00	06:43 07:19-07:58/39 19:09	07:15 07:52-08:28/36 18:19 16:50-17:36/46	06:52 07:23-08:03/40 16:41	07:22 09:04-10:10/66 16:32 08:04-08:28/24
18	05:42 06:38-07:12/34 20:33	06:12 18:46-19:16/30 19:58	06:44 07:21-07:58/37 19:07	07:16 07:52-08:28/36 18:17 16:49-17:36/47	06:53 07:24-08:02/38 16:40	07:23 09:04-10:11/67 16:33 08:04-08:29/25
19	05:43 06:38-07:13/35 20:32	06:13 18:45-19:16/31 19:57	06:45 07:24-07:58/34 19:06	07:17 07:52-08:28/36 18:16 16:48-17:35/47	06:54 07:25-08:03/38 16:39	07:23 09:04-10:11/67 16:33 08:04-08:29/25
20	05:44 06:38-07:13/35 20:31	06:14 18:44-19:15/31 19:55	06:46 07:24-07:58/34 19:04	07:18 07:53-08:27/34 18:14 16:47-17:34/47	06:55 07:25-08:03/38 16:38	07:24 09:05-10:12/67 16:34 08:05-08:30/25
21	05:45 06:38-07:12/34 20:31	06:15 18:44-19:14/30 19:54	06:47 07:24-07:58/34 19:02	07:19 07:53-08:27/34 18:13 16:46-17:32/46	06:57 07:26-08:02/36 16:38	07:25 09:05-10:12/67 16:34 08:05-08:30/25
22	05:45 06:38-07:13/35 20:30	06:16 18:44-19:14/30 19:52	06:48 07:25-08:00/35 19:01	07:21 07:56-08:27/32 18:11 16:46-17:32/46	06:58 07:26-08:02/36 16:37	07:25 09:06-10:13/67 16:34 08:06-08:31/25
23	05:46 06:38-07:13/35 20:29	06:17 18:43-19:13/30 19:51	06:49 07:26-08:05/39 18:59	07:22 07:55-08:27/32 18:10 16:45-17:30/45	06:59 07:28-08:02/34 16:36	07:26 09:06-10:13/67 16:35 08:06-08:31/25
24	05:47 06:38-07:13/35 20:28	06:18 18:43-19:12/29 19:49	06:50 07:27-08:07/40 18:57	07:23 07:57-08:26/29 18:08 16:44-17:28/44	07:00 07:29-08:02/33 16:36	07:26 09:07-10:14/67 16:36 08:07-08:32/25
25	05:48 06:38-07:13/35 20:27	06:19 18:43-19:11/28 19:48	06:51 07:27-08:08/41 18:55	06:24 06:57-07:29/32 17:07 15:44-16:25/41	07:01 09:18-09:26/8 16:35 07:30-08:01/31	07:26 09:07-10:14/67 16:36 08:07-08:32/25
26	05:49 19:15-19:32/17 20:26	06:20 18:44-19:09/25 19:46	06:52 07:28-08:09/41 18:54	06:25 06:58-07:32/34 17:06 15:44-16:19/35	07:02 09:13-09:31/18 16:35 07:31-08:01/30	07:27 09:07-10:14/67 16:37 08:08-08:32/24
27	05:50 19:14-19:32/18 20:25	06:21 07:26-07:36/10 19:45 18:44-19:08/24	06:53 07:29-08:10/41 18:52	06:26 06:59-07:33/34 17:04 15:44-16:20/36	07:04 09:10-09:34/24 16:34 07:31-08:00/29	07:27 09:08-10:13/65 16:37 08:09-08:32/23
28	05:51 19:12-19:32/20 20:24	06:22 07:29-07:38/15 19:43 18:45-19:06/21	06:54 07:30-08:10/40 18:50	06:28 07:00-07:34/34 17:03 15:44-16:19/35	07:05 09:08-09:37/29 16:34 07:33-07:59/26	07:28 09:09-10:14/65 16:38 08:09-08:32/23
29	05:52 19:12-19:33/21 20:23	06:23 07:20-07:40/20 19:41 18:46-19:04/18	06:55 07:31-08:11/40 18:48	06:29 07:01-07:35/34 17:01 15:44-16:18/34	07:06 09:08-09:40/32 16:33 07:34-08:00/26	07:28 09:10-10:13/63 16:39 08:10-08:31/21
30	05:53 19:11-19:34/23 20:22	06:24 07:19-07:41/22 19:40 18:47-19:01/14	06:56 07:34-08:12/38 18:47	06:30 07:04-07:36/32 17:00 15:45-16:19/34	07:07 09:07-09:42/35 16:33 07:35-07:59/24	07:28 09:10-10:13/63 16:40 08:10-08:31/21
31	05:54 19:10-19:34/24 20:21	06:25 07:17-07:42/25 19:38 18:50-18:57/7		06:31 07:07-07:36/29 16:59 15:46-16:18/32		07:28 09:11-10:12/61 16:40 08:11-08:31/20
Ore potenziali eliofanía	461	429	375	345	297	286
Somma minuti d'ombra	1134	1146	1126	2187	1679	2467

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 2 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 07:51-07:59/8 16:41	07:14 07:35-07:36/1 17:16	06:38 06:57-07:43/46 17:51	06:46 07:05-08:09/64 19:26	06:00 19:58	05:30 19:26-19:57/31 20:29
2	07:28 07:52-07:58/6 16:42	07:13 07:34-07:38/4 17:17	06:36 06:55-07:41/46 17:52	06:45 07:03-08:08/65 19:27	05:58 20:00	05:30 19:26-19:57/31 20:29
3	07:29 16:43	07:12 07:33-07:39/6 17:19	06:35 06:54-07:40/46 17:53	06:43 07:01-08:07/66 19:28	05:57 20:01	05:29 19:27-19:58/31 20:30
4	07:29 16:44	07:11 07:32-07:41/9 17:20	06:33 06:52-07:38/46 17:54	06:41 07:00-08:07/67 19:29	05:56 20:02	05:29 19:28-19:58/30 20:31
5	07:29 16:45	07:10 07:30-07:41/11 17:21	06:31 06:51-07:38/47 17:56	06:39 06:58-08:06/68 19:30	05:54 20:03	05:28 19:28-19:58/30 20:32
6	07:29 16:46	07:09 07:29-07:43/14 17:22	06:30 06:49-07:36/47 17:57	06:38 06:56-08:05/69 19:31	05:53 19:31-19:38/7 20:04	05:28 19:29-19:58/29 20:32
7	07:28 16:47	07:08 07:28-07:44/16 17:24	06:28 06:47-07:35/48 17:58	06:36 06:55-08:05/70 19:32	05:52 19:28-19:41/13 20:05	05:28 19:30-19:59/29 20:33
8	07:28 16:48	07:07 07:27-07:45/18 17:25	06:27 06:46-07:35/49 17:59	06:35 06:53-08:04/71 19:33	05:51 19:27-19:43/16 20:06	05:28 19:30-19:59/29 20:33
9	07:28 16:49	07:06 07:26-07:46/20 17:26	06:25 06:44-07:33/49 18:00	06:33 06:52-08:04/72 19:35	05:50 19:24-19:43/19 20:07	05:27 19:30-19:59/29 20:34
10	07:28 16:50	07:05 07:24-07:46/22 17:28	06:23 06:42-07:31/49 18:01	06:31 06:50-08:02/72 19:36	05:48 19:23-19:44/21 20:08	05:27 19:31-19:59/28 20:35
11	07:28 16:51	07:03 07:23-07:47/24 17:29	06:22 06:41-07:30/49 18:03	06:30 06:48-08:01/73 19:37	05:47 19:23-19:45/22 20:09	05:27 19:32-19:59/27 20:35
12	07:28 16:52	07:02 07:22-07:48/26 17:30	06:20 06:39-07:28/49 18:04	06:28 06:48-08:00/72 19:38	05:46 19:22-19:46/24 20:10	05:27 19:32-20:00/28 20:36
13	07:27 16:53	07:01 07:21-07:49/28 17:31	06:18 06:37-07:26/49 18:05	06:26 06:48-07:59/71 19:39	05:45 19:22-19:46/24 20:11	05:27 19:33-20:00/27 20:36
14	07:27 16:54	07:00 07:19-07:48/29 17:33	06:17 06:36-07:24/48 18:06	06:25 06:49-07:58/69 19:40	05:44 19:21-19:47/26 20:12	05:27 19:33-20:00/27 20:37
15	07:26 16:55	06:58 07:18-07:49/31 17:34	06:15 06:34-07:21/47 18:07	06:23 06:49-07:56/67 19:41	05:43 19:21-19:47/26 20:13	05:27 19:33-20:00/27 20:37
16	07:26 16:56	06:57 07:16-07:49/33 17:35	06:13 06:32-07:17/45 18:08	06:22 06:49-07:54/65 19:42	05:42 19:21-19:48/27 20:14	05:27 19:33-20:00/27 20:37
17	07:26 16:58	06:55 07:15-07:49/34 17:36	06:12 06:30-07:11/41 18:09	06:20 06:50-07:53/63 19:43	05:41 19:21-19:49/28 20:15	05:27 19:33-20:00/27 20:38
18	07:25 16:59	06:54 07:14-07:50/36 17:38	06:10 06:29-07:08/39 18:10	06:18 06:50-07:51/61 19:44	05:40 19:21-19:49/28 20:16	05:27 19:34-20:00/26 20:38
19	07:25 17:00	06:53 07:12-07:49/37 17:39	06:08 06:27-07:08/41 18:12	06:17 06:52-07:50/58 19:45	05:39 19:21-19:50/29 20:17	05:27 19:34-20:01/27 20:38
20	07:24 17:01	06:51 07:11-07:49/38 17:40	06:07 06:25-07:09/44 18:13	06:15 06:52-07:47/55 19:46	05:38 19:21-19:50/29 20:18	05:27 19:35-20:02/27 20:39
21	07:23 17:02	06:50 07:09-07:48/39 17:41	06:05 06:24-07:10/46 18:14	06:14 06:54-07:46/52 19:48	05:37 19:21-19:51/30 20:19	05:27 19:35-20:02/27 20:39
22	07:23 17:04	06:48 07:08-07:49/41 17:42	06:03 06:22-07:10/48 18:15	06:12 06:54-07:43/49 19:49	05:37 19:22-19:53/31 20:20	05:27 19:35-20:02/27 20:39
23	07:22 17:05	06:47 07:06-07:48/42 17:44	06:01 06:20-07:10/50 18:16	06:11 06:56-07:40/44 19:50	05:36 19:22-19:53/31 20:21	05:28 19:35-20:02/27 20:39
24	07:21 17:06	06:45 07:05-07:48/43 17:45	06:00 06:18-07:10/52 18:17	06:09 06:58-07:37/39 19:51	05:35 19:22-19:53/31 20:22	05:28 19:36-20:02/26 20:40
25	07:21 17:07	06:44 07:03-07:46/43 17:46	05:58 06:17-07:11/54 18:18	06:08 07:00-07:34/34 19:52	05:34 19:22-19:54/32 20:23	05:28 19:36-20:02/26 20:40
26	07:20 17:08	06:42 07:02-07:46/44 17:47	05:56 06:15-07:10/55 18:19	06:07 07:02-07:31/29 19:53	05:34 19:23-19:55/32 20:24	05:28 19:35-20:02/27 20:40
27	07:19 17:10	06:41 07:00-07:45/45 17:49	05:55 06:13-07:10/57 18:20	06:05 07:05-07:27/22 19:54	05:33 19:23-19:55/32 20:24	05:29 19:36-20:03/27 20:40
28	07:18 17:11	06:39 06:59-07:44/45 17:50	05:53 06:12-07:11/59 18:21	06:04 07:10-07:23/13 19:55	05:32 19:25-19:56/31 20:25	05:29 19:36-20:03/27 20:40
29	07:17 17:12		06:51 07:10-08:10/60 19:23	06:02 19:56	05:32 19:25-19:56/31 20:26	05:30 19:36-20:03/27 20:40
30	07:16 17:14		06:50 07:08-08:09/61 19:24	06:01 19:57	05:31 19:25-19:57/32 20:27	05:30 19:36-20:04/28 20:40
31	07:15 17:15		06:48 07:07-08:10/63 19:25		05:31 19:25-19:57/32 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	14	779	1530	1620	684	836

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 2 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 19:36-20:03/27 20:40	05:55 19:33-19:56/23 20:20	06:26 06:47-08:00/73 19:36	06:57 07:17-08:06/49 18:45	06:32 06:54-07:16/22 16:57	07:08 16:32
2	05:31 19:36-20:04/28 20:19	05:56 19:34-19:55/21 20:19	06:27 06:48-08:00/72 19:35	06:58 07:19-08:08/49 18:43	06:33 06:55-07:15/20 16:56	07:09 16:32
3	05:31 19:36-20:04/28 20:39	05:57 19:34-19:54/20 20:18	06:28 06:49-08:01/72 19:33	06:59 07:20-08:09/49 18:42	06:35 06:57-07:15/18 16:55	07:10 16:32
4	05:32 19:36-20:04/28 20:39	05:58 19:35-19:53/18 20:17	06:29 06:50-08:01/71 19:31	07:00 07:21-08:10/49 18:40	06:36 06:58-07:14/16 16:54	07:11 16:32
5	05:33 19:35-20:04/29 20:39	05:59 19:37-19:52/15 20:16	06:30 06:51-08:01/70 19:30	07:01 07:22-08:11/49 18:38	06:37 06:59-07:12/13 16:53	07:12 16:31
6	05:33 19:35-20:05/30 20:39	06:00 19:39-19:50/11 20:14	06:32 06:52-08:01/69 19:28	07:03 07:23-08:11/48 18:36	06:38 07:01-07:12/11 16:51	07:13 16:31
7	05:34 19:35-20:05/30 20:38	06:01 19:42-19:46/4 20:13	06:33 06:53-08:02/69 19:26	07:04 07:24-08:12/48 18:35	06:40 07:02-07:11/9 16:50	07:14 16:31
8	05:34 19:34-20:05/31 20:38	06:02 20:12	06:34 06:54-08:02/68 19:25	07:05 07:25-08:12/47 18:33	06:41 07:03-07:09/6 16:49	07:15 16:31
9	05:35 19:34-20:05/31 20:38	06:03 20:11	06:35 06:55-08:01/66 19:23	07:06 07:26-08:12/46 18:32	06:42 07:04-07:07/3 16:48	07:16 16:31
10	05:36 19:35-20:05/30 20:37	06:04 20:09	06:36 06:56-08:01/65 19:21	07:07 07:27-08:13/46 18:30	06:43 16:47	07:17 07:43-07:47/4 16:31
11	05:36 19:34-20:05/31 20:37	06:05 20:08	06:37 06:57-08:01/64 19:19	07:08 07:28-08:14/46 18:28	06:44 16:46	07:17 07:41-07:49/8 16:31
12	05:37 19:34-20:05/31 20:36	06:06 20:07	06:38 06:58-08:01/63 19:18	07:09 07:30-08:16/46 18:27	06:46 16:45	07:18 07:42-07:50/8 16:31
13	05:38 19:34-20:05/31 20:36	06:07 20:05	06:39 06:59-08:01/62 19:16	07:10 07:31-08:17/46 18:25	06:47 16:44	07:19 07:43-07:52/9 16:31
14	05:39 19:33-20:04/31 20:35	06:08 20:04	06:40 07:00-08:00/60 19:14	07:11 07:32-08:17/45 18:23	06:48 16:43	07:20 07:44-07:53/9 16:32
15	05:40 19:33-20:04/31 20:35	06:09 07:16-07:32/16 20:03	06:41 07:01-08:00/59 19:13	07:12 07:33-08:18/45 18:22	06:49 16:42	07:21 07:45-07:54/9 16:32
16	05:40 19:33-20:04/31 20:34	06:10 07:12-07:36/24 20:01	06:42 07:02-07:59/57 19:11	07:14 07:34-08:18/44 18:20	06:50 16:41	07:21 07:45-07:55/10 16:32
17	05:41 19:33-20:04/31 20:33	06:11 07:09-07:39/30 20:00	06:43 07:03-07:59/56 19:09	07:15 07:35-08:18/43 18:19	06:52 16:40	07:22 07:46-07:56/10 16:32
18	05:42 19:33-20:04/31 20:33	06:12 07:06-07:41/35 19:58	06:44 07:04-07:58/54 19:07	07:16 07:37-08:19/42 18:17	06:53 16:40	07:23 07:47-07:57/10 16:33
19	05:43 19:32-20:03/31 20:32	06:13 07:04-07:44/40 19:57	06:45 07:05-07:57/52 19:06	07:17 07:38-08:19/41 18:16	06:54 16:39	07:23 07:47-07:57/10 16:33
20	05:44 19:32-20:03/31 20:31	06:14 07:02-07:47/45 19:55	06:46 07:06-07:56/50 19:04	07:18 07:39-08:19/40 18:14	06:55 16:38	07:24 07:48-07:58/10 16:33
21	05:45 19:32-20:02/30 20:31	06:15 07:00-07:49/49 19:54	06:47 07:07-07:55/48 19:02	07:19 07:40-08:19/39 18:13	06:56 16:37	07:24 07:48-07:58/10 16:34
22	05:45 19:32-20:02/30 20:30	06:16 06:58-07:51/53 19:52	06:48 07:08-07:54/46 19:00	07:20 07:41-08:19/38 18:11	06:58 16:37	07:25 07:49-07:59/10 16:34
23	05:46 19:32-20:01/29 20:29	06:17 06:57-07:52/55 19:51	06:49 07:09-07:53/44 18:59	07:22 07:43-08:19/36 18:10	06:59 16:36	07:25 07:49-07:59/10 16:35
24	05:47 19:32-20:01/29 20:28	06:18 06:55-07:54/59 19:49	06:50 07:10-07:52/42 18:57	07:23 07:44-08:19/35 18:08	07:00 16:36	07:26 07:49-07:59/10 16:35
25	05:48 19:32-20:00/28 20:27	06:19 06:54-07:55/61 19:48	06:51 07:11-07:51/40 18:55	06:24 06:45-07:19/34 17:07	07:01 16:35	07:26 07:50-08:00/10 16:36
26	05:49 19:32-20:00/28 20:26	06:20 06:53-07:56/63 19:46	06:52 07:12-07:49/37 18:54	06:25 06:46-07:18/32 17:05	07:02 16:34	07:27 07:50-08:00/10 16:37
27	05:50 19:31-19:59/28 20:25	06:21 06:52-07:57/65 19:44	06:53 07:13-07:57/44 18:52	06:26 06:48-07:19/31 17:04	07:03 16:34	07:27 07:50-08:00/10 16:37
28	05:51 19:31-19:58/27 20:24	06:22 06:51-07:58/67 19:43	06:54 07:14-08:00/46 18:50	06:27 06:49-07:18/29 17:03	07:05 16:34	07:27 07:51-08:01/10 16:38
29	05:52 19:32-19:58/26 20:23	06:23 06:49-07:59/70 19:41	06:55 07:15-08:03/48 18:48	06:29 06:50-07:17/27 17:01	07:06 16:33	07:28 07:51-08:00/9 16:39
30	05:53 19:32-19:57/25 20:22	06:24 06:48-07:59/71 19:40	06:56 07:16-08:05/49 18:47	06:30 06:52-07:18/26 17:00	07:07 16:33	07:28 07:51-08:00/9 16:39
31	05:54 19:32-19:57/25 20:21	06:25 06:47-07:59/72 19:38		06:31 06:53-07:17/24 16:59		07:28 07:51-08:00/9 16:40
Ore potenziali eliofanìa	461	429	375	345	297	286
Somma minuti d'ombra	907	987	1716	1269	118	204

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 3 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	06:57-07:08/11 19:26	06:46 19:58	05:30 20:29
2	07:28 16:42	07:13 17:17	06:36 17:52	06:55-07:04/9 19:27	06:44 19:59	05:30 20:29
3	07:29 16:43	07:12 17:19	06:35 17:53	06:54-07:00/6 19:28	06:43 20:01	05:29 20:30
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52-06:59/7 19:29	06:41 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	06:31 17:56	06:51-07:00/9 19:30	06:39 20:03	05:28 20:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:49-07:00/11 19:31	06:38 20:04	05:28 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:47-06:59/12 19:32	06:36 20:05	05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46-07:00/14 19:33	06:34 20:06	05:27 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:44-06:59/15 19:34	06:33 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	06:23 18:01	06:42-06:58/16 19:36	06:31 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:02	06:41-06:58/17 19:37	06:30 20:09	05:27 20:35
12	07:27 16:52	07:02 17:30	06:20 18:04	06:39-06:56/17 19:38	06:28 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:37-06:55/18 19:39	06:26 20:11	05:27 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:36-06:54/18 19:40	06:25 20:12	05:27 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:34-06:52/18 19:41	06:23 20:13	05:27 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:32-06:50/18 19:42	06:22 20:14	05:27 20:37
17	07:26 16:58	06:55 17:36	06:12 18:09	06:30-06:47/17 19:43	06:20 20:15	05:27 20:38
18	07:25 16:59	06:54 17:38	06:10 18:10	06:29-06:45/16 19:44	06:18 20:16	05:27 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:29-06:41/12 19:45	06:17 20:17	05:27 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:11-07:20/9 19:46	06:15 20:18	05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:09-07:18/9 19:48	06:14 20:19	05:27 20:39
22	07:23 17:04	06:48 17:42	06:03 18:15	06:08-07:18/10 19:49	06:12 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:06-07:16/10 19:50	06:11 20:21	05:27 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:05-07:15/10 19:51	06:09 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:03-07:13/10 19:52	06:08 20:23	05:28 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:02-07:13/11 19:53	06:07 20:24	05:28 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:00-07:11/11 19:54	06:05 20:24	05:29 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:59-07:10/11 19:55	06:04 20:25	05:29 20:40
29	07:17 17:12		06:51 19:22		06:02 20:26	05:30 20:40
30	07:16 17:14		06:50 19:24		06:01 19:57	05:30 20:40
31	07:15 17:15		06:48 19:25		05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	0	119	261	0	577	1390

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 3 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 19:23-20:09/46 20:40	05:55 20:20	06:26 19:36	06:57 07:17-07:35/18 18:45	06:32 16:57	07:08 16:32
2	05:31 19:23-20:10/47 20:39	05:56 20:19	06:27 19:35	06:58 07:19-07:36/17 18:43	06:33 16:56	07:09 16:32
3	05:31 19:23-20:09/46 20:39	05:57 20:18	06:28 19:33	06:59 07:20-07:36/16 18:42	06:35 16:55	07:10 16:32
4	05:32 19:24-20:10/46 20:39	05:58 20:17	06:29 19:31	07:00 07:21-07:36/15 18:40	06:36 16:54	07:11 16:32
5	05:33 19:23-20:09/46 20:39	05:59 20:16	06:30 19:30	07:01 07:22-07:36/14 18:38	06:37 16:53	07:12 16:31
6	05:33 19:24-20:10/46 20:39	06:00 20:14	06:31 19:28	07:03 07:23-07:36/13 18:36	06:38 16:51	07:13 16:31
7	05:34 19:25-20:10/45 20:38	06:01 20:13	06:32 19:26	07:04 07:24-07:36/12 18:35	06:40 16:50	07:14 16:31
8	05:34 19:24-20:09/45 20:38	06:02 20:12	06:34 19:25	07:05 07:25-07:35/10 18:33	06:41 16:49	07:15 16:31
9	05:35 19:25-20:09/44 20:38	06:03 20:11	06:35 19:23	07:06 07:26-07:34/8 18:31	06:42 16:48	07:16 16:31
10	05:36 19:26-20:09/43 20:37	06:04 20:09	06:36 19:21	07:07 07:27-07:34/7 18:30	06:43 16:47	07:16 16:31
11	05:36 19:25-20:08/43 20:37	06:05 20:08	06:37 19:19	07:08 07:28-07:35/7 18:28	06:44 16:46	07:17 16:31
12	05:37 19:26-20:09/43 20:36	06:06 20:07	06:38 19:18	07:09 07:30-07:40/10 18:27	06:46 16:45	07:18 16:31
13	05:38 19:27-20:09/42 20:36	06:07 20:05	06:39 19:16	07:10 07:31-07:42/11 18:25	06:47 16:44	07:19 16:31
14	05:39 19:26-20:08/42 20:35	06:08 20:04	06:40 19:14	07:11 07:32-07:43/11 18:23	06:48 16:43	07:20 16:32
15	05:39 19:27-20:08/41 20:35	06:09 20:02	06:41 19:13	07:12 07:33-07:44/11 18:22	06:49 16:42	07:21 16:32
16	05:40 19:27-20:08/41 20:34	06:10 20:01	06:42 19:11	07:14 07:34-07:45/11 18:20	06:50 16:41	07:21 16:32
17	05:41 19:28-20:07/39 20:33	06:11 20:00	06:43 19:09	07:15 07:35-07:45/10 18:19	06:52 16:40	07:22 16:32
18	05:42 19:29-20:07/38 20:33	06:12 19:58	06:44 19:07	07:16 07:37-07:47/10 18:17	06:53 16:40	07:23 16:33
19	05:43 19:29-20:06/37 20:32	06:13 19:57	06:45 19:06	07:17 07:38-07:48/10 18:16	06:54 16:39	07:23 16:33
20	05:44 19:29-20:05/36 20:31	06:14 19:55	06:46 19:04	07:18 07:39-07:49/10 18:14	06:55 16:38	07:24 16:33
21	05:45 19:30-20:05/35 20:31	06:15 19:54	06:47 19:02	07:19 07:40-07:49/9 18:13	06:56 16:37	07:24 16:34
22	05:45 19:31-20:04/33 20:30	06:16 19:52	06:48 19:00	07:20 07:41-07:49/8 18:11	06:58 16:37	07:25 16:34
23	05:46 19:32-20:04/32 20:29	06:17 19:51	06:49 18:59	07:22 07:43-07:50/7 18:10	06:59 16:36	07:25 16:35
24	05:47 19:33-20:03/30 20:28	06:18 19:49	06:50 07:14-07:23/9 18:57	07:23 07:44-07:50/6 18:08	07:00 16:36	07:26 16:35
25	05:48 19:34-20:02/28 20:27	06:19 19:48	06:51 07:11-07:27/16 18:55	06:24 06:45-06:50/5 17:07	07:01 16:35	07:26 16:36
26	05:49 19:36-20:01/25 20:26	06:20 19:46	06:52 07:12-07:29/17 18:53	06:25 06:46-06:50/4 17:05	07:02 16:34	07:27 16:37
27	05:50 19:36-19:59/23 20:25	06:21 19:44	06:53 07:13-07:30/17 18:52	06:26 06:48-06:50/2 17:04	07:03 16:34	07:27 16:37
28	05:51 19:38-19:57/19 20:24	06:22 19:43	06:54 07:14-07:32/18 18:50	06:27 06:49-06:50/1 17:03	07:04 16:34	07:27 16:38
29	05:52 19:41-19:54/13 20:23	06:23 19:41	06:55 07:15-07:33/18 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	05:53 19:46-19:50/4 20:22	06:24 19:40	06:56 07:16-07:34/18 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	05:54 20:21	06:25 19:38		06:31 16:59		07:28 16:40
Ore potenziali eliofanía	461	429	375	345	297	286
Somma minuti d'ombra	1098	0	113	273	0	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Redatto il:
14/11/2023 14:56/3.6.355



SHADOW - Calendario per WTG

Calcolo: ShadowFlickering\_Progetto WTG: 4 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for days (1 to 31). Each cell contains a time range (hh:mm) representing shadow periods. Summary rows at the bottom show 'Ore potenziali eliofania' and 'Somma minuti d'ombra' for each month.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra
Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Pedatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 5 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 14:06-15:11/65 16:41	07:14 14:18-15:32/74 17:16 07:35-08:03/28	06:38 07:14-07:42/28 17:51	06:46 17:29-18:17/48 19:26 07:05-08:04/59	06:00 06:21-06:44/23 19:58 06:51-07:46/55	05:30 20:28
2	07:28 14:07-15:12/65 16:42	07:13 14:19-15:32/73 17:17 07:34-08:04/30	06:36 07:15-07:40/25 17:52	06:44 17:28-18:18/50 19:27 07:03-08:03/60	05:58 06:21-06:45/24 19:59 06:52-07:45/53	05:30 20:29
3	07:28 14:07-15:13/66 16:43	07:12 14:19-15:31/72 17:19 07:33-08:04/31	06:35 07:17-07:38/21 17:53	06:43 17:27-18:18/51 19:28 07:01-08:03/62	05:57 06:21-06:45/24 20:00 06:52-07:43/51	05:29 20:30
4	07:28 14:07-15:14/67 16:44	07:11 14:20-15:30/70 17:20 07:31-08:04/33	06:33 07:20-07:35/15 17:54	06:41 17:27-18:20/53 19:29 07:00-08:03/63	05:56 06:20-06:44/24 20:02 06:53-07:42/49	05:29 20:31
5	07:28 14:07-15:15/68 16:45	07:10 14:21-15:30/69 17:21 07:30-08:04/34	06:31 17:55	06:39 17:26-18:20/54 19:30 06:58-08:01/63	05:54 06:21-06:44/23 20:03 06:54-07:41/47	05:28 20:31
6	07:28 14:08-15:17/69 16:46	07:09 14:23-15:30/67 17:22 07:29-08:04/35	06:30 17:57	06:38 17:25-18:20/55 19:31 06:56-08:01/65	05:53 06:21-06:43/22 20:04 06:55-07:40/45	05:28 20:32
7	07:28 14:08-15:18/70 16:47	07:08 14:24-15:29/65 17:24 07:28-08:04/36	06:28 17:58	06:36 17:26-18:21/55 19:32 06:56-08:02/66	05:52 06:22-06:43/21 20:05 06:56-07:39/43	05:28 20:33
8	07:28 14:08-15:18/70 16:48	07:07 14:26-15:28/62 17:25 07:27-08:04/37	06:27 17:59	06:34 17:25-18:20/55 19:33 06:54-08:01/67	05:51 06:22-06:42/20 20:06 06:58-07:38/40	05:27 20:33
9	07:28 14:08-15:19/71 16:49	07:06 14:27-15:26/59 17:26 07:26-08:04/38	06:25 18:00	06:33 17:25-18:20/55 19:34 06:53-08:01/68	05:49 06:23-06:41/18 20:07 06:58-07:35/37	05:27 20:34
10	07:28 14:09-15:20/71 16:50	07:04 14:29-15:25/56 17:27 07:24-08:03/39	06:23 18:01	06:31 17:26-18:21/55 19:35 06:53-08:01/68	05:48 06:23-06:39/16 20:08 07:00-07:34/34	05:27 20:34
11	07:28 14:09-15:22/73 16:51	07:03 14:32-15:24/52 17:29 07:23-08:03/40	06:22 18:02	06:30 17:26-18:20/54 19:37 06:51-08:01/70	05:47 06:25-06:38/13 20:09 07:02-07:32/30	05:27 20:35
12	07:27 14:09-15:22/73 16:52	07:02 14:35-15:22/47 17:30 07:22-08:03/41	06:20 18:04	06:28 17:26-18:20/54 19:38 06:51-08:01/70	05:46 06:27-06:36/9 20:10 07:04-07:29/25	05:27 20:36
13	07:27 14:10-15:23/73 16:53	07:01 14:37-15:17/40 17:31 07:20-08:02/42	06:18 18:05	06:26 17:26-18:20/54 19:39 06:50-08:00/70	05:45 06:31-06:32/1 20:11 07:07-07:27/20	05:27 20:36
14	07:27 14:09-15:24/75 16:54	06:59 14:43-15:06/23 17:32 07:19-08:01/42	06:17 18:06	06:25 17:27-18:19/52 19:40 06:49-07:59/70	05:44 07:10-07:23/13 20:12	05:27 20:36
15	07:26 14:10-15:25/75 16:55	06:58 07:18-08:00/42 17:34	06:15 18:07	06:23 17:28-18:19/51 19:41 06:49-07:59/70	05:43 20:13	05:26 20:37
16	07:26 14:10-15:25/75 16:56	06:57 07:16-07:58/42 17:35	06:13 18:08	06:22 17:28-18:18/50 19:42 06:49-07:58/69	05:42 20:14	05:27 20:37
17	07:25 14:10-15:26/76 16:58	06:55 07:15-07:57/42 17:36	06:12 18:09	06:20 17:30-18:18/48 19:43 06:49-07:58/69	05:41 20:15	05:27 20:38
18	07:25 14:10-15:27/77 16:59	06:54 07:14-07:56/42 17:37	06:10 18:10	06:18 17:30-18:17/47 19:44 06:48-07:57/69	05:40 20:16	05:27 20:38
19	07:24 14:11-15:28/77 17:00	06:53 07:12-07:53/41 17:39	06:08 18:11	06:17 17:32-18:16/44 19:45 06:48-07:56/68	05:39 20:17	05:27 20:38
20	07:24 14:11-15:28/77 17:01	06:51 07:11-07:52/41 17:40	06:06 18:13	06:15 17:33-18:15/42 19:46 06:48-07:55/67	05:38 20:18	05:27 20:39
21	07:23 14:11-15:29/78 17:02	06:50 07:09-07:50/41 17:41	06:05 18:14	06:14 17:36-18:14/38 19:47 06:48-07:55/67	05:37 20:19	05:27 20:39
22	07:23 14:12-15:30/78 17:03	06:48 07:10-07:50/40 17:42	06:03 18:15	06:12 17:36-18:13/37 19:49 06:48-07:53/65	05:37 20:20	05:27 20:39
23	07:22 14:12-15:30/78 17:05	06:47 07:10-07:49/39 17:44	06:01 18:16	06:11 17:38-18:12/34 19:50 06:48-07:53/65	05:36 20:21	05:27 20:39
24	07:21 14:12-15:30/78 17:06	06:45 07:10-07:48/38 17:45	06:00 18:17	06:10 16:42-17:03/21 19:51 17:38-18:10/32	05:35 20:22	05:28 20:39
25	07:20 14:13-15:31/78 17:07	06:44 07:10-07:47/37 17:46	05:58 18:18	06:08 06:27-06:41/14 17:40-18:09/29 19:52 06:48-07:51/63	05:34 20:23	05:28 20:40
26	07:20 14:13-15:31/78 17:08	06:42 07:11-07:47/36 17:47	05:56 18:19	06:06 06:26-06:43/17 17:42-18:07/25 19:53 06:49-07:51/62	05:34 20:23	05:28 20:40
27	07:19 14:13-15:31/78 17:10	06:41 07:12-07:45/33 17:48	05:55 18:20	06:05 06:24-06:43/19 17:44-18:04/20 19:54 06:49-07:49/60	05:33 20:24	05:29 20:40
28	07:18 14:15-15:32/77 17:11	06:39 07:12-07:43/31 17:50	05:53 18:21	06:04 06:23-06:44/21 17:47-18:01/14 19:55 06:49-07:49/60	05:32 20:25	05:29 20:40
29	07:17 14:15-15:32/77 17:12		06:51 19:22	06:02 06:22-06:45/23 19:56 06:50-07:48/58	05:32 20:26	05:29 20:40
30	07:16 14:16-15:32/76 17:13		06:49 19:23	06:01 06:21-06:44/23 19:57 06:50-07:47/57	05:31 20:27	05:30 20:40
31	07:15 14:17-15:32/75 17:15		06:48 19:25		05:31 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	2482	1880	1136	3335	780	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:56/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto WTG: 5 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:30 20:40	05:55 06:36-06:48/12 20:20 07:14-07:41/27	06:26 17:24-18:19/55 19:36 06:50-08:00/70	06:57 18:45	06:32 13:59-14:55/56 16:57 06:54-07:33/39	07:08 13:51-15:04/73 16:32	
2	05:31 20:39	05:56 06:35-06:49/14 20:19 07:12-07:43/31	06:27 17:24-18:19/55 19:35 06:51-07:59/68	06:58 18:43	06:33 13:56-14:56/60 16:56 06:55-07:33/38	07:09 13:52-15:03/71 16:32	
3	05:31 20:39	05:57 06:34-06:51/17 20:18 07:10-07:45/35	06:28 17:23-18:18/55 19:33 06:51-07:59/68	06:59 18:41	06:35 13:55-14:57/62 16:55 06:57-07:34/37	07:10 13:52-15:03/71 16:32	
4	05:32 20:39	05:58 06:33-06:51/18 20:17 07:08-07:46/38	06:29 17:22-18:17/55 19:31 06:51-07:58/67	07:00 18:40	06:36 13:54-14:59/65 16:54 06:58-07:34/36	07:11 13:53-15:03/70 16:32	
5	05:33 20:39	05:59 06:32-06:52/20 20:15 07:07-07:48/41	06:30 17:22-18:17/55 19:30 06:52-07:58/66	07:01 18:38	06:37 13:52-15:00/68 16:52 06:59-07:34/35	07:12 13:53-15:03/70 16:31	
6	05:33 20:39	06:00 06:31-06:53/22 20:14 07:06-07:49/43	06:31 17:21-18:16/55 19:28 06:52-07:57/65	07:02 18:36	06:38 13:51-15:00/69 16:51 07:00-07:34/34	07:13 13:54-15:03/69 16:31	
7	05:34 20:38	06:01 06:31-06:53/22 20:13 07:04-07:50/46	06:32 17:21-18:15/54 19:26 06:53-07:57/64	07:04 18:35	06:39 13:51-15:01/70 16:50 07:02-07:34/32	07:14 13:55-15:02/67 16:31	
8	05:34 20:38	06:02 06:30-06:53/23 20:12 07:03-07:51/48	06:33 17:21-18:14/53 19:24 06:54-07:57/63	07:05 18:33	06:41 13:50-15:02/72 16:49 07:03-07:34/31	07:15 13:55-15:02/67 16:31	
9	05:35 20:38	06:03 06:30-06:53/23 20:10 07:02-07:52/50	06:34 17:21-18:13/52 19:23 06:55-07:57/62	07:06 07:57-08:07/10 18:31	06:42 13:49-15:02/73 16:48 07:04-07:34/30	07:16 13:56-15:02/66 16:31	
10	05:36 20:37	06:04 06:30-06:53/23 20:09 07:01-07:53/52	06:35 17:21-18:11/50 19:21 06:56-07:57/61	07:07 07:52-08:10/18 18:30	06:43 13:49-15:03/74 16:47 07:06-07:34/28	07:16 13:56-15:01/65 16:31	
11	05:36 20:37	06:05 06:30-06:53/23 20:08 07:00-07:54/54	06:36 17:21-18:09/48 19:19 06:57-07:56/59	07:08 07:50-08:12/22 18:28	06:44 13:48-15:03/75 16:46 07:07-07:34/27	07:17 13:56-15:01/65 16:31	
12	05:37 20:36	06:06 06:30-06:53/23 20:07 06:59-07:55/56	06:37 17:21-18:08/47 19:18 06:58-07:56/58	07:09 07:49-08:15/26 18:27	06:46 13:47-15:03/76 16:45 07:08-07:33/25	07:18 13:57-15:01/64 16:31	
13	05:38 20:36	06:07 06:30-06:53/23 20:05 06:58-07:55/57	06:39 17:21-18:05/44 19:16 06:59-07:56/57	07:10 07:47-08:16/29 18:25	06:47 13:47-15:04/77 16:44 07:10-07:33/23	07:19 13:58-15:01/63 16:31	
14	05:39 20:35	06:08 06:30-06:52/22 17:59-18:05/6 20:04 06:58-07:56/58	06:40 17:22-18:03/41 19:14 07:00-07:55/55	07:11 07:45-08:17/32 18:23	06:48 13:47-15:04/77 16:43 07:11-07:32/21	07:20 13:59-15:02/63 16:32	
15	05:39 20:35	06:09 06:31-06:51/20 17:54-18:10/16 20:02 06:57-07:57/60	06:41 17:23-18:01/38 19:12 07:01-07:55/54	07:12 07:44-08:18/34 18:22	06:49 13:46-15:04/78 16:42 07:12-07:32/20	07:20 13:59-15:01/62 16:32	
16	05:40 20:34	06:10 06:32-06:50/18 17:51-18:12/21 20:01 06:56-07:57/61	06:42 17:23-17:59/36 19:11 07:02-07:54/52	07:13 07:43-08:18/35 18:20	06:50 13:46-15:04/78 16:41 07:13-07:31/18	07:21 13:59-15:01/62 16:32	
17	05:41 20:33	06:11 06:33-06:49/16 17:49-18:14/25 20:00 06:55-07:57/62	06:43 17:25-17:56/31 19:09 07:03-07:54/51	07:15 07:42-08:19/37 18:19	06:52 13:47-15:05/78 16:40 07:15-07:31/16	07:22 14:00-15:02/62 16:32	
18	05:42 20:33	06:12 06:34-06:47/13 17:47-18:16/29 19:58 06:55-07:58/63	06:44 17:26-17:54/28 19:07 07:04-07:53/49	07:16 07:42-08:20/38 18:17	06:53 13:46-15:04/78 16:40 07:16-07:30/14	07:22 14:00-15:01/61 16:33	
19	05:43 20:32	06:13 06:36-06:45/9 06:54-07:58/64 19:57 17:45-18:17/32	06:45 17:28-17:51/23 19:06 07:05-07:52/47	07:17 07:41-08:20/39 18:16	06:54 13:46-15:04/78 16:39 07:17-07:29/12	07:23 14:01-15:02/61 16:33	
20	05:44 20:31	06:14 17:43-18:18/35 19:55 06:54-07:58/64	06:46 07:06-07:51/45 19:04 17:32-17:47/15	07:18 07:40-08:20/40 18:14	06:55 13:47-15:04/77 16:38 07:19-07:28/9	07:24 14:01-15:01/60 16:33	
21	05:44 20:30	06:15 17:42-18:19/37 19:54 06:53-07:59/66	06:47 07:07-07:50/43 19:02	07:19 07:40-08:21/41 18:13	06:56 13:47-15:05/78 16:37 07:20-07:27/7	07:24 14:02-15:02/60 16:34	
22	05:45 20:30	06:16 17:39-18:18/39 19:52 06:53-08:00/67	06:48 07:08-07:48/40 19:00	07:20 07:41-08:22/41 18:11	06:58 13:47-15:04/77 16:37 07:21-07:25/4	07:25 14:02-15:02/60 16:34	
23	05:46 20:29	06:17 17:37-18:19/42 19:51 06:52-08:00/68	06:49 07:09-07:47/38 18:59	07:21 07:43-08:24/41 18:10	06:59 13:47-15:04/77 16:36 07:22-07:23/1	07:25 14:03-15:03/60 16:35	
24	05:47 20:28	06:18 17:35-18:19/44 19:49 06:52-08:00/68	06:50 07:10-07:45/35 18:57	07:23 07:44-08:26/42 18:08	07:00 13:47-15:04/77 16:35	07:26 14:03-15:04/61 16:35	
25	05:48 20:27	06:19 17:33-18:20/47 19:47 06:51-08:00/69	06:51 07:11-07:44/33 18:55	07:24 06:45-07:27/42 17:07	07:01 13:48-15:04/76 16:35	07:26 14:04-15:05/61 16:36	
26	05:49 20:26	06:20 17:31-18:20/49 19:46 06:51-08:00/69	06:52 07:12-07:42/30 18:53	07:25 06:46-07:28/42 17:05	07:02 13:49-15:04/75 16:34	07:27 14:04-15:05/61 16:37	
27	05:50 20:25	06:21 17:30-18:20/50 19:44 06:50-08:00/70	06:53 07:13-07:39/26 18:52	07:26 06:48-07:30/42 17:04	07:03 13:49-15:04/75 16:34	07:27 14:04-15:06/62 16:37	
28	05:51 20:24	06:22 17:29-18:20/51 19:43 06:50-08:00/70	06:54 07:14-07:37/23 18:50	07:27 14:11-14:36/25 17:03	07:04 13:49-15:04/75 16:33	07:27 14:05-15:07/62 16:38	
29	05:52 07:25-07:29/4 20:23	06:23 17:27-18:20/53 19:41 06:50-08:00/70	06:55 07:15-07:34/19 18:48	07:29 14:06-14:48/42 17:01	07:05 13:50-15:03/73 16:33	07:28 14:06-15:08/62 16:39	
30	05:53 07:19-07:35/16 20:22	06:24 17:26-18:20/54 19:39 06:50-08:00/70	06:56 07:16-07:29/13 18:47	07:30 14:03-14:51/48 17:00	07:07 13:50-15:03/73 16:33	07:28 14:06-15:09/63 16:39	
31	05:54 06:39-06:45/6 20:21 07:16-07:38/22	06:25 17:25-18:19/54 19:38 06:50-08:00/70	 19:38 06:50-08:00/70	 16:59 06:53-07:33/40	 	07:28 14:06-15:10/64 16:40	
	Ore potenziali eliofania Somma minuti d'ombra	461 48	429 2812	375 2371	345 991	297 2734	286 1988

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

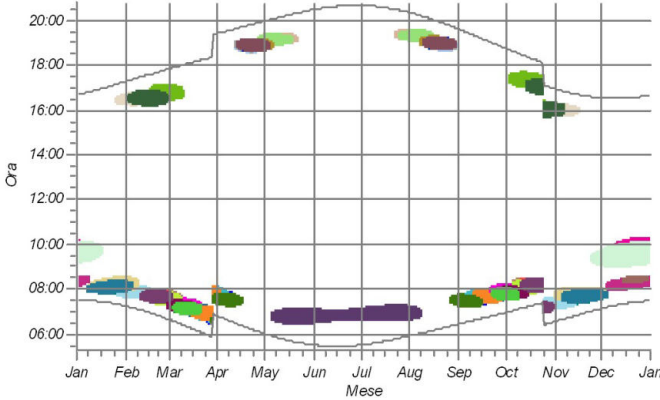
14/11/2023 14:56/3.6.355



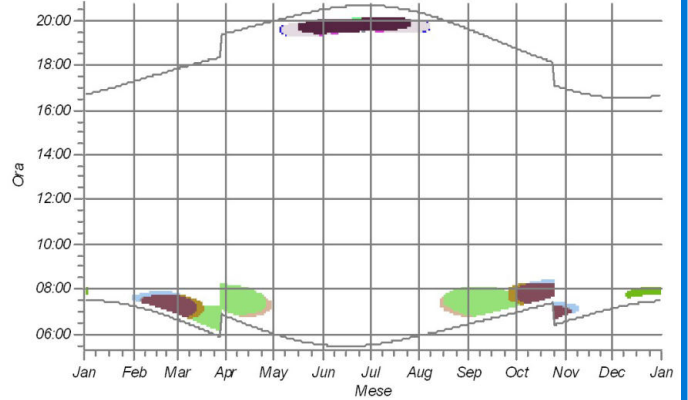
# SHADOW - Calendario per WTG, grafico

Calcolo: ShadowFlickering Progetto

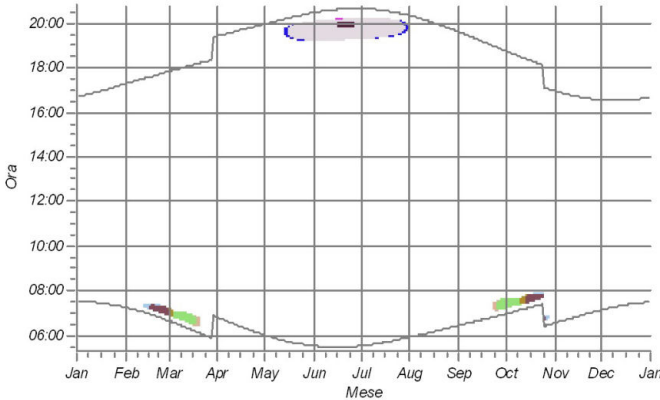
1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)



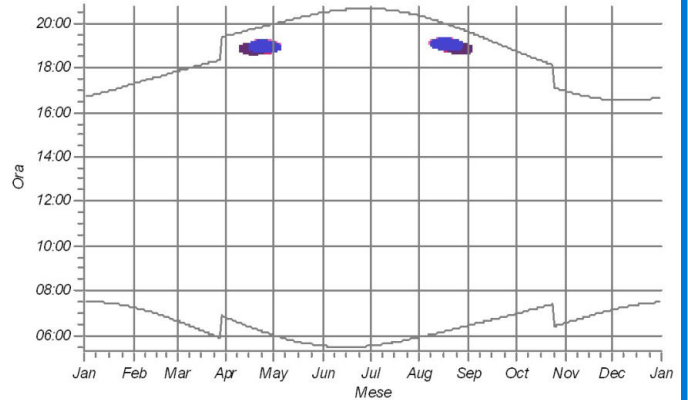
2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)



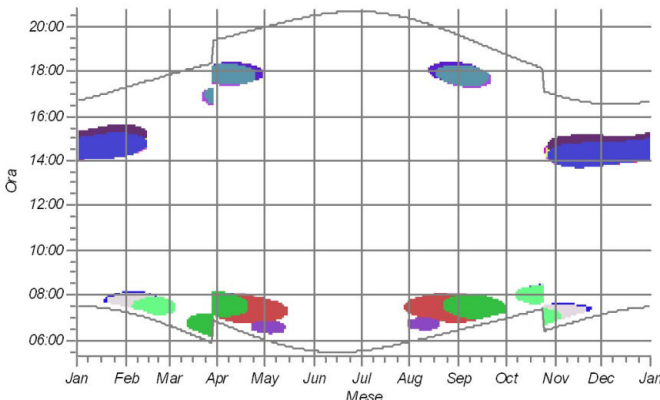
3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)



4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)

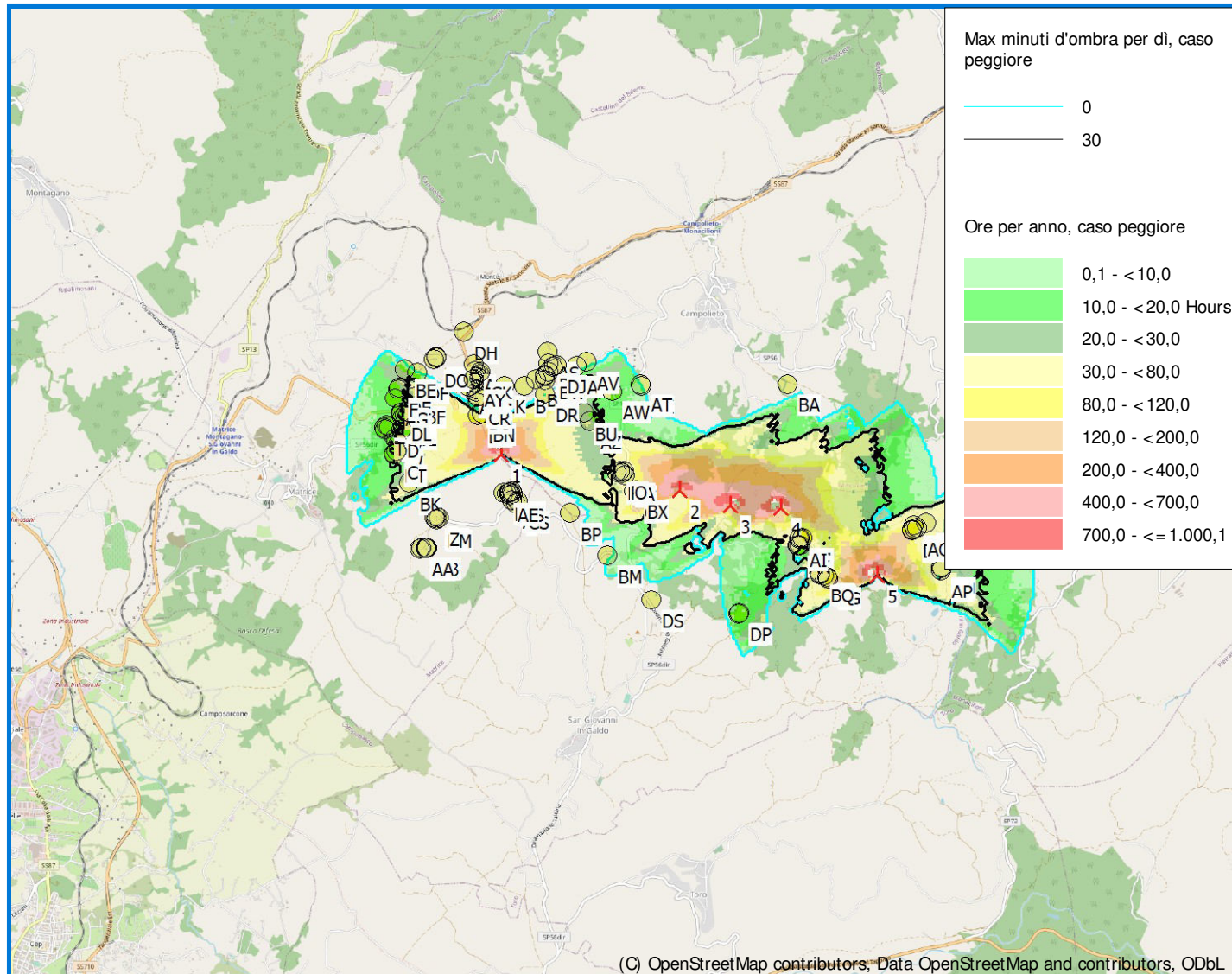


5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)



Receptor d'ombra

AD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (21)	AE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (22)	AF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (23)	AG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (24)	AH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (25)	AI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (27)	AK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (28)	AL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (29)	AM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (30)	AN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (31)	AO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (32)	AP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (33)	AQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (34)	AR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (35)	AS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (36)	AT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (37)	AV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (38)	AW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (39)	AX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (40)	AY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (41)	AZ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (42)	BA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (43)	BB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (44)	BC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (45)	BD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (46)	BE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (47)	BF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (48)	BG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (49)	BH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (50)	BI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (51)	BJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (52)	BK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (53)	BL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (54)	BM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (55)	BN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (56)	BO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (57)	BP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (58)	BQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (59)	BR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (60)	BS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (61)	BT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (62)	BU Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (63)	BV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (64)	BW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (65)	BX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (66)	BY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (67)	BZ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (68)	CA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (69)	CB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (70)	CC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (71)	CD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (72)	CE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (73)	CF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (74)	CG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (75)	CH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (76)	CI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (77)	CJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (78)	CK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (79)	CL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (80)	CM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (81)	CN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (82)	CO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (83)	CP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (84)	CQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (85)	CR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (86)	CS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (87)	CT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (88)	CU Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (89)	CV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (90)	CW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (91)	CX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (92)	CY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (93)	CA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (94)	CB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (95)	CC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (96)	CD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (97)	CE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (98)	CF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (99)	CG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (100)	CH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (101)	CI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (102)	CJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (103)	CK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (104)	CL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (105)	CM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (106)	CN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (107)	CO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (108)	CP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (109)	CQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (110)	CR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (111)	CS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (112)	CT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (113)	CU Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (114)	CV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (115)	CW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (116)	CX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (117)	CY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (118)	CA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (119)	CB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (120)	CC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (121)	CD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (122)	CE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (123)	CF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (124)	CG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (125)
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Progetto:  
231114\_Shadow flickering\_Galdo\_rev01

**SHADOW -**  
**Mappa**  
Calcolo:  
ShadowFlickering\_Progetto

Utente autorizzato:  
VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
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Redatto il:  
14/11/2023 14:56/3.6.355



Mappa: EMD OpenStreetMap , Scala di stampa 1:75.000, Centro mappa UTM (north)-WGS84 Zone: 33 Est: 479.610 Nord: 4.606.950  
 Nuova WTG      Recettore d'ombra  
 Fonte altimetria: Height Contours: CONTOURLINE\_ONLINEDATA\_0.wpo (1)  
 Time step: 4 minuti, Day step: 14 giorni, Map resolution: 30 m, Visibility calculation: 15 m, Altezza dell'osservatore: 1,5 m



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering\_Progetto+ Esistenti

### Assunzioni sui calcoli d'ombra

Distanza massima di influenza  
 Calcola solo quando oltre il 20% del sole è coperto dalla pala  
 Consultare la tabella delle WTG

Altezza minima del sole sull'orizzonte 3 °  
 Passo giornaliero del calcolo 1 giorni  
 Passo temporale del calcolo 1 minuti

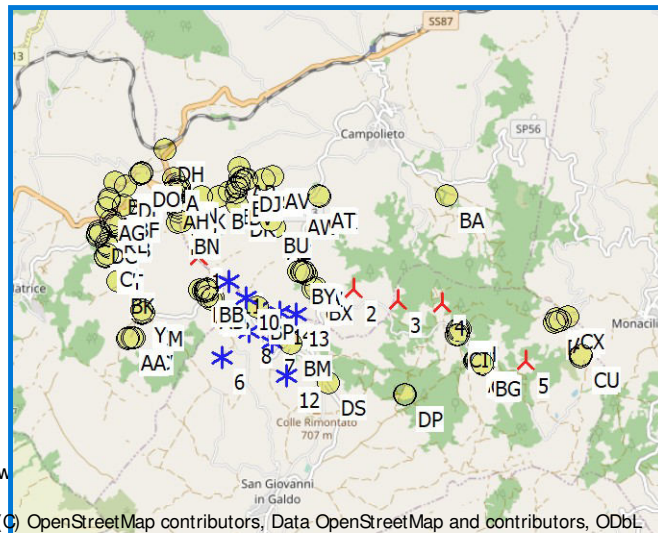
Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]  
 Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Per evitare di considerare l' ombreggiamento da WTG in realtà non direttamente visibili, prima del calcolo dell' ombra viene eseguito un calcolo ZVI. Quest' ultimo si basa sulle seguenti assunzioni.

Curve altimetriche usate: Height Contours: CONTOURLINE\_ONLINEDATA\_0.w  
 Risoluzione del grigliato: 1,0 m

Tutte le coordinate sono in UTM (north)-WGS84 Zona: 33



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

Scala 1:100.000

▲ Nuova WTG      \* WTG preesistente      ● Recettore d'ombra

### WTG

	Easting	Northing	Z	Dati/Descrizione	Tipo di WTG			Potenza nominale	Diametro rotore	Altezza mozzo	Dati di ombra	
					Valida	Produttore	Tipo generatore				Distanza di calcolo	giri/min
			[m]				[kW]	[m]	[m]	[m]	[giri/min]	
1	478.151	4.607.381	823,6	NORDEX N163/6.X 6...Si	NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0	
2	480.201	4.606.956	650,0	NORDEX N163/6.X 6...Si	NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0	
3	480.781	4.606.796	621,2	NORDEX N163/6.X 6...Si	NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0	
4	481.367	4.606.766	576,4	NORDEX N163/6.X 6...Si	NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0	
5	482.466	4.605.988	579,0	NORDEX N163/6.X 6...Si	NORDEX	N163/6.X-6.600	6.600	163,0	118,0	1.788	10,0	
6	478.459	4.606.054	750,0	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
7	479.111	4.606.260	770,8	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
8	478.818	4.606.399	770,0	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
9	478.932	4.606.693	790,0	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
10	478.770	4.606.838	799,8	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
11	478.535	4.607.049	799,1	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
12	479.310	4.605.814	730,0	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
13	479.445	4.606.624	740,0	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	
14	479.218	4.606.648	770,9	Acciona AW 77/150... No	Acciona	AW 77/1500 CI-1.500	1.500	77,0	60,0	2.500	0,0	

### Recettore d'ombra-Immissione dati

n.	Easting	Northing	Z	Ampiezza	Height	Altezza s.l.t.	Inclinazione della finestra	Modo orientazione	Altezza osservatore
			[m]	[m]	[m]	[m]	[°]		[m]
A	477.828	4.608.417	840,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
B	478.420	4.608.164	817,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
C	476.938	4.607.423	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
D	476.918	4.607.391	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
E	478.319	4.606.816	776,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
F	476.968	4.608.132	766,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
G	477.856	4.608.122	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
H	477.871	4.608.126	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
I	477.838	4.608.245	834,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
J	477.850	4.608.337	838,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
K	478.185	4.608.165	827,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
L	478.748	4.608.382	798,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
M	478.762	4.608.395	797,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
N	477.804	4.608.243	835,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
O	479.556	4.607.187	711,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
P	479.510	4.607.179	719,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0

continua alla pagina successiva...

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering Progetto+ Esistenti

...continua dalla pagina precedente

n.	Easting	Northing	Z	Ampiezza	Height	Altezza s.l.t.	Inclinazione della finestra	Modo orientazione	Altezza osservatore
	[m]	[m]	[m]	[m]	[m]	[m]	[°]		[m]
Q	479.678	4.606.950	700,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
R	477.005	4.607.859	750,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
S	476.965	4.607.496	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
T	476.808	4.607.689	740,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
U	476.857	4.607.697	740,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
V	476.928	4.607.556	730,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
W	476.939	4.607.533	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
X	477.006	4.607.664	737,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
Y	477.403	4.606.676	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
Z	477.431	4.606.651	722,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AA	477.230	4.606.313	710,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AB	477.289	4.606.318	715,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AC	477.273	4.606.312	713,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AD	478.272	4.606.852	780,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AE	478.210	4.606.926	794,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AF	477.402	4.608.488	824,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AG	476.932	4.608.029	760,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AH	477.782	4.608.165	829,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AI	481.572	4.606.403	600,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AJ	481.616	4.606.417	604,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AK	481.565	4.606.336	588,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AL	481.588	4.606.335	589,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AM	481.818	4.606.009	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AN	481.813	4.606.003	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AO	482.933	4.606.534	443,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AP	483.205	4.606.044	456,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AQ	483.201	4.606.081	450,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AR	478.683	4.608.550	810,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AS	478.688	4.608.552	810,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AT	479.753	4.608.178	729,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AU	479.020	4.608.392	778,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AV	479.134	4.608.433	786,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AW	479.427	4.608.097	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AX	478.660	4.608.279	809,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AY	477.835	4.608.250	834,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
AZ	479.164	4.607.760	744,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BA	481.440	4.608.174	702,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BB	478.254	4.606.949	795,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BC	478.236	4.606.939	795,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BD	478.245	4.606.945	795,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BE	477.045	4.608.367	791,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BF	477.161	4.608.051	761,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BG	481.900	4.605.970	589,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BH	482.864	4.606.501	460,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BI	480.871	4.605.548	530,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BJ	478.554	4.608.238	820,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BK	477.088	4.607.057	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BL	477.060	4.607.799	744,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BM	479.370	4.606.226	740,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BN	477.930	4.607.847	829,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BO	477.884	4.607.974	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BP	478.931	4.606.714	790,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BQ	481.808	4.605.999	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BR	478.176	4.606.943	796,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BS	478.286	4.606.931	791,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BT	478.246	4.606.908	790,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BU	479.099	4.607.849	750,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BV	478.653	4.608.230	810,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BW	478.694	4.608.334	803,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BX	479.701	4.606.970	697,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BY	479.471	4.607.175	723,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
BZ	479.568	4.607.138	708,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CA	479.535	4.607.165	714,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CB	478.663	4.608.289	809,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0

continua alla pagina successiva...

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

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Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering\_Progetto+ Esistenti

...continua dalla pagina precedente

n.	Easting	Northing	Z	Ampiezza	Height	Altezza s.l.t.	Inclinazione della finestra	Modo orientazione	Altezza osservatore
			[m]	[m]	[m]	[m]	[°]		[m]
CC	478.737	4.608.378	799,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CD	478.272	4.606.955	795,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CE	481.859	4.605.981	595,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CF	481.908	4.605.947	585,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CG	481.825	4.606.011	600,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CH	481.584	4.606.420	605,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CI	481.556	4.606.333	587,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CJ	481.581	4.606.331	588,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CK	477.908	4.608.326	835,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CL	477.902	4.608.298	834,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CM	477.842	4.608.275	835,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CN	477.902	4.608.252	832,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CO	477.838	4.608.204	832,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CP	477.854	4.608.201	831,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CQ	477.867	4.608.055	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CR	477.886	4.608.031	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CS	478.335	4.606.843	780,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CT	477.042	4.607.832	748,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CJ	483.212	4.606.070	451,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CV	482.903	4.606.520	451,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CW	482.886	4.606.550	450,1	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CX	483.034	4.606.580	437,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CY	477.871	4.608.268	834,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
CZ	477.864	4.608.092	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DA	482.864	4.606.509	459,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DB	477.011	4.607.804	747,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DC	476.833	4.607.718	742,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DD	476.814	4.607.665	737,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DE	476.979	4.608.154	768,3	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DF	477.186	4.608.318	802,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DG	477.399	4.608.504	827,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DH	477.720	4.608.793	863,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DI	478.699	4.608.425	802,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DJ	478.791	4.608.400	793,7	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DK	479.766	4.608.162	725,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DL	476.995	4.607.861	751,2	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DM	477.403	4.606.639	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DN	477.381	4.606.653	720,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DO	477.380	4.608.467	820,4	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DP	480.887	4.605.549	529,9	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DQ	477.208	4.606.304	710,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DR	478.659	4.608.069	802,5	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DS	479.871	4.605.714	688,6	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DT	476.912	4.607.378	730,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DU	477.879	4.607.828	830,0	1,0	1,0	1,0	90,0	"Modalità serra"	2,0
DV	477.299	4.606.311	715,8	1,0	1,0	1,0	90,0	"Modalità serra"	2,0

### Risultati dei calcoli

Recettore d'ombra

Ombratura, caso peggiore

Ombratura, valore atteso

n.	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	Ore d'ombra per anno
	[ore/anno]	[giorni/anno]	[ore/giorno]	[ore/anno]
A	0:00	0	0:00	0:00
B	0:00	0	0:00	0:00
C	20:50	89	0:31	10:29
D	20:27	87	0:30	10:25
E	66:26	146	0:40	31:24
F	21:44	94	0:28	9:08
G	0:00	0	0:00	0:00
H	0:00	0	0:00	0:00
I	0:00	0	0:00	0:00

continua alla pagina successiva...

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

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Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering\_Progetto+ Esistenti

...continua dalla pagina precedente

n.	Ombra, caso peggiore		Ombra, valore atteso	
	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	Ore d'ombra per anno
	[ore/anno]	[giorni/anno]	[ore/giorno]	[ore/anno]
J	0:00	0	0:00	0:00
K	0:00	0	0:00	0:00
L	0:00	0	0:00	0:00
M	0:00	0	0:00	0:00
N	0:00	0	0:00	0:00
O	79:44	194	1:01	36:56
P	81:53	203	0:52	37:29
Q	169:37	297	1:22	82:25
R	19:48	74	0:31	8:44
S	21:20	92	0:31	10:34
T	14:56	67	0:27	6:49
U	16:18	75	0:28	7:22
V	19:35	88	0:30	9:38
W	20:20	89	0:31	10:02
X	20:55	98	0:32	9:35
Y	21:36	130	0:16	10:41
Z	23:21	138	0:16	11:34
AA	13:00	96	0:15	6:46
AB	14:07	102	0:15	7:20
AC	13:51	103	0:15	7:12
AD	50:33	129	0:36	23:02
AE	102:53	189	0:55	54:22
AF	0:00	0	0:00	0:00
AG	17:47	72	0:28	7:41
AH	0:00	0	0:00	0:00
AI	74:57	176	0:43	38:18
AJ	85:19	182	0:45	43:36
AK	56:22	150	0:39	28:12
AL	32:41	104	0:30	17:50
AM	53:28	86	0:57	28:15
AN	52:52	87	0:57	28:01
AO	87:21	146	0:52	37:50
AP	41:10	67	0:48	22:39
AQ	39:25	64	0:48	21:13
AR	0:00	0	0:00	0:00
AS	0:00	0	0:00	0:00
AT	0:00	0	0:00	0:00
AU	0:00	0	0:00	0:00
AV	0:00	0	0:00	0:00
AW	14:26	42	0:27	6:14
AX	0:00	0	0:00	0:00
AY	0:00	0	0:00	0:00
AZ	24:08	71	0:35	10:24
BA	0:00	0	0:00	0:00
BB	122:44	181	1:03	64:51
BC	112:25	174	1:00	59:31
BD	118:12	178	1:01	62:31
BE	11:11	36	0:23	4:12
BF	31:47	98	0:33	13:15
BG	77:22	93	1:06	42:27
BH	102:11	148	0:58	43:55
BI	11:46	38	0:24	6:41
BJ	0:00	0	0:00	0:00
BK	56:04	181	0:35	29:40
BL	20:22	63	0:32	8:59
BM	156:42	160	1:39	86:19
BN	9:43	25	0:30	3:33
BO	0:00	0	0:00	0:00
BP	675:35	249	3:20	364:25
BQ	52:12	88	0:57	27:43
BR	98:02	209	0:50	52:08
BS	83:09	147	0:58	43:00
BT	72:18	161	0:51	37:22

continua alla pagina successiva...

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

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14/11/2023 14:53/3.6.355



## SHADOW - Risultato principale

Calcolo: ShadowFlickering\_Progetto+ Esistenti

...continua dalla pagina precedente

n.	Ombra, caso peggiore		Ombra, valore atteso	
	Ore d'ombra per anno	Giorni con ombra per anno	Massima durata dell'ombra per giorno	Ore d'ombra per anno
	[ore/anno]	[giorni/anno]	[ore/giorno]	[ore/anno]
BU	23:44	51	0:36	10:29
BV	0:00	0	0:00	0:00
BW	0:00	0	0:00	0:00
BX	166:54	288	1:24	81:17
BY	80:01	193	0:45	36:38
BZ	77:50	177	1:02	36:31
CA	77:24	189	0:56	36:01
CB	0:00	0	0:00	0:00
CC	0:00	0	0:00	0:00
CD	130:28	183	1:08	68:46
CE	64:50	88	1:02	35:06
CF	84:41	99	1:07	47:08
CG	54:44	87	0:58	28:52
CH	82:36	184	0:46	42:25
CI	55:03	146	0:39	27:33
CJ	30:59	100	0:27	16:55
CK	0:00	0	0:00	0:00
CL	0:00	0	0:00	0:00
CM	0:00	0	0:00	0:00
CN	0:00	0	0:00	0:00
CO	0:00	0	0:00	0:00
CP	0:00	0	0:00	0:00
CQ	0:00	0	0:00	0:00
CR	0:00	0	0:00	0:00
CS	51:26	130	0:41	24:53
CT	19:43	63	0:32	8:43
CU	38:51	64	0:47	21:02
CV	93:52	146	0:54	40:28
CW	90:34	137	0:53	38:47
CX	70:07	139	0:46	30:31
CY	0:00	0	0:00	0:00
CZ	0:00	0	0:00	0:00
DA	100:33	146	0:57	43:10
DB	19:57	74	0:31	8:46
DC	15:18	69	0:28	6:50
DD	15:25	73	0:28	7:10
DE	23:36	92	0:28	9:52
DF	2:04	15	0:10	0:45
DG	0:00	0	0:00	0:00
DH	0:00	0	0:00	0:00
DI	0:00	0	0:00	0:00
DJ	0:00	0	0:00	0:00
DK	0:00	0	0:00	0:00
DL	19:22	72	0:30	8:33
DM	22:13	132	0:16	11:04
DN	20:45	126	0:16	10:19
DO	0:00	0	0:00	0:00
DP	16:51	78	0:24	9:32
DQ	12:43	99	0:14	6:38
DR	0:00	0	0:00	0:00
DS	23:32	49	0:44	13:26
DT	20:17	87	0:30	10:24
DU	40:45	54	0:57	15:45
DV	14:22	103	0:15	7:28

Ombreggiamento totale sui recettori d'ombra causato da ciascuna WTG

n.	Nome	Caso peggiore		Atteso	
		[ore/anno]	[ore/anno]	[ore/anno]	[ore/anno]
1	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)	301:06	141:16		
2	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)	177:44	90:53		
3	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)	63:51	33:57		
4	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)	19:42	11:14		

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Progetto:

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## SHADOW - Risultato principale

Calcolo: ShadowFlickering\_Progetto+ Esistenti

...continua dalla pagina precedente

n.	Nome	Caso peggiore [ore/anno]	Atteso [ore/anno]
5	NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)	342:37	165:46
6	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (1)	24:16	10:42
7	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)	146:21	78:55
8	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (3)	62:59	29:55
9	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)	720:11	381:53
10	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)	121:05	60:17
11	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)	160:19	85:12
12	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (7)	22:53	12:44
13	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)	43:27	17:54
14	Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)	80:45	37:37

I tempi totali possono differire tra le tabelle per turbina e quelle per recettore, in quanto ciascuna WTG può dare ombreggiamento su 2 o più recettori contemporaneamente, e/o un recettore può subire ombreggiamento da 2 o più WTGs contemporaneamente.

Total time as expected values at given receptor in case of cumulative (but not concurrent) flicker within a day from several turbines may deviate marginally from the individual flicker caused by each turbines seperately

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: A - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
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23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
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25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
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29	07:17 17:12	06:39 17:51	05:52 18:23	06:03 19:56	05:31 20:27	05:28 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:38 17:50	05:51 18:24	06:02 19:57	05:30 20:28	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:49	05:50 18:25	06:01 19:58	05:31 20:29	05:26 20:40	05:54 20:21	06:25 19:38	06:57 18:36	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: B - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
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9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
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18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
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25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
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31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: C - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:29 16:41	07:15 17:16	06:38 17:51	06:57 (11) 07:05 (11)	06:46 19:26	07:24 (1) 07:54 (1)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:57 (11) 07:07 (11)	06:45 19:27	07:23 (1) 07:54 (1)	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19	06:35 17:53	06:56 (11) 07:07 (11)	06:43 19:28	07:24 (1) 07:54 (1)	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:55 (11) 07:06 (11)	06:41 19:29	07:23 (1) 07:53 (1)	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:56 (11) 07:06 (11)	06:40 19:30	07:23 (1) 07:52 (1)	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:57 (11) 07:04 (11)	06:38 19:31	07:24 (1) 07:52 (1)	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:33	06:36 19:33	07:24 (1) 07:51 (1)	05:52 20:05	05:28 20:33
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	06:35 19:34	07:24 (1) 07:49 (1)	05:51 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	06:33 19:35	07:25 (1) 07:49 (1)	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	06:31 19:36	07:26 (1) 07:46 (1)	05:49 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	06:30 19:37	07:27 (1) 07:44 (1)	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	06:28 19:38	07:30 (1) 07:41 (1)	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	06:19 07:21 (9)	06:27 18:05	06:27 19:39	06:27 19:39	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 07:19 (9)	06:25 18:06	06:25 19:40	06:25 19:40	05:44 20:12	05:27 20:37
15	07:27 16:55	06:58 17:34	06:15 07:18 (9)	06:23 18:07	06:23 19:41	06:23 19:41	05:43 20:13	05:27 20:37
16	07:26 16:57	06:57 17:35	06:14 07:17 (9)	06:22 18:08	06:22 19:42	06:22 19:42	05:42 20:14	05:27 20:38
17	07:26 16:58	06:56 17:36	06:12 07:15 (9)	06:20 18:09	06:20 19:43	06:20 19:43	05:41 20:15	05:27 20:38
18	07:25 16:59	06:54 17:38	06:10 07:17 (9)	06:19 18:11	06:19 19:44	06:19 19:44	05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	06:08 07:12 (10)	06:18 18:12	06:17 19:46	06:17 19:46	05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	06:07 07:11 (10)	06:16 18:13	06:16 19:47	06:16 19:47	05:38 20:18	05:27 20:39
21	07:24 17:02	06:50 17:41	06:05 07:09 (10)	06:14 18:14	06:14 19:48	06:14 19:48	05:38 20:19	05:27 20:39
22	07:23 17:04	06:49 17:43	06:03 07:09 (10)	06:13 18:15	06:13 19:49	06:13 19:49	05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:02 07:09 (10)	06:11 18:16	06:11 19:50	06:11 19:50	05:36 20:21	05:28 20:40
24	07:21 17:06	06:46 07:42 (8)	06:00 07:10 (10)	06:10 18:17	06:10 19:51	06:10 19:51	05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 07:41 (8)	05:58 18:18	06:08 18:18	06:08 19:52	06:08 19:52	05:34 20:23	05:28 20:40
26	07:20 17:09	06:43 07:41 (8)	05:57 18:19	06:07 18:19	06:07 19:53	06:07 19:53	05:34 20:24	05:29 20:40
27	07:19 17:10	06:41 07:40 (7)	05:55 18:20	06:05 18:20	06:05 19:54	06:05 19:54	05:33 20:25	05:29 20:40
28	07:18 17:11	06:40 07:39 (7)	05:53 07:01 (11)	06:04 18:22	06:04 19:55	06:04 19:55	05:32 20:26	05:29 20:40
29	07:17 17:12	06:39 07:39 (8)	06:02 07:04 (11)	06:02 18:22	06:02 19:55	06:02 19:55	05:32 20:26	05:30 20:40
30	07:17 17:14	06:38 07:41 (8)	06:01 19:23	06:01 19:23	06:01 19:56	06:01 19:56	05:31 20:26	05:30 20:40
31	07:16 17:15	06:37 19:25	06:00 19:25	06:00 19:25	06:00 19:57	06:00 19:57	05:31 20:27	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454		
Totale, caso peggiore	16	72	230	302				
Probabilità di eliofania	0,44	0,46	0,44	0,48				
Tempo di operatività rid.	1,00	1,00	1,00	1,00				
Dir. del vento rid.	1,00	1,00	1,00	1,00				
Totale ridotto	0,44	0,46	0,44	0,48				
Totale effettivo	7	33	101	144				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: C - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:31	05:55	06:27	07:27 (1)	06:57	06:32	07:08		
	20:40	20:20	19:36	17 07:44 (1)	18:45	16:58	16:33		
2	05:31	05:56	06:28	07:25 (1)	06:58	06:34	07:09		
	20:40	20:19	19:35	20 07:45 (1)	18:43	16:56	16:32		
3	05:32	05:57	06:29	07:23 (1)	06:59	06:35	07:10		
	20:40	20:18	19:33	24 07:47 (1)	18:42	16:55	16:32		
4	05:32	05:58	06:30	07:21 (1)	07:01	06:36	07:11		
	20:39	20:17	19:31	25 07:46 (1)	18:40	16:54	16:32		
5	05:33	05:59	06:31	07:20 (1)	07:02	06:37	07:12		
	20:39	20:16	19:30	27 07:47 (1)	18:38	16:53	16:32		
6	05:33	06:00	06:32	07:19 (1)	07:03	06:38	07:13		
	20:39	20:15	19:28	28 07:47 (1)	18:37	16:52	16:31		
7	05:34	06:01	06:33	07:18 (1)	07:04	07:34 (11)	06:40	07:14	
	20:39	20:13	19:26	29 07:47 (1)	18:35	5 07:39 (11)	16:50	16:31	
8	05:35	06:02	06:34	07:17 (1)	07:05	9 07:31 (11)	06:41	07:15	
	20:38	20:12	19:25	30 07:47 (1)	18:33	9 07:40 (11)	16:49	16:31	
9	05:35	06:03	06:35	07:17 (1)	07:06	07:30 (11)	06:42	07:16	
	20:38	20:11	19:23	30 07:47 (1)	18:32	11 07:41 (11)	16:48	16:31	
10	05:36	06:04	06:36	07:16 (1)	07:07	07:30 (11)	06:43	07:17	
	20:37	20:09	19:21	31 07:47 (1)	18:30	11 07:41 (11)	16:47	16:31	
11	05:37	06:05	06:37	07:16 (1)	07:08	07:30 (11)	06:45	07:18	
	20:37	20:08	19:20	30 07:46 (1)	18:28	11 07:41 (11)	16:46	16:31	
12	05:37	06:06	06:38	07:16 (1)	07:09	07:31 (11)	06:46	07:18	
	20:37	20:07	19:18	30 07:46 (1)	18:27	9 07:40 (11)	16:45	16:31	
13	05:38	06:07	06:39	07:16 (1)	07:10	07:32 (11)	06:47	07:19	
	20:36	20:05	19:16	29 07:45 (1)	18:25	6 07:38 (11)	16:44	2 07:13 (8)	16:32
14	05:39	06:08	06:40	07:17 (1)	07:11	06:48	07:11 (7)	07:20	16:32
	20:35	20:04	19:14	27 07:44 (1)	18:24	16:43	4 07:15 (8)	16:32	16:32
15	05:40	06:09	06:41	07:17 (1)	07:13	06:49	07:12 (7)	07:21	16:32
	20:35	20:03	19:13	26 07:43 (1)	18:22	16:42	4 07:16 (8)	16:32	16:32
16	05:40	06:10	06:42	07:18 (1)	07:14	06:51	07:14 (8)	07:21	16:32
	20:34	20:01	19:11	23 07:41 (1)	18:20	16:41	3 07:17 (8)	16:32	16:32
17	05:41	06:11	06:43	07:19 (1)	07:15	06:52	07:15 (8)	07:22	16:32
	20:34	20:00	19:09	20 07:39 (1)	18:19	16:41	2 07:17 (8)	16:33	16:33
18	05:42	06:12	06:44	07:21 (1)	07:16	07:41 (10)	06:53	07:16 (8)	07:23
	20:33	19:58	19:08	16 07:37 (1)	18:17	7 07:48 (10)	16:40	1 07:17 (8)	16:33
19	05:43	06:13	06:45	07:24 (1)	07:17	07:40 (10)	06:54	07:23	16:33
	20:32	19:57	19:06	9 07:33 (1)	18:16	9 07:49 (10)	16:39	16:33	16:33
20	05:44	06:14	06:46	07:18 (1)	07:18	07:39 (10)	06:55	07:24	16:34
	20:32	19:55	19:04	07:19	18:14	10 07:49 (10)	16:38	16:34	16:34
21	05:45	06:15	06:47	07:19 (1)	07:19	07:40 (10)	06:57	07:25	16:34
	20:31	19:54	19:02	07:21	18:13	8 07:48 (10)	16:38	16:34	16:34
22	05:46	06:16	06:48	07:21 (1)	07:21	07:42 (10)	06:58	07:25	16:34
	20:30	19:52	19:01	07:22	18:11	6 07:48 (10)	16:37	16:35	16:35
23	05:46	06:17	06:49	07:22 (1)	07:22	07:43 (10)	06:59	07:26	16:35
	20:29	19:51	18:59	07:23	18:10	3 07:46 (10)	16:36	16:35	16:35
24	05:47	06:18	06:50	07:23 (1)	07:23	07:46 (9)	07:00	07:26	16:36
	20:28	19:49	18:57	07:24	18:08	5 07:51 (9)	16:36	16:36	16:36
25	05:48	06:19	06:51	07:24 (1)	06:24	06:45 (9)	07:01	07:27	16:36
	20:27	19:48	18:55	07:25	17:07	7 06:52 (9)	16:35	16:36	16:36
26	05:49	06:20	06:52	07:25 (1)	06:25	06:47 (9)	07:02	07:27	16:36
	20:26	19:46	18:54	07:26	17:06	6 06:53 (9)	16:35	16:37	16:37
27	05:50	06:21	06:53	07:26 (1)	06:26	06:48 (9)	07:04	07:27	16:37
	20:26	19:45	18:52	07:27	17:04	5 06:53 (9)	16:34	16:37	16:37
28	05:51	06:22	06:54	07:27 (1)	06:28	06:49 (9)	07:05	07:28	16:37
	20:25	19:43	18:50	07:28	17:03	3 06:52 (9)	16:34	16:38	16:38
29	05:52	06:23	06:55	07:28 (1)	06:29	06:29	07:06	07:28	16:38
	20:24	19:41	18:49	07:29	17:01	06:33	07:07	16:39	16:39
30	05:53	06:25	06:56	07:29 (1)	06:30	06:30	07:07	07:28	16:40
	20:22	19:40	18:47	07:30	17:00	16:33	07:07	16:40	16:40
31	05:54	06:26	07:30 (1)	06:31	06:31	06:31	07:08	07:28	16:40
	20:21	19:38	12 07:42 (1)	16:59	16:59	16:59	07:09	16:40	16:40
Ore potenziali eliofania	461	429	375	471	345	297	16	286	
Totale, caso peggiore		12	471	131			16		
Probabilità di eliofania		0,67	0,58	0,44			0,40		
Tempo di operatività rid.		1,00	1,00	1,00			1,00		
Dir. del vento rid.		1,00	1,00	1,00			1,00		
Totale ridotto		0,67	0,58	0,44			0,40		
Totale effettivo		8	272	57			6		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: D - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (4)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	07:21 (1) 06:00	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	07:48 (1) 05:58	05:30 20:30
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	07:20 (1) 05:57	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	07:49 (1) 20:01	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	07:18 (1) 05:55	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	07:48 (1) 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:33	07:18 (1) 05:52	05:28 20:33
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	07:47 (1) 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	07:18 (1) 05:50	05:27 20:34
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	07:46 (1) 20:07	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	07:18 (1) 05:49	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	07:43 (1) 20:09	05:27 20:36
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	07:42 (1) 20:10	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	07:21 (1) 05:45	05:27 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	07:40 (1) 20:11	05:27 20:37
16	07:26 16:57	06:57 17:35	07:17 (9) 18:08	06:22 19:42	07:23 (1) 05:44	05:27 20:37
17	07:26 16:58	06:56 17:36	07:20 (9) 18:09	06:20 19:43	07:39 (1) 20:12	05:27 20:38
18	07:25 16:59	06:54 17:38	07:14 (9) 18:11	06:19 19:44	07:26 (1) 05:43	05:27 20:38
19	07:25 17:00	06:53 17:39	07:12 (9) 18:12	06:17 19:46	05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	07:13 (9) 18:13	06:16 19:47	07:40 (1) 20:11	05:27 20:39
21	07:24 17:02	06:50 17:41	07:09 (10) 18:14	06:14 19:48	07:23 (1) 05:44	05:27 20:39
22	07:23 17:04	06:49 17:43	07:08 (10) 18:15	06:13 19:49	07:43 (1) 20:09	05:27 20:40
23	07:22 17:05	06:47 17:44	07:06 (10) 18:16	06:11 19:50	05:37 20:20	05:27 20:40
24	07:21 17:06	06:46 17:45	07:05 (10) 18:17	06:10 19:51	05:36 20:21	05:28 20:40
25	07:21 17:07	06:44 17:46	07:05 (10) 18:18	06:08 19:52	05:35 20:22	05:28 20:40
26	07:20 17:09	06:43 17:47	07:07 (10) 18:19	06:07 19:53	05:34 20:23	05:29 20:40
27	07:19 17:10	06:41 (8) 17:49	05:55 18:20	06:05 19:54	05:33 20:24	05:29 20:40
28	07:18 17:11	07:39 (8) 17:50	05:53 18:22	06:29 (1) 19:55	06:04 20:25	05:29 20:40
29	07:17 17:12	07:38 (7) 17:51	06:51 19:23	06:44 (1) 19:56	06:02 20:26	05:30 20:40
30	07:17 17:14	07:37 (7) 17:52	06:50 19:24	07:26 (1) 19:57	06:01 20:27	05:30 20:40
31	07:16 17:15	07:36 (7) 17:53	06:48 19:25	07:24 (1) 19:58	06:01 20:28	05:31 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	14	68	150	377		
Probabilità di eliofania	0,44	0,46	0,44	0,48		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,44	0,46	0,44	0,48		
Totale effettivo	6	31	66	180		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: D - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (4)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre				
1	05:31	05:55	06:27	07:19 (1)	06:57	06:32	07:08			
	20:40	20:20	19:36	24 07:43 (1)	18:45	16:58	16:33			
2	05:31	05:56	06:28	07:17 (1)	06:58	06:34	07:09			
	20:40	20:19	19:35	27 07:44 (1)	18:43	16:56	16:32			
3	05:32	05:57	06:29	07:17 (1)	06:59	06:35	07:10			
	20:40	20:18	19:33	27 07:44 (1)	18:42	16:55	16:32			
4	05:32	05:58	06:30	07:15 (1)	07:01	06:36	07:11			
	20:39	20:17	19:31	29 07:44 (1)	18:40	16:54	16:32			
5	05:33	05:59	06:31	07:14 (1)	07:02	07:30 (11)	06:37	07:12		
	20:39	20:16	19:30	30 07:44 (1)	18:38	7 07:37 (11)	16:53	16:32		
6	05:33	06:00	06:32	07:14 (1)	07:03	07:28 (11)	06:38	07:13		
	20:39	20:15	19:28	30 07:44 (1)	18:37	10 07:38 (11)	16:52	16:31		
7	05:34	06:01	06:33	07:13 (1)	07:04	07:27 (11)	06:40	07:14		
	20:39	20:13	19:26	30 07:43 (1)	18:35	11 07:38 (11)	16:50	16:31		
8	05:35	06:02	06:34	07:13 (1)	07:05	07:27 (11)	06:41	07:15		
	20:38	20:12	19:25	30 07:43 (1)	18:33	11 07:38 (11)	16:49	16:31		
9	05:35	06:03	06:35	07:13 (1)	07:06	07:27 (11)	06:42	07:16		
	20:38	20:11	19:23	29 07:42 (1)	18:32	10 07:37 (11)	16:48	16:31		
10	05:36	06:04	06:36	07:13 (1)	07:07	07:27 (11)	06:43	07:17		
	20:37	20:09	19:21	28 07:41 (1)	18:30	9 07:36 (11)	16:47	16:31		
11	05:37	06:05	06:37	07:13 (1)	07:08	07:30 (11)	06:45	07:18		
	20:37	20:08	19:20	28 07:41 (1)	18:28	4 07:34 (11)	16:46	4 07:11 (8)	16:31	
12	05:37	06:06	06:38	07:14 (1)	07:09	06:46	07:09 (7)	07:18	16:31	
	20:37	20:07	19:18	25 07:39 (1)	18:27	16:45	4 07:13 (8)	16:31	16:32	
13	05:38	06:07	06:39	07:15 (1)	07:10	06:47	07:10 (7)	07:19	16:32	
	20:36	20:05	19:16	23 07:38 (1)	18:25	16:44	3 07:13 (8)	16:32	16:32	
14	05:39	06:08	06:40	07:16 (1)	07:11	06:48	07:11 (8)	07:20	16:32	
	20:35	20:04	19:14	20 07:36 (1)	18:24	16:43	2 07:13 (8)	16:32	16:32	
15	05:40	06:09	06:41	07:17 (1)	07:13	07:40 (10)	06:49	07:12 (8)	07:21	16:32
	20:35	20:03	19:13	17 07:34 (1)	18:22	3 07:43 (10)	16:42	1 07:13 (8)	16:32	16:32
16	05:40	06:10	06:42	07:20 (1)	07:14	07:38 (10)	06:51	07:21	16:32	16:32
	20:34	20:01	19:11	10 07:30 (1)	18:20	7 07:45 (10)	16:41	16:32	16:32	16:32
17	05:41	06:11	06:43	07:15 (1)	07:15	07:37 (10)	06:52	07:22	16:33	16:33
	20:34	20:00	19:09	07:16	18:19	9 07:46 (10)	16:41	16:33	16:33	16:33
18	05:42	06:12	06:44	07:16	07:16	07:37 (10)	06:53	07:23	16:33	16:33
	20:33	19:58	19:08	07:17	18:17	9 07:46 (10)	16:40	07:23	16:33	16:33
19	05:43	06:13	06:45	07:17	07:17	07:38 (10)	06:54	07:23	16:33	16:33
	20:32	19:57	19:06	07:18	18:16	8 07:46 (10)	16:39	07:23	16:33	16:33
20	05:44	06:14	06:46	07:18	07:18	07:39 (10)	06:55	07:24	16:34	16:34
	20:32	19:55	19:04	07:19	18:14	5 07:44 (10)	16:38	07:25	16:34	16:34
21	05:45	06:15	06:47	07:19	07:19	07:40 (10)	06:57	07:25	16:34	16:34
	20:31	19:54	19:02	07:20	18:13	2 07:42 (10)	16:38	07:25	16:34	16:34
22	05:46	06:16	06:48	07:21	07:21	07:43 (9)	06:58	07:25	16:34	16:34
	20:30	19:52	19:01	07:22	18:11	6 07:49 (9)	16:37	07:26	16:34	16:34
23	05:46	06:17	06:49	07:22	07:22	07:43 (9)	06:59	07:26	16:34	16:34
	20:29	19:51	18:59	07:23	18:10	7 07:50 (9)	16:36	07:26	16:34	16:34
24	05:47	06:18	06:50	07:23	07:23	07:44 (9)	07:00	07:26	16:34	16:34
	20:28	19:49	18:57	07:24	18:08	6 07:50 (9)	16:36	07:27	16:34	16:34
25	05:48	06:19	06:51	07:24	06:24	06:45 (9)	07:01	07:27	16:34	16:34
	20:27	19:48	18:55	07:25	17:07	4 06:49 (9)	16:35	07:27	16:34	16:34
26	05:49	06:20	06:52	07:25	06:25	06:47 (9)	07:02	07:27	16:34	16:34
	20:26	19:46	18:54	07:26	17:06	2 06:49 (9)	16:35	07:27	16:34	16:34
27	05:50	06:21	06:53	07:26	06:26	07:04	07:04	07:27	16:34	16:34
	20:26	19:45	18:52	07:27	17:04	16:34	16:34	07:27	16:34	16:34
28	05:51	06:22	07:27 (1)	06:54	06:28	07:05	07:05	07:28	16:34	16:34
	20:25	19:43	10 07:37 (1)	18:50	17:03	16:34	16:34	07:28	16:34	16:34
29	05:52	06:23	07:24 (1)	06:55	06:29	07:06	07:06	07:28	16:34	16:34
	20:24	19:41	16 07:40 (1)	18:49	17:01	16:33	16:33	07:28	16:34	16:34
30	05:53	06:25	07:22 (1)	06:56	06:30	07:07	07:07	07:28	16:34	16:34
	20:22	19:40	19 07:41 (1)	18:47	17:00	16:33	16:33	07:28	16:34	16:34
31	05:54	06:26	07:20 (1)	06:31	06:31	07:08	07:08	07:28	16:34	16:34
	20:21	19:38	22 07:42 (1)	16:59	16:59	07:16	07:16	07:28	16:34	16:34
Ore potenziali eliofania	461	429	375	345	345	297	286	286	286	286
Totale, caso peggiore		67	407	130	14					
Probabilità di eliofania		0,67	0,58	0,44	0,40					
Tempo di operatività rid.		1,00	1,00	1,00	1,00					
Dir. del vento rid.		1,00	1,00	1,00	1,00					
Totale ridotto		0,67	0,58	0,44	0,40					
Totale effettivo		45	235	57	6					

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: E - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
1	07:28		07:51 (7)	07:15	06:38		06:46		07:20 (10)	06:00	05:30	
	16:41	33	08:24 (8)	17:16	17:51		19:26	17	07:37 (10)	19:59	20:29	
2	07:29		07:51 (7)	07:14	06:36		06:45		07:17 (10)	05:58	05:30	
	16:42	33	08:24 (8)	17:17	17:52	13	06:55 (14)	06:45	07:39 (10)	20:00	20:29	
3	07:29		07:51 (7)	07:13	06:35		06:54 (14)	06:43	07:15 (10)	05:57	05:29	
	16:43	33	08:24 (8)	17:19	17:53	17	07:11 (9)	19:28	07:41 (10)	20:01	20:30	
4	07:29		07:51 (7)	07:11	06:33		06:52 (14)	06:41	07:13 (10)	05:56	05:29	
	16:44	33	08:24 (8)	17:20	17:55	20	07:12 (9)	19:29	07:42 (10)	20:02	20:31	
5	07:29		07:51 (7)	07:10	06:32		06:51 (14)	06:40	07:11 (10)	05:55	05:29	
	16:45	33	08:24 (8)	17:21	17:56	23	07:14 (9)	19:30	07:43 (10)	20:03	20:32	
6	07:29		07:51 (7)	07:09	06:30		06:49 (14)	06:38	07:10 (10)	05:53	05:28	
	16:46	33	08:24 (8)	17:23	17:57	25	07:14 (9)	19:31	07:44 (10)	20:04	20:32	
7	07:29		07:51 (7)	07:08	06:28		06:47 (14)	06:36	07:09 (10)	05:52	05:28	
	16:47	31	08:24 (8)	17:24	17:58	27	07:14 (9)	19:32	07:44 (10)	20:05	20:33	
8	07:28		07:51 (7)	07:07	06:27		06:46 (14)	06:35	07:07 (10)	05:51	05:28	
	16:48	31	08:24 (8)	17:25	17:59	29	07:15 (9)	19:34	07:44 (10)	20:06	20:34	
9	07:28		07:50 (7)	07:06	06:25		06:44 (14)	06:33	07:07 (10)	05:50	05:27	
	16:49	29	08:23 (8)	17:26	18:00	31	07:15 (9)	19:35	07:45 (10)	20:07	20:34	
10	07:28		07:50 (7)	07:05	06:23		06:42 (14)	06:31	07:06 (10)	05:49	05:27	
	16:50	27	08:22 (8)	17:28	18:01	33	07:15 (9)	19:36	07:45 (10)	20:08	20:35	
11	07:28		07:50 (7)	07:03	06:22		06:43 (14)	06:30	07:05 (10)	05:47	05:27	
	16:51	24	08:21 (8)	17:29	18:03	32	07:15 (9)	19:37	07:44 (10)	20:09	20:35	
12	07:28		07:49 (7)	07:02	06:20		06:44 (14)	06:28	07:05 (10)	05:46	05:27	
	16:52	17	08:17 (8)	17:30	18:04	30	07:14 (9)	19:38	07:45 (10)	20:10	20:36	
13	07:27		07:50 (7)	07:01	06:18		06:46 (9)	06:26	07:05 (10)	05:45	05:27	
	16:53	14	08:04 (7)	17:31	18:05	27	07:13 (9)	19:39	07:44 (10)	20:11	20:36	
14	07:27		07:51 (7)	07:00	06:17		06:47 (9)	06:25	07:05 (10)	05:44	05:27	
	16:54	13	08:04 (7)	17:33	18:06	26	07:13 (9)	19:40	07:44 (10)	20:12	20:37	
15	07:27		07:52 (7)	06:58	06:15		06:47 (9)	06:23	07:04 (10)	05:43	05:27	
	16:55	11	08:03 (7)	17:34	18:07	25	07:12 (9)	19:41	07:43 (10)	20:13	20:37	
16	07:26		07:54 (7)	06:57	06:13		06:48 (9)	06:22	07:05 (10)	05:42	05:27	
	16:57	9	08:03 (7)	17:35	18:08	22	07:10 (9)	19:42	07:43 (10)	20:14	20:38	
17	07:26		07:57 (7)	06:56	06:12		06:50 (9)	06:20	07:05 (10)	05:41	05:27	
	16:58	3	08:00 (7)	17:36	18:09	19	07:09 (9)	19:43	07:42 (10)	20:15	20:38	
18	07:25			06:54	06:10		06:51 (9)	06:19	07:04 (10)	05:40	05:27	
	16:59			17:38	18:10	15	07:06 (9)	19:44	07:40 (10)	20:16	20:38	
19	07:25			06:53	06:08		06:54 (9)	06:17	07:05 (10)	05:39	05:27	
	17:00			17:39	18:12	9	07:03 (9)	19:45	07:40 (10)	20:17	20:39	
20	07:24			06:51	06:07			06:16	07:05 (10)	05:38	05:27	
	17:01			17:40	18:13			19:47	07:38 (10)	20:18	20:39	
21	07:23			06:50	06:05			06:14	07:07 (10)	05:38	05:27	
	17:02			17:41	18:14			19:48	07:38 (10)	20:19	20:39	
22	07:23			06:48	06:03			06:12	07:08 (10)	05:37	05:27	
	17:04			17:43	18:15			19:49	07:37 (10)	20:20	20:39	
23	07:22			06:47	06:02			06:11	07:09 (10)	05:36	05:28	
	17:05			17:44	18:16			19:50	07:35 (10)	20:21	20:39	
24	07:21			06:46	06:00			06:10	07:10 (10)	05:35	05:28	
	17:06			17:45	18:17			19:51	07:33 (10)	20:22	20:40	
25	07:21			06:44	05:58			06:08	07:12 (10)	05:34	05:28	
	17:07			17:46	18:18			19:52	07:30 (10)	20:23	20:40	
26	07:20			06:43	05:56			06:07	07:15 (10)	05:34	05:28	
	17:09			17:47	18:19			19:53	07:28 (10)	20:24	20:40	
27	07:19			06:41	05:55			06:05		05:33	05:29	
	17:10			17:49	18:20			19:54		20:25	20:40	
28	07:18			06:39	05:53			06:04		05:32	05:29	
	17:11			17:50	18:22			19:55		20:25	20:40	
29	07:17				06:51			06:02		05:32	05:30	
	17:12				19:23			19:56		20:26	20:40	
30	07:16				06:50			06:01		05:31	05:30	
	17:14				19:24			19:57		20:27	20:40	
31	07:16				06:48					05:31		
	17:15				19:25	8		07:25 (10)		20:28		
								07:33 (10)				
Ore potenziali eliofania	296		296	369	431		399	824	450	454		
Totale, caso peggiore	407				0,44			0,48				
Probabilità di eliofania	0,44				1,00			1,00				
Tempo di operatività rid.	1,00				1,00			1,00				
Dir. del vento rid.	1,00				1,00			1,00				
Totale ridotto	0,44				0,44			0,48				
Totale effettivo	180				190			394				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uternte autorizzato:

VSF Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: E - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:31 20:40	05:55 20:20	06:26 19:36	07:04 (10) 07:43 (10)	06:57 18:45	07:26 (14) 07:54 (9)	06:32 16:58	07:08 16:33	07:32 (7) 08:03 (8)
2	05:31 20:40	05:56 20:19	06:28 19:35	07:04 (10) 07:43 (10)	06:58 18:43	07:22 (14) 07:54 (9)	06:34 16:56	07:09 16:32	07:33 (7) 08:05 (8)
3	05:32 20:39	05:57 20:18	06:29 19:33	07:04 (10) 07:42 (10)	06:59 18:42	07:20 (14) 07:53 (9)	06:35 16:55	07:10 16:32	07:34 (7) 08:07 (8)
4	05:32 20:39	05:58 20:17	06:30 19:31	07:04 (10) 07:41 (10)	07:00 18:40	07:21 (14) 07:53 (9)	06:36 16:54	07:11 16:32	07:35 (7) 08:08 (8)
5	05:33 20:39	05:59 20:16	06:31 19:30	07:05 (10) 07:40 (10)	07:02 18:38	07:22 (14) 07:52 (9)	06:37 16:53	07:12 16:32	07:36 (7) 08:09 (8)
6	05:33 20:39	06:00 20:14	06:32 19:28	07:05 (10) 07:39 (10)	07:03 18:37	07:23 (14) 07:51 (9)	06:38 16:51	07:13 16:31	07:37 (7) 08:10 (8)
7	05:34 20:38	06:01 20:13	06:33 19:26	07:06 (10) 07:38 (10)	07:04 18:35	07:24 (14) 07:50 (9)	06:40 16:50	07:14 16:31	07:38 (7) 08:11 (8)
8	05:35 20:38	06:02 20:12	06:34 19:25	07:07 (10) 07:36 (10)	07:05 18:33	07:25 (14) 07:49 (9)	06:41 16:49	07:15 16:31	07:39 (7) 08:12 (8)
9	05:35 20:38	06:03 20:11	06:35 19:23	07:08 (10) 07:34 (10)	07:06 18:32	07:26 (14) 07:48 (9)	06:42 16:48	07:16 16:31	07:40 (7) 08:13 (8)
10	05:36 20:37	06:04 20:09	06:36 19:21	07:09 (10) 07:32 (10)	07:07 18:30	07:27 (14) 07:46 (9)	06:43 16:47	07:17 16:31	07:41 (7) 08:14 (8)
11	05:37 20:37	06:05 20:08	06:37 19:20	07:12 (10) 07:29 (10)	07:08 18:28	07:29 (14) 07:44 (9)	06:44 16:46	07:17 16:31	07:41 (7) 08:14 (8)
12	05:37 20:36	06:06 20:07	06:38 19:18	07:15 (10) 07:25 (10)	07:09 18:27	07:30 (14) 07:40 (9)	06:46 16:45	07:18 16:31	07:42 (7) 08:15 (8)
13	05:38 20:36	06:07 20:05	06:39 19:16	06:39 19:16	07:10 18:25	06:47 16:44	06:47 16:44	07:19 16:32	07:43 (7) 08:16 (8)
14	05:39 20:35	06:08 20:04	06:40 19:14	06:40 19:14	07:11 18:24	06:48 16:43	06:48 16:43	07:20 16:32	07:44 (7) 08:17 (8)
15	05:40 20:35	06:09 20:03	06:41 19:13	06:41 19:13	07:13 18:22	06:49 16:42	06:49 16:42	07:21 16:32	07:45 (7) 08:17 (8)
16	05:40 20:34	06:10 20:01	06:42 19:11	06:42 19:11	07:14 18:20	06:51 16:41	06:51 16:41	07:21 16:32	07:45 (7) 08:17 (8)
17	05:41 20:34	06:11 20:00	06:43 19:09	06:43 19:09	07:15 18:19	06:52 16:41	06:52 16:41	07:22 16:32	07:46 (7) 08:18 (8)
18	05:42 20:33	06:12 19:58	06:44 19:07	06:44 19:07	07:16 18:17	06:53 16:40	06:53 16:40	07:23 16:33	07:47 (7) 08:19 (8)
19	05:43 20:32	06:13 19:57	06:45 19:06	06:45 19:06	07:17 18:16	06:54 16:39	06:54 16:39	07:23 16:33	07:47 (7) 08:19 (8)
20	05:44 20:31	06:14 19:55	06:46 19:04	06:46 19:04	07:18 18:14	06:55 16:38	06:55 16:38	07:24 16:34	07:48 (7) 08:20 (8)
21	05:45 20:31	06:15 19:54	06:47 19:02	06:47 19:02	07:19 18:13	06:57 16:38	06:57 16:38	07:25 16:34	07:48 (7) 08:20 (8)
22	05:46 20:30	06:16 19:52	06:48 19:01	06:48 19:01	07:20 18:11	06:58 16:37	06:58 16:37	07:25 16:34	07:49 (7) 08:21 (8)
23	05:46 20:29	06:17 19:51	06:49 18:59	06:49 18:59	07:22 18:10	06:59 16:36	06:59 16:36	07:26 16:35	07:49 (7) 08:21 (8)
24	05:47 20:28	06:18 19:49	06:50 18:57	06:50 18:57	07:23 18:08	07:00 16:36	07:00 16:36	07:26 16:36	07:49 (7) 08:21 (8)
25	05:48 20:27	06:19 19:48	06:51 18:55	06:51 18:55	07:24 18:07	07:01 16:35	07:01 16:35	07:26 16:36	07:50 (7) 08:22 (8)
26	05:49 20:26	06:20 19:46	06:52 18:54	06:52 18:54	07:25 18:06	07:02 16:35	07:02 16:35	07:27 16:37	07:50 (7) 08:22 (8)
27	05:50 20:25	06:21 19:44	06:53 18:52	06:53 18:52	07:26 18:05	07:03 16:34	07:03 16:34	07:27 16:37	07:50 (7) 08:22 (8)
28	05:51 20:24	06:22 19:43	06:54 18:50	06:54 18:50	07:28 18:03	07:05 16:34	07:05 16:34	07:27 16:38	07:51 (7) 08:23 (8)
29	05:52 20:23	06:23 19:41	06:55 18:48	06:55 18:48	07:29 18:02	07:06 16:33	07:06 16:33	07:28 16:39	07:51 (7) 08:23 (8)
30	05:53 20:22	06:24 19:40	06:56 18:47	06:56 18:47	07:30 18:01	07:07 16:33	07:07 16:33	07:28 16:40	07:51 (7) 08:24 (8)
31	05:54 20:21	06:25 19:38	06:57 18:46	06:57 18:46	07:31 17:59	07:08 16:33	07:08 16:33	07:28 16:40	07:51 (7) 08:24 (8)
Ore potenziali eliofania	461	429	375	345	297	297	65	286	984
Totale, caso peggiore		485	493	5	297		65		984
Probabilità di eliofania		0,67	0,58		0,44		0,40		0,36
Tempo di operatività rid.		1,00	1,00		1,00		1,00		1,00
Dir. del vento rid.		1,00	1,00		1,00		1,00		1,00
Totale ridotto		0,67	0,58		0,44		0,40		0,36
Totale effettivo		323	285		129		26		357

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: F - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (6)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for specific dates and times. Includes summary rows for 'Ore potenziali eliofanía', 'Totale, caso peggiore', 'Probabilità di eliofanía', etc.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Ute autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: G - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: H - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (8)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
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16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: I - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (9)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
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29	07:17 17:12	06:37 17:51	06:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 17:49	06:50 18:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:33 17:47	06:48 18:25	06:00 19:59	05:30 20:28	05:29 20:40	05:54 20:21	06:25 19:38	06:57 18:40	06:31 16:59	07:08 16:40	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: J - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (10)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
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9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
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20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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30	07:17 17:14	06:35 17:49	06:50 19:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:34 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:28	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: K - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (11)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
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14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: L - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (12)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: M - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (13)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)







Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: O - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (15)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	06:54 (2) 07:16 (2)	07:08 16:32	15:21 (9) 20 15:41 (9)
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	06:55 (2) 07:15 (2)	07:09 16:32	15:22 (9) 19 15:41 (9)
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	06:57 (2) 07:15 (2)	07:10 16:32	15:23 (9) 17 15:40 (9)
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	06:58 (2) 07:14 (2)	07:11 16:32	15:23 (9) 17 15:40 (9)
5	05:33 20:39	05:59 20:16	06:31 19:30	07:01 18:38	06:37 16:53	06:59 (2) 07:12 (2)	07:12 16:31	15:24 (9) 16 15:40 (9)
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:01 (2) 07:12 (2)	07:13 16:31	15:25 (9) 15 15:40 (9)
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:02 (2) 07:11 (2)	07:14 16:31	15:27 (9) 12 15:39 (9)
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:03 (2) 07:09 (2)	07:15 16:31	15:28 (9) 11 15:39 (9)
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:04 (2) 07:07 (2)	07:16 16:31	15:29 (9) 10 15:39 (9)
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:33 (2) 08:13 (2)	07:17 16:31	15:31 (9) 7 15:38 (9)
11	05:37 20:37	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46	07:32 (2) 08:14 (2)	07:17 16:31	15:32 (9) 4 15:36 (9)
12	05:37 20:36	06:06 20:07	18:56 (1) 19:02 (1)	06:38 19:18	07:09 18:27	07:31 (2) 08:16 (2)	15:22 (9) 15:29 (9)	07:18 16:31
13	05:38 20:36	06:07 20:05	18:53 (1) 19:05 (1)	06:39 19:16	07:10 18:25	07:31 (2) 08:17 (2)	15:20 (9) 15:33 (9)	07:19 16:31
14	05:39 20:35	06:08 20:04	18:51 (1) 19:07 (1)	06:40 19:14	07:11 18:23	07:32 (2) 08:17 (2)	15:19 (9) 15:34 (9)	07:20 16:32
15	05:40 20:35	06:09 20:03	18:49 (1) 19:08 (1)	06:41 19:13	07:12 18:22	07:33 (2) 17:15 (10)	15:17 (9) 15:35 (9)	07:21 16:32
16	05:40 20:34	06:10 20:01	18:48 (1) 19:09 (1)	06:42 19:11	07:14 18:20	07:34 (2) 17:17 (10)	15:17 (9) 15:37 (9)	07:21 16:32
17	05:41 20:34	06:11 20:00	18:47 (1) 19:10 (1)	06:43 19:09	07:15 18:19	07:35 (2) 17:19 (10)	15:17 (9) 15:37 (9)	07:22 16:32
18	05:42 20:33	06:12 19:58	18:46 (1) 19:10 (1)	06:44 19:07	07:16 18:17	07:37 (2) 17:20 (10)	15:16 (9) 15:38 (9)	07:23 16:33
19	05:43 20:32	06:13 19:57	18:45 (1) 19:10 (1)	06:45 19:06	18:06 (11) 18:16	07:38 (2) 17:21 (10)	15:16 (9) 15:38 (9)	07:23 16:33
20	05:44 20:31	06:14 19:55	18:44 (1) 19:10 (1)	06:46 19:04	18:03 (11) 18:15 (11)	07:39 (2) 17:21 (10)	15:16 (9) 15:39 (9)	07:24 16:33
21	05:45 20:31	06:15 19:54	18:44 (1) 19:10 (1)	06:47 19:02	18:02 (11) 18:16 (11)	07:40 (2) 17:21 (10)	15:16 (9) 15:39 (9)	07:24 16:34
22	05:45 20:30	06:16 19:52	18:44 (1) 19:10 (1)	06:48 19:00	18:00 (11) 18:16 (11)	07:41 (2) 17:20 (10)	15:16 (9) 15:39 (9)	07:25 16:34
23	05:46 20:29	06:17 19:51	18:43 (1) 19:10 (1)	06:49 18:59	17:59 (11) 18:16 (11)	07:43 (2) 17:21 (10)	15:16 (9) 15:40 (9)	07:25 16:35
24	05:47 20:28	06:18 19:49	18:43 (1) 19:09 (1)	06:50 18:57	17:59 (11) 18:16 (11)	07:44 (2) 17:20 (10)	15:17 (9) 15:41 (9)	07:26 16:35
25	05:48 20:27	06:19 19:48	18:43 (1) 19:09 (1)	06:51 18:55	17:59 (11) 18:15 (11)	06:45 (2) 16:19 (10)	15:17 (9) 15:41 (9)	07:26 16:36
26	05:49 20:26	06:20 19:46	18:44 (1) 19:08 (1)	06:52 18:54	17:59 (11) 18:15 (11)	06:46 (2) 16:18 (10)	15:17 (9) 15:40 (9)	07:27 16:37
27	05:50 20:25	06:21 19:44	18:44 (1) 19:07 (1)	06:53 18:52	17:59 (11) 18:13 (11)	06:48 (2) 16:17 (10)	15:18 (9) 15:40 (9)	07:27 16:37
28	05:51 20:24	06:22 19:43	18:45 (1) 19:06 (1)	06:54 18:50	18:00 (11) 18:12 (11)	06:49 (2) 16:15 (10)	15:18 (9) 15:40 (9)	07:27 16:38
29	05:52 20:23	06:23 19:41	18:46 (1) 19:04 (1)	06:55 18:48	18:02 (11) 18:09 (11)	06:50 (2) 16:12 (10)	15:19 (9) 15:40 (9)	07:28 16:39
30	05:53 20:22	06:24 19:40	18:47 (1) 19:01 (1)	06:56 18:47	17:59 (11) 17:00	06:52 (2) 07:18 (2)	15:20 (9) 15:41 (9)	07:28 16:39
31	05:54 20:21	06:25 19:38	18:50 (1) 18:57 (1)	06:57 18:46	17:59 (11) 16:59	06:53 (2) 07:17 (2)	15:21 (9) 16:40	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286		
Totale, caso peggiore		410	148	1196	505	148		
Probabilità di eliofania		0,67	0,58	0,44	0,40	0,36		
Tempo di operatività rid.		1,00	1,00	1,00	1,00	1,00		
Dir. del vento rid.		1,00	1,00	1,00	1,00	1,00		
Totale ridotto		0,67	0,58	0,44	0,40	0,36		
Totale effettivo		273	86	521	204	54		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: P - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (16)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	06:54 (2) 07:04 (2)	07:08 16:32	15:13 (9) 25 15:38 (9)	
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	06:55 (2) 07:03 (2)	07:09 16:32	15:14 (9) 24 15:38 (9)	
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	06:57 (2) 07:03 (2)	07:10 16:32	15:14 (9) 24 15:38 (9)	
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	06:58 (2) 07:01 (2)	07:11 16:32	15:15 (9) 23 15:38 (9)	
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:37 (2) 07:58 (2)	06:37 16:53	15:15 (9) 24 15:39 (9)	
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:33 (2) 08:01 (2)	06:38 16:51	15:16 (9) 23 15:39 (9)	
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:31 (2) 08:03 (2)	06:40 16:50	15:16 (9) 23 15:39 (9)	
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:29 (2) 08:04 (2)	06:41 16:49	15:17 (9) 22 15:39 (9)	
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:27 (2) 08:05 (2)	06:42 16:48	15:18 (9) 21 15:39 (9)	
10	05:36 20:37	06:04 20:09	18:59 (1) 19:03 (1)	06:36 19:21	07:07 18:30	07:27 (2) 08:06 (2)	06:43 16:47	15:19 (9) 21 15:40 (9)	
11	05:37 20:37	06:05 20:08	18:55 (1) 19:07 (1)	06:37 19:19	07:08 18:28	07:28 (2) 08:07 (2)	06:44 16:46	15:18 (9) 21 15:39 (9)	
12	05:37 20:36	06:06 20:07	18:53 (1) 19:09 (1)	06:38 19:18	07:09 18:27	07:30 (2) 08:09 (2)	06:46 16:45	15:19 (9) 20 15:39 (9)	
13	05:38 20:36	06:07 20:05	18:51 (1) 19:10 (1)	06:39 19:16	07:10 18:25	07:31 (2) 08:09 (2)	06:47 16:44	15:20 (9) 20 15:40 (9)	
14	05:39 20:35	06:08 20:04	18:50 (1) 19:11 (1)	06:40 19:14	07:11 18:23	07:32 (2) 08:09 (2)	06:48 16:43	15:21 (9) 19 15:40 (9)	
15	05:40 20:35	06:09 20:03	18:49 (1) 19:12 (1)	06:41 19:13	07:12 18:22	07:33 (2) 08:10 (2)	06:49 16:42	15:19 (9) 19 15:41 (9)	
16	05:40 20:34	06:10 20:01	18:48 (1) 19:12 (1)	06:42 19:11	07:14 18:20	07:34 (2) 17:12 (10)	06:51 16:41	15:22 (9) 11 15:27 (9)	
17	05:41 20:34	06:11 20:00	18:47 (1) 19:13 (1)	06:43 19:09	07:15 18:19	07:35 (2) 17:15 (10)	06:52 16:41	15:14 (9) 15 15:29 (9)	
18	05:42 20:33	06:12 19:58	18:46 (1) 19:13 (1)	06:44 19:07	07:16 18:17	07:37 (2) 17:17 (10)	06:53 16:40	15:13 (9) 17 15:30 (9)	
19	05:43 20:32	06:13 19:57	18:46 (1) 19:13 (1)	06:45 19:06	07:17 18:15	07:38 (2) 17:18 (10)	06:54 16:39	15:12 (9) 19 15:31 (9)	
20	05:44 20:31	06:14 19:55	18:45 (1) 19:13 (1)	06:46 19:04	07:18 18:16	07:39 (2) 17:18 (10)	06:55 16:38	15:12 (9) 21 15:33 (9)	
21	05:45 20:31	06:15 19:54	18:45 (1) 19:13 (1)	06:47 19:02	07:19 18:17	07:40 (2) 17:19 (10)	06:57 16:38	15:12 (9) 21 15:33 (9)	
22	05:45 20:30	06:16 19:52	18:45 (1) 19:12 (1)	06:48 19:00	07:20 18:17	07:41 (2) 17:19 (10)	06:58 16:37	15:11 (9) 23 15:34 (9)	
23	05:46 20:29	06:17 19:51	18:45 (1) 19:12 (1)	06:49 18:59	07:22 18:17	07:43 (2) 17:19 (10)	06:59 16:36	15:11 (9) 23 15:34 (9)	
24	05:47 20:28	06:18 19:49	18:45 (1) 19:11 (1)	06:50 18:57	07:23 18:17	07:44 (2) 17:19 (10)	07:00 16:36	15:11 (9) 24 15:35 (9)	
25	05:48 20:27	06:19 19:48	18:45 (1) 19:10 (1)	06:51 18:55	07:24 18:16	06:45 (2) 16:18 (10)	07:01 16:35	15:11 (9) 25 15:36 (9)	
26	05:49 20:26	06:20 19:46	18:46 (1) 19:09 (1)	06:52 18:54	07:25 18:16	06:46 (2) 16:18 (10)	07:02 16:35	15:11 (9) 25 15:36 (9)	
27	05:50 20:25	06:21 19:44	18:47 (1) 19:08 (1)	06:53 18:52	07:26 18:14	06:48 (2) 16:18 (10)	07:03 16:34	15:11 (9) 25 15:36 (9)	
28	05:51 20:24	06:22 19:43	18:48 (1) 19:06 (1)	06:54 18:50	07:27 18:13	06:49 (2) 16:16 (10)	07:05 16:34	15:11 (9) 25 15:36 (9)	
29	05:52 20:23	06:23 19:41	18:49 (1) 19:04 (1)	06:55 18:48	07:28 18:10	06:50 (2) 16:15 (10)	07:06 16:33	15:12 (9) 25 15:37 (9)	
30	05:53 20:22	06:24 19:40	18:51 (1) 18:59 (1)	06:56 18:47	07:29 17:00	06:52 (2) 16:14 (10)	07:07 16:33	15:13 (9) 25 15:38 (9)	
31	05:54 20:21	06:25 19:38			06:31 16:59	06:53 (2) 16:10 (10)		07:28 16:40	20 15:48 (9)
Ore potenziali eliofania	461	429	375	345	297		286		
Totale, caso peggiore		445	162	1075	355		617		
Probabilità di eliofania		0,67	0,58	0,44	0,40		0,36		
Tempo di operatività rid.		1,00	1,00	1,00	1,00		1,00		
Dir. del vento rid.		1,00	1,00	1,00	1,00		1,00		
Totale ridotto		0,67	0,58	0,44	0,40		0,36		
Totale effettivo		297	94	468	144		224		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: Q - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (17)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Luglio, Agosto, Settembre, Ottobre, Novembre, Dicembre) and rows for each day (e.g., 1 | 05:30 | 20:40 | 05:55 | 23 | 19:34 | 19:36 | 06:27 | 81 | 18:57 | 18:45 | 07:32 | 16:57 | 32 | 15:48 | 16:32 | 31 | 14:41 | 14:09 | 13).

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)
(WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: R - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (18)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	07:37 (11) 06:38	07:31 (1) 06:46	06:00	05:30
2	07:29 16:42	07:14 17:17	07:38 (11) 06:36	07:33 (1) 06:45	05:58	05:30
3	07:29 16:43	07:13 17:18	07:41 (11) 06:35	07:37 (1) 06:43	05:57	05:29
4	07:29 16:44	07:12 17:20	07:42 (11) 06:33	07:42 (1) 06:41	05:56	05:29
5	07:29 16:45	07:10 17:21	06:32	17:55	19:29	20:02
6	07:29 16:46	07:09 17:23	06:30	17:57	19:31	20:04
7	07:29 16:47	07:08 17:24	06:28	17:58	19:33	20:05
8	07:29 16:48	07:07 17:25	06:27	17:59	19:34	20:06
9	07:28 16:49	07:06 17:26	06:25	18:00	19:35	20:07
10	07:28 16:50	07:05 17:28	06:24	18:02	19:36	20:08
11	07:28 16:51	07:03 17:29	06:22	18:03	19:37	20:09
12	07:28 16:52	07:02 17:30	06:20	18:04	19:38	20:10
13	07:27 16:53	07:01 17:31	06:19	18:05	19:39	20:11
14	07:27 16:54	07:00 17:33	06:17	18:06	19:40	20:12
15	07:27 16:55	06:58 17:34	06:15	18:07	19:41	20:13
16	07:26 16:57	06:57 17:35	06:14	18:08	19:42	20:14
17	07:26 16:58	06:56 17:36	06:12	18:09	19:43	20:15
18	07:25 16:59	06:54 17:38	06:10	18:11	19:44	20:16
19	07:25 17:00	06:53 17:39	06:08	18:12	19:46	20:17
20	07:24 17:01	06:51 17:40	06:07	18:13	19:47	20:18
21	07:24 17:02	06:50 17:41	06:05	18:14	19:48	20:19
22	07:23 17:04	06:49 17:43	06:03	18:15	19:49	20:20
23	07:22 17:05	06:47 17:44	06:02	18:16	19:50	20:21
24	07:21 17:06	06:46 17:45	06:00	18:17	19:51	20:22
25	07:21 17:07	06:44 17:46	05:58	18:18	19:52	20:23
26	07:20 17:09	06:43 17:47	05:57	18:19	19:53	20:24
27	07:19 17:10	06:41 17:49	05:55	18:20	19:54	20:25
28	07:18 17:11	06:40 17:50	05:53	18:22	19:55	20:26
29	07:17 17:12	06:38 17:51	05:51	18:23	19:56	20:27
30	07:17 17:14	06:37 17:52	05:50	18:24	19:57	20:28
31	07:16 17:15	06:36 17:53	05:48	18:25	19:58	20:29
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	78	474	37			
Probabilità di eliofania	0,44	0,46	0,44			
Tempo di operatività rid.	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44			
Totale effettivo	34	216	16			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: R - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (18)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:19 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:20 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:21 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:22 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:23 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:24 16:32
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:25 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:26 16:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:27 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:28 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:29 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:30 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:31 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 18:07	07:01 16:35	07:32 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 18:06	07:02 16:35	07:33 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 18:05	07:04 16:34	07:34 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	07:28 18:03	07:05 16:34	07:35 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	07:29 18:02	07:06 16:33	07:36 16:39
30	05:53 20:23	06:25 19:40	06:56 18:47	07:30 18:00	07:07 16:33	07:37 16:40
31	05:54 20:21	06:26 19:38	06:57 18:45	07:31 17:59	07:08 16:32	07:38 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore				501	98	
Probabilità di eliofania				0,44	0,40	
Tempo di operatività rid.				1,00	1,00	
Dir. del vento rid.				1,00	1,00	
Totale ridotto				0,44	0,40	
Totale effettivo				218	40	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: S - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (19)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:29 16:41	07:15 17:16	06:38 17:51	07:05 (11) 07:13 (11)	06:46 19:26	07:36 (1) 08:02 (1)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	06:45 19:27	07:36 (1) 08:01 (1)	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	06:43 19:28	07:37 (1) 08:00 (1)	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:32 19:29	06:41 19:29	07:38 (1) 07:57 (1)	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:32 19:30	06:40 19:30	07:40 (1) 07:54 (1)	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:30 19:31	06:38 19:31	07:45 (1) 07:50 (1)	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:28 19:32	06:36 19:32	05:52 20:05	05:28 20:33	
8	07:29 16:48	07:07 17:25	06:27 17:59	06:27 19:34	06:35 19:34	05:51 20:06	05:28 20:34	
9	07:28 16:49	07:06 17:26	06:25 18:00	06:25 19:35	06:33 19:35	05:50 20:07	05:27 20:34	
10	07:28 16:50	07:05 17:28	06:24 18:02	06:24 19:36	06:31 19:36	05:49 20:08	05:27 20:35	
11	07:28 16:51	07:03 17:29	06:22 18:03	06:22 19:37	06:30 19:37	05:47 20:09	05:27 20:35	
12	07:28 16:52	07:02 17:30	06:20 18:04	06:20 19:38	06:28 19:38	05:46 20:10	05:27 20:36	
13	07:27 16:53	07:01 17:31	06:19 18:05	06:19 19:39	06:27 19:39	05:45 20:11	05:27 20:36	
14	07:27 16:54	07:00 17:33	06:17 18:06	06:17 19:40	06:25 19:40	05:44 20:12	05:27 20:37	
15	07:27 16:55	06:58 17:34	06:15 18:07	06:15 19:41	06:23 19:41	05:43 20:13	05:27 20:37	
16	07:26 16:57	06:57 17:35	06:14 18:08	06:14 19:42	06:22 19:42	05:42 20:14	05:27 20:38	
17	07:26 16:58	06:56 17:36	06:12 18:09	06:12 19:43	06:20 19:43	05:41 20:15	05:27 20:38	
18	07:25 16:59	06:54 17:38	06:10 18:11	06:10 19:44	06:19 19:44	05:40 20:16	05:27 20:38	
19	07:25 17:00	06:53 17:39	06:08 18:12	06:08 19:46	06:17 19:46	05:39 20:17	05:27 20:39	
20	07:24 17:01	06:51 17:40	06:07 18:13	06:07 19:47	06:16 19:47	05:38 20:18	05:27 20:39	
21	07:24 17:02	06:50 17:41	06:05 18:14	06:05 19:48	06:14 19:48	05:38 20:19	05:27 20:39	
22	07:23 17:04	06:49 17:43	06:03 18:15	06:03 19:49	06:13 19:49	05:37 20:20	05:27 20:39	
23	07:22 17:05	06:47 17:44	06:02 18:16	06:02 19:50	06:11 19:50	05:36 20:21	05:28 20:40	
24	07:21 17:06	06:46 17:45	06:00 18:17	06:00 19:51	06:10 19:51	05:35 20:22	05:28 20:40	
25	07:21 17:07	06:44 17:46	05:58 18:18	05:58 19:52	06:08 19:52	05:34 20:23	05:28 20:40	
26	07:20 17:09	06:43 17:47	05:57 18:19	05:57 19:53	06:07 19:53	05:34 20:24	05:29 20:40	
27	07:19 17:10	06:41 17:49	05:55 18:20	05:55 19:54	06:05 19:54	05:33 20:25	05:29 20:40	
28	07:18 17:11	06:40 17:50	05:53 18:22	05:53 19:55	06:04 19:55	05:32 20:26	05:29 20:40	
29	07:17 17:12	06:38 19:23	05:51 19:23	05:51 19:56	06:02 19:56	05:32 20:26	05:30 20:40	
30	07:17 17:14	06:36 19:24	05:50 19:24	05:50 19:58	06:01 19:58	05:31 20:27	05:30 20:40	
31	07:16 17:15	06:34 19:25	05:48 19:25	05:48 19:59	06:00 19:59	05:31 20:28	05:30 20:40	
Ore potenziali eliofania	296	296	369	399	450	454		
Totale, caso peggiore	18	128	380	112				
Probabilità di eliofania	0,44	0,46	0,44	0,48				
Tempo di operatività rid.	1,00	1,00	1,00	1,00				
Dir. del vento rid.	1,00	1,00	1,00	1,00				
Totale ridotto	0,44	0,46	0,44	0,48				
Totale effettivo	8	58	167	54				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: S - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (19)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	October	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	06:54 (9) 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	06:58 (9) 16:32
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	06:58 (9) 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	06:58 (9) 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	06:58 (9) 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	06:58 (9) 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	06:58 (9) 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	06:58 (9) 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	06:58 (9) 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	06:58 (9) 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	06:58 (9) 16:31
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	06:58 (9) 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	06:58 (9) 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	06:58 (9) 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	06:58 (9) 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	06:58 (9) 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	06:58 (9) 16:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	06:58 (9) 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	06:58 (9) 16:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	06:58 (9) 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	06:58 (9) 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	06:58 (9) 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	06:58 (9) 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	06:58 (9) 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 18:07	07:01 16:35	06:58 (9) 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 18:06	07:02 16:35	06:58 (9) 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 18:04	07:04 16:34	06:58 (9) 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	07:27 18:03	07:05 16:34	06:58 (9) 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	07:28 18:01	07:06 16:33	06:58 (9) 16:39
30	05:53 20:23	06:25 19:40	06:56 18:47	07:29 18:00	07:07 16:33	06:58 (9) 16:40
31	05:54 20:21	06:26 19:38		07:30 17:59	07:08 16:32	06:58 (9) 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore			484	134	24	
Probabilità di eliofania			0,58	0,44	0,40	
Tempo di operatività rid.			1,00	1,00	1,00	
Dir. del vento rid.			1,00	1,00	1,00	
Totale ridotto			0,58	0,44	0,40	
Totale effettivo			280	58	10	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: T - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (20)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	07:11 (1) 06:45	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19	07:33 (9) 06:35	07:05 (1) 06:43	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	07:32 (9) 06:33	07:18 (1) 06:41	05:56 20:02	05:29 20:31
5	07:29 16:45	07:11 17:21	07:31 (9) 06:32	07:01 (1) 06:40	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	07:29 (10) 06:30	07:00 (1) 06:38	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	07:28 (10) 06:28	07:23 (1) 19:31	05:52 20:05	05:28 20:33
8	07:29 16:48	07:07 17:25	07:27 (10) 06:27	06:58 (1) 06:35	05:51 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26	07:26 (10) 06:25	07:24 (1) 19:34	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	07:25 (10) 06:24	06:57 (1) 06:33	05:49 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	07:26 (10) 06:22	07:24 (1) 19:35	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30	07:30 (10) 18:03	06:56 (1) 06:28	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	07:21 (11) 06:19	07:23 (1) 19:38	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 17:33	07:24 (11) 06:17	06:56 (1) 06:27	05:44 20:12	05:27 20:37
15	07:27 16:55	06:58 17:34	07:18 (11) 06:15	07:22 (1) 19:40	05:43 20:13	05:27 20:37
16	07:26 16:57	06:57 17:35	07:25 (11) 18:07	06:57 (1) 06:25	05:42 20:14	05:27 20:38
17	07:26 16:57	06:56 17:36	07:17 (11) 06:14	07:20 (1) 19:41	05:41 20:15	05:27 20:38
18	07:25 16:58	06:54 17:38	07:26 (11) 18:08	06:58 (1) 06:22	05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	07:16 (11) 06:12	07:18 (1) 19:42	05:41 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	07:25 (11) 18:09	07:00 (1) 06:20	05:41 20:18	05:27 20:39
21	07:24 17:02	06:50 17:41	07:17 (11) 06:10	07:17 (1) 19:43	05:41 20:19	05:27 20:39
22	07:23 17:04	06:49 17:43	07:22 (11) 18:12	06:56 (1) 06:28	05:42 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	07:19 (11) 06:17	07:23 (1) 19:38	05:45 20:21	05:27 20:40
24	07:21 17:06	06:46 17:45	07:24 (11) 18:06	06:57 (1) 06:25	05:44 20:22	05:27 20:40
25	07:21 17:07	06:44 17:46	07:24 (11) 18:06	07:22 (1) 19:40	05:43 20:23	05:28 20:40
26	07:20 17:09	06:43 17:47	07:18 (11) 06:15	07:20 (1) 19:41	05:43 20:23	05:29 20:40
27	07:19 17:10	06:41 17:49	07:17 (11) 06:10	07:20 (1) 19:41	05:44 20:24	05:29 20:40
28	07:18 17:11	06:40 17:50	07:25 (11) 18:07	07:01 (1) 06:19	05:40 20:25	05:29 20:40
29	07:17 17:12		07:25 (11) 18:11	07:14 (1) 19:44	05:40 20:26	05:29 20:40
30	07:17 17:14		07:18 (11) 06:08	07:05 (1) 06:17	05:39 20:27	05:29 20:40
31	07:16 17:15		07:22 (11) 18:12	07:10 (1) 19:46	05:39 20:28	05:29 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		82	365			
Probabilità di eliofania		0,46	0,44			
Tempo di operatività rid.		1,00	1,00			
Dir. del vento rid.		1,00	1,00			
Totale ridotto		0,46	0,44			
Totale effettivo		37	161			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: T - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (20)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	07:36 (1) 08:02 (1)	06:32 07:01 (10)
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	07:35 (1) 08:02 (1)	06:34 07:02 (10)
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	07:35 (1) 08:02 (1)	06:35 07:02 (10)
4	05:32 20:39	05:58 20:17	06:30 19:32	07:01 18:40	07:35 (1) 08:01 (1)	06:36 07:01 (10)
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	07:34 (1) 08:01 (1)	06:37 07:02 (9)
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	07:35 (1) 08:00 (1)	06:38 07:01 (9)
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	07:35 (1) 07:59 (1)	06:40 07:05 (9)
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	07:35 (1) 07:57 (1)	06:41 16:49
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	07:36 (1) 07:56 (1)	06:42 16:48
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	07:38 (1) 07:53 (1)	06:43 16:47
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	07:41 (1) 07:51 (1)	06:45 16:46
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	07:42 (1) 16:45	06:46 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	07:43 (1) 16:44	06:47 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	07:44 (1) 16:43	06:48 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	07:45 (1) 16:42	06:49 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	07:46 (1) 16:41	06:51 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	07:47 (1) 16:41	06:52 16:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	07:48 (11) 16:40	06:53 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	07:49 (11) 16:39	06:54 16:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	07:50 (11) 16:38	06:55 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	07:51 (11) 16:38	06:57 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	07:52 (11) 16:37	06:58 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	07:53 (11) 16:36	06:59 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:54 (11) 16:36	07:00 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 (1) 17:07	07:55 (11) 16:35	07:01 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 (1) 17:06	07:56 (11) 16:35	07:02 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 (1) 17:04	07:57 (11) 16:34	07:04 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	07:28 (1) 17:03	07:58 (11) 16:34	07:05 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	07:29 (1) 17:01	07:59 (11) 16:33	07:06 16:39
30	05:53 20:23	06:25 19:40	06:56 18:47	07:30 (1) 17:00	08:00 (11) 16:33	07:07 16:40
31	05:54 20:21	06:26 19:38		06:31 16:59	06:55 (10) 07:00 (10)	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore			117	300		32
Probabilità di eliofania			0,58	0,44		0,40
Tempo di operatività rid.			1,00	1,00		1,00
Dir. del vento rid.			1,00	1,00		1,00
Totale ridotto			0,58	0,44		0,40
Totale effettivo			68	131		13

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: U - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (21)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	07:35 (9) 06:38	07:11 (1) 06:46	06:00 05:30	05:30 20:29
2	07:29 16:42	07:14 17:17	07:34 (9) 06:36	07:08 (1) 06:45	05:58 05:30	05:30 20:30
3	07:29 16:43	07:13 17:19	07:33 (9) 06:35	07:05 (1) 06:43	05:57 05:29	05:29 20:30
4	07:29 16:44	07:12 17:20	07:32 (10) 06:33	07:03 (1) 06:41	05:56 05:29	05:29 20:31
5	07:29 16:45	07:11 17:21	07:31 (10) 06:32	07:03 (1) 06:40	05:55 05:29	05:29 20:32
6	07:29 16:46	07:09 17:23	07:29 (10) 06:30	07:01 (1) 06:38	05:53 05:28	05:28 20:32
7	07:29 16:47	07:08 17:24	07:28 (10) 06:28	07:00 (1) 06:36	05:52 05:28	05:28 20:33
8	07:29 16:48	07:07 17:25	07:27 (10) 06:27	07:00 (1) 06:35	05:51 05:28	05:28 20:34
9	07:28 16:49	07:06 17:26	07:27 (10) 06:25	07:28 (1) 19:34	06:59 (1) 06:33	05:50 05:27
10	07:28 16:50	07:50 (8) 07:05	07:34 (10) 18:00	07:27 (1) 19:35	06:59 (1) 06:31	05:49 05:27
11	07:28 16:51	07:51 (8) 07:03	07:27 (10) 18:02	07:27 (1) 19:36	06:59 (1) 06:30	05:47 05:27
12	07:28 16:52	07:29 17:29	07:25 (11) 18:03	07:27 (1) 19:37	06:59 (1) 06:28	05:46 05:27
13	07:27 16:53	07:02 17:30	07:22 (11) 18:04	07:26 (1) 19:38	06:59 (1) 06:27	05:45 05:27
14	07:27 16:54	07:01 17:31	07:21 (11) 18:05	07:25 (1) 19:39	06:59 (1) 06:25	05:44 05:27
15	07:27 16:55	07:00 17:33	07:19 (11) 18:06	07:24 (1) 19:40	06:59 (1) 06:23	05:43 05:27
16	07:26 16:57	06:58 17:34	07:18 (11) 18:07	07:23 (1) 19:41	06:59 (1) 06:22	05:42 05:27
17	07:26 16:58	06:57 17:35	07:19 (11) 18:08	07:22 (1) 19:42	06:59 (1) 06:20	05:41 05:27
18	07:25 16:59	06:56 17:36	07:19 (11) 18:09	07:21 (1) 19:43	06:59 (1) 06:19	05:40 05:27
19	07:25 17:00	06:54 17:38	06:10 18:11	07:20 (1) 19:44	06:19 06:17	05:40 05:27
20	07:24 17:01	06:53 17:39	06:08 18:12	07:19 (1) 19:46	06:19 06:16	05:40 05:27
21	07:24 17:02	06:51 17:40	06:07 18:13	07:18 (1) 19:47	06:19 06:14	05:40 05:27
22	07:23 17:04	06:50 17:41	06:05 18:14	07:17 (1) 19:48	06:19 06:13	05:40 05:27
23	07:22 17:05	06:49 17:43	06:03 18:15	07:16 (1) 19:49	06:19 06:11	05:40 05:28
24	07:21 17:06	06:47 17:44	06:02 18:16	07:15 (1) 19:50	06:19 06:10	05:40 05:28
25	07:21 17:07	06:46 17:45	06:00 18:17	07:14 (1) 19:51	06:19 06:08	05:40 05:28
26	07:20 17:09	06:44 17:46	05:58 18:18	07:13 (1) 19:52	06:19 06:07	05:40 05:29
27	07:19 17:10	06:43 17:47	05:57 18:19	07:12 (1) 19:53	06:19 06:05	05:40 05:29
28	07:18 17:11	06:41 17:49	05:55 18:20	07:11 (1) 19:54	06:19 06:04	05:40 05:29
29	07:17 17:12	06:40 17:50	05:53 18:22	07:10 (1) 19:55	06:19 06:02	05:40 05:30
30	07:17 17:14	06:39 17:51	05:51 19:23	07:09 (1) 19:56	06:19 06:01	05:40 05:30
31	07:16 17:15	06:38 17:52	05:50 19:24	07:08 (1) 19:57	06:19 05:31	05:40 05:30
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore						
Probabilità di eliofania	0,44	0,46	0,46	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,44	0,46	0,44	0,44		
Totale effettivo	1	41	174			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: U - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (21)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	07:39 (1) 08:05 (1)	06:32 06:58 (10)
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	07:38 (1) 08:05 (1)	06:34 06:57 (10)
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	07:38 (1) 08:05 (1)	06:35 06:57 (10)
4	05:32 20:39	05:58 20:17	06:30 19:32	07:01 18:40	07:37 (1) 08:05 (1)	06:36 06:58 (10)
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	07:37 (1) 08:05 (1)	06:37 06:59 (10)
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	07:37 (1) 08:04 (1)	06:38 07:01 (10)
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	07:37 (1) 08:03 (1)	06:40 06:50 (9)
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	07:37 (1) 08:02 (1)	06:41 06:49
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	07:38 (1) 08:01 (1)	06:42 06:48
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	07:38 (1) 07:59 (1)	06:43 06:47
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	07:41 (1) 07:58 (1)	06:45 06:46
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	07:42 (1) 07:55 (1)	06:46 06:45
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	07:47 (1) 07:50 (1)	06:47 06:44
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 06:43	06:48 06:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 06:42	06:49 06:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 06:41	06:51 06:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 06:41	06:52 06:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 06:40	06:53 06:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 06:39	06:54 06:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 06:38	06:55 06:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 06:38	06:57 06:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 06:37	06:58 06:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 06:36	06:59 06:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:51 (11) 07:55 (11)	07:00 06:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 (1) 07:55 (1)	06:24 06:56 (11)	07:01 06:35
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 (1) 07:59 (1)	06:25 06:58 (11)	07:02 06:35
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 (1) 08:01 (1)	06:26 06:58 (11)	07:04 06:34
28	05:51 20:25	06:22 19:43	06:54 18:50	07:27 (1) 08:03 (1)	06:28 06:57 (11)	07:05 06:34
29	05:52 20:24	06:23 19:41	06:55 18:49	07:28 (1) 08:05 (1)	06:29 06:57 (11)	07:06 06:33
30	05:53 20:23	06:25 19:40	06:56 18:47	07:29 (1) 08:05 (1)	06:30 06:56 (11)	07:07 06:33
31	05:54 20:21	06:26 19:38		06:31 06:59	06:53 (11) 06:54 (11)	06:33 06:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore			102	342	44	2
Probabilità di eliofania			0,58	0,44	0,40	0,36
Tempo di operatività rid.			1,00	1,00	1,00	1,00
Dir. del vento rid.			1,00	1,00	1,00	1,00
Totale ridotto			0,58	0,44	0,40	0,36
Totale effettivo			59	149	18	1

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: V - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (22)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	07:29 (9) 06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	07:28 (9) 06:28 17:58	06:36 19:33	05:52 20:05	05:28 20:33
8	07:29 16:48	07:07 17:25	07:27 (9) 06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26	07:26 (9) 06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	07:25 (9) 06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	07:23 (10) 06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30	07:22 (10) 06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	07:21 (10) 06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 17:33	07:19 (10) 06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37
15	07:27 16:55	07:48 (8) 06:58 17:34	07:18 (10) 06:15 18:07	06:55 (1) 06:27 19:41	06:23 05:43 20:13	05:27 20:37
16	07:26 16:57	07:48 (8) 06:57 17:35	07:20 (10) 06:14 18:08	07:11 (1) 06:22 19:42	06:48 (1) 05:42 20:14	05:27 20:38
17	07:26 16:58	07:47 (8) 06:56 17:36	07:27 (10) 06:12 18:09	07:12 (1) 06:20 19:43	06:47 (1) 05:41 20:15	05:27 20:38
18	07:25 16:59	07:47 (8) 06:54 17:38	07:25 (10) 06:10 18:11	07:13 (1) 06:19 19:44	07:13 (1) 05:40 20:16	05:27 20:38
19	07:25 17:00	07:46 (8) 06:53 17:39	07:22 (10) 06:08 18:12	06:44 (1) 06:17 19:46	06:17 05:39 20:17	05:27 20:39
20	07:24 17:01	07:45 (8) 06:51 17:40	07:11 (11) 06:07 18:13	07:13 (1) 06:16 19:47	06:43 (1) 05:38 20:18	05:27 20:39
21	07:24 17:02	07:48 (8) 06:50 17:41	07:18 (11) 06:05 18:14	07:09 (11) 06:05 19:48	06:44 (1) 06:14 20:19	05:27 20:39
22	07:23 17:04	06:49 17:43	07:18 (11) 06:03 18:15	07:13 (1) 06:13 19:49	06:43 (1) 05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	07:08 (11) 06:02 18:16	06:43 (1) 06:11 19:50	06:11 05:36 20:21	05:28 20:40
24	07:21 17:06	06:46 17:45	07:19 (11) 06:00 18:17	07:12 (1) 06:10 19:51	06:43 (1) 05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	07:19 (11) 05:58 18:18	06:43 (1) 06:08 19:52	06:43 (1) 05:34 20:23	05:28 20:40
26	07:20 17:09	06:43 17:47	07:11 (11) 05:57 18:19	07:11 (1) 06:07 19:53	06:43 (1) 05:34 20:24	05:29 20:40
27	07:19 17:10	06:41 17:49	07:16 (11) 05:55 18:20	07:10 (1) 06:05 19:54	07:10 (1) 05:33 20:25	05:29 20:40
28	07:18 17:11	06:40 17:50	05:53 18:22	07:08 (1) 06:04 19:55	07:08 (1) 05:32 20:26	05:29 20:40
29	07:17 17:12		06:51 19:23	07:07 (1) 06:02 19:56	07:07 (1) 05:32 20:26	05:30 20:40
30	07:17 17:14		06:50 19:24	08:05 (1) 07:48 (1) 19:58	08:05 (1) 06:01 20:27	05:30 20:40
31	07:16 17:15		06:48 19:25	07:52 (1) 07:58 (1)	07:52 (1) 20:28	05:31 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore			127			443
Probabilità di eliofania	0,44		0,46			0,44
Tempo di operatività rid.	1,00		1,00			1,00
Dir. del vento rid.	1,00		1,00			1,00
Totale ridotto	0,44		0,46			0,44
Totale effettivo	6		58			195

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: V - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (22)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	October	November	Dicembre		
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	07:38 (1) 07:43 (1)	06:32 16:58	06:54 (9) 07:00 (9)	07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	06:34 16:56	06:56 (9) 07:01 (9)	07:09 16:32
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	06:35 16:55	06:57 (9) 07:01 (9)	07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	06:36 16:54	06:58 (9) 07:01 (9)	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	06:37 16:53	07:12 16:32	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	06:38 16:52	07:13 16:31	07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	06:40 16:50	07:14 16:31	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	06:41 16:49	07:15 16:31	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	06:42 16:48	07:16 16:31	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	06:43 16:47	07:17 16:31	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	06:45 16:46	07:18 16:31	07:18 16:31
12	05:37 20:37	06:06 20:07	06:38 19:18	07:44 (1) 07:49 (1)	07:09 18:27	07:09 18:27	07:19 16:31	07:19 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:39 (1) 07:53 (1)	07:10 18:25	07:10 18:25	07:20 16:32	07:20 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:37 (1) 07:55 (1)	07:11 18:24	07:11 18:24	07:21 16:32	07:21 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:35 (1) 07:56 (1)	07:13 18:22	07:13 18:22	07:22 16:32	07:22 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:33 (1) 07:57 (1)	07:14 18:20	07:14 18:20	07:23 16:32	07:23 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:32 (1) 07:58 (1)	07:15 18:19	07:15 18:19	07:24 16:33	07:24 16:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:31 (1) 07:58 (1)	07:16 18:17	07:16 18:17	07:25 16:33	07:25 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:30 (1) 07:58 (1)	07:17 18:16	07:17 18:16	07:26 16:33	07:26 16:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:29 (1) 07:58 (1)	07:18 18:14	07:18 18:14	07:27 16:34	07:27 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:28 (1) 07:58 (1)	07:19 18:13	07:19 18:13	07:28 16:34	07:28 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:28 (1) 07:58 (1)	07:21 18:11	07:21 18:11	07:29 16:35	07:29 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:28 (1) 07:57 (1)	07:22 18:10	07:22 18:10	07:30 16:35	07:30 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:28 (1) 07:57 (1)	07:23 18:08	07:23 18:08	07:31 16:36	07:31 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:28 (1) 07:56 (1)	06:24 17:07	06:24 17:07	07:32 16:36	07:32 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:28 (1) 07:55 (1)	06:25 17:06	06:25 17:06	07:33 16:37	07:33 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	07:29 (1) 07:53 (1)	06:26 17:04	06:26 17:04	07:34 16:37	07:34 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	07:30 (1) 07:52 (1)	06:28 17:03	06:28 17:03	07:35 16:38	07:35 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	07:31 (1) 07:50 (1)	06:29 17:01	06:29 17:01	07:36 16:39	07:36 16:39
30	05:53 20:23	06:25 19:40	06:56 18:47	07:34 (1) 07:48 (1)	06:30 17:00	06:30 17:00	07:37 16:40	07:37 16:40
31	05:54 20:21	06:26 19:38		06:31 16:59	06:31 16:59	06:31 16:59	07:38 16:40	07:38 16:40
Ore potenziali eliofania	461	429	375	345	297	286		
Totale, caso peggiore			444	114	33			
Probabilità di eliofania			0,58	0,44	0,40			
Tempo di operatività rid.			1,00	1,00	1,00			
Dir. del vento rid.			1,00	1,00	1,00			
Totale ridotto			0,58	0,44	0,40			
Totale effettivo			257	50	13			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
(WTG che provoca l'inizio dell'ombreggiamento)  
(WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: W - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (23)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	07:44 (1) 08:00 (1)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	07:47 (1) 07:56 (1)	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:28 20:32
7	07:29 16:47	07:08 17:24	07:28 (9) 17:58	06:28 19:33	05:52 20:05	05:28 20:33	05:28 20:33
8	07:29 16:48	07:07 17:25	07:27 (9) 17:59	06:27 19:34	05:51 20:06	05:28 20:34	05:28 20:34
9	07:28 16:49	07:06 17:26	07:26 (9) 18:00	06:25 19:35	05:50 20:07	05:27 20:34	05:27 20:34
10	07:28 16:50	07:05 17:28	07:25 (9) 18:02	06:24 19:36	05:49 20:08	05:27 20:35	05:27 20:35
11	07:28 16:51	07:03 17:29	07:23 (9) 18:03	06:22 19:37	05:47 20:09	05:27 20:35	05:27 20:35
12	07:28 16:52	07:02 17:30	07:22 (10) 18:04	06:20 19:38	05:46 20:10	05:27 20:36	05:27 20:36
13	07:27 16:53	07:01 17:31	07:21 (10) 18:05	06:19 19:39	05:45 20:11	05:27 20:36	05:27 20:36
14	07:27 16:54	07:00 17:33	07:19 (10) 18:06	06:17 19:40	05:44 20:12	05:27 20:37	05:27 20:37
15	07:27 16:55	06:58 17:34	07:18 (10) 18:07	06:15 19:41	06:52 (1) 07:04 (1)	05:43 20:13	05:27 20:37
16	07:26 16:57	07:48 (8) 17:35	07:18 (10) 18:08	06:14 19:42	06:49 (1) 07:06 (1)	05:42 20:14	05:27 20:38
17	07:26 16:58	07:47 (8) 17:36	07:18 (10) 18:09	06:12 19:43	06:47 (1) 07:08 (1)	05:41 20:15	05:27 20:38
18	07:25 16:59	07:47 (8) 17:38	07:20 (10) 18:11	06:10 19:44	06:45 (1) 07:09 (1)	05:40 20:16	05:27 20:38
19	07:25 17:00	07:46 (8) 17:39	07:24 (10) 18:12	06:08 19:46	06:43 (1) 07:10 (1)	06:17 20:17	05:27 20:39
20	07:24 17:01	07:45 (8) 17:40	06:07 18:13	27 28	07:10 (1) 07:10 (1)	06:16 19:47	05:27 20:39
21	07:24 17:02	07:45 (8) 17:41	06:05 18:14	28 29	07:10 (1) 07:11 (1)	06:14 19:48	05:27 20:39
22	07:23 17:04	06:49 17:43	07:08 (11) 18:15	29 30	07:11 (1) 07:11 (1)	06:13 19:49	05:27 20:39
23	07:22 17:05	06:47 17:44	07:07 (11) 18:16	30 30	06:40 (1) 07:10 (1)	06:11 19:50	05:28 20:40
24	07:21 17:06	06:46 17:45	07:07 (11) 18:17	31 31	06:40 (1) 07:11 (1)	06:10 19:51	05:28 20:40
25	07:21 17:07	06:44 17:46	07:06 (11) 18:18	31 30	06:40 (1) 07:10 (1)	06:08 19:52	05:28 20:40
26	07:20 17:09	06:43 17:47	07:07 (11) 18:19	30 29	06:40 (1) 07:09 (1)	06:07 19:53	05:29 20:40
27	07:19 17:10	06:41 17:49	07:08 (11) 18:20	29 29	06:39 (1) 07:08 (1)	06:05 19:54	05:29 20:40
28	07:18 17:11	06:40 17:50	05:53 18:22	29 27	07:08 (1) 07:07 (1)	06:04 19:55	05:29 20:40
29	07:17 17:12	06:39 17:51	06:51 19:23	27 25	07:41 (1) 08:06 (1)	06:02 19:56	05:30 20:40
30	07:17 17:14	06:38 17:52	06:50 19:24	25 23	07:41 (1) 08:04 (1)	06:01 19:58	05:30 20:40
31	07:16 17:15	06:37 17:53	06:48 19:25	23 20	07:43 (1) 08:03 (1)	05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454	
Totale, caso peggiore	16	134	432	25			
Probabilità di eliofania	0,44	0,46	0,44	0,48			
Tempo di operatività rid.	1,00	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44	0,48			
Totale effettivo	7	61	190	12			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
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Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: W - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (23)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	October	Novembre	Dicembre
1	05:31	05:55	06:27	06:57	06:32	06:54 (9)
	20:40	20:20	19:36	18:45	16:58	6 07:00 (9)
2	05:31	05:56	06:28	06:58	06:34	06:56 (9)
	20:40	20:19	19:35	18:43	16:56	4 07:00 (9)
3	05:32	05:57	06:29	06:59	06:35	06:57 (9)
	20:40	20:18	19:33	18:42	16:55	3 07:00 (9)
4	05:32	05:58	06:30	07:01	06:36	07:11
	20:39	20:17	19:31	18:40	16:54	16:32
5	05:33	05:59	06:31	07:02	06:37	07:12
	20:39	20:16	19:30	18:38	16:53	16:32
6	05:33	06:00	06:32	07:03	06:38	07:13
	20:39	20:15	19:28	18:37	16:52	16:31
7	05:34	06:01	06:33	07:04	06:40	07:14
	20:39	20:13	19:26	18:35	16:50	16:31
8	05:35	06:02	06:34	07:05	06:41	07:15
	20:38	20:12	19:25	18:33	16:49	16:31
9	05:35	06:03	06:35	07:06	06:42	07:16
	20:38	20:11	19:23	18:32	16:48	16:31
10	05:36	06:04	06:36	07:07	06:43	07:17
	20:37	20:09	19:21	8 07:49 (1)	18:30	16:47
11	05:37	06:05	06:37	07:08	06:45	07:18
	20:37	20:08	19:20	15 07:52 (1)	18:28	16:46
12	05:37	06:06	06:38	07:09	06:46	07:18
	20:37	20:07	19:18	20 07:54 (1)	18:27	16:45
13	05:38	06:07	06:39	07:10	06:47	07:19
	20:36	20:05	19:16	22 07:55 (1)	18:25	16:44
14	05:39	06:08	06:40	07:11	07:43 (11)	06:48
	20:35	20:04	19:14	25 07:56 (1)	18:24	3 07:46 (11)
15	05:40	06:09	06:41	07:13	07:40 (11)	06:49
	20:35	20:03	19:13	26 07:56 (1)	18:22	8 07:48 (11)
16	05:40	06:10	06:42	07:14	07:39 (11)	06:51
	20:34	20:01	19:11	28 07:57 (1)	18:20	10 07:49 (11)
17	05:41	06:11	06:43	07:15	07:39 (11)	06:52
	20:34	20:00	19:09	29 07:57 (1)	18:19	11 07:50 (11)
18	05:42	06:12	06:44	07:16	07:38 (11)	06:53
	20:33	19:58	19:08	30 07:57 (1)	18:17	11 07:49 (11)
19	05:43	06:13	06:45	07:17	07:39 (11)	06:54
	20:32	19:57	19:06	30 07:57 (1)	18:16	9 07:48 (11)
20	05:44	06:14	06:46	07:18	07:39 (11)	06:55
	20:32	19:55	19:04	31 07:57 (1)	18:14	8 07:47 (11)
21	05:45	06:15	06:47	07:19	07:41 (11)	06:57
	20:31	19:54	19:02	30 07:56 (1)	18:13	3 07:44 (11)
22	05:46	06:16	06:48	07:21	06:58	4 07:24 (8)
	20:30	19:52	19:01	29 07:55 (1)	18:11	4 07:25 (8)
23	05:46	06:17	06:49	07:22	06:59	07:23 (8)
	20:29	19:51	18:59	28 07:54 (1)	18:10	3 07:26 (8)
24	05:47	06:18	06:50	07:23	07:49 (10)	07:00
	20:28	19:49	18:57	26 07:53 (1)	18:08	6 07:55 (10)
25	05:48	06:19	06:51	07:24	06:47 (10)	07:01
	20:27	19:48	18:55	25 07:52 (1)	17:07	9 06:56 (10)
26	05:49	06:20	06:52	07:25	06:48 (10)	07:02
	20:26	19:46	18:54	22 07:50 (1)	17:06	9 06:57 (10)
27	05:50	06:21	06:53	07:26	06:48 (10)	07:04
	20:26	19:45	18:52	19 07:48 (1)	17:04	8 06:56 (10)
28	05:51	06:22	06:54	07:27	06:49 (10)	07:05
	20:25	19:43	18:50	15 07:46 (1)	17:03	7 06:56 (10)
29	05:52	06:23	06:55	07:28	06:50 (10)	07:06
	20:24	19:41	18:49	6 07:41 (1)	17:01	5 06:55 (10)
30	05:53	06:25	06:56	07:29	06:52 (10)	07:07
	20:23	19:40	18:47	7 17:00	06:59 (9)	16:33
31	05:54	06:26		06:31	06:53 (9)	07:28
	20:21	19:38		16:59	06:59 (9)	16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore			464	120	29	
Probabilità di eliofania			0,58	0,44	0,40	
Tempo di operatività rid.			1,00	1,00	1,00	
Dir. del vento rid.			1,00	1,00	1,00	
Totale ridotto			0,58	0,44	0,40	
Totale effettivo			268	52	12	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: X - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (24)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:51 (8) 17:16	07:15	06:38	06:46	06:00
2	07:29 16:42	07:51 (8) 17:17	07:34 (10)	06:36	07:14 (1)	06:45
3	07:29 16:43	07:51 (8) 17:19	07:31 (10)	06:32	07:25 (1)	06:45
4	07:29 16:44	07:51 (8) 17:20	07:37 (10)	06:33	07:10 (1)	06:43
5	07:29 16:45	07:51 (8) 17:21	07:32 (10)	06:30	07:27 (1)	06:43
6	07:29 16:46	07:51 (8) 17:23	07:38 (10)	06:32	07:08 (1)	06:41
7	07:29 16:47	07:51 (8) 17:24	07:38 (10)	06:32	07:29 (1)	06:41
8	07:29 16:48	07:51 (8) 17:25	07:39 (10)	06:30	07:07 (1)	06:40
9	07:28 16:49	07:51 (8) 17:26	07:29 (10)	06:30	07:31 (1)	06:40
10	07:28 16:50	07:51 (8) 17:28	07:38 (10)	06:28	07:31 (1)	06:40
11	07:28 16:51	07:51 (8) 17:29	07:38 (10)	06:28	07:03 (1)	06:36
12	07:28 16:52	07:51 (8) 17:30	07:38 (10)	06:27	07:32 (1)	06:36
13	07:27 16:53	07:51 (8) 17:31	07:37 (10)	06:27	07:03 (1)	06:36
14	07:27 16:54	07:51 (8) 17:33	07:37 (10)	06:25	07:32 (1)	06:36
15	07:27 16:55	07:51 (8) 17:34	07:37 (10)	06:25	07:02 (1)	06:33
16	07:26 16:57	07:51 (8) 17:36	07:37 (10)	06:25	07:32 (1)	06:33
17	07:26 16:58	07:51 (8) 17:37	07:37 (10)	06:25	07:32 (1)	06:33
18	07:25 16:59	07:51 (8) 17:38	07:37 (10)	06:25	07:32 (1)	06:33
19	07:25 17:00	07:51 (8) 17:39	07:37 (10)	06:25	07:32 (1)	06:33
20	07:24 17:01	07:51 (8) 17:40	07:37 (10)	06:25	07:32 (1)	06:33
21	07:24 17:02	07:51 (8) 17:41	07:37 (10)	06:25	07:32 (1)	06:33
22	07:23 17:04	07:51 (8) 17:43	07:37 (10)	06:25	07:32 (1)	06:33
23	07:22 17:05	07:51 (8) 17:44	07:37 (10)	06:25	07:32 (1)	06:33
24	07:21 17:06	07:51 (8) 17:45	07:37 (10)	06:25	07:32 (1)	06:33
25	07:21 17:07	07:51 (8) 17:46	07:37 (10)	06:25	07:32 (1)	06:33
26	07:20 17:09	07:51 (8) 17:47	07:37 (10)	06:25	07:32 (1)	06:33
27	07:19 17:10	07:51 (8) 17:49	07:37 (10)	06:25	07:32 (1)	06:33
28	07:18 17:11	07:51 (8) 17:50	07:37 (10)	06:25	07:32 (1)	06:33
29	07:17 17:12	07:51 (8)	07:37 (10)	06:25	07:32 (1)	06:33
30	07:17 17:14	07:51 (8)	07:37 (10)	06:25	07:32 (1)	06:33
31	07:16 17:15	07:51 (8)	07:37 (10)	06:25	07:32 (1)	06:33
Ore potenziali eliofania	296	296	369	491	399	454
Totale, caso peggiore	12	113	491	444	450	454
Probabilità di eliofania	0,44	0,46	0,44	0,44	0,44	0,44
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00
Totale ridotto	0,44	0,46	0,44	0,44	0,44	0,44
Totale effettivo	5	52	216	216	216	216

## Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: X - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (24)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	October	Novembre	December
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	07:40 (1) 08:12 (1)	06:32 06:58 (11)
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	07:40 (1) 08:11 (1)	06:34 07:03 (10)
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	07:40 (1) 08:11 (1)	06:35 16:55
4	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	07:40 (1) 08:10 (1)	06:36 16:54
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	07:40 (1) 08:10 (1)	06:37 16:53
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	07:40 (1) 08:09 (1)	06:38 16:52
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	07:40 (1) 08:07 (1)	06:40 16:50
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	07:41 (1) 08:06 (1)	06:41 16:49
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	07:42 (1) 08:04 (1)	06:42 16:48
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	07:43 (1) 08:02 (1)	06:43 16:47
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	07:46 (1) 08:01 (1)	06:45 16:46
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	07:50 (1) 07:56 (1)	06:46 16:45
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	07:10 16:44	06:47 16:44
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	06:48 16:43
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	06:49 16:42
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	06:51 16:41
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	06:52 16:41
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	06:53 16:40
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	06:54 16:39
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	06:55 16:38
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	06:57 16:38
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	06:58 16:37
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	06:59 16:36
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:00 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 18:07	06:52 (11) 06:59 (11)	07:01 16:35
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 18:06	06:52 (11) 07:01 (11)	07:02 16:35
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 18:05	06:51 (11) 07:02 (11)	07:04 16:34
28	05:51 20:25	06:22 19:43	06:54 18:50	07:27 18:04	06:50 (11) 07:01 (11)	07:05 16:34
29	05:52 20:24	06:23 19:41	06:55 18:49	07:28 18:03	06:50 (11) 07:01 (11)	07:06 16:33
30	05:53 20:23	06:25 19:40	06:56 18:47	07:29 18:02	06:52 (11) 07:01 (11)	07:07 16:33
31	05:54 20:21	06:26 19:38		06:31 16:59	06:53 (11) 07:00 (11)	07:08 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore			199	362	49	29
Probabilità di eliofania			0,58	0,44	0,40	0,36
Tempo di operatività rid.			1,00	1,00	1,00	1,00
Dir. del vento rid.			1,00	1,00	1,00	1,00
Totale ridotto			0,58	0,44	0,40	0,36
Totale effettivo			115	158	20	11

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: Y - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (25)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (7) 07:05 (7)	06:46 19:26	07:12 (9) 19:59	06:00 20:29	
2	07:29 16:42	07:14 17:17	06:36 17:52	06:56 (7) 07:05 (7)	06:45 19:27	07:13 (9) 20:00	05:58 20:29	
3	07:29 16:43	07:13 17:19	06:35 17:53	06:56 (7) 07:04 (7)	06:43 19:28	05:57 20:01	05:29 20:30	
4	07:29 16:44	07:12 17:20	06:33 17:55	06:52 (8) 07:01 (7)	06:41 19:29	05:56 20:02	05:29 20:31	
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (8) 07:00 (8)	06:40 19:30	05:55 20:03	05:29 20:32	
6	07:29 16:46	07:09 17:23	06:30 17:57	06:49 (8) 07:00 (8)	06:38 19:31	05:53 20:04	06:23 (11) 06:31 (11)	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:48 (8) 07:00 (8)	06:36 19:32	05:52 20:05	06:22 (11) 06:33 (11)	05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:48 (8) 07:00 (8)	06:35 19:34	05:51 20:06	06:21 (11) 06:34 (11)	05:28 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:48 (8) 06:59 (8)	06:33 19:35	05:50 20:07	06:20 (11) 06:35 (11)	05:27 20:34
10	07:28 16:50	07:05 17:28	06:23 18:02	06:49 (8) 06:57 (8)	06:31 19:36	05:49 20:08	06:20 (11) 06:35 (11)	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:52 (8) 06:55 (8)	06:30 19:37	05:47 20:09	06:20 (11) 06:35 (11)	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:55 (8)	06:28 19:38	05:46 20:10	06:20 (11) 06:35 (11)	05:27 20:36
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	06:27 19:39	05:45 20:11	06:20 (11) 06:35 (11)	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	06:25 19:40	05:44 20:12	06:20 (11) 06:35 (11)	05:27 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:23 19:41	05:43 20:13	06:20 (11) 06:34 (11)	05:27 20:37
16	07:26 16:57	07:48 (6) 07:49 (6)	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	06:21 (11) 06:34 (11)	05:27 20:38
17	07:26 16:58	07:47 (6) 07:51 (6)	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	06:21 (11) 06:33 (11)	05:27 20:38
18	07:25 16:59	07:46 (6) 07:52 (6)	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	06:22 (11) 06:32 (11)	05:27 20:38
19	07:25 17:00	07:46 (6) 07:54 (6)	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	06:23 (11) 06:31 (11)	05:27 20:39
20	07:24 17:01	07:45 (6) 07:54 (6)	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	06:26 (11) 06:27 (11)	05:27 20:39
21	07:23 17:02	07:45 (6) 07:56 (6)	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	06:27 (11)	05:27
22	07:23 17:04	07:44 (6) 07:56 (6)	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27	20:39
23	07:22 17:05	07:43 (6) 07:56 (6)	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28	20:40
24	07:21 17:06	07:42 (6) 07:56 (6)	06:46 17:45	06:00 18:17	06:19 (14) 06:25 (14)	06:10 19:51	05:28 20:22	20:40
25	07:21 17:07	07:41 (6) 07:56 (6)	06:44 17:46	05:58 18:18	06:17 (14) 06:24 (14)	06:08 19:52	05:28 20:23	20:40
26	07:20 17:09	07:42 (6) 07:57 (6)	06:43 17:47	07:02 (7) 07:04 (7)	05:57 18:19	06:07 19:53	05:29 20:24	20:40
27	07:19 17:10	07:43 (6) 07:57 (6)	06:41 17:49	07:00 (7) 07:05 (7)	05:55 18:20	06:05 19:54	05:29 20:25	20:40
28	07:18 17:11	07:44 (6) 07:57 (6)	06:40 17:50	06:59 (7) 07:06 (7)	05:53 18:22	06:04 19:55	05:29 20:25	20:40
29	07:17 17:12	07:45 (6) 07:56 (6)	06:39 17:51	06:51 19:23	07:13 (9) 07:24 (9)	06:02 19:56	05:30 20:26	20:40
30	07:16 17:14	07:46 (6) 07:55 (6)	06:38 17:52	06:50 19:24	07:12 (9) 07:23 (9)	06:01 19:57	05:31 20:27	20:40
31	07:16 17:15	07:49 (6) 07:52 (6)	06:37 17:53	06:48 19:25	07:12 (9) 07:24 (9)	05:31 20:28	05:31 20:28	20:40
Ore potenziali eliofanía	296	296	369	399	450	454		
Totale, caso peggiore	158	14	177	110	180			
Probabilità di eliofanía	0,44	0,46	0,44	0,48	0,47			
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44	0,48	0,47			
Totale effettivo	70	6	78	53	84			

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: Y - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (25)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:29 (11) 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	05:31 20:40	05:56 20:19	06:29 (11) 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	05:32 20:39	05:57 20:18	06:30 (11) 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 (11) 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 (11) 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 (11) 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 (11) 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	05:54 20:21	06:26 19:38	06:54 (10) 07:07 (10)	06:31 16:59	07:08 (14) 16:33	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	98	154	125	118	162	
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,61	0,67	0,58	0,44	0,40	
Totale effettivo	59	103	72	51	66	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: Z - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	07:48 (6) 07:52 (6)	06:38 17:51	06:57 (7) 07:04 (7)	06:46 19:26
2	07:29 16:42	07:14 17:17	06:36 17:52	06:56 (7) 07:04 (7)	06:45 19:27	07:08 (9) 07:20 (9)
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (7) 07:03 (7)	06:43 19:28	07:09 (9) 07:20 (9)
4	07:29 16:44	07:12 17:20	06:33 17:55	06:54 (7) 07:02 (7)	06:41 19:29	07:10 (9) 07:17 (9)
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (8) 07:01 (7)	06:40 19:30	05:55 20:03
6	07:29 16:46	07:09 17:23	06:30 17:57	06:49 (8) 06:57 (8)	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	06:28 17:58	06:47 (8) 06:58 (8)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46 (8) 06:59 (8)	06:35 19:34	05:51 20:06
9	07:28 16:49	07:06 17:26	06:25 18:00	06:45 (8) 06:58 (8)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	06:23 18:02	06:45 (8) 06:57 (8)	06:31 19:36	05:49 20:08
11	07:28 16:51	07:03 17:29	06:22 18:03	06:46 (8) 06:57 (8)	06:30 19:37	06:55 (10) 20:09
12	07:28 16:52	07:02 17:30	06:20 18:04	06:47 (8) 06:54 (8)	06:28 19:38	06:53 (10) 07:02 (10)
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	06:51 (10) 07:03 (10)	05:45 20:11
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	06:51 (10) 07:04 (10)	05:44 20:12
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:50 (10) 07:03 (10)	05:43 20:13
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	06:50 (10) 07:03 (10)	05:42 20:14
17	07:26 16:58	07:47 (6) 07:48 (6)	06:56 17:36	06:12 18:09	06:20 19:43	06:50 (10) 07:02 (10)
18	07:25 16:59	07:46 (6) 07:50 (6)	06:54 17:38	06:10 18:11	06:19 19:44	06:50 (10) 07:01 (10)
19	07:25 17:00	07:46 (6) 07:52 (6)	06:53 17:39	06:08 18:12	06:17 19:46	06:51 (10) 07:00 (10)
20	07:24 17:01	07:45 (6) 07:53 (6)	06:51 17:40	06:07 18:13	06:16 19:47	06:54 (10) 06:56 (10)
21	07:23 17:02	07:45 (6) 07:55 (6)	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19
22	07:23 17:04	07:44 (6) 07:55 (6)	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20
23	07:22 17:05	07:43 (6) 07:55 (6)	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21
24	07:21 17:06	07:42 (6) 07:56 (6)	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22
25	07:21 17:07	07:41 (6) 07:56 (6)	06:44 17:46	05:58 18:18	06:17 (14) 06:22 (14)	06:08 19:52
26	07:20 17:09	07:41 (6) 07:57 (6)	06:43 17:47	05:57 18:19	06:15 (14) 06:22 (14)	06:07 19:53
27	07:19 17:10	07:41 (6) 07:57 (6)	06:41 17:49	05:55 07:00 (7) 07:01 (7)	06:13 (14) 06:21 (14) 18:20	06:05 19:54
28	07:18 17:11	07:42 (6) 07:57 (6)	06:40 17:50	05:53 06:59 (7) 07:04 (7)	06:12 (14) 18:22	06:04 19:55
29	07:17 17:12	07:43 (6) 07:56 (6)	06:51 17:44	06:51 19:23	07:12 (9) 07:19 (14)	06:02 19:56
30	07:16 17:14	07:44 (6) 07:55 (6)	06:49 17:43	06:50 19:24	07:10 (9) 07:20 (9)	06:01 19:57
31	07:16 17:15	07:45 (6) 07:54 (6)	06:48 17:42	06:48 19:25	07:10 (9) 07:21 (9)	05:31 20:28
Ore potenziali eliofanìa	296	296	369	399	450	454
Totale, caso peggiore	161	10	176	140	213	
Probabilità di eliofanìa	0,44	0,46	0,44	0,48	0,47	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,44	0,46	0,44	0,48	0,47	
Totale effettivo	71	5	77	67	99	

#### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: Z - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (26)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:27 (11) 06:27	06:27 06:55 (10)	06:57 07:28 (8)	06:32 07:08
2	05:31 20:40	05:56 20:19	06:28 (11) 06:28	06:28 06:59 (10)	06:58 07:33 (8)	06:34 07:09
3	05:32 20:39	05:57 20:18	06:30 (11) 06:29	06:29 06:59	06:59 07:35 (8)	06:35 07:10
4	05:32 20:39	05:58 20:17	06:36 (11) 06:30	06:30 06:59	06:59 07:36 (8)	06:36 07:11
5	05:33 20:39	05:59 20:16	06:31 06:30	06:31 06:59	06:59 07:37 (8)	06:37 07:12
6	05:33 20:39	06:00 20:15	06:32 06:28	06:32 06:59	06:59 07:38 (8)	06:38 07:13
7	05:34 20:39	06:01 20:13	06:33 06:26	06:33 06:59	06:59 07:39 (8)	06:40 07:14
8	05:35 20:38	06:02 20:12	06:34 06:25	06:34 06:59	06:59 07:40 (8)	06:41 07:15
9	05:35 20:38	06:03 20:11	06:35 06:23	06:35 06:59	06:59 07:41 (8)	06:42 07:16
10	05:36 20:37	06:04 20:09	06:36 06:21	06:36 06:59	06:59 07:42 (8)	06:43 07:17
11	05:37 20:37	06:05 20:08	06:37 06:20	06:37 06:59	06:59 07:43 (8)	06:44 07:18
12	05:37 20:36	06:06 20:07	06:38 06:19	06:38 06:59	06:59 07:44 (8)	06:45 07:19
13	05:38 20:36	06:07 20:05	06:39 06:18	06:39 06:59	06:59 07:45 (8)	06:46 07:20
14	05:39 20:35	06:08 20:04	06:40 06:17	06:40 06:59	06:59 07:46 (8)	06:47 07:21
15	05:40 20:35	06:09 20:03	06:41 06:16	06:41 06:59	06:59 07:47 (8)	06:48 07:22
16	05:40 20:34	06:10 20:01	06:42 06:15	06:42 06:59	06:59 07:48 (8)	06:49 07:23
17	05:41 20:34	06:11 20:00	06:43 06:14	06:43 06:59	06:59 07:49 (8)	06:50 07:24
18	05:42 20:33	06:30 (11) 06:36 (11)	06:12 19:58	06:12 19:08	06:12 06:59	06:51 07:25
19	05:43 20:32	06:29 (11) 06:37 (11)	06:13 19:57	06:13 19:06	06:13 06:59	06:52 07:26
20	05:44 20:31	06:28 (11) 06:39 (11)	06:14 19:55	06:14 19:04	06:14 06:59	06:53 07:27
21	05:45 20:31	06:26 (11) 06:39 (11)	06:15 19:54	06:15 19:02	06:15 06:59	06:54 07:28
22	05:46 20:30	06:26 (11) 06:39 (11)	06:16 19:52	06:16 19:01	06:16 06:59	06:55 07:29
23	05:46 20:29	06:26 (11) 06:40 (11)	06:17 19:51	06:17 18:59	06:17 06:59	06:56 07:30
24	05:47 20:28	06:25 (11) 06:41 (11)	06:18 19:49	06:18 18:57	06:18 06:59	06:57 07:31
25	05:48 20:27	06:25 (11) 06:41 (11)	06:19 19:48	06:19 18:55	06:19 06:59	06:58 07:32
26	05:49 20:26	06:25 (11) 06:41 (11)	06:20 19:46	06:20 18:54	06:20 06:59	06:59 07:33
27	05:50 20:25	06:25 (11) 06:41 (11)	06:21 19:45	06:21 18:52	06:21 06:59	07:00 07:34
28	05:51 20:24	06:26 (11) 06:41 (11)	06:22 19:43	06:22 18:50	06:22 06:59	07:01 07:35
29	05:52 20:23	06:26 (11) 06:41 (11)	06:23 19:41	06:23 18:48	06:23 06:59	07:02 07:36
30	05:53 20:22	06:25 (11) 06:40 (11)	06:24 19:40	06:24 18:47	06:24 06:59	07:03 07:37
31	05:54 20:21	06:26 (11) 06:39 (11)	06:26 19:38	06:26 07:02 (10)	06:26 06:59	07:04 07:38
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	187	122	104	122	166	
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,61	0,67	0,58	0,44	0,40	
Totale effettivo	113	81	60	53	67	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (27)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (12) 06:58 (12)	06:46 19:26	07:05 (8) 07:14 (8)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:56 (6) 07:02 (6)	06:45 19:27	07:03 (8) 07:14 (8)	05:58 20:00	05:30 20:29
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (6) 07:03 (6)	06:43 19:28	07:03 (8) 07:15 (8)	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:52 (6) 07:04 (6)	06:41 19:29	07:03 (8) 07:14 (8)	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (6) 07:05 (6)	06:40 19:30	07:03 (8) 07:12 (8)	05:55 20:03	06:20 (10) 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:50 (6) 07:04 (6)	06:38 19:31	07:05 (8) 07:11 (8)	05:53 20:04	06:18 (10) 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:50 (6) 07:04 (6)	06:36 19:32	06:36 20:05	05:52 20:09	06:17 (10) 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:51 (6) 07:03 (6)	06:35 19:34	06:35 20:06	05:51 20:11	06:16 (10) 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:51 (6) 07:02 (6)	06:33 19:35	06:33 20:07	05:50 20:11	06:16 (10) 20:34
10	07:28 16:50	07:05 17:28	06:23 18:02	06:53 (6) 06:59 (6)	06:31 19:36	06:31 20:08	05:49 20:11	06:16 (10) 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	06:30 19:37	06:30 20:09	05:47 20:11	06:16 (10) 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	06:28 19:38	06:47 (14) 06:49 (14)	05:46 20:10	06:16 (10) 20:36
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	06:27 19:39	06:45 (14) 06:49 (14)	05:45 20:11	06:17 (10) 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	06:25 19:40	06:44 (14) 06:50 (14)	05:44 20:12	06:18 (10) 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:23 19:41	06:42 (14) 06:49 (14)	05:43 20:13	06:19 (10) 20:37
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	06:22 19:42	06:41 (14) 06:49 (14)	05:42 20:14	06:20 (10) 20:38
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	06:20 19:43	06:42 (14) 06:47 (14)	05:41 20:15	06:21 (10) 20:38
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	06:19 19:44	06:19 20:16	05:40 20:16	06:22 (10) 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	06:17 19:46	06:17 20:17	05:39 20:17	06:23 (10) 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	06:16 19:47	06:36 (9) 06:42 (9)	05:38 20:18	06:24 (10) 20:39
21	07:23 17:03	06:50 17:41	06:05 18:14	06:14 19:48	06:14 19:48	06:35 (9) 06:43 (9)	05:38 20:19	06:25 (10) 20:39
22	07:23 17:04	06:49 17:43	06:03 18:15	06:22 (7) 06:27 (7)	06:13 19:49	06:34 (9) 06:44 (9)	05:37 20:20	06:26 (10) 20:39
23	07:22 17:05	06:47 17:44	06:02 18:16	06:20 (7) 06:27 (7)	06:11 19:50	06:33 (9) 06:44 (9)	05:36 20:21	06:27 (10) 20:40
24	07:21 17:06	06:46 17:45	06:00 18:17	06:19 (7) 06:27 (7)	06:10 19:51	06:34 (9) 06:44 (9)	05:35 20:22	06:28 (10) 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:18 (7) 06:26 (7)	06:08 19:52	06:33 (9) 06:42 (9)	05:35 20:23	06:29 (10) 20:40
26	07:20 17:09	06:43 17:47	05:57 18:19	06:18 (7) 06:25 (7)	06:07 19:53	06:35 (9) 06:41 (9)	05:34 20:24	06:30 (10) 20:40
27	07:19 17:10	06:41 17:49	05:55 18:20	06:17 19:54	06:05 19:54	06:05 20:25	05:33 20:25	06:31 (10) 20:40
28	07:18 17:11	06:40 17:50	06:59 (12) 07:00 (12)	05:53 18:22	06:04 19:55	06:04 20:25	05:33 20:25	06:32 (10) 20:40
29	07:17 17:12		06:51 19:23	06:51 19:23	06:02 19:56	06:02 20:26	05:32 20:26	06:33 (10) 20:40
30	07:16 17:14		06:50 19:24	06:50 19:24	06:01 19:57	06:01 20:27	05:31 20:27	06:34 (10) 20:40
31	07:16 17:15		06:48 19:25	06:48 19:25	07:07 (8) 07:13 (8)	06:31 20:28	05:31 20:28	06:35 (10) 20:40
Ore potenziali eliofania	296	296	369	399	450	454		
Totale, caso peggiore			141	150	94			
Probabilità di eliofania		0,46	0,44	0,48	0,47			
Tempo di operatività rid.		1,00	1,00	1,00	1,00			
Dir. del vento rid.		1,00	1,00	1,00	1,00			
Totale ridotto		0,46	0,44	0,48	0,47			
Totale effettivo		0	62	72	44			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (27)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:26 (10) 06:37 (10)	06:27 19:36	06:57 18:45	06:32 16:58
2	05:31 20:40	05:56 20:19	06:26 (10) 06:37 (10)	06:28 19:35	06:58 18:43	06:34 16:56
3	05:32 20:39	05:57 20:18	06:25 (10) 06:37 (10)	06:29 19:33	06:59 18:42	06:35 16:55
4	05:32 20:39	05:58 20:17	06:26 (10) 06:37 (10)	06:30 19:31	07:01 18:40	06:36 16:54
5	05:33 20:39	05:59 20:16	06:26 (10) 06:36 (10)	06:31 19:30	07:02 18:38	06:37 16:53
6	05:33 20:39	06:00 20:15	06:27 (10) 06:35 (10)	06:32 19:28	07:03 18:37	06:38 16:52
7	05:34 20:39	06:01 20:13	06:28 (10) 06:34 (10)	06:33 19:26	06:58 (8) 07:07 (8)	06:40 (6) 07:25 (6)
8	05:35 20:38	06:02 20:12	06:34 19:25	06:34 19:25	07:05 18:33	06:41 16:49
9	05:35 20:38	06:03 20:11	06:35 19:23	06:35 19:23	07:06 18:32	06:42 16:48
10	05:36 20:37	06:04 20:09	06:36 19:21	06:36 19:21	07:07 18:30	06:43 16:47
11	05:37 20:37	06:05 20:08	06:37 19:20	06:37 19:20	07:08 18:28	06:44 16:46
12	05:37 20:36	06:06 20:07	06:38 19:18	06:38 19:18	07:09 18:27	06:46 16:45
13	05:38 20:36	06:07 20:05	06:39 19:16	06:39 19:16	07:10 18:25	06:47 16:44
14	05:39 20:35	06:08 20:04	06:40 19:14	06:40 19:14	07:11 18:24	06:48 16:43
15	05:40 20:35	06:09 20:03	06:41 19:13	06:41 19:13	07:13 18:22	06:49 16:42
16	05:40 20:34	06:10 20:01	06:43 (9) 06:47 (9)	06:42 19:11	07:14 18:20	06:51 16:41
17	05:41 20:34	06:11 20:00	06:41 (9) 06:48 (9)	06:43 19:09	07:15 18:19	06:52 16:41
18	05:42 20:33	06:12 19:58	06:40 (9) 06:49 (9)	06:44 19:08	07:16 18:17	06:53 16:40
19	05:43 20:32	06:13 19:57	06:39 (9) 06:50 (9)	06:45 19:06	07:17 18:16	06:54 16:39
20	05:44 20:31	06:14 19:55	06:39 (9) 06:49 (9)	06:46 19:04	07:18 18:14	06:55 16:38
21	05:45 20:31	06:15 19:54	06:39 (9) 06:49 (9)	06:47 19:02	07:19 18:13	06:57 16:38
22	05:46 20:30	06:16 19:52	06:39 (9) 06:48 (9)	06:48 19:01	07:21 18:11	06:58 16:37
23	05:46 20:29	06:17 19:51	06:41 (9) 06:46 (9)	06:49 18:59	07:22 18:10	06:59 16:36
24	05:47 20:28	06:18 19:49	06:50 18:57	06:50 18:57	07:23 18:08	07:00 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	06:51 18:55	06:24 17:07	07:01 16:35
26	05:49 20:26	06:20 19:46	06:45 (14) 06:50 (14)	06:52 18:54	06:25 17:06	07:02 16:35
27	05:50 20:25	06:21 19:45	06:43 (14) 06:51 (14)	06:53 18:52	06:26 17:04	07:04 16:34
28	05:51 20:24	06:22 19:43	06:44 (14) 06:51 (14)	06:54 18:50	06:28 17:03	07:05 16:34
29	05:52 20:23	06:29 (10) 06:35 (10)	06:23 19:41	06:45 (14) 06:51 (14)	06:29 17:01	07:06 16:33
30	05:53 20:22	06:27 (10) 06:35 (10)	06:25 19:40	06:46 (14) 06:50 (14)	06:30 17:00	07:07 16:33
31	05:54 20:21	06:26 (10) 06:36 (10)	06:26 19:38	06:47 (14) 06:49 (14)	06:31 16:59	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	24	166	103	101		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	15	111	60	44		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (28)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (6) 07:06 (6)	06:46 19:26	07:05 (8) 19:59	06:00 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:56 (6) 07:07 (6)	06:45 19:27	07:03 (8) 20:00	05:58 20:29
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (6) 07:07 (6)	06:43 19:28	07:03 (8) 20:01	05:57 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:52 (6) 07:07 (6)	06:41 19:29	07:03 (8) 20:02	05:56 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:52 (6) 07:07 (6)	06:40 19:30	07:03 (8) 20:03	05:55 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:52 (6) 07:06 (6)	06:38 19:31	07:05 (8) 20:04	05:53 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:52 (6) 07:05 (6)	06:36 19:32	05:52 20:05	06:17 (10) 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:54 (6) 07:04 (6)	06:35 19:34	05:51 20:06	06:15 (10) 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:57 (6) 06:59 (6)	06:33 19:35	05:50 20:07	06:15 (10) 20:34
10	07:28 16:50	07:05 17:28	06:23 18:02	06:59 (6) 07:06 (6)	06:31 19:36	05:49 20:08	06:14 (10) 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:59 (6) 07:06 (6)	06:30 19:37	05:47 20:09	06:14 (10) 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:59 (6) 07:06 (6)	06:28 19:38	05:46 20:10	06:14 (10) 20:36
13	07:27 16:53	07:01 17:31	06:19 18:05	06:59 (6) 07:06 (6)	06:27 19:39	05:45 20:11	06:14 (10) 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:59 (6) 07:06 (6)	06:25 19:40	05:44 20:12	06:15 (10) 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:59 (6) 07:06 (6)	06:23 19:41	05:43 20:13	06:15 (10) 20:37
16	07:26 16:57	06:57 17:35	06:13 18:08	06:59 (6) 07:06 (6)	06:22 19:42	05:42 20:14	06:16 (10) 20:38
17	07:26 16:58	06:56 17:36	06:12 18:09	06:59 (6) 07:06 (6)	06:20 19:43	05:41 20:15	06:18 (10) 20:38
18	07:25 16:59	06:54 17:38	06:10 18:11	06:59 (6) 07:06 (6)	06:19 19:44	05:40 20:16	06:18 (10) 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12	06:59 (6) 07:06 (6)	06:17 19:46	05:39 20:17	06:18 (10) 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:59 (6) 07:06 (6)	06:16 19:47	05:38 20:18	06:18 (10) 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:24 (7) 06:27 (7)	06:14 19:48	05:38 20:19	06:18 (10) 20:39
22	07:23 17:04	06:49 17:43	06:03 18:15	06:24 (7) 06:27 (7)	06:13 19:49	05:37 20:20	06:18 (10) 20:39
23	07:22 17:05	06:47 17:44	06:02 18:16	06:24 (7) 06:27 (7)	06:11 19:50	05:36 20:21	06:18 (10) 20:40
24	07:21 17:06	06:46 17:45	06:00 18:17	06:24 (7) 06:27 (7)	06:10 19:51	05:35 20:22	06:18 (10) 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:24 (7) 06:27 (7)	06:08 19:52	05:35 20:23	06:18 (10) 20:40
26	07:20 17:09	06:43 17:47	05:57 18:19	06:24 (7) 06:27 (7)	06:07 19:53	05:34 20:24	06:18 (10) 20:40
27	07:19 17:10	06:41 17:49	05:55 18:20	06:24 (7) 06:27 (7)	06:05 19:54	05:33 20:25	06:18 (10) 20:40
28	07:18 17:11	06:40 17:50	05:53 07:04 (6)	06:24 (7) 06:27 (7)	06:04 19:55	05:32 20:26	06:18 (10) 20:40
29	07:17 17:12		05:51 19:23	06:24 (7) 06:27 (7)	06:02 19:56	05:32 20:26	06:18 (10) 20:40
30	07:16 17:14		06:50 19:24	07:08 (8) 07:11 (8)	06:01 19:57	05:31 20:27	06:18 (10) 20:40
31	07:16 17:15		06:48 19:25	07:07 (8) 07:14 (8)		05:31 20:28	06:18 (10) 20:40
Ore potenziali eliofania	296	296	369	399	450	454	
Totale, caso peggiore			150	161	106		
Probabilità di eliofania		0,46	0,44	0,48	0,47		
Tempo di operatività rid.		1,00	1,00	1,00	1,00		
Dir. del vento rid.		1,00	1,00	1,00	1,00		
Totale ridotto		0,46	0,44	0,48	0,47		
Totale effettivo		2	66	77	49		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (28)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:24 (10) 06:27	06:48 (13) 06:57		06:32 07:08
2	05:31 20:40	05:56 20:19	06:24 (10) 06:28	06:49 (13) 06:58		16:58 16:33
3	05:32 20:39	05:57 20:18	06:24 (10) 06:29	06:50 (13) 06:59		06:34 07:09
4	05:32 20:39	05:58 20:17	06:25 (10) 06:30			16:56 16:32
5	05:33 20:39	05:59 20:16	06:25 (10) 06:31			06:35 07:10
6	05:33 20:39	06:00 20:15	06:27 (10) 06:32	18:42 18:40		16:55 16:32
7	05:34 20:39	06:01 20:13	06:32 (10) 19:28	07:00 (8) 07:03	07:32 (6) 07:39 (6)	06:37 16:53
8	05:35 20:38	06:02 20:12	06:34 19:25	07:06 (8) 18:37	07:41 (6) 07:30 (6)	06:38 07:13
9	05:35 20:38	06:03 20:11	06:35 19:23	07:07 (8) 18:35	07:42 (6) 06:40	16:52 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:08 (8) 18:33	07:28 (6) 06:40	06:41 07:15
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 (8) 18:32	07:27 (6) 06:43	06:41 07:15
12	05:37 20:36	06:06 20:07	06:38 19:18	07:09 (8) 18:31	07:26 (6) 06:44	06:41 07:15
13	05:38 20:36	06:07 20:05	06:39 19:16	07:08 (8) 18:30	07:26 (6) 06:42	06:42 07:16
14	05:39 20:35	06:08 20:04	06:40 19:14	07:09 (8) 18:29	07:26 (6) 06:43	06:42 07:16
15	05:40 20:35	06:09 20:03	06:41 19:13	07:09 (8) 18:28	07:26 (6) 06:44	06:43 07:17
16	05:40 20:34	06:10 20:01	06:42 19:11	07:10 (8) 18:27	07:26 (6) 06:45	06:43 07:17
17	05:41 20:34	06:11 20:00	06:43 19:09	07:11 (8) 18:26	07:26 (6) 06:46	06:44 07:18
18	05:42 20:33	06:12 19:58	06:44 19:08	07:12 (7) 18:19	07:26 (6) 06:47	06:44 07:18
19	05:43 20:32	06:13 19:57	06:45 19:06	07:13 (7) 18:18	07:26 (6) 06:48	06:45 07:19
20	05:44 20:31	06:14 19:55	06:46 19:04	07:14 (7) 18:17	07:26 (6) 06:49	06:46 07:20
21	05:45 20:31	06:15 19:54	06:47 19:02	07:15 (7) 18:16	07:26 (6) 06:50	06:47 07:21
22	05:46 20:29	06:17 19:51	06:48 18:59	07:16 (7) 18:15	07:26 (6) 06:51	06:48 07:22
23	05:46 20:28	06:18 19:49	06:49 18:57	07:17 (7) 18:14	07:26 (6) 06:52	06:48 07:23
24	05:47 20:28	06:19 19:48	06:50 18:55	07:18 (7) 18:13	07:26 (6) 06:53	06:49 07:24
25	05:48 20:27	06:20 19:46	06:51 18:52	07:19 (7) 18:12	07:26 (6) 06:54	06:49 07:25
26	05:49 20:26	06:21 19:45	06:52 18:50	07:20 (7) 18:11	07:26 (6) 06:55	06:50 07:26
27	05:50 20:25	06:22 19:44	06:53 18:48	07:21 (7) 18:10	07:26 (6) 06:56	06:51 07:27
28	05:51 20:24	06:23 19:43	06:54 18:47	07:22 (7) 18:09	07:26 (6) 06:57	06:52 07:28
29	05:52 20:23	06:24 19:42	06:55 18:46	07:23 (7) 18:08	07:26 (6) 06:58	06:53 07:29
30	05:53 20:22	06:25 19:41	06:56 18:45	07:24 (7) 18:07	07:26 (6) 06:59	06:54 07:30
31	05:54 20:21	06:26 19:40	06:57 18:44	07:25 (7) 18:06	07:26 (6) 07:00	06:55 07:31
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	47	160	111	107		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	28	107	64	47		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (29)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (6) 07:02 (6)	06:46 19:26	07:05 (8) 07:13 (8)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:56 (6) 07:05 (6)	06:45 19:27	07:03 (8) 07:14 (8)	05:58 20:00	05:30 20:29
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (6) 07:05 (6)	06:43 19:28	07:03 (8) 07:14 (8)	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:52 (6) 07:05 (6)	06:41 19:29	07:02 (8) 07:13 (8)	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (6) 07:06 (6)	06:40 19:30	07:02 (8) 07:12 (8)	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:51 (6) 07:05 (6)	06:38 19:31	07:04 (8) 07:11 (8)	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:51 (6) 07:04 (6)	06:36 19:32		05:52 20:05	
8	07:28 16:48	07:07 17:25	06:27 17:59	06:52 (6) 07:04 (6)	06:35 19:34		05:51 20:06	06:17 (10) 06:16 (10)
9	07:28 16:49	07:06 17:26	06:25 18:00	06:53 (6) 07:02 (6)	06:33 19:35		05:50 20:07	06:24 (10) 06:15 (10)
10	07:28 16:50	07:05 17:28	06:23 18:02		06:31 19:36	06:50 (13) 06:51 (13)	05:49 20:08	06:25 (10) 06:14 (10)
11	07:28 16:51	07:03 17:29	06:22 18:03		06:30 19:37	06:48 (13) 06:49 (13)	05:47 20:09	06:14 (10) 06:26 (10)
12	07:28 16:52	07:02 17:30	06:20 18:04		06:28 19:38	06:47 (13) 06:48 (13)	05:46 20:10	06:14 (10) 06:26 (10)
13	07:27 16:53	07:01 17:31	06:19 18:05		06:27 19:39	06:45 (14) 06:48 (14)	05:45 20:11	06:14 (10) 06:26 (10)
14	07:27 16:54	07:00 17:33	06:17 18:06		06:25 19:40	06:44 (14) 06:49 (14)	05:44 20:12	06:15 (10) 06:25 (10)
15	07:27 16:55	06:58 17:34	06:15 18:07		06:23 19:41	06:42 (14) 06:49 (14)	05:43 20:13	06:15 (10) 06:25 (10)
16	07:26 16:57	06:57 17:35	06:13 18:08		06:22 19:42	06:41 (14) 06:49 (14)	05:42 20:14	06:16 (10) 06:24 (10)
17	07:26 16:58	06:56 17:36	06:12 18:09		06:20 19:43	06:40 (14) 06:47 (14)	05:41 20:15	06:18 (10) 06:22 (10)
18	07:25 16:59	06:54 17:38	06:10 18:11		06:19 19:44	06:42 (14) 06:44 (14)	05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12		06:17 19:46		05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13		06:16 19:47	06:37 (9) 06:39 (9)	05:38 20:18	05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:24 (7) 06:25 (7)	06:14 19:48	06:34 (9) 06:42 (9)	05:38 20:19	05:27 20:39
22	07:23 17:04	06:49 17:43	06:03 18:15	06:22 (7) 06:27 (7)	06:13 19:49	06:33 (9) 06:43 (9)	05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:02 18:16	06:20 (7) 06:27 (7)	06:11 19:50	06:32 (9) 06:43 (9)	05:36 20:21	05:28 20:40
24	07:21 17:06	06:46 17:45	06:00 18:17	06:19 (7) 06:27 (7)	06:10 19:51	06:32 (9) 06:43 (9)	05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:17 (7) 06:26 (7)	06:08 19:52	06:32 (9) 06:42 (9)	05:35 20:23	05:28 20:40
26	07:20 17:09	06:43 17:47	05:57 18:19	06:18 (7) 06:25 (7)	06:07 19:53	06:32 (9) 06:42 (9)	05:34 20:24	05:29 20:40
27	07:19 17:10	06:41 17:49	05:55 18:20		06:05 19:54	06:34 (9) 06:41 (9)	05:33 20:25	05:29 20:40
28	07:18 17:11	06:40 17:50	06:59 (12) 07:00 (12)	05:53 18:22	06:04 19:55		05:32 20:25	05:29 20:40
29	07:17 17:12		06:51 19:23	06:51 19:23	06:02 19:56		05:32 20:26	05:30 20:40
30	07:16 17:14		06:50 19:24	06:50 19:24	06:01 19:57		05:31 20:27	05:30 20:40
31	07:16 17:15		06:48 19:25	07:07 (8) 07:12 (8)	06:00 19:58		05:31 20:28	
Ore potenziali eliofania	296	296	369	399	450	450	104	454
Totale, caso peggiore			143	162			104	
Probabilità di eliofania		0,46	0,44	0,48			0,47	
Tempo di operatività rid.		1,00	1,00	1,00			1,00	
Dir. del vento rid.		1,00	1,00	1,00			1,00	
Totale ridotto		0,46	0,44	0,48			0,47	
Totale effettivo		0	63	78			48	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (29)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:24 (10) 06:27	06:27 06:48 (13)	06:57 06:57	06:32 07:08
2	05:31 20:40	05:56 20:19	06:24 (10) 06:35 (10)	06:28 19:35	06:49 (13) 06:58	16:58 16:33
3	05:32 20:39	05:57 20:18	06:24 (10) 06:35 (10)	06:29 19:33	06:59 18:42	16:34 16:32
4	05:32 20:39	05:58 20:17	06:25 (10) 06:35 (10)	06:30 19:31	07:01 18:40	16:36 16:32
5	05:33 20:39	05:59 20:16	06:26 (10) 06:34 (10)	06:31 19:30	07:02 18:38	16:37 16:32
6	05:33 20:39	06:00 20:15	06:27 (10) 06:32 (10)	06:32 19:28	07:03 07:06 (8)	16:38 16:32
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	07:07 (8)	16:40 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	07:08 (8)	16:41 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	07:09 (8)	16:42 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	07:10 (8)	16:43 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	07:11 (8)	16:44 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	07:12 (8)	16:45 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	07:13 (8)	16:46 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	07:14 (12)	16:47 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:12 18:22	07:15 (12)	16:48 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:13 18:20	07:16 (12)	16:49 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:14 18:19	07:17 (7)	16:50 16:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:15 18:17	07:18 (7)	16:51 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:16 18:16	07:19 (7)	16:52 16:33
20	05:44 20:31	06:14 19:55	06:46 19:04	07:17 18:14	07:20 (7)	16:53 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:18 18:13	07:21 (7)	16:54 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:19 18:11	07:22 (7)	16:55 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:23 18:10	07:23 (7)	16:56 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:24 18:08	07:24 (7)	16:57 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:25 17:07	07:25 (7)	16:58 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:26 17:06	07:26 (7)	16:59 16:37
27	05:50 20:25	06:21 19:45	06:53 18:52	07:27 17:05	07:27 (7)	17:00 16:37
28	05:51 20:24	06:22 19:43	06:54 18:50	07:28 17:04	07:28 (7)	17:01 16:38
29	05:52 20:23	06:23 19:41	06:55 18:48	07:29 17:03	07:29 (7)	17:02 16:38
30	05:53 20:22	06:24 19:40	06:56 18:47	07:30 17:02	07:30 (7)	17:03 16:39
31	05:54 20:21	06:25 19:38	06:57 18:46	07:31 17:01	07:31 (7)	17:04 16:39
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	47	160	106	108		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	28	107	61	47		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (30)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno			
1	07:28 16:41 27	07:51 (7) 08:18 (8)	07:15 17:16	06:38 17:51 21	06:57 (14) 07:18 (9)	06:46 19:26 35	07:18 (10) 07:53 (10)	06:00 19:59	05:30 20:29
2	07:29 16:42 27	07:51 (7) 08:18 (8)	07:14 17:17	06:36 17:52 23	06:55 (14) 07:18 (9)	06:45 19:27 36	07:17 (10) 07:53 (10)	05:58 20:00	05:30 20:29
3	07:29 16:43 26	07:51 (7) 08:18 (8)	07:13 17:19	06:35 17:53 25	06:54 (14) 07:19 (9)	06:43 19:28 35	07:18 (10) 07:53 (10)	05:57 20:01	05:29 20:30
4	07:29 16:44 25	07:51 (7) 08:18 (8)	07:11 17:20	06:33 17:55 27	06:52 (14) 07:19 (9)	06:41 19:29 35	07:17 (10) 07:52 (10)	05:56 20:02	05:29 20:31
5	07:29 16:45 23	07:51 (7) 08:17 (8)	07:10 17:21	06:32 17:56 28	06:51 (14) 07:19 (9)	06:40 19:30 34	07:17 (10) 07:51 (10)	05:55 20:03	05:29 20:32
6	07:29 16:46 21	07:51 (7) 08:17 (8)	07:09 17:23	06:30 17:57 29	06:49 (14) 07:18 (9)	06:38 19:31 33	07:18 (10) 07:51 (10)	05:53 20:04	05:28 20:32
7	07:29 16:47 19	07:51 (7) 08:16 (8)	07:08 17:24	06:28 17:58 31	06:47 (14) 07:18 (9)	06:36 19:32 31	07:18 (10) 07:49 (10)	05:52 20:05	05:28 20:33
8	07:28 16:48 12	07:51 (7) 08:03 (7)	07:07 17:25	06:27 17:59 28	06:49 (14) 07:17 (9)	06:35 19:34 30	07:18 (10) 07:48 (10)	05:51 20:06	05:28 20:34
9	07:28 16:49 12	07:50 (7) 08:02 (7)	07:06 17:26	06:25 18:00 23	06:53 (9) 07:16 (9)	06:33 19:35 28	07:19 (10) 07:47 (10)	05:50 20:07	05:27 20:34
10	07:28 16:50 12	07:50 (7) 08:02 (7)	07:05 17:28	06:23 18:01 22	06:53 (9) 07:15 (9)	06:31 19:36 25	07:20 (10) 07:45 (10)	05:49 20:08	05:27 20:35
11	07:28 16:51 12	07:50 (7) 08:02 (7)	07:03 17:29	06:22 18:03 19	06:55 (9) 07:14 (9)	06:30 19:37 22	07:21 (10) 07:43 (10)	05:47 20:09	05:27 20:35
12	07:28 16:52 11	07:50 (7) 08:01 (7)	07:02 17:30	06:20 18:04 15	06:56 (9) 07:11 (9)	06:28 19:38 18	07:23 (10) 07:41 (10)	05:46 20:10	05:27 20:36
13	07:27 16:53 9	07:52 (7) 08:01 (7)	07:01 17:31	06:18 18:05 8	06:59 (9) 07:07 (9)	06:26 19:39 11	07:26 (10) 07:37 (10)	05:45 20:11	05:27 20:36
14	07:27 16:54 6	07:54 (7) 08:00 (7)	07:00 17:33	06:17 18:06		06:25 19:40		05:44 20:12	05:27 20:37
15	07:27 16:55		06:58 17:34	06:15 18:07		06:23 19:41		05:43 20:13	05:27 20:37
16	07:26 16:57		06:57 17:35	06:13 18:08		06:22 19:42		05:42 20:14	05:27 20:38
17	07:26 16:58		06:56 17:36	06:12 18:09		06:20 19:43		05:41 20:15	05:27 20:38
18	07:25 16:59		06:54 17:38	06:10 18:10		06:19 19:44		05:40 20:16	05:27 20:38
19	07:25 17:00		06:53 17:39	06:08 18:12		06:17 19:45		05:39 20:17	05:27 20:39
20	07:24 17:01		06:51 17:40	06:07 18:13		06:16 19:47		05:38 20:18	05:27 20:39
21	07:23 17:02		06:50 17:41	06:05 18:14		06:14 19:48		05:38 20:19	05:27 20:39
22	07:23 17:04		06:48 17:43	06:03 18:15		06:33 (10) 06:44 (10)		05:37 20:20	05:27 20:39
23	07:22 17:05		06:47 17:44	06:02 18:16		06:29 (10) 06:47 (10)		05:36 20:21	05:28 20:39
24	07:21 17:06		06:46 17:45	06:00 18:17		06:27 (10) 06:50 (10)		05:35 20:22	05:28 20:40
25	07:21 17:07		06:44 17:46	05:58 07:03 (9) 07:11 (9)		06:25 (10) 06:51 (10)		05:34 20:23	05:28 20:40
26	07:20 17:09		06:43 17:47	05:56 07:02 (9) 07:15 (9)		06:23 (10) 06:52 (10)		05:34 20:24	05:28 20:40
27	07:19 17:10		06:41 17:49	05:55 07:00 (14) 07:16 (9)		06:21 (10) 06:52 (10)		05:33 20:25	05:29 20:40
28	07:18 17:11		06:39 17:50	05:53 06:59 (14) 07:18 (9)		06:21 (10) 06:53 (10)		05:32 20:25	05:29 20:40
29	07:17 17:12			06:51 19:23		07:20 (10) 07:53 (10)		05:32 20:26	05:30 20:40
30	07:16 17:14			06:50 19:24		07:19 (10) 07:53 (10)		05:31 20:27	05:30 20:40
31	07:16 17:15			06:48 19:25		07:19 (10) 07:54 (10)		05:31 20:28	
Ore potenziali eliofania	296		296	369		399		450	454
Totale, caso peggiore	242		56	571		373			
Probabilità di eliofania	0,44		0,46	0,44		0,48			
Tempo di operatività rid.	1,00		1,00	1,00		1,00			
Dir. del vento rid.	1,00		1,00	1,00		1,00			
Totale ridotto	0,44		0,46	0,44		0,48			
Totale effettivo	107		26	251		178			

## Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (30)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:31 20:40	05:55 20:20	06:26 19:36	07:20 (10) 07:42 (10)	06:57 18:45	07:37 (9) 16:58	07:08 16:33	07:32 (7) 12 07:44 (7)
2	05:31 20:40	05:56 20:19	06:28 19:35	07:18 (10) 07:43 (10)	06:58 18:43	07:34 (9) 16:56	07:09 16:32	07:33 (7) 12 07:45 (7)
3	05:32 20:39	05:57 20:18	06:29 19:33	07:16 (10) 07:44 (10)	06:59 18:42	07:33 (9) 16:55	07:10 16:32	07:34 (7) 12 07:46 (7)
4	05:32 20:39	05:58 20:17	06:30 19:31	07:15 (10) 07:45 (10)	07:00 18:40	07:31 (9) 16:54	07:11 16:32	07:35 (7) 12 07:47 (7)
5	05:33 20:39	05:59 20:16	06:31 19:30	07:14 (10) 07:45 (10)	07:02 18:38	07:27 (14) 16:53	07:12 16:32	07:36 (7) 19 08:01 (8)
6	05:33 20:39	06:00 20:14	06:32 19:28	07:13 (10) 07:46 (10)	07:03 18:37	07:24 (14) 16:51	07:13 16:31	07:37 (7) 21 08:03 (8)
7	05:34 20:38	06:01 20:13	06:33 19:26	07:12 (10) 07:46 (10)	07:04 18:35	07:24 (14) 16:50	07:14 16:31	07:38 (7) 23 08:04 (8)
8	05:35 20:38	06:02 20:12	06:34 19:25	07:11 (10) 07:46 (10)	07:05 18:33	07:25 (14) 16:49	07:15 16:31	07:39 (7) 25 08:06 (8)
9	05:35 20:38	06:03 20:11	06:35 19:23	07:11 (10) 07:46 (10)	07:06 18:32	07:26 (14) 16:48	07:16 16:31	07:40 (7) 26 08:07 (8)
10	05:36 20:37	06:04 20:09	06:36 19:21	07:10 (10) 07:46 (10)	07:07 18:30	07:27 (14) 16:47	07:17 16:31	07:41 (7) 27 08:08 (8)
11	05:37 20:37	06:05 20:08	06:37 19:20	07:10 (10) 07:45 (10)	07:08 18:28	07:29 (14) 16:46	07:17 16:31	07:41 (7) 26 08:08 (8)
12	05:37 20:36	06:06 20:07	06:38 19:18	07:10 (10) 07:45 (10)	07:09 18:27	07:30 (14) 16:45	07:18 16:31	07:42 (7) 27 08:09 (8)
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 (10) 07:44 (10)	07:10 18:25	07:31 (14) 16:44	07:19 16:32	07:43 (7) 27 08:10 (8)
14	05:39 20:35	06:08 20:04	06:40 19:14	07:10 (10) 07:43 (10)	07:11 18:24	07:32 (14) 16:43	07:20 16:32	07:44 (7) 27 08:11 (8)
15	05:40 20:35	06:09 20:03	06:41 19:13	07:10 (10) 07:43 (10)	07:13 18:22	07:33 (14) 16:42	07:21 16:32	07:45 (7) 27 08:12 (8)
16	05:40 20:34	06:10 20:01	06:42 19:11	07:10 (10) 07:41 (10)	07:14 18:20	07:34 (9) 16:41	07:21 16:32	07:45 (7) 27 08:12 (8)
17	05:41 20:34	06:11 20:00	06:43 19:09	07:11 (10) 07:40 (10)	07:15 18:19	07:36 (9) 16:41	07:22 16:32	07:46 (7) 27 08:13 (8)
18	05:42 20:33	06:12 19:58	06:44 19:07	07:12 (10) 07:38 (10)	07:16 18:17	06:53 16:40	07:23 16:33	07:47 (7) 27 08:14 (8)
19	05:43 20:32	06:13 19:57	06:45 19:06	07:13 (10) 07:36 (10)	07:17 18:16	06:54 16:39	07:23 16:33	07:47 (7) 27 08:14 (8)
20	05:44 20:31	06:14 19:55	06:46 19:04	07:15 (10) 07:34 (10)	07:18 18:14	06:55 16:38	07:24 16:34	07:48 (7) 27 08:15 (8)
21	05:45 20:31	06:15 19:54	06:47 19:02	07:18 (10) 07:31 (10)	07:19 18:13	06:57 16:38	07:25 16:34	07:48 (7) 27 08:15 (8)
22	05:46 20:30	06:16 19:52	06:48 19:01	07:20 18:11	07:20 18:11	06:58 16:37	07:25 16:34	07:49 (7) 27 08:16 (8)
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	07:22 18:10	06:59 16:36	07:26 16:35	07:49 (7) 27 08:16 (8)
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:23 18:08	07:00 16:36	07:26 16:36	07:49 (7) 27 08:16 (8)
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 17:07	06:24 17:07	07:01 16:35	07:26 16:36	07:50 (7) 27 08:17 (8)
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 17:06	06:25 17:06	07:02 16:35	07:27 16:37	07:50 (7) 27 08:17 (8)
27	05:50 20:25	06:21 19:44	06:53 18:52	07:26 17:04	06:26 17:04	07:03 16:34	07:27 16:37	07:50 (7) 27 08:17 (8)
28	05:51 20:24	06:22 19:43	06:54 18:50	07:28 17:03	06:28 17:03	07:05 16:34	07:27 16:36	07:51 (7) 27 08:18 (8)
29	05:52 20:23	06:23 19:41	06:55 18:48	07:29 17:01	06:29 17:01	07:06 16:33	07:28 16:39	07:51 (7) 27 08:18 (8)
30	05:53 20:22	06:24 19:40	06:56 18:47	07:26 (10) 07:38 (10)	06:30 17:00	07:07 16:33	07:28 16:40	07:51 (7) 27 08:18 (8)
31	05:54 20:21	06:25 19:38	06:57 18:45	07:23 (10) 07:41 (10)	06:31 16:59	07:32 (7) 16:33	07:28 16:40	07:51 (7) 27 08:18 (8)
Ore potenziali eliofania	461	429	375	345	297	26	755	
Totale, caso peggiore		30	623	357	26		0,36	
Probabilità di eliofania		0,67	0,58	0,44	0,40		1,00	
Tempo di operatività rid.		1,00	1,00	1,00	1,00		1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00		1,00	
Totale ridotto		0,67	0,58	0,44	0,40		0,36	
Totale effettivo		20	360	155	11		274	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)









Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (33)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	07:41 (1) 08:04 (1)	06:38 17:51	06:46 19:26	06:00 19:59
2	07:29 16:42	07:14 17:17	07:41 (1) 08:05 (1)	06:36 17:52	06:45 19:27	05:58 20:00
3	07:29 16:43	07:13 17:19	07:40 (1) 08:06 (1)	06:35 17:53	06:43 19:28	05:57 20:01
4	07:29 16:44	07:12 17:20	07:40 (1) 08:07 (1)	06:33 17:55	06:41 19:29	05:56 20:02
5	07:29 16:45	07:11 17:21	07:40 (1) 08:07 (1)	06:32 17:56	06:40 19:30	05:55 20:03
6	07:29 16:46	07:09 17:23	07:39 (1) 08:07 (1)	06:30 17:57	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	07:39 (1) 08:07 (1)	06:28 17:58	06:36 19:33	05:52 20:05
8	07:29 16:48	07:07 17:25	07:40 (1) 08:07 (1)	06:27 17:59	06:35 19:34	05:51 20:06
9	07:28 16:49	07:50 (10) 07:51 (10)	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07
10	07:28 16:50	07:50 (10) 07:52 (10)	07:05 17:28	06:24 18:02	06:31 19:36	05:49 20:08
11	07:28 16:51	07:50 (10) 07:52 (10)	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09
12	07:28 16:52	07:49 (10) 07:52 (10)	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10
13	07:27 16:53	07:49 (10) 07:52 (10)	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11
14	07:27 16:54	07:49 (10) 07:53 (10)	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12
15	07:27 16:55	07:48 (10) 07:51 (10)	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13
16	07:26 16:57	07:48 (11) 07:51 (11)	06:57 17:35	06:14 18:08	06:22 19:42	05:42 20:14
17	07:26 16:58	07:47 (11) 07:51 (11)	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15
18	07:25 16:59	07:47 (11) 07:52 (11)	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16
19	07:25 17:00	07:46 (11) 07:52 (11)	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17
20	07:24 17:01	07:45 (11) 07:52 (11)	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18
21	07:24 17:02	07:45 (11) 07:52 (11)	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19
22	07:23 17:04	07:46 (11) 07:51 (11)	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20
23	07:22 17:05	07:46 (11) 07:45 (11)	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21
24	07:21 17:06	07:45 (11) 07:44 (11)	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22
25	07:21 17:07	07:45 (11) 07:44 (11)	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23
26	07:20 17:09	07:44 (11) 07:47 (11)	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24
27	07:19 17:10	07:50 (1) 07:54 (1)	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25
28	07:18 17:11	07:46 (1) 07:58 (1)	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26
29	07:17 17:12	07:45 (1) 08:00 (1)	06:39 17:51	06:51 19:23	06:02 19:56	05:32 20:26
30	07:17 17:14	07:43 (1) 08:02 (1)	06:38 17:52	06:50 19:24	06:01 19:58	05:31 20:27
31	07:16 17:15	07:42 (1) 08:03 (1)	06:37 17:53	06:48 19:25	05:31 19:59	05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	126	407				
Probabilità di eliofania	0,44	0,46				
Tempo di operatività rid.	1,00	1,00				
Dir. del vento rid.	1,00	1,00				
Totale ridotto	0,44	0,46				
Totale effettivo	56	186				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
(WTG che provoca l'inizio dell'ombreggiamento)  
(WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (33)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:09 (1) 16:33	07:32 (10) 07:34 (10)
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:10 (1) 07:37 (1)	07:33 (10) 16:32
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:09 (1) 07:37 (1)	07:34 (10) 16:32
4	05:32 20:39	05:58 20:17	06:30 19:32	07:01 18:40	06:36 16:54	07:09 (1) 07:37 (1)	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:09 (1) 07:37 (1)	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:10 (1) 07:37 (1)	07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:10 (1) 07:36 (1)	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:10 (1) 07:36 (1)	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:12 (1) 07:36 (1)	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:12 (1) 07:35 (1)	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:13 (1) 07:34 (1)	07:18 16:31
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:15 (1) 07:33 (1)	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:17 (1) 07:32 (1)	07:19 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:19 (1) 07:30 (1)	07:20 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:23 (1) 07:25 (1)	07:21 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41		07:21 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41		07:22 16:32
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40		07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39		07:23 16:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:21 (11)	07:24 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	5 07:26 (11)	07:25 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	7 07:27 (11)	07:25 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	7 07:28 (11)	07:26 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	6 07:29 (11)	07:26 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 17:07	07:01 16:35	5 07:29 (11)	07:27 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 17:06	07:02 16:35	5 07:30 (11)	07:27 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 17:04	07:04 16:34	4 07:27 (10)	07:27 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	07:28 17:03	07:05 16:34	3 07:30 (10)	07:28 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	07:29 17:01	07:06 16:33	4 07:33 (10)	07:28 16:39
30	05:53 20:23	06:25 19:40	06:56 18:47	07:30 17:00	07:07 16:33	3 07:33 (10)	07:28 16:40
31	05:54 20:21	06:26 19:38		06:31 16:59	07:10 (1) 07:36 (1)		07:28 16:40
Ore potenziali eliofania	461	429	375	345	297		286
Totale, caso peggiore				146	383		5
Probabilità di eliofania				0,44	0,40		0,36
Tempo di operatività rid.				1,00	1,00		1,00
Dir. del vento rid.				1,00	1,00		1,00
Totale ridotto				0,44	0,40		0,36
Totale effettivo				64	155		2

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: Al - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (35)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:14 17:16	07:35 (5) 07:54 (5)	06:38 17:51	17:16 (12) 19:26	06:46 19:58	05:30 20:29	19:25 (3) 20:01 (3)
2	07:28 16:42	07:13 17:17	07:34 (5) 07:55 (5)	06:36 17:52	17:17 (12) 19:27	06:44 19:27	05:58 19:59	19:24 (3) 20:01 (3)
3	07:28 16:43	07:12 17:19	07:33 (5) 07:56 (5)	06:35 17:53	17:22 (12) 19:28	06:43 19:28	05:57 20:01	19:25 (3) 20:02 (3)
4	07:29 16:44	07:11 17:20	07:31 (5) 07:56 (5)	06:33 17:54	19:29	06:41 19:29	05:56 20:02	19:25 (3) 20:03 (3)
5	07:29 16:45	07:10 17:21	07:30 (5) 07:57 (5)	06:31 17:56	19:30	06:39 19:30	05:54 20:03	19:24 (3) 20:02 (3)
6	07:28 16:46	07:09 17:22	07:29 (5) 07:57 (5)	06:30 17:57	19:31	06:38 19:31	05:53 20:04	19:24 (3) 20:03 (3)
7	07:28 16:47	07:08 17:24	07:28 (5) 07:58 (5)	06:28 17:58	19:02 (13) 19:32	05:52 19:32	20:05 20:05	19:24 (3) 20:04 (3)
8	07:28 16:48	07:07 17:25	07:27 (5) 07:58 (5)	06:27 17:59	19:04 (13) 19:33	20:05 20:06	05:51 20:06	19:24 (3) 20:05 (3)
9	07:28 16:49	07:06 17:26	07:26 (5) 07:59 (5)	06:25 18:00	19:05 (13) 19:34	20:06 20:07	05:50 20:07	19:23 (3) 20:04 (3)
10	07:28 16:50	07:04 17:27	07:24 (5) 07:58 (5)	06:23 18:01	19:05 (13) 19:35	05:48 20:08	19:35 (2) 19:37 (2)	19:23 (3) 20:04 (3)
11	07:28 16:51	07:03 17:29	07:23 (5) 07:58 (5)	06:22 18:02	19:06 (13) 19:37	20:08 20:09	19:41 (2) 19:43 (2)	20:05 (3) 20:05 (3)
12	07:27 16:52	07:02 17:30	07:22 (5) 07:58 (5)	06:20 18:04	19:07 (13) 19:38	20:09 20:10	19:44 (2) 19:45 (2)	19:24 (3) 20:06 (3)
13	07:27 16:53	07:01 17:31	07:20 (5) 07:57 (5)	06:18 18:05	19:04 (13) 19:39	20:10 20:11	19:46 (2) 19:47 (2)	19:24 (3) 20:06 (3)
14	07:27 16:54	06:59 17:33	07:20 (5) 07:57 (5)	06:17 18:06	19:40	20:12	19:48 (2) 19:49 (2)	19:24 (3) 20:06 (3)
15	07:26 16:55	06:58 17:34	07:21 (5) 07:57 (5)	06:15 18:07	19:41	20:13	19:50 (2) 19:51 (2)	19:24 (3) 20:07 (3)
16	07:26 16:56	06:57 17:35	07:21 (5) 07:56 (5)	06:13 18:08	19:42	20:14	19:52 (2) 19:53 (2)	19:24 (3) 20:07 (3)
17	07:25 16:58	06:55 17:36	07:22 (5) 07:56 (5)	06:12 18:09	19:43	20:15	19:54 (2) 19:55 (2)	19:24 (3) 20:07 (3)
18	07:25 16:59	06:54 17:38	07:23 (5) 07:55 (5)	06:10 18:10	19:44	20:16	19:56 (2) 19:57 (2)	19:24 (3) 20:07 (3)
19	07:24 17:00	06:53 17:39	07:24 (5) 07:53 (5)	06:08 18:11	19:45	20:17	19:58 (2) 19:59 (2)	19:25 (3) 20:07 (3)
20	07:24 17:01	06:51 17:40	07:26 (5) 07:52 (5)	06:07 18:13	19:46	20:18	20:00 (2) 20:01 (2)	19:26 (3) 20:08 (3)
21	07:23 17:02	06:50 17:41	07:27 (5) 07:50 (5)	06:05 18:14	17:41 (7) 19:48	06:14 19:48	20:19 (2) 20:20 (2)	19:26 (3) 20:08 (3)
22	07:23 17:04	06:48 17:42	07:29 (5) 07:48 (5)	06:03 18:15	17:40 (7) 19:49	06:12 19:49	20:21 (2) 20:22 (2)	19:26 (3) 20:08 (3)
23	07:22 17:05	06:47 17:44	07:32 (5) 07:43 (5)	06:01 18:16	17:39 (7) 19:50	06:11 19:50	20:23 (2) 20:24 (2)	19:26 (3) 20:08 (3)
24	07:21 17:06	06:45 17:45	07:43 (5) 18:17	06:00 18:17	17:46 (7) 19:51	06:09 19:51	20:25 (2) 20:26 (2)	19:26 (3) 20:09 (3)
25	07:20 17:07	06:44 17:46	07:41 (7) 18:18	05:58 18:18	17:41 (7) 19:52	06:08 19:52	20:27 (2) 20:28 (2)	19:26 (3) 20:09 (3)
26	07:20 17:08	07:40 (5) 07:44 (5)	06:42 17:47	17:19 (12) 18:19	05:56 19:53	06:06 19:53	20:29 (2) 20:30 (2)	19:26 (3) 20:09 (3)
27	07:19 17:10	07:40 (5) 07:47 (5)	06:41 17:48	17:17 (12) 18:20	05:55 19:54	06:05 19:54	20:31 (2) 20:32 (2)	19:27 (3) 20:10 (3)
28	07:18 17:11	07:39 (5) 07:49 (5)	06:39 17:50	17:16 (12) 18:21	05:53 19:55	06:04 19:55	20:33 (2) 20:34 (2)	19:27 (3) 20:09 (3)
29	07:17 17:12	07:38 (5) 07:51 (5)	18:21 19:22	06:51 19:22	06:02 19:56	06:02 19:56	20:35 (2) 20:36 (2)	19:27 (3) 20:09 (3)
30	07:16 17:13	07:37 (5) 07:52 (5)	19:24 19:24	06:50 19:24	06:01 19:57	06:01 19:57	20:37 (2) 20:38 (2)	19:28 (3) 20:10 (3)
31	07:15 17:15	07:36 (5) 07:53 (5)	06:48 19:25	06:48 19:25	19:57	05:31 20:28	19:25 (2) 20:00 (3)	20:10 (3)
Ore potenziali eliofanía	296	296	369	399	399	450	454	1235
Totale, caso peggiore	66	679	39	39	39	578	1235	
Probabilità di eliofanía	0,44	0,46	0,44	0,44	0,48	0,47	0,54	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,44	0,46	0,44	0,44	0,48	0,47	0,54	
Totale effettivo	29	310	17	19	19	269	667	

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (36)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:14 17:16	07:35 (5) 08:03 (5)	06:38 17:51	17:17 (12) 06:46 17:24 (12)	06:00 19:58	05:30 19:18 (3)
2	07:28 16:42	07:13 17:17	07:34 (5) 08:04 (5)	06:36 17:52	17:18 (12) 06:44 17:22 (12)	05:58 19:59	05:30 20:29
3	07:28 16:43	07:12 17:19	07:33 (5) 08:04 (5)	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30
4	07:29 16:44	07:11 17:20	07:31 (5) 08:04 (5)	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	07:30 (5) 08:04 (5)	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31
6	07:28 16:46	07:09 17:22	07:29 (5) 08:04 (5)	06:30 17:57	06:38 19:31	05:53 19:00 (13)	05:28 19:31 (2)
7	07:28 16:47	07:08 17:24	07:28 (5) 08:04 (5)	06:28 17:58	06:36 19:32	05:52 18:58 (13)	05:28 19:28 (2)
8	07:28 16:48	07:07 17:25	07:27 (5) 08:04 (5)	06:27 17:59	06:34 19:33	05:51 18:57 (14)	05:27 19:43 (2)
9	07:28 16:49	07:06 17:26	07:26 (5) 08:04 (5)	06:25 18:00	06:33 19:34	05:50 18:56 (14)	05:27 19:43 (2)
10	07:28 16:50	07:04 17:27	07:24 (5) 08:03 (5)	06:23 18:01	06:31 19:36	05:48 18:57 (14)	05:27 19:43 (2)
11	07:28 16:51	07:03 17:29	07:25 (5) 08:03 (5)	06:22 18:02	06:30 19:37	05:47 18:58 (14)	05:27 19:44 (2)
12	07:27 16:52	07:02 17:30	07:26 (5) 08:03 (5)	06:20 18:04	06:28 19:38	05:46 20:10	05:27 19:22 (2)
13	07:27 16:53	07:01 17:31	07:26 (5) 08:02 (5)	06:18 18:05	06:26 19:39	05:45 20:11	05:27 19:22 (2)
14	07:27 16:54	06:59 17:33	07:27 (5) 08:01 (5)	06:17 18:06	06:25 19:40	05:44 20:12	05:27 19:21 (2)
15	07:26 16:55	06:58 17:34	07:29 (5) 08:00 (5)	06:15 18:07	06:23 19:41	05:43 20:13	05:27 19:21 (2)
16	07:26 16:56	06:57 17:35	07:29 (5) 07:58 (5)	06:13 18:08	06:22 19:42	05:42 20:14	05:27 19:21 (2)
17	07:25 16:58	06:55 17:36	07:31 (5) 07:57 (5)	06:12 18:09	06:20 19:43	05:41 20:15	05:27 19:21 (2)
18	07:25 16:59	06:54 17:37	07:33 (5) 07:56 (5)	06:10 18:10	06:18 19:44	05:40 20:16	05:27 19:21 (2)
19	07:24 17:00	07:46 (5) 07:47 (5)	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	05:27 19:21 (2)
20	07:24 17:01	07:45 (5) 07:49 (5)	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	05:27 19:21 (2)
21	07:23 17:02	07:44 (5) 07:51 (5)	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 19:21 (2)
22	07:23 17:04	07:44 (5) 07:53 (5)	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 19:21 (3)
23	07:22 17:05	07:43 (5) 07:55 (5)	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	05:27 19:20 (3)
24	07:21 17:06	07:42 (5) 07:56 (5)	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 19:19 (3)
25	07:20 17:07	07:41 (5) 07:57 (5)	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 19:19 (3)
26	07:20 17:08	07:40 (5) 07:58 (5)	06:42 17:47	17:19 (12) 18:19	06:06 19:53	05:34 20:24	05:28 19:19 (3)
27	07:19 17:10	07:40 (5) 08:00 (5)	06:41 17:48	17:17 (12) 18:20	06:05 19:54	05:33 20:24	05:29 19:18 (3)
28	07:18 17:11	07:39 (5) 08:01 (5)	06:39 17:50	17:16 (12) 18:21	06:04 19:55	05:32 20:25	05:29 19:19 (3)
29	07:17 17:12	07:38 (5) 08:01 (5)	06:38 19:22	18:21 06:51	06:02 19:56	05:32 20:26	05:29 19:18 (3)
30	07:16 17:13	07:37 (5) 08:02 (5)	06:37 19:24	06:50 19:24	06:01 19:57	05:31 20:27	05:30 19:18 (3)
31	07:15 17:15	07:36 (5) 08:03 (5)	06:48 19:25	06:48 19:25	06:01 20:28	05:31 20:28	05:30 19:18 (3)
Ore potenziali eliofania	296	296	369	399	450	454	1312
Totale, caso peggiore	198	643	11	40	760	0,47	0,54
Probabilità di eliofania	0,44	0,46	0,44	0,48	0,47	0,47	0,54
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Totale ridotto	0,44	0,46	0,44	0,48	0,47	0,47	0,54
Totale effettivo	87	293	5	19	354	708	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (37)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	07:16 (5) 07:42 (5)	06:46 19:26	06:00 19:58
2	07:28 16:42	07:13 17:17	06:36 17:52	07:17 (5) 17:25 (12)	06:44 19:27	05:58 19:59
3	07:28 16:43	07:12 17:19	06:35 17:53	07:20 (5) 17:27 (12)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	07:24 (5) 17:27 (12)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	07:30 (5) 07:33 (5)	06:31 17:26 (12)	06:39 19:30	05:54 20:03
6	07:28 16:46	07:09 17:22	07:29 (5) 07:38 (5)	06:30 17:20 (12)	06:38 19:31	05:53 20:04
7	07:28 16:47	07:08 17:24	07:28 (5) 07:40 (5)	06:28 17:58	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	07:27 (5) 07:43 (5)	06:27 17:59	06:34 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	07:26 (5) 07:44 (5)	06:25 18:00	06:33 19:34	05:50 20:07
10	07:28 16:50	07:04 17:27	07:24 (5) 07:45 (5)	06:23 18:01	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	07:23 (5) 07:46 (5)	06:22 18:02	06:30 19:37	05:47 20:09
12	07:27 16:52	07:02 17:30	07:22 (5) 07:48 (5)	06:20 18:04	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	07:20 (5) 07:48 (5)	06:18 18:05	06:26 19:39	05:45 20:11
14	07:27 16:54	06:59 17:33	07:19 (5) 07:49 (5)	06:17 18:06	06:25 19:40	05:44 20:12
15	07:26 16:55	06:58 17:34	07:18 (5) 07:50 (5)	06:15 18:07	06:23 19:41	05:43 20:13
16	07:26 16:56	06:57 17:35	07:16 (5) 07:49 (5)	06:13 18:08	06:22 19:42	05:42 20:14
17	07:25 16:58	06:55 17:36	07:15 (5) 07:50 (5)	06:12 18:09	06:20 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	07:14 (5) 07:50 (5)	06:10 18:10	06:18 19:44	05:40 20:16
19	07:24 17:00	06:53 17:39	07:12 (5) 07:50 (5)	06:08 18:11	06:17 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	07:11 (5) 07:50 (5)	06:07 18:13	06:15 19:46	05:38 20:18
21	07:23 17:02	06:50 17:41	07:10 (5) 07:49 (5)	06:05 18:14	06:14 19:48	05:37 20:19
22	07:23 17:04	06:48 17:42	07:11 (5) 07:50 (5)	06:03 18:15	06:12 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	07:11 (5) 07:49 (5)	06:01 18:16	06:11 19:50	05:36 20:21
24	07:21 17:06	06:45 17:45	07:12 (5) 07:48 (5)	06:00 18:17	06:09 17:46 (7)	05:35 20:22
25	07:20 17:07	06:44 17:46	07:12 (5) 07:47 (5)	05:58 18:18	06:08 17:49 (7)	05:34 20:23
26	07:20 17:08	06:42 17:47	07:13 (5) 07:47 (5)	05:56 18:19	06:06 17:41 (7)	05:34 20:24
27	07:19 17:10	06:41 17:48	07:13 (5) 07:45 (5)	05:55 18:20	06:05 17:41 (7)	05:33 20:24
28	07:18 17:11	06:39 17:50	07:14 (5) 07:43 (5)	05:53 18:21	06:04 17:42 (7)	05:32 20:25
29	07:17 17:12		06:51 19:22		06:02 19:56	05:32 20:26
30	07:16 17:13		06:50 19:24		06:01 19:57	05:31 20:27
31	07:15 17:15		06:48 19:25		05:31 20:28	05:30 19:30 (2)
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		681	133		289	790
Probabilità di eliofania		0,46	0,44		0,47	0,54
Tempo di operatività rid.		1,00	1,00		1,00	1,00
Dir. del vento rid.		1,00	1,00		1,00	1,00
Totale ridotto		0,46	0,44		0,47	0,54
Totale effettivo		311	58		18	426

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (37)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	19:36 (2) 20:03 (2)	05:55 20:20	06:26 19:36	06:57 18:45	06:32 07:14 (5)
2	05:31 20:39	19:37 (2) 20:03 (2)	05:56 20:19	06:27 19:35	06:58 18:43	06:33 07:13 (5)
3	05:31 20:39	19:36 (2) 20:03 (2)	05:57 20:18	06:28 19:33	06:59 18:41	06:35 06:57 (5)
4	05:32 20:39	19:37 (2) 20:04 (2)	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:55 (5)
5	05:33 20:39	19:37 (2) 20:03 (2)	05:59 20:16	06:30 19:30	07:01 18:38	06:37 16:52
6	05:33 20:39	19:37 (2) 20:04 (2)	06:00 20:14	06:31 19:28	07:02 18:36	06:38 07:00 (5)
7	05:34 20:38	19:38 (2) 20:05 (2)	06:01 20:13	06:32 19:26	07:04 18:35	06:39 16:50
8	05:34 20:38	19:37 (2) 20:04 (2)	06:02 20:12	06:33 19:25	07:05 18:33	06:41 16:49
9	05:35 20:38	19:38 (2) 20:05 (2)	06:03 20:11	06:34 19:23	07:06 18:31	06:42 16:48
10	05:36 20:37	19:38 (2) 20:05 (2)	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47
11	05:36 20:37	19:38 (2) 20:04 (2)	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46
12	05:37 20:36	19:38 (2) 20:05 (2)	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45
13	05:38 20:36	19:39 (2) 20:05 (2)	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44
14	05:39 20:35	19:38 (2) 20:04 (2)	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43
15	05:39 20:35	19:39 (2) 20:04 (2)	06:09 20:02	06:41 19:12	07:12 18:36 (7)	06:49 07:45 (5)
16	05:40 20:34	19:40 (2) 20:04 (2)	06:10 20:01	06:42 19:11	07:13 18:37 (7)	06:50 16:41
17	05:41 20:33	19:40 (2) 20:04 (2)	06:11 20:00	06:43 19:09	07:15 18:30 (7)	06:52 07:43 (5)
18	05:42 20:33	19:41 (2) 20:04 (2)	06:12 19:58	06:44 19:07	07:16 18:29 (7)	06:53 07:43 (5)
19	05:43 20:32	19:41 (2) 20:03 (2)	06:13 19:57	06:45 19:06	07:17 18:30 (7)	06:54 07:42 (5)
20	05:44 20:31	19:41 (2) 20:03 (2)	06:14 19:55	06:46 19:04	07:18 18:14	06:55 08:20 (5)
21	05:44 20:31	19:42 (2) 20:02 (2)	06:15 19:54	06:47 19:02	07:19 18:13	06:56 08:20 (5)
22	05:45 20:30	19:43 (2) 20:02 (2)	06:16 19:52	06:48 19:00	07:20 18:11	06:58 08:20 (5)
23	05:46 20:29	19:45 (2) 20:01 (2)	06:17 19:51	06:49 18:59	07:21 18:10	06:59 08:20 (5)
24	05:47 20:28	19:46 (2) 20:00 (2)	06:18 19:49	06:50 18:57	07:23 18:08	07:00 08:20 (5)
25	05:48 20:27	19:48 (2) 19:58 (2)	06:19 19:47	06:51 18:55	07:24 17:07	07:01 16:35
26	05:49 20:26	19:52 (2) 19:54 (2)	06:20 19:46	06:52 18:53	07:25 17:05	07:02 07:19 (5)
27	05:50 20:25	06:21 19:44	19:02 (14)	06:53 18:52	07:26 17:04	07:03 06:48 (5)
28	05:51 20:24	06:22 19:43	19:00 (14)	06:54 18:50	07:27 17:03	07:04 06:49 (5)
29	05:52 20:23	06:23 19:41	19:00 (14)	06:55 18:48	07:28 17:01	07:06 06:50 (5)
30	05:53 20:22	06:24 19:40	19:00 (14)	06:56 18:47	07:29 17:00	07:07 06:51 (5)
31	05:54 20:21	06:25 19:38	19:01 (14)	06:57 18:45	07:30 16:59	07:08 06:53 (5)
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	594	38	29	715	75	
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,61	0,67	0,58	0,44	0,40	
Totale effettivo	360	25	17	311	30	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (38)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:14 17:16	06:38 17:51		06:46 19:26		05:30 19:30 (2)
2	07:28 16:42	07:13 17:17	06:36 17:52	17:21 (12)	06:44 19:27		26 19:56 (2)
3	07:28 16:43	07:12 17:19	06:35 17:53	17:20 (12)	06:43 19:28		26 19:56 (2)
4	07:29 16:44	07:11 17:20	06:33 17:54	17:19 (12)	06:41 19:29		27 19:57 (2)
5	07:29 16:45	07:10 17:21	06:31 17:56	17:19 (12)	06:39 19:30		26 19:57 (2)
6	07:28 16:46	07:09 17:22	06:30 17:57	17:21 (12)	06:38 19:31		26 19:57 (2)
7	07:28 16:47	07:08 17:24	06:28 17:58		06:36 19:32		26 19:57 (2)
8	07:28 16:48	07:07 17:25	06:27 17:59		06:34 19:33		26 19:58 (2)
9	07:28 16:49	07:06 17:26	06:25 18:00		06:33 19:34		26 19:57 (2)
10	07:28 16:50	07:04 17:27	06:23 18:01		06:31 19:36		26 19:57 (2)
11	07:28 16:51	07:03 17:29	06:22 18:02		06:30 19:37	19:04 (13)	25 19:57 (2)
12	07:27 16:52	07:02 17:30	06:20 18:04		06:28 19:38	19:06 (13)	25 19:57 (2)
13	07:27 16:53	07:01 17:31	06:18 18:05		06:26 19:39	19:01 (14)	27 19:59 (3)
14	07:27 16:54	06:59 17:33	06:17 18:06		06:25 19:40	19:08 (13)	27 20:00 (3)
15	07:26 16:55	06:58 17:34	06:15 18:07		06:23 19:41	19:08 (13)	28 20:01 (3)
16	07:26 16:56	06:57 17:35	06:13 18:08		06:22 19:42	19:00 (14)	29 20:02 (3)
17	07:25 16:58	06:55 17:36	06:12 18:09		06:20 19:43	19:08 (13)	29 20:03 (3)
18	07:25 16:59	06:54 17:38	06:10 18:10		06:18 19:44	19:09 (13)	30 20:04 (3)
19	07:24 17:00	06:53 17:39	06:08 18:11		06:17 19:45	19:34 (2)	30 20:04 (3)
20	07:24 17:01	06:51 17:40	06:07 18:13		06:15 19:46	19:49 (2)	30 20:05 (3)
21	07:23 17:02	06:50 17:41	06:05 18:14		06:14 19:48	19:32 (2)	30 20:05 (3)
22	07:23 17:04	06:48 17:42	06:03 18:15		06:12 19:49	19:51 (2)	30 20:05 (3)
23	07:22 17:05	06:47 17:44	06:01 18:16		06:11 19:50	20:20 (2)	30 20:05 (3)
24	07:21 17:06	06:45 17:45	06:00 18:17	17:44 (7)	06:09 19:51	20:21 (2)	29 20:05 (3)
25	07:20 17:07	06:44 17:46	05:58 18:18	17:43 (7)	06:08 19:52	20:22 (2)	29 20:05 (3)
26	07:20 17:08	06:42 17:47	05:56 18:19	17:42 (7)	06:06 19:53	20:23 (2)	29 20:05 (3)
27	07:19 17:10	06:41 17:48	05:55 18:20	17:41 (7)	06:05 19:54	20:24 (2)	29 20:05 (3)
28	07:18 17:11	06:39 17:50	05:53 18:21	17:43 (7)	06:04 19:55	20:25 (2)	28 20:04 (3)
29	07:17 17:12		06:51 19:22	17:47 (7)	06:02 19:56	20:26 (2)	27 20:03 (3)
30	07:16 17:13		06:50 19:24		06:01 19:57	20:27 (2)	27 20:03 (3)
31	07:15 17:15		06:48 19:25			20:28 (2)	26 19:56 (2)
Ore potenziali eliofania	296	296	369	399	450	454	834
Totale, caso peggiore			57	41	315		0,54
Probabilità di eliofania			0,44	0,48	0,47		1,00
Tempo di operatività rid.			1,00	1,00	1,00		1,00
Dir. del vento rid.			1,00	1,00	1,00		1,00
Totale ridotto			0,44	0,48	0,47		0,54
Totale effettivo			25	20	147		450

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (38)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:30 20:40	19:36 (2) 20:02 (2)	05:55 20:20	06:26 19:36	19:03 (13) 19:05 (13)	06:57 18:45	06:32 16:57	07:08 16:32	
2	05:31 20:39	19:37 (2) 20:02 (2)	05:56 20:19	06:27 19:35		06:58 18:43	06:33 16:56	07:09 16:32	
3	05:31 20:39	19:36 (2) 20:02 (2)	05:57 20:18	06:28 19:33		06:59 18:41	06:35 16:55	07:10 16:32	
4	05:32 20:39	19:37 (2) 20:03 (2)	05:58 20:17	06:29 19:31		07:00 18:40	06:36 16:54	07:11 16:32	
5	05:33 20:39	19:36 (2) 20:02 (2)	05:59 20:16	06:30 19:30		07:01 18:38	06:37 16:52	07:12 16:31	
6	05:33 20:39	19:37 (2) 20:03 (2)	06:00 20:14	06:31 19:28		07:02 18:36	06:38 16:51	07:13 16:31	
7	05:34 20:38	19:37 (2) 20:04 (2)	06:01 20:13	06:32 19:26		07:04 18:35	06:39 16:50	07:14 16:31	
8	05:34 20:38	19:37 (2) 20:03 (2)	06:02 20:12	06:33 19:25		07:05 18:33	06:41 16:49	07:15 16:31	
9	05:35 20:38	19:37 (2) 20:04 (2)	06:03 20:11	06:34 19:23		07:06 18:31	06:42 16:48	07:16 16:31	
10	05:36 20:37	19:38 (2) 20:04 (2)	06:04 20:09	06:36 19:21		07:07 18:30	06:43 16:47	07:16 16:31	
11	05:36 20:37	19:37 (2) 20:04 (2)	06:05 20:08	06:37 19:19		07:08 18:28	06:44 16:46	07:17 16:31	
12	05:37 20:36	19:38 (2) 20:04 (2)	06:06 20:07	06:38 19:18		07:09 18:27	06:46 16:45	07:18 16:31	
13	05:38 20:36	19:38 (2) 20:04 (2)	06:07 20:05	06:39 19:16		07:10 18:25	06:47 16:44	07:19 16:31	
14	05:39 20:35	19:38 (2) 20:04 (2)	06:08 20:04	06:40 19:14		07:11 18:23	06:48 16:43	07:20 16:32	
15	05:39 20:35	19:38 (2) 20:04 (2)	06:09 20:02	06:41 19:12	4	18:32 (7) 18:36 (7)	07:12 18:22	06:49 16:42	07:20 16:32
16	05:40 20:34	19:39 (2) 20:04 (2)	06:10 20:01	06:42 19:11	6	18:31 (7) 18:37 (7)	07:13 18:20	06:50 16:41	07:21 16:32
17	05:41 20:33	19:39 (2) 20:04 (2)	06:11 20:00	06:43 19:09	7	18:30 (7) 18:37 (7)	07:15 18:19	06:52 16:40	07:22 16:32
18	05:42 20:33	19:40 (2) 20:04 (2)	06:12 19:58	06:44 19:07	6	18:30 (7) 18:36 (7)	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	19:40 (2) 20:03 (2)	06:13 19:57	06:45 19:06	4	18:31 (7) 18:35 (7)	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	19:40 (2) 20:03 (2)	06:14 19:55	06:46 19:04		07:18 18:14	06:55 16:38	07:24 16:33	
21	05:44 20:31	19:41 (2) 20:02 (2)	06:15 19:54	06:47 19:02		07:19 18:13	06:56 16:37	07:24 16:34	
22	05:45 20:30	19:42 (2) 20:02 (2)	06:16 19:52	06:48 19:00		07:20 18:11	06:58 16:37	07:25 16:34	
23	05:46 20:29	19:43 (2) 20:01 (2)	06:17 19:51	06:49 18:59		07:21 18:10	06:59 16:36	07:25 16:35	
24	05:47 20:28	19:44 (2) 20:01 (2)	06:18 19:49	06:50 18:57		07:23 18:08	07:00 16:36	07:26 16:35	
25	05:48 20:27	19:45 (2) 19:59 (2)	06:19 19:47	06:51 18:55		06:24 17:07	07:01 16:35	07:26 16:36	
26	05:49 20:26	19:47 (2) 19:58 (2)	06:20 19:46	06:52 18:53		06:25 17:05	07:02 16:34	07:27 16:37	
27	05:50 20:25	19:50 (2) 19:54 (2)	06:21 19:44	19:02 (14) 06:53	6	19:08 (13) 18:52	06:26 17:04	07:03 16:34	
28	05:51 20:24	19:54 (2) 19:43	06:22 19:43	19:01 (14) 06:54	8	19:09 (13) 18:50	06:27 17:03	07:04 16:34	
29	05:52 20:23	19:43 (2) 19:41	06:23 19:41	19:00 (14) 06:55	9	19:00 (14) 18:48	06:29 17:01	07:06 16:33	
30	05:53 20:22	06:24 19:40	06:24 19:40	19:00 (14) 06:56	8	19:00 (14) 18:47	06:30 17:00	07:07 16:33	
31	05:54 20:21	06:25 19:38	06:25 19:38	19:00 (14) 19:07 (13)	7	19:00 (14) 18:59	06:31 16:59	07:28 16:40	
Ore potenziali eliofania	461	429	375	345	297	286			
Totale, caso peggiore	617	38	29	30					
Probabilità di eliofania	0,61	0,67	0,58	0,44					
Tempo di operatività rid.	1,00	1,00	1,00	1,00					
Dir. del vento rid.	1,00	1,00	1,00	1,00					
Totale ridotto	0,61	0,67	0,58	0,44					
Totale effettivo	374	25	17	13					

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
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DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: AN - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (40)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for time slots (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofania', 'Totale, caso peggiore', 'Probabilità di eliofania', 'Tempo di operatività rid.', 'Dir. del vento rid.', 'Totale ridotto', and 'Totale effettivo'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)
(WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)







Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (41)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	06:26	06:57	06:32	14:09 (5) 07:08 14:08 (5)
	20:40	20:20	19:36	18:45	16:57	35 14:44 (5) 16:32 44 14:52 (5)
2	05:31	05:56	06:27	06:58	06:33	14:07 (5) 07:09 14:09 (5)
	20:39	20:19	19:35	18:43	16:56	38 14:45 (5) 16:32 43 14:52 (5)
3	05:31	05:57	06:28	06:59	06:35	14:05 (5) 07:10 14:10 (5)
	20:39	20:18	19:33	18:41	16:55	41 14:46 (5) 16:32 42 14:52 (5)
4	05:32	05:58	06:29	07:00	06:36	14:05 (5) 07:11 14:11 (5)
	20:39	20:17	19:31	18:40	16:54	42 14:47 (5) 16:32 41 14:52 (5)
5	05:32	05:59	06:30	07:01	06:37	14:04 (5) 07:12 14:11 (5)
	20:39	20:15	19:30	18:38	16:52	44 14:48 (5) 16:31 41 14:52 (5)
6	05:33	06:00	06:31	07:02	06:38	14:02 (5) 07:13 14:12 (5)
	20:39	20:14	19:28	18:36	16:51	46 14:48 (5) 16:31 40 14:52 (5)
7	05:34	06:01	06:32	07:03	06:39	14:02 (5) 07:14 14:13 (5)
	20:38	20:13	19:26	18:35	16:50	47 14:49 (5) 16:31 39 14:52 (5)
8	05:34	06:02	06:33	07:05	06:41	14:02 (5) 07:15 14:14 (5)
	20:38	20:12	19:24	18:33	16:49	47 14:49 (5) 16:31 38 14:52 (5)
9	05:35	06:03	06:34	07:06	06:42	14:01 (5) 07:16 14:15 (5)
	20:38	20:10	19:23	18:31	16:48	49 14:50 (5) 16:31 37 14:52 (5)
10	05:36	06:04	06:35	07:07	06:43	14:01 (5) 07:16 14:15 (5)
	20:37	20:09	19:21	18:30	16:47	50 14:51 (5) 16:31 36 14:51 (5)
11	05:36	06:05	06:36	07:08	06:44	14:01 (5) 07:17 14:16 (5)
	20:37	20:08	19:19	18:28	16:46	50 14:51 (5) 16:31 35 14:51 (5)
12	05:37	06:06	18:59 (4) 06:37	07:09	06:45	14:00 (5) 07:18 14:17 (5)
	20:36	20:07	19:04 (4) 19:18	18:27	16:45	51 14:51 (5) 16:31 34 14:51 (5)
13	05:38	06:07	18:55 (4) 06:38	07:10	06:47	14:01 (5) 07:19 14:18 (5)
	20:36	20:05	19:07 (4) 19:16	18:25	16:44	51 14:52 (5) 16:31 34 14:52 (5)
14	05:39	06:08	18:53 (4) 06:40	07:11	06:48	14:00 (5) 07:20 14:19 (5)
	20:35	20:04	19:08 (4) 19:14	18:23	16:43	52 14:52 (5) 16:31 33 14:52 (5)
15	05:39	06:09	18:52 (4) 06:41	07:12	06:49	14:00 (5) 07:20 14:19 (5)
	20:35	20:02	19:10 (4) 19:12	18:22	16:42	52 14:52 (5) 16:32 33 14:52 (5)
16	05:40	06:10	18:51 (4) 06:42	07:13	06:50	14:00 (5) 07:21 14:20 (5)
	20:34	20:01	19:10 (4) 19:11	18:20	16:41	51 14:51 (5) 16:32 32 14:52 (5)
17	05:41	06:11	18:50 (4) 06:43	07:15	06:52	14:01 (5) 07:22 14:21 (5)
	20:33	20:00	19:11 (4) 19:09	18:19	16:40	51 14:52 (5) 16:32 32 14:53 (5)
18	05:42	06:12	18:49 (4) 06:44	07:16	06:53	14:01 (5) 07:22 14:21 (5)
	20:33	19:58	19:11 (4) 19:07	18:17	16:40	51 14:52 (5) 16:33 31 14:52 (5)
19	05:43	06:13	18:48 (4) 06:45	07:17	06:54	14:01 (5) 07:23 14:22 (5)
	20:32	19:57	19:11 (4) 19:06	18:16	16:39	51 14:52 (5) 16:33 31 14:53 (5)
20	05:44	06:14	18:48 (4) 06:46	07:18	06:55	14:01 (5) 07:24 14:22 (5)
	20:31	19:55	19:12 (4) 19:04	18:14	16:38	51 14:52 (5) 16:33 31 14:53 (5)
21	05:44	06:15	18:47 (4) 06:47	07:19	06:56	14:02 (5) 07:24 14:23 (5)
	20:30	19:54	19:11 (4) 19:02	18:13	16:37	50 14:52 (5) 16:34 31 14:54 (5)
22	05:45	06:16	18:47 (4) 06:48	07:20	06:58	14:02 (5) 07:25 14:23 (5)
	20:30	19:52	19:11 (4) 19:00	18:11	16:37	50 14:52 (5) 16:34 31 14:54 (5)
23	05:46	06:17	18:46 (4) 06:49	07:21	06:59	14:02 (5) 07:25 14:24 (5)
	20:29	19:51	19:10 (4) 18:59	18:10	16:36	50 14:52 (5) 16:35 31 14:55 (5)
24	05:47	06:18	18:46 (4) 06:50	07:23	07:00	14:03 (5) 07:26 14:24 (5)
	20:28	19:49	19:09 (4) 18:57	18:08	16:35	49 14:52 (5) 16:35 31 14:55 (5)
25	05:48	06:19	18:47 (4) 06:51	06:24	07:01	14:04 (5) 07:26 14:25 (5)
	20:27	19:47	19:08 (4) 18:55	17:07	16:35	49 14:53 (5) 16:36 31 14:56 (5)
26	05:49	06:20	18:47 (4) 06:52	06:25	07:02	14:05 (5) 07:27 14:25 (5)
	20:26	19:46	19:07 (4) 18:53	17:05	16:34	47 14:52 (5) 16:37 31 14:56 (5)
27	05:50	06:21	18:48 (4) 06:53	06:26	07:03	14:05 (5) 07:27 14:25 (5)
	20:25	19:44	19:05 (4) 18:52	17:04	14:32 (5) 16:34	47 14:52 (5) 16:37 32 14:57 (5)
28	05:51	06:22	18:50 (4) 06:54	06:27	14:18 (5) 07:04	14:06 (5) 07:27 14:25 (5)
	20:24	19:43	19:03 (4) 18:50	17:03	14:36 (5) 16:33	46 14:52 (5) 16:38 32 14:57 (5)
29	05:52	06:23	18:52 (4) 06:55	06:29	14:15 (5) 07:05	14:06 (5) 07:28 14:26 (5)
	20:23	19:41	19:00 (4) 18:48	17:01	14:39 (5) 16:33	46 14:52 (5) 16:39 33 14:59 (5)
30	05:53	06:24	06:56	06:30	14:12 (5) 07:07	14:07 (5) 07:28 14:26 (5)
	20:22	19:39	18:47	17:00	29 14:41 (5) 16:33	45 14:52 (5) 16:39 33 14:59 (5)
31	05:54	06:25	06:31	06:31	14:11 (5)	07:28 14:26 (5)
	20:21	19:38	16:59	32 14:43 (5)	16:40	34 15:00 (5)
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		333		111	1429	1077
Probabilità di eliofania		0,67		0,44	0,40	0,36
Tempo di operatività rid.		1,00		1,00	1,00	1,00
Dir. del vento rid.		1,00		1,00	1,00	1,00
Totale ridotto		0,67		0,44	0,40	0,36
Totale effettivo		222		48	578	391

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
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DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (42)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for hours (07:28 to 17:15). Includes summary rows at the bottom for 'Ore potenziali eliofania', 'Totale, caso peggiore', 'Probabilità di eliofania', 'Tempo di operatività rid.', 'Dir. del vento rid.', 'Totale ridotto', and 'Totale effettivo'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (43)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for hours (07:28 to 17:15). Includes summary rows for potential and effective hours, and probability of shadowing.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (44)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (45)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
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6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (46)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AU - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (47)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:33	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:44 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:12 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:37	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (48)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:33	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:44 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:12 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:37	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AW - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (49)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for time slots (07:28 to 17:15). It includes potential shadow hours, total worst case, probability of shadow, and effective total shadow hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (50)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (51)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 17:51	06:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 17:49	06:50 18:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:33 17:47	06:48 18:25	06:00 19:59	05:30 20:28	05:29 20:40	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	07:08 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (52)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:51 (2) 17:16	07:15 17:51	06:38 17:04 (1)	06:46 19:26	06:00 19:59
2	07:29 16:42	07:52 (2) 17:17	07:14 17:52	06:36 17:03 (1)	06:45 19:27	05:58 20:00
3	07:29 16:43	07:58 (2) 17:19	07:13 17:53	06:35 17:03 (1)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	07:11 17:54	06:33 17:02 (1)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	07:10 17:56	06:32 17:02 (1)	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:22	07:09 17:57	06:30 17:00 (1)	06:38 19:31	05:53 20:04
7	07:29 16:47	07:08 17:24	07:08 17:58	06:28 16:58 (1)	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	07:07 17:59	06:27 16:57 (1)	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	07:06 18:00	06:25 16:54 (1)	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	07:05 18:01	06:23 16:40 (1)	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	07:03 18:03	06:22 18:00 (1)	06:30 19:37	05:47 20:09
12	07:28 16:52	07:02 17:30	07:02 18:04	06:20 18:04 (1)	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	07:01 18:05	06:18 18:05 (1)	06:26 19:39	05:45 20:11
14	07:27 16:54	07:00 17:33	07:00 18:06	06:17 18:06 (1)	06:25 19:40	05:44 20:12
15	07:27 16:55	06:58 17:34	06:58 18:07	06:15 18:07 (1)	06:23 19:41	05:43 20:13
16	07:26 16:56	06:57 17:35	16:44 (1) 18:08	06:13 18:08 (1)	06:22 19:42	05:42 20:14
17	07:26 16:58	06:56 17:36	16:41 (1) 18:09	06:12 18:09 (1)	06:20 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	16:39 (1) 18:10	06:10 18:10 (1)	06:19 19:44	05:40 20:16
19	07:25 17:00	06:53 17:39	16:36 (1) 18:12	06:08 18:12 (1)	06:17 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	16:35 (1) 18:13	06:07 18:13 (1)	06:15 19:47	05:38 20:18
21	07:23 17:02	06:50 17:41	16:34 (1) 18:14	06:05 18:14 (1)	06:14 19:48	05:38 20:19
22	07:23 17:04	06:48 17:43	16:33 (1) 18:15	06:03 18:15 (1)	06:12 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	16:32 (1) 18:16	06:02 18:16 (1)	06:11 19:50	05:36 20:21
24	07:21 17:06	06:46 17:45	16:32 (1) 18:17	06:00 18:17 (1)	06:09 19:51	05:35 20:22
25	07:21 17:07	06:44 17:46	16:31 (1) 18:18	05:58 18:18 (1)	06:08 19:52	05:34 20:23
26	07:20 17:09	06:42 17:47	16:31 (1) 18:19	05:56 18:19 (1)	06:07 19:53	05:34 20:24
27	07:19 17:10	06:41 17:49	16:30 (1) 18:20	05:55 18:20 (1)	06:05 19:54	05:33 20:25
28	07:18 17:11	06:39 17:50	16:31 (1) 18:21	05:53 18:21 (1)	06:04 19:55	05:32 20:25
29	07:17 17:12		06:51 19:23	06:51 19:23 (1)	06:02 19:56	05:32 20:26
30	07:16 17:14		06:50 19:24	06:50 19:24 (1)	06:01 19:57	05:31 20:27
31	07:15 17:15		06:48 19:25	06:48 19:25 (1)	05:31 20:28	05:30 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	14	351	259			
Probabilità di eliofania	0,44	0,46	0,44			
Tempo di operatività rid.	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44			
Totale effettivo	6	160	114			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
(WTG che provoca l'inizio dell'ombreggiamento)  
(WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: AZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (52)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32		
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32		
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	17:23 (1) 17:25 (1)	06:35 16:55	07:10 16:32	
4	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	17:16 (1) 17:31 (1)	06:36 16:54	07:11 16:32	
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	17:13 (1) 17:33 (1)	06:37 16:53	07:12 16:32	
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	17:11 (1) 17:34 (1)	06:38 16:51	07:13 16:31	
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	17:09 (1) 17:35 (1)	06:40 16:50	07:14 16:31	
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	17:08 (1) 17:36 (1)	06:41 16:49	07:15 16:31	
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	17:06 (1) 17:37 (1)	06:42 16:48	07:16 16:31	
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	17:05 (1) 17:37 (1)	06:43 16:47	07:17 16:31	07:43 (2) 07:47 (2)
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	17:05 (1) 17:38 (1)	06:44 16:46	07:17 16:31	07:41 (2) 07:49 (2)
12	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	17:04 (1) 17:38 (1)	06:46 16:45	07:18 16:31	07:42 (2) 07:50 (2)
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	17:04 (1) 17:38 (1)	06:47 16:44	07:19 16:31	07:43 (2) 07:52 (2)
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	17:03 (1) 17:37 (1)	06:48 16:43	07:20 16:32	07:44 (2) 07:53 (2)
15	05:40 20:35	06:09 20:03	06:41 19:13	07:12 18:22	17:03 (1) 17:37 (1)	06:49 16:42	07:21 16:32	07:45 (2) 07:54 (2)
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	17:02 (1) 17:36 (1)	06:51 16:41	07:21 16:32	07:45 (2) 07:55 (2)
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	17:02 (1) 17:36 (1)	06:52 16:41	07:22 16:32	07:46 (2) 07:56 (2)
18	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	17:03 (1) 17:36 (1)	06:53 16:40	07:23 16:33	07:47 (2) 07:57 (2)
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	17:03 (1) 17:35 (1)	06:54 16:39	07:23 16:33	07:47 (2) 07:57 (2)
20	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	17:04 (1) 17:34 (1)	06:55 16:38	07:24 16:33	07:48 (2) 07:58 (2)
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	17:04 (1) 17:32 (1)	06:57 16:38	07:24 16:34	07:48 (2) 07:58 (2)
22	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	17:06 (1) 17:32 (1)	06:58 16:37	07:25 16:34	07:49 (2) 07:59 (2)
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	17:07 (1) 17:30 (1)	06:59 16:36	07:26 16:35	07:49 (2) 07:59 (2)
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	17:09 (1) 17:28 (1)	07:00 16:36	07:26 16:35	07:49 (2) 07:59 (2)
25	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	16:11 (1) 16:25 (1)	07:01 16:35	07:26 16:36	07:50 (2) 08:00 (2)
26	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	16:17 (1) 16:18 (1)	07:02 16:35	07:27 16:37	07:50 (2) 08:00 (2)
27	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:34	07:27 16:37	07:50 (2) 08:00 (2)
28	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:27 16:38	07:27 16:38	07:51 (2) 08:01 (2)
29	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39	07:28 16:39	07:51 (2) 08:00 (2)
30	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39	07:28 16:39	07:51 (2) 08:00 (2)
31	05:54 20:21	06:25 19:38	06:31 16:59	06:31 16:59	07:28 16:40	07:51 (2) 08:00 (2)	07:51 (2) 08:00 (2)	07:51 (2) 08:00 (2)
Ore potenziali eliofania	461	429	375	345	297	286		
Totale, caso peggiore				620			204	
Probabilità di eliofania				0,44			0,36	
Tempo di operatività rid.				1,00			1,00	
Dir. del vento rid.				1,00			1,00	
Totale ridotto				0,44			0,36	
Totale effettivo				270			74	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (53)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	05:58 19:59	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	05:28 20:31	05:32 20:39	05:59 20:16	06:30 19:30	07:01 18:38	06:37 16:52	07:12 16:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	07:13 16:31
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:32 19:26	07:04 18:35	06:39 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06	05:27 20:33	05:34 20:38	06:02 20:12	06:33 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:49 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:34 19:23	07:06 18:31	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:27	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	05:27 20:35	05:36 20:37	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46	07:17 16:31
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:26 20:37	05:39 20:35	06:09 20:02	06:41 19:13	07:12 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:26 20:37	05:40 20:34	06:10 20:01	06:42 19:11	07:13 18:20	06:50 16:41	07:21 16:32
17	07:26 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:33	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:40	07:22 16:32
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	05:27 20:38	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 20:39	05:44 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:56 16:37	07:24 16:34
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	05:27 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:25 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:35	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:53	06:25 17:05	07:02 16:34	07:27 16:37
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	07:04 16:33	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:29 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:13	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:29 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:15 17:15	06:36 17:49	05:50 18:24	06:01 19:58	05:31 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:57 18:46	06:31 16:59	07:08 16:40	07:29 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (54)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno			
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (10) 07:16 (10)	06:46 19:26	06:00 19:59		05:30 20:29	63 07:12 (11)
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (10) 07:17 (10)	06:45 19:27	05:58 20:00	15 06:33 (11)	05:30 20:29	63 07:12 (11)
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (10) 07:19 (10)	06:43 19:28	05:57 20:01	23 06:52 (11)	05:29 20:30	63 07:12 (11)
4	07:29 16:44	07:11 17:20	06:33 17:55	06:52 (10) 07:19 (10)	06:41 19:29	05:56 20:02	28 06:54 (11)	05:29 20:31	63 07:13 (11)
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (10) 07:21 (10)	06:40 19:30	05:55 20:03	32 06:56 (11)	05:29 20:32	63 07:12 (11)
6	07:29 16:46	07:09 17:23	06:30 17:57	06:49 (10) 07:21 (10)	06:38 19:31	05:53 20:04	36 06:58 (11)	05:28 20:32	63 07:13 (11)
7	07:29 16:47	07:08 17:24	06:28 17:58	06:48 (10) 07:21 (10)	06:36 19:32	05:52 20:05	39 07:00 (11)	05:28 20:33	63 07:13 (11)
8	07:28 16:48	07:07 17:25	07:27 (9) 07:29 (9)	06:27 17:59	06:35 19:34	05:51 20:06	42 07:01 (11)	05:28 20:34	62 07:13 (11)
9	07:28 16:49	07:06 17:26	07:26 (9) 07:31 (9)	06:25 18:00	06:33 19:35	05:50 20:07	44 07:02 (11)	05:27 20:34	63 07:14 (11)
10	07:28 16:50	07:05 17:28	07:24 (9) 07:32 (9)	06:23 18:01	06:31 19:36	05:49 20:08	46 07:03 (11)	05:27 20:35	63 07:13 (11)
11	07:28 16:51	07:03 17:29	07:23 (9) 07:33 (9)	06:22 18:03	06:30 19:37	05:47 20:09	48 07:04 (11)	05:27 20:35	62 07:13 (11)
12	07:28 16:52	07:02 17:30	07:22 (9) 07:34 (9)	06:20 18:04	06:28 19:38	05:46 20:10	50 07:04 (11)	05:27 20:36	63 07:14 (11)
13	07:27 16:53	07:01 17:31	07:21 (9) 07:35 (9)	06:18 18:05	06:26 19:39	05:45 20:11	52 07:05 (11)	05:27 20:36	63 07:14 (11)
14	07:27 16:54	07:00 17:33	07:19 (9) 07:35 (9)	06:17 18:06	06:25 19:40	05:44 20:12	53 07:06 (11)	05:27 20:37	63 07:14 (11)
15	07:27 16:55	06:58 17:34	07:18 (9) 07:36 (9)	06:15 18:07	06:23 19:41	05:43 20:13	54 07:07 (11)	05:27 20:37	62 07:14 (11)
16	07:26 16:57	06:57 17:35	07:16 (9) 07:35 (9)	06:13 18:08	06:22 19:42	05:42 20:14	56 07:08 (11)	05:27 20:38	62 07:14 (11)
17	07:26 16:58	06:56 17:36	07:15 (9) 07:35 (9)	06:12 18:09	06:20 19:43	05:41 20:15	56 07:08 (11)	05:27 20:38	62 07:14 (11)
18	07:25 16:59	06:54 17:38	07:14 (14) 07:35 (9)	06:10 18:10	06:19 19:44	05:40 20:16	57 07:08 (11)	05:27 20:38	63 07:15 (11)
19	07:25 17:00	06:53 17:39	07:12 (14) 07:34 (9)	06:08 18:12	06:17 19:46	05:39 20:17	59 07:09 (11)	05:27 20:39	63 07:16 (11)
20	07:24 17:01	06:51 17:40	07:11 (14) 07:34 (9)	06:07 18:13	06:16 19:47	05:38 20:18	59 07:09 (11)	05:27 20:39	63 07:16 (11)
21	07:23 17:02	06:50 17:41	07:09 (14) 07:33 (9)	06:05 18:14	06:14 19:48	05:38 20:19	60 07:09 (11)	05:27 20:39	63 07:16 (11)
22	07:23 17:04	06:48 17:43	07:08 (14) 07:32 (9)	06:03 18:15	06:12 19:49	05:37 20:20	60 07:10 (11)	05:27 20:39	63 07:16 (11)
23	07:22 17:05	06:47 17:44	07:06 (14) 07:30 (9)	06:02 18:16	06:11 19:50	05:36 20:21	61 07:10 (11)	05:28 20:40	63 07:16 (11)
24	07:21 17:06	06:46 17:45	07:05 (14) 07:28 (9)	06:00 18:17	06:10 19:51	05:35 20:22	61 07:10 (11)	05:28 20:40	63 07:17 (11)
25	07:21 17:07	06:44 17:46	06:58 18:18	05:58 18:19	06:08 19:52	05:34 20:23	61 07:11 (11)	05:28 20:40	62 07:16 (11)
26	07:20 17:09	06:43 17:47	06:56 18:19	05:56 18:20	06:07 19:53	05:34 20:24	62 07:11 (11)	05:28 20:40	62 07:16 (11)
27	07:19 17:10	06:41 17:49	07:01 (10) 07:11 (10)	05:55 18:20	06:05 19:54	05:33 20:25	62 06:09 (11)	05:29 20:40	62 07:17 (11)
28	07:18 17:11	06:39 17:50	06:59 (10) 07:15 (10)	05:53 18:22	06:04 19:55	05:32 20:25	62 06:09 (11)	05:29 20:40	63 07:17 (11)
29	07:17 17:12		06:51 19:23	06:02 19:24	06:02 19:56	05:32 20:26	62 07:11 (11)	05:30 20:40	63 07:18 (11)
30	07:16 17:14		06:50 19:24	06:01 19:24	06:01 19:57	05:31 20:27	63 06:09 (11)	05:30 20:40	63 07:18 (11)
31	07:16 17:15		06:48 19:25	06:00 19:25	06:00 20:28	05:31 20:28	63 07:12 (11)		
Ore potenziali eliofania	296	296	369	399	450	454			
Totale, caso peggiore		303	534		1526	1882			
Probabilità di eliofania		0,46	0,44		0,47	0,54			
Tempo di operatività rid.		1,00	1,00		1,00	1,00			
Dir. del vento rid.		1,00	1,00		1,00	1,00			
Totale ridotto		0,46	0,44		0,47	0,54			
Totale effettivo		138	235		711	1016			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)







## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (55)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	06:08 (11) 07:07 (11)
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	06:07 (11) 07:06 (11)
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	06:33 (11) 20:30	06:08 (11) 07:07 (11)
4	07:29 16:44	07:11 17:20	06:33 17:55	06:41 19:29	05:56 20:02	06:27 (11) 20:31	06:08 (11) 07:07 (11)
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	06:24 (11) 20:32	06:08 (11) 07:07 (11)
6	07:29 16:46	07:09 17:23	06:30 17:57	06:49 (10) 19:31	05:53 20:04	06:22 (11) 20:32	06:08 (11) 07:07 (11)
7	07:29 16:47	07:08 17:24	06:28 17:58	06:47 (10) 19:32	05:52 20:05	06:20 (11) 20:33	06:08 (11) 07:08 (11)
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46 (10) 19:34	05:51 20:06	06:18 (11) 20:34	06:09 (11) 07:08 (11)
9	07:28 16:49	07:06 17:26	06:25 18:00	06:44 (10) 19:35	05:50 20:07	06:17 (11) 20:34	06:09 (11) 07:08 (11)
10	07:28 16:50	07:05 17:28	06:23 18:01	06:43 (10) 19:36	05:49 20:08	06:16 (11) 20:35	06:09 (11) 07:08 (11)
11	07:28 16:51	07:03 17:29	06:22 18:03	06:43 (10) 19:37	05:47 20:09	06:15 (11) 20:35	06:09 (11) 07:08 (11)
12	07:28 16:52	07:02 17:30	06:22 (9) 18:04	06:43 (10) 19:38	05:46 20:10	06:13 (11) 20:36	06:09 (11) 07:08 (11)
13	07:27 16:53	07:01 17:31	06:21 (9) 18:05	06:42 (10) 19:39	05:45 20:11	06:12 (11) 20:36	06:10 (11) 07:08 (11)
14	07:27 16:54	07:00 17:33	06:19 (9) 18:06	06:43 (10) 19:40	05:44 20:12	06:11 (11) 20:37	06:10 (11) 07:09 (11)
15	07:27 16:55	06:58 17:34	06:18 (9) 18:07	06:43 (10) 19:41	05:43 20:13	06:11 (11) 20:37	06:10 (11) 07:09 (11)
16	07:26 16:57	06:57 17:35	06:16 (9) 18:08	06:43 (10) 19:42	05:42 20:14	06:11 (11) 20:38	06:10 (11) 07:09 (11)
17	07:26 16:57	06:56 17:36	06:15 (9) 18:09	06:44 (10) 19:43	05:41 20:15	06:10 (11) 20:38	06:10 (11) 07:09 (11)
18	07:25 16:59	06:54 17:38	06:14 (9) 18:10	06:44 (10) 19:44	05:40 20:16	06:10 (11) 20:38	06:10 (11) 07:09 (11)
19	07:25 17:00	06:53 17:39	06:12 (9) 18:12	06:45 (10) 19:46	05:39 20:17	06:09 (11) 20:39	06:12 (11) 07:10 (11)
20	07:24 17:01	06:51 17:40	06:11 (9) 18:13	06:46 (10) 19:47	05:38 20:18	06:08 (11) 20:39	06:12 (11) 07:10 (11)
21	07:23 17:02	06:50 17:41	06:09 (9) 18:14	06:49 (10) 19:48	05:38 20:19	06:08 (11) 20:39	06:12 (11) 07:10 (11)
22	07:23 17:04	06:48 17:43	06:08 (9) 18:15	06:53 (10) 19:49	05:37 20:20	06:08 (11) 20:39	06:12 (11) 07:10 (11)
23	07:22 17:05	06:47 17:44	06:07 (9) 18:16	06:58 (10) 19:50	05:36 20:21	06:08 (11) 20:40	06:12 (11) 07:10 (11)
24	07:21 17:06	06:46 17:45	06:06 (9) 18:17	06:10 19:51	05:35 20:22	06:07 (11) 20:40	06:12 (11) 07:11 (11)
25	07:21 17:07	06:44 17:46	06:05 (9) 18:18	06:08 19:52	05:34 20:23	06:08 (11) 20:40	06:12 (11) 07:11 (11)
26	07:20 17:09	06:43 17:47	06:04 (9) 18:19	06:07 19:53	05:34 20:24	06:07 (11) 20:40	06:12 (11) 07:11 (11)
27	07:19 17:10	06:41 17:49	06:03 (9) 18:20	06:05 19:54	05:33 20:25	06:07 (11) 20:40	06:13 (11) 07:12 (11)
28	07:18 17:11	06:39 17:50	06:02 (9) 18:22	06:04 19:55	05:32 20:25	06:08 (11) 20:40	06:13 (11) 07:12 (11)
29	07:17 17:12	06:38 17:51	06:01 (9) 18:23	06:02 19:56	05:32 20:26	06:07 (11) 20:40	06:14 (11) 07:12 (11)
30	07:16 17:14	06:37 17:52	06:00 (9) 18:24	06:01 19:57	05:31 20:27	06:08 (11) 20:40	06:13 (11) 07:12 (11)
31	07:16 17:15	06:37 17:53	06:00 (9) 18:25	06:01 19:58	05:31 20:28	06:08 (11) 20:40	06:13 (11) 07:12 (11)
Ore potenziali eliofania	296	296	369	399	450	454	1764
Totale, caso peggiore		257	522		1364		1764
Probabilità di eliofania		0,46	0,44		0,47		0,54
Tempo di operatività rid.		1,00	1,00		1,00		1,00
Dir. del vento rid.		1,00	1,00		1,00		1,00
Totale ridotto		0,46	0,44		0,47		0,54
Totale effettivo		117	230		635		952

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (55)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:31 20:40 59	06:13 (11) 07:12 (11) 20:20 45	06:24 (11) 07:09 (11) 19:36	06:26 06:25 (11) 06:28	06:57 06:58	07:22 (10) 07:22 (10) 06:34	07:08 16:33
2	05:31 20:40 59	06:14 (11) 07:13 (11) 20:19 43	06:25 (11) 07:08 (11) 19:35	06:28 (11) 06:29 (11) 06:31	06:59 06:59	07:21 (10) 07:21 (10) 06:35	07:09 16:32
3	05:32 20:39 59	06:13 (11) 07:12 (11) 20:18 40	06:26 (11) 07:06 (11) 19:33	06:29 (11) 06:27 (11) 06:30	06:59 07:00	07:21 (10) 07:54 (10) 16:55	07:10 16:32
4	05:32 20:39 59	06:14 (11) 07:13 (11) 20:17 38	06:27 (11) 07:05 (11) 19:31	06:30 06:29 (11) 06:31	07:00 07:02	07:21 (10) 07:53 (10) 16:54	07:11 16:32
5	05:33 20:39 59	06:15 (11) 07:14 (11) 20:16 35	06:29 (11) 07:04 (11) 19:30	06:31 06:30 (11) 06:32	07:02 07:03	07:22 (10) 07:52 (10) 16:53	07:12 16:32
6	05:33 20:39 59	06:14 (11) 07:13 (11) 20:14 32	06:30 (11) 07:02 (11) 19:28	06:32 06:32 (11) 06:33	07:03 07:03	07:23 (10) 07:51 (10) 16:51	07:13 16:31
7	05:34 20:38 59	06:15 (11) 07:14 (11) 20:13 28	06:32 (11) 07:00 (11) 19:26	06:33 06:34 (11) 06:34	07:04 07:05	07:24 (10) 07:50 (10) 16:50	07:14 16:31
8	05:35 20:38 60	06:14 (11) 07:14 (11) 20:12 23	06:34 (11) 06:57 (11) 19:25	06:34 06:38 (11) 06:35	07:05 07:06	07:25 (10) 07:49 (10) 16:49	07:15 16:31
9	05:35 20:38 59	06:15 (11) 07:14 (11) 20:11 16	06:35 (11) 06:54 (11) 19:23	06:35 06:36	07:06 07:07	07:26 (10) 07:47 (10) 16:48	07:16 16:31
10	05:36 20:37 60	06:15 (11) 07:15 (11) 20:09	06:36 07:15 (11) 19:21	06:36 06:37	07:07 07:08	07:27 (10) 07:45 (10) 16:47	07:17 16:31
11	05:37 20:37 59	06:15 (11) 07:14 (11) 20:08	06:37 07:14 (11) 19:20	06:37 06:38	07:08 07:09	07:29 (10) 07:43 (10) 16:46	07:17 16:31
12	05:37 20:36 59	06:15 (11) 07:14 (11) 20:07	06:38 07:14 (11) 19:18	06:38 06:39	07:09 07:10	07:31 (10) 07:39 (10) 16:45	07:18 16:31
13	05:38 20:36 59	06:16 (11) 07:15 (11) 20:05	06:39 06:40	06:39 06:40	07:10 07:11	06:47 06:48	07:19 16:32
14	05:39 20:35 59	06:16 (11) 07:15 (11) 20:04	06:40 07:15 (11) 19:14	06:40 06:41	07:11 07:13	06:48 06:49	07:20 16:32
15	05:40 20:35 58	06:16 (11) 07:14 (11) 20:03	06:41 07:14 (11) 19:13	06:41 06:42	07:13 07:14	07:48 (9) 07:34 (14) 06:51	07:21 16:32
16	05:40 20:34 59	06:16 (11) 07:15 (11) 20:01	06:42 06:43	06:42 06:43	07:14 07:15	07:34 (14) 07:57 (9) 16:41	07:21 16:32
17	05:41 20:34 58	06:17 (11) 07:15 (11) 20:00	06:43 06:44	06:43 06:44	07:15 07:16	06:52 07:59 (9) 16:41	07:22 16:32
18	05:42 20:33 58	06:17 (11) 07:15 (11) 19:58	06:44 06:45	06:44 06:45	07:16 07:17	06:53 08:00 (9) 16:40	07:23 16:33
19	05:43 20:32 57	06:18 (11) 07:15 (11) 19:57	06:45 06:46	06:45 06:46	07:17 07:18	06:54 08:01 (9) 16:39	07:23 16:33
20	05:44 20:31 57	06:17 (11) 07:14 (11) 19:55	06:46 06:47	06:46 06:47	07:18 07:19	07:39 (14) 08:01 (9) 16:38	07:24 16:34
21	05:45 20:31 56	06:18 (11) 07:14 (11) 19:54	06:47 06:48	06:47 06:48	07:19 07:20	06:57 08:01 (9) 16:38	07:25 16:34
22	05:46 20:30 56	06:18 (11) 07:14 (11) 19:52	06:48 06:49	06:48 06:49	07:20 07:21	06:58 07:42 (14) 06:58	07:25 16:34
23	05:46 20:29 55	06:19 (11) 07:14 (11) 19:51	06:49 06:50	06:49 06:50	07:21 07:22	06:59 08:02 (9) 16:37	07:26 16:35
24	05:47 20:28 55	06:19 (11) 07:14 (11) 19:49	06:50 06:51	06:50 06:51	07:22 07:23	06:59 07:44 (9) 07:00	07:26 16:35
25	05:48 20:27 54	06:20 (11) 07:14 (11) 19:48	06:51 06:52	06:51 06:52	07:23 07:24	06:59 07:01 (9) 16:36	07:26 16:35
26	05:49 20:26 53	06:20 (11) 07:13 (11) 19:46	06:52 06:53	06:52 06:53	07:24 07:25	07:02 06:48 (9) 07:03	07:27 16:36
27	05:50 20:25 52	06:21 (11) 07:13 (11) 19:45	06:53 06:54	06:53 06:54	07:25 07:26	07:03 07:00 (9) 16:34	07:27 16:36
28	05:51 20:24 50	06:22 (11) 07:12 (11) 19:43	06:54 06:55	06:54 06:55	07:26 07:27	06:49 (9) 07:05	07:27 16:36
29	05:52 20:23 50	06:21 (11) 07:11 (11) 19:41	06:55 06:56	06:55 06:56	07:27 07:28	06:50 (9) 07:06	07:28 16:37
30	05:53 20:22 48	06:22 (11) 07:10 (11) 19:40	06:56 06:57	06:56 06:57	07:28 07:29	06:51 (9) 07:07	07:28 16:37
31	05:54 20:21 46	06:23 (11) 07:09 (11) 19:38	06:57 06:58	06:57 06:58	07:30 07:31	06:52 (9) 07:08	07:28 16:37
Ore potenziali eliofania	461	429	375	345	297	286	
Totale, caso peggiore	1750	300	231	557			
Probabilità di eliofania	0,61	0,67	0,58	0,44			
Tempo di operatività rid.	1,00	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00	1,00			
Totale ridotto	0,61	0,67	0,58	0,44			
Totale effettivo	1061	200	134	242			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: BD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (56)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno			
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (10) 07:12 (10)	06:46 19:26	06:00 19:59		05:30 20:29	61 07:10 (11)
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (10) 07:13 (10)	06:45 19:27	05:58 20:00	10 06:34 (11)	05:30 20:29	61 07:09 (11)
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (10) 07:15 (10)	06:43 19:28	05:57 20:01	20 06:49 (11)	05:29 20:30	61 07:10 (11)
4	07:29 16:44	07:11 17:20	06:33 17:55	06:52 (10) 07:16 (10)	06:41 19:29	05:56 20:02	26 06:51 (11)	05:29 20:31	61 07:10 (11)
5	07:29 16:45	07:10 17:21	06:32 17:56	06:51 (10) 07:18 (10)	06:40 19:30	05:55 20:03	31 06:54 (11)	05:29 20:32	61 07:10 (11)
6	07:29 16:46	07:09 17:23	06:30 17:57	06:49 (10) 07:18 (10)	06:38 19:31	05:53 20:04	35 06:21 (11)	05:28 20:32	61 07:10 (11)
7	07:29 16:47	07:08 17:24	06:28 17:58	06:47 (10) 07:18 (10)	06:36 19:32	05:52 20:05	37 06:57 (11)	05:28 20:33	61 07:11 (11)
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46 (10) 07:19 (10)	06:35 19:34	05:51 20:06	40 06:59 (11)	05:28 20:34	61 07:11 (11)
9	07:28 16:49	07:06 17:26	06:25 18:00	06:45 (10) 07:18 (10)	06:33 19:35	05:50 20:07	43 07:00 (11)	05:27 20:34	61 07:11 (11)
10	07:28 16:50	07:05 17:28	06:23 18:01	06:45 (10) 07:18 (10)	06:31 19:36	05:49 20:08	45 06:16 (11)	05:27 20:35	61 07:11 (11)
11	07:28 16:51	07:03 17:29	06:22 18:03	06:45 (10) 07:30 (9)	06:30 19:37	05:47 20:09	47 07:02 (11)	05:27 20:35	61 07:11 (11)
12	07:28 16:52	07:02 17:30	06:20 18:04	06:45 (10) 07:32 (9)	06:28 19:38	05:46 20:10	49 07:02 (11)	05:27 20:36	61 07:11 (11)
13	07:27 16:53	07:01 17:31	06:18 18:05	06:44 (10) 07:33 (9)	06:26 19:39	05:45 20:11	50 07:03 (11)	05:27 20:36	60 07:11 (11)
14	07:27 16:54	07:00 17:33	06:17 18:06	06:45 (10) 07:33 (9)	06:25 19:40	05:44 20:12	51 06:12 (11)	05:27 20:37	60 07:11 (11)
15	07:27 16:55	06:58 17:34	06:15 18:07	06:45 (10) 07:34 (9)	06:23 19:41	05:43 20:13	53 07:05 (11)	05:27 20:37	61 07:12 (11)
16	07:26 16:57	06:57 17:35	06:13 18:08	06:46 (10) 07:33 (9)	06:22 19:42	05:42 20:14	53 07:05 (11)	05:27 20:38	61 07:12 (11)
17	07:26 16:57	06:56 17:36	06:12 18:09	06:47 (10) 07:34 (9)	06:20 19:43	05:41 20:15	55 06:11 (11)	05:27 20:38	60 07:12 (11)
18	07:25 16:59	06:54 17:38	06:10 18:10	06:48 (10) 07:34 (9)	06:19 19:44	05:40 20:16	56 06:10 (11)	05:27 20:38	60 07:12 (11)
19	07:25 17:00	06:53 17:39	06:08 18:12	06:49 (10) 07:33 (9)	06:17 19:46	05:39 20:17	56 06:10 (11)	05:27 20:39	60 07:13 (11)
20	07:24 17:01	06:51 17:40	06:07 18:13	06:52 (10) 07:33 (9)	06:16 19:47	05:38 20:18	58 07:07 (11)	05:27 20:39	60 07:13 (11)
21	07:23 17:02	06:50 17:41	06:05 18:14	06:50 (10) 07:32 (9)	06:14 19:48	05:38 20:19	58 06:09 (11)	05:27 20:39	60 07:13 (11)
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 (10) 07:31 (9)	06:12 19:49	05:37 20:20	59 06:09 (11)	05:27 20:39	60 07:13 (11)
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 (10) 07:29 (9)	06:11 19:50	05:36 20:21	59 06:09 (11)	05:28 20:40	60 07:13 (11)
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 (10) 07:28 (9)	06:10 19:51	05:35 20:22	60 07:08 (11)	05:28 20:40	60 07:14 (11)
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 (10) 07:03 (14)	06:08 19:52	05:34 20:23	60 07:09 (11)	05:28 20:40	60 07:14 (11)
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 (10) 07:25 (9)	06:07 19:53	05:34 20:24	60 06:09 (11)	05:28 20:40	61 07:14 (11)
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 (10) 07:08 (10)	06:05 19:54	05:33 20:25	60 06:08 (11)	05:29 20:40	61 07:15 (11)
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 (10) 07:08 (10)	06:04 19:55	05:32 20:25	60 06:09 (11)	05:29 20:40	61 07:15 (11)
29	07:17 17:12		06:51 19:23	06:02 (10)	06:02 19:56	05:32 20:26	61 06:08 (11)	05:30 20:40	60 07:15 (11)
30	07:16 17:14		06:50 19:24	06:01 (10)	06:01 19:57	05:31 20:27	60 06:09 (11)	05:30 20:40	60 07:15 (11)
31	07:16 17:15		06:48 19:25	06:00 (10)	06:00 20:28	05:31 20:28	61 06:08 (11)	05:30 20:40	60 07:15 (11)
Ore potenziali eliofania	296	296	369	399	450	454			
Totale, caso peggiore		276	534	1473	1817				
Probabilità di eliofania		0,46	0,44	0,47	0,54				
Tempo di operatività rid.		1,00	1,00	1,00	1,00				
Dir. del vento rid.		1,00	1,00	1,00	1,00				
Totale ridotto		0,46	0,44	0,47	0,54				
Totale effettivo		126	235	686	981				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (56)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre							
1	05:31 20:40	61	06:14 (11) 07:15 (11)	05:55 20:20	48	06:24 (11) 07:12 (11)	06:26 19:36	06:57 18:45	07:24 (10) 07:57 (10)	06:32 16:58	4	06:54 (9) 06:58 (9)	07:08 16:33
2	05:31 20:40	61	06:15 (11) 07:16 (11)	05:56 20:19	46	06:25 (11) 07:11 (11)	06:28 19:35	06:58 18:43	07:24 (10) 07:57 (10)	06:34 16:56			07:09 16:32
3	05:32 20:39	60	06:15 (11) 07:15 (11)	05:57 20:18	44	06:26 (11) 07:10 (11)	06:29 19:33	06:59 18:42	07:23 (10) 07:57 (10)	06:35 16:55			07:10 16:32
4	05:32 20:39	61	06:15 (11) 07:16 (11)	05:58 20:17	42	06:27 (11) 07:09 (11)	06:30 19:31	07:00 18:40	07:23 (10) 07:56 (10)	06:36 16:54			07:11 16:32
5	05:33 20:39	61	06:16 (11) 07:17 (11)	05:59 20:16	39	06:29 (11) 07:08 (11)	06:31 19:30	07:02 18:38	07:23 (10) 07:56 (10)	06:37 16:53			07:12 16:32
6	05:33 20:39	61	06:15 (11) 07:16 (11)	06:00 20:14	36	06:30 (11) 07:06 (11)	06:32 19:28	07:03 18:37	07:23 (10) 07:55 (10)	06:38 16:51			07:13 16:31
7	05:34 20:38	61	06:16 (11) 07:17 (11)	06:01 20:13	33	06:32 (11) 07:05 (11)	06:33 19:26	07:04 18:35	07:24 (10) 07:54 (10)	06:40 16:50			07:14 16:31
8	05:35 20:38	61	06:16 (11) 07:17 (11)	06:02 20:12	29	06:34 (11) 07:03 (11)	06:34 19:25	07:05 18:33	07:25 (10) 07:53 (10)	06:41 16:49			07:15 16:31
9	05:35 20:38	61	06:16 (11) 07:17 (11)	06:03 20:11	24	06:36 (11) 07:00 (11)	06:35 19:23	07:06 18:32	07:26 (10) 07:51 (10)	06:42 16:48			07:16 16:31
10	05:36 20:37	61	06:17 (11) 07:18 (11)	06:04 20:09	18	06:39 (11) 06:57 (11)	06:36 19:21	07:07 18:30	07:27 (10) 07:50 (10)	06:43 16:47			07:17 16:31
11	05:37 20:37	61	06:16 (11) 07:17 (11)	06:05 20:08	4	06:46 (11) 06:50 (11)	06:37 19:20	07:08 18:28	07:29 (10) 07:49 (10)	06:45 16:46			07:17 16:31
12	05:37 20:36	60	06:17 (11) 07:17 (11)	06:06 20:07		06:38 19:18	06:38 19:18	07:09 18:27	07:30 (10) 07:47 (10)	06:46 16:45			07:18 16:31
13	05:38 20:36	61	06:17 (11) 07:18 (11)	06:07 20:05		06:39 19:16	06:39 19:16	07:10 18:25	07:31 (10) 07:44 (10)	06:47 16:44			07:19 16:32
14	05:39 20:35	61	06:17 (11) 07:18 (11)	06:08 20:04		06:40 19:14	06:40 19:14	07:11 18:24	07:44 (10)	06:48 16:43			07:20 16:32
15	05:40 20:35	60	06:17 (11) 07:17 (11)	06:09 20:03		06:41 19:13	06:41 19:13	07:13 18:22		06:49 16:42			07:21 16:32
16	05:40 20:34	61	06:17 (11) 07:18 (11)	06:10 20:01		06:42 19:11	06:42 19:11	07:14 18:20	07:51 (9)	06:51 16:41			07:21 16:32
17	05:41 20:34	60	06:18 (11) 07:18 (11)	06:11 20:00		06:43 19:09	06:43 19:09	07:15 18:19	07:36 (14)	06:52 16:41			07:22 16:32
18	05:42 20:33	60	06:18 (11) 07:18 (11)	06:12 19:58		06:44 19:07	06:44 19:07	07:16 18:17	07:37 (14)	06:53 16:40			07:23 16:33
19	05:43 20:32	59	06:19 (11) 07:18 (11)	06:13 19:57		06:45 19:06	06:45 19:06	07:17 18:16	08:00 (9)	06:54 16:39			07:23 16:33
20	05:44 20:31	59	06:18 (11) 07:17 (11)	06:14 19:55		06:46 19:04	06:46 19:04	07:18 18:14	07:39 (14)	06:55 16:38			07:24 16:34
21	05:45 20:31	58	06:19 (11) 07:17 (11)	06:15 19:54		06:47 19:02	06:47 19:02	07:19 18:13	07:40 (14)	06:57 16:37			07:25 16:34
22	05:46 20:30	58	06:19 (11) 07:17 (11)	06:16 19:52		06:48 19:01	06:48 19:01	07:20 18:11	07:42 (14)	06:58 16:37			07:25 16:34
23	05:46 20:29	57	06:20 (11) 07:17 (11)	06:17 19:51		06:49 18:59	06:49 18:59	07:22 18:10	08:04 (9)	06:59 16:36			07:26 16:35
24	05:47 20:28	57	06:20 (11) 07:17 (11)	06:18 19:49		06:50 18:57	06:50 18:57	07:23 18:08	07:44 (9)	07:00 16:36			07:26 16:36
25	05:48 20:27	56	06:21 (11) 07:17 (11)	06:19 19:48		06:51 18:55	06:51 18:55	07:24 17:07	08:04 (9)	07:01 16:35			07:26 16:36
26	05:49 20:26	56	06:21 (11) 07:17 (11)	06:20 19:46		06:52 18:54	06:52 18:54	07:25 17:06	07:37 (14)	07:02 16:35			07:27 16:37
27	05:50 20:25	54	06:22 (11) 07:16 (11)	06:21 19:45		06:53 18:52	06:53 18:52	07:26 17:04	08:04 (9)	07:03 16:34			07:27 16:37
28	05:51 20:24	54	06:22 (11) 07:16 (11)	06:22 19:43		06:54 18:50	06:54 18:50	07:27 17:03	08:04 (9)	07:04 16:34			07:27 16:38
29	05:52 20:23	52	06:22 (11) 07:14 (11)	06:23 19:41		06:55 18:48	06:55 18:48	07:28 17:01	08:04 (9)	07:05 16:33			07:28 16:39
30	05:53 20:22	51	06:23 (11) 07:14 (11)	06:24 19:40		06:56 18:47	06:56 18:47	07:29 17:00	08:04 (9)	07:06 16:33			07:28 16:40
31	05:54 20:21	49	06:24 (11) 07:13 (11)	06:25 19:38				06:31 16:59	07:01 (9)	07:07 16:40			07:28 16:40
Ore potenziali eliofanía	461		429			375		345		297			286
Totale, caso peggiore	1813		363			194		618		4			
Probabilità di eliofanía	0,61		0,67			0,58		0,44		0,40			
Tempo di operatività rid.	1,00		1,00			1,00		1,00		1,00			
Dir. del vento rid.	1,00		1,00			1,00		1,00		1,00			
Totale ridotto	0,61		0,67			0,58		0,44		0,40			
Totale effettivo	1099		242			112		269		2			

## Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BE - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (57)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	07:29 16:41	08:12 (1) 08:31 (1)	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	08:13 (1) 08:31 (1)	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	08:13 (1) 08:31 (1)	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	08:15 (1) 08:31 (1)	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	08:16 (1) 08:31 (1)	07:11 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	08:17 (1) 08:30 (1)	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	08:19 (1) 08:30 (1)	07:08 17:24	06:28 17:58	06:36 19:33	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	08:21 (1) 08:29 (1)	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:03 19:23	06:35 18:32	07:06 16:48	06:42 16:31	07:16 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:04 19:21	06:36 18:30	07:07 16:47	06:43 16:31	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:05 19:20	06:37 18:28	07:08 16:46	06:45 16:31	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:06 19:18	06:38 18:27	07:09 16:45	06:46 16:31	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:09 19:16	06:39 18:25	07:10 16:44	06:47 16:32	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:36	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32	07:21 16:32
16	07:26 16:57	06:57 17:35	06:14 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:22 16:32	07:22 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:35	07:25 16:35
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35	07:26 16:35
24	07:22 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	07:24 17:07	07:01 16:35	07:27 16:36	07:27 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	07:25 17:06	07:02 16:35	07:27 16:37	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	07:26 17:04	07:04 16:34	07:27 16:37	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	07:28 17:03	07:05 16:34	07:28 16:38	07:28 16:38
29	07:17 17:12	06:51 19:23	06:02 19:56	06:02 20:26	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:49	07:29 17:01	07:06 16:33	07:28 16:39	07:28 16:39
30	07:17 17:14	06:50 19:24	06:01 19:58	05:31 20:27	05:30 20:27	05:30 20:40	05:53 20:23	06:24 19:40	06:56 18:47	07:00 17:00	07:07 16:33	07:28 16:40	07:28 16:40
31	07:16 17:15	06:48 19:25	06:08 19:55	05:31 20:28	05:31 20:28	05:31 20:28	05:54 20:21	06:26 19:38	07:01 16:59	07:00 16:40	07:06 16:34	07:28 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286	553
Totale, caso peggiore	118												0,36
Probabilità di eliofania	0,44												1,00
Tempo di operatività rid.	1,00												1,00
Dir. del vento rid.	1,00												0,36
Totale ridotto	0,44												0,36
Totale effettivo	52												201

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (58)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1   07:29	07:51 (11)   07:15	07:59 (1)   06:38	06:46	06:00	05:30	05:31	05:55	06:27	06:57	06:32	07:08	07:43 (1)
16:41	08:01 (11)   17:16	08:30 (1)   17:51	19:26	19:59	20:29	20:40	20:20	19:36	18:45	16:58	16:33	15   07:58 (1)
2   07:29	07:51 (11)   07:14	08:00 (1)   06:36	06:45	05:58	05:30	05:31	05:56	06:28	06:58	06:34	07:39 (1)   07:09	07:45 (1)
16:42	08:01 (11)   17:17	08:30 (1)   17:52	19:27	20:00	20:30	20:40	20:19	19:35	18:43	16:56	12   07:51 (1)   16:32	12   07:57 (1)
3   07:29	07:52 (11)   07:13	08:00 (1)   06:35	06:43	05:57	05:29	05:32	05:57	06:29	06:59	06:35	07:36 (1)   07:10	07:48 (1)
16:43	08:01 (11)   17:19	29   08:29 (1)   17:53	19:28	20:01	20:30	20:40	20:18	19:33	18:42	16:55	17   07:53 (1)   16:32	7   07:55 (1)
4   07:29	07:52 (11)   07:12	08:01 (1)   06:33	06:41	05:56	05:29	05:32	05:58	06:30	07:01	06:36	07:34 (1)   07:11	
16:44	08:01 (11)   17:23	28   08:29 (1)   17:55	19:29	20:02	20:31	20:39	20:17	19:31	18:40	16:54	21   07:55 (1)   16:32	
5   07:29	07:53 (11)   07:10	08:03 (1)   06:32	06:40	05:55	05:29	05:33	05:59	06:31	07:02	06:37	07:33 (1)   07:12	07:41 (11)
16:45	08:01 (11)   17:21	25   08:28 (1)   17:56	19:30	20:03	20:32	20:39	20:16	19:30	18:38	16:53	23   07:56 (1)   16:32	5   07:46 (11)
6   07:29	07:55 (11)   07:09	08:03 (1)   06:30	06:38	05:53	05:28	05:33	06:00	06:32	07:03	06:38	07:32 (1)   07:13	07:41 (11)
16:46	08:01 (11)   17:23	23   08:26 (1)   17:57	19:31	20:04	20:32	20:39	20:15	19:28	18:37	16:52	26   07:58 (1)   16:31	6   07:47 (11)
7   07:29	07:56 (11)   07:08	08:05 (1)   06:28	06:36	05:52	05:28	05:34	06:01	06:33	07:04	06:40	07:31 (1)   07:14	07:41 (11)
16:47	08:01 (11)   17:24	20   08:25 (1)   17:58	19:32	20:05	20:33	20:39	20:13	19:26	18:35	16:50	28   07:59 (1)   16:31	7   07:48 (11)
8   07:29	07:57 (11)   07:07	08:07 (1)   06:27	06:35	05:51	05:28	05:35	06:02	06:34	07:05	06:41	07:30 (1)   07:15	07:41 (11)
16:48	08:01 (11)   17:25	16   08:23 (1)   17:59	19:34	20:06	20:34	20:38	20:12	19:25	18:33	16:49	29   07:59 (1)   16:31	8   07:49 (11)
9   07:28	08:04 (1)   07:06	08:10 (1)   06:25	06:33	05:50	05:27	05:35	06:03	06:35	07:06	06:42	07:30 (1)   07:16	07:41 (11)
16:49	08:10 (1)   17:26	11   08:21 (1)   17:00	19:35	20:07	20:34	20:38	20:11	19:23	18:32	16:48	30   08:00 (1)   16:31	9   07:50 (11)
10   07:28	08:02 (1)   07:05	08:02 (1)   06:24	06:31	05:49	05:27	05:36	06:04	06:36	07:07	06:43	07:30 (1)   07:17	07:41 (11)
16:50	08:13 (1)   17:28	18:02	19:36	20:08	20:35	20:37	20:09	19:21	18:30	16:47	31   08:01 (1)   16:31	10   07:51 (11)
11   07:28	08:01 (1)   07:03	08:01 (1)   06:23	06:30	05:47	05:27	05:37	06:05	06:37	07:08	06:45	07:29 (1)   07:18	07:42 (11)
16:51	08:16 (1)   17:29	18:03	19:37	20:09	20:35	20:37	20:08	19:20	18:28	16:46	32   08:01 (1)   16:31	10   07:52 (11)
12   07:28	08:00 (1)   07:02	08:00 (1)   06:20	06:28	05:46	05:27	05:37	06:06	06:38	07:09	06:46	07:30 (1)   07:18	07:42 (11)
16:52	08:17 (1)   17:30	18:04	19:38	20:10	20:36	20:37	20:07	19:18	18:27	16:45	32   08:02 (1)   16:31	9   07:51 (11)
13   07:27	08:00 (1)   07:01	08:00 (1)   06:19	06:27	05:45	05:26	05:38	06:07	06:39	07:10	06:47	07:30 (1)   07:19	07:43 (11)
16:53	08:19 (1)   17:31	18:05	19:39	20:11	20:36	20:36	20:05	19:16	18:25	16:44	32   08:02 (1)   16:32	9   07:52 (11)
14   07:27	07:59 (1)   07:00	08:01 (1)   06:17	06:25	05:44	05:27	05:39	06:08	06:40	07:11	06:48	07:29 (1)   07:20	07:44 (11)
16:54	08:20 (1)   17:33	18:06	19:40	20:12	20:37	20:35	20:04	19:14	18:24	16:43	33   08:02 (1)   16:32	9   07:53 (11)
15   07:27	07:58 (1)   06:58	08:02 (1)   06:15	06:23	05:43	05:27	05:40	06:09	06:41	07:13	06:49	07:29 (1)   07:21	07:45 (11)
16:55	08:21 (1)   17:34	18:07	19:41	20:13	20:37	20:35	20:03	19:13	18:22	16:42	33   08:02 (1)   16:32	9   07:54 (11)
16   07:26	07:59 (1)   06:57	08:04 (1)   06:14	06:22	05:42	05:27	05:40	06:10	06:42	07:14	06:51	07:30 (1)   07:21	07:45 (11)
16:57	08:23 (1)   17:35	18:08	19:42	20:14	20:38	20:34	20:01	19:11	18:20	16:41	33   08:03 (1)   16:32	9   07:54 (11)
17   07:26	07:58 (1)   06:56	08:06 (1)   06:12	06:20	05:41	05:27	05:41	06:11	06:43	07:15	06:52	07:30 (1)   07:22	07:46 (11)
16:58	08:23 (1)   17:36	18:09	19:43	20:15	20:38	20:34	20:00	19:09	18:19	16:41	33   08:03 (1)   16:32	8   07:54 (11)
18   07:25	07:58 (1)   06:54	08:06 (1)   06:10	06:19	05:40	05:27	05:42	06:12	06:44	07:16	06:53	07:30 (1)   07:23	07:47 (11)
16:59	08:25 (1)   17:38	18:11	19:44	20:16	20:38	20:33	19:58	19:08	18:17	16:40	32   08:02 (1)   16:33	8   07:55 (11)
19   07:25	07:57 (1)   06:53	08:08 (1)   06:08	06:17	05:39	05:27	05:43	06:13	06:45	07:17	06:54	07:32 (1)   07:23	07:47 (11)
17:00	08:25 (1)   17:39	18:12	19:46	20:17	20:39	20:32	19:57	19:06	18:16	16:39	31   08:03 (1)   16:33	8   07:55 (11)
20   07:24	07:57 (1)   06:51	08:07 (1)   06:07	06:16	05:38	05:27	05:44	06:14	06:46	07:18	06:55	07:32 (1)   07:24	07:48 (11)
17:01	08:26 (1)   17:40	18:13	19:47	20:18	20:39	20:32	19:55	19:04	18:14	16:38	31   08:03 (1)   16:34	8   07:56 (11)
21   07:24	07:57 (1)   06:50	08:05 (1)   06:05	06:14	05:38	05:27	05:45	06:15	06:47	07:19	06:57	07:32 (1)   07:25	07:48 (11)
17:02	08:27 (1)   17:41	18:14	19:48	20:19	20:39	20:31	19:54	19:02	18:13	16:38	30   08:02 (1)   16:34	8   07:56 (11)
22   07:23	07:57 (1)   06:49	08:03 (1)   06:03	06:13	05:37	05:27	05:46	06:16	06:48	07:21	06:58	07:33 (1)   07:25	07:49 (11)
17:04	08:28 (1)   17:43	18:15	19:49	20:20	20:39	20:30	19:52	19:01	18:11	16:37	29   08:02 (1)   16:35	8   07:57 (11)
23   07:22	07:57 (1)   06:47	08:02 (1)   06:02	06:11	05:36	05:28	05:46	06:17	06:49	07:22	06:59	07:34 (1)   07:26	07:49 (11)
17:05	08:28 (1)   17:44	18:16	19:50	20:21	20:40	20:29	19:51	18:59	18:10	16:36	28   08:02 (1)   16:35	8   07:57 (11)
24   07:21	07:56 (1)   06:46	08:00 (1)   06:00	06:10	05:35	05:28	05:47	06:18	06:50	07:23	07:00	07:35 (1)   07:26	07:50 (11)
17:06	08:28 (1)   17:45	18:17	19:51	20:22	20:40	20:28	19:49	18:57	18:08	16:36	27   08:02 (1)   16:36	8   07:58 (11)
25   07:21	07:56 (1)   06:44	08:01 (1)   06:05	06:08	05:34	05:28	05:48	06:19	06:51	07:24	07:01	07:36 (1)   07:27	07:50 (11)
17:07	08:29 (1)   17:46	18:18	19:52	20:23	20:40	20:27	19:48	18:55	18:06	16:35	25   08:01 (1)   16:36	8   07:58 (11)
26   07:20	07:57 (1)   06:43	08:02 (1)   06:04	06:07	05:34	05:29	05:49	06:20	06:52	07:25	07:02	07:37 (1)   07:27	07:50 (11)
17:09	08:30 (1)   17:47	18:19	19:53	20:24	20:40	20:26	19:46	18:54	18:06	16:35	24   08:01 (1)   16:37	8   07:58 (11)
27   07:19	07:57 (1)   06:41	08:04 (1)   06:05	06:05	05:33	05:29	05:50	06:21	06:53	07:26	07:04	07:37 (1)   07:27	07:51 (11)
17:10	08:30 (1)   17:49	18:20	19:54	20:25	20:40	20:26	19:45	18:52	18:04	16:34	23   08:00 (1)   16:37	8   07:59 (11)
28   07:18	07:57 (1)   06:40	08:05 (1)   06:04	06:04	05:32	05:29	05:51	06:22	06:54	07:28	07:05	07:38 (1)   07:28	07:51 (11)
17:11	08:30 (1)   17:50	18:22	19:55	20:26	20:40	20:25	19:43	18:50	18:03	16:34	21   07:59 (1)   16:38	9   08:00 (11)
29   07:17	07:58 (1)   06:40	08:06 (1)   06:02	06:02	05:32	05:30	05:52	06:23	06:55	07:29	07:06	07:41 (1)   07:28	07:51 (11)
17:12	08:30 (1)   06:40	19:23	19:56	20:26	20:40	20:24	19:41	18:48	17:01	16:33	19   08:00 (1)   16:39	9   08:00 (11)
30   07:17	07:58 (1)   06:40	08:05 (1)   06:01	06:01	05:31	05:30	05:53	06:24	06:56	07:30	07:07	07:42 (1)   07:28	07:51 (11)
17:14	08:30 (1)   06:40	19:24	19:58	20:27	20:40	20:23	19:40	18:47	17:00	16:33	17   07:59 (1)   16:40	9   08:00 (11)
31   07:16	07:58 (1)   06:40	08:04 (1)   06:01	06:01	05:31	05:31	05:54	06:26	06:58	07:31	07:08	07:43 (1)   07:28	07:51 (11)
17:15	08:30 (1)   06:40	19:25	19:58	20:28	20:40	20:21	19:38	18:45	16:59	16:40	16   07:59 (1)   16:40	9   08:00 (11)
Ore potenziali eliofania	296	296	369	399	450							

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (59)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	07:05 (5) 08:01 (5)	06:00 19:58	07:04 (5) 07:41 (5)	05:30 20:28
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	07:03 (5) 08:01 (5)	05:58 19:59	07:06 (5) 07:39 (5)	05:30 20:29
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	07:01 (5) 08:01 (5)	05:57 20:01	07:07 (5) 07:36 (5)	05:29 20:30
4	07:28 16:44	07:11 17:20	06:33 17:54	06:41 19:29	07:00 (5) 08:02 (5)	05:56 20:02	07:10 (5) 07:34 (5)	05:29 20:31
5	07:28 16:45	07:10 17:21	06:31 17:56	06:39 19:30	06:59 (5) 08:01 (5)	05:54 20:03	07:14 (5) 07:30 (5)	05:28 20:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	06:57 (5) 08:01 (5)	05:53 20:04	07:21 (5) 07:23 (5)	05:28 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	06:57 (5) 08:02 (5)	05:52 20:05		05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	06:56 (5) 08:01 (5)	05:51 20:06		05:27 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	06:56 (5) 08:01 (5)	05:50 20:07		05:27 20:34
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	06:56 (5) 08:01 (5)	05:48 20:08		05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	06:55 (5) 08:01 (5)	05:47 20:09		05:27 20:35
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	06:55 (5) 08:01 (5)	05:46 20:10		05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	06:55 (5) 08:00 (5)	05:45 20:11		05:27 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	06:54 (5) 07:59 (5)	05:44 20:12		05:27 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:55 (5) 07:59 (5)	05:43 20:13		05:27 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	06:54 (5) 07:58 (5)	05:42 20:14		05:27 20:37
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	06:55 (5) 07:58 (5)	05:41 20:15		05:27 20:38
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18 19:44	06:54 (5) 07:57 (5)	05:40 20:16		05:27 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	06:55 (5) 07:56 (5)	05:39 20:17		05:27 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	06:55 (5) 07:55 (5)	05:38 20:18		05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:47	06:56 (5) 07:55 (5)	05:37 20:19		05:27 20:39
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12 19:49	06:56 (5) 07:53 (5)	05:37 20:20		05:27 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	06:57 (5) 07:53 (5)	05:36 20:21		05:27 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	06:57 (5) 07:51 (5)	05:35 20:22		05:28 20:39
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	06:58 (5) 07:50 (5)	05:34 20:23		05:28 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	06:59 (5) 07:49 (5)	05:34 20:24		05:28 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	06:59 (5) 07:47 (5)	05:33 20:24		05:29 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	07:01 (5) 07:46 (5)	05:32 20:25		05:29 20:40
29	07:17 17:12		06:51 19:22	06:02 19:56	07:02 (5) 07:45 (5)	05:32 20:26		05:29 20:40
30	07:16 17:13		06:50 19:24	06:01 19:57	07:03 (5) 07:43 (5)	05:31 20:27		05:30 20:40
31	07:15 17:15		06:48 19:25	07:06 (5) 07:59 (5)		05:31 20:28		
Ore potenziali eliofania	296	296	369	399	450	454		
Totale, caso peggiore			397	1763	141			
Probabilità di eliofania			0,44	0,48	0,47			
Tempo di operatività rid.			1,00	1,00	1,00			
Dir. del vento rid.			1,00	1,00	1,00			
Totale ridotto			0,44	0,48	0,47			
Totale effettivo			175	844	66			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (59)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:30 20:40	05:55 20:20	06:26 19:36	06:54 (5) 18:00 (5)	06:57 18:45	06:32 16:57	07:08 16:32
2	05:31 20:39	05:56 20:19	06:27 19:35	06:54 (5) 07:59 (5)	06:58 18:43	06:33 16:56	07:09 16:32
3	05:31 20:39	05:57 20:18	06:28 19:33	06:54 (5) 07:59 (5)	06:59 18:41	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:29 19:31	06:54 (5) 07:58 (5)	07:00 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:15	06:30 19:30	06:53 (5) 07:58 (5)	07:01 18:38	06:37 16:52	07:12 16:31
6	05:33 20:39	06:00 20:14	06:31 19:28	06:53 (5) 07:57 (5)	07:02 18:36	06:38 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	06:32 19:26	06:54 (5) 07:57 (5)	07:04 18:35	06:39 16:50	07:14 16:31
8	05:34 20:38	06:02 20:12	06:33 19:24	06:54 (5) 07:56 (5)	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:34 19:23	06:55 (5) 07:55 (5)	07:06 18:31	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:35 19:21	06:56 (5) 07:54 (5)	07:07 18:30	06:43 16:47	07:16 16:31
11	05:36 20:37	06:05 20:08	06:37 19:19	06:57 (5) 07:49 (5)	07:08 18:28	06:44 16:46	07:17 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	06:58 (5) 07:50 (5)	07:09 18:27	06:46 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	06:59 (5) 07:52 (5)	07:10 18:25	06:47 16:44	07:19 16:31
14	05:39 20:35	06:08 20:04	06:40 19:14	07:00 (5) 07:53 (5)	07:11 18:23	06:48 16:43	07:20 16:32
15	05:39 20:35	06:09 20:02	06:41 19:12	07:01 (5) 07:54 (5)	07:12 18:22	06:49 16:42	07:20 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:02 (5) 07:55 (5)	07:13 18:20	06:50 16:41	07:21 16:32
17	05:41 20:33	06:11 20:00	06:43 19:09	07:03 (5) 07:56 (5)	07:15 18:19	06:52 16:40	07:22 16:32
18	05:42 20:33	06:12 19:58	06:44 19:07	07:04 (5) 07:57 (5)	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:05 (5) 07:58 (5)	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	06:46 19:04	07:06 (5) 07:58 (5)	07:18 18:14	06:55 16:38	07:24 16:33
21	05:44 20:30	06:15 19:54	06:47 19:02	07:07 (5) 07:59 (5)	07:19 18:13	06:56 16:37	07:24 16:34
22	05:45 20:30	06:16 19:52	06:48 19:00	07:15 (5) 08:00 (5)	07:20 18:11	06:58 16:37	07:25 16:34
23	05:46 20:29	06:17 19:51	06:49 18:59	07:21 (5) 08:00 (5)	07:21 18:10	06:59 16:36	07:25 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:22 (5) 08:00 (5)	07:23 18:08	07:00 16:36	07:26 16:35
25	05:48 20:27	06:19 19:47	06:51 18:55	07:23 (5) 08:00 (5)	07:24 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 19:46	06:52 18:53	07:24 (5) 08:00 (5)	07:25 17:05	07:02 16:34	07:27 16:37
27	05:50 20:25	06:21 19:44	06:53 18:52	07:25 (5) 08:00 (5)	07:26 17:04	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	06:54 18:50	07:26 (5) 08:00 (5)	07:27 17:03	07:04 16:33	07:27 16:38
29	05:52 20:23	06:23 19:41	06:55 18:48	07:27 (5) 08:00 (5)	07:28 17:01	07:06 16:33	07:28 16:39
30	05:53 20:22	06:24 19:39	06:56 18:47	07:28 (5) 08:00 (5)	07:29 17:00	07:07 16:33	07:28 16:39
31	05:54 20:21	06:25 19:38	06:54 (5) 08:00 (5)	06:31 16:59	06:31 16:59	07:28 16:40	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286	
Totale, caso peggiore		1240		1101			
Probabilità di eliofania		0,67		0,58			
Tempo di operatività rid.		1,00		1,00			
Dir. del vento rid.		1,00		1,00			
Totale ridotto		0,67		0,58			
Totale effettivo		827		636			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BH - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (60)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno		
1	07:28		14:09 (5)	07:14		14:18 (5)	06:38		06:46		05:59	18:48 (4)	05:30
	16:41	48	14:57 (5)	17:16	53	15:11 (5)	17:51	19:26		19:58	19	19:07 (4)	20:28
2	07:28		14:09 (5)	07:13		14:19 (5)	06:36		06:44		05:58	18:49 (4)	05:30
	16:42	49	14:58 (5)	17:17	52	15:11 (5)	17:52	19:27		19:59	17	19:06 (4)	20:29
3	07:28		14:09 (5)	07:12		14:19 (5)	06:35		06:43		05:57	18:50 (4)	05:29
	16:43	49	14:58 (5)	17:18	51	15:10 (5)	17:53	19:28		20:00	14	19:04 (4)	20:30
4	07:28		14:09 (5)	07:11		14:20 (5)	06:33		06:41		05:56	18:52 (4)	05:29
	16:44	50	14:59 (5)	17:20	49	15:09 (5)	17:54	19:29		20:02	10	19:02 (4)	20:31
5	07:28		14:10 (5)	07:10		14:21 (5)	06:31		06:39		05:54		05:28
	16:45	50	15:00 (5)	17:21	48	15:09 (5)	17:55	19:30		20:03			20:31
6	07:28		14:10 (5)	07:09		14:23 (5)	06:30		06:38		05:53		05:28
	16:46	51	15:01 (5)	17:22	45	15:08 (5)	17:57	19:31		20:04			20:32
7	07:28		14:10 (5)	07:08		14:24 (5)	06:28		06:36		05:52		05:28
	16:47	52	15:02 (5)	17:24	44	15:08 (5)	17:58	19:32		20:05			20:33
8	07:28		14:10 (5)	07:07		14:26 (5)	06:27		06:34		05:51		05:27
	16:48	52	15:02 (5)	17:25	41	15:07 (5)	17:59	19:33		20:06			20:33
9	07:28		14:10 (5)	07:06		14:27 (5)	06:25		06:33		05:49		05:27
	16:49	53	15:03 (5)	17:26	38	15:05 (5)	18:00	19:34		20:07			20:34
10	07:28		14:10 (5)	07:04		14:29 (5)	06:23		06:31		05:48		05:27
	16:50	54	15:04 (5)	17:27	35	15:04 (5)	18:01	19:35		20:08			20:34
11	07:28		14:11 (5)	07:03		14:32 (5)	06:22		06:29		05:47		05:27
	16:51	54	15:05 (5)	17:29	30	15:02 (5)	18:02	19:37		20:09			20:35
12	07:27		14:10 (5)	07:02		14:35 (5)	06:20		06:28		05:46		05:27
	16:52	55	15:05 (5)	17:30	26	15:01 (5)	18:04	19:38		20:10			20:36
13	07:27		14:11 (5)	07:01		14:37 (5)	06:18		06:26		05:45		05:27
	16:53	55	15:06 (5)	17:31	20	14:57 (5)	18:05	19:39		20:11			20:36
14	07:27		14:11 (5)	06:59		14:43 (5)	06:17		06:25		05:44		05:26
	16:54	55	15:06 (5)	17:32	9	14:52 (5)	18:06	19:40		20:12			20:36
15	07:26		14:11 (5)	06:58			06:15		06:23		05:43		05:26
	16:55	56	15:07 (5)	17:34			18:07	19:41		20:13			20:37
16	07:26		14:11 (5)	06:57			06:13		06:21		18:59 (4)	05:42	05:26
	16:56	56	15:07 (5)	17:35			18:08	19:42	2	19:01 (4)	20:14		20:37
17	07:25		14:12 (5)	06:55			06:12		06:20		18:54 (4)	05:41	05:27
	16:57	56	15:08 (5)	17:36			18:09	19:43	12	19:06 (4)	20:15		20:38
18	07:25		14:11 (5)	06:54			06:10		06:18		18:52 (4)	05:40	05:27
	16:59	57	15:08 (5)	17:37			18:10	19:44	16	19:08 (4)	20:16		20:38
19	07:24		14:12 (5)	06:53			06:08		06:17		18:50 (4)	05:39	05:27
	17:00	57	15:09 (5)	17:39			18:11	19:45	19	19:09 (4)	20:17		20:38
20	07:24		14:12 (5)	06:51			06:06		06:15		18:49 (4)	05:38	05:27
	17:01	57	15:09 (5)	17:40			18:12	19:46	21	19:10 (4)	20:18		20:39
21	07:23		14:12 (5)	06:50			06:05		06:14		18:48 (4)	05:37	05:27
	17:02	57	15:09 (5)	17:41			18:14	19:47	23	19:11 (4)	20:19		20:39
22	07:23		14:13 (5)	06:48			06:03		06:12		18:47 (4)	05:37	05:27
	17:03	57	15:10 (5)	17:42			18:15	19:49	23	19:10 (4)	20:20		20:39
23	07:22		14:13 (5)	06:47			06:01		06:11		18:47 (4)	05:36	05:27
	17:05	57	15:10 (5)	17:44			18:16	19:50	24	19:11 (4)	20:21		20:39
24	07:21		14:13 (5)	06:45			06:00		06:09		18:46 (4)	05:35	05:28
	17:06	58	15:11 (5)	17:45			18:17	19:51	25	19:11 (4)	20:22		20:39
25	07:20		14:14 (5)	06:44			05:58		06:08		18:46 (4)	05:34	05:28
	17:07	57	15:11 (5)	17:46			18:18	19:52	25	19:11 (4)	20:23		20:40
26	07:20		14:14 (5)	06:42			05:56		06:06		18:46 (4)	05:33	05:28
	17:08	57	15:11 (5)	17:47			18:19	19:53	25	19:11 (4)	20:23		20:40
27	07:19		14:14 (5)	06:41			05:55		06:05		18:46 (4)	05:33	05:29
	17:10	57	15:11 (5)	17:48			18:20	19:54	24	19:10 (4)	20:24		20:40
28	07:18		14:16 (5)	06:39			05:53		06:04		18:46 (4)	05:32	05:29
	17:11	56	15:12 (5)	17:50			18:21	19:55	24	19:10 (4)	20:25		20:40
29	07:17		14:16 (5)				06:51		06:02		18:47 (4)	05:32	05:29
	17:12	56	15:12 (5)				19:22	19:56	22	19:09 (4)	20:26		20:40
30	07:16		14:17 (5)				06:49		06:01		18:47 (4)	05:31	05:30
	17:13	54	15:11 (5)				19:23	19:57	21	19:08 (4)	20:27		20:40
31	07:15		14:18 (5)				06:48				05:31		
	17:15	53	15:11 (5)				19:25				20:28		
Ore potenziali eliofania	296		296			369		399		450		454	
Totale, caso peggiore	1685		541			306		60					
Probabilità di eliofania	0,44		0,46			0,48		0,47					
Tempo di operatività rid.	1,00		1,00			1,00		1,00					
Dir. del vento rid.	1,00		1,00			1,00		1,00					
Totale ridotto	0,44		0,46			0,48		0,47					
Totale effettivo	743		247			146		28					

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BH - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (60)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	05:55	06:26	06:57	06:32	13:59 (5) 07:08 13:53 (5)
	20:40	20:20	19:36	18:45	16:57	35 14:34 (5) 16:32 54 14:47 (5)
2	05:31	05:56	06:27	06:58	06:33	13:56 (5) 07:09 13:54 (5)
	20:39	20:19	19:35	18:43	16:56	39 14:35 (5) 16:32 53 14:47 (5)
3	05:31	05:57	06:28	06:59	06:35	13:55 (5) 07:10 13:54 (5)
	20:39	20:18	19:33	18:41	16:55	41 14:36 (5) 16:32 53 14:47 (5)
4	05:32	05:58	06:29	07:00	06:36	13:54 (5) 07:11 13:55 (5)
	20:39	20:17	19:31	18:40	16:54	44 14:38 (5) 16:32 52 14:47 (5)
5	05:32	05:59	06:30	07:01	06:37	13:52 (5) 07:12 13:55 (5)
	20:39	20:15	19:30	18:38	16:52	46 14:38 (5) 16:31 52 14:47 (5)
6	05:33	06:00	06:31	07:02	06:38	13:51 (5) 07:13 13:56 (5)
	20:39	20:14	19:28	18:36	16:51	48 14:39 (5) 16:31 51 14:47 (5)
7	05:34	06:01	06:32	07:03	06:39	13:51 (5) 07:14 13:57 (5)
	20:38	20:13	19:26	18:35	16:50	49 14:40 (5) 16:31 50 14:47 (5)
8	05:34	06:02	19:05 (4) 06:33	07:05	06:41	13:50 (5) 07:15 13:57 (5)
	20:38	20:12	4 19:09 (4) 19:24	18:33	16:49	51 14:41 (5) 16:31 50 14:47 (5)
9	05:35	06:03	19:01 (4) 06:34	07:06	06:42	13:49 (5) 07:16 13:58 (5)
	20:38	20:10	11 19:12 (4) 19:23	18:31	16:48	52 14:41 (5) 16:31 50 14:48 (5)
10	05:36	06:04	18:59 (4) 06:35	07:07	06:43	13:49 (5) 07:16 13:58 (5)
	20:37	20:09	15 19:14 (4) 19:21	18:30	16:47	53 14:42 (5) 16:31 49 14:47 (5)
11	05:36	06:05	18:57 (4) 06:36	07:08	06:44	13:48 (5) 07:17 13:59 (5)
	20:37	20:08	18 19:15 (4) 19:19	18:28	16:46	54 14:42 (5) 16:31 48 14:47 (5)
12	05:37	06:06	18:56 (4) 06:37	07:09	06:45	13:48 (5) 07:18 14:00 (5)
	20:36	20:07	20 19:16 (4) 19:18	18:27	16:45	54 14:42 (5) 16:31 48 14:48 (5)
13	05:38	06:07	18:55 (4) 06:38	07:10	06:47	13:48 (5) 07:19 14:01 (5)
	20:36	20:05	22 19:17 (4) 19:16	18:25	16:44	55 14:43 (5) 16:31 47 14:48 (5)
14	05:39	06:08	18:54 (4) 06:40	07:11	06:48	13:48 (5) 07:20 14:01 (5)
	20:35	20:04	23 19:17 (4) 19:14	18:23	16:43	56 14:44 (5) 16:32 48 14:49 (5)
15	05:39	06:09	18:54 (4) 06:41	07:12	06:49	13:47 (5) 07:20 14:01 (5)
	20:35	20:02	24 19:18 (4) 19:12	18:22	16:42	57 14:44 (5) 16:32 47 14:48 (5)
16	05:40	06:10	18:53 (4) 06:42	07:13	06:50	13:47 (5) 07:21 14:02 (5)
	20:34	20:01	25 19:18 (4) 19:11	18:20	16:41	57 14:44 (5) 16:32 47 14:49 (5)
17	05:41	06:11	18:53 (4) 06:43	07:15	06:52	13:48 (5) 07:22 14:03 (5)
	20:33	20:00	25 19:18 (4) 19:09	18:19	16:40	57 14:45 (5) 16:32 46 14:49 (5)
18	05:42	06:12	18:53 (4) 06:44	07:16	06:53	13:47 (5) 07:22 14:03 (5)
	20:33	19:58	25 19:18 (4) 19:07	18:17	16:40	58 14:45 (5) 16:33 46 14:49 (5)
19	05:43	06:13	18:52 (4) 06:45	07:17	06:54	13:47 (5) 07:23 14:04 (5)
	20:32	19:57	25 19:17 (4) 19:06	18:16	16:39	57 14:44 (5) 16:33 46 14:50 (5)
20	05:44	06:14	18:52 (4) 06:46	07:18	06:55	13:48 (5) 07:24 14:04 (5)
	20:31	19:55	25 19:17 (4) 19:04	18:14	16:38	57 14:45 (5) 16:33 46 14:50 (5)
21	05:44	06:15	18:53 (4) 06:47	07:19	06:56	13:48 (5) 07:24 14:05 (5)
	20:30	19:54	23 19:16 (4) 19:02	18:13	16:37	57 14:45 (5) 16:34 46 14:51 (5)
22	05:45	06:16	18:53 (4) 06:48	07:20	06:58	13:48 (5) 07:25 14:05 (5)
	20:30	19:52	22 19:15 (4) 19:00	18:11	16:37	57 14:45 (5) 16:34 46 14:51 (5)
23	05:46	06:17	18:53 (4) 06:49	07:21	06:59	13:48 (5) 07:25 14:06 (5)
	20:29	19:51	20 19:13 (4) 18:59	18:10	16:36	57 14:45 (5) 16:35 46 14:52 (5)
24	05:47	06:18	18:53 (4) 06:50	07:23	07:00	13:49 (5) 07:26 14:06 (5)
	20:28	19:49	19 19:12 (4) 18:57	18:08	16:35	56 14:45 (5) 16:35 46 14:52 (5)
25	05:48	06:19	18:55 (4) 06:51	06:24	07:01	13:50 (5) 07:26 14:07 (5)
	20:27	19:47	15 19:10 (4) 18:55	17:07	16:35	56 14:46 (5) 16:36 46 14:53 (5)
26	05:49	06:20	18:57 (4) 06:52	06:25	07:02	13:50 (5) 07:27 14:07 (5)
	20:26	19:46	11 19:08 (4) 18:53	17:05	16:34	56 14:46 (5) 16:37 46 14:53 (5)
27	05:50	06:21	06:53	06:26	07:03	13:50 (5) 07:27 14:07 (5)
	20:25	19:44	18:52	17:04	16:34	56 14:46 (5) 16:37 47 14:54 (5)
28	05:51	06:22	06:54	06:27	14:11 (5) 07:04	13:51 (5) 07:27 14:07 (5)
	20:24	19:43	18:50	17:03	13 14:24 (5) 16:33	55 14:46 (5) 16:38 47 14:54 (5)
29	05:52	06:23	06:55	06:29	14:06 (5) 07:05	13:51 (5) 07:28 14:08 (5)
	20:23	19:41	18:48	17:01	21 14:27 (5) 16:33	55 14:46 (5) 16:39 47 14:55 (5)
30	05:53	06:24	06:56	06:30	14:03 (5) 07:07	13:52 (5) 07:28 14:08 (5)
	20:22	19:39	18:47	17:00	27 14:30 (5) 16:33	54 14:46 (5) 16:39 48 14:56 (5)
31	05:54	06:25	06:31	06:31	14:01 (5)	07:28 14:09 (5)
	20:21	19:38	16:59	32 14:33 (5)	16:40	47 14:56 (5)
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		372		93	1579	1495
Probabilità di eliofania		0,67		0,44	0,40	0,36
Tempo di operatività rid.		1,00		1,00	1,00	1,00
Dir. del vento rid.		1,00		1,00	1,00	1,00
Totale ridotto		0,67		0,44	0,40	0,36
Totale effettivo		248		40	639	543

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: Bl - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (61)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	06:21 (5) 20:29	05:30 20:40	05:55 20:20	06:38 (5) 19:36	06:26 18:45	06:57 16:57	06:32 16:32
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	05:58 19:59	06:21 (5) 20:29	05:30 20:39	05:56 20:19	06:36 (5) 19:35	06:27 18:43	06:58 16:56	06:33 16:32
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	06:21 (5) 20:30	05:31 20:39	05:57 20:18	06:34 (5) 19:33	06:28 18:42	06:59 16:55	06:35 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	06:21 (5) 20:31	05:32 20:39	05:58 20:17	06:33 (5) 19:31	06:29 18:40	07:00 16:54	06:36 16:32
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	06:21 (5) 20:31	05:28 20:39	05:33 20:16	06:32 (5) 19:30	06:30 18:38	07:01 16:53	06:37 16:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	06:22 (5) 20:32	05:33 20:39	06:00 20:14	06:32 (5) 19:28	06:31 18:36	07:03 16:51	06:38 16:31
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	06:43 (5) 20:33	05:34 20:38	06:01 20:13	06:31 (5) 19:26	06:32 18:35	07:04 16:50	06:39 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06	06:23 (5) 20:33	05:28 20:38	06:02 20:12	06:31 (5) 19:25	06:34 18:33	07:05 16:49	06:41 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:50 20:07	06:42 (5) 20:33	05:27 20:38	06:03 20:11	06:30 (5) 19:23	06:35 18:32	07:06 16:48	06:42 16:31
10	07:28 16:50	07:04 17:28	06:23 18:01	06:31 19:36	05:48 20:08	06:41 (5) 20:35	05:27 20:37	06:04 20:09	06:30 (5) 19:21	06:36 18:30	07:07 16:47	06:43 16:31
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	06:26 (5) 20:35	05:27 20:37	06:05 20:08	06:30 (5) 19:19	06:37 18:28	07:08 16:46	06:44 16:31
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	06:22 (5) 20:36	05:27 20:36	06:06 20:07	06:30 (5) 19:18	06:38 18:27	07:09 16:45	06:46 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	06:25 (5) 20:36	05:27 20:36	06:07 20:05	06:30 (5) 19:16	06:39 18:25	07:10 16:44	06:47 16:31
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	06:27 (5) 20:37	05:27 20:35	06:08 20:04	06:30 (5) 19:14	06:40 18:23	07:11 16:43	06:48 16:32
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	06:28 (5) 20:37	05:27 20:35	06:09 20:02	06:31 (5) 19:13	06:41 18:22	07:12 16:42	06:49 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	06:29 (5) 20:37	05:27 20:34	06:10 20:01	06:32 (5) 19:11	06:42 18:20	07:13 16:41	06:50 16:32
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	06:30 (5) 20:38	05:27 20:33	06:11 20:00	06:33 (5) 19:09	06:43 18:19	07:15 16:40	06:52 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:18 19:44	05:40 20:16	06:31 (5) 20:38	05:27 20:33	06:12 19:58	06:34 (5) 19:07	06:44 18:17	07:16 16:40	06:53 16:33
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	06:43 (5) 20:38	05:27 20:32	06:13 19:57	06:36 (5) 19:06	06:45 18:16	07:17 16:39	06:54 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	06:44 (5) 20:39	05:27 20:31	06:14 19:55	06:45 (5) 19:04	06:46 18:14	07:18 16:38	06:55 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	06:45 (5) 20:39	05:27 20:31	06:15 19:54	06:47 (5) 19:02	06:47 18:13	07:19 16:37	06:56 16:34
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	06:46 (5) 20:39	05:27 20:30	06:16 19:52	06:48 (5) 19:00	06:48 18:11	07:20 16:37	06:58 16:34
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	06:47 (5) 20:39	05:28 20:29	06:17 19:51	06:49 (5) 18:59	06:49 18:10	07:22 16:36	06:59 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	06:48 (5) 20:39	05:28 20:28	06:18 19:49	06:50 (5) 18:57	06:50 18:08	07:23 16:36	07:00 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	06:49 (5) 20:40	05:28 20:27	06:19 19:48	06:51 (5) 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:07 19:53	05:34 20:24	06:50 (5) 20:40	05:28 20:26	06:20 19:46	06:52 (5) 18:53	06:25 17:05	07:02 16:34	07:27 16:37
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:25	06:51 (5) 20:40	05:29 20:25	06:21 19:44	06:53 (5) 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	06:52 (5) 20:40	05:29 20:24	06:22 19:43	06:54 (5) 18:50	06:27 17:03	07:04 16:34	07:27 16:38
29	07:17 17:12	06:37 19:22	05:51 19:56	06:02 20:26	05:32 20:26	06:53 (5) 20:40	05:28 20:23	06:23 19:41	06:55 (5) 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:35 19:24	06:01 19:57	06:01 20:27	05:31 20:27	06:54 (5) 20:40	05:30 20:22	06:24 19:40	06:56 (5) 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:15 17:15	06:48 19:25	06:48 19:57	06:31 20:28	05:31 20:28	06:55 (5) 20:40	05:31 20:21	06:25 19:38	06:57 (5) 18:47	06:31 16:59	07:08 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore				126	227			353				
Probabilità di eliofania				0,48	0,47			0,67				
Tempo di operatività rid.				1,00	1,00			1,00				
Dir. del vento rid.				1,00	1,00			1,00				
Totale ridotto				0,48	0,47			0,67				
Totale effettivo				60	106			235				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (62)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (63)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno				
1	07:29	07:51 (6)	07:15	06:38	06:46	07:17 (11)	06:00	05:30	06:31 (1)	
	16:41	8 07:59 (6)	17:16	17:51	19:26	9 07:26 (11)	19:59	20:29	31 07:02 (1)	
2	07:29	07:51 (6)	07:14	06:36	06:45	07:18 (11)	05:58	05:30	06:32 (1)	
	16:42	8 07:59 (6)	17:17	17:52	19:27	5 07:23 (11)	20:00	20:30	30 07:02 (1)	
3	07:29	07:52 (6)	07:13	06:35	06:43		05:57	05:29	06:31 (1)	
	16:43	7 07:59 (6)	17:19	17:53	19:28		20:01	20:30	30 07:01 (1)	
4	07:29	07:53 (6)	07:12	06:33	06:52 (9)	06:41	05:56	05:29	06:32 (1)	
	16:44	6 07:59 (6)	17:20	17:55	5 06:57 (9)	19:29	20:02	20:31	30 07:02 (1)	
5	07:29	07:55 (6)	07:10	06:32	06:51 (9)	06:40	05:55	05:29	06:33 (1)	
	16:45	4 07:59 (6)	17:21	17:56	7 06:58 (9)	19:30	20:03	20:32	29 07:02 (1)	
6	07:29		07:09	06:30	06:49 (9)	06:38	05:53	06:38 (1)	05:28	06:33 (1)
	16:46		17:23	17:57	9 06:58 (9)	19:31	20:04	16 06:54 (1)	20:32	28 07:01 (1)
7	07:29		07:08	06:28	06:48 (9)	06:36	05:52	06:36 (1)	05:28	06:34 (1)
	16:47		17:24	17:58	10 06:58 (9)	19:32	20:05	20 06:56 (1)	20:33	27 07:01 (1)
8	07:29		07:07	06:27	06:49 (9)	06:35	05:51	06:34 (1)	05:28	06:34 (1)
	16:48		17:25	17:59	8 06:57 (9)	19:34	20:06	23 06:57 (1)	20:34	27 07:01 (1)
9	07:28		07:06	06:25	06:50 (9)	06:33	05:50	06:33 (1)	05:27	06:35 (1)
	16:49		17:26	18:00	5 06:55 (9)	19:35	20:07	26 06:59 (1)	20:34	26 07:01 (1)
10	07:28		07:05	06:24		06:31	05:49	06:32 (1)	05:27	06:35 (1)
	16:50		17:28	18:02		19:36	20:08	28 07:00 (1)	20:35	25 07:00 (1)
11	07:28		07:03	06:22		06:30	05:47	06:31 (1)	05:27	06:35 (1)
	16:51		17:29	18:03		19:37	20:09	29 07:00 (1)	20:35	25 07:00 (1)
12	07:28		07:02	06:20	06:41 (10)	06:28	05:46	06:31 (1)	05:27	06:36 (1)
	16:52		17:30	18:04	6 06:47 (10)	19:38	20:10	30 07:01 (1)	20:36	24 07:00 (1)
13	07:27		07:01	06:19	06:39 (10)	06:27	05:45	06:30 (1)	05:27	06:36 (1)
	16:53		17:31	18:05	9 06:48 (10)	19:39	20:11	32 07:02 (1)	20:36	24 07:00 (1)
14	07:27		07:00	06:17	06:39 (10)	06:25	05:44	06:30 (1)	05:27	06:37 (1)
	16:54		17:33	18:06	10 06:49 (10)	19:40	20:12	32 07:02 (1)	20:37	23 07:00 (1)
15	07:27		06:58	06:15	06:38 (10)	06:23	05:43	06:29 (1)	05:27	06:37 (1)
	16:55		17:34	18:07	11 06:49 (10)	19:41	20:13	33 07:02 (1)	20:37	23 07:00 (1)
16	07:26		06:57	06:14	06:38 (10)	06:22	05:42	06:29 (1)	05:27	06:38 (1)
	16:57		17:35	18:08	10 06:48 (10)	19:42	20:14	33 07:02 (1)	20:38	22 07:00 (1)
17	07:26		06:56	06:12	06:40 (10)	06:20	05:41	06:28 (1)	05:27	06:38 (1)
	16:58		17:36	18:09	7 06:47 (10)	19:43	20:15	35 07:03 (1)	20:38	22 07:00 (1)
18	07:25		06:54	06:10		06:19	05:40	06:28 (1)	05:27	06:38 (1)
	16:59		17:38	18:11		19:44	20:16	35 07:03 (1)	20:38	22 07:00 (1)
19	07:25		06:53	06:08		06:17	05:39	06:28 (1)	05:27	06:39 (1)
	17:00		17:39	18:12		19:46	20:17	35 07:03 (1)	20:39	22 07:01 (1)
20	07:24		06:51	06:07		06:16	05:38	06:28 (1)	05:27	06:39 (1)
	17:01		17:40	18:13		19:47	20:18	35 07:03 (1)	20:39	22 07:01 (1)
21	07:24		06:50	06:05		06:14	05:38	06:27 (1)	05:27	06:39 (1)
	17:02		17:41	18:14		19:48	20:19	35 07:02 (1)	20:39	22 07:01 (1)
22	07:23		06:49	06:03		06:13	05:37	06:28 (1)	05:27	06:39 (1)
	17:04		17:43	18:15		19:49	20:20	35 07:03 (1)	20:39	22 07:01 (1)
23	07:22		06:47	06:02		06:11	05:36	06:28 (1)	05:28	06:39 (1)
	17:05		17:44	18:16		19:50	20:21	35 07:03 (1)	20:40	22 07:01 (1)
24	07:21		06:46	06:00		06:10	05:35	06:28 (1)	05:28	06:40 (1)
	17:06		17:45	18:17		19:51	20:22	34 07:02 (1)	20:40	22 07:02 (1)
25	07:21		06:44	05:58		06:08	05:34	06:29 (1)	05:28	06:40 (1)
	17:07		17:46	18:18		19:52	20:23	34 07:03 (1)	20:40	22 07:02 (1)
26	07:20		06:43	05:57	06:20 (11)	06:07	05:34	06:29 (1)	05:29	06:40 (1)
	17:09		17:47	18:19	6 06:26 (11)	19:53	20:24	34 07:03 (1)	20:40	22 07:02 (1)
27	07:19		06:41	05:55	06:18 (11)	06:05	05:33	06:28 (1)	05:29	06:40 (1)
	17:10		17:49	18:20	10 06:28 (11)	19:54	20:25	34 07:02 (1)	20:40	23 07:03 (1)
28	07:18		06:40	05:53	06:17 (11)	06:04	05:32	06:29 (1)	05:29	06:40 (1)
	17:11		17:50	18:22	12 06:29 (11)	19:55	20:26	34 07:03 (1)	20:40	23 07:03 (1)
29	07:17			06:51	07:16 (11)	06:02	05:32	06:29 (1)	05:30	06:41 (1)
	17:12			19:23	13 07:29 (11)	19:56	20:26	33 07:02 (1)	20:40	23 07:04 (1)
30	07:17			06:50	07:16 (11)	06:01	05:31	06:30 (1)	05:30	06:40 (1)
	17:14			19:24	12 07:28 (11)	19:58	20:27	32 07:02 (1)	20:40	24 07:04 (1)
31	07:16			06:48	07:17 (11)		05:31	06:30 (1)		
	17:15			19:25	11 07:28 (11)		20:28	32 07:02 (1)		
Ore potenziali eliofania	296	296	369	399	450	454				
Totale, caso peggiore	33	41	161	14	825	737				
Probabilità di eliofania	0,44	0,46	0,44	0,48	0,47	0,54				
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00				
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00				
Totale ridotto	0,44	0,46	0,44	0,48	0,47	0,54				
Totale effettivo	15	19	71	7	384	398				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (63)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:31 20:40	06:39 (1) 07:04 (1)	05:55 20:20	06:41 (1) 07:10 (1)	06:27 19:36	06:57 18:45	07:20 (10) 07:28 (10)	06:32 16:58	07:08 16:33
2	05:31 20:40	06:40 (1) 07:05 (1)	05:56 20:19	06:41 (1) 07:10 (1)	06:28 19:35	06:58 18:43	07:22 (10) 07:25 (10)	06:34 16:56	07:09 16:32
3	05:32 20:40	06:40 (1) 07:06 (1)	05:57 20:18	06:42 (1) 07:09 (1)	06:29 19:33	06:59 18:42		06:35 16:55	07:10 16:32
4	05:32 20:39	06:40 (1) 07:06 (1)	05:58 20:17	06:43 (1) 07:08 (1)	06:30 19:31	07:01 18:40		06:36 16:54	07:11 16:32
5	05:33 20:39	06:40 (1) 07:07 (1)	05:59 20:16	06:44 (1) 07:06 (1)	06:31 19:30	07:02 18:38	07:27 (9) 07:33 (9)	06:37 16:53	07:12 16:32
6	05:33 20:39	06:39 (1) 07:07 (1)	06:00 20:15	06:46 (1) 07:05 (1)	06:32 19:28	07:03 18:37	07:25 (9) 07:34 (9)	06:38 16:52	07:13 16:31
7	05:34 20:39	06:39 (1) 07:08 (1)	06:01 20:13	06:48 (1) 07:03 (1)	06:33 19:26	07:04 18:35	07:24 (9) 07:34 (9)	06:40 16:50	07:14 16:31
8	05:35 20:38	06:39 (1) 07:08 (1)	06:02 20:12	06:51 (1) 06:59 (1)	06:34 19:25	07:05 18:33	07:25 (9) 07:33 (9)	06:41 16:49	07:15 16:31
9	05:35 20:38	06:39 (1) 07:08 (1)	06:03 20:11	06:35 19:23	06:35 19:23	07:06 18:32	07:26 (9) 07:32 (9)	06:42 16:48	07:16 16:31
10	05:36 20:37	06:39 (1) 07:09 (1)	06:04 20:09	06:36 19:21	06:36 19:21	07:07 18:30	07:27 (9) 07:30 (9)	06:43 16:47	07:17 16:31
11	05:37 20:37	06:39 (1) 07:10 (1)	06:05 20:08	06:37 19:20	06:37 19:20	07:08 (11) 18:28		06:45 16:46	07:18 16:31
12	05:37 20:37	06:38 (1) 07:10 (1)	06:06 20:07	06:38 19:18	06:38 19:18	07:08 (11) 18:27		06:46 16:45	07:18 16:31
13	05:38 20:36	06:38 (1) 07:10 (1)	06:07 20:05	06:39 19:16	06:39 19:16	07:09 (11) 18:25		06:47 16:44	07:19 16:32
14	05:39 20:35	06:39 (1) 07:11 (1)	06:08 20:04	06:40 19:14	06:40 19:14	07:10 (11) 18:24		06:48 16:43	07:20 16:32
15	05:40 20:35	06:38 (1) 07:11 (1)	06:09 20:03	06:41 19:13	06:41 19:13	07:11 (11) 18:22		06:49 16:42	07:21 16:32
16	05:40 20:34	06:38 (1) 07:11 (1)	06:10 20:01	06:42 19:11	06:42 19:11	07:11 (11) 18:20		06:51 16:41	07:21 16:32
17	05:41 20:34	06:38 (1) 07:12 (1)	06:11 20:00	06:43 19:09	06:43 19:09	07:12 (11) 18:19		06:52 16:41	07:22 16:33
18	05:42 20:33	06:38 (1) 07:12 (1)	06:12 19:58	06:44 19:08	06:44 19:08	07:13 (11) 18:17		06:53 16:40	07:23 16:33
19	05:43 20:32	06:38 (1) 07:13 (1)	06:13 19:57	06:45 19:06	06:45 19:06	07:14 (11) 18:16		06:54 16:39	07:24 16:33
20	05:44 20:32	06:38 (1) 07:13 (1)	06:14 19:55	06:46 19:04	06:46 19:04	07:15 (11) 18:14		06:55 16:38	07:24 16:34
21	05:45 20:31	06:38 (1) 07:12 (1)	06:15 19:54	06:47 19:02	06:47 19:02	07:16 (11) 18:13		06:57 16:38	07:25 16:34
22	05:46 20:30	06:38 (1) 07:13 (1)	06:16 19:52	06:48 19:01	06:48 19:01	07:17 (11) 18:11		06:58 16:37	07:25 16:35
23	05:46 20:29	06:38 (1) 07:13 (1)	06:17 19:51	06:49 18:59	06:49 18:59	07:18 (11) 18:10		06:59 16:36	07:26 16:35
24	05:47 20:28	06:38 (1) 07:13 (1)	06:18 19:49	06:50 18:57	06:50 18:57	07:19 (11) 18:08		07:00 16:36	07:26 16:36
25	05:48 20:27	06:38 (1) 07:13 (1)	06:19 19:48	06:51 18:55	06:51 18:55	07:20 (11) 17:07	06:47 (8) 06:54 (8)	07:01 16:35	07:26 16:36
26	05:49 20:26	06:39 (1) 07:13 (1)	06:20 19:46	06:52 18:54	06:52 18:54	07:22 (10) 07:28 (10)	06:47 (8) 06:56 (8)	07:02 16:35	07:27 16:37
27	05:50 20:25	06:39 (1) 07:13 (1)	06:21 19:45	06:53 18:52	06:53 18:52	07:29 (10) 17:04	06:48 (8) 06:56 (8)	07:04 16:34	07:27 16:37
28	05:51 20:25	06:39 (1) 07:13 (1)	06:22 19:43	06:54 18:50	06:54 18:50	07:19 (10) 07:29 (10)	06:28 17:03	06:49 (7) 06:55 (8)	07:05 16:34
29	05:52 20:24	06:40 (1) 07:13 (1)	06:23 19:41	06:55 18:49	06:55 18:49	07:18 (10) 07:29 (10)	06:29 17:01	06:50 (7) 06:55 (7)	07:06 16:33
30	05:53 20:22	06:39 (1) 07:11 (1)	06:25 19:40	06:56 18:47	06:56 18:47	07:19 (10) 07:29 (10)	06:30 17:00	06:52 (7) 06:56 (7)	07:07 16:33
31	05:54 20:21	06:40 (1) 07:11 (1)	06:26 19:38				06:31 16:59	06:53 (7) 06:55 (7)	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	185			
Totale, caso peggiore	977	174	123	94		185			
Probabilità di eliofania	0,61	0,67	0,58	0,44		0,36			
Tempo di operatività rid.	1,00	1,00	1,00	1,00		1,00			
Dir. del vento rid.	1,00	1,00	1,00	1,00		1,00			
Totale ridotto	0,61	0,67	0,58	0,44		0,36			
Totale effettivo	592	116	71	41		67			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (64)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	07:35 (11) 06:38	07:23 (1) 06:46	06:00	05:30
2	07:29 16:42	07:14 17:17	07:34 (11) 06:36	07:23 (1) 06:45	05:58	05:30
3	07:29 16:43	07:13 17:19	07:35 (11) 06:35	07:24 (1) 06:43	05:57	05:29
4	07:29 16:44	07:12 17:20	07:35 (11) 06:33	07:24 (1) 06:41	05:56	05:29
5	07:29 16:45	07:10 17:21	07:37 (11) 06:32	07:26 (1) 06:40	05:55	05:29
6	07:29 16:46	07:09 17:23	07:38 (11) 06:30	07:27 (1) 06:38	05:53	05:28
7	07:29 16:47	07:08 17:24	07:42 (11) 17:57	07:47 (1) 19:31	20:04	20:32
8	07:29 16:48	07:07 17:25	06:28	07:28 (1) 06:36	05:52	05:28
9	07:28 16:49	07:06 17:26	06:25	07:44 (1) 19:32	20:05	20:33
10	07:28 16:50	07:05 17:28	18:00	07:33 (1) 06:35	05:51	05:28
11	07:28 16:51	07:03 17:29	17:59	07:40 (1) 19:34	20:06	20:34
12	07:28 16:52	07:02 17:30	06:22	06:33	05:50	05:27
13	07:27 16:53	07:01 17:31	06:19	06:27	05:45	05:27
14	07:27 16:54	07:00 17:33	18:05	06:25	05:44	05:27
15	07:27 16:55	06:58 17:34	06:17	06:23	05:43	05:27
16	07:26 16:57	06:57 17:35	07:38 (1) 06:15	07:41 (1) 18:07	19:41	20:13
17	07:26 16:58	06:56 17:36	06:14	18:07	05:43	05:27
18	07:25 16:59	06:54 17:38	06:12	06:22	05:42	05:27
19	07:25 17:00	06:53 17:39	06:10	19:42	20:14	20:38
20	07:24 17:01	06:51 17:40	06:08	06:20	05:41	05:27
21	07:24 17:02	06:50 17:41	06:07	19:43	20:15	20:38
22	07:23 17:04	06:49 17:43	06:06	06:19	05:40	05:27
23	07:22 17:05	06:47 17:44	06:05	06:18	05:39	05:27
24	07:21 17:06	06:46 17:45	06:04	06:17	05:39	05:27
25	07:21 17:07	06:44 17:46	06:03	06:16	05:38	05:27
26	07:20 17:09	06:43 17:47	06:02	06:15	05:37	05:27
27	07:19 17:10	06:41 17:49	06:01	06:14	05:36	05:28
28	07:18 17:11	06:40 17:50	06:00	06:13	05:35	05:28
29	07:17 17:12	07:39 (11) 07:40 (11)	05:59	06:12	05:34	05:28
30	07:17 17:14	07:38 (11) 07:43 (11)	05:58	06:11	05:33	05:29
31	07:16 17:15	07:37 (11) 07:44 (11)	05:57	06:10	05:32	05:29
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	22	409	179			
Probabilità di eliofania	0,44	0,46	0,44			
Tempo di operatività rid.	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44			
Totale effettivo	10	187	79			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (64)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre		Novembre		Dicembre
1	05:31	05:55	06:27	06:57		06:32		07:08
	20:40	20:20	19:36	18:45		16:58		16:33
2	05:31	05:56	06:28	06:58		06:34		07:09
	20:40	20:19	19:35	18:43		16:56		16:32
3	05:32	05:57	06:29	06:59		06:35		07:10
	20:40	20:18	19:33	18:42		16:55		16:32
4	05:32	05:58	06:30	07:01		06:36		07:11
	20:39	20:17	19:31	18:40		16:54		16:32
5	05:33	05:59	06:31	07:02		06:37	07:07 (11)	07:12
	20:39	20:16	19:30	18:38		16:53	5 07:12 (11)	16:32
6	05:33	06:00	06:32	07:03	08:07 (1)	06:38	07:06 (11)	07:13
	20:39	20:15	19:28	18:37	12 08:19 (1)	16:52	8 07:14 (11)	16:31
7	05:34	06:01	06:33	07:04	08:03 (1)	06:40	07:05 (11)	07:14
	20:39	20:13	19:26	18:35	18 08:21 (1)	16:50	10 07:15 (11)	16:31
8	05:35	06:02	06:34	07:05	08:01 (1)	06:41	07:04 (11)	07:15
	20:38	20:12	19:25	18:33	22 08:23 (1)	16:49	11 07:15 (11)	16:31
9	05:35	06:03	06:35	07:06	07:59 (1)	06:42	07:05 (11)	07:16
	20:38	20:11	19:23	18:32	25 08:24 (1)	16:48	11 07:16 (11)	16:31
10	05:36	06:04	06:36	07:07	07:58 (1)	06:43	07:06 (11)	07:17
	20:37	20:09	19:21	18:30	27 08:25 (1)	16:47	10 07:16 (11)	16:31
11	05:37	06:05	06:37	07:08	07:58 (1)	06:45	07:07 (11)	07:18
	20:37	20:08	19:20	18:28	28 08:26 (1)	16:46	8 07:15 (11)	16:31
12	05:37	06:06	06:38	07:09	07:57 (1)	06:46	07:09 (11)	07:18
	20:37	20:07	19:18	18:27	29 08:26 (1)	16:45	7 07:16 (11)	16:31
13	05:38	06:07	06:39	07:10	07:56 (1)	06:47	07:10 (11)	07:19
	20:36	20:05	19:16	18:25	31 08:27 (1)	16:44	4 07:14 (11)	16:32
14	05:39	06:08	06:40	07:11	07:55 (1)	06:48	07:11 (11)	07:20
	20:35	20:04	19:14	18:24	32 08:27 (1)	16:43	1 07:12 (11)	16:32
15	05:40	06:09	06:41	07:13	07:54 (1)	06:49		07:21
	20:35	20:03	19:13	18:22	32 08:26 (1)	16:42		16:32
16	05:40	06:10	06:42	07:14	07:54 (1)	06:51		07:21
	20:34	20:01	19:11	18:20	32 08:26 (1)	16:41		16:32
17	05:41	06:11	06:43	07:15	07:55 (1)	06:52		07:22
	20:34	20:00	19:09	18:19	32 08:27 (1)	16:41		16:32
18	05:42	06:12	06:44	07:16	07:55 (1)	06:53		07:23
	20:33	19:58	19:08	18:17	31 08:26 (1)	16:40		16:33
19	05:43	06:13	06:45	07:17	07:55 (1)	06:54		07:23
	20:32	19:57	19:06	18:16	30 08:25 (1)	16:39		16:33
20	05:44	06:14	06:46	07:18	07:55 (1)	06:55		07:24
	20:32	19:55	19:04	18:14	29 08:24 (1)	16:38		16:34
21	05:45	06:15	06:47	07:19	07:55 (1)	06:57		07:25
	20:31	19:54	19:02	18:13	28 08:23 (1)	16:38		16:34
22	05:46	06:16	06:48	07:21	07:57 (1)	06:58		07:25
	20:30	19:52	19:01	18:11	26 08:23 (1)	16:37		16:35
23	05:46	06:17	06:49	07:22	07:58 (1)	06:59		07:26
	20:29	19:51	18:59	18:10	24 08:22 (1)	16:36		16:35
24	05:47	06:18	06:50	07:23	07:59 (1)	07:00		07:26
	20:28	19:49	18:57	18:08	21 08:20 (1)	16:36		16:36
25	05:48	06:19	06:51	06:24	07:00 (1)	07:01		07:27
	20:27	19:48	18:55	17:07	17 07:17 (1)	16:35		16:36
26	05:49	06:20	06:52	06:25	07:04 (1)	07:02		07:27
	20:26	19:46	18:54	17:06	11 07:15 (1)	16:35		16:37
27	05:50	06:21	06:53	06:26		07:04		07:27
	20:26	19:45	18:52	17:04		16:34		16:37
28	05:51	06:22	06:54	06:28		07:05		07:28
	20:25	19:43	18:50	17:03		16:34		16:38
29	05:52	06:23	06:55	06:29		07:06		07:28
	20:24	19:41	18:49	17:01		16:33		16:39
30	05:53	06:24	06:56	06:30		07:07		07:28
	20:23	19:40	18:47	17:00		16:33		16:40
31	05:54	06:26		06:31				07:28
	20:21	19:38		16:59				16:40
Ore potenziali eliofania	461	429	375	345		297		286
Totale, caso peggiore				537		75		
Probabilità di eliofania				0,44		0,40		
Tempo di operatività rid.				1,00		1,00		
Dir. del vento rid.				1,00		1,00		
Totale ridotto				0,44		0,40		
Totale effettivo				234		30		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BM - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (65)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	17:47 (7) 20:29
2	07:28 16:42	07:14 17:17	06:36 17:52	17:26 (6) 19:27	05:58 20:00	75 19:23 (8)
3	07:29 16:43	07:12 17:19	06:35 17:53	17:24 (6) 19:28	05:57 20:01	81 17:46 (7)
4	07:29 16:44	07:11 17:20	06:33 17:54	17:23 (6) 19:29	05:56 20:02	85 19:27 (8)
5	07:29 16:45	07:10 17:21	06:32 17:56	17:22 (6) 19:30	05:54 20:03	88 19:28 (8)
6	07:29 16:46	07:09 17:22	06:30 17:57	17:21 (6) 19:31	05:53 20:04	93 19:30 (8)
7	07:28 16:47	07:08 17:24	06:28 17:58	17:21 (6) 19:32	05:52 20:05	94 17:45 (7)
8	07:28 16:48	07:07 17:25	06:27 17:59	17:21 (6) 19:33	05:51 20:06	95 19:31 (8)
9	07:28 16:49	07:06 17:26	06:25 18:00	17:21 (6) 19:35	05:50 20:07	97 19:32 (8)
10	07:28 16:50	07:05 17:28	06:23 18:01	17:21 (6) 19:36	05:48 20:08	98 19:32 (8)
11	07:28 16:51	07:03 17:29	06:22 18:03	17:23 (6) 19:37	05:47 20:09	98 19:32 (8)
12	07:28 16:52	07:02 17:30	06:20 18:04	17:24 (6) 19:38	05:46 20:10	98 19:32 (8)
13	07:27 16:53	07:01 17:31	06:18 18:05	17:26 (6) 19:39	05:45 20:11	98 19:32 (8)
14	07:27 16:54	07:00 17:33	06:17 18:06	17:32 (6) 19:40	05:44 20:12	98 19:32 (8)
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	18:16 (7) 18:25 (7)	05:43 20:13
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	18:09 (7) 18:31 (7)	05:42 20:14
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	18:06 (7) 18:35 (7)	05:41 20:15
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	18:03 (7) 18:37 (7)	05:40 20:16
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	18:01 (7) 18:39 (7)	05:39 20:17
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	17:58 (7) 18:40 (7)	05:38 20:18
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	17:57 (7) 18:42 (7)	05:38 20:19
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	17:55 (7) 18:43 (7)	05:37 20:20
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	17:54 (7) 18:45 (7)	05:36 20:21
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	17:53 (7) 18:46 (7)	05:35 20:22
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	17:51 (7) 18:46 (7)	05:34 20:23
26	07:20 17:09	06:42 17:47	05:56 18:19	06:07 19:53	17:50 (7) 18:47 (7)	05:34 20:24
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	17:49 (7) 18:47 (7)	05:33 20:25
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	17:49 (7) 18:48 (7)	05:32 20:25
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	17:48 (7) 18:49 (7)	05:32 20:26
30	07:16 17:14	06:37 17:52	05:51 18:23	06:02 19:57	17:47 (7) 18:49 (7)	05:31 20:27
31	07:15 17:15	06:36 17:53	05:50 18:24	06:01 19:58	17:47 (7) 18:49 (7)	05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore			148	723	2770	1470
Probabilità di eliofania			0,44	0,48	0,47	0,54
Tempo di operatività rid.			1,00	1,00	1,00	1,00
Dir. del vento rid.			1,00	1,00	1,00	1,00
Totale ridotto			0,44	0,48	0,47	0,54
Totale effettivo			65	346	1290	793

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenne autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BO - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (67)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12		06:51 19:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14		06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15		06:48 19:25		05:31 20:28		05:54 20:21	06:25 19:38		06:31 16:59		07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (68)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Giugno) and rows for each hour of the day (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofania', 'Totale, caso peggiore', 'Probabilità di eliofania', 'Tempo di operatività rid.', 'Dir. del vento rid.', 'Totale ridotto', and 'Totale effettivo'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (68)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31   20:40	11:19 (9)   14:36 (9)	11:22 (9)   14:40 (9)	11:26 (9)   14:24 (9)	07:18 (14)   13:30 (9)	06:32   16:58
2	05:31   20:40	11:20 (9)   14:37 (9)	11:22 (9)   14:40 (9)	11:26 (9)   14:23 (9)	07:19 (14)   13:26 (9)	06:34   16:56
3	05:32   20:39	11:20 (9)   14:37 (9)	11:22 (9)   14:40 (9)	11:26 (9)   14:22 (9)	07:20 (14)   13:22 (9)	06:35   16:55
4	05:32   20:39	11:20 (9)   14:38 (9)	11:22 (9)   14:40 (9)	11:27 (9)   14:21 (9)	07:21 (14)   13:18 (9)	06:36   16:54
5	05:33   20:39	11:21 (9)   14:38 (9)	11:22 (9)   14:40 (9)	11:27 (9)   14:19 (9)	07:22 (14)   13:13 (9)	06:37   16:53
6	05:33   20:39	11:20 (9)   14:38 (9)	11:22 (9)   14:40 (9)	11:28 (9)   14:18 (9)	07:23 (14)   13:07 (9)	06:38   16:51
7	05:34   20:38	11:21 (9)   14:39 (9)	11:22 (9)   14:40 (9)	11:29 (9)   14:17 (9)	07:24 (14)   12:59 (9)	06:40   16:50
8	05:35   20:38	11:20 (9)   14:38 (9)	11:22 (9)   14:39 (9)	11:29 (9)   14:16 (9)	07:25 (14)   12:54 (9)	06:41   16:49
9	05:35   20:38	11:21 (9)   14:39 (9)	11:22 (9)   14:39 (9)	11:30 (9)   14:15 (9)	07:26 (14)   12:49 (9)	06:42   16:48
10	05:36   20:37	11:21 (9)   14:39 (9)	11:22 (9)   14:39 (9)	11:30 (9)   14:14 (9)	07:27 (14)   12:44 (9)	06:43   16:47
11	05:37   20:37	11:20 (9)   14:39 (9)	11:22 (9)   14:39 (9)	11:31 (9)   14:13 (9)	07:29 (14)   12:39 (9)	06:44   16:46
12	05:37   20:36	11:21 (9)   14:39 (9)	11:22 (9)   14:38 (9)	11:32 (9)   14:12 (9)	07:30 (14)   12:34 (9)	06:46   16:45
13	05:38   20:36	11:21 (9)   14:40 (9)	11:22 (9)   14:38 (9)	11:33 (9)   14:11 (9)	07:31 (14)   12:29 (9)	06:47   16:44
14	05:39   20:35	11:22 (9)   14:40 (9)	11:23 (9)   14:37 (9)	11:33 (9)   14:10 (9)	07:32 (14)   12:24 (9)	06:48   16:43
15	05:40   20:35	11:21 (9)   14:40 (9)	11:23 (9)   14:37 (9)	11:33 (9)   14:09 (9)	07:33 (14)   12:19 (9)	06:49   16:42
16	05:40   20:34	11:21 (9)   14:40 (9)	11:23 (9)   14:37 (9)	11:33 (9)   14:08 (9)	07:34 (14)   12:14 (9)	06:51   16:41
17	05:41   20:34	11:21 (9)   14:40 (9)	11:23 (9)   14:36 (9)	11:33 (9)   14:07 (9)	07:35 (14)   12:09 (9)	06:52   16:40
18	05:42   20:33	11:22 (9)   14:41 (9)	11:23 (9)   14:36 (9)	11:34 (9)   14:06 (9)	07:36 (14)   12:04 (9)	06:53   16:39
19	05:43   20:32	11:22 (9)   14:41 (9)	11:23 (9)   14:35 (9)	11:34 (9)   14:05 (9)	07:37 (14)   12:00 (9)	06:54   16:38
20	05:44   20:31	11:21 (9)   14:41 (9)	11:23 (9)   14:35 (9)	11:34 (9)   14:04 (9)	07:38 (14)   11:55 (9)	06:55   16:37
21	05:45   20:31	11:21 (9)   14:40 (9)	11:24 (9)   14:34 (9)	11:35 (9)   14:03 (9)	07:39 (14)   11:50 (9)	06:57   16:36
22	05:45   20:30	11:21 (9)   14:41 (9)	11:24 (9)   14:34 (9)	11:35 (9)   14:02 (9)	07:40 (14)   11:45 (9)	06:58   16:35
23	05:46   20:29	11:22 (9)   14:41 (9)	11:24 (9)   14:33 (9)	11:35 (9)   14:01 (9)	07:41 (14)   11:40 (9)	06:59   16:34
24	05:47   20:28	11:22 (9)   14:41 (9)	11:24 (9)   14:32 (9)	11:35 (9)   14:00 (9)	07:42 (14)   11:35 (9)	06:58   16:33
25	05:48   20:27	11:22 (9)   14:41 (9)	11:24 (9)   14:31 (9)	11:35 (9)   13:59 (9)	07:43 (14)   11:30 (9)	06:59   16:32
26	05:49   20:26	11:22 (9)   14:41 (9)	11:25 (9)   14:30 (9)	11:35 (9)   13:58 (9)	07:44 (14)   11:25 (9)	06:59   16:31
27	05:50   20:25	11:22 (9)   14:41 (9)	11:25 (9)   14:29 (9)	11:35 (9)   13:57 (9)	07:45 (14)   11:20 (9)	06:59   16:30
28	05:51   20:24	11:22 (9)   14:41 (9)	11:25 (9)   14:29 (9)	11:35 (9)   13:56 (9)	07:46 (14)   11:15 (9)	06:59   16:29
29	05:52   20:23	11:21 (9)   14:41 (9)	11:26 (9)   14:28 (9)	11:35 (9)   13:55 (9)	07:47 (14)   11:10 (9)	06:59   16:28
30	05:53   20:22	11:21 (9)   14:41 (9)	11:26 (9)   14:27 (9)	11:35 (9)   13:54 (9)	07:48 (14)   11:05 (9)	06:59   16:27
31	05:54   20:21	11:22 (9)   14:41 (9)	11:25 (9)   14:25 (9)	11:35 (9)   13:53 (9)	07:49 (14)   11:00 (9)	06:59   16:26
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	6156	5955	5064	1361		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	3732	3972	2927	592		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (69)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for specific times of day (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofanìa', 'Totale, caso peggiore', 'Probabilità di eliofanìa', 'Tempo di operatività rid.', 'Dir. del vento rid.', 'Totale ridotto', and 'Totale effettivo'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)
(WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (70)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:51 (7) 07:15	06:38 17:51	06:46 19:26	06:00 19:59	06:21 (11) 05:30
2	07:29 16:42	07:51 (7) 07:14	06:36 17:52	06:45 19:27	05:58 20:00	06:20 (11) 05:29
3	07:29 16:43	07:53 (7) 07:13	06:35 17:53	06:43 19:28	05:57 20:01	06:20 (11) 05:29
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	06:18 (11) 05:29
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	06:18 (11) 05:29
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	06:17 (11) 05:28
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	06:17 (11) 05:28
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	06:17 (11) 05:28
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	06:16 (11) 05:27
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	06:16 (11) 05:27
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	06:16 (11) 05:27
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	06:15 (11) 05:27
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	06:15 (11) 05:27
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	06:16 (11) 05:27
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	06:16 (11) 05:27
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	06:16 (11) 05:27
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	06:16 (11) 05:27
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	06:16 (11) 05:27
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	06:16 (11) 05:27
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	06:16 (11) 05:27
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	06:16 (11) 05:27
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	06:17 (11) 05:27
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	06:17 (11) 05:28
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	06:17 (11) 05:28
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	06:18 (11) 05:28
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	06:18 (11) 05:28
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	06:18 (11) 05:29
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	06:19 (11) 05:29
29	07:17 17:12		06:51 19:23	06:02 19:56	05:32 20:26	06:19 (11) 05:30
30	07:16 17:14		06:50 19:24	06:01 19:57	05:31 20:27	06:20 (11) 05:30
31	07:16 17:15		06:48 19:25	06:00 19:58	05:31 20:28	06:20 (11) 05:30
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	5	191	410	194	1431	923
Probabilità di eliofania	0,44	0,46	0,44	0,48	0,47	0,54
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00
Totale ridotto	0,44	0,46	0,44	0,48	0,47	0,54
Totale effettivo	2	87	180	93	667	498

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (70)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:31 20:40	06:31 (11) 07:02 (11)	05:55 20:20	06:26 (11) 07:15 (11)	06:26 19:36	06:57 18:45	07:20 (10) 07:49 (10)	06:32 16:58	07:08 16:33
2	05:31 20:40	06:32 (11) 07:03 (11)	05:56 20:19	06:26 (11) 07:15 (11)	06:28 19:35	06:58 18:43	07:19 (10) 07:49 (10)	06:34 16:56	07:09 16:32
3	05:32 20:39	06:31 (11) 07:03 (11)	05:57 20:18	06:26 (11) 07:15 (11)	06:29 19:33	06:59 18:42	07:20 (10) 07:48 (10)	06:35 16:55	07:10 16:32
4	05:32 20:39	06:31 (11) 07:04 (11)	05:58 20:17	06:26 (11) 07:15 (11)	06:30 19:31	07:00 18:40	07:21 (10) 07:47 (10)	06:36 16:54	07:11 16:32
5	05:33 20:39	06:31 (11) 07:05 (11)	05:59 20:16	06:26 (11) 07:14 (11)	06:31 19:30	07:02 18:38	07:22 (10) 07:47 (10)	06:37 16:53	07:12 16:32
6	05:33 20:39	06:31 (11) 07:05 (11)	06:00 20:14	06:27 (11) 07:14 (11)	06:32 19:28	07:03 18:37	07:23 (10) 07:46 (10)	06:38 16:51	07:13 16:31
7	05:34 20:38	06:31 (11) 07:06 (11)	06:01 20:13	06:27 (11) 07:13 (11)	06:33 19:26	07:04 18:35	07:24 (10) 07:44 (10)	06:40 16:50	07:14 16:31
8	05:35 20:38	06:30 (11) 07:06 (11)	06:02 20:12	06:28 (11) 07:13 (11)	06:34 19:25	07:05 18:33	07:25 (10) 07:43 (10)	06:41 16:49	07:15 16:31
9	05:35 20:38	06:30 (11) 07:07 (11)	06:03 20:11	06:28 (11) 07:12 (11)	06:35 19:23	07:06 18:32	07:26 (10) 07:41 (10)	06:42 16:48	07:16 16:31
10	05:36 20:37	06:30 (11) 07:08 (11)	06:04 20:09	06:29 (11) 07:11 (11)	06:36 19:21	07:07 18:30	07:27 (10) 07:38 (10)	06:43 16:47	07:17 16:31
11	05:37 20:37	06:29 (11) 07:08 (11)	06:05 20:08	06:29 (11) 07:10 (11)	06:37 19:20	07:08 18:28	07:29 (10) 07:35 (10)	06:45 16:46	07:17 16:31
12	05:37 20:36	06:29 (11) 07:09 (11)	06:06 20:07	06:30 (11) 07:09 (11)	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31	07:42 (7) 07:45 (7)
13	05:38 20:36	06:29 (11) 07:10 (11)	06:07 20:05	06:31 (11) 07:08 (11)	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32	07:44 (7) 07:46 (7)
14	05:39 20:35	06:29 (11) 07:11 (11)	06:08 20:04	06:32 (11) 07:07 (11)	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32	07:44 (7) 07:47 (7)
15	05:40 20:35	06:28 (11) 07:10 (11)	06:09 20:03	06:33 (11) 07:05 (11)	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32	07:45 (7) 07:49 (7)
16	05:40 20:34	06:28 (11) 07:11 (11)	06:10 20:01	06:35 (11) 07:03 (11)	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32	07:45 (7) 07:49 (7)
17	05:41 20:34	06:28 (11) 07:12 (11)	06:11 20:00	06:37 (11) 07:01 (11)	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32	07:46 (7) 07:50 (7)
18	05:42 20:33	06:28 (11) 07:12 (11)	06:12 19:58	06:39 (11) 06:58 (11)	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33	07:47 (7) 07:51 (7)
19	05:43 20:32	06:28 (11) 07:13 (11)	06:13 19:57	06:43 (11) 06:54 (11)	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33	07:47 (7) 07:51 (7)
20	05:44 20:31	06:27 (11) 07:13 (11)	06:14 19:55	06:46 19:04	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34	07:48 (7) 07:52 (7)
21	05:45 20:31	06:27 (11) 07:13 (11)	06:15 19:54	06:47 19:02	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34	07:48 (7) 07:52 (7)
22	05:46 20:30	06:27 (11) 07:14 (11)	06:16 19:52	06:48 19:01	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34	07:49 (7) 07:53 (7)
23	05:46 20:29	06:26 (11) 07:14 (11)	06:17 19:51	06:49 18:59	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35	07:49 (7) 07:53 (7)
24	05:47 20:28	06:26 (11) 07:15 (11)	06:18 19:49	06:50 18:57	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36	07:49 (7) 07:53 (7)
25	05:48 20:27	06:26 (11) 07:15 (11)	06:19 19:48	06:51 18:55	06:51 18:55	07:25 17:07	07:01 16:35	07:26 16:36	07:50 (7) 07:54 (7)
26	05:49 20:26	06:26 (11) 07:15 (11)	06:20 19:46	06:52 18:54	06:52 18:54	07:26 17:06	07:02 16:35	07:27 16:37	07:50 (7) 07:54 (7)
27	05:50 20:25	06:26 (11) 07:16 (11)	06:21 19:45	06:53 18:52	06:53 18:52	07:22 17:04	06:26 16:34	07:03 16:37	07:27 16:37
28	05:51 20:24	06:26 (11) 07:16 (11)	06:22 19:43	06:54 18:50	06:54 18:50	07:21 17:03	06:49 (9) 16:34	07:05 16:38	07:27 16:38
29	05:52 20:23	06:25 (11) 07:15 (11)	06:23 19:41	06:55 18:48	06:55 18:48	07:20 17:01	06:29 16:33	07:06 16:39	07:28 16:39
30	05:53 20:22	06:25 (11) 07:15 (11)	06:24 19:40	06:56 18:47	06:56 18:47	07:19 (10) 17:00	06:30 16:33	07:07 16:40	07:28 16:40
31	05:54 20:21	06:26 (11) 07:15 (11)	06:25 19:38	06:57 16:59	06:57 16:59	07:18 (10) 16:59	06:31 16:59	07:08 16:40	07:29 16:40
Ore potenziali eliofanía	461	429	375	345	297	286	79		
Totale, caso peggiore	1304	734	185	426	79				
Probabilità di eliofanía	0,61	0,67	0,58	0,44	0,36				
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00				
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00				
Totale ridotto	0,61	0,67	0,58	0,44	0,36				
Totale effettivo	790	490	107	185	29				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra  
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
(WTG che provoca l'inizio dell'ombreggiamento)  
(WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (71)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	06:08 (11) 06:55 (11)
2	07:29 16:42	07:14 17:17	06:36 17:52	07:01 (10) 19:27	06:45 20:00	05:58 20:29	06:07 (11) 06:55 (11)
3	07:29 16:43	07:13 17:19	06:35 17:53	06:57 (10) 19:28	06:43 20:01	05:57 20:30	06:07 (11) 06:56 (11)
4	07:29 16:44	07:11 17:20	06:33 17:55	06:54 (10) 19:29	06:41 20:02	05:56 20:31	06:07 (11) 06:57 (11)
5	07:29 16:45	07:10 17:21	06:32 17:56	06:52 (10) 19:30	06:40 20:03	05:55 20:32	06:06 (11) 06:57 (11)
6	07:29 16:46	07:09 17:23	06:30 17:57	06:50 (10) 19:31	06:38 20:04	05:53 20:32	06:06 (11) 06:58 (11)
7	07:29 16:47	07:08 17:24	06:28 17:58	06:48 (10) 19:32	06:36 20:05	05:52 20:33	06:06 (11) 06:59 (11)
8	07:28 16:48	07:07 17:25	06:27 17:59	06:48 (10) 19:34	06:35 20:06	05:51 20:34	06:06 (11) 06:59 (11)
9	07:28 16:49	07:06 17:26	07:26 (9) 07:27 (9)	06:25 18:00	06:33 19:35	05:50 20:07	06:06 (11) 07:00 (11)
10	07:28 16:50	07:05 17:28	07:24 (9) 07:30 (9)	06:23 18:01	06:31 19:36	05:49 20:08	06:05 (11) 07:00 (11)
11	07:28 16:51	07:03 17:29	07:23 (9) 07:32 (9)	06:22 18:03	06:30 19:37	05:47 20:09	06:05 (11) 07:00 (11)
12	07:28 16:52	07:02 17:30	07:22 (9) 07:33 (9)	06:20 18:04	06:28 19:38	05:46 20:10	06:05 (11) 07:01 (11)
13	07:27 16:53	07:01 17:31	07:21 (9) 07:35 (9)	06:18 18:05	06:26 19:39	05:45 20:11	06:05 (11) 07:01 (11)
14	07:27 16:54	07:00 17:33	07:19 (9) 07:35 (9)	06:17 18:06	06:25 19:40	05:44 20:12	06:05 (11) 07:02 (11)
15	07:27 16:55	06:58 17:34	07:18 (9) 07:36 (9)	06:15 18:07	06:23 19:41	05:43 20:13	06:05 (11) 07:02 (11)
16	07:26 16:57	06:57 17:35	07:16 (9) 07:36 (9)	06:13 18:08	06:22 19:42	05:42 20:14	06:05 (11) 07:02 (11)
17	07:26 16:58	06:56 17:36	07:15 (9) 07:36 (9)	06:12 18:09	06:20 19:43	05:41 20:15	06:05 (11) 07:03 (11)
18	07:25 16:59	06:54 17:38	07:14 (14) 07:37 (9)	06:10 18:10	06:19 19:44	05:40 20:16	06:05 (11) 07:03 (11)
19	07:25 17:00	06:53 17:39	07:12 (14) 07:36 (9)	06:08 18:12	06:17 19:45	05:39 20:17	06:06 (11) 07:04 (11)
20	07:24 17:01	06:51 17:40	07:11 (14) 07:36 (9)	06:07 18:13	06:16 19:47	05:38 20:18	06:06 (11) 07:04 (11)
21	07:23 17:02	06:50 17:41	07:09 (14) 07:35 (9)	06:05 18:14	06:14 19:48	05:38 20:19	06:06 (11) 07:04 (11)
22	07:23 17:04	06:48 17:43	07:08 (14) 07:35 (9)	06:03 18:15	06:12 19:49	05:37 20:20	06:06 (11) 07:04 (11)
23	07:22 17:05	06:47 17:44	07:06 (14) 07:33 (9)	06:02 18:16	06:11 19:50	05:36 20:21	06:06 (11) 07:04 (11)
24	07:21 17:06	06:46 17:45	07:05 (14) 07:33 (9)	06:00 18:17	06:10 19:51	05:35 20:22	06:07 (11) 07:05 (11)
25	07:21 17:07	06:44 17:46	07:03 (14) 07:31 (9)	05:58 18:18	06:08 19:52	05:34 20:23	06:07 (11) 07:05 (11)
26	07:20 17:09	06:43 17:47	07:03 (14) 07:29 (9)	05:56 18:19	06:07 19:53	05:34 20:24	06:07 (11) 07:04 (11)
27	07:19 17:10	06:41 17:49	07:21 (9) 07:23 (9)	05:55 18:20	06:05 19:54	05:33 20:25	06:08 (11) 07:05 (11)
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	06:10 (11) 06:51 (11)	06:08 (11) 07:05 (11)
29	07:17 17:12	06:38 17:51	06:02 19:23	06:03 19:56	05:32 20:26	06:09 (11) 06:51 (11)	06:09 (11) 07:05 (11)
30	07:16 17:14	06:37 17:52	06:50 19:24	06:01 19:57	05:31 20:27	06:09 (11) 06:53 (11)	06:09 (11) 07:05 (11)
31	07:16 17:15	06:37 17:53	06:48 19:25	05:31 20:28	06:08 (11) 06:53 (11)	06:08 (11) 06:53 (11)	06:08 (11) 07:05 (11)
Ore potenziali eliofania	296	296	369	399	450	454	
Totale, caso peggiore		342	645		372	1655	
Probabilità di eliofania		0,46	0,44		0,47	0,54	
Tempo di operatività rid.		1,00	1,00		1,00	1,00	
Dir. del vento rid.		1,00	1,00		1,00	1,00	
Totale ridotto		0,46	0,44		0,47	0,54	
Totale effettivo		156	284		173	893	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BS - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (71)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:31	06:09 (11)	05:55	06:26	06:57	07:24 (10)	06:32	06:54 (9)	07:08
	20:40	56 07:05 (11)	20:20	19:36	18:45	36 08:00 (10)	16:58	5 06:59 (9)	16:33
2	05:31	06:10 (11)	05:56	06:28	06:58	07:24 (10)	06:34		07:09
	20:40	55 07:05 (11)	20:19	19:35	18:43	36 08:00 (10)	16:56		16:32
3	05:32	06:10 (11)	05:57	06:29	06:59	07:24 (10)	06:35		07:10
	20:39	54 07:04 (11)	20:18	19:33	18:42	35 07:59 (10)	16:55		16:32
4	05:32	06:11 (11)	05:58	06:30	07:00	07:24 (10)	06:36		07:11
	20:39	54 07:05 (11)	20:17	19:31	18:40	34 07:58 (10)	16:54		16:32
5	05:33	06:12 (11)	05:59	06:31	07:02	07:24 (10)	06:37		07:12
	20:39	53 07:05 (11)	20:16	19:30	18:38	33 07:57 (10)	16:53		16:32
6	05:33	06:12 (11)	06:00	06:32	07:03	07:25 (10)	06:38		07:13
	20:39	52 07:04 (11)	20:14	19:28	18:37	31 07:56 (10)	16:51		16:31
7	05:34	06:13 (11)	06:01	06:33	07:04	07:25 (10)	06:40		07:14
	20:38	51 07:04 (11)	20:13	19:26	18:35	29 07:54 (10)	16:50		16:31
8	05:35	06:13 (11)	06:02	06:34	07:05	07:26 (10)	06:41		07:15
	20:38	50 07:03 (11)	20:12	19:25	18:33	27 07:53 (10)	16:49		16:31
9	05:35	06:14 (11)	06:03	06:35	07:06	07:27 (10)	06:42		07:16
	20:38	49 07:03 (11)	20:11	19:23	18:32	24 07:51 (10)	16:48		16:31
10	05:36	06:15 (11)	06:04	06:36	07:07	07:29 (10)	06:43		07:17
	20:37	48 07:03 (11)	20:09	19:21	18:30	19 07:48 (10)	16:47		16:31
11	05:37	06:15 (11)	06:05	06:37	07:08	07:33 (10)	06:45		07:17
	20:37	47 07:02 (11)	20:08	19:20	18:28	13 07:46 (10)	16:46		16:31
12	05:37	06:16 (11)	06:06	06:38	07:09		06:46		07:18
	20:36	46 07:02 (11)	20:07	19:18	18:27		16:45		16:31
13	05:38	06:17 (11)	06:07	06:39	07:10		06:47		07:19
	20:36	45 07:02 (11)	20:05	19:16	18:25		16:44		16:32
14	05:39	06:18 (11)	06:08	06:40	07:11		06:48		07:20
	20:35	43 07:01 (11)	20:04	19:14	18:24		16:43		16:32
15	05:40	06:18 (11)	06:09	06:41	07:13	07:50 (9)	06:49		07:21
	20:35	42 07:00 (11)	20:03	19:13	18:22	9 07:59 (9)	16:42		16:32
16	05:40	06:20 (11)	06:10	06:42	07:14	07:34 (14)	06:51		07:21
	20:34	39 06:59 (11)	20:01	19:11	18:20	22 08:01 (9)	16:41		16:32
17	05:41	06:21 (11)	06:11	06:43	07:15	07:36 (14)	06:52		07:22
	20:34	37 06:58 (11)	20:00	19:09	18:19	26 08:04 (9)	16:41		16:32
18	05:42	06:23 (11)	06:12	06:44	07:16	07:37 (14)	06:53		07:23
	20:33	34 06:57 (11)	19:58	19:07	18:17	28 08:05 (9)	16:40		16:33
19	05:43	06:24 (11)	06:13	06:45	07:17	07:38 (14)	06:54		07:23
	20:32	32 06:56 (11)	19:57	19:06	9 07:50 (10)	18:16	27 08:05 (9)	16:39	16:33
20	05:44	06:25 (11)	06:14	06:46	07:18	07:39 (14)	06:55		07:24
	20:31	29 06:54 (11)	19:55	19:04	17 07:54 (10)	18:14	27 08:06 (9)	16:38	16:34
21	05:45	06:27 (11)	06:15	06:47	07:19	07:40 (14)	06:57		07:25
	20:31	25 06:52 (11)	19:54	19:02	22 07:56 (10)	18:13	26 08:06 (9)	16:38	16:34
22	05:46	06:30 (11)	06:16	06:48	07:20	07:42 (14)	06:58		07:25
	20:30	20 06:50 (11)	19:52	19:01	25 07:57 (10)	18:11	25 08:07 (9)	16:37	16:34
23	05:46	06:34 (11)	06:17	06:49	07:22	07:43 (14)	06:59		07:26
	20:29	12 06:46 (11)	19:51	18:59	28 07:58 (10)	18:10	24 08:07 (9)	16:36	16:35
24	05:47		06:18	06:50	07:23	07:44 (14)	07:00		07:26
	20:28		19:49	18:57	30 07:59 (10)	18:08	22 08:06 (9)	16:36	16:36
25	05:48		06:19	06:51	07:24 (10)	06:24	06:45 (9)	07:01	07:26
	20:27		19:48	18:55	32 07:59 (10)	17:07	21 07:06 (9)	16:35	16:36
26	05:49		06:20	06:52	07:26 (10)	06:25	06:46 (9)	07:02	07:27
	20:26		19:46	18:54	34 08:00 (10)	17:06	19 07:05 (9)	16:35	16:37
27	05:50		06:21	06:53	07:25 (10)	06:26	06:48 (9)	07:03	07:27
	20:25		19:44	18:52	35 08:00 (10)	17:04	17 07:05 (9)	16:34	16:37
28	05:51		06:22	06:54	07:25 (10)	06:28	06:49 (9)	07:05	07:27
	20:24		19:43	18:50	35 08:00 (10)	17:03	16 07:05 (9)	16:34	16:38
29	05:52		06:23	06:55	07:24 (10)	06:29	06:50 (9)	07:06	07:28
	20:23		19:41	18:48	36 08:00 (10)	17:01	13 07:03 (9)	16:33	16:39
30	05:53		06:24	06:56	07:24 (10)	06:30	06:52 (9)	07:07	07:28
	20:22		19:40	18:47	36 08:00 (10)	17:00	11 07:03 (9)	16:33	16:40
31	05:54		06:25		06:31	06:53 (9)			07:28
	20:21		19:38		16:59	8 07:01 (9)			16:40
Ore potenziali eliofania	461	429	375	345	297				286
Totale, caso peggiore	973			658	5				
Probabilità di eliofania	0,61			0,44	0,40				
Tempo di operatività rid.	1,00			1,00	1,00				
Dir. del vento rid.	1,00			1,00	1,00				
Totale ridotto	0,61			0,44	0,40				
Totale effettivo	590			286	2				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BT - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (72)

Assunzioni sui calcoli d'ombra Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
1	07:28	07:52 (7)	07:15	06:38	06:57 (14)	06:46	06:00			05:30	06:04 (11)	
	16:41	5 07:57 (7)	17:16	17:51	26 07:23 (9)	19:26	19:59			20:29	39 06:43 (11)	
2	07:29	07:54 (7)	07:14	06:36	07:05 (9)	06:45	05:58			05:30	06:03 (11)	
	16:42	2 07:56 (7)	17:17	17:52	16 07:21 (9)	19:27	20:00			20:29	41 06:44 (11)	
3	07:29		07:13	06:35	07:08 (9)	06:43	05:57			05:29	06:03 (11)	
	16:43		17:19	17:53	11 07:19 (9)	19:28	20:01			20:30	42 06:45 (11)	
4	07:29		07:11	06:33		06:41	05:56			05:29	06:03 (11)	
	16:44		17:20	17:55		19:29	20:02			20:31	43 06:46 (11)	
5	07:29		07:10	06:32		06:40	05:55			05:29	06:02 (11)	
	16:45		17:21	17:56		19:30	20:03			20:32	44 06:46 (11)	
6	07:29		07:09	06:30		06:38	05:53			05:28	06:02 (11)	
	16:46		17:23	17:57		19:31	20:04			20:32	45 06:47 (11)	
7	07:29		07:08	06:28		06:36	05:52			05:28	06:02 (11)	
	16:47		17:24	17:58		19:32	20:05			20:33	45 06:47 (11)	
8	07:28		07:07	06:27		06:52 (10)	06:35	05:51		05:28	06:02 (11)	
	16:48		17:25	17:59	4 06:56 (10)	19:34	20:06			20:34	46 06:48 (11)	
9	07:28		07:06	06:25		06:46 (10)	06:33	05:50		05:27	06:02 (11)	
	16:49		17:26	18:00	15 07:01 (10)	19:35	20:07			20:34	47 06:49 (11)	
10	07:28		07:05	06:23		06:43 (10)	06:31	05:49		05:27	06:01 (11)	
	16:50		17:28	18:01	20 07:03 (10)	19:36	20:08			20:35	48 06:49 (11)	
11	07:28		07:03	06:22		06:42 (10)	06:30	05:47		05:27	06:01 (11)	
	16:51		17:29	18:03	23 07:05 (10)	19:37	20:09			20:35	48 06:49 (11)	
12	07:28		07:02	06:20		06:40 (10)	06:28	05:46		05:27	06:01 (11)	
	16:52		17:30	18:04	26 07:06 (10)	19:38	20:10			20:36	49 06:50 (11)	
13	07:27		07:01	06:18		06:38 (10)	06:26	05:45		05:27	06:01 (11)	
	16:53		17:31	18:05	28 07:06 (10)	19:39	20:11			20:36	49 06:50 (11)	
14	07:27		07:00	06:17		06:37 (10)	06:25	05:44		05:27	06:01 (11)	
	16:54		17:33	18:06	31 07:08 (10)	19:40	20:12			20:37	49 06:50 (11)	
15	07:27		06:58	06:15		06:36 (10)	06:23	05:43		05:27	06:01 (11)	
	16:55		17:34	18:07	32 07:08 (10)	19:41	20:13			20:37	50 06:51 (11)	
16	07:26		06:57	06:13		06:35 (10)	06:22	05:42		05:27	06:01 (11)	
	16:57		17:35	5 07:21 (9)	18:08	33 07:08 (10)	19:42	20:14		20:38	50 06:51 (11)	
17	07:26		06:56	06:12		06:35 (10)	06:20	05:41		05:27	06:01 (11)	
	16:58		17:36	8 07:23 (9)	18:09	33 07:08 (10)	19:43	20:15		20:38	50 06:51 (11)	
18	07:25		06:54	06:10		06:34 (10)	06:19	05:40		05:27	06:01 (11)	
	16:59		17:38	11 07:25 (9)	18:10	34 07:08 (10)	19:44	20:16		20:38	50 06:51 (11)	
19	07:25		06:53	06:08		06:34 (10)	06:17	05:39		05:27	06:02 (11)	
	17:00		17:39	13 07:25 (9)	18:12	33 07:07 (10)	19:46	20:17		20:39	51 06:53 (11)	
20	07:24		06:51	06:07		06:33 (10)	06:16	05:38		05:27	06:02 (11)	
	17:01		17:40	16 07:27 (9)	18:13	34 07:07 (10)	19:47	20:18		20:39	51 06:53 (11)	
21	07:23		06:50	06:05		06:34 (10)	06:14	05:38		05:27	06:02 (11)	
	17:02		17:41	18 07:27 (9)	18:14	33 07:07 (10)	19:48	20:19		20:39	51 06:53 (11)	
22	07:23		06:48	06:03		06:34 (10)	06:12	05:37		06:20 (11)	05:27	06:02 (11)
	17:04		17:43	19 07:27 (9)	18:15	32 07:06 (10)	19:49	20:20	5 06:25 (11)	20:39	51 06:53 (11)	
23	07:22		06:47	06:02		06:34 (10)	06:11	05:36		06:15 (11)	05:28	06:02 (11)
	17:05		17:44	21 07:27 (9)	18:16	30 07:04 (10)	19:50	20:21	15 06:30 (11)	20:39	51 06:53 (11)	
24	07:21		06:46	06:00		06:35 (10)	06:10	05:35		06:12 (11)	05:28	06:03 (11)
	17:06		17:45	22 07:27 (9)	18:17	29 07:04 (10)	19:51	20:22	21 06:33 (11)	20:40	51 06:54 (11)	
25	07:21		06:44	05:58		06:36 (10)	06:08	05:34		06:11 (11)	05:28	06:03 (11)
	17:07		17:46	23 07:26 (9)	18:18	26 07:02 (10)	19:52	20:23	24 06:35 (11)	20:40	50 06:53 (11)	
26	07:20		06:43	05:56		06:36 (10)	06:07	05:34		06:09 (11)	05:28	06:03 (11)
	17:09		17:47	24 07:26 (9)	18:19	24 07:00 (10)	19:53	20:24	28 06:37 (11)	20:40	50 06:53 (11)	
27	07:19		06:41	05:55		06:38 (10)	06:05	05:33		06:07 (11)	05:29	06:04 (11)
	17:10		17:49	25 07:25 (9)	18:20	20 06:58 (10)	19:54	20:25	31 06:38 (11)	20:40	50 06:54 (11)	
28	07:18		06:39	05:53		06:40 (10)	06:04	05:32		06:07 (11)	05:29	06:04 (11)
	17:11		17:50	26 07:25 (9)	18:22	16 06:56 (10)	19:55	20:25	32 06:39 (11)	20:40	50 06:54 (11)	
29	07:17			06:51		07:44 (10)	06:02	05:32		06:06 (11)	05:30	06:05 (11)
	17:12			19:23	7 07:51 (10)	19:56	20:26	34 06:40 (11)	20:40	49 06:54 (11)		
30	07:16			06:50		06:01	05:31		06:05 (11)	05:30	06:05 (11)	
	17:14			19:24		19:57	20:27	37 06:42 (11)	20:40	49 06:54 (11)		
31	07:16			06:48			05:31		06:04 (11)			
	17:15			19:25			20:28	38 06:42 (11)				
Ore potenziali eliofanía	296		296		369		399		450		454	
Totale, caso peggiore	7		231		616		265		1439			
Probabilità di eliofanía	0,44		0,46		0,44		0,47		0,54			
Tempo di operatività rid.	1,00		1,00		1,00		1,00		1,00			
Dir. del vento rid.	1,00		1,00		1,00		1,00		1,00			
Totale ridotto	0,44		0,46		0,44		0,47		0,54			
Totale effettivo	3		105		271		123		777			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (72)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:31 20:40 48	06:05 (11) 06:53 (11) 20:20	05:55 19:36	06:26 19:36	06:57 18:45 27	07:19 (10) 07:46 (10) 16:58	07:08 16:33
2	05:31 20:40 48	06:06 (11) 06:54 (11) 20:19	05:56 19:35	06:28 19:35	06:58 18:43 24	07:20 (10) 07:44 (10) 16:56	07:09 16:32
3	05:32 20:39 47	06:06 (11) 06:53 (11) 20:18	05:57 19:33	06:29 19:33	06:59 18:42 21	07:21 (10) 07:42 (10) 16:55	07:10 16:32
4	05:32 20:39 47	06:07 (11) 06:54 (11) 20:17	05:58 19:31	06:30 19:31	07:00 18:40 18	07:22 (10) 07:40 (10) 16:54	07:11 16:32
5	05:33 20:39 46	06:08 (11) 06:54 (11) 20:16	05:59 19:30	06:31 19:30	07:02 18:38 11	07:25 (10) 07:36 (10) 16:53	07:12 16:32
6	05:33 20:39 45	06:08 (11) 06:53 (11) 20:14	06:00 19:28	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	05:34 20:38 44	06:09 (11) 06:53 (11) 20:13	06:01 19:26	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	05:35 20:38 43	06:09 (11) 06:52 (11) 20:12	06:02 19:25	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38 42	06:10 (11) 06:52 (11) 20:11	06:03 19:23	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	05:36 20:37 41	06:11 (11) 06:52 (11) 20:09	06:04 19:21	06:36 19:21	07:07 18:30 5	06:43 07:50 (9) 16:47	07:17 16:31
11	05:37 20:37 40	06:11 (11) 06:51 (11) 20:08	06:05 19:20	06:37 19:20	07:08 18:28 13	06:45 07:54 (9) 16:46	07:17 16:31
12	05:37 20:36 39	06:12 (11) 06:51 (11) 20:07	06:06 19:18	06:38 19:18	07:09 18:27 22	06:46 07:56 (9) 16:45	07:18 16:31
13	05:38 20:36 37	06:13 (11) 06:50 (11) 20:05	06:07 19:16	06:39 19:16	07:10 18:25 26	06:47 07:57 (9) 16:44	07:19 16:32
14	05:39 20:35 36	06:14 (11) 06:50 (11) 20:04	06:08 19:14	06:40 19:14	07:11 18:24 26	06:48 07:58 (9) 16:43	07:20 16:32
15	05:40 20:35 33	06:15 (11) 06:48 (11) 20:03	06:09 19:13	06:41 19:13	07:13 18:22 25	06:49 07:58 (9) 16:42	07:21 16:32
16	05:40 20:34 32	06:16 (11) 06:48 (11) 20:01	06:10 19:11	06:42 19:11	07:14 18:20 24	06:51 07:58 (9) 16:41	07:21 16:32
17	05:41 20:34 29	06:18 (11) 06:47 (11) 20:00	06:11 19:09	06:43 19:09	07:15 18:19 23	06:52 07:59 (9) 16:41	07:22 16:32
18	05:42 20:33 26	06:19 (11) 06:45 (11) 19:58	06:12 19:07	06:44 19:07	07:16 18:17 22	06:53 07:59 (9) 16:40	07:23 16:33
19	05:43 20:32 23	06:21 (11) 06:44 (11) 19:57	06:13 19:06	06:45 19:06	07:17 18:16 20	06:54 07:58 (9) 16:39	07:23 16:33
20	05:44 20:31 18	06:23 (11) 06:41 (11) 19:55	06:14 19:04	06:46 19:04	07:18 18:14 19	06:55 07:58 (9) 16:38	07:24 16:34
21	05:45 20:31 12	06:26 (11) 06:38 (11) 19:54	06:15 19:02	06:47 19:02	07:19 18:13 17	06:57 07:57 (9) 16:38	07:25 16:34
22	05:46 20:30	06:16 (11) 19:52	06:16 19:01	06:48 19:01	07:20 18:11 15	06:58 07:57 (9) 16:37	07:25 16:34
23	05:46 20:29	06:17 (11) 19:51	06:17 18:59	06:49 18:59	07:21 18:10 13	06:59 07:56 (9) 16:36	07:26 16:35
24	05:47 20:28	06:18 (11) 19:49	06:18 18:57	06:50 18:57	07:22 18:08 10	06:36 (14) 07:44 (9) 16:36	07:27 16:36
25	05:48 20:27	06:19 (11) 19:48	06:19 18:55	06:51 18:55	07:23 18:07 8	06:45 (9) 06:53 (9) 16:35	07:28 16:36
26	05:49 20:26	06:20 (11) 19:46	06:20 18:54	06:52 18:54	07:24 18:06 4	06:46 (9) 06:50 (9) 16:35	07:29 16:37
27	05:50 20:25	06:21 (11) 19:45	06:21 18:52	06:53 18:52	07:25 18:05 3	06:47 (9) 07:43 (9) 16:34	07:30 16:37
28	05:51 20:24	06:22 (11) 19:43	06:22 18:50	06:54 18:50	07:26 18:04 3	06:48 (9) 07:44 (9) 16:34	07:31 16:38
29	05:52 20:23	06:23 (11) 19:41	06:23 18:48	06:55 18:48	07:27 18:03 31	06:49 (9) 07:48 (10) 17:01	07:32 16:39
30	05:53 20:22	06:24 (11) 19:40	06:24 18:47	06:56 18:47	07:28 18:02 29	06:50 (9) 07:46 (10) 17:00	07:33 16:40
31	05:54 20:21	06:25 (11) 19:38	06:25 19:38	06:31 19:38	06:31 16:59	07:28 16:40	07:34 16:40
Ore potenziali eliofania	461	429	375	345	393	297	286
Totale, caso peggiore	776		466		393		145
Probabilità di eliofania	0,61		0,58		0,44		0,36
Tempo di operatività rid.	1,00		1,00		1,00		1,00
Dir. del vento rid.	1,00		1,00		1,00		1,00
Totale ridotto	0,61		0,58		0,44		0,36
Totale effettivo	470		269		171		53

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BU - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (73)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for each day of the year, showing start and end times of shadow and potential irradiation hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BV - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (74)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 17:48	06:51 19:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:35 17:46	06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:34 17:45	06:48 19:25	06:48 19:57	05:31 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BW - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (75)

#### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 19:23	05:52 19:56	06:03 19:57	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 19:24	05:51 19:57	06:02 19:58	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 19:25	05:51 19:58	06:02 19:58	05:30 20:28	05:27 20:40	05:53 20:21	06:24 19:38	06:56 18:37	06:30 16:59	07:07 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (76)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	19:09 (1) 19:31 (1)	06:26 19:36	06:54 (2) 18:45	06:57 23
2	05:31 20:40	05:56 20:19	19:09 (1) 19:31 (1)	06:27 19:35	06:53 (2) 18:43	06:58 20
3	05:31 20:39	05:57 20:18	19:08 (1) 19:31 (1)	06:28 19:33	06:52 (2) 18:42	06:59 16
4	05:32 20:39	05:58 20:17	19:08 (1) 19:32 (1)	06:29 19:31	06:51 (2) 18:40	07:00 15
5	05:33 20:39	05:59 20:16	19:08 (1) 19:32 (1)	06:31 19:30	06:51 (2) 18:38	07:01 14
6	05:33 20:39	06:00 20:14	19:08 (1) 19:32 (1)	06:32 19:28	06:52 (2) 18:37	07:03 23
7	05:34 20:38	06:01 20:13	19:08 (1) 19:32 (1)	06:33 19:26	06:53 (2) 18:35	07:04 27
8	05:34 20:38	06:02 20:12	19:08 (1) 19:31 (1)	06:34 19:25	06:54 (2) 18:33	07:05 27
9	05:35 20:38	06:03 20:11	19:08 (1) 19:31 (1)	06:35 19:23	06:55 (2) 18:32	07:06 27
10	05:36 20:37	06:04 20:09	19:08 (1) 19:31 (1)	06:36 19:21	06:56 (2) 18:30	07:07 27
11	05:37 20:37	06:05 20:08	19:09 (1) 19:30 (1)	06:37 19:19	06:57 (2) 18:28	07:08 26
12	05:37 20:36	06:06 20:07	19:09 (1) 19:29 (1)	06:38 19:18	06:58 (2) 18:27	07:09 23
13	05:38 20:36	06:07 20:05	19:10 (1) 19:28 (1)	06:39 19:16	06:59 (2) 18:25	07:10 22
14	05:39 20:35	06:08 20:04	19:12 (1) 19:26 (1)	06:40 19:14	07:00 (2) 18:23	07:11 21
15	05:40 20:35	06:09 20:03	19:13 (1) 19:24 (1)	06:41 19:13	07:01 (2) 18:22	07:12 20
16	05:40 20:34	06:10 20:01	19:24 (1)	06:42 19:11	07:02 (2) 18:20	07:14 19
17	05:41 20:34	06:11 20:00		06:43 19:09	07:03 (2) 18:19	07:15 17
18	05:42 20:33	06:12 19:58	07:22 (2)	06:44 19:07	07:04 (2) 18:17	07:16 14
19	05:43 20:32	06:13 19:57	07:17 (2)	06:45 19:06	07:05 (2) 18:16	07:17 9
20	05:44 20:31	06:14 19:55	07:14 (2)	06:46 19:04	07:06 (2) 18:14	07:18 16
21	05:45 20:31	06:15 19:54	07:12 (2)	06:47 19:02	07:07 (2) 18:13	07:19 15
22	05:45 20:30	06:16 19:52	07:10 (2)	06:48 19:00	07:08 (2) 18:11	07:20 14
23	05:46 20:29	06:17 19:51	07:08 (2)	06:49 18:59	07:09 (2) 18:10	07:22 7
24	05:47 20:28	06:18 19:49	07:06 (2)	06:50 18:57	07:10 (2) 18:08	07:23 14
25	05:48 20:27	06:19 19:48	07:04 (2)	06:51 18:55	07:11 (2) 18:07	07:24 19
26	05:49 20:26	06:20 19:47	07:02 (2)	06:52 18:54	07:12 (2) 18:05	07:25 22
27	05:50 20:25	06:21 19:46	07:01 (2)	06:53 18:52	07:13 (2) 18:04	07:26 24
28	05:51 20:24	06:22 19:45	07:00 (2)	06:54 18:50	07:14 (2) 18:03	07:27 27
29	05:52 20:23	06:23 19:44	06:58 (2)	06:55 18:48	07:15 (2) 18:02	07:28 28
30	05:53 20:22	06:24 19:43	19:28 (1)	06:56 18:47	07:16 (2) 18:01	07:29 29
31	05:54 20:21	06:25 19:42	19:10 (1)	06:55 (2) 18:54 (11)	07:17 (2) 18:00	07:30 (3) 29
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	86	1014	1893	589	710	1118
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40	0,36
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00
Totale ridotto	0,61	0,67	0,58	0,44	0,40	0,36
Totale effettivo	52	676	1094	256	287	406

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (77)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Giugno) and rows for each hour of the day (07:00 to 17:15). It contains numerical data for potential shadow hours, probability of shadowing, and effective shadowing hours. Includes summary rows at the bottom for totals.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)
(WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (77)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	06:54 (2) 16:10 (10)	07:08 16:32	15:07 (9) 25 15:32 (9)	
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	16:01 (10) 16:06 (10)	07:09 16:32	15:07 (9) 26 15:33 (9)	
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:40 (2) 07:47 (2)	06:35 16:32	07:10 16:32	15:07 (9) 26 15:33 (9)
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:34 (2) 07:52 (2)	06:36 16:54	07:11 16:32	15:07 (9) 27 15:34 (9)
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:31 (2) 07:55 (2)	06:37 16:53	07:12 16:32	15:08 (9) 26 15:34 (9)
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:28 (2) 07:57 (2)	06:38 16:51	07:13 16:31	15:08 (9) 26 15:34 (9)
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:26 (2) 07:59 (2)	06:40 16:50	07:14 16:31	15:09 (9) 26 15:35 (9)
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:25 (2) 08:00 (2)	06:41 16:49	07:15 16:31	15:09 (9) 26 15:35 (9)
9	05:35 20:38	06:03 20:11	18:57 (1) 19:06 (1)	06:35 19:23	07:06 18:32	07:26 (2) 08:01 (2)	06:42 16:48	07:16 16:31	15:10 (9) 26 15:36 (9)
10	05:36 20:37	06:04 20:09	18:55 (1) 19:09 (1)	06:36 19:21	07:07 18:30	07:27 (2) 08:02 (2)	06:43 16:47	07:17 16:31	15:10 (9) 26 15:36 (9)
11	05:37 20:37	06:05 20:08	18:53 (1) 19:10 (1)	06:37 19:19	07:08 18:28	07:28 (2) 08:02 (2)	06:44 16:46	07:17 16:31	15:10 (9) 26 15:36 (9)
12	05:37 20:36	06:06 20:07	18:51 (1) 19:12 (1)	06:38 19:18	07:09 18:27	07:30 (2) 08:04 (2)	06:46 16:45	07:18 16:31	15:11 (9) 25 15:36 (9)
13	05:38 20:36	06:07 20:05	18:50 (1) 19:13 (1)	06:39 19:16	07:10 18:25	07:31 (2) 08:04 (2)	06:47 16:44	07:19 16:31	15:11 (9) 26 15:37 (9)
14	05:39 20:35	06:08 20:04	18:49 (1) 19:14 (1)	06:40 19:14	07:11 18:23	07:32 (2) 08:04 (2)	06:48 16:43	07:20 16:32	15:12 (9) 25 15:37 (9)
15	05:40 20:35	06:09 20:03	18:48 (1) 19:14 (1)	06:41 19:13	07:12 18:22	07:33 (2) 08:04 (2)	06:49 16:42	07:21 16:32	15:13 (9) 25 15:38 (9)
16	05:40 20:34	06:10 20:01	18:47 (1) 19:14 (1)	06:42 19:11	07:14 18:20	07:34 (2) 08:04 (2)	06:51 16:41	07:21 16:32	15:13 (9) 25 15:38 (9)
17	05:41 20:34	06:11 20:00	18:47 (1) 19:14 (1)	06:43 19:09	07:15 18:19	07:35 (2) 17:08 (10)	06:52 16:41	07:22 16:32	15:14 (9) 24 15:38 (9)
18	05:42 20:33	06:12 19:58	18:46 (1) 19:14 (1)	06:44 19:07	18:08 (11) 18:12 (11)	07:16 18:17	06:53 16:40	07:23 16:33	15:14 (9) 24 15:38 (9)
19	05:43 20:32	06:13 19:57	18:46 (1) 19:14 (1)	06:45 19:06	18:04 (11) 18:15 (11)	07:17 18:16	06:54 16:39	07:23 15:11 (9)	15:14 (9) 25 15:39 (9)
20	05:44 20:31	06:14 19:55	18:46 (1) 19:14 (1)	06:46 19:04	18:02 (11) 18:16 (11)	07:18 18:14	06:55 16:38	07:24 15:23 (9)	15:15 (9) 25 15:40 (9)
21	05:45 20:31	06:15 19:54	18:46 (1) 19:14 (1)	06:47 19:02	18:01 (11) 18:13 (11)	07:19 18:13	06:57 16:38	07:24 15:24 (9)	15:15 (9) 25 15:40 (9)
22	05:45 20:30	06:16 19:52	18:46 (1) 19:13 (1)	06:48 19:00	17:59 (11) 18:17 (11)	07:20 18:11	06:58 16:37	07:25 15:25 (9)	15:16 (9) 25 15:41 (9)
23	05:46 20:29	06:17 19:51	18:46 (1) 19:13 (1)	06:49 18:59	17:59 (11) 18:17 (11)	07:22 18:10	06:59 16:36	07:25 15:26 (9)	15:16 (9) 25 15:41 (9)
24	05:47 20:28	06:18 19:49	18:46 (1) 19:12 (1)	06:50 18:57	17:58 (11) 18:17 (11)	07:23 18:08	07:00 16:36	07:26 15:28 (9)	15:16 (9) 25 15:41 (9)
25	05:48 20:27	06:19 19:48	18:47 (1) 19:11 (1)	06:51 18:55	17:58 (11) 18:16 (11)	06:24 17:07	07:01 16:35	07:26 15:29 (9)	15:17 (9) 25 15:42 (9)
26	05:49 20:26	06:20 19:46	18:47 (1) 19:09 (1)	06:52 18:54	17:58 (11) 18:16 (11)	06:25 17:05	07:02 16:35	07:27 15:29 (9)	15:18 (9) 24 15:42 (9)
27	05:50 20:25	06:21 19:44	18:48 (1) 19:08 (1)	06:53 18:52	17:58 (11) 18:14 (11)	06:26 17:04	07:03 16:34	07:27 15:30 (9)	15:18 (9) 25 15:43 (9)
28	05:51 20:24	06:22 19:43	18:50 (1) 19:06 (1)	06:54 18:50	17:59 (11) 18:13 (11)	06:27 17:03	07:05 16:34	07:27 15:30 (9)	15:19 (9) 25 15:44 (9)
29	05:52 20:23	06:23 19:41	18:52 (1) 19:03 (1)	06:55 18:48	18:01 (11) 18:10 (11)	06:29 17:01	07:06 16:33	07:28 15:31 (9)	15:19 (9) 25 15:44 (9)
30	05:53 20:22	06:24 19:40	19:03 (1)	06:56 18:47	18:10 (11)	06:30 17:00	07:07 16:33	07:28 15:32 (9)	15:19 (9) 26 15:45 (9)
31	05:54 20:21	06:25 19:38		06:57 16:59	17:00 16:12 (10)	06:31 16:12 (10)	07:08 16:40	07:28 16:40	15:20 (9) 25 15:45 (9)
Ore potenziali eliofania	461	429	375	345	297	261	286	785	
Totale, caso peggiore		473	175	964	261			785	
Probabilità di eliofania		0,67	0,58	0,44	0,40			0,36	
Tempo di operatività rid.		1,00	1,00	1,00	1,00			1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00			1,00	
Totale ridotto		0,67	0,58	0,44	0,40			0,36	
Totale effettivo		315	101	420	106			285	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (78)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	15:53 (9) 16:16 (9)	06:38 17:51	06:57 (2) 16:57 (10)	06:46 19:26
2	07:29 16:42	07:14 17:17	15:54 (9) 16:16 (9)	06:36 17:52	06:55 (2) 16:56 (10)	06:45 19:27
3	07:29 16:43	07:12 17:19	15:55 (9) 16:15 (9)	06:35 17:53	06:54 (2) 16:56 (10)	06:43 19:28
4	07:29 16:44	07:11 17:20	15:56 (9) 16:15 (9)	06:33 17:54	06:52 (2) 16:54 (10)	06:41 19:29
5	07:29 16:45	07:10 17:21	15:56 (9) 16:13 (9)	06:32 17:56	06:51 (2) 16:52 (10)	06:40 19:30
6	07:29 16:46	07:09 17:22	15:58 (9) 16:12 (9)	06:30 17:57	06:49 (2) 07:36 (2)	06:38 19:31
7	07:29 16:47	07:08 17:24	16:00 (9) 16:11 (9)	06:28 06:27	06:47 (2) 07:35 (2)	06:36 19:32
8	07:28 16:48	07:07 17:25	06:27 17:59	06:27 17:59	06:46 (2) 07:35 (2)	06:35 19:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:25 18:00	06:45 (2) 07:33 (2)	06:33 19:35
10	07:28 16:50	07:05 17:28	07:24 (2) 18:01	06:23 18:01	06:46 (2) 07:31 (2)	06:31 19:36
11	07:28 16:51	07:03 17:29	07:23 (2) 18:03	06:22 18:03	06:48 (2) 07:30 (2)	06:30 19:37
12	07:28 16:52	07:02 17:30	07:22 (2) 18:04	06:20 18:04	06:48 (2) 07:28 (2)	06:28 19:38
13	07:27 16:53	07:01 17:31	07:21 (2) 18:05	06:18 18:05	06:50 (2) 07:26 (2)	06:26 19:39
14	07:27 16:54	07:00 17:33	07:19 (2) 18:06	06:17 18:06	06:52 (2) 07:24 (2)	06:25 19:40
15	07:26 16:55	06:58 17:34	07:18 (2) 18:07	06:15 18:07	06:54 (2) 07:21 (2)	06:23 19:41
16	07:26 16:56	06:57 17:35	07:16 (2) 18:08	06:13 18:08	06:57 (2) 07:17 (2)	06:22 19:42
17	07:26 16:58	06:56 17:36	07:15 (2) 18:09	06:12 18:09	07:02 (2) 07:11 (2)	06:20 19:43
18	07:25 16:59	15:57 (9) 17:38	07:14 (2) 18:10	06:10 18:10	06:19 19:44	18:48 (1) 19:06 (1)
19	07:25 17:00	15:56 (9) 16:07 (9)	06:53 17:39	07:12 (2) 18:12	06:08 19:45	18:51 (1) 19:08 (1)
20	07:24 17:01	15:54 (9) 16:08 (9)	06:51 17:40	07:11 (2) 18:13	06:07 17:35 (11)	18:45 (1) 19:47
21	07:23 17:02	15:53 (9) 16:09 (9)	06:50 17:41	07:09 (2) 18:14	06:05 17:24 (11)	18:45 (1) 19:48
22	07:23 17:04	15:53 (9) 16:11 (9)	06:48 17:42	07:08 (2) 18:15	06:12 17:23 (11)	18:44 (1) 19:49
23	07:22 17:05	15:52 (9) 16:12 (9)	06:47 17:44	07:06 (2) 18:16	06:11 17:38 (11)	18:44 (1) 19:50
24	07:21 17:06	15:52 (9) 16:13 (9)	06:45 17:45	07:05 (2) 18:17	06:09 17:20 (11)	18:44 (1) 19:51
25	07:21 17:07	15:51 (9) 16:13 (9)	06:44 17:46	07:03 (2) 18:18	05:58 17:38 (11)	18:43 (1) 19:52
26	07:20 17:09	15:52 (9) 16:15 (9)	06:42 17:47	07:02 (2) 18:19	05:56 17:37 (11)	18:43 (1) 19:53
27	07:19 17:10	15:52 (9) 16:15 (9)	06:41 17:49	07:00 (2) 18:20	05:55 17:36 (11)	18:42 (1) 19:54
28	07:18 17:11	15:52 (9) 16:16 (9)	06:39 17:50	06:59 (2) 18:21	05:53 17:35 (11)	18:43 (1) 19:55
29	07:17 17:12	15:52 (9) 16:16 (9)	06:38 18:22	06:51 18:23 (11)	06:02 18:23 (11)	18:44 (1) 19:56
30	07:16 17:14	15:52 (9) 16:16 (9)	06:37 18:23	06:50 18:26 (11)	06:01 18:26 (11)	18:44 (1) 19:57
31	07:15 17:15	15:53 (9) 16:16 (9)	06:36 18:24	06:48 19:25	06:00 19:25	05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	269	753	889	332	79	
Probabilità di eliofania	0,44	0,46	0,44	0,48	0,47	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,44	0,46	0,44	0,48	0,47	
Totale effettivo	119	344	391	159	37	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: BZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (78)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	07:28 (2) 08:06 (2)	06:32 16:57
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	07:27 (2) 08:08 (2)	06:33 16:56
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	07:25 (2) 08:09 (2)	06:35 16:55
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	07:23 (2) 08:10 (2)	06:36 16:54
5	05:33 20:39	05:59 20:16	06:30 19:30	07:01 18:38	07:22 (2) 08:11 (2)	06:37 16:53
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	07:23 (2) 08:11 (2)	06:38 16:51
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	07:24 (2) 08:12 (2)	06:40 16:50
8	05:34 20:38	06:02 20:12	18:59 (1) 19:10 (1)	06:34 19:25	07:05 18:33	06:41 16:49
9	05:35 20:38	06:03 20:11	18:57 (1) 19:12 (1)	06:35 19:23	07:06 18:32	06:42 16:48
10	05:36 20:37	06:04 20:09	18:55 (1) 19:13 (1)	06:36 19:21	07:07 18:30	06:43 16:47
11	05:37 20:37	06:05 20:08	18:54 (1) 19:14 (1)	06:37 19:19	07:08 18:28	06:44 16:46
12	05:37 20:36	06:06 20:07	18:53 (1) 19:15 (1)	06:38 19:18	07:09 18:27	06:46 16:45
13	05:38 20:36	06:07 20:05	18:52 (1) 19:15 (1)	06:39 19:16	07:10 18:25	06:47 16:44
14	05:39 20:35	06:08 20:04	18:51 (1) 19:16 (1)	06:40 19:14	18:14 (11) 18:23 (11)	07:11 18:23
15	05:40 20:35	06:09 20:03	18:51 (1) 19:16 (1)	06:41 19:13	18:11 (11) 18:24 (11)	07:12 18:22
16	05:40 20:34	06:10 20:01	18:50 (1) 19:16 (1)	06:42 19:11	18:10 (11) 18:25 (11)	07:14 18:20
17	05:41 20:34	06:11 20:00	18:50 (1) 19:16 (1)	06:43 19:09	18:09 (11) 18:25 (11)	07:15 18:19
18	05:42 20:33	06:12 19:58	18:50 (1) 19:16 (1)	06:44 19:07	18:08 (11) 18:25 (11)	07:16 18:17
19	05:43 20:32	06:13 19:57	18:49 (1) 19:16 (1)	06:45 19:06	18:08 (11) 18:25 (11)	07:17 18:16
20	05:44 20:31	06:14 19:55	18:49 (1) 19:15 (1)	06:46 19:04	18:08 (11) 18:24 (11)	07:18 18:14
21	05:45 20:31	06:15 19:54	18:50 (1) 19:14 (1)	06:47 19:02	18:08 (11) 18:23 (11)	07:19 18:13
22	05:45 20:30	06:16 19:52	18:50 (1) 19:14 (1)	06:48 19:00	18:08 (11) 18:22 (11)	07:20 18:11
23	05:46 20:29	06:17 19:51	18:50 (1) 19:13 (1)	06:49 18:59	18:10 (11) 18:20 (11)	07:22 18:10
24	05:47 20:28	06:18 19:49	18:51 (1) 19:11 (1)	06:50 18:57	18:13 (11) 18:16 (11)	07:23 18:08
25	05:48 20:27	06:19 19:48	18:52 (1) 19:10 (1)	06:51 18:55	18:16 (11) 17:07	18:08 17:07
26	05:49 20:26	06:20 19:46	18:54 (1) 19:08 (1)	06:52 18:54	06:25 17:05	07:02 16:35
27	05:50 20:25	06:21 19:44	18:57 (1) 19:04 (1)	06:53 18:52	07:40 (2) 07:57 (2)	07:03 17:04
28	05:51 20:24	06:22 19:43	06:54 18:50	06:54 18:50	07:36 (2) 08:00 (2)	07:05 17:03
29	05:52 20:23	06:23 19:41	06:55 18:48	06:55 18:48	07:32 (2) 08:03 (2)	07:06 17:01
30	05:53 20:22	06:24 19:40	06:56 18:47	06:56 18:47	07:30 (2) 08:05 (2)	07:07 17:00
31	05:54 20:21	06:25 19:38	06:57 18:46	06:57 18:46	06:31 16:59	06:53 (2) 16:59 (2)
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		420	252	1269	407	
Probabilità di eliofania		0,67	0,58	0,44	0,40	
Tempo di operatività rid.		1,00	1,00	1,00	1,00	
Dir. del vento rid.		1,00	1,00	1,00	1,00	
Totale ridotto		0,67	0,58	0,44	0,40	
Totale effettivo		280	146	552	165	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (79)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (2) 07:38 (2)	06:46 19:26	06:00 19:58
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (2) 07:37 (2)	06:45 19:27	05:58 20:00
3	07:29 16:43	15:44 (9) 17:19	06:35 17:53	06:54 (2) 07:36 (2)	06:43 19:28	05:57 20:01
4	07:29 16:44	15:42 (9) 17:20	06:33 17:54	06:52 (2) 07:35 (2)	06:41 19:29	05:56 20:02
5	07:29 16:45	15:40 (9) 17:21	06:32 17:56	06:51 (2) 07:34 (2)	06:40 19:30	05:54 20:03
6	07:29 16:46	15:41 (9) 17:22	06:30 17:57	06:51 (2) 07:32 (2)	06:38 19:31	05:53 20:04
7	07:29 16:47	15:41 (9) 17:24	07:28 (2) 17:58	06:28 17:58	06:36 19:32	05:52 20:05
8	07:28 16:48	15:55 (9) 17:25	07:27 (2) 17:59	06:27 17:59	06:35 19:33	05:51 20:06
9	07:28 16:49	15:56 (9) 17:26	07:32 (2) 18:00	06:25 18:00	06:33 19:35	05:50 20:07
10	07:28 16:50	15:56 (9) 17:28	07:34 (2) 18:01	06:23 18:01	06:31 19:36	05:48 20:08
11	07:28 16:51	15:40 (9) 17:29	07:23 (2) 18:03	06:22 18:03	06:30 19:37	05:47 20:09
12	07:28 16:52	15:59 (9) 17:30	07:35 (2) 18:04	06:20 18:04	06:28 19:38	05:46 20:10
13	07:27 16:53	15:59 (9) 17:31	07:37 (2) 18:05	06:18 18:05	06:26 19:39	05:45 20:11
14	07:27 16:54	16:00 (9) 17:33	07:38 (2) 18:06	06:17 18:06	06:25 19:40	18:53 (1) 19:01 (1)
15	07:27 16:55	16:02 (9) 17:34	07:38 (2) 18:07	06:15 18:07	06:23 19:41	18:49 (1) 19:03 (1)
16	07:26 16:56	16:02 (9) 17:35	07:16 (2) 18:08	06:13 18:08	06:22 19:42	18:46 (1) 19:05 (1)
17	07:26 16:57	16:03 (9) 17:36	07:15 (2) 18:09	06:12 18:09	06:20 19:43	18:45 (1) 19:06 (1)
18	07:25 16:58	16:03 (9) 17:37	07:14 (2) 18:10	06:10 18:10	06:19 19:44	18:43 (1) 19:06 (1)
19	07:25 17:00	16:03 (9) 17:38	07:12 (2) 18:12	06:08 18:12	06:17 19:45	18:43 (1) 19:08 (1)
20	07:24 17:01	16:04 (9) 17:39	07:11 (2) 18:13	06:07 18:13	06:15 19:47	18:42 (1) 19:07 (1)
21	07:23 17:02	16:05 (9) 17:40	07:09 (2) 18:14	06:05 18:14	06:14 19:48	18:42 (1) 19:08 (1)
22	07:23 17:04	16:05 (9) 17:41	07:08 (2) 18:15	06:03 18:15	06:12 19:49	18:41 (1) 19:07 (1)
23	07:22 17:05	16:05 (9) 17:42	07:06 (2) 18:16	06:02 18:16	06:11 19:50	18:41 (1) 19:08 (1)
24	07:21 17:06	16:05 (9) 17:43	07:05 (2) 18:17	06:00 18:17	06:09 19:51	18:41 (1) 19:08 (1)
25	07:21 17:07	16:05 (9) 17:44	07:03 (2) 18:18	05:58 18:18	06:08 19:52	18:41 (1) 19:07 (1)
26	07:20 17:09	16:05 (9) 17:45	07:02 (2) 18:19	05:56 18:19	06:07 19:53	18:41 (1) 19:07 (1)
27	07:19 17:10	16:06 (9) 17:46	07:00 (2) 18:20	05:55 18:20	06:05 19:54	18:41 (1) 19:06 (1)
28	07:18 17:11	16:05 (9) 17:47	06:59 (2) 18:21	05:53 18:21	06:04 19:55	18:42 (1) 19:05 (1)
29	07:17 17:12	16:04 (9) 17:48	06:57 (2) 18:22	05:51 18:22	06:02 19:56	18:43 (1) 19:05 (1)
30	07:16 17:14	16:04 (9) 17:49	06:50 18:23	05:50 18:23	06:01 19:57	18:43 (1) 19:03 (1)
31	07:15 17:15	15:51 (9) 16:01 (9)	06:48 19:25	06:48 19:25	06:00 19:58	05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	538	773	571	383	41	
Probabilità di eliofania	0,44	0,46	0,44	0,48	0,47	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,44	0,46	0,44	0,48	0,47	
Totale effettivo	237	353	251	183	19	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (79)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	06:54 (2) 07:04 (2)
2	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	06:55 (2) 07:09
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	06:57 (2) 07:10
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	06:58 (2) 07:11
5	05:33 20:39	05:59 20:16	06:31 19:30	07:01 18:38	06:37 16:53	07:12 16:31
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	18:57 (1) 19:07 (1)	06:36 19:21	07:07 18:30	06:43 16:47
11	05:37 20:37	06:05 20:08	18:54 (1) 19:09 (1)	06:37 19:19	07:08 18:28	06:44 16:46
12	05:37 20:36	06:06 20:07	18:53 (1) 19:11 (1)	06:38 19:18	07:09 18:27	06:46 16:45
13	05:38 20:36	06:07 20:05	18:51 (1) 19:12 (1)	06:39 19:16	07:10 18:25	06:47 16:44
14	05:39 20:35	06:08 20:04	18:50 (1) 19:13 (1)	06:40 19:14	07:11 18:23	06:48 16:43
15	05:40 20:35	06:09 20:03	18:49 (1) 19:13 (1)	06:41 19:13	07:12 18:22	06:49 16:42
16	05:40 20:34	06:10 20:01	18:48 (1) 19:14 (1)	06:42 19:11	07:14 18:20	06:51 16:41
17	05:41 20:34	06:11 20:00	18:48 (1) 19:14 (1)	06:43 19:09	07:15 18:19	06:52 16:41
18	05:42 20:33	06:12 19:58	18:47 (1) 19:14 (1)	06:44 19:07	07:16 18:17	06:53 16:40
19	05:43 20:32	06:13 19:57	18:47 (1) 19:14 (1)	06:45 19:06	07:17 18:16	06:54 16:39
20	05:44 20:31	06:14 19:55	18:47 (1) 19:14 (1)	06:46 19:04	07:18 18:14	06:55 16:38
21	05:45 20:31	06:15 19:54	18:46 (1) 19:13 (1)	06:47 19:02	07:19 18:13	06:57 16:38
22	05:45 20:30	06:16 19:52	18:46 (1) 19:13 (1)	06:48 19:00	07:20 18:11	06:58 16:37
23	05:46 20:29	06:17 19:51	18:47 (1) 19:12 (1)	06:49 18:59	07:22 18:10	06:59 16:36
24	05:47 20:28	06:18 19:49	18:47 (1) 19:11 (1)	06:50 18:57	07:23 18:08	07:00 16:36
25	05:48 20:27	06:19 19:48	18:47 (1) 19:10 (1)	06:51 18:55	07:24 18:07	07:01 16:35
26	05:49 20:26	06:20 19:46	18:48 (1) 19:09 (1)	06:52 18:54	07:25 18:05	07:02 16:35
27	05:50 20:25	06:21 19:44	18:49 (1) 19:07 (1)	06:53 18:52	07:26 18:04	07:03 16:34
28	05:51 20:24	06:22 19:43	18:51 (1) 19:05 (1)	06:54 18:50	07:27 18:03	07:04 16:34
29	05:52 20:23	06:23 19:41	18:54 (1) 19:02 (1)	06:55 18:48	07:29 18:01	07:06 16:33
30	05:53 20:22	06:24 19:40	06:56 18:47	06:56 18:47	06:30 17:00	07:07 16:33
31	05:54 20:21	06:25 19:38	06:57 18:46	06:57 18:46	06:31 17:00	07:08 16:33
Ore potenziali eliofanía	461	429	375	345	297	286
Totale, caso peggiore		431	156	1181	454	116
Probabilità di eliofanía		0,67	0,58	0,44	0,40	0,36
Tempo di operatività rid.		1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.		1,00	1,00	1,00	1,00	1,00
Totale ridotto		0,67	0,58	0,44	0,40	0,36
Totale effettivo		287	90	514	184	42

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)







# SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (81)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:37 17:51	05:51 18:23	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese	Alba (hh:mm)	Inizio ombreggiamento (hh:mm)	(WTG che provoca l'inizio dell'ombreggiamento)
	Tramonto (hh:mm)Minuti d'ombra	Fine ombreggiamento (hh:mm)	(WTG che provoca l'ultimo ombreggiamento)





## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: CD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (82)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (10) 07:23 (10)	06:46 19:26	06:00 19:59	
2	07:29 16:42	07:14 17:17	06:36 17:52	06:55 (10) 07:24 (10)	06:45 19:27	05:58 20:00	16 06:35 (11) 05:30 20:29
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (10) 07:25 (10)	06:43 19:28	05:57 20:01	23 06:32 (11) 05:29 20:30
4	07:29 16:44	07:11 17:20	06:33 17:55	06:52 (10) 07:25 (10)	06:41 19:29	05:56 20:02	29 06:55 (11) 05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:52 (10) 07:26 (10)	06:40 19:30	05:55 20:03	34 06:26 (11) 20:32 07:00 (11)
6	07:29 16:46	07:09 17:23	07:29 (9) 07:32 (9)	06:30 17:57	06:51 (10) 07:26 (10)	05:53 19:31	38 06:24 (11) 20:32 07:02 (11)
7	07:29 16:47	07:08 17:24	07:28 (9) 07:34 (9)	06:28 17:58	06:50 (10) 07:25 (10)	05:52 19:32	41 06:22 (11) 20:33 07:03 (11)
8	07:28 16:48	07:07 17:25	07:27 (9) 07:36 (9)	06:27 17:59	06:51 (10) 07:26 (10)	05:51 19:34	44 06:21 (11) 20:34 07:05 (11)
9	07:28 16:49	07:06 17:26	07:26 (9) 07:37 (9)	06:25 18:00	06:50 (10) 07:25 (10)	05:50 19:35	46 06:20 (11) 20:34 07:06 (11)
10	07:28 16:50	07:05 17:28	07:24 (9) 07:37 (9)	06:23 18:01	06:50 (10) 07:24 (10)	05:49 19:36	48 06:19 (11) 20:35 07:07 (11)
11	07:28 16:51	07:03 17:29	07:23 (9) 07:38 (9)	06:22 18:03	06:51 (10) 07:24 (10)	05:47 19:37	50 06:18 (11) 20:35 07:08 (11)
12	07:28 16:52	07:02 17:30	07:22 (9) 07:39 (9)	06:20 18:04	06:51 (10) 07:23 (10)	05:46 19:38	52 06:16 (11) 20:36 07:08 (11)
13	07:27 16:53	07:01 17:31	07:21 (9) 07:39 (9)	06:18 18:05	06:51 (10) 07:21 (10)	05:45 19:39	54 06:15 (11) 20:36 07:09 (11)
14	07:27 16:54	07:00 17:33	07:19 (9) 07:39 (9)	06:17 18:06	06:52 (10) 07:21 (10)	05:44 19:40	56 06:14 (11) 20:37 07:10 (11)
15	07:27 16:55	06:58 17:34	07:18 (9) 07:39 (9)	06:15 18:07	06:53 (10) 07:19 (10)	05:43 19:41	57 06:14 (11) 20:37 07:11 (11)
16	07:26 16:57	06:57 17:35	07:16 (14) 07:38 (9)	06:13 18:08	06:54 (10) 07:17 (10)	05:42 19:42	58 06:14 (11) 20:38 07:12 (11)
17	07:26 16:58	06:56 17:36	07:15 (14) 07:38 (9)	06:12 18:09	06:57 (10) 07:15 (10)	05:41 19:43	59 06:13 (11) 20:38 07:12 (11)
18	07:25 16:59	06:54 17:38	07:14 (14) 07:38 (9)	06:10 18:10	06:59 (10) 07:11 (10)	05:40 19:44	61 06:12 (11) 20:38 07:13 (11)
19	07:25 17:00	06:53 17:39	07:12 (14) 07:37 (9)	06:08 18:12	06:17 19:46	05:39 20:17	61 06:12 (11) 20:39 07:13 (11)
20	07:24 17:01	06:51 17:40	07:11 (14) 07:36 (9)	06:07 18:13	06:16 19:47	05:38 20:18	62 06:11 (11) 20:39 07:13 (11)
21	07:23 17:02	06:50 17:41	07:09 (14) 07:34 (9)	06:05 18:14	06:14 19:48	05:38 20:19	62 06:11 (11) 20:39 07:13 (11)
22	07:23 17:04	06:48 17:43	07:08 (14) 07:32 (9)	06:03 18:15	06:12 19:49	05:37 20:20	63 06:11 (11) 20:39 07:14 (11)
23	07:22 17:05	06:47 17:44	07:06 (14) 07:27 (9)	06:02 18:16	06:11 19:50	05:36 20:21	64 06:11 (11) 20:39 07:15 (11)
24	07:21 17:06	06:46 17:45	06:00 18:17	06:00 18:17	06:10 19:51	05:35 20:22	65 06:10 (11) 20:40 07:15 (11)
25	07:21 17:07	06:44 17:46	07:04 (10) 07:16 (10)	05:58 18:18	06:08 19:52	05:34 20:23	64 06:11 (11) 20:40 07:15 (11)
26	07:20 17:09	06:43 17:47	07:02 (10) 07:19 (10)	05:56 18:19	06:07 19:53	05:34 20:24	65 06:10 (11) 20:40 07:15 (11)
27	07:19 17:10	06:41 17:49	07:00 (10) 07:21 (10)	05:55 18:20	06:05 19:54	05:33 20:25	65 06:10 (11) 20:40 07:15 (11)
28	07:18 17:11	06:39 17:50	06:59 (10) 07:23 (10)	05:53 18:22	06:04 19:55	05:32 20:25	66 06:10 (11) 20:40 07:16 (11)
29	07:17 17:12		06:51 19:23	06:51 19:23	06:02 19:56	05:32 20:26	66 06:10 (11) 20:40 07:16 (11)
30	07:16 17:14		06:50 19:24	06:50 19:24	06:01 19:57	05:31 20:27	67 06:10 (11) 20:40 07:17 (11)
31	07:16 17:15		06:48 19:25	06:48 19:25	05:31 20:28	06:10 (11) 07:16 (11)	66 06:10 (11) 20:40 07:16 (11)
Ore potenziali eliofania	296	296	369	399	450	454	
Totale, caso peggiore		379	530		1602	2010	
Probabilità di eliofania		0,46	0,44		0,47	0,54	
Tempo di operatività rid.		1,00	1,00		1,00	1,00	
Dir. del vento rid.		1,00	1,00		1,00	1,00	
Totale ridotto		0,46	0,44		0,47	0,54	
Totale effettivo		173	233		746	1085	

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
Pedatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: CE - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (83)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for time slots (07:28 to 17:15). Includes summary rows for 'Ore potenziali eliofania', 'Totale, caso peggiore', 'Probabilità di eliofania', 'Tempo di operatività rid.', 'Dir. del vento rid.', 'Totale ridotto', and 'Totale effettivo'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CF - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (84)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	07:05 (5) 07:50 (5)	06:00 19:58	06:51 (5) 07:46 (5)	05:30 20:28
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	07:03 (5) 07:51 (5)	05:58 19:59	06:52 (5) 07:45 (5)	05:30 20:29
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	07:01 (5) 07:51 (5)	05:57 20:01	06:52 (5) 07:43 (5)	05:29 20:30
4	07:28 16:44	07:11 17:20	06:33 17:54	06:41 19:29	07:00 (5) 07:53 (5)	05:56 20:02	06:53 (5) 07:42 (5)	05:29 20:31
5	07:28 16:45	07:10 17:21	06:31 17:56	06:39 19:30	06:58 (5) 07:53 (5)	05:54 20:03	06:54 (5) 07:41 (5)	05:28 20:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	06:56 (5) 07:54 (5)	05:53 20:04	06:55 (5) 07:40 (5)	05:28 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	06:56 (5) 07:55 (5)	05:52 20:05	06:56 (5) 07:39 (5)	05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	06:54 (5) 07:55 (5)	05:51 20:06	06:58 (5) 07:38 (5)	05:27 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	06:53 (5) 07:55 (5)	05:50 20:07	06:58 (5) 07:35 (5)	05:27 20:34
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	06:53 (5) 07:56 (5)	05:48 20:08	07:00 (5) 07:34 (5)	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	06:51 (5) 07:55 (5)	05:47 20:09	07:02 (5) 07:32 (5)	05:27 20:35
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	06:51 (5) 07:56 (5)	05:46 20:10	07:04 (5) 07:29 (5)	05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	06:50 (5) 07:56 (5)	05:45 20:11	07:07 (5) 07:27 (5)	05:27 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	06:49 (5) 07:55 (5)	05:44 20:12	07:10 (5) 07:23 (5)	05:27 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:49 (5) 07:56 (5)	05:43 20:13		05:27 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	06:49 (5) 07:55 (5)	05:42 20:14		05:27 20:37
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	06:49 (5) 07:55 (5)	05:41 20:15		05:27 20:38
18	07:25 16:59	06:54 17:37	06:10 18:10	06:18 19:44	06:48 (5) 07:54 (5)	05:40 20:16		05:27 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	06:48 (5) 07:55 (5)	05:39 20:17		05:27 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	06:48 (5) 07:54 (5)	05:38 20:18		05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:47	06:48 (5) 07:54 (5)	05:37 20:19		05:27 20:39
22	07:23 17:03	06:48 17:42	06:03 18:15	06:12 19:49	06:48 (5) 07:53 (5)	05:37 20:20		05:27 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	06:48 (5) 07:52 (5)	05:36 20:21		05:27 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	06:48 (5) 07:51 (5)	05:35 20:22		05:28 20:39
25	07:20 17:07	06:44 17:46	05:58 18:18	06:08 19:52	06:48 (5) 07:51 (5)	05:34 20:23		05:28 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	06:49 (5) 07:51 (5)	05:34 20:24		05:28 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	06:49 (5) 07:49 (5)	05:33 20:24		05:29 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	06:49 (5) 07:49 (5)	05:32 20:25		05:29 20:40
29	07:17 17:12		06:51 19:22	06:02 07:12 (5)	06:50 (5) 07:48 (5)	05:32 20:26		05:29 20:40
30	07:16 17:13		06:50 19:24	06:01 07:46 (5)	06:50 (5) 07:47 (5)	05:31 20:27		05:30 20:40
31	07:15 17:15		06:48 19:25	07:06 (5) 07:47 (5)		05:31 20:28		
Ore potenziali eliofania	296	296	369	399	450	454		
Totale, caso peggiore			151	1831	542			
Probabilità di eliofania			0,44	0,48	0,47			
Tempo di operatività rid.			1,00	1,00	1,00			
Dir. del vento rid.			1,00	1,00	1,00			
Totale ridotto			0,44	0,48	0,47			
Totale effettivo			66	876	253			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (84)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40	05:55 20:20	07:14 (5) 07:41 (5)	06:26 19:36	06:50 (5) 07:54 (5)	06:57 18:45	06:32 16:57	07:08 16:32
2	05:31 20:39	05:56 20:19	07:12 (5) 07:43 (5)	06:27 19:35	06:51 (5) 07:54 (5)	06:58 18:43	06:33 16:56	07:09 16:32
3	05:31 20:39	05:57 20:18	07:10 (5) 07:45 (5)	06:28 19:33	06:51 (5) 07:53 (5)	06:59 18:41	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	07:08 (5) 07:46 (5)	06:29 19:31	06:51 (5) 07:52 (5)	07:00 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:15	07:07 (5) 07:48 (5)	06:30 19:30	06:52 (5) 07:51 (5)	07:01 18:38	06:37 16:52	07:12 16:31
6	05:33 20:39	06:00 20:14	07:06 (5) 07:49 (5)	06:31 19:28	06:52 (5) 07:50 (5)	07:02 18:36	06:38 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	07:04 (5) 07:50 (5)	06:32 19:26	06:53 (5) 07:49 (5)	07:04 18:35	06:39 16:50	07:14 16:31
8	05:34 20:38	06:02 20:12	07:03 (5) 07:51 (5)	06:33 19:24	06:54 (5) 07:47 (5)	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	07:02 (5) 07:52 (5)	06:34 19:23	06:55 (5) 07:46 (5)	07:06 18:31	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	07:01 (5) 07:53 (5)	06:35 19:21	06:56 (5) 07:44 (5)	07:07 18:30	06:43 16:47	07:16 16:31
11	05:36 20:37	06:05 20:08	07:00 (5) 07:54 (5)	06:37 19:19	06:57 (5) 07:42 (5)	07:08 18:28	06:44 16:46	07:17 16:31
12	05:37 20:36	06:06 20:07	06:59 (5) 07:55 (5)	06:38 19:18	06:58 (5) 07:40 (5)	07:09 18:27	06:46 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:58 (5) 07:55 (5)	06:39 19:16	06:58 (5) 07:38 (5)	07:10 18:25	06:47 16:44	07:19 16:31
14	05:39 20:35	06:08 20:04	06:58 (5) 07:56 (5)	06:40 19:14	07:02 (5) 07:35 (5)	07:11 18:23	06:48 16:43	07:20 16:32
15	05:39 20:35	06:09 20:02	06:57 (5) 07:57 (5)	06:41 19:12	07:04 (5) 07:31 (5)	07:12 18:22	06:49 16:42	07:20 16:32
16	05:40 20:34	06:10 20:01	06:56 (5) 07:57 (5)	06:42 19:11	07:08 (5) 07:27 (5)	07:13 18:20	06:50 16:41	07:21 16:32
17	05:41 20:33	06:11 20:00	06:55 (5) 07:57 (5)	06:43 19:09	07:15 18:19	07:15 18:19	06:52 16:40	07:22 16:32
18	05:42 20:33	06:12 19:58	06:55 (5) 07:58 (5)	06:44 19:07	07:16 18:17	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:54 (5) 07:58 (5)	06:45 19:06	07:17 18:16	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	06:54 (5) 07:58 (5)	06:46 19:04	07:18 18:14	07:18 18:14	06:55 16:38	07:24 16:33
21	05:44 20:30	06:15 19:54	06:53 (5) 07:58 (5)	06:47 19:02	07:19 18:13	07:19 18:13	06:56 16:37	07:24 16:34
22	05:45 20:30	06:16 19:52	06:53 (5) 07:58 (5)	06:48 19:00	07:20 18:11	07:20 18:11	06:57 16:37	07:25 16:34
23	05:46 20:29	06:17 19:51	06:52 (5) 07:59 (5)	06:49 18:59	07:21 18:10	07:21 18:10	06:59 16:36	07:25 16:35
24	05:47 20:28	06:18 19:49	06:52 (5) 07:58 (5)	06:50 18:57	07:23 18:08	07:23 18:08	07:00 16:36	07:26 16:35
25	05:48 20:27	06:19 19:47	06:51 (5) 07:57 (5)	06:51 18:55	06:24 17:07	06:24 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 19:46	06:51 (5) 07:57 (5)	06:52 18:53	06:25 17:05	06:25 17:05	07:02 16:34	07:27 16:37
27	05:50 20:25	06:21 19:44	06:50 (5) 07:57 (5)	06:53 18:52	06:26 17:04	06:26 17:04	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	06:50 (5) 07:57 (5)	06:54 18:50	06:27 17:03	06:27 17:03	07:04 16:33	07:27 16:38
29	05:52 20:23	07:25 (5) 07:29 (5)	06:23 19:41	06:50 (5) 07:56 (5)	06:55 18:48	06:29 17:01	07:05 16:33	07:28 16:39
30	05:53 20:22	07:19 (5) 07:35 (5)	06:24 19:39	06:50 (5) 07:56 (5)	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	05:54 20:21	07:16 (5) 07:38 (5)	06:25 19:38	06:50 (5) 07:55 (5)		06:31 16:59		07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286		
Totale, caso peggiore			1736	779				
Probabilità di eliofania	0,61		0,67	0,58				
Tempo di operatività rid.	1,00		1,00	1,00				
Dir. del vento rid.	1,00		1,00	1,00				
Totale ridotto	0,61		0,67	0,58				
Totale effettivo	25		1158	450				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
+49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (85)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for hourly shadow flickering data (start and end times) and summary statistics (Ore potenziali eliofanía, Totale caso peggiore, etc.)

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



# SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CH - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (86)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28   16:41	07:14   17:16	07:35 (5)   06:38	17:17 (12)   06:46	06:00	05:30   19:19 (3)
2	07:28   16:42	07:13   17:17	07:34 (5)   06:36	17:23 (12)   06:44	19:58   05:58	20:29   05:30
3	07:28   16:43	07:12   17:19	07:33 (5)   06:35	19:27   06:43	19:59   05:57	20:29   05:29
4	07:29   16:44	07:11   17:20	07:31 (5)   06:33	19:28   06:41	20:01   05:56	20:30   05:29
5	07:29   16:45	07:10   17:21	07:30 (5)   06:31	19:29   06:39	20:02   05:54	20:31   05:28
6	07:28   16:46	07:09   17:22	08:01 (5)   17:56	19:30   06:38	20:03   05:53	20:31   05:28
7	07:28   16:47	07:08   17:24	07:28 (5)   06:28	19:31   06:36	19:00 (13)   05:53	20:32   05:28
8	07:28   16:48	07:07   17:25	08:01 (5)   17:58	19:32   06:34	19:03 (13)   05:51	19:31 (2)   05:28
9	07:28   16:49	07:06   17:26	07:27 (5)   06:27	19:33   06:33	19:05 (13)   05:50	19:40 (2)   05:27
10	07:28   16:50	07:04   17:27	08:01 (5)   18:02	19:34   06:31	18:56 (14)   05:50	19:42 (2)   05:27
11	07:28   16:51	07:03   17:29	07:25 (5)   06:23	19:35   06:30	19:05 (13)   05:48	19:43 (2)   05:27
12	07:27   16:52	07:02   17:30	08:01 (5)   18:01	19:36   06:28	18:57 (14)   05:47	19:44 (2)   05:27
13	07:27   16:53	07:01   17:31	07:23 (5)   06:22	19:37   06:26	19:04 (14)   05:47	19:45 (2)   05:27
14	07:27   16:54	06:59   17:32	08:00 (5)   18:02	19:38   06:25	19:02 (14)   05:45	19:46 (2)   05:27
15	07:26   16:55	06:58   17:33	07:24 (5)   06:20	19:39   06:24	19:05 (13)   05:44	19:47 (2)   05:27
16	07:26   16:56	06:57   17:34	07:25 (5)   06:18	19:40   06:23	18:57 (14)   05:44	19:48 (2)   05:27
17	07:25   16:58	06:55   17:35	07:26 (5)   06:15	19:41   06:22	19:05 (13)   05:42	19:49 (3)   05:27
18	07:25   16:59	06:54   17:36	07:27 (5)   06:13	19:42   06:20	19:06 (13)   05:41	19:50 (3)   05:27
19	07:24   17:00	06:53   17:37	07:28 (5)   06:10	19:43   06:18	19:07 (13)   05:40	19:51 (3)   05:27
20	07:24   17:01	06:51   17:38	07:29 (5)   06:08	19:44   06:17	19:08 (13)   05:39	19:52 (3)   05:27
21	07:23   17:02	06:50   17:39	07:30 (5)   06:07	19:45   06:16	19:09 (13)   05:38	19:53 (3)   05:27
22	07:23   17:03	06:48   17:40	07:31 (5)   06:05	19:46   06:15	19:10 (13)   05:37	19:54 (3)   05:27
23	07:22   17:04	06:47   17:41	07:32 (5)   06:03	19:47   06:14	19:11 (13)   05:36	19:55 (3)   05:27
24	07:21   17:05	06:45   17:42	07:33 (5)   06:01	19:48   06:13	19:12 (13)   05:35	19:56 (3)   05:27
25	07:20   17:06	06:44   17:43	07:34 (5)   06:00	19:49   06:12	19:13 (13)   05:34	19:57 (3)   05:27
26	07:20   17:07	06:42   17:44	07:35 (5)   05:58	19:50   06:11	19:14 (13)   05:33	19:58 (3)   05:27
27	07:19   17:08	06:41   17:45	07:36 (5)   05:56	19:51   06:10	19:15 (13)   05:32	19:59 (3)   05:27
28	07:18   17:09	06:39   17:46	07:37 (5)   05:55	19:52   06:09	19:16 (13)   05:31	20:00 (3)   05:27
29	07:17   17:10	06:38   17:47	07:38 (5)   05:53	19:53   06:08	19:17 (13)   05:30	20:01 (3)   05:27
30	07:16   17:11	06:37   17:48	07:39 (5)   05:51	19:54   06:07	19:18 (13)   05:29	20:02 (3)   05:27
31	07:15   17:12	06:36   17:49	07:40 (5)   05:50	19:55   06:06	19:19 (13)   05:28	20:03 (3)   05:27
Ore potenziali eliofanía	296	296	369	399	450	454
Totale, caso peggiore	138	624	31	39	717	1339
Probabilità di eliofanía	0,44	0,46	0,44	0,48	0,47	0,54
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00
Totale ridotto	0,44	0,46	0,44	0,48	0,47	0,54
Totale effettivo	61	285	14	19	334	723

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



# SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CH - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (86)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40 45	19:23 (3) 20:08 (3) 20:20	05:55 22	19:34 (2) 19:56 (2) 19:36	06:26 5	18:56 (14) 19:01 (14) 18:45	06:57 16:57 36	06:54 (5) 07:30 (5) 16:32
2	05:31 20:39 45	19:24 (3) 20:09 (3) 20:19	05:56 20	19:35 (2) 19:55 (2) 19:35	06:27 7	18:55 (14) 19:02 (14) 18:43	06:58 16:56 35	06:55 (5) 07:30 (5) 16:32
3	05:31 20:39 44	19:24 (3) 20:08 (3) 20:18	05:57 18	19:36 (2) 19:54 (2) 19:33	06:28 9	18:54 (14) 19:03 (13) 18:41	06:59 16:55 34	06:57 (5) 07:31 (5) 16:32
4	05:32 20:39 44	19:25 (3) 20:09 (3) 20:17	05:58 16	19:37 (2) 19:53 (2) 19:31	06:29 8	18:54 (14) 19:02 (13) 18:40	07:00 16:54 33	06:58 (5) 07:31 (5) 16:32
5	05:33 20:39 44	19:24 (3) 20:08 (3) 20:16	05:59 12	19:39 (2) 19:51 (2) 19:30	06:30 7	18:54 (13) 19:01 (13) 18:38	07:01 16:52 32	06:59 (5) 07:31 (5) 16:31
6	05:33 20:39 44	19:25 (3) 20:09 (3) 20:14	06:00 6	19:42 (2) 19:48 (2)	06:31 5	18:55 (13) 19:00 (13)	07:02 18:36 16:51	07:00 (5) 07:30 (5) 16:31
7	05:34 20:38 43	19:26 (3) 20:09 (3) 20:13	06:01 19:26	06:32 19:33	07:04 18:35	07:04 18:35	06:39 16:50	07:02 (5) 07:31 (5) 16:31
8	05:34 20:38 44	19:25 (3) 20:09 (3) 20:12	06:02 19:25	06:33 18:33	07:05 16:49	07:05 18:33	06:41 16:49	07:03 (5) 07:31 (5) 16:31
9	05:35 20:38 43	19:26 (3) 20:09 (3) 20:11	06:03 19:23	06:34 18:31	07:06 16:48	07:06 18:31	06:42 16:48	07:04 (5) 07:30 (5) 16:31
10	05:36 20:37 42	19:27 (3) 20:09 (3) 20:09	06:04 19:21	06:36 18:30	07:07 16:47	07:07 18:30	06:43 16:47	07:06 (5) 07:30 (5) 16:31
11	05:36 20:37 41	19:27 (3) 20:08 (3) 20:08	06:05 19:19	06:37 18:28	07:08 16:46	07:08 18:28	06:44 16:46	07:07 (5) 07:30 (5) 16:31
12	05:37 20:36 42	19:27 (3) 20:09 (3) 20:07	06:06 19:18	06:38 18:27	07:09 5	17:51 (12) 17:56 (12)	06:46 16:45	07:08 (5) 07:29 (5) 16:31
13	05:38 20:36 41	19:28 (3) 20:09 (3) 20:05	06:07 19:16	06:39 18:25	07:10 6	17:50 (12) 17:56 (12)	06:47 16:44	07:10 (5) 07:29 (5) 16:31
14	05:39 20:35 40	19:28 (3) 20:08 (3) 20:04	06:08 19:14	06:40 18:23	07:11 7	17:49 (12) 17:56 (12)	06:48 16:43	07:11 (5) 07:28 (5) 16:32
15	05:39 20:35 40	19:28 (3) 20:08 (3) 20:02	06:09 19:12	06:41 18:22	07:12 7	17:49 (12) 17:56 (12)	06:49 16:42	07:12 (5) 07:27 (5) 16:32
16	05:40 20:34 39	19:29 (3) 20:08 (3) 20:01	06:10 19:11	06:42 18:20	07:13 5	17:49 (12) 17:54 (12)	06:50 16:41	07:13 (5) 07:26 (5) 16:32
17	05:41 20:33 37	19:30 (3) 20:07 (3) 20:00	06:11 19:09	06:43 18:19	07:15 18:19	07:15 18:19	06:52 16:40	07:15 (5) 07:26 (5) 16:32
18	05:42 20:33 36	19:31 (3) 20:07 (3) 19:58	06:12 19:07	06:44 18:17	07:16 18:17	07:16 18:17	06:53 16:40	07:16 (5) 07:25 (5) 16:33
19	05:43 20:32 35	19:31 (3) 20:06 (3) 19:57	06:13 19:06	06:45 18:16	07:17 18:16	07:17 18:16	06:54 16:39	07:17 (5) 07:23 (5) 16:33
20	05:44 20:31 33	19:32 (2) 20:05 (3) 19:55	06:14 19:04	06:46 18:31	07:18 6	18:25 (7) 18:31 (7)	06:55 16:38	07:19 (5) 07:23 (5) 16:33
21	05:44 20:31 33	19:32 (2) 20:05 (3) 19:54	06:15 19:02	06:47 18:31	07:19 7	18:24 (7) 18:31 (7)	06:56 16:37	07:24 16:34
22	05:45 20:30 32	19:32 (2) 20:04 (3) 19:52	06:16 19:00	06:48 18:31	07:20 7	18:24 (7) 18:31 (7)	06:58 16:37	07:25 16:34
23	05:46 20:29 31	19:32 (2) 20:03 (3) 19:51	06:17 18:59	06:49 18:30	07:21 6	18:24 (7) 18:30 (7)	06:59 16:36	07:25 16:35
24	05:47 20:28 30	19:32 (2) 20:02 (3) 19:49	06:18 18:57	06:50 18:28	07:23 25	18:10 18:08	16:36 16:36	07:26 16:35
25	05:48 20:27 29	19:32 (2) 20:01 (3) 19:47	06:19 18:55	06:51 17:07	07:24 28	18:08 17:07	16:36 16:35	07:26 16:36
26	05:49 20:26 27	19:32 (2) 19:59 (2) 19:46	06:20 18:53	06:52 17:05	07:25 30	18:08 17:05	16:36 16:34	07:27 16:37
27	05:50 20:25 26	19:32 (2) 19:58 (2) 19:44	06:21 18:52	06:53 17:04	07:26 33	18:08 17:04	16:36 16:34	07:27 16:37
28	05:51 20:24 26	19:32 (2) 19:58 (2) 19:43	06:22 18:50	06:54 17:03	07:27 34	18:10 17:03	16:36 16:33	07:27 16:38
29	05:52 20:23 26	19:32 (2) 19:58 (2) 19:41	06:23 18:48	06:55 17:01	07:28 36	18:10 17:01	16:36 16:33	07:28 16:39
30	05:53 20:22 24	19:33 (2) 19:57 (2) 19:40	06:24 18:47	06:56 17:00	07:29 37	18:10 17:00	16:36 16:33	07:28 16:39
31	05:54 20:21 24	19:33 (2) 19:57 (2) 19:38	06:25 19:38	06:57 16:59	07:30 37	18:10 16:59	16:36 16:30	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286		
Totale, caso peggiore	1130	94	67	332	445			
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40			
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00			
Totale ridotto	0,61	0,67	0,58	0,44	0,40			
Totale effettivo	685	63	39	145	180			

### Legenda della tabella:

Giorno del mese	Alba (hh:mm)	Inizio ombreggiamento (hh:mm)	(WTG che provoca l'inizio dell'ombreggiamento)
	Tramonto (hh:mm)Minuti d'ombra	Fine ombreggiamento (hh:mm)	(WTG che provoca l'ultimo ombreggiamento)





## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: Cl - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (87)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	07:14 (5) 07:42 (5)	06:46 19:26	06:00 19:58
2	07:28 16:42	07:13 17:17	06:36 17:52	07:15 (5) 17:25 (12)	06:44 19:27	05:58 19:59
3	07:28 16:43	07:12 17:19	06:35 17:53	07:17 (5) 17:27 (12)	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	07:20 (5) 17:26 (12)	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:31 17:56	06:31 17:26 (12)	06:39 19:30	05:54 20:03
6	07:28 16:46	07:09 17:22	07:29 (5) 07:31 (5)	06:30 17:20 (12)	06:38 19:31	05:53 20:04
7	07:28 16:47	07:08 17:24	07:28 (5) 07:36 (5)	06:28 17:58	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	07:27 (5) 07:39 (5)	06:27 17:59	06:34 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	07:26 (5) 07:42 (5)	06:25 18:00	06:33 19:34	05:50 20:07
10	07:28 16:50	07:04 17:27	07:24 (5) 07:42 (5)	06:23 18:01	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	07:23 (5) 07:44 (5)	06:22 18:02	06:30 19:37	05:47 20:09
12	07:27 16:52	07:02 17:30	07:22 (5) 07:46 (5)	06:20 18:04	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	07:20 (5) 07:46 (5)	06:18 18:05	06:26 19:39	05:45 20:11
14	07:27 16:54	06:59 17:33	07:19 (5) 07:47 (5)	06:17 18:06	06:25 19:40	05:44 20:12
15	07:26 16:55	06:58 17:34	07:18 (5) 07:48 (5)	06:15 18:07	06:23 19:41	05:43 20:13
16	07:26 16:56	06:57 17:35	07:16 (5) 07:48 (5)	06:13 18:08	06:22 19:42	05:42 20:14
17	07:25 16:58	06:55 17:36	07:15 (5) 07:48 (5)	06:12 18:09	06:20 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	07:14 (5) 07:49 (5)	06:10 18:10	06:18 19:44	05:40 20:16
19	07:24 17:00	06:53 17:39	07:12 (5) 07:49 (5)	06:08 18:11	06:17 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	07:11 (5) 07:49 (5)	06:07 18:13	06:15 19:46	05:38 20:18
21	07:23 17:02	06:50 17:41	07:09 (5) 07:48 (5)	06:05 18:14	06:14 19:48	05:37 20:19
22	07:23 17:04	06:48 17:42	07:10 (5) 07:49 (5)	06:03 18:15	06:12 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	07:10 (5) 07:48 (5)	06:01 18:16	06:11 19:50	05:36 20:21
24	07:21 17:06	06:45 17:45	07:10 (5) 07:48 (5)	06:00 18:17	06:09 19:51	05:35 20:22
25	07:20 17:07	06:44 17:46	07:10 (5) 07:46 (5)	05:58 18:18	06:08 19:52	05:34 20:23
26	07:20 17:08	06:42 17:47	07:11 (5) 07:46 (5)	05:56 18:19	06:06 19:53	05:34 20:24
27	07:19 17:10	06:41 17:48	07:12 (5) 07:45 (5)	05:55 18:20	06:05 19:54	05:33 20:24
28	07:18 17:11	06:39 17:50	07:12 (5) 07:43 (5)	05:53 18:21	06:04 19:55	05:32 20:25
29	07:17 17:12		06:51 19:22		06:02 19:56	05:32 20:26
30	07:16 17:13		06:50 19:24		06:01 19:57	05:31 20:27
31	07:15 17:15		06:48 19:25		05:31 20:28	05:31 19:31 (2)
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore		649	144			802
Probabilità di eliofania		0,46	0,44		0,48	0,54
Tempo di operatività rid.		1,00	1,00		1,00	1,00
Dir. del vento rid.		1,00	1,00		1,00	1,00
Totale ridotto		0,46	0,44		0,48	0,54
Totale effettivo		296	63		21	433

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: Cl - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (87)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30	19:36 (2)	05:55	06:26	06:57	06:32
	20:40	27 20:03 (2)	20:20	19:36	18:45	16:57
2	05:31	19:37 (2)	05:56	06:27	06:58	06:33
	20:39	27 20:04 (2)	20:19	19:35	18:43	16:56
3	05:31	19:37 (2)	05:57	06:28	06:59	06:35
	20:39	27 20:04 (2)	20:18	19:33	18:41	16:55
4	05:32	19:37 (2)	05:58	06:29	07:00	06:36
	20:39	27 20:04 (2)	20:17	19:31	18:40	16:54
5	05:33	19:37 (2)	05:59	06:30	07:01	06:37
	20:39	27 20:04 (2)	20:16	19:30	18:38	16:53
6	05:33	19:38 (2)	06:00	06:31	07:02	06:38
	20:39	27 20:05 (2)	20:14	19:28	18:36	16:51
7	05:34	19:38 (2)	06:01	06:32	07:04	06:39
	20:38	27 20:05 (2)	20:13	19:26	18:35	16:50
8	05:34	19:38 (2)	06:02	06:33	07:05	06:41
	20:38	27 20:05 (2)	20:12	19:25	18:33	16:49
9	05:35	19:38 (2)	06:03	06:34	07:06	06:42
	20:38	27 20:05 (2)	20:11	19:23	18:31	16:48
10	05:36	19:39 (2)	06:04	06:36	07:07	06:43
	20:37	26 20:05 (2)	20:09	19:21	18:30	16:47
11	05:36	19:38 (2)	06:05	06:37	07:08	06:44
	20:37	27 20:05 (2)	20:08	19:19	18:28	16:46
12	05:37	19:39 (2)	06:06	06:38	07:09	06:46
	20:36	26 20:05 (2)	20:07	19:18	18:27	16:45
13	05:38	19:40 (2)	06:07	06:39	07:10	06:47
	20:36	25 20:05 (2)	20:05	19:16	18:25	16:44
14	05:39	19:39 (2)	06:08	06:40	07:11	06:48
	20:35	25 20:04 (2)	20:04	19:14	18:23	16:43
15	05:39	19:40 (2)	06:09	06:41	07:12	06:49
	20:35	24 20:04 (2)	20:02	19:13	18:22	16:42
16	05:40	19:40 (2)	06:10	06:42	07:13	06:50
	20:34	24 20:04 (2)	20:01	19:11	18:20	16:41
17	05:41	19:41 (2)	06:11	06:43	07:15	06:52
	20:33	23 20:04 (2)	20:00	19:09	18:19	16:40
18	05:42	19:42 (2)	06:12	06:44	07:16	06:53
	20:33	22 20:04 (2)	19:58	19:07	18:18	16:40
19	05:43	19:42 (2)	06:13	06:45	07:17	06:54
	20:32	21 20:03 (2)	19:57	19:06	18:17	16:39
20	05:44	19:43 (2)	06:14	06:46	07:18	06:55
	20:31	19 20:02 (2)	19:55	19:04	18:16	16:38
21	05:44	19:44 (2)	06:15	06:47	07:19	06:56
	20:31	18 20:02 (2)	19:54	19:02	18:15	16:37
22	05:45	19:45 (2)	06:16	06:48	07:20	06:58
	20:30	16 20:01 (2)	19:52	19:00	18:14	16:37
23	05:46	19:47 (2)	06:17	06:49	07:21	06:59
	20:29	13 20:00 (2)	19:51	18:59	18:13	16:36
24	05:47	19:49 (2)	06:18	06:50	07:23	07:00
	20:28	9 19:58 (2)	19:49	18:57	18:08	16:35
25	05:48	06:19	06:19	06:51	06:24	07:01
	20:27	19:47	19:47	18:55	17:07	16:35
26	05:49	06:20	19:04 (14)	06:52	06:25	07:02
	20:26	19:46	4 19:08 (13)	18:53	17:05	16:34
27	05:50	06:21	19:01 (14)	06:53	06:26	07:03
	20:25	19:44	8 19:09 (13)	18:52	17:04	16:34
28	05:51	06:22	19:00 (14)	06:54	06:27	07:04
	20:24	19:43	9 19:09 (13)	18:50	17:03	16:34
29	05:52	06:23	19:00 (14)	06:55	06:29	07:06
	20:23	19:41	9 19:09 (13)	18:48	17:01	16:33
30	05:53	06:24	19:00 (14)	06:56	06:30	07:07
	20:22	19:40	8 19:08 (13)	18:47	17:00	16:33
31	05:54	06:25	19:02 (14)	06:57	06:31	07:08
	20:21	19:38	5 19:07 (13)	18:46	16:59	16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	561	43	27	723	53	
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,61	0,67	0,58	0,44	0,40	
Totale effettivo	340	29	16	315	21	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (88)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:14 17:16	06:38 17:51		06:46 19:26		
2	07:28 16:42	07:13 17:17	06:36 17:52	17:22 (12)	06:44 19:27		
3	07:28 16:43	07:12 17:19	06:35 17:53	17:21 (12)	06:43 19:28		
4	07:29 16:44	07:11 17:20	06:33 17:54	17:19 (12)	06:41 19:29		
5	07:29 16:45	07:10 17:21	06:31 17:56	17:19 (12)	06:39 19:30		
6	07:28 16:46	07:09 17:22	06:30 17:57	17:20 (12)	06:38 19:31		
7	07:28 16:47	07:08 17:24	06:28 17:58		06:36 19:32		
8	07:28 16:48	07:07 17:25	06:27 17:59		06:34 19:33		
9	07:28 16:49	07:06 17:26	06:25 18:00		06:33 19:34		
10	07:28 16:50	07:04 17:27	06:23 18:01		06:31 19:36		
11	07:28 16:51	07:03 17:29	06:22 18:02		06:30 19:37		
12	07:27 16:52	07:02 17:30	06:20 18:04		06:28 19:38		
13	07:27 16:53	07:01 17:31	06:18 18:05		06:26 19:39		
14	07:27 16:54	06:59 17:33	06:17 18:06		06:25 19:40		
15	07:26 16:55	06:58 17:34	06:15 18:07		06:23 19:41		
16	07:26 16:56	06:57 17:35	06:13 18:08		06:22 19:42		
17	07:25 16:58	06:55 17:36	06:12 18:09		06:20 19:43		
18	07:25 16:59	06:54 17:38	06:10 18:10		06:18 19:44		
19	07:24 17:00	06:53 17:39	06:08 18:11		06:17 19:45		
20	07:24 17:01	06:51 17:40	06:07 18:13		06:15 19:46		
21	07:23 17:02	06:50 17:41	06:05 18:14		06:14 19:48		
22	07:23 17:04	06:48 17:42	06:03 18:15		06:12 19:49		
23	07:22 17:05	06:47 17:44	06:01 18:16		06:11 19:50		
24	07:21 17:06	06:45 17:45	06:00 18:17		06:09 19:51		
25	07:20 17:07	06:44 17:46	05:58 18:18	17:43 (7)	06:08 19:52		
26	07:20 17:08	06:42 17:47	05:56 18:19	17:42 (7)	06:06 19:53		
27	07:19 17:10	06:41 17:48	05:55 18:20	17:41 (7)	06:05 19:54		
28	07:18 17:11	06:39 17:50	05:53 18:21	17:42 (7)	06:04 19:55		
29	07:17 17:12		06:51 19:22	17:48 (7)	06:02 19:56		
30	07:16 17:13		06:50 19:24		06:01 19:57		
31	07:15 17:15		06:48 19:25		05:31 20:28		
Ore potenziali eliofania	296	296	369	399	450	454	
Totale, caso peggiore			56	39	294	777	
Probabilità di eliofania			0,44	0,48	0,47	0,54	
Tempo di operatività rid.			1,00	1,00	1,00	1,00	
Dir. del vento rid.			1,00	1,00	1,00	1,00	
Totale ridotto			0,44	0,48	0,47	0,54	
Totale effettivo			25	19	137	419	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (88)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:30 20:40	19:36 (2) 20:02 (2)	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	05:31 20:39	19:37 (2) 20:03 (2)	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	05:31 20:39	19:37 (2) 20:03 (2)	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	07:10 16:32
4	05:32 20:39	19:37 (2) 20:04 (2)	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	19:37 (2) 20:03 (2)	05:59 20:16	06:30 19:30	07:01 18:38	06:37 16:52	07:12 16:31
6	05:33 20:39	19:37 (2) 20:04 (2)	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	07:13 16:31
7	05:34 20:38	19:38 (2) 20:04 (2)	06:01 20:13	06:32 19:26	07:04 18:35	06:39 16:50	07:14 16:31
8	05:34 20:38	19:37 (2) 20:04 (2)	06:02 20:12	06:33 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	19:38 (2) 20:04 (2)	06:03 20:11	06:34 19:23	07:06 18:31	06:42 16:48	07:16 16:31
10	05:36 20:37	19:38 (2) 20:05 (2)	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:16 16:31
11	05:36 20:37	19:38 (2) 20:04 (2)	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46	07:17 16:31
12	05:37 20:36	19:38 (2) 20:05 (2)	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	05:38 20:36	19:39 (2) 20:05 (2)	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	05:39 20:35	19:38 (2) 20:04 (2)	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	05:39 20:35	19:39 (2) 20:04 (2)	06:09 20:02	06:41 19:12	07:12 18:22	06:49 16:42	07:20 16:32
16	05:40 20:34	19:40 (2) 20:04 (2)	06:10 20:01	06:42 19:11	07:13 18:20	06:50 16:41	07:21 16:32
17	05:41 20:33	19:40 (2) 20:04 (2)	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:40	07:22 16:32
18	05:42 20:33	19:41 (2) 20:04 (2)	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	19:41 (2) 20:03 (2)	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	19:41 (2) 20:03 (2)	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	05:44 20:31	19:42 (2) 20:02 (2)	06:15 19:54	06:47 19:02	07:19 18:13	06:56 16:37	07:24 16:34
22	05:45 20:30	19:43 (2) 20:02 (2)	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	05:46 20:29	19:44 (2) 20:01 (2)	06:17 19:51	06:49 18:59	07:21 18:10	06:59 16:36	07:25 16:35
24	05:47 20:28	19:46 (2) 20:00 (2)	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	05:48 20:27	19:48 (2) 19:58 (2)	06:19 19:47	06:51 18:55	07:24 18:07	07:01 16:35	07:26 16:36
26	05:49 20:26	19:51 (2) 19:56 (2)	06:20 19:46	19:05 (13) 19:07 (13)	06:52 18:53	07:02 17:05	07:27 16:37
27	05:50 20:25	06:21 19:44	19:02 (14) 19:09 (13)	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	19:01 (14) 19:09 (13)	06:54 18:50	06:27 17:03	07:04 16:34	07:27 16:38
29	05:52 20:23	06:23 19:41	19:00 (14) 19:09 (13)	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	05:53 20:22	06:24 19:40	19:00 (14) 19:09 (13)	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	05:54 20:21	06:25 19:38	19:01 (14) 19:07 (13)	06:57 18:46	06:31 16:59	07:08 16:34	07:29 16:40
Ore potenziali eliofania	461	429	375	345	297	286	
Totale, caso peggiore	594		41	26			
Probabilità di eliofania	0,61		0,67	0,58	0,44		
Tempo di operatività rid.	1,00		1,00	1,00	1,00		
Dir. del vento rid.	1,00		1,00	1,00	1,00		
Totale ridotto	0,61		0,67	0,58	0,44		
Totale effettivo	360		27	15	14		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CK - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (89)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:32 19:30	06:40 20:03	05:55 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 17:49	06:51 18:19	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 17:48	06:50 18:20	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:33 17:47	06:48 18:21	06:00 19:58	05:30 20:28	05:29 20:40	05:54 20:21	06:25 19:38	06:31 18:46	06:31 16:59	07:08 16:40	07:28 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

#### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Ute autorizzato:

VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsv.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CL - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (90°)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese	Alba (hh:mm)	Inizio ombreggiamento (hh:mm)	(WTG che provoca l'inizio dell'ombreggiamento)
	Tramonto (hh:mm)	Minuti d'ombra Fine ombreggiamento (hh:mm)	(WTG che provoca l'ultimo ombreggiamento)



Progetto:  
231114\_Shadow flickering\_Galdo\_rev01

Uteente autorizzato:  
VSB Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CM - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (91)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
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6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
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29	07:17 17:12	06:37 17:51	06:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
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Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
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14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CN - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (92)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns representing months from Gennaio to Dicembre and rows representing specific dates with two time values per date. Summary rows at the bottom include 'Ore potenziali eliofania', 'Totale, caso peggiore', and 'Totale effettivo'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: CO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (93)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
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29	07:17 17:12	06:37 18:19	05:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 19:24	05:50 19:58	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:06 19:55	06:15 20:28	05:31 20:28	05:31 20:21	05:54 20:21	06:25 19:38	06:31 16:59	06:31 16:59	07:28 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

### Legenda della tabella:

Giorno del mese    Alba (hh:mm)    Inizio ombreggiamento (hh:mm)    (WTG che provoca l'inizio dell'ombreggiamento)  
    Tramonto (hh:mm)Minuti d'ombra    Fine ombreggiamento (hh:mm)    (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

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+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (94)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:36 17:51	05:50 18:25	06:01 19:58	05:31 20:28	05:30 20:40	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	07:08 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

VSB Neue Energien Deutschland GmbH
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DE-01069 Dresden
+ 49 (0) 351 / 211 83 - 46
Luca Di Grigoli / luca.digrigoli@vsb.energy
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (95)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns for months (Gennaio to Dicembre) and 31 rows of time slots (07:29 to 17:15). Includes summary rows for potential and effective hours.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Schweizer Straße 3a  
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Redatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (96)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 17:51	05:52 18:23	06:03 19:56	05:31 20:26	05:28 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
	07:16 17:15	06:37 17:51	05:51 18:24	06:02 19:57	05:30 20:27	05:27 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
Ore potenziali eliofanìa	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofanìa												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (97)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno			
1	07:28 16:41	07:51 (7) 08:05 (7)	07:15 17:16	06:38 17:51	06:57 (14) 07:23 (9)	06:46 19:26	07:18 (10) 07:56 (10)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:51 (7) 08:05 (7)	07:14 17:17	06:36 17:52	06:55 (14) 07:23 (9)	06:45 19:27	07:17 (10) 07:56 (10)	05:58 20:00	05:30 20:29
3	07:29 16:43	07:51 (7) 08:05 (7)	07:13 17:19	06:35 17:53	06:54 (14) 07:24 (9)	06:43 19:28	07:17 (10) 07:57 (10)	05:57 20:01	05:29 20:30
4	07:29 16:44	07:52 (7) 08:05 (7)	07:11 17:20	06:33 17:55	06:52 (14) 07:23 (9)	06:41 19:29	07:16 (10) 07:56 (10)	05:56 20:02	05:29 20:31
5	07:29 16:45	07:53 (7) 08:05 (7)	07:10 17:21	06:32 17:56	06:51 (14) 07:24 (9)	06:40 19:30	07:15 (10) 07:56 (10)	05:55 20:03	05:29 20:32
6	07:29 16:46	07:54 (7) 08:05 (7)	07:09 17:23	06:30 17:57	06:49 (14) 07:23 (9)	06:38 19:31	07:15 (10) 07:56 (10)	05:53 20:04	05:28 20:32
7	07:29 16:47	07:55 (7) 08:05 (7)	07:08 17:24	06:28 17:58	06:47 (14) 07:22 (9)	06:36 19:32	07:15 (10) 07:55 (10)	05:52 20:05	05:28 20:33
8	07:28 16:48	07:57 (7) 08:05 (7)	07:07 17:25	06:27 17:59	06:49 (14) 07:22 (9)	06:35 19:34	07:14 (10) 07:54 (10)	05:51 20:06	05:28 20:34
9	07:28 16:48	07:59 (7) 08:02 (7)	07:06 17:26	06:25 18:00	06:55 (9) 07:21 (9)	06:33 19:35	07:15 (10) 07:54 (10)	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	07:05 17:28	06:23 18:01	06:55 (9) 07:19 (9)	06:31 19:36	07:15 (10) 07:53 (10)	05:49 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	07:03 17:29	06:22 18:03	06:57 (9) 07:19 (9)	06:30 19:37	07:15 (10) 07:52 (10)	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30	07:02 17:30	06:20 18:04	06:58 (9) 07:16 (9)	06:28 19:38	07:16 (10) 07:51 (10)	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	07:01 17:31	06:18 18:05	06:59 (9) 07:14 (9)	06:26 19:39	07:16 (10) 07:50 (10)	05:45 20:11	05:27 20:36
14	07:27 16:53	07:00 17:33	07:00 17:33	06:17 18:06	07:04 (9) 07:10 (9)	06:25 19:40	07:17 (10) 07:49 (10)	05:44 20:12	05:27 20:37
15	07:27 16:55	06:58 17:34	06:58 17:34	06:15 18:07	06:23 19:41	06:23 19:41	07:17 (10) 07:47 (10)	05:43 20:13	05:27 20:37
16	07:26 16:57	06:57 17:35	06:57 17:35	06:13 18:08	06:22 19:42	06:22 19:42	07:19 (10) 07:46 (10)	05:42 20:14	05:27 20:38
17	07:26 16:58	06:56 17:36	06:56 17:36	06:12 18:09	06:20 19:43	06:20 19:43	07:20 (10) 07:43 (10)	05:41 20:15	05:27 20:38
18	07:25 16:59	06:54 17:38	06:54 17:38	06:10 18:10	06:19 19:44	06:19 19:44	07:22 (10) 07:40 (10)	05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	06:53 17:39	06:08 18:12	06:17 19:45	06:17 19:45	07:25 (10) 07:37 (10)	05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	06:51 17:40	06:07 18:13	06:16 19:47	06:16 19:47	05:38 20:18	05:38 20:18	05:27 20:39
21	07:23 17:02	06:50 17:41	06:50 17:41	06:05 18:14	06:14 19:48	06:14 19:48	05:38 20:19	05:38 20:19	05:27 20:39
22	07:23 17:04	06:48 17:43	06:48 17:43	06:03 18:15	06:12 19:49	06:12 19:49	05:37 20:20	05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:47 17:44	06:02 18:16	06:11 19:50	06:11 19:50	05:36 20:21	05:36 20:21	05:28 20:39
24	07:21 17:06	06:46 17:45	06:46 17:45	06:00 18:17	06:36 (10) 06:44 (10)	06:10 19:51	05:35 20:22	05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	06:44 17:46	05:58 18:18	06:31 (10) 06:48 (10)	06:08 19:52	05:34 20:23	05:34 20:23	05:28 20:40
26	07:20 17:09	06:43 17:47	06:43 17:47	05:56 18:19	06:27 (10) 06:50 (10)	06:07 19:53	05:34 20:24	05:34 20:24	05:28 20:40
27	07:19 17:10	06:41 17:49	06:41 17:49	05:55 18:20	06:25 (10) 06:52 (10)	06:05 19:54	05:33 20:25	05:33 20:25	05:29 20:40
28	07:18 17:11	06:39 17:50	06:39 17:50	05:53 18:22	06:24 (10) 06:54 (10)	06:04 19:55	05:32 20:25	05:32 20:25	05:29 20:40
29	07:17 17:12	06:37 17:51	06:37 17:51	05:51 18:23	06:51 07:22 (10)	06:02 06:02	05:32 20:26	05:32 20:26	05:30 20:40
30	07:16 17:14	06:35 17:52	06:35 17:52	05:50 18:24	06:50 07:55 (10)	06:01 19:57	05:31 20:27	05:31 20:27	05:30 20:40
31	07:16 17:15	06:34 17:53	06:34 17:53	05:48 18:25	07:19 (10) 07:56 (10)	06:00 06:00	05:31 20:28	05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454			
Totale, caso peggiore	99	87	570	644					
Probabilità di eliofania	0,44	0,46	0,44	0,48					
Tempo di operatività rid.	1,00	1,00	1,00	1,00					
Dir. del vento rid.	1,00	1,00	1,00	1,00					
Totale ridotto	0,44	0,46	0,44	0,48					
Totale effettivo	44	40	251	308					

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
(WTG che provoca l'inizio dell'ombreggiamento)  
(WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Pedatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CS - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (97)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:31 20:40	05:55 20:20	06:26 19:36	07:14 (10) 07:51 (10)	06:57 18:45	07:38 (9) 16:58	07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	07:13 (10) 07:51 (10)	06:58 18:43	07:36 (9) 16:56	07:09 16:32
3	05:32 20:39	05:57 20:18	06:29 19:33	07:12 (10) 07:51 (10)	06:59 18:42	07:34 (9) 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:11 (10) 07:51 (10)	07:00 18:40	07:33 (9) 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:11 (10) 07:51 (10)	07:02 18:38	07:28 (14) 16:53	07:12 16:32
6	05:33 20:39	06:00 20:14	06:32 19:28	07:10 (10) 07:51 (10)	07:03 18:37	07:25 (14) 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	06:33 19:26	07:10 (10) 07:51 (10)	07:04 18:35	07:24 (14) 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:10 (10) 07:50 (10)	07:05 18:33	07:25 (14) 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:10 (10) 07:50 (10)	07:06 18:32	07:26 (14) 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:10 (10) 07:49 (10)	07:07 18:30	07:27 (14) 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:10 (10) 07:48 (10)	07:08 18:28	07:29 (14) 16:46	07:17 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	07:10 (10) 07:47 (10)	07:09 18:27	07:30 (14) 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:11 (10) 07:46 (10)	07:10 18:25	07:31 (14) 16:44	07:19 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:12 (10) 07:45 (10)	07:11 18:24	07:32 (14) 16:43	07:20 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 (10) 07:43 (10)	07:13 18:22	07:33 (14) 16:42	07:21 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 (10) 07:41 (10)	07:14 18:20	07:34 (9) 16:41	07:21 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 (10) 07:39 (10)	07:15 18:19	07:36 (9) 16:41	07:22 16:32
18	05:42 20:33	06:12 19:58	06:44 19:07	07:17 (10) 07:36 (10)	07:16 18:17	07:39 (9) 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:21 (10) 07:32 (10)	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	06:46 19:04	07:18 (10) 18:14	07:18 18:14	06:55 16:38	07:24 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 (10) 18:13	07:19 18:13	06:57 16:38	07:25 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:20 (10) 18:11	07:20 18:11	06:58 16:37	07:26 16:34
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 (10) 18:10	07:22 18:10	06:59 16:36	07:27 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 (10) 18:08	07:23 18:08	07:00 16:36	07:26 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:25 (10) 18:55	06:51 18:55	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:23 (10) 18:54	06:52 18:54	07:02 16:35	07:27 16:37
27	05:50 20:25	06:21 19:44	06:53 18:52	07:21 (10) 18:52	06:53 18:52	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	06:54 18:50	07:19 (10) 18:50	06:54 18:50	07:05 16:34	07:27 16:38
29	05:52 20:23	06:23 19:41	06:55 18:48	07:18 (10) 18:48	06:55 18:48	07:06 16:33	07:28 16:39
30	05:53 20:22	06:24 19:40	06:56 18:47	07:17 (10) 18:47	06:56 18:47	07:07 16:33	07:28 16:40
31	05:54 20:21	06:25 19:38	06:57 18:46	07:15 (10) 18:46	06:57 18:46	07:08 16:33	07:29 16:40
Ore potenziali eliofania	461	429	375	345	297	286	368
Totale, caso peggiore		214	661	443			0,36
Probabilità di eliofania		0,67	0,58	0,44			1,00
Tempo di operatività rid.		1,00	1,00	1,00			1,00
Dir. del vento rid.		1,00	1,00	1,00			1,00
Totale ridotto		0,67	0,58	0,44			0,36
Totale effettivo		143	382	193			134

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (98)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	07:36 (11) 06:38	07:27 (1) 06:46	06:00	05:30
2	07:29 16:42	07:14 17:17	07:37 (11) 06:36	07:29 (1) 06:45	05:58	05:30
3	07:29 16:43	07:13 17:19	07:38 (11) 06:35	07:30 (1) 06:43	05:57	05:29
4	07:29 16:44	07:12 17:20	07:41 (11) 06:33	07:32 (1) 06:41	05:56	05:29
5	07:29 16:45	07:10 17:21	07:43 (11) 17:55	07:37 (1) 06:40	05:55	05:29
6	07:29 16:46	07:09 17:23	06:30	07:42 (1) 19:30	20:03	20:32
7	07:29 16:47	07:08 17:24	06:28	06:38	05:53	05:28
8	07:29 16:48	07:07 17:25	06:27	19:31	20:04	20:32
9	07:28 16:49	07:06 17:26	17:59	06:36	05:52	05:28
10	07:28 16:50	07:05 17:28	06:25	19:32	20:05	20:33
11	07:28 16:51	07:03 17:29	18:00	06:35	05:51	05:28
12	07:28 16:52	07:02 17:30	06:24	19:34	20:06	20:34
13	07:27 16:53	07:01 17:31	18:02	06:33	05:50	05:27
14	07:27 16:54	07:00 17:33	06:22	19:35	20:07	20:34
15	07:27 16:55	06:58 17:34	18:03	06:31	05:49	05:27
16	07:26 16:57	06:57 17:35	06:20	19:36	20:08	20:35
17	07:26 16:58	06:56 17:36	06:19	06:30	05:47	05:27
18	07:25 16:59	06:54 17:38	06:18	19:37	20:09	20:35
19	07:25 17:00	06:53 17:39	06:17	06:28	05:46	05:27
20	07:24 17:01	06:51 17:40	06:16	19:38	20:10	20:36
21	07:24 17:02	06:50 17:41	06:15	06:27	05:45	05:27
22	07:23 17:04	06:49 17:43	06:14	19:39	20:11	20:36
23	07:22 17:05	06:47 17:44	06:13	06:25	05:44	05:27
24	07:21 17:06	06:46 17:45	06:12	19:40	20:12	20:37
25	07:21 17:07	06:44 17:46	06:11	06:23	05:43	05:27
26	07:20 17:09	06:43 17:47	06:10	19:41	20:13	20:37
27	07:19 17:10	06:41 17:49	06:09	06:22	05:42	05:27
28	07:18 17:11	06:40 17:50	06:08	19:42	20:14	20:38
29	07:17 17:12	06:38 17:51	06:07	06:20	05:41	05:27
30	07:17 17:14	06:37 17:52	06:06	19:43	20:15	20:38
31	07:16 17:15	06:36 17:53	06:05	06:19	05:40	05:27
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	39	465	85			
Probabilità di eliofania	0,44	0,46	0,44			
Tempo di operatività rid.	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44			
Totale effettivo	17	212	37			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (98)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre		Novembre		Dicembre
1	05:31	05:55	06:27	06:57		06:32		07:08
	20:40	20:20	19:36	18:45		16:58		16:33
2	05:31	05:56	06:28	06:58		06:34		07:09
	20:40	20:19	19:35	18:43		16:56		16:32
3	05:32	05:57	06:29	06:59		06:35		07:10
	20:40	20:18	19:33	18:42		16:55		16:32
4	05:32	05:58	06:30	07:01		06:36		07:11
	20:39	20:17	19:31	18:40		16:54		16:32
5	05:33	05:59	06:31	07:02		06:37		07:12
	20:39	20:16	19:30	18:38		16:53		16:32
6	05:33	06:00	06:32	07:03		06:38		07:13
	20:39	20:15	19:28	18:37		16:52		16:31
7	05:34	06:01	06:33	07:04		06:40	07:10 (11)	07:14
	20:39	20:13	19:26	18:35		16:50	3 07:13 (11)	16:31
8	05:35	06:02	06:34	07:05		06:41	07:08 (11)	07:15
	20:38	20:12	19:25	18:33		16:49	7 07:15 (11)	16:31
9	05:35	06:03	06:35	07:06	08:08 (1)	06:42	07:08 (11)	07:16
	20:38	20:11	19:23	18:32	11 08:19 (1)	16:48	9 07:17 (11)	16:31
10	05:36	06:04	06:36	07:07	08:05 (1)	06:43	07:07 (11)	07:17
	20:37	20:09	19:21	18:30	17 08:22 (1)	16:47	10 07:17 (11)	16:31
11	05:37	06:05	06:37	07:08	08:04 (1)	06:45	07:07 (11)	07:18
	20:37	20:08	19:20	18:28	20 08:24 (1)	16:46	10 07:17 (11)	16:31
12	05:37	06:06	06:38	07:09	08:02 (1)	06:46	07:09 (11)	07:18
	20:37	20:07	19:18	18:27	23 08:25 (1)	16:45	9 07:18 (11)	16:31
13	05:38	06:07	06:39	07:10	08:00 (1)	06:47	07:10 (11)	07:19
	20:36	20:05	19:16	18:25	26 08:26 (1)	16:44	8 07:18 (11)	16:32
14	05:39	06:08	06:40	07:11	07:59 (1)	06:48	07:11 (11)	07:20
	20:35	20:04	19:14	18:24	28 08:27 (1)	16:43	6 07:17 (11)	16:32
15	05:40	06:09	06:41	07:13	07:58 (1)	06:49	07:12 (11)	07:21
	20:35	20:03	19:13	18:22	29 08:27 (1)	16:42	4 07:16 (11)	16:32
16	05:40	06:10	06:42	07:14	07:57 (1)	06:51	07:14 (11)	07:21
	20:34	20:01	19:11	18:20	30 08:27 (1)	16:41	2 07:16 (11)	16:32
17	05:41	06:11	06:43	07:15	07:57 (1)	06:52		07:22
	20:34	20:00	19:09	18:19	31 08:28 (1)	16:41		16:32
18	05:42	06:12	06:44	07:16	07:57 (1)	06:53		07:23
	20:33	19:58	19:08	18:17	31 08:28 (1)	16:40		16:33
19	05:43	06:13	06:45	07:17	07:56 (1)	06:54		07:23
	20:32	19:57	19:06	18:16	32 08:28 (1)	16:39		16:33
20	05:44	06:14	06:46	07:18	07:56 (1)	06:55		07:24
	20:32	19:55	19:04	18:14	31 08:27 (1)	16:38		16:34
21	05:45	06:15	06:47	07:19	07:56 (1)	06:57		07:25
	20:31	19:54	19:02	18:13	31 08:27 (1)	16:38		16:34
22	05:46	06:16	06:48	07:21	07:57 (1)	06:58		07:25
	20:30	19:52	19:01	18:11	30 08:27 (1)	16:37		16:35
23	05:46	06:17	06:49	07:22	07:57 (1)	06:59		07:26
	20:29	19:51	18:59	18:10	29 08:26 (1)	16:36		16:35
24	05:47	06:18	06:50	07:23	07:58 (1)	07:00		07:26
	20:28	19:49	18:57	18:08	27 08:25 (1)	16:36		16:36
25	05:48	06:19	06:51	06:24	06:58 (1)	07:01		07:27
	20:27	19:48	18:55	17:07	26 07:24 (1)	16:35		16:36
26	05:49	06:20	06:52	06:25	07:00 (1)	07:02		07:27
	20:26	19:46	18:54	17:06	23 07:23 (1)	16:35		16:37
27	05:50	06:21	06:53	06:26	07:01 (1)	07:04		07:27
	20:26	19:45	18:52	17:04	21 07:22 (1)	16:34		16:37
28	05:51	06:22	06:54	06:28	07:02 (1)	07:05		07:28
	20:25	19:43	18:50	17:03	18 07:20 (1)	16:34		16:38
29	05:52	06:23	06:55	06:29	07:05 (1)	07:06		07:28
	20:24	19:41	18:49	17:01	12 07:17 (1)	16:33		16:39
30	05:53	06:24	06:56	06:30		07:07		07:28
	20:23	19:40	18:47	17:00		16:33		16:40
31	05:54	06:26		06:31				07:28
	20:21	19:38		16:59				16:40
Ore potenziali eliofania	461	429	375	345		297		286
Totale, caso peggiore				526		68		
Probabilità di eliofania				0,44		0,40		
Tempo di operatività rid.				1,00		1,00		
Dir. del vento rid.				1,00		1,00		
Totale ridotto				0,44		0,40		
Totale effettivo				229		28		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: CU - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (99)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre			
1	07:28	07:14	06:38	06:46	17:33 (5)	05:59	05:30	05:55	06:26	17:27 (5)	06:57	06:32	07:08		
	16:41	17:16	17:51	19:26	18:15 (5)	19:58	20:28	20:20	19:36	46	18:13 (5)	18:45	16:57	16:32	
2	07:28	07:13	06:36	06:44	17:32 (5)	05:58	05:30	05:56	06:27	17:27 (5)	06:58	06:33	07:09		
	16:42	17:17	17:52	19:27	18:15 (5)	19:59	20:29	20:19	19:35	46	18:13 (5)	18:43	16:56	16:32	
3	07:28	07:12	06:35	06:43	17:31 (5)	05:57	05:29	05:57	06:28	17:26 (5)	06:59	06:35	07:10		
	16:43	17:18	17:53	19:28	18:15 (5)	20:00	20:30	20:18	19:33	47	18:13 (5)	18:41	16:55	16:32	
4	07:28	07:11	06:33	06:41	17:31 (5)	05:56	05:29	05:58	06:29	17:26 (5)	07:00	06:36	07:11		
	16:44	17:20	17:54	19:29	18:16 (5)	20:02	20:31	20:17	19:31	46	18:12 (5)	18:40	16:54	16:32	
5	07:28	07:10	06:31	06:39	17:30 (5)	05:54	05:28	05:59	06:30	17:25 (5)	07:01	06:37	07:12		
	16:45	17:21	17:55	19:30	18:16 (5)	20:03	20:31	20:15	19:30	47	18:12 (5)	18:38	16:52	16:31	
6	07:28	07:09	06:30	06:38	17:29 (5)	05:53	05:28	06:00	06:31	17:25 (5)	07:02	06:38	07:13		
	16:46	17:22	17:57	19:31	18:15 (5)	20:04	20:32	20:14	19:28	46	18:11 (5)	18:36	16:51	16:31	
7	07:28	07:08	06:28	06:36	17:29 (5)	05:52	05:28	06:01	06:32	17:25 (5)	07:03	06:39	07:14		
	16:47	17:24	17:58	19:32	18:16 (5)	20:05	20:33	20:13	19:26	46	18:11 (5)	18:35	16:50	16:31	
8	07:28	07:07	06:26	06:34	17:29 (5)	05:51	05:27	06:02	06:33	17:25 (5)	07:05	06:41	07:15		
	16:48	17:25	17:59	19:33	18:15 (5)	20:06	20:33	20:12	19:24	45	18:10 (5)	18:33	16:49	16:31	
9	07:28	07:06	06:25	06:33	17:28 (5)	05:49	05:27	06:03	06:34	17:25 (5)	07:06	06:42	07:15		
	16:49	17:26	18:00	19:34	18:15 (5)	20:07	20:34	20:10	19:23	44	18:09 (5)	18:31	16:48	16:31	
10	07:28	07:04	06:23	06:31	17:29 (5)	05:48	05:27	06:04	06:35	17:25 (5)	07:07	06:43	07:16		
	16:50	17:27	18:01	19:35	18:15 (5)	20:08	20:34	20:09	19:21	43	18:08 (5)	18:30	16:47	16:31	
11	07:28	07:03	06:22	06:29	17:28 (5)	05:47	05:27	06:05	06:36	17:25 (5)	07:08	06:44	07:17		
	16:51	17:29	18:02	19:37	18:14 (5)	20:09	20:35	20:08	19:19	42	18:07 (5)	18:28	16:46	16:31	
12	07:27	07:02	06:20	06:28	17:29 (5)	05:46	05:27	06:06	06:37	17:26 (5)	07:09	06:45	07:18		
	16:52	17:30	18:04	19:38	18:14 (5)	20:10	20:36	20:06	19:18	40	18:06 (5)	18:27	16:45	16:31	
13	07:27	07:01	06:18	06:26	17:29 (5)	05:45	05:27	06:07	06:38	17:26 (5)	07:10	06:47	07:19		
	16:53	17:31	18:05	19:39	18:13 (5)	20:11	20:36	20:05	19:16	39	18:05 (5)	18:25	16:44	16:31	
14	07:27	06:59	06:17	06:25	17:29 (5)	05:44	05:26	06:08	06:39	17:27 (5)	07:11	06:48	07:20		
	16:54	17:32	18:06	19:40	18:12 (5)	20:12	20:36	20:04	19:14	36	18:03 (5)	18:23	16:43	16:31	
15	07:26	06:58	06:15	06:23	17:30 (5)	05:43	05:26	06:09	06:41	17:28 (5)	07:12	06:49	07:20		
	16:55	17:34	18:07	19:41	18:12 (5)	20:13	20:37	20:02	19:12	33	18:01 (5)	18:22	16:42	16:32	
16	07:26	06:57	06:13	06:21	17:30 (5)	05:42	05:26	06:10	06:42	17:29 (5)	07:13	06:50	07:21		
	16:56	17:35	18:08	19:42	18:10 (5)	20:14	20:37	20:01	19:11	30	17:59 (5)	18:20	16:41	16:32	
17	07:25	06:55	06:12	06:20	17:31 (5)	05:41	05:26	06:11	06:43	17:31 (5)	07:15	06:52	07:22		
	16:57	17:36	18:09	19:43	18:10 (5)	20:15	20:38	20:03	19:09	25	17:56 (5)	18:19	16:40	16:32	
18	07:25	06:54	06:10	06:18	17:32 (5)	05:40	05:27	06:12	06:44	17:34 (5)	07:16	06:53	07:22		
	16:59	17:37	18:10	19:44	18:08 (5)	20:16	20:38	20:03	19:07	19	17:53 (5)	18:17	16:40	16:33	
19	07:24	06:53	06:08	06:17	17:33 (5)	05:39	05:27	06:13	06:45	17:38 (5)	07:17	06:54	07:23		
	17:00	17:39	18:11	19:45	18:07 (5)	20:17	20:38	20:02	19:57	14	18:03 (5)	18:05	16:39	16:33	
20	07:24	06:51	06:06	06:15	17:34 (5)	05:38	05:27	06:14	06:46	17:45 (5)	07:18	06:55	07:24		
	17:01	17:40	18:12	19:46	18:05 (5)	20:18	20:39	20:01	19:55	21	18:06 (5)	18:04	16:38	16:33	
21	07:23	06:50	06:05	06:14	17:36 (5)	05:37	05:27	06:15	06:47	17:43 (5)	07:19	06:56	07:24		
	17:02	17:41	18:14	19:47	18:04 (5)	20:19	20:39	20:00	19:54	25	18:08 (5)	18:02	16:37	16:34	
22	07:23	06:48	06:03	06:12	17:37 (5)	05:37	05:27	06:16	06:48	17:40 (5)	07:20	06:57	07:25		
	17:03	17:42	18:15	19:49	18:01 (5)	20:20	20:39	20:00	19:52	28	18:08 (5)	18:00	16:37	16:34	
23	07:22	06:47	06:01	06:11	17:40 (5)	05:36	05:27	06:17	06:49	17:38 (5)	07:19	06:57	07:25		
	17:05	17:44	18:16	19:50	17:59 (5)	20:21	20:39	20:29	19:51	31	18:09 (5)	18:59	18:10	16:36	16:35
24	07:21	06:45	06:00	06:10	17:43 (5)	05:35	05:28	06:18	06:50	17:36 (5)	07:23	07:00	07:26		
	17:06	17:45	18:17	19:51	16:58 (5)	20:22	20:39	20:28	19:49	34	18:10 (5)	18:57	18:08	16:35	16:35
25	07:20	06:44	05:58	06:08	16:47 (5)	06:08	05:34	06:19	06:51	17:35 (5)	07:24	07:01	07:26		
	17:07	17:46	18:18	19:52	17:05 (5)	20:23	20:39	20:27	19:47	36	18:11 (5)	18:55	17:07	16:35	16:36
26	07:20	06:42	05:56	06:06	16:43 (5)	06:06	05:34	06:20	06:52	17:33 (5)	07:25	07:02	07:27		
	17:08	17:47	18:19	19:53	16:40 (5)	20:23	20:40	20:26	19:46	39	18:12 (5)	18:53	17:05	16:34	16:37
27	07:19	06:41	05:55	06:05	16:40 (5)	06:05	05:33	06:21	06:53	17:32 (5)	07:26	07:03	07:27		
	17:10	17:48	18:20	19:54	16:38 (5)	20:24	20:40	20:25	19:44	40	18:12 (5)	18:52	17:04	16:34	16:37
28	07:18	06:39	05:53	06:04	16:38 (5)	06:04	05:32	06:22	06:54	17:31 (5)	07:27	07:04	07:27		
	17:11	17:50	18:21	19:55	17:11 (5)	20:25	20:40	20:24	19:43	42	18:13 (5)	18:50	17:03	16:33	16:38
29	07:17	06:51	06:02	06:02	17:37 (5)	06:02	05:32	06:23	06:55	17:30 (5)	07:28	07:05	07:27		
	17:12	17:51	18:22	19:56	18:12 (5)	20:26	20:40	20:23	19:41	43	18:13 (5)	18:48	17:01	16:33	16:39
30	07:16	06:49	06:01	06:01	17:35 (5)	06:01	05:31	06:24	06:56	17:29 (5)	07:29	07:07	07:28		
	17:13	17:52	18:23	19:57	18:13 (5)	20:27	20:40	20:22	19:39	44	18:13 (5)	18:47	17:00	16:33	16:39
31	07:15	06:48	06:00	06:00	17:33 (5)	06:00	05:31	06:25	06:57	17:28 (5)	07:30	07:08	07:28		
	17:15	17:54	18:25	19:59	18:14 (5)	20:28	20:40	20:21	19:38	45	18:13 (5)	18:59	17:00	16:40	16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	730	345	297	286		
Totale, caso peggiore			224	935											
Probabilità di eliofania			0,44	0,48				0,67	0,58						
Tempo di operatività rid.			1,00	1,00				1,00	1,00						
Dir. del vento rid.			1,00	1,00				1,00	1,00						
Totale ridotto			0,44	0,48				0,67	0,58						
Totale effettivo			99	447				295	422						

### Legenda della tabella:

Giorno del mese    Alba (hh:mm)    Tramonto (hh:mm)    Minuti d'ombra  
 Inizio ombreggiamento (hh:mm)    Fine ombreggiamento (hh:mm)    (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Schweizer Straße 3a  
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Redatto il:  
14/11/2023 14:53/3.6.355



### SHADOW - Calendario

Calcolo: Shadow Flickering Progetto+ Esistenti Recettore d'ombra: CV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (100)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1   07:28	14:18 (5)	07:14	14:25 (5)	06:38	06:46	
16:41	42	15:00 (5)	17:16	51	15:16 (5)	17:51
2   07:28	14:18 (5)	07:13	14:26 (5)	06:36	06:44	
16:42	43	15:01 (5)	17:17	50	15:16 (5)	17:52
3   07:28	14:18 (5)	07:12	14:26 (5)	06:35	06:43	
16:43	44	15:02 (5)	17:18	49	15:15 (5)	17:53
4   07:28	14:19 (5)	07:11	14:27 (5)	06:33	06:41	
16:44	43	15:02 (5)	17:20	47	15:14 (5)	17:54
5   07:28	14:19 (5)	07:10	14:28 (5)	06:31	06:39	
16:45	44	15:03 (5)	17:21	46	15:14 (5)	17:55
6   07:28	14:19 (5)	07:09	14:29 (5)	06:30	06:38	
16:46	45	15:04 (5)	17:22	45	15:14 (5)	17:57
7   07:28	14:19 (5)	07:08	14:31 (5)	06:28	06:36	
16:47	46	15:05 (5)	17:24	42	15:13 (5)	17:58
8   07:28	14:19 (5)	07:07	14:33 (5)	06:27	06:34	
16:48	46	15:05 (5)	17:25	39	15:12 (5)	17:59
9   07:28	14:19 (5)	07:06	14:33 (5)	06:25	06:33	
16:49	47	15:06 (5)	17:26	38	15:11 (5)	18:00
10   07:28	14:19 (5)	07:04	14:35 (5)	06:23	06:31	
16:50	48	15:07 (5)	17:27	35	15:10 (5)	18:01
11   07:28	14:20 (5)	07:03	14:38 (5)	06:22	06:29	
16:51	48	15:08 (5)	17:29	30	15:08 (5)	18:02
12   07:27	14:19 (5)	07:02	14:40 (5)	06:20	06:28	
16:52	49	15:08 (5)	17:30	27	15:07 (5)	18:04
13   07:27	14:20 (5)	07:01	14:43 (5)	06:18	06:26	
16:53	49	15:09 (5)	17:31	20	15:03 (5)	18:05
14   07:27	14:19 (5)	06:59	14:48 (5)	06:17	06:25	
16:54	51	15:10 (5)	17:32	11	14:59 (5)	18:06
15   07:26	14:20 (5)	06:58		06:15	06:23	
16:55	51	15:11 (5)	17:34		18:07	19:41
16   07:26	14:19 (5)	06:57		06:13	06:21	
16:56	52	15:11 (5)	17:35		18:08	19:42
17   07:25	14:20 (5)	06:55		06:12	06:20	
16:57	52	15:12 (5)	17:36		18:09	19:43
18   07:25	14:20 (5)	06:54		06:10	06:18	
16:59	52	15:12 (5)	17:37		18:10	19:44
19   07:24	14:20 (5)	06:53		06:08	06:17	
17:00	53	15:13 (5)	17:39		18:11	19:45
20   07:24	14:20 (5)	06:51		06:06	06:15	
17:01	53	15:13 (5)	17:40		18:12	19:46
21   07:23	14:20 (5)	06:50		06:05	06:14	
17:02	54	15:14 (5)	17:41		18:14	19:47
22   07:23	14:21 (5)	06:48		06:03	06:12	
17:03	54	15:15 (5)	17:42		18:15	19:49
23   07:22	14:21 (5)	06:47		06:01	06:11	
17:05	54	15:15 (5)	17:44		18:16	19:50
24   07:21	14:21 (5)	06:45		06:00	06:09	
17:06	54	15:15 (5)	17:45		18:17	19:51
25   07:20	14:21 (5)	06:44		05:58	06:08	
17:07	54	15:15 (5)	17:46		18:18	19:52
26   07:20	14:21 (5)	06:42		05:56	06:06	
17:08	54	15:15 (5)	17:47		18:19	19:53
27   07:19	14:22 (5)	06:41		05:55	06:05	
17:10	53	15:15 (5)	17:48		18:20	19:54
28   07:18	14:23 (5)	06:39		05:53	06:04	
17:11	53	15:16 (5)	17:50		18:21	19:55
29   07:17	14:24 (5)			06:51	06:02	
17:12	52	15:16 (5)		19:22	19:56	
30   07:16	14:24 (5)			06:49	06:01	
17:13	52	15:16 (5)		19:23	19:57	
31   07:15	14:25 (5)			06:48		
17:15	51	15:16 (5)		19:25		
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	1543	530		323		20
Probabilità di eliofania	0,44	0,46		0,48		0,47
Tempo di operatività rid.	1,00	1,00		1,00		1,00
Dir. del vento rid.	1,00	1,00		1,00		1,00
Totale ridotto	0,44	0,46		0,48		0,47
Totale effettivo	681	242		155		9

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: CV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (100)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	14:05 (5) 16:32 48
2	05:31 20:39	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	14:03 (5) 14:41 (5) 48
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	14:01 (5) 14:41 (5) 47
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	14:01 (5) 14:43 (5) 46
5	05:32 20:39	05:59 20:15	06:30 19:30	07:01 18:38	06:37 16:52	13:59 (5) 14:44 (5) 46
6	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	13:58 (5) 14:44 (5) 45
7	05:34 20:38	06:01 20:13	06:32 19:26	07:03 18:35	06:39 16:50	13:58 (5) 14:45 (5) 44
8	05:34 20:38	06:02 20:12	06:33 19:24	07:05 18:33	06:41 16:49	13:57 (5) 14:46 (5) 44
9	05:35 20:38	06:03 20:10	06:34 19:23	07:06 18:31	06:42 16:48	13:56 (5) 14:46 (5) 44
10	05:36 20:37	06:04 20:09	06:35 19:21	07:07 18:30	06:43 16:47	13:56 (5) 14:47 (5) 43
11	05:36 20:37	06:05 20:08	06:36 19:08 (4)	07:08 18:28	06:44 16:46	13:56 (5) 14:47 (5) 42
12	05:37 20:36	06:06 20:07	06:37 19:10 (4)	07:09 18:27	06:45 16:45	13:55 (5) 14:47 (5) 41
13	05:38 20:36	06:07 20:05	06:38 18:55 (4)	07:10 18:25	06:47 16:44	13:55 (5) 14:48 (5) 41
14	05:39 20:35	06:08 20:04	06:40 18:54 (4)	07:11 18:23	06:48 16:43	13:55 (5) 14:48 (5) 40
15	05:39 20:35	06:09 20:02	06:41 18:52 (4)	07:12 18:22	06:49 16:42	13:55 (5) 14:48 (5) 40
16	05:40 20:34	06:10 20:01	06:42 19:13 (4)	07:13 18:20	06:50 16:41	13:54 (5) 14:48 (5) 39
17	05:41 20:33	06:11 20:00	06:43 18:51 (4)	07:15 18:19	06:52 16:40	13:55 (5) 14:49 (5) 39
18	05:42 20:33	06:12 19:58	06:44 19:14 (4)	07:16 18:17	06:53 16:40	13:55 (5) 14:49 (5) 39
19	05:43 20:32	06:13 19:57	06:45 18:50 (4)	07:17 18:16	06:54 16:39	13:55 (5) 14:49 (5) 38
20	05:44 20:31	06:14 19:55	06:46 19:14 (4)	07:18 18:14	06:55 16:38	13:56 (5) 14:50 (5) 38
21	05:44 20:30	06:15 19:54	06:47 18:49 (4)	07:19 18:13	06:56 16:37	13:56 (5) 14:50 (5) 38
22	05:45 20:30	06:16 19:52	06:48 19:13 (4)	07:20 18:11	06:58 16:37	13:56 (5) 14:50 (5) 38
23	05:46 20:29	06:17 19:51	06:49 19:11 (4)	07:21 18:10	06:59 16:36	13:56 (5) 14:49 (5) 38
24	05:47 20:28	06:18 19:49	06:50 19:11 (4)	07:23 18:08	07:00 16:35	13:57 (5) 14:49 (5) 38
25	05:48 20:27	06:19 19:47	06:51 18:50 (4)	07:24 18:07	07:01 16:35	13:58 (5) 14:50 (5) 39
26	05:49 20:26	06:20 19:46	06:52 19:09 (4)	07:25 17:05	07:02 16:34	13:58 (5) 14:50 (5) 39
27	05:50 20:25	06:21 19:44	06:53 18:52 (4)	07:26 17:04	07:03 16:34	13:59 (5) 14:50 (5) 39
28	05:51 20:24	06:22 19:43	06:54 19:06 (4)	07:27 17:03	07:04 16:33	13:59 (5) 14:50 (5) 40
29	05:52 20:23	06:23 19:41	06:55 18:50 (4)	07:29 17:01	07:05 16:33	14:00 (5) 14:50 (5) 40
30	05:53 20:22	06:24 19:39	06:56 18:47	07:30 17:00	07:07 16:33	14:00 (5) 14:49 (5) 41
31	05:54 20:21	06:25 19:38	06:57 16:59	07:31 14:38 (5)	07:08 14:38 (5)	07:28 16:40 41
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		346		94	1493	1283
Probabilità di eliofania		0,67		0,44	0,40	0,36
Tempo di operatività rid.		1,00		1,00	1,00	1,00
Dir. del vento rid.		1,00		1,00	1,00	1,00
Totale ridotto		0,67		0,44	0,40	0,36
Totale effettivo		231		41	604	466

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: CW - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (101)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

Id	Gennaio		Febbraio		Marzo		Aprile		Maggio		Giugno	
	Inizio	Fin	Inizio	Fin	Inizio	Fin	Inizio	Fin	Inizio	Fin	Inizio	Fin
1	07:28	14:06 (5)	07:14	14:21 (5)	06:38	14:21 (5)	06:46	14:21 (5)	05:59	14:21 (5)	05:30	14:21 (5)
2	16:41	49	14:55 (5)	17:16	44	15:05 (5)	17:51	19:26	19:58	20:28	19:58	20:28
	07:28		14:07 (5)	07:13		14:22 (5)	06:36	06:44	05:58	05:30	05:58	05:30
3	16:42	49	14:56 (5)	17:17	42	15:04 (5)	17:52	19:27	19:59	20:29	19:59	20:29
	07:28		14:07 (5)	07:12		14:22 (5)	06:35	06:43	05:57	05:29	05:57	05:29
4	16:43	49	14:56 (5)	17:18	40	15:02 (5)	17:53	19:28	20:00	20:30	20:00	20:30
	07:28		14:07 (5)	07:11		14:24 (5)	06:33	06:41	05:56	05:29	05:56	05:29
5	16:44	50	14:57 (5)	17:20	38	15:02 (5)	17:54	19:29	20:02	20:31	20:02	20:31
	07:28		14:07 (5)	07:10		14:26 (5)	06:31	06:39	05:54	05:28	05:54	05:28
6	16:45	51	14:58 (5)	17:21	35	15:01 (5)	17:55	19:30	20:03	20:31	20:03	20:31
	07:28		14:08 (5)	07:09		14:28 (5)	06:30	06:38	05:53	05:28	05:53	05:28
7	16:46	50	14:58 (5)	17:22	32	15:00 (5)	17:57	19:31	20:04	20:32	20:04	20:32
	07:28		14:08 (5)	07:08		14:30 (5)	06:28	06:36	05:52	05:28	05:52	05:28
8	16:47	51	14:59 (5)	17:24	28	14:58 (5)	17:58	19:32	20:05	20:33	20:05	20:33
	07:28		14:08 (5)	07:07		14:33 (5)	06:27	06:34	05:51	05:27	05:51	05:27
9	16:48	51	14:59 (5)	17:25	23	14:56 (5)	17:59	19:33	20:06	20:33	20:06	20:33
	07:28		14:08 (5)	07:06		14:36 (5)	06:25	06:33	05:49	05:27	05:49	05:27
10	16:49	52	15:00 (5)	17:26	16	14:52 (5)	18:00	19:34	20:07	20:34	20:07	20:34
	07:28		14:09 (5)	07:04			06:23	06:31	05:48	05:27	05:48	05:27
11	16:50	52	15:01 (5)	17:27			18:01	19:35	20:08	20:34	20:08	20:34
	07:28		14:09 (5)	07:03			06:22	06:29	05:47	05:27	05:47	05:27
12	16:51	53	15:02 (5)	17:29			18:02	19:37	20:09	20:35	20:09	20:35
	07:27		14:09 (5)	07:02			06:20	06:28	05:46	05:27	05:46	05:27
13	16:52	53	15:02 (5)	17:30			18:04	19:38	20:10	20:36	20:10	20:36
	07:27		14:10 (5)	07:01			06:18	06:26	05:45	05:27	05:45	05:27
14	16:53	52	15:02 (5)	17:31			18:05	19:39	8	18:59 (4)	20:11	20:36
	07:27		14:09 (5)	06:59			06:17	06:25		18:47 (4)	05:44	05:26
15	16:54	53	15:02 (5)	17:32			18:06	19:40	14	19:01 (4)	20:12	20:36
	07:26		14:10 (5)	06:58			06:15	06:23		18:46 (4)	05:43	05:26
16	16:55	53	15:03 (5)	17:34			18:07	19:41	17	19:03 (4)	20:13	20:37
	07:26		14:10 (5)	06:57			06:13	06:21		18:44 (4)	05:42	05:26
17	16:56	53	15:03 (5)	17:35			18:08	19:42	20	19:04 (4)	20:14	20:37
	07:25		14:11 (5)	06:55			06:12	06:20		18:43 (4)	05:41	05:26
18	16:57	53	15:04 (5)	17:36			18:09	19:43	22	19:05 (4)	20:15	20:38
	07:25		14:11 (5)	06:54			06:10	06:18		18:42 (4)	05:40	05:27
19	16:59	53	15:04 (5)	17:37			18:10	19:44	23	19:05 (4)	20:16	20:38
	07:24		14:12 (5)	06:53			06:08	06:17		18:42 (4)	05:39	05:27
20	17:00	53	15:05 (5)	17:39			18:11	19:45	24	19:06 (4)	20:17	20:38
	07:24		14:12 (5)	06:51			06:06	06:15		18:41 (4)	05:38	05:27
21	17:01	53	15:05 (5)	17:40			18:12	19:46	24	19:05 (4)	20:18	20:39
	07:23		14:12 (5)	06:50			06:05	06:14		18:41 (4)	05:37	05:27
22	17:02	53	15:05 (5)	17:41			18:14	19:47	25	19:06 (4)	20:19	20:39
	07:23		14:13 (5)	06:48			06:03	06:12		18:40 (4)	05:37	05:27
23	17:03	53	15:06 (5)	17:42			18:15	19:49	25	19:05 (4)	20:20	20:39
	07:22		14:13 (5)	06:47			06:01	06:11		18:41 (4)	05:36	05:27
24	17:05	53	15:06 (5)	17:44			18:16	19:50	24	19:05 (4)	20:21	20:39
	07:21		14:14 (5)	06:45			06:00	06:09		18:40 (4)	05:35	05:28
25	17:06	52	15:06 (5)	17:45			18:17	19:51	24	19:04 (4)	20:22	20:39
	07:20		14:14 (5)	06:44			05:58	06:08		18:41 (4)	05:34	05:28
26	17:07	52	15:06 (5)	17:46			18:18	19:52	22	19:03 (4)	20:23	20:40
	07:20		14:15 (5)	06:42			05:56	06:06		18:42 (4)	05:33	05:28
27	17:08	51	15:06 (5)	17:47			18:19	19:53	21	19:03 (4)	20:23	20:40
	07:19		14:15 (5)	06:41			05:55	06:05		18:42 (4)	05:33	05:29
28	17:10	50	15:05 (5)	17:48			18:20	19:54	19	19:01 (4)	20:24	20:40
	07:18		14:17 (5)	06:39			05:53	06:04		18:44 (4)	05:32	05:29
29	17:11	49	15:06 (5)	17:50			18:21	19:55	16	19:00 (4)	20:25	20:40
	07:17		14:18 (5)				06:51	06:02		18:46 (4)	05:32	05:29
30	17:12	48	15:06 (5)				19:22	19:56	13	18:59 (4)	20:26	20:40
	07:16		14:18 (5)				06:49	06:01		18:48 (4)	05:31	05:30
31	17:13	48	15:06 (5)				19:23	19:57	7	18:55 (4)	20:27	20:40
	07:15		14:19 (5)				06:48				05:31	
	17:15	46	15:05 (5)				19:25			20:28		
Ore potenziali eliofanìa	296		296			369	399		450	454		
Totale, caso peggiore		1588		298			348					
Probabilità di eliofanìa		0,44		0,46			0,48					
Tempo di operatività rid.		1,00		1,00			1,00					
Dir. del vento rid.		1,00		1,00			1,00					
Totale ridotto		0,44		0,46			0,48					
Totale effettivo		701		136			167					

### Legenda della tabella:

Giorno del mese	Alba (hh:mm)	Inizio ombreggiamento (hh:mm)	(WTG che provoca l'inizio dell'ombreggiamento)
	Tramonto (hh:mm) Minuti d'ombra	Fine ombreggiamento (hh:mm)	(WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: CW - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (101)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	14:11 (5) 14:18 (5)
2	05:31 20:39	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	7 14:05 (5)
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	18 14:23 (5)
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	24 14:01 (5)
5	05:32 20:39	05:59 20:15	06:30 19:30	07:01 18:38	06:37 16:52	28 14:25 (5)
6	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	36 14:00 (5)
7	05:34 20:38	06:01 20:13	06:32 19:26	07:03 18:35	06:39 16:50	33 13:55 (5)
8	05:34 20:38	06:02 20:12	06:33 19:24	07:05 18:33	06:41 16:49	38 14:33 (5)
9	05:35 20:38	06:03 20:10	06:34 19:23	07:06 18:31	06:42 16:48	40 14:33 (5)
10	05:36 20:37	06:04 20:09	06:35 19:21	07:07 18:30	06:43 16:47	42 13:51 (5)
11	05:36 20:37	06:05 20:08	06:36 19:19	07:08 18:28	06:44 16:46	45 14:36 (5)
12	05:37 20:36	06:06 20:07	06:37 19:18	07:09 18:27	06:45 16:45	46 13:49 (5)
13	05:38 20:36	06:07 20:05	18:55 (4) 19:05 (4)	06:38 19:16	07:10 18:25	48 14:37 (5)
14	05:39 20:35	06:08 20:04	18:53 (4) 19:07 (4)	06:40 19:14	07:11 18:23	48 14:38 (5)
15	05:39 20:35	06:09 20:02	18:51 (4) 19:08 (4)	06:41 19:12	07:12 18:22	49 13:48 (5)
16	05:40 20:34	06:10 20:01	18:50 (4) 19:09 (4)	06:42 19:11	07:13 18:20	50 14:38 (5)
17	05:41 20:33	06:11 20:00	18:49 (4) 19:10 (4)	06:43 19:09	07:15 18:19	51 14:39 (5)
18	05:42 20:33	06:12 19:58	18:48 (4) 19:10 (4)	06:44 19:07	07:16 18:17	52 13:48 (5)
19	05:43 20:32	06:13 19:57	18:47 (4) 19:11 (4)	06:45 19:06	07:17 18:16	52 14:40 (5)
20	05:44 20:31	06:14 19:55	18:47 (4) 19:11 (4)	06:46 19:04	07:18 18:14	53 14:41 (5)
21	05:44 20:30	06:15 19:54	18:46 (4) 19:11 (4)	06:47 19:02	07:19 18:13	53 14:41 (5)
22	05:45 20:30	06:16 19:52	18:46 (4) 19:10 (4)	06:48 19:00	07:20 18:11	53 14:41 (5)
23	05:46 20:29	06:17 19:51	18:45 (4) 19:09 (4)	06:49 18:59	07:21 18:10	53 14:41 (5)
24	05:47 20:28	06:18 19:49	18:45 (4) 19:09 (4)	06:50 18:57	07:23 18:08	53 14:41 (5)
25	05:48 20:27	06:19 19:47	18:45 (4) 19:08 (4)	06:51 18:55	07:01 17:07	53 14:42 (5)
26	05:49 20:26	06:20 19:46	18:45 (4) 19:07 (4)	06:52 18:53	07:02 17:05	53 14:42 (5)
27	05:50 20:25	06:21 19:44	18:46 (4) 19:06 (4)	06:53 18:52	07:03 17:04	53 14:42 (5)
28	05:51 20:24	06:22 19:43	18:47 (4) 19:04 (4)	06:54 18:50	07:04 17:03	53 14:42 (5)
29	05:52 20:23	06:23 19:41	18:48 (4) 19:02 (4)	06:55 18:48	07:05 17:01	53 14:43 (5)
30	05:53 20:22	06:24 19:39	18:51 (4) 18:59 (4)	06:56 18:47	07:07 17:00	53 14:43 (5)
31	05:54 20:21	06:25 19:38		06:31 16:59		286 16:40
Ore potenziali eliofania	461	429	375	345	297	1505
Totale, caso peggiore		352			1343	1505
Probabilità di eliofania		0,67			0,40	0,36
Tempo di operatività rid.		1,00			1,00	1,00
Dir. del vento rid.		1,00			1,00	1,00
Totale ridotto		0,67			0,40	0,36
Totale effettivo		235			543	546

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSBS Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: Shadow Flickering Progetto+ Esistenti Recettore d'ombra: CX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (102)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1   07:28	14:46 (5)   07:14	14:48 (5)   06:38	06:46	05:59	05:30	
16:41	25   15:11 (5)   17:16	44   15:32 (5)   17:51	19:26	19:58	20:28	
2   07:28	14:46 (5)   07:13	14:49 (5)   06:36	06:44	05:58	05:30	
16:42	26   15:12 (5)   17:17	43   15:32 (5)   17:52	19:27	19:59	20:29	
3   07:28	14:46 (5)   07:12	14:49 (5)   06:35	06:43	05:57	05:29	
16:43	27   15:13 (5)   17:18	42   15:31 (5)   17:53	19:28	20:00	20:30	
4   07:28	14:46 (5)   07:11	14:50 (5)   06:33	06:41	05:56	05:29	
16:44	28   15:14 (5)   17:20	40   15:30 (5)   17:54	19:29	20:02	20:31	
5   07:28	14:46 (5)   07:10	14:51 (5)   06:31	06:39	05:54	05:28	
16:45	29   15:15 (5)   17:21	39   15:30 (5)   17:55	19:30	20:03	20:31	
6   07:28	14:46 (5)   07:09	14:52 (5)   06:30	06:38	05:53	05:28	
16:46	31   15:17 (5)   17:22	38   15:30 (5)   17:57	19:31	20:04	20:32	
7   07:28	14:46 (5)   07:08	14:53 (5)   06:28	06:36	05:52	05:28	
16:47	32   15:18 (5)   17:24	36   15:29 (5)   17:58	19:32	20:05	20:33	
8   07:28	14:45 (5)   07:07	14:55 (5)   06:27	06:34	05:51	05:27	
16:48	33   15:18 (5)   17:25	33   15:28 (5)   17:59	19:33	20:06	20:33	
9   07:28	14:45 (5)   07:06	14:56 (5)   06:25	06:33	05:49	05:27	
16:49	34   15:19 (5)   17:26	30   15:26 (5)   18:00	19:34	20:07	20:34	
10   07:28	14:45 (5)   07:04	14:58 (5)   06:23	06:31	18:47 (4)   05:48	05:27	
16:50	35   15:20 (5)   17:27	27   15:25 (5)   18:01	19:35	11   18:58 (4)   20:08	20:34	
11   07:28	14:45 (5)   07:03	15:00 (5)   06:22	06:29	18:45 (4)   05:47	05:27	
16:51	37   15:22 (5)   17:29	24   15:24 (5)   18:02	19:37	14   18:59 (4)   20:09	20:35	
12   07:27	14:45 (5)   07:02	15:03 (5)   06:20	06:28	18:43 (4)   05:46	05:27	
16:52	37   15:22 (5)   17:30	19   15:22 (5)   18:04	19:38	18   19:01 (4)   20:10	20:36	
13   07:27	14:45 (5)   07:01	15:07 (5)   06:18	06:26	18:42 (4)   05:45	05:27	
16:53	38   15:23 (5)   17:31	10   15:17 (5)   18:05	19:39	19   19:01 (4)   20:11	20:36	
14   07:27	14:44 (5)   06:59	06:17	06:25	18:40 (4)   05:44	05:26	
16:54	40   15:24 (5)   17:32	18:06	19:40	21   19:01 (4)   20:12	20:36	
15   07:26	14:45 (5)   06:58	06:15	06:23	18:40 (4)   05:43	05:26	
16:55	40   15:25 (5)   17:34	18:07	19:41	22   19:02 (4)   20:13	20:37	
16   07:26	14:44 (5)   06:57	06:13	06:21	18:39 (4)   05:42	05:26	
16:56	41   15:25 (5)   17:35	18:08	19:42	23   19:02 (4)   20:14	20:37	
17   07:25	14:45 (5)   06:55	06:12	06:20	18:40 (4)   05:41	05:26	
16:57	41   15:26 (5)   17:36	18:09	19:43	22   19:02 (4)   20:15	20:38	
18   07:25	14:44 (5)   06:54	06:10	06:18	18:39 (4)   05:40	05:27	
16:59	43   15:27 (5)   17:37	18:10	19:44	22   19:01 (4)   20:16	20:38	
19   07:24	14:45 (5)   06:53	06:08	06:17	18:40 (4)   05:39	05:27	
17:00	43   15:28 (5)   17:39	18:11	19:45	21   19:01 (4)   20:17	20:38	
20   07:24	14:45 (5)   06:51	06:06	06:15	18:39 (4)   05:38	05:27	
17:01	43   15:28 (5)   17:40	18:12	19:46	21   19:00 (4)   20:18	20:39	
21   07:23	14:44 (5)   06:50	06:05	06:14	18:40 (4)   05:37	05:27	
17:02	45   15:29 (5)   17:41	18:14	19:47	19   18:59 (4)   20:19	20:39	
22   07:23	14:45 (5)   06:48	06:03	06:12	18:41 (4)   05:37	05:27	
17:03	45   15:30 (5)   17:42	18:15	19:49	17   18:58 (4)   20:20	20:39	
23   07:22	14:45 (5)   06:47	06:01	06:11	18:42 (4)   05:36	05:27	
17:05	45   15:30 (5)   17:44	18:16	19:50	14   18:56 (4)   20:21	20:39	
24   07:21	14:45 (5)   06:45	06:00	06:09	18:44 (4)   05:35	05:28	
17:06	45   15:30 (5)   17:45	18:17	19:51	10   18:54 (4)   20:22	20:39	
25   07:20	14:45 (5)   06:44	05:58	06:08	05:34	05:28	
17:07	46   15:31 (5)   17:46	18:18	19:52	20:23	20:40	
26   07:20	14:45 (5)   06:42	05:56	06:06	05:33	05:28	
17:08	46   15:31 (5)   17:47	18:19	19:53	20:23	20:40	
27   07:19	14:45 (5)   06:41	05:55	06:05	05:33	05:29	
17:10	46   15:31 (5)   17:48	18:20	19:54	20:24	20:40	
28   07:18	14:46 (5)   06:39	05:53	06:04	05:32	05:29	
17:11	46   15:32 (5)   17:50	18:21	19:55	20:25	20:40	
29   07:17	14:47 (5)	06:51	06:02	05:32	05:29	
17:12	45   15:32 (5)	19:22	19:56	20:26	20:40	
30   07:16	14:47 (5)	06:49	06:01	05:31	05:30	
17:13	45   15:32 (5)	19:23	19:57	20:27	20:40	
31   07:15	14:48 (5)	06:48		05:30		
17:15	44   15:32 (5)	19:25		20:28		
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	1201	425		274		
Probabilità di eliofania	0,44	0,46		0,48		
Tempo di operatività rid.	1,00	1,00		1,00		
Dir. del vento rid.	1,00	1,00		1,00		
Totale ridotto	0,44	0,46		0,48		
Totale effettivo	530	194		131		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: CX - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (102)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 19:36	18:44 (4) 18:58 (4)	06:57 18:45	06:32 16:57
2	05:31 20:39	05:56 20:19	06:27 19:35	18:45 (4) 18:56 (4)	06:58 18:43	06:33 16:56
3	05:31 20:39	05:57 20:18	06:28 19:33	18:51 18:41	06:59 18:51	06:34 16:55
4	05:32 20:39	05:58 20:17	06:29 19:31	18:52 18:40	07:00 18:40	06:36 16:54
5	05:32 20:39	05:59 20:15	06:30 19:30	18:42 18:38	07:01 18:38	06:37 16:52
6	05:33 20:39	06:00 20:14	06:31 19:28	18:43 18:36	07:02 18:36	06:38 16:51
7	05:34 20:38	06:01 20:13	06:32 19:26	18:35 18:35	07:03 18:35	06:39 16:50
8	05:34 20:38	06:02 20:12	06:33 19:24	18:36 18:33	07:05 18:33	06:41 16:49
9	05:35 20:38	06:03 20:10	06:34 19:23	18:37 18:31	07:06 18:31	06:42 16:48
10	05:36 20:37	06:04 20:09	06:35 19:21	18:38 18:30	07:07 18:30	06:43 16:47
11	05:36 20:37	06:05 20:08	06:36 19:19	18:39 18:28	07:08 18:28	06:44 16:46
12	05:37 20:36	06:06 20:07	06:37 19:18	18:29 18:27	07:09 18:27	06:45 16:45
13	05:38 20:36	06:07 20:05	06:38 19:16	18:28 18:25	07:10 18:25	06:47 16:44
14	05:39 20:35	06:08 20:04	06:40 19:14	18:23 18:23	07:11 18:23	06:48 16:43
15	05:39 20:35	06:09 20:02	06:41 19:12	18:22 18:22	07:12 18:22	06:49 16:42
16	05:40 20:34	06:10 20:01	06:42 19:11	18:21 18:20	07:13 18:20	06:50 16:41
17	05:41 20:33	06:11 20:00	06:43 19:09	18:19 18:19	07:15 18:19	06:52 16:40
18	05:42 20:33	06:12 19:58	18:54 (4) 18:58 (4)	06:44 19:07	07:16 18:17	06:53 16:40
19	05:43 20:32	06:13 19:57	18:50 (4) 19:01 (4)	06:45 19:05	07:17 18:16	06:54 16:39
20	05:44 20:31	06:14 19:55	18:48 (4) 19:03 (4)	06:46 19:04	07:18 18:14	06:55 16:38
21	05:44 20:30	06:15 19:54	18:46 (4) 19:04 (4)	06:47 19:02	07:19 18:13	06:56 16:37
22	05:45 20:30	06:16 19:52	18:44 (4) 19:03 (4)	06:48 19:00	07:20 18:11	06:57 16:37
23	05:46 20:29	06:17 19:51	18:43 (4) 19:04 (4)	06:49 18:59	07:21 18:10	06:59 16:36
24	05:47 20:28	06:18 19:49	18:42 (4) 19:04 (4)	06:50 18:57	07:23 18:08	07:00 16:35
25	05:48 20:27	06:19 19:47	18:42 (4) 19:04 (4)	06:51 18:55	07:24 18:07	07:01 16:35
26	05:49 20:26	06:20 19:46	18:41 (4) 19:04 (4)	06:52 18:53	07:25 17:05	07:02 16:34
27	05:50 20:25	06:21 19:44	18:41 (4) 19:03 (4)	06:53 18:52	07:26 17:04	07:03 16:34
28	05:51 20:24	06:22 19:43	18:41 (4) 19:03 (4)	06:54 18:50	07:27 17:03	07:04 16:33
29	05:52 20:23	06:23 19:41	18:41 (4) 19:02 (4)	06:55 18:48	07:29 17:01	07:05 16:33
30	05:53 20:22	06:24 19:39	18:42 (4) 19:01 (4)	06:56 18:47	07:30 17:00	07:07 16:33
31	05:54 20:21	06:25 19:38	18:42 (4) 19:00 (4)	06:57 18:46	07:31 16:59	07:08 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore		257	25	57	1239	729
Probabilità di eliofania		0,67	0,58	0,44	0,40	0,36
Tempo di operatività rid.		1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.		1,00	1,00	1,00	1,00	1,00
Totale ridotto		0,67	0,58	0,44	0,40	0,36
Totale effettivo		171	14	25	501	265

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



### SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: CY - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (103)

#### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]  
Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	06:31 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:38 19:23	06:51 19:56	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:37 19:24	06:50 19:58	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:30 20:21	05:54 20:21	06:25 19:38	06:31 16:59	06:31 16:59	06:31 16:59	06:31 16:59
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

#### Legenda della tabella:

Giorno del mese    Alba (hh:mm)    Tramonto (hh:mm)    Minuti d'ombra    Inizio ombreggiamento (hh:mm)    Fine ombreggiamento (hh:mm)    (WTG che provoca l'inizio dell'ombreggiamento)    (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: CZ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (104)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:22	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 19:23	06:51 19:56	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:35 19:24	06:50 19:57	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:48 19:25	06:48 19:25	06:48 19:25	05:31 20:28	05:31 20:28	05:54 20:21	06:25 19:38	06:31 18:59	06:31 16:59	06:31 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenza autorizzato:

VSb Neue Energien Deutschland GmbH  
Schweizer Straße 3a  
DE-01069 Dresden  
+ 49 (0) 351 / 211 83 - 46  
Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



# SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (105)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio			Febbraio			Marzo			Aprile			Maggio			Giugno										
1	07:28			14:07 (5)			07:14			14:18 (5)			06:38			06:46				05:59			18:48 (4)			05:30
	16:41	49		14:56 (5)			17:16	51		15:09 (5)			17:51			19:26				19:58	18		19:06 (4)			20:28
2	07:28			14:07 (5)			07:13			14:19 (5)			06:36			06:44				05:58			18:49 (4)			05:30
	16:42	50		14:57 (5)			17:17	50		15:09 (5)			17:52			19:27				19:59	15		19:04 (4)			20:29
3	07:28			14:07 (5)			07:12			14:19 (5)			06:35			06:43				05:57			18:50 (4)			05:29
	16:43	51		14:58 (5)			17:18	48		15:07 (5)			17:53			19:28				20:00	12		19:02 (4)			20:30
4	07:28			14:08 (5)			07:11			14:20 (5)			06:33			06:41				05:56			18:54 (4)			05:29
	16:44	50		14:58 (5)			17:20	47		15:07 (5)			17:54			19:29				20:02	4		18:58 (4)			20:31
5	07:28			14:08 (5)			07:10			14:21 (5)			06:31			06:39				05:54						05:28
	16:45	51		14:59 (5)			17:21	45		15:06 (5)			17:55			19:30				20:03						20:31
6	07:28			14:08 (5)			07:09			14:23 (5)			06:30			06:38				05:53						05:28
	16:46	52		15:00 (5)			17:22	43		15:06 (5)			17:57			19:31				20:04						20:32
7	07:28			14:09 (5)			07:08			14:25 (5)			06:28			06:36				05:52						05:28
	16:47	52		15:01 (5)			17:24	40		15:05 (5)			17:58			19:32				20:05						20:33
8	07:28			14:08 (5)			07:07			14:26 (5)			06:27			06:34				05:51						05:27
	16:48	53		15:01 (5)			17:25	38		15:04 (5)			17:59			19:33				20:06						20:33
9	07:28			14:08 (5)			07:06			14:28 (5)			06:25			06:33				05:49						05:27
	16:49	54		15:02 (5)			17:26	34		15:02 (5)			18:00			19:34				20:07						20:34
10	07:28			14:09 (5)			07:04			14:30 (5)			06:23			06:31				05:48						05:27
	16:50	53		15:02 (5)			17:27	31		15:01 (5)			18:01			19:35				20:08						20:34
11	07:28			14:09 (5)			07:03			14:33 (5)			06:22			06:29				05:47						05:27
	16:51	54		15:03 (5)			17:29	26		14:59 (5)			18:02			19:37				20:09						20:35
12	07:27			14:09 (5)			07:02			14:37 (5)			06:20			06:28				05:46						05:27
	16:52	54		15:03 (5)			17:30	19		14:56 (5)			18:04			19:38				20:10						20:36
13	07:27			14:10 (5)			07:01			14:42 (5)			06:18			06:26				05:45						05:27
	16:53	54		15:04 (5)			17:31	8		14:50 (5)			18:05			19:39				20:11						20:36
14	07:27			14:09 (5)			06:59						06:17			06:25				05:44						05:26
	16:54	55		15:04 (5)			17:32			18:06			19:40			20:12				20:12						20:36
15	07:26			14:10 (5)			06:58			06:15			06:23			06:31				05:43						05:26
	16:55	55		15:05 (5)			17:34			18:07			19:41			20:13				20:13						20:37
16	07:26			14:10 (5)			06:57			06:13			06:21			06:29				05:42						05:26
	16:56	56		15:06 (5)			17:35			18:08			19:42	10		20:14				20:14						20:37
17	07:25			14:10 (5)			06:55			06:12			06:20			06:28				05:41						05:27
	16:57	57		15:07 (5)			17:36			18:09			19:43	15		20:15				20:15						20:38
18	07:25			14:10 (5)			06:54			06:10			06:18			06:26				05:40						05:27
	16:59	57		15:07 (5)			17:37			18:10			19:44	17		20:16				20:16						20:38
19	07:24			14:11 (5)			06:53			06:08			06:17			06:25				05:39						05:27
	17:00	57		15:08 (5)			17:39			18:11			19:45	20		20:17				20:17						20:38
20	07:24			14:11 (5)			06:51			06:06			06:15			06:23				05:38						05:27
	17:01	57		15:08 (5)			17:40			18:12			19:46	22		20:18				20:18						20:39
21	07:23			14:11 (5)			06:50			06:05			06:14			06:22				05:37						05:27
	17:02	57		15:08 (5)			17:41			18:14			19:47	23		20:19				20:19						20:39
22	07:23			14:12 (5)			06:48			06:03			06:12			06:20				05:37						05:27
	17:03	57		15:09 (5)			17:42			18:15			19:49	24		20:20				20:20						20:39
23	07:22			14:12 (5)			06:47			06:01			06:11			06:19				05:36						05:27
	17:05	57		15:09 (5)			17:44			18:16			19:50	24		20:21				20:21						20:39
24	07:21			14:12 (5)			06:45			06:00			06:09			06:17				05:35						05:28
	17:06	57		15:09 (5)			17:45			18:17			19:51	25		20:22				20:22						20:39
25	07:20			14:13 (5)			06:44			05:58			06:08			06:16				05:34						05:28
	17:07	56		15:09 (5)			17:46			18:18			19:52	25		20:23				20:23						20:40
26	07:20			14:13 (5)			06:42			05:56			06:06			06:14				05:33						05:28
	17:08	56		15:09 (5)			17:47			18:19			19:53	25		20:23				20:23						20:40
27	07:19			14:13 (5)			06:41			05:55			06:05			06:13				05:33						05:29
	17:10	56		15:09 (5)			17:48			18:20			19:54	24		20:24				20:24						20:40
28	07:18			14:15 (5)			06:39			05:53			06:04			06:12				05:32						05:29
	17:11	55		15:10 (5)			17:50			18:21			19:55	23		20:25				20:25						20:40
29	07:17			14:15 (5)						06:51			06:02			06:10				05:32						05:29
	17:12	55		15:10 (5)						19:22			19:56	22		20:26				20:26						20:40
30	07:16			14:16 (5)						06:49			06:01			06:09				05:31						05:30
	17:13	54		15:10 (5)						19:23			19:57	20		20:27				20:27						20:40
31	07:15			14:17 (5)						06:48						05:31				05:31						
	17:15	52		15:09 (5)						19:25						20:28				20:28						
Ore potenziali eliofania		296						296					369		399				450							454
Totale, caso peggiore		1683						480						319		49										
Probabilità di eliofania		0,44						0,46						0,48		0,47										
Tempo di operatività rid.		1,00						1,00						1,00		1,00										
Dir. del vento rid.		1,00						1,00						1,00		1,00										
Totale ridotto		0,44						0,46						0,48		0,47										
Totale effettivo		743						219						153		23										

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DA - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (105)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	13:59 (5) 16:32	07:08 54	13:51 (5) 14:45 (5)
2	05:31 20:39	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	13:57 (5) 14:32 (5)	07:09 54	13:52 (5) 14:46 (5)
3	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:41	06:35 16:55	13:55 (5) 14:33 (5)	07:10 54	13:52 (5) 14:46 (5)
4	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	13:54 (5) 14:35 (5)	07:11 53	13:53 (5) 14:46 (5)
5	05:32 20:39	05:59 20:15	06:30 19:30	07:01 18:38	06:37 16:52	13:52 (5) 14:36 (5)	07:12 52	13:54 (5) 14:46 (5)
6	05:33 20:39	06:00 20:14	06:31 19:28	07:02 18:36	06:38 16:51	13:51 (5) 14:36 (5)	07:13 52	13:54 (5) 14:46 (5)
7	05:34 20:38	06:01 20:13	06:32 19:26	07:03 18:35	06:39 16:50	13:51 (5) 14:38 (5)	07:14 51	13:55 (5) 14:46 (5)
8	05:34 20:38	06:02 20:12	06:33 19:24	07:05 18:33	06:41 16:49	13:50 (5) 14:38 (5)	07:15 50	13:56 (5) 14:46 (5)
9	05:35 20:38	06:03 20:10	19:02 (4) 19:09 (4)	06:34 19:23	07:06 18:31	13:49 (5) 14:39 (5)	07:16 51	13:56 (5) 14:47 (5)
10	05:36 20:37	06:04 20:09	18:59 (4) 19:12 (4)	06:35 19:21	07:07 18:30	13:49 (5) 14:40 (5)	07:16 50	13:56 (5) 14:46 (5)
11	05:36 20:37	06:05 20:08	18:57 (4) 19:13 (4)	06:36 19:19	07:08 18:28	13:48 (5) 14:40 (5)	07:17 49	13:57 (5) 14:46 (5)
12	05:37 20:36	06:06 20:07	18:56 (4) 19:15 (4)	06:37 19:18	07:09 18:27	13:47 (5) 14:40 (5)	07:18 49	13:58 (5) 14:47 (5)
13	05:38 20:36	06:07 20:05	18:55 (4) 19:15 (4)	06:38 19:16	07:10 18:25	13:47 (5) 14:42 (5)	07:19 48	13:59 (5) 14:47 (5)
14	05:39 20:35	06:08 20:04	18:54 (4) 19:16 (4)	06:40 19:14	07:11 18:23	13:47 (5) 14:42 (5)	07:20 49	13:59 (5) 14:48 (5)
15	05:39 20:35	06:09 20:02	18:53 (4) 19:16 (4)	06:41 19:12	07:12 18:22	13:46 (5) 14:42 (5)	07:20 48	13:59 (5) 14:47 (5)
16	05:40 20:34	06:10 20:01	18:53 (4) 19:17 (4)	06:42 19:11	07:13 18:20	13:46 (5) 14:42 (5)	07:21 48	14:00 (5) 14:48 (5)
17	05:41 20:33	06:11 20:00	18:52 (4) 19:17 (4)	06:43 19:09	07:15 18:19	13:47 (5) 14:43 (5)	07:22 48	14:01 (5) 14:49 (5)
18	05:42 20:33	06:12 19:58	18:52 (4) 19:17 (4)	06:44 19:07	07:16 18:17	13:46 (5) 14:43 (5)	07:22 47	14:01 (5) 14:48 (5)
19	05:43 20:32	06:13 19:57	18:51 (4) 19:16 (4)	06:45 19:06	07:17 18:16	13:46 (5) 14:43 (5)	07:23 47	14:02 (5) 14:49 (5)
20	05:44 20:31	06:14 19:55	18:51 (4) 19:16 (4)	06:46 19:04	07:18 18:14	13:47 (5) 14:44 (5)	07:24 47	14:02 (5) 14:49 (5)
21	05:44 20:30	06:15 19:54	18:51 (4) 19:15 (4)	06:47 19:02	07:19 18:13	13:47 (5) 14:44 (5)	07:24 47	14:03 (5) 14:50 (5)
22	05:45 20:30	06:16 19:52	18:52 (4) 19:15 (4)	06:48 19:00	07:20 18:11	13:47 (5) 14:44 (5)	07:25 47	14:03 (5) 14:50 (5)
23	05:46 20:29	06:17 19:51	18:51 (4) 19:13 (4)	06:49 18:59	07:21 18:10	13:47 (5) 14:44 (5)	07:25 47	14:04 (5) 14:51 (5)
24	05:47 20:28	06:18 19:49	18:52 (4) 19:12 (4)	06:50 18:57	07:23 18:08	13:47 (5) 14:44 (5)	07:26 47	14:04 (5) 14:51 (5)
25	05:48 20:27	06:19 19:47	18:53 (4) 19:10 (4)	06:51 18:55	06:24 17:07	13:48 (5) 14:45 (5)	07:26 47	14:05 (5) 14:52 (5)
26	05:49 20:26	06:20 19:46	18:54 (4) 19:08 (4)	06:52 18:53	06:25 17:05	13:49 (5) 14:45 (5)	07:27 47	14:05 (5) 14:52 (5)
27	05:50 20:25	06:21 19:44	18:57 (4) 19:05 (4)	06:53 18:52	06:26 17:04	13:49 (5) 14:45 (5)	07:27 48	14:05 (5) 14:53 (5)
28	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	07:04 16:33	13:49 (5) 14:44 (5)	07:27 48	14:05 (5) 14:53 (5)
29	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	14:10 (5) 14:22 (5)	13:50 (5) 16:33	07:28 49	14:06 (5) 14:55 (5)
30	05:53 20:22	06:24 19:39	06:56 18:47	06:30 17:00	14:05 (5) 14:26 (5)	13:50 (5) 16:33	07:28 48	14:07 (5) 14:55 (5)
31	05:54 20:21	06:25 19:38	06:31 16:59	06:31 14:29 (5)	14:02 (5) 16:40	07:28 16:40	07:28 49	14:07 (5) 14:56 (5)
Ore potenziali eliofanía	461	429	375	345	297	286		
Totale, caso peggiore		372		60	1545		1525	
Probabilità di eliofanía		0,67		0,44	0,40		0,36	
Tempo di operatività rid.		1,00		1,00	1,00		1,00	
Dir. del vento rid.		1,00		1,00	1,00		1,00	
Totale ridotto		0,67		0,44	0,40		0,36	
Totale effettivo		248		26	625		554	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (106)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:29 16:41	07:15 17:16	07:35 (11) 07:42 (11)	06:38 17:51	07:20 (1) 07:49 (1)	06:46 19:26	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	07:34 (11) 07:43 (11)	06:36 17:52	07:21 (1) 07:49 (1)	06:45 19:27	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19	07:33 (11) 07:43 (11)	06:35 17:53	07:21 (1) 07:48 (1)	06:43 19:28	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	07:33 (11) 07:43 (11)	06:33 17:55	07:21 (1) 07:46 (1)	06:41 19:29	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	07:33 (11) 07:43 (11)	06:32 17:56	07:23 (1) 07:45 (1)	06:40 19:30	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	07:34 (11) 07:41 (11)	06:30 17:57	07:24 (1) 07:43 (1)	06:38 19:31	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	07:37 (11) 07:38 (11)	06:28 17:58	07:26 (1) 07:40 (1)	06:36 19:33	05:52 20:05	05:28 20:33
8	07:29 16:48	07:07 17:25	07:38 (11) 17:59	06:27 17:59	07:32 (1) 07:34 (1)	06:35 19:34	05:51 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:27 20:34
10	07:28 16:50	07:05 17:28	06:24 18:02	06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:27 20:36
13	07:27 16:53	07:01 17:31	06:19 18:05	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:27 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:27 20:37
16	07:26 16:57	06:57 17:35	07:32 (1) 07:41 (1)	06:14 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:27 20:38
17	07:26 16:58	06:56 17:36	07:28 (1) 07:44 (1)	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:27 20:38
18	07:25 16:59	06:54 17:38	07:27 (1) 07:46 (1)	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:27 20:38
19	07:25 17:00	06:53 17:39	07:24 (1) 07:47 (1)	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:27 20:39
20	07:24 17:01	06:51 17:40	07:24 (1) 07:49 (1)	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:27 20:39
21	07:24 17:02	06:50 17:41	07:22 (1) 07:49 (1)	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:27 20:39
22	07:23 17:04	06:49 17:43	07:22 (1) 07:50 (1)	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:27 20:39
23	07:22 17:05	06:47 17:44	07:21 (1) 07:50 (1)	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:28 20:40
24	07:21 17:06	06:46 17:45	07:21 (1) 07:51 (1)	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:28 20:40
25	07:21 17:07	06:44 17:46	07:20 (1) 07:50 (1)	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:28 20:40
26	07:20 17:09	06:43 17:47	07:20 (1) 07:51 (1)	05:57 18:19	06:07 19:53	05:34 20:24	05:29 20:40	05:29 20:40
27	07:19 17:10	06:41 17:49	07:20 (1) 07:50 (1)	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:29 20:40
28	07:18 17:11	06:40 17:50	07:20 (1) 07:50 (1)	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:29 20:40
29	07:17 17:12	06:39 17:46	06:51 19:23	06:51 19:23	06:02 19:56	05:32 20:26	05:30 20:40	05:30 20:40
30	07:17 17:14	06:37 17:44	06:50 19:24	06:50 19:24	06:01 19:58	05:31 20:27	05:30 20:40	05:30 20:40
31	07:16 17:15	06:36 17:41	06:48 19:25	06:48 19:25	05:31 20:28	05:31 20:28	05:30 20:40	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454		
Totale, caso peggiore			381	166				
Probabilità di eliofania	0,44		0,46	0,44				
Tempo di operatività rid.	1,00		1,00	1,00				
Dir. del vento rid.	1,00		1,00	1,00				
Totale ridotto	0,44		0,46	0,44				
Totale effettivo	20		174	73				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



# SHADOW - Calendario

Calcolo: Shadow Flickering Progetto+ Esistenti Recettore d'ombra: DB - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (106)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen	Feb	Mar	Apr	Mag	Giu	Lug	Ago	Set	Ott	Nov	Dic
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre		Novembre		Dicembre
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45		06:32 16:58		07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43		06:34 16:56		07:09 16:32
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42		06:35 16:55		07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40		06:36 16:54	07:06 (11)	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38		06:37 16:53	07:03 (11) 07:11 (11)	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	10	08:05 (1) 08:15 (1)	06:38 16:52	07:03 (11) 07:13 (11)
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	16	08:01 (1) 08:17 (1)	06:40 16:50	07:02 (11) 07:13 (11)
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	20	07:59 (1) 08:19 (1)	06:41 16:49	07:03 (11) 07:13 (11)
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	23	07:57 (1) 08:20 (1)	06:42 16:48	07:05 (11) 07:14 (11)
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	26	07:55 (1) 08:21 (1)	06:43 16:47	07:06 (11) 07:13 (11)
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	27	07:55 (1) 08:22 (1)	06:45 16:46	07:07 (11) 07:12 (11)
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	29	07:54 (1) 08:23 (1)	06:46 16:45	07:09 (11) 07:16 (10)
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	30	07:53 (1) 08:23 (1)	06:47 16:44	07:11 (10) 07:18 (10)
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	31	07:52 (1) 08:23 (1)	06:48 16:43	07:11 (10) 07:18 (10)
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	31	07:52 (1) 08:23 (1)	06:49 16:42	07:12 (10) 07:19 (10)
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	30	07:52 (1) 08:22 (1)	06:51 16:41	07:14 (10) 07:20 (10)
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	31	07:52 (1) 08:23 (1)	06:52 16:41	07:15 (10) 07:19 (10)
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	30	07:52 (1) 08:22 (1)	06:53 16:40	07:16 (10) 07:19 (10)
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	29	07:52 (1) 08:21 (1)	06:54 16:39	07:18 (10) 07:19 (10)
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	27	07:53 (1) 08:20 (1)	06:55 16:38	07:24 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	26	07:53 (1) 08:19 (1)	06:57 16:38	07:25 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	24	07:55 (1) 08:19 (1)	06:58 16:37	07:25 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	22	07:55 (1) 08:17 (1)	06:59 16:36	07:26 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	18	07:57 (1) 08:15 (1)	07:00 16:36	07:26 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	14	06:59 (1) 07:13 (1)	07:01 16:35	07:27 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	6	07:03 (1) 07:09 (1)	07:02 16:35	07:27 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	06:26 17:04			07:04 16:34	07:27 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03			07:05 16:34	07:28 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	06:29 17:01			07:06 16:33	07:28 16:39
30	05:53 20:23	06:25 19:40	06:56 18:47	06:30 17:00			07:07 16:33	07:28 16:40
31	05:54 20:21	06:26 19:38		06:31 16:59				07:28 16:40
Ore potenziali eliofania	461	429	375	345		297		286
Totale, caso peggiore				500		104		
Probabilità di eliofania				0,44		0,40		
Tempo di operatività rid.				1,00		1,00		
Dir. del vento rid.				1,00		1,00		
Totale ridotto				0,44		0,40		
Totale effettivo				218		42		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (107)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	07:35 (9) 06:38	07:08 (1) 06:46	06:00 05:30	05:30 20:29
2	07:29 16:42	07:14 17:17	07:34 (9) 06:36	07:06 (1) 06:45	05:58 05:30	05:30 20:30
3	07:29 16:43	07:13 17:19	07:33 (9) 06:35	07:05 (1) 06:43	05:57 05:29	05:29 20:30
4	07:29 16:44	07:12 17:20	07:32 (10) 06:33	07:03 (1) 06:41	05:56 05:29	05:29 20:31
5	07:29 16:45	07:11 17:21	07:31 (10) 06:32	07:03 (1) 06:40	05:55 05:28	05:28 20:32
6	07:29 16:46	07:09 17:23	07:29 (10) 06:30	07:02 (1) 06:38	05:53 05:28	05:28 20:32
7	07:29 16:47	07:08 17:24	07:28 (10) 06:28	07:01 (1) 06:36	05:52 05:28	05:28 20:33
8	07:29 16:48	07:07 17:25	07:27 (10) 06:27	07:01 (1) 06:35	05:51 05:28	05:28 20:34
9	07:28 16:49	07:06 17:26	07:30 (10) 06:25	07:01 (1) 06:33	05:50 05:27	05:27 20:34
10	07:28 16:50	07:05 17:28	07:25 (11) 06:24	07:00 (1) 06:31	05:49 05:27	05:27 20:35
11	07:28 16:51	07:03 17:29	07:23 (11) 06:22	07:01 (1) 06:30	05:47 05:27	05:27 20:35
12	07:28 16:52	07:02 17:30	07:22 (11) 06:20	07:01 (1) 06:28	05:46 05:27	05:27 20:36
13	07:27 16:53	07:01 17:31	07:21 (11) 06:19	07:02 (1) 06:27	05:45 05:27	05:27 20:36
14	07:27 16:54	07:00 17:33	07:19 (11) 06:17	07:03 (1) 06:25	05:44 05:27	05:27 20:37
15	07:27 16:55	06:58 17:34	07:18 (11) 06:15	07:05 (1) 06:23	05:43 05:27	05:27 20:37
16	07:26 16:57	06:57 17:35	07:21 (11) 06:14	07:07 (1) 06:22	05:42 05:27	05:27 20:38
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:29 20:40
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40
28	07:18 17:11	06:40 17:50	07:11 (1) 05:53	06:04 19:55	05:32 20:26	05:29 20:40
29	07:17 17:12		07:22 (1) 18:22	06:02 19:56	05:32 20:26	05:30 20:40
30	07:17 17:14		06:50 19:24	06:01 19:58	05:31 20:27	05:30 20:40
31	07:16 17:15	07:36 (9) 07:37 (9)	06:48 19:25	05:31 20:28	05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	1					
Probabilità di eliofania	0,44					
Tempo di operatività rid.	1,00					
Dir. del vento rid.	1,00					
Totale ridotto	0,44					
Totale effettivo	0					

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DC - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (107)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	05:31	05:55	06:27	06:57	07:41 (1)	06:32	07:08	
	20:40	20:20	19:36	18:45	24 08:05 (1)	16:58	16:33	
2	05:31	05:56	06:28	06:58	07:40 (1)	06:34	07:09	
	20:40	20:19	19:35	18:43	25 08:05 (1)	16:56	16:32	
3	05:32	05:57	06:29	06:59	07:39 (1)	06:35	06:57 (10)	07:10
	20:40	20:18	19:33	18:42	26 08:05 (1)	16:55	7 07:04 (10)	16:32
4	05:32	05:58	06:30	07:01	07:38 (1)	06:36	06:58 (10)	07:11
	20:39	20:17	19:32	18:40	27 08:05 (1)	16:54	6 07:04 (10)	16:32
5	05:33	05:59	06:31	07:02	07:38 (1)	06:37	06:59 (10)	07:12
	20:39	20:16	19:30	18:38	27 08:05 (1)	16:53	5 07:04 (10)	16:32
6	05:33	06:00	06:32	07:03	07:37 (1)	06:38	07:01 (10)	07:13
	20:39	20:15	19:28	18:37	28 08:05 (1)	16:52	4 07:05 (10)	16:31
7	05:34	06:01	06:33	07:04	07:37 (1)	06:40	07:02 (10)	07:14
	20:39	20:13	19:26	18:35	27 08:04 (1)	16:50	3 07:05 (9)	16:31
8	05:35	06:02	06:34	07:05	07:37 (1)	06:41	07:03 (9)	07:15
	20:38	20:12	19:25	18:33	26 08:03 (1)	16:49	3 07:06 (9)	16:31
9	05:35	06:03	06:35	07:06	07:37 (1)	06:42	07:05 (9)	07:16
	20:38	20:11	19:23	18:32	26 08:03 (1)	16:48	3 07:08 (9)	16:31
10	05:36	06:04	06:36	07:07	07:38 (1)	06:43	07:06 (9)	07:17
	20:37	20:09	19:21	18:30	23 08:01 (1)	16:47	2 07:08 (9)	16:31
11	05:37	06:05	06:37	07:08	07:39 (1)	06:45	07:07 (9)	07:18
	20:37	20:08	19:20	18:28	22 08:01 (1)	16:46	1 07:08 (9)	16:31
12	05:37	06:06	06:38	07:09	07:40 (1)	06:46		07:18
	20:37	20:07	19:18	18:27	19 07:59 (1)	16:45		16:31
13	05:38	06:07	06:39	07:10	07:42 (1)	06:47		07:19
	20:36	20:05	19:16	18:25	15 07:57 (1)	16:44		16:32
14	05:39	06:08	06:40	07:11	07:45 (1)	06:48		07:20
	20:35	20:04	19:14	18:24	8 07:53 (1)	16:43		16:32
15	05:40	06:09	06:41	07:13		06:49		07:21
	20:35	20:03	19:13	18:22		16:42		16:32
16	05:40	06:10	06:42	07:14		06:51		07:21
	20:34	20:01	19:11	18:20		16:41		16:32
17	05:41	06:11	06:43	07:15		06:52		07:22
	20:34	20:00	19:09	18:19		16:41		16:33
18	05:42	06:12	06:44	07:16		06:53		07:23
	20:33	19:58	19:08	18:17		16:40		16:33
19	05:43	06:13	06:45	07:17		06:54		07:23
	20:32	19:57	19:06	18:16		16:39		16:33
20	05:44	06:14	06:46	07:18		06:55		07:24
	20:32	19:55	19:04	18:14		16:38		16:34
21	05:45	06:15	06:47	07:19		06:57		07:25
	20:31	19:54	19:02	18:13		16:38		16:34
22	05:46	06:16	06:48	07:21		06:58		07:25
	20:30	19:52	19:01	18:11		16:37		16:35
23	05:46	06:17	06:49	07:22		06:59		07:26
	20:29	19:51	18:59	18:10		16:36		16:35
24	05:47	06:18	06:50	07:23		07:00		07:26
	20:28	19:49	18:57	18:08		16:36		16:36
25	05:48	06:19	06:51	06:24		06:51 (11)	07:01	07:27
	20:27	19:48	18:55	17:07	4	06:55 (11)	16:35	16:36
26	05:49	06:20	06:52	06:25		06:50 (11)	07:02	07:27
	20:26	19:46	18:54	17:06	7	06:57 (11)	16:35	16:37
27	05:50	06:21	06:53	07:50 (1)	06:26	06:49 (11)	07:04	07:27
	20:26	19:45	18:52	7 07:57 (1)	17:04	9 06:58 (11)	16:34	16:37
28	05:51	06:22	06:54	07:46 (1)	06:28	06:49 (11)	07:05	07:28
	20:25	19:43	18:50	14 08:00 (1)	17:03	9 06:58 (11)	16:34	16:38
29	05:52	06:23	06:55	07:45 (1)	06:29	06:50 (11)	07:06	07:28
	20:24	19:41	18:49	18 08:03 (1)	17:01	8 06:58 (11)	16:33	16:39
30	05:53	06:25	06:56	07:43 (1)	06:30	06:52 (11)	07:07	07:28
	20:23	19:40	18:47	21 08:04 (1)	17:00	6 06:58 (11)	16:33	16:40
31	05:54	06:26		06:31		06:53 (11)		07:28
	20:21	19:38		16:59	4	06:57 (11)		16:40
Ore potenziali eliofania	461	429	375	345		297		286
Totale, caso peggiore			60		370		38	
Probabilità di eliofania			0,58		0,44		0,40	
Tempo di operatività rid.			1,00		1,00		1,00	
Dir. del vento rid.			1,00		1,00		1,00	
Totale ridotto			0,58		0,44		0,40	
Totale effettivo			35		161		15	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (108)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31
5	07:29 16:45	07:11 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:33	05:52 20:05	05:28 20:33
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37
15	07:27 16:55	07:48 (8) 07:49 (8)	06:15 07:18 (11)	06:23 06:54 (1)	05:43 05:43	05:27 05:27
16	07:26 16:57	07:48 (8) 07:49 (8)	06:14 07:17 (11)	06:22 06:54 (1)	05:42 05:42	05:27 05:27
17	07:26 16:58	07:49 (8) 17:35	06:12 07:24 (11)	06:20 06:55 (1)	05:41 05:41	05:27 05:27
18	07:25 16:59	06:54 17:38	06:10 07:14 (11)	06:19 06:55 (1)	05:40 05:40	05:27 05:27
19	07:25 17:00	06:53 17:39	06:08 07:14 (11)	06:17 07:16 (1)	05:39 05:39	05:27 05:27
20	07:24 17:01	06:51 17:40	06:07 07:16 (11)	06:16 06:58 (1)	05:38 05:38	05:27 05:27
21	07:24 17:02	06:50 17:41	06:05 18:13	06:14 07:12 (1)	05:38 05:38	05:27 05:27
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 05:37	05:27 05:27
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 05:36	05:28 05:28
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 05:35	05:28 05:28
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 05:34	05:28 05:28
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 05:34	05:29 05:29
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 05:33	05:29 05:29
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 05:32	05:29 05:29
29	07:17 17:12		06:51 19:23	06:02 19:56	05:32 05:32	05:30 05:30
30	07:17 17:14		06:50 19:24	06:01 19:58	05:31 05:31	05:30 05:30
31	07:16 17:15		06:48 19:25		05:31 05:31	05:30 05:30
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore	3					
Probabilità di eliofania	0,44	0,46	0,44			
Tempo di operatività rid.	1,00	1,00	1,00			
Dir. del vento rid.	1,00	1,00	1,00			
Totale ridotto	0,44	0,46	0,44			
Totale effettivo	1	40	164			

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DD - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (108)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	October	Novembre	Dicembre
1	05:31	05:55	06:27	06:57	07:34 (1) 06:32	06:54 (10) 07:08
	20:40	20:20	19:36	18:45	27 08:01 (1) 16:58	6 07:00 (10) 16:33
2	05:31	05:56	06:28	06:58	07:33 (1) 06:34	06:56 (10) 07:09
	20:40	20:19	19:35	18:43	27 08:00 (1) 16:56	5 07:01 (10) 16:32
3	05:32	05:57	06:29	06:59	07:33 (1) 06:35	06:57 (10) 07:10
	20:40	20:18	19:33	18:42	27 08:00 (1) 16:55	3 07:00 (10) 16:32
4	05:32	05:58	06:30	07:01	07:33 (1) 06:36	06:58 (10) 07:11
	20:39	20:17	19:32	18:40	26 07:59 (1) 16:54	4 07:02 (9) 16:32
5	05:33	05:59	06:31	07:02	07:34 (1) 06:37	06:59 (9) 07:12
	20:39	20:16	19:30	18:38	24 07:58 (1) 16:53	4 07:03 (9) 16:32
6	05:33	06:00	06:32	07:03	07:34 (1) 06:38	07:01 (9) 07:13
	20:39	20:15	19:28	18:37	22 07:56 (1) 16:52	3 07:04 (9) 16:31
7	05:34	06:01	06:33	07:04	07:35 (1) 06:40	07:02 (9) 07:14
	20:39	20:13	19:26	18:35	19 07:54 (1) 16:50	2 07:04 (9) 16:31
8	05:35	06:02	06:34	07:05	07:37 (1) 06:41	07:15
	20:38	20:12	19:25	18:33	15 07:52 (1) 16:49	16:31
9	05:35	06:03	06:35	07:06	07:39 (1) 06:42	07:16
	20:38	20:11	19:23	18:32	10 07:49 (1) 16:48	16:31
10	05:36	06:04	06:36	07:07	06:43	07:17
	20:37	20:09	19:21	18:30	16:47	16:31
11	05:37	06:05	06:37	07:08	06:45	07:18
	20:37	20:08	19:20	18:28	16:46	16:31
12	05:37	06:06	06:38	07:09	06:46	07:18
	20:37	20:07	19:18	18:27	16:45	16:31
13	05:38	06:07	06:39	07:10	06:47	07:19
	20:36	20:05	19:16	18:25	16:44	16:32
14	05:39	06:08	06:40	07:11	06:48	07:20
	20:35	20:04	19:14	18:24	16:43	16:32
15	05:40	06:09	06:41	07:13	06:49	07:21
	20:35	20:03	19:13	18:22	16:42	16:32
16	05:40	06:10	06:42	07:14	06:51	07:21
	20:34	20:01	19:11	18:20	16:41	16:32
17	05:41	06:11	06:43	07:15	06:52	07:22
	20:34	20:00	19:09	18:19	16:41	16:33
18	05:42	06:12	06:44	07:16	06:53	07:23
	20:33	19:58	19:08	18:17	16:40	16:33
19	05:43	06:13	06:45	07:17	06:54	07:23
	20:32	19:57	19:06	18:16	16:39	16:33
20	05:44	06:14	06:46	07:18	06:55	07:24
	20:32	19:55	19:04	18:14	16:38	16:34
21	05:45	06:15	06:47	07:19	07:47 (11) 06:57	07:25
	20:31	19:54	19:02	18:13	3 07:50 (11) 16:38	16:34
22	05:46	06:16	06:48	07:21	7 07:46 (11) 06:58	07:25
	20:30	19:52	19:01	18:11	7 07:53 (11) 16:37	16:35
23	05:46	06:17	06:49	07:22	07:44 (11) 06:59	07:26
	20:29	19:51	18:59	12 07:55 (1) 18:10	10 07:54 (11) 16:36	16:35
24	05:47	06:18	06:50	07:23	07:44 (11) 07:00	07:26
	20:28	19:49	18:57	17 07:57 (1) 18:08	10 07:54 (11) 16:36	16:36
25	05:48	06:19	06:51	07:24	06:45 (11) 07:01	07:27
	20:27	19:48	18:55	20 07:58 (1) 17:07	8 06:53 (11) 16:35	16:36
26	05:49	06:20	06:52	07:25	06:47 (11) 07:02	07:27
	20:26	19:46	18:54	22 07:59 (1) 17:06	6 06:53 (11) 16:35	1 07:27 (8) 16:37
27	05:50	06:21	06:53	07:26	06:48 (11) 07:04	07:27 (8) 07:27
	20:26	19:45	18:52	25 08:00 (1) 17:04	4 06:52 (11) 16:34	1 07:28 (8) 16:37
28	05:51	06:22	06:54	07:27	07:05	07:28 (8) 07:28
	20:25	19:43	18:50	26 08:00 (1) 17:03	16:34	1 07:29 (8) 16:38
29	05:52	06:23	06:55	07:28	07:06	07:28
	20:24	19:41	18:49	26 08:01 (1) 17:01	16:33	16:39
30	05:53	06:25	06:56	07:29	06:54 (10) 07:07	07:28
	20:23	19:40	18:47	27 08:01 (1) 17:00	6 07:00 (10) 16:33	16:40
31	05:54	06:26		06:31	06:53 (10)	07:28
	20:21	19:38		16:59	7 07:00 (10)	16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore			175	258	30	
Probabilità di eliofania			0,58	0,44	0,40	
Tempo di operatività rid.			1,00	1,00	1,00	
Dir. del vento rid.			1,00	1,00	1,00	
Totale ridotto			0,58	0,44	0,40	
Totale effettivo			101	112	12	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DE - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (109)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Dicembre) and rows for specific dates and times, showing shadow flickering data and summary statistics like 'Ore potenziali eliofania' and 'Totale, caso peggiore'.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DF - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (110)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:44	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:08 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	07:19 17:07	06:55 16:35	07:27 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	07:25 17:06	06:57 16:35	07:28 16:37
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28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	07:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12		06:51 19:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	07:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14		06:50 19:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:24 19:40	06:56 18:47	07:00 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15		06:48 19:25	06:00 20:28	05:31 20:28	05:30 20:40	05:54 20:21	06:26 19:38	06:31 16:59	07:01 16:30	07:08 16:40	07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												124
Probabilità di eliofania												0,36
Tempo di operatività rid.												1,00
Dir. del vento rid.												1,00
Totale ridotto												0,36
Totale effettivo												45

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
(WTG che provoca l'inizio dell'ombreggiamento)  
(WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Ute autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DG - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (111)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
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3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
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9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
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11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:27 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:38 17:52	05:50 18:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:53	05:48 18:25	06:00 19:59	05:31 20:28	05:30 20:41	05:54 20:24	06:25 19:38	06:57 18:51	06:31 17:01	07:08 16:34	07:29 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTC che provoca l'inizio dell'ombreggiamento) (WTC che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DH - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (112)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29	07:15	06:38	06:46	06:00	05:30	05:31	05:55	06:27	06:57	06:32	07:08
	16:41	17:16	17:51	19:26	19:59	20:29	20:40	20:20	19:36	18:45	16:58	16:33
2	07:29	07:14	06:36	06:45	05:58	05:30	05:31	05:56	06:28	06:58	06:34	07:09
	16:42	17:17	17:52	19:27	20:00	20:30	20:40	20:19	19:35	18:43	16:56	16:32
3	07:29	07:13	06:35	06:43	05:57	05:29	05:32	05:57	06:29	06:59	06:35	07:10
	16:43	17:19	17:53	19:28	20:01	20:30	20:40	20:18	19:33	18:42	16:55	16:32
4	07:29	07:12	06:33	06:41	05:56	05:29	05:32	05:58	06:30	07:01	06:36	07:11
	16:44	17:20	17:55	19:29	20:02	20:31	20:39	20:17	19:31	18:40	16:54	16:32
5	07:29	07:10	06:32	06:40	05:55	05:28	05:33	05:59	06:31	07:02	06:37	07:12
	16:45	17:21	17:56	19:30	20:03	20:32	20:39	20:16	19:30	18:38	16:53	16:32
6	07:29	07:09	06:30	06:38	05:53	05:28	05:33	06:00	06:32	07:03	06:38	07:13
	16:46	17:23	17:57	19:31	20:04	20:32	20:39	20:15	19:28	18:37	16:51	16:31
7	07:29	07:08	06:28	06:36	05:52	05:28	05:34	06:01	06:33	07:04	06:40	07:14
	16:47	17:24	17:58	19:32	20:05	20:33	20:39	20:13	19:26	18:35	16:50	16:31
8	07:29	07:07	06:27	06:35	05:51	05:28	05:35	06:02	06:34	07:05	06:41	07:15
	16:48	17:25	17:59	19:34	20:06	20:34	20:38	20:12	19:25	18:33	16:49	16:31
9	07:28	07:06	06:25	06:33	05:50	05:27	05:35	06:03	06:35	07:06	06:42	07:16
	16:49	17:26	18:00	19:35	20:07	20:34	20:38	20:11	19:23	18:32	16:48	16:31
10	07:28	07:05	06:23	06:31	05:49	05:27	05:36	06:04	06:36	07:07	06:43	07:17
	16:50	17:28	18:01	19:36	20:08	20:35	20:37	20:09	19:21	18:30	16:47	16:31
11	07:28	07:03	06:22	06:30	05:47	05:27	05:37	06:05	06:37	07:08	06:45	07:18
	16:51	17:29	18:03	19:37	20:09	20:35	20:37	20:08	19:20	18:28	16:46	16:31
12	07:28	07:02	06:20	06:28	05:46	05:27	05:37	06:06	06:38	07:09	06:46	07:18
	16:52	17:30	18:04	19:38	20:10	20:36	20:37	20:07	19:18	18:27	16:45	16:31
13	07:27	07:01	06:19	06:26	05:45	05:27	05:38	06:07	06:39	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:11	20:36	20:36	20:05	19:16	18:25	16:44	16:32
14	07:27	07:00	06:17	06:25	05:44	05:27	05:39	06:08	06:40	07:11	06:48	07:20
	16:54	17:33	18:06	19:40	20:12	20:37	20:35	20:04	19:14	18:24	16:43	16:32
15	07:27	06:58	06:15	06:23	05:43	05:27	05:40	06:09	06:41	07:13	06:49	07:21
	16:55	17:34	18:07	19:41	20:13	20:37	20:35	20:03	19:13	18:22	16:42	16:32
16	07:26	06:57	06:13	06:22	05:42	05:27	05:40	06:10	06:42	07:14	06:51	07:21
	16:57	17:35	18:08	19:42	20:14	20:38	20:34	20:01	19:11	18:20	16:41	16:32
17	07:26	06:56	06:12	06:20	05:41	05:27	05:41	06:11	06:43	07:15	06:52	07:22
	16:58	17:36	18:09	19:43	20:15	20:38	20:34	20:00	19:09	18:19	16:41	16:32
18	07:25	06:54	06:10	06:19	05:40	05:27	05:42	06:12	06:44	07:16	06:53	07:23
	16:59	17:38	18:11	19:44	20:16	20:38	20:33	19:58	19:07	18:17	16:40	16:33
19	07:25	06:53	06:08	06:17	05:39	05:27	05:43	06:13	06:45	07:17	06:54	07:23
	17:00	17:39	18:12	19:46	20:17	20:39	20:32	19:57	19:06	18:16	16:39	16:33
20	07:24	06:51	06:07	06:16	05:38	05:27	05:44	06:14	06:46	07:18	06:55	07:24
	17:01	17:40	18:13	19:47	20:18	20:39	20:32	19:55	19:04	18:14	16:38	16:34
21	07:24	06:50	06:05	06:14	05:38	05:27	05:45	06:15	06:47	07:19	06:57	07:25
	17:02	17:41	18:14	19:48	20:19	20:39	20:31	19:54	19:02	18:13	16:38	16:34
22	07:23	06:49	06:03	06:12	05:37	05:27	05:45	06:16	06:48	07:21	06:58	07:25
	17:04	17:43	18:15	19:49	20:20	20:39	20:30	19:52	19:01	18:11	16:37	16:34
23	07:22	06:47	06:02	06:11	05:36	05:28	05:46	06:17	06:49	07:22	06:59	07:26
	17:05	17:44	18:16	19:50	20:21	20:40	20:29	19:51	18:59	18:10	16:36	16:35
24	07:21	06:46	06:00	06:10	05:35	05:28	05:47	06:18	06:50	07:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20:40	20:28	19:49	18:57	18:08	16:36	16:36
25	07:21	06:44	05:58	06:08	05:34	05:28	05:48	06:19	06:51	06:24	07:01	07:27
	17:07	17:46	18:18	19:52	20:23	20:40	20:27	19:48	18:55	17:07	16:35	16:36
26	07:20	06:43	05:56	06:07	05:34	05:28	05:49	06:20	06:52	06:25	07:02	07:27
	17:09	17:47	18:19	19:53	20:24	20:40	20:26	19:46	18:54	17:06	16:35	16:37
27	07:19	06:41	05:55	06:05	05:33	05:29	05:50	06:21	06:53	06:26	07:04	07:27
	17:10	17:49	18:20	19:54	20:25	20:40	20:26	19:45	18:52	17:04	16:34	16:37
28	07:18	06:40	05:53	06:04	05:32	05:29	05:51	06:22	06:54	06:28	07:05	07:28
	17:11	17:50	18:22	19:55	20:26	20:40	20:25	19:43	18:50	17:03	16:34	16:38
29	07:17		06:51	06:02	05:32	05:30	05:52	06:23	06:55	06:29	07:06	07:28
	17:12		19:23	19:56	20:26	20:40	20:24	19:41	18:48	17:01	16:33	16:39
30	07:17		06:50	06:01	05:31	05:30	05:53	06:24	06:56	06:30	07:07	07:28
	17:14		19:24	19:58	20:27	20:40	20:22	19:40	18:47	17:00	16:33	16:40
31	07:16		06:48		05:31		05:54	06:25		06:31		07:28
	17:15		19:25		20:28		20:21	19:38		16:59		16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
 Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH
Schweizer Straße 3a
DE-01069 Dresden
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Luca Di Grigoli / luca.digrigoli@vsb.energy
Redatto il: 14/11/2023 14:53/3.6.355



SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DI - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (113)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with 12 columns for months (Gennaio to Dicembre) and 31 rows of hourly data (07:28 to 17:15). Summary row at the bottom shows 'Ore potenziali eliofania' and 'Totale, caso peggiore' for each month.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)





Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Redatto il:  
14/11/2023 14:53/3.6.355



### SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DJ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (114)

#### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:01	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:09	06:43 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:37 17:49	05:51 18:22	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:35 17:47	05:50 18:23	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:16 17:15	06:35 17:47	05:50 18:23	06:01 19:57	05:31 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

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Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DK - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (115)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:58	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:57	07:08 16:32
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:29	05:31 20:40	05:56 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:29 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:39 19:30	05:54 20:03	05:28 20:32	05:33 20:39	05:59 20:16	06:30 19:30	07:01 18:38	06:37 16:53	07:12 16:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:33	05:51 20:06	05:27 20:34	05:34 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:36 20:37	06:05 20:08	06:37 19:19	07:08 18:28	06:44 16:46	07:17 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:39 20:35	06:09 20:03	06:41 19:13	07:12 18:22	06:49 16:42	07:21 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:40	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:10	06:18 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:37	07:24 16:34
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:27 20:39	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:25 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:05	07:02 16:34	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	07:05 16:34	07:27 16:38
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:31 20:26	05:30 20:40	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:14	06:37 17:50	05:51 18:23	06:02 19:57	05:30 20:27	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	07:15 17:15	06:36 17:55	05:50 18:24	06:01 19:58	05:31 20:28	05:30 20:40	05:53 20:21	06:24 19:38	06:56 18:38	06:30 16:59	07:07 16:40	07:28 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+ Esistenti Recettore d'ombra: DL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (116)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:29 16:41	07:15 17:16	07:36 (11) 06:38	07:30 (1) 06:46	06:00	05:30
2	07:29 16:42	07:14 17:17	07:38 (11) 06:36	07:33 (1) 06:45	05:58	05:30
3	07:29 16:43	07:13 17:19	07:40 (11) 06:35	07:38 (1) 06:43	05:57	05:29
4	07:29 16:44	07:12 17:20	07:42 (11) 06:33	07:41 (1) 06:41	05:56	05:29
5	07:29 16:45	07:10 17:21	06:32	06:30	05:55	05:29
6	07:29 16:46	07:09 17:23	06:30	06:38	05:53	05:28
7	07:29 16:47	07:08 17:24	06:28	06:35	05:51	05:28
8	07:29 16:48	07:07 17:25	06:27	06:36	05:52	05:28
9	07:28 16:49	07:06 17:26	06:25	06:33	05:50	05:27
10	07:28 16:50	07:05 17:28	06:24	06:31	05:49	05:27
11	07:28 16:51	07:03 17:29	06:22	06:30	05:47	05:27
12	07:28 16:52	07:02 17:30	06:20	06:28	05:46	05:27
13	07:27 16:53	07:01 17:31	06:19	06:27	05:45	05:27
14	07:27 16:54	07:00 17:33	06:17	06:25	05:44	05:27
15	07:27 16:55	06:58 17:34	06:15	06:23	05:43	05:27
16	07:26 16:57	06:57 17:35	06:14	06:22	05:42	05:27
17	07:26 16:58	06:56 17:36	06:12	06:20	05:41	05:27
18	07:25 16:59	06:54 17:38	06:10	06:19	05:40	05:27
19	07:25 17:00	06:53 17:39	06:08	06:17	05:39	05:27
20	07:24 17:01	06:51 07:45 (10)	06:07	06:16	05:38	05:27
21	07:24 17:02	06:50 07:47 (10)	06:05	06:14	05:38	05:27
22	07:23 17:04	06:49 07:48 (10)	06:03	06:13	05:37	05:27
23	07:22 17:05	06:47 07:44 (10)	06:02	06:11	05:36	05:28
24	07:21 17:06	06:46 07:48 (10)	06:00	06:10	05:35	05:28
25	07:21 17:07	06:44 07:41 (10)	05:58	06:08	05:34	05:28
26	07:20 17:09	06:43 07:48 (10)	05:57	06:07	05:34	05:29
27	07:19 17:10	06:41 07:47 (10)	05:55	06:05	05:33	05:29
28	07:18 17:11	06:40 07:45 (11)	05:53	06:04	05:32	05:29
29	07:17 17:12	06:38 07:46 (11)	05:51	06:02	05:32	05:30
30	07:17 17:14	06:37 07:46 (11)	05:50	06:01	05:31	05:30
31	07:16 17:15	06:36 07:46 (11)	05:48	05:31	05:31	05:30
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore			471			
Probabilità di eliofania	0,44		0,46			0,44
Tempo di operatività rid.	1,00		1,00			1,00
Dir. del vento rid.	1,00		1,00			1,00
Totale ridotto	0,44		0,46			0,44
Totale effettivo	31		215			15

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

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Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DL - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (116)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre		Novembre		Dicembre
1	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45		06:32 16:58		07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43		06:34 16:56		07:09 16:32
3	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42		06:35 16:55		07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40		06:36 16:54		07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38		06:37 16:53		07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37		06:38 16:52		07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35		06:40 16:50		07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33		06:41 16:49	07:09 (11)	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32		06:42 16:48	07:08 (11)	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30		06:43 16:47	07:16 (11)	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	08:09 (1)	06:45 16:46	07:07 (11)	07:18 16:31
12	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	9 08:09 (1)	06:46 16:45	07:17 (11)	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	16 08:21 (1)	06:47 16:44	07:09 (11)	07:19 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	20 08:23 (1)	06:48 16:43	07:18 (11)	07:20 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	23 08:24 (1)	06:49 16:42	07:18 (11)	07:21 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	25 08:25 (1)	06:51 16:41	07:17 (11)	07:21 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	27 08:26 (1)	06:52 16:41	07:20 (10)	07:22 16:32
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	28 08:27 (1)	06:53 16:40	07:22 (10)	07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	29 08:28 (1)	06:54 16:39	07:11 (11)	07:24 16:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	30 08:29 (1)	06:55 16:38	07:16 (10)	07:25 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	30 08:30 (1)	06:57 16:38	07:20 (10)	07:26 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	30 08:31 (1)	06:58 16:37	07:23 (10)	07:27 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	29 08:32 (1)	06:59 16:36	07:18 (10)	07:28 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	28 08:33 (1)	07:00 16:36	07:22 (10)	07:29 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 17:07	27 08:34 (1)	07:01 16:35	07:23 (10)	07:30 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 17:06	26 08:35 (1)	07:02 16:35	07:24 (10)	07:31 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 17:04	24 08:36 (1)	07:04 16:34	07:25 (10)	07:32 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	07:28 17:03	21 08:37 (1)	07:05 16:34	07:26 (10)	07:33 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	07:29 17:01	19 08:38 (1)	07:06 16:33	07:27 (10)	07:34 16:39
30	05:53 20:23	06:25 19:40	06:56 18:47	07:30 17:00	14 08:39 (1)	07:07 16:33	07:28 (10)	07:35 16:40
31	05:54 20:21	06:26 19:38	06:57 18:45	07:31 16:59	8 08:40 (1)	07:08 16:32	07:29 (10)	07:36 16:40
Ore potenziali eliofania	461	429	375	345		297		286
Totale, caso peggiore				493		92		
Probabilità di eliofania				0,44		0,40		
Tempo di operatività rid.				1,00		1,00		
Dir. del vento rid.				1,00		1,00		
Totale ridotto				0,44		0,40		
Totale effettivo				215		37		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DM - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (117)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	07:40 (6) 17:51	06:38 17:51	06:57 (7) 19:26	07:08 (9) 19:59
2	07:29 16:42	07:14 17:17	07:41 (6) 17:52	06:36 17:52	06:56 (7) 19:27	07:07 (9) 20:00
3	07:29 16:43	07:13 17:19	07:43 (6) 17:53	06:35 17:53	06:54 (7) 19:28	07:08 (9) 20:01
4	07:29 16:44	07:12 17:20	07:43 (6) 17:55	06:33 17:55	06:52 (7) 19:29	07:08 (9) 20:02
5	07:29 16:45	07:10 17:21	07:43 (6) 17:56	06:32 17:56	06:52 (7) 19:30	07:09 (9) 20:03
6	07:29 16:46	07:09 17:23	07:43 (6) 17:57	06:30 17:57	06:49 (8) 19:31	07:09 (9) 20:04
7	07:29 16:47	07:08 17:24	07:43 (6) 17:58	06:28 17:58	06:47 (8) 19:32	07:09 (9) 20:05
8	07:28 16:48	07:07 17:25	07:43 (6) 17:59	06:27 17:59	06:46 (8) 19:34	07:09 (9) 20:06
9	07:28 16:49	07:06 17:26	07:43 (6) 18:00	06:25 18:00	06:44 (8) 19:35	07:09 (9) 20:07
10	07:28 16:50	07:05 17:28	07:43 (6) 18:02	06:23 18:02	06:43 (8) 19:36	07:09 (9) 20:08
11	07:28 16:51	07:03 17:29	07:43 (6) 18:03	06:22 18:03	06:44 (8) 19:37	07:09 (9) 20:09
12	07:28 16:52	07:02 17:30	07:43 (6) 18:04	06:20 18:04	06:44 (8) 19:38	07:09 (9) 20:10
13	07:27 16:53	07:01 17:31	07:43 (6) 18:05	06:19 18:05	06:45 (8) 19:39	07:09 (9) 20:11
14	07:27 16:54	07:00 17:33	07:43 (6) 18:06	06:17 18:06	06:45 (8) 19:40	07:09 (9) 20:12
15	07:27 16:55	06:58 17:34	07:43 (6) 18:07	06:15 18:07	06:44 (8) 19:41	07:09 (9) 20:13
16	07:26 16:57	06:57 17:35	07:43 (6) 18:08	06:13 18:08	06:44 (8) 19:42	07:09 (9) 20:14
17	07:26 16:58	06:56 17:36	07:43 (6) 18:09	06:12 18:09	06:44 (8) 19:43	07:09 (9) 20:15
18	07:25 16:59	06:54 17:38	07:43 (6) 18:11	06:10 18:11	06:44 (8) 19:44	07:09 (9) 20:16
19	07:25 17:00	06:53 17:39	07:43 (6) 18:12	06:08 18:12	06:44 (8) 19:46	07:09 (9) 20:17
20	07:24 17:01	06:51 17:40	07:43 (6) 18:13	06:07 18:13	06:44 (8) 19:47	07:09 (9) 20:18
21	07:23 17:02	07:45 (6) 17:41	07:43 (6) 18:14	06:05 18:14	06:44 (8) 19:48	07:09 (9) 20:19
22	07:23 17:04	07:44 (6) 17:43	07:43 (6) 18:15	06:03 18:15	06:44 (8) 19:49	07:09 (9) 20:20
23	07:22 17:05	07:43 (6) 17:44	07:43 (6) 18:16	06:02 18:16	06:44 (8) 19:50	07:09 (9) 20:21
24	07:21 17:06	07:42 (6) 17:45	07:43 (6) 18:17	06:00 18:17	06:44 (8) 19:51	07:09 (9) 20:22
25	07:21 17:07	07:41 (6) 17:46	07:43 (6) 18:18	05:58 18:18	06:17 (14) 19:52	07:09 (9) 20:23
26	07:20 17:09	07:41 (6) 17:47	07:43 (6) 18:19	05:57 18:19	06:15 (14) 19:53	07:09 (9) 20:24
27	07:19 17:10	07:40 (6) 17:49	07:43 (6) 18:20	05:55 18:20	06:13 (14) 19:54	07:09 (9) 20:25
28	07:18 17:11	07:39 (6) 17:50	07:43 (6) 18:22	05:53 18:22	06:12 (14) 19:55	07:09 (9) 20:26
29	07:17 17:12	07:38 (6) 17:54 (6)	07:43 (6) 19:23	05:51 19:23	07:11 (14) 19:56	07:09 (9) 20:27
30	07:16 17:14	07:38 (6) 17:54 (6)	07:43 (6) 19:24	05:50 19:24	07:10 (9) 19:57	07:09 (9) 20:28
31	07:16 17:15	07:39 (6) 17:53 (6)	07:43 (6) 19:25	05:48 19:25	07:09 (9) 19:59	07:09 (9) 20:29
Ore potenziali eliofanía	296	296	369	399	450	454
Totale, caso peggiore	117	32	164	142	205	205
Probabilità di eliofanía	0,44	0,46	0,44	0,48	0,47	0,47
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00
Totale ridotto	0,44	0,46	0,44	0,48	0,47	0,47
Totale effettivo	52	15	72	68	95	95

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DM - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (117)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:27 (11) 06:27	06:27 18:45	07:24 (8) 06:32	07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 (11) 06:28	06:28 18:43	07:23 (8) 06:34	07:09 16:32
3	05:32 20:39	05:57 20:18	06:30 (11) 06:29	06:29 18:42	07:22 (8) 06:35	07:10 16:32
4	05:32 20:39	05:58 20:17	06:34 (11) 06:30	06:30 18:40	07:34 (8) 06:36	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	06:31 18:38	07:22 (8) 06:37	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	06:32 18:37	07:23 (8) 06:38	07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	06:33 18:35	07:24 (8) 06:40	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	06:34 18:33	07:29 (8) 06:41	2 07:16 (6) 07:15
9	05:35 20:38	06:03 20:11	06:35 19:23	06:35 18:32	07:28 (7) 06:42	9 07:21 (6) 07:16
10	05:36 20:37	06:04 20:09	06:36 19:21	06:36 18:30	07:27 (7) 06:43	11 07:23 (6) 07:17
11	05:37 20:37	06:05 20:08	06:37 19:20	06:37 18:28	07:26 (7) 06:45	13 07:24 (6) 07:18
12	05:37 20:36	06:06 20:07	06:38 19:18	06:38 18:27	07:36 (7) 06:46	14 07:25 (6) 07:19
13	05:38 20:36	06:07 20:05	06:39 19:16	06:39 18:25	07:35 (7) 06:47	16 07:26 (6) 07:20
14	05:39 20:35	06:08 20:04	06:40 19:14	06:40 18:24	07:34 (7) 06:48	16 07:27 (6) 07:21
15	05:40 20:35	06:09 20:03	06:41 19:13	06:41 18:22	06:49 16:42	14 07:28 (6) 07:22
16	05:40 20:34	06:10 20:01	06:42 19:11	06:42 18:20	06:51 16:41	13 07:29 (6) 07:23
17	05:41 20:34	06:11 20:00	06:43 19:09	06:43 18:19	06:52 16:40	12 07:30 (6) 07:24
18	05:42 20:33	06:29 (11) 06:35 (11)	06:12 19:58	06:12 19:08	07:09 (14) 18:17	6 07:09 (14) 18:20
19	05:43 20:32	06:28 (11) 06:37 (11)	06:13 19:57	06:13 19:06	07:08 (14) 18:17	7 07:08 (14) 18:17
20	05:44 20:31	06:27 (11) 06:38 (11)	06:14 19:55	06:14 19:04	07:17 18:16	4 07:17 18:16
21	05:45 20:31	06:26 (11) 06:38 (11)	06:15 19:54	06:15 19:02	07:18 18:13	3 07:18 18:13
22	05:46 20:30	06:25 (11) 06:39 (11)	06:16 19:52	06:16 19:01	07:19 18:11	5 07:19 18:11
23	05:46 20:29	06:25 (11) 06:39 (11)	06:17 19:51	06:17 18:59	07:20 18:10	6 07:20 18:10
24	05:47 20:28	06:25 (11) 06:40 (11)	06:18 19:49	06:18 18:57	07:21 18:08	7 07:21 18:08
25	05:48 20:27	06:25 (11) 06:40 (11)	06:19 19:48	06:19 18:55	07:22 17:07	8 07:22 17:07
26	05:49 20:26	06:25 (11) 06:41 (11)	06:20 19:46	06:20 18:54	07:23 17:06	9 07:23 17:06
27	05:50 20:25	06:25 (11) 06:41 (11)	06:21 19:45	06:21 18:52	07:24 17:04	10 07:24 17:04
28	05:51 20:24	06:25 (11) 06:41 (11)	06:22 19:43	06:22 18:50	07:25 17:03	11 07:25 17:03
29	05:52 20:23	06:26 (11) 06:41 (11)	06:23 19:41	06:23 18:48	07:26 17:01	12 07:26 17:01
30	05:53 20:22	06:25 (11) 06:39 (11)	06:24 19:40	06:24 18:47	07:27 17:00	13 07:27 17:00
31	05:54 20:21	06:26 (11) 06:39 (11)	06:26 19:38	06:26 18:47	07:28 16:59	14 07:28 16:59
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	186	118	107	112	150	
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,61	0,67	0,58	0,44	0,40	
Totale effettivo	113	79	62	49	61	

## Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+ Esistenti Recettore d'ombra: DN - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (118)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 17:16	07:40 (6) 06:38	06:57 (7) 06:46	07:09 (9) 06:00	05:30 20:29
2	07:29 16:42	07:14 17:17	07:42 (6) 06:36	06:56 (7) 06:45	07:09 (9) 05:58	05:30 20:29
3	07:29 16:43	07:13 17:19	07:44 (6) 06:35	06:54 (7) 06:43	07:10 (9) 05:57	05:29 20:30
4	07:29 16:44	07:12 17:20	07:50 (6) 06:33	06:52 (7) 06:41	07:11 (9) 05:56	05:29 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:54 (7) 06:40	06:40 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:49 (8) 06:38	06:38 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:47 (8) 06:36	06:36 20:05	05:28 06:22 (11)
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46 (8) 06:35	06:35 20:06	05:28 06:20 (11)
9	07:28 16:49	07:06 17:26	06:25 18:00	06:45 (8) 06:33	06:33 20:07	05:27 06:19 (11)
10	07:28 16:50	07:05 17:28	06:23 18:02	06:44 (8) 06:31	06:31 20:08	05:27 06:18 (11)
11	07:28 16:51	07:03 17:29	06:22 18:03	06:45 (8) 06:30	06:30 06:54 (10)	05:27 05:47
12	07:28 16:52	07:02 17:30	06:20 18:04	06:46 (8) 06:28	06:28 07:02 (10)	05:27 20:09
13	07:27 16:53	07:01 17:31	06:19 18:05	06:47 (8) 06:27	06:27 06:53 (10)	05:27 05:46
14	07:27 16:54	07:00 17:33	06:17 18:06	06:48 (8) 06:25	06:25 07:04 (10)	05:27 20:11
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:23 06:51 (10)	05:27 05:43
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	06:22 07:03 (10)	05:27 20:14
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	06:20 07:02 (10)	05:27 20:15
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	06:19 07:00 (10)	05:27 20:16
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	06:17 20:17	05:27 11 06:30 (11)
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	06:16 20:18	05:27 9 06:29 (11)
21	07:23 17:02	06:50 07:45 (6)	06:05 18:14	06:14 19:48	06:14 20:19	05:27 6 06:27 (11)
22	07:23 17:04	06:49 07:44 (6)	06:03 18:15	06:13 19:49	06:13 20:20	05:27 20:39
23	07:22 17:05	06:47 07:43 (6)	06:02 18:16	06:11 19:50	06:11 20:21	05:28 20:40
24	07:21 17:06	06:46 07:42 (6)	06:00 18:17	06:10 06:19 (14)	06:10 19:51	05:28 20:22
25	07:21 17:07	06:44 07:41 (6)	05:58 18:18	06:17 (14) 06:17 (14)	06:08 06:22 (14)	05:28 20:23
26	07:20 17:09	06:43 07:41 (6)	05:57 18:19	06:15 (14) 06:22 (14)	06:07 19:53	05:29 20:24
27	07:19 17:10	06:41 07:40 (6)	05:55 18:20	06:13 (14) 06:21 (14)	06:05 19:54	05:29 20:25
28	07:18 17:11	06:40 07:39 (6)	05:53 18:22	06:13 (14) 06:21 (14)	06:04 19:55	05:29 20:25
29	07:17 17:12	06:38 (6) 07:38 (6)	05:51 19:23	06:12 (9) 07:12 (9)	06:02 19:56	05:30 20:26
30	07:16 17:14	06:39 (6) 07:39 (6)	05:50 19:24	06:10 (9) 07:10 (9)	06:01 19:57	05:31 20:27
31	07:16 17:15	06:39 (6) 07:39 (6)	05:48 19:25	06:09 (9) 07:21 (9)	05:31 20:28	05:31 454
Ore potenziali eliofanía	296	296	369	399	450	454
Totale, caso peggiore	115	30	165	125	184	
Probabilità di eliofanía	0,44	0,46	0,44	0,48	0,47	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,44	0,46	0,44	0,48	0,47	
Totale effettivo	51	14	73	60	86	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DN - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (118)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:27 (11) 19:36	06:54 (10) 18:45	07:26 (8) 16:58	07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 (11) 19:35	06:58 18:43	07:24 (8) 16:56	07:09 16:32
3	05:32 20:39	05:57 20:18	06:28 (11) 19:33	06:59 18:42	07:23 (8) 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:29 (11) 19:31	07:01 18:40	07:22 (8) 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 (11) 19:30	07:02 18:38	07:22 (8) 16:53	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	07:23 (8) 16:52	07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	07:24 (8) 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:06 (9) 18:33	07:25 (8) 16:49	07:13 (6) 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:03 (9) 18:32	07:28 (7) 16:48	07:12 (6) 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:02 (9) 18:30	07:27 (7) 16:47	06:43 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:01 (9) 18:28	07:29 (7) 16:46	06:45 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	07:01 (9) 18:27	07:30 (7) 16:45	06:46 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:01 (9) 18:25	07:31 (7) 16:44	06:47 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:02 (9) 18:24	07:32 (7) 16:43	06:48 16:32
15	05:40 20:35	06:09 20:03	06:41 19:13	07:02 (14) 18:22	06:49 16:42	07:12 (6) 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:02 (14) 18:20	06:51 16:41	07:14 (6) 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:03 (14) 18:19	06:52 16:41	07:15 (6) 16:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:04 (14) 18:17	06:53 16:40	07:16 (6) 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:05 (14) 18:16	06:54 16:39	07:18 (6) 16:33
20	05:44 20:31	06:14 19:55	06:46 19:04	07:08 (14) 18:14	06:55 16:38	07:19 (6) 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:09 (14) 18:13	06:57 16:38	07:20 (6) 16:34
22	05:46 20:30	06:32 (11) 19:52	06:16 19:01	06:48 18:11	06:58 16:37	07:25 16:35
23	05:46 20:29	06:31 (11) 19:51	06:17 18:59	06:49 18:10	06:59 16:36	07:26 16:35
24	05:47 20:28	06:30 (11) 19:49	06:18 18:57	06:50 18:08	07:00 16:36	07:26 16:36
25	05:48 20:27	06:29 (11) 19:48	06:19 18:55	06:51 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:29 (11) 19:46	06:20 18:54	06:52 17:06	07:02 16:35	07:27 16:37
27	05:50 20:25	06:28 (11) 19:45	06:21 18:52	06:53 (10) 17:04	06:53 16:34	07:27 16:37
28	05:51 20:24	06:28 (11) 19:43	06:22 18:50	06:54 (10) 17:03	06:54 16:34	07:28 16:38
29	05:52 20:23	06:28 (11) 19:41	06:23 18:48	06:55 (10) 17:01	06:55 16:33	07:28 16:39
30	05:53 20:22	06:27 (11) 19:40	06:24 18:47	06:52 (10) 17:00	06:56 16:33	07:28 16:40
31	05:54 20:21	06:27 (11) 19:38	06:26 18:47	06:53 (10) 16:59	06:57 16:33	07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	122	141	105	114	144	
Probabilità di eliofania	0,61	0,67	0,58	0,44	0,40	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,61	0,67	0,58	0,44	0,40	
Totale effettivo	74	94	61	50	58	

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)





## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DO - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (119)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:29 16:41	07:15 17:16	06:38 17:51	06:46 19:26	06:00 19:59	05:30 20:29	05:31 20:40	05:55 20:20	06:27 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	07:29 16:42	07:14 17:17	06:36 17:52	06:45 19:27	05:58 20:00	05:30 20:30	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	06:34 16:56	07:09 16:32
3	07:29 16:43	07:13 17:19	06:35 17:53	06:43 19:28	05:57 20:01	05:29 20:30	05:32 20:40	05:57 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	07:29 16:44	07:12 17:20	06:33 17:55	06:41 19:29	05:56 20:02	05:29 20:31	05:32 20:39	05:58 20:17	06:30 19:31	07:01 18:40	06:36 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:55 20:03	05:29 20:32	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:38 19:31	05:53 20:04	05:28 20:32	05:33 20:39	06:00 20:15	06:32 19:28	07:03 18:37	06:38 16:52	07:13 16:31
7	07:29 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	05:28 20:33	05:34 20:39	06:01 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 16:31
8	07:29 16:48	07:07 17:25	06:27 17:59	06:35 19:34	05:51 20:06	05:28 20:34	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	05:27 20:34	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	06:42 16:48	07:16 16:31
10	07:28 16:50	07:05 17:28	06:24 18:02	06:31 19:36	05:49 20:08	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	06:43 16:47	07:17 16:31
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	05:27 20:35	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	06:45 16:46	07:18 16:31
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:37	06:06 20:07	06:38 19:18	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:19 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44	07:19 16:32
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43	07:20 16:32
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:03	06:41 19:13	07:13 18:22	06:49 16:42	07:21 16:32
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 16:32
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38	05:41 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	05:40 20:16	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:08	07:16 18:17	06:53 16:40	07:23 16:33
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	05:27 20:39	05:43 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39	05:44 20:32	06:14 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	07:24 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39	05:45 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 16:38	07:25 16:34
22	07:23 17:04	06:49 17:43	06:03 18:15	06:13 19:49	05:37 20:20	05:27 20:39	05:46 20:30	06:16 19:52	06:48 19:01	07:21 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:40	05:46 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:26 16:35
24	07:21 17:06	06:46 17:45	06:00 18:17	06:10 19:51	05:35 20:22	05:28 20:40	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	06:24 17:07	07:01 16:35	07:27 16:36
26	07:20 17:09	06:43 17:47	05:57 18:19	06:07 19:53	05:34 20:24	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 20:25	05:29 20:40	05:50 20:26	06:21 19:45	06:53 18:52	06:26 17:04	07:04 16:34	07:27 16:37
28	07:18 17:11	06:40 17:50	05:53 18:22	06:04 19:55	05:32 20:26	05:29 20:40	05:51 20:25	06:22 19:43	06:54 18:50	06:28 17:03	07:05 16:34	07:28 16:38
29	07:17 17:12	06:39 17:51	05:51 18:23	06:02 19:56	05:32 20:26	05:30 20:40	05:52 20:24	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	07:17 17:14	06:38 17:52	05:50 18:24	06:01 19:58	05:31 20:27	05:30 20:40	05:53 20:23	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	07:16 17:15	06:37 17:53	05:49 18:25	06:00 19:59	05:30 20:28	05:29 20:40	05:54 20:21	06:25 19:38	06:31 18:46	06:31 16:59	07:08 16:40	07:28 16:41
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofania												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (120)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	06:21 (5) 20:29 10
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	05:58 19:59	06:21 (5) 20:29 10
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	06:21 (5) 20:30 9
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	06:20 (5) 20:31 10
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03	06:21 (5) 20:31 9
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	06:21 (5) 20:32 8
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	06:22 (5) 20:33 8
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06	06:22 (5) 20:33 7
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:50 20:07	06:23 (5) 20:34 6
10	07:28 16:50	07:04 17:28	06:23 18:01	06:31 19:36	05:48 20:08	06:23 (5) 20:35 5
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	06:25 (5) 20:35 4
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	06:27 (5) 20:36 2
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	06:31 (5) 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	06:32 (5) 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	06:33 (5) 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	06:34 (5) 20:37
17	07:25 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	06:35 (5) 20:38
18	07:25 16:59	06:54 17:38	06:10 18:10	06:18 19:44	05:40 20:16	06:36 (5) 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	06:37 (5) 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	06:38 (5) 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	06:39 (5) 20:39
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	06:40 (5) 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	06:41 (5) 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	06:42 (5) 20:39
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	06:43 (5) 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:07 19:53	05:34 20:24	06:44 (5) 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	06:45 (5) 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	06:46 (5) 20:40
29	07:17 17:12	06:38 17:51	05:52 18:22	06:03 19:56	05:32 20:26	06:47 (5) 20:40
30	07:16 17:14	06:37 17:52	05:51 18:23	06:02 19:57	05:31 20:27	06:48 (5) 20:40
31	07:15 17:15	06:36 17:53	05:50 18:24	06:01 19:58	05:31 20:28	06:49 (5) 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Totale, caso peggiore				123	291	90
Probabilità di eliofania				0,48	0,47	0,54
Tempo di operatività rid.				1,00	1,00	1,00
Dir. del vento rid.				1,00	1,00	1,00
Totale ridotto				0,48	0,47	0,54
Totale effettivo				59	136	49

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DP - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (120)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Luglio		Agosto		Settembre		Ottobre		Novembre		Dicembre	
1	05:30	19:33 (7)	05:55	06:36 (5)	06:26	06:57	06:32	07:08				
	20:40	4 19:37 (7)	20:20	12 06:48 (5)	19:36	18:45	16:57	16:32				
2	05:31	19:33 (7)	05:56	06:35 (5)	06:27	06:58	06:33	07:09				
	20:39	5 19:38 (7)	20:19	14 06:49 (5)	19:35	18:43	16:56	16:32				
3	05:31	19:32 (7)	05:57	06:34 (5)	06:28	06:59	06:35	07:10				
	20:39	6 19:38 (7)	20:18	17 06:51 (5)	19:33	18:42	16:55	16:32				
4	05:32	19:33 (7)	05:58	06:33 (5)	06:29	07:00	06:36	07:11				
	20:39	6 19:39 (7)	20:17	18 06:51 (5)	19:31	18:40	16:54	16:32				
5	05:33	19:32 (7)	05:59	06:32 (5)	06:30	07:01	06:37	07:12				
	20:39	7 19:39 (7)	20:16	20 06:52 (5)	19:30	18:38	16:53	16:31				
6	05:33	19:32 (7)	06:00	06:31 (5)	06:31	07:03	06:38	07:13				
	20:39	8 19:40 (7)	20:14	22 06:53 (5)	19:28	18:36	16:51	16:31				
7	05:34	19:32 (7)	06:01	06:31 (5)	06:32	07:04	06:39	07:14				
	20:38	9 19:41 (7)	20:13	22 06:53 (5)	19:26	18:35	16:50	16:31				
8	05:34	19:32 (7)	06:02	06:30 (5)	06:34	07:05	06:41	07:15				
	20:38	9 19:41 (7)	20:12	23 06:53 (5)	19:25	18:33	16:49	16:31				
9	05:35	19:32 (7)	06:03	06:30 (5)	06:35	07:06	06:42	07:16				
	20:38	10 19:42 (7)	20:11	23 06:53 (5)	19:23	18:32	16:48	16:31				
10	05:36	19:32 (7)	06:04	06:30 (5)	06:36	07:07	06:43	07:16				
	20:37	10 19:42 (7)	20:09	23 06:53 (5)	19:21	18:30	16:47	16:31				
11	05:37	19:32 (7)	06:05	06:30 (5)	06:37	07:08	06:44	07:17				
	20:37	10 19:42 (7)	20:08	23 06:53 (5)	19:19	18:28	16:46	16:31				
12	05:37	19:32 (7)	06:06	06:30 (5)	06:38	07:09	06:46	07:18				
	20:36	10 19:42 (7)	20:07	23 06:53 (5)	19:18	18:27	16:45	16:31				
13	05:38	19:33 (7)	06:07	06:30 (5)	06:39	07:10	06:47	07:19				
	20:36	9 19:42 (7)	20:05	23 06:53 (5)	19:16	18:25	16:44	16:31				
14	05:39	19:33 (7)	06:08	06:30 (5)	06:40	07:11	06:48	07:20				
	20:35	10 19:43 (7)	20:04	22 06:52 (5)	19:14	18:23	16:43	16:32				
15	05:40	19:33 (7)	06:09	06:31 (5)	06:41	07:12	06:49	07:20				
	20:35	9 19:42 (7)	20:02	20 06:51 (5)	19:13	18:22	16:42	16:32				
16	05:40	19:34 (7)	06:10	06:32 (5)	06:42	07:13	06:50	07:21				
	20:34	8 19:42 (7)	20:01	18 06:50 (5)	19:11	18:20	16:41	16:32				
17	05:41	19:34 (7)	06:11	06:33 (5)	06:43	07:15	06:52	07:22				
	20:33	7 19:41 (7)	20:00	16 06:49 (5)	19:09	18:19	16:40	16:32				
18	05:42	19:36 (7)	06:12	06:34 (5)	06:44	07:16	06:53	07:23				
	20:33	5 19:41 (7)	19:58	13 06:47 (5)	19:07	18:17	16:40	16:33				
19	05:43	06:13	06:37 (5)	06:45	07:17	06:54	07:23					
	20:32	7 19:57	06:44 (5)	19:06	18:16	16:39	16:33					
20	05:44	06:14	06:46	07:18	06:55	07:24						
	20:31	19:55	19:04	18:14	16:38	16:33						
21	05:45	06:15	06:47	07:19	06:56	07:24						
	20:31	19:54	19:02	18:13	16:37	16:34						
22	05:45	06:16	06:48	07:20	06:58	07:25						
	20:30	19:52	19:00	18:11	16:37	16:34						
23	05:46	06:17	06:49	07:22	06:59	07:25						
	20:29	19:51	18:59	18:10	16:36	16:35						
24	05:47	06:18	06:50	07:23	07:00	07:26						
	20:28	19:49	18:57	18:08	16:36	16:35						
25	05:48	06:19	06:51	06:24	07:01	07:26						
	20:27	19:48	18:55	17:07	16:35	16:36						
26	05:49	06:20	06:52	06:25	07:02	07:27						
	20:26	19:46	18:53	17:05	16:34	16:37						
27	05:50	06:21	06:53	06:26	07:03	07:27						
	20:25	19:44	18:52	17:04	16:34	16:37						
28	05:51	06:22	06:54	06:27	07:04	07:27						
	20:24	19:43	18:50	17:03	16:34	16:38						
29	05:52	06:23	06:55	06:29	07:06	07:28						
	20:23	19:41	18:48	17:01	16:33	16:39						
30	05:53	06:24	06:56	06:30	07:07	07:28						
	20:22	19:40	18:47	17:00	16:33	16:39						
31	05:54	06:39 (5)	06:25	06:31	06:31	07:28						
	20:21	6 06:45 (5)	19:38	16:59	16:59	16:40						
Ore potenziali eliofania	461		429		375	345	297	286				
Totale, caso peggiore		148		359								
Probabilità di eliofania		0,61		0,67								
Tempo di operatività rid.		1,00		1,00								
Dir. del vento rid.		1,00		1,00								
Totale ridotto		0,61		0,67								
Totale effettivo		90		239								

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento)  
Tramonto (hh:mm)Minuti d'ombra Fine ombreggiamento (hh:mm) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (121)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile		Maggio		Giugno	
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (12) 06:58 (12)	06:46 19:26	7	07:05 (8) 07:12 (8)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52		06:45 19:27	10	07:03 (8) 07:13 (8)	05:58 20:00	05:30 20:29
3	07:29 16:43	07:13 17:19	06:35 17:53	6	06:54 (6) 07:00 (6)	06:43 19:28	12	07:02 (8) 07:14 (8)	05:57 20:01
4	07:29 16:44	07:12 17:20	06:33 17:55	9	06:52 (6) 07:01 (6)	06:41 19:29	11	07:02 (8) 07:13 (8)	05:56 20:02
5	07:29 16:45	07:10 17:21	06:32 17:56	11	06:51 (6) 07:02 (6)	06:40 19:30	10	07:02 (8) 07:12 (8)	05:55 20:03
6	07:29 16:46	07:09 17:23	06:30 17:57	13	06:49 (6) 07:02 (6)	06:38 19:31	8	07:03 (8) 07:11 (8)	05:53 20:04
7	07:29 16:47	07:08 17:24	06:28 17:58	14	06:48 (6) 07:02 (6)	06:36 19:32	1	05:52 07:07 (8)	05:28 20:05
8	07:28 16:48	07:07 17:25	06:27 17:59	14	06:48 (6) 07:02 (6)	06:35 19:34	10	05:51 20:06	06:16 (10) 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	13	06:48 (6) 07:01 (6)	06:33 19:35	11	05:50 20:07	06:16 (10) 20:34
10	07:28 16:50	07:05 17:28	06:23 18:02	10	06:49 (6) 06:59 (6)	06:31 19:36	1	06:50 (13) 06:51 (13)	05:49 20:08
11	07:28 16:51	07:03 17:29	06:22 18:03	5	06:52 (6) 06:57 (6)	06:30 19:37	1	05:47 06:49 (13)	05:27 20:09
12	07:28 16:52	07:02 17:30	06:20 18:04		06:28 19:38		1	06:47 (14) 06:48 (14)	05:46 20:10
13	07:27 16:53	07:01 17:31	06:19 18:05		06:27 19:39		4	05:45 06:49 (14)	05:45 20:11
14	07:27 16:54	07:00 17:33	06:17 18:06		06:25 19:40		6	05:44 06:50 (14)	05:44 20:12
15	07:27 16:55	06:58 17:34	06:15 18:07		06:23 19:41		7	05:43 06:49 (14)	05:43 20:13
16	07:26 16:57	06:57 17:35	06:13 18:08		06:22 19:42		8	05:42 06:49 (14)	05:42 20:14
17	07:26 16:58	06:56 17:36	06:12 18:09		06:20 19:43		6	05:41 06:47 (14)	05:41 20:15
18	07:25 16:59	06:54 17:38	06:10 18:11		06:19 19:44			05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12		06:17 19:46			05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13		06:16 19:47		5	06:36 (9) 06:41 (9)	05:38 20:18
21	07:23 17:03	06:50 17:41	06:05 18:14		06:14 19:48		9	05:38 06:43 (9)	05:38 20:19
22	07:23 17:04	06:49 17:43	06:03 18:15	3	06:22 (7) 06:25 (7)	06:13 19:49	10	05:37 06:44 (9)	05:37 20:20
23	07:22 17:05	06:47 17:44	06:02 18:16	6	06:20 (7) 06:26 (7)	06:11 19:50	10	05:36 06:43 (9)	05:28 20:21
24	07:21 17:06	06:46 17:45	06:00 18:17	7	06:19 (7) 06:26 (7)	06:10 19:51	10	05:35 06:43 (9)	05:28 20:22
25	07:21 17:07	06:44 17:46	05:58 18:18	9	06:17 (7) 06:26 (7)	06:08 19:52	9	05:35 06:42 (9)	05:28 20:23
26	07:20 17:09	06:43 17:47	05:57 18:19	7	06:17 (7) 06:24 (7)	06:07 19:53	7	05:34 06:41 (9)	05:29 20:24
27	07:19 17:10	06:41 17:49	05:55 18:20	4	06:18 (7) 06:22 (7)	06:05 19:54	2	05:33 06:39 (9)	05:29 20:25
28	07:18 17:11	06:40 17:50	05:53 18:22		06:04 19:55			05:33 20:25	05:29 20:40
29	07:17 17:12		06:51 19:23		06:02 19:56			05:32 20:26	05:30 20:40
30	07:16 17:14		06:50 19:24		06:01 19:57			05:31 20:27	05:30 20:40
31	07:16 17:15		06:48 19:25	4	07:07 (8) 07:11 (8)			05:31 20:28	05:29 20:40
Ore potenziali eliofania	296	296	369		399			450	454
Totale, caso peggiore			136		155			89	
Probabilità di eliofania			0,44		0,48			0,47	
Tempo di operatività rid.			1,00		1,00			1,00	
Dir. del vento rid.			1,00		1,00			1,00	
Totale ridotto			0,44		0,48			0,47	
Totale effettivo			60		74			41	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DQ - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (121)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:25 (10) 06:27	06:48 (13) 06:57	06:32 07:08	07:08 16:33
2	05:31 20:40	05:56 20:19	06:25 (10) 06:28	06:49 (13) 06:58	06:34 07:09	16:32 07:10
3	05:32 20:39	05:57 20:18	06:25 (10) 06:29	06:50 (13) 18:43	16:56 16:32	07:10 07:11
4	05:32 20:39	05:58 20:17	06:25 (10) 06:30	07:01 18:40	9 07:37 (6) 07:26 (6)	16:55 16:32
5	05:33 20:39	05:59 20:16	06:26 (10) 06:31	07:02 18:38	12 07:38 (6) 07:25 (6)	16:54 16:32
6	05:33 20:39	06:00 20:15	06:26 (10) 06:32	06:58 (8) 07:03	13 07:38 (6) 07:25 (6)	16:53 16:32
7	05:34 20:39	06:01 20:13	06:28 (10) 06:33	07:06 (8) 18:37	14 07:38 (6) 07:24 (6)	16:52 16:31
8	05:35 20:38	06:02 20:12	06:34 (10) 06:34	07:07 (8) 18:35	15 07:38 (6) 07:24 (6)	16:50 16:31
9	05:35 20:38	06:03 20:11	06:35 (10) 19:25	07:07 (8) 18:33	16 07:37 (6) 07:23 (6)	16:49 16:31
10	05:36 20:37	06:04 20:09	06:36 (10) 19:21	07:07 (8) 18:32	17 07:36 (6) 07:22 (6)	16:48 16:31
11	05:37 20:37	06:05 20:08	06:37 (10) 19:20	07:08 (8) 18:30	18 07:35 (6) 07:21 (6)	16:47 16:31
12	05:37 20:36	06:06 20:07	06:38 (10) 06:38	07:09 (8) 18:28	19 07:34 (6) 07:20 (6)	16:46 16:31
13	05:38 20:36	06:07 20:05	06:39 (10) 19:18	07:10 (8) 18:27	20 07:33 (6) 07:19 (6)	16:45 16:31
14	05:39 20:35	06:08 20:04	06:40 (10) 19:16	07:11 (8) 18:25	21 07:32 (6) 07:18 (6)	16:44 16:32
15	05:40 20:35	06:09 20:03	06:41 (10) 19:14	07:12 (8) 18:24	22 07:31 (6) 07:17 (6)	16:43 16:32
16	05:40 20:34	06:10 20:01	06:42 (9) 06:42	07:13 (8) 18:22	23 07:30 (6) 07:16 (6)	16:42 16:32
17	05:41 20:34	06:11 20:00	06:43 (9) 06:43	07:14 (8) 18:21	24 07:29 (6) 07:15 (6)	16:41 16:33
18	05:42 20:33	06:12 19:58	06:44 (9) 06:44	07:15 (8) 18:20	25 07:28 (6) 07:14 (6)	16:40 16:33
19	05:43 20:32	06:13 19:57	06:45 (9) 06:45	07:16 (8) 18:19	26 07:27 (6) 07:13 (6)	16:39 16:33
20	05:44 20:31	06:14 19:55	06:46 (9) 06:46	07:17 (8) 18:18	27 07:26 (6) 07:12 (6)	16:38 16:34
21	05:45 20:31	06:15 19:54	06:47 (9) 06:47	07:18 (8) 18:17	28 07:25 (6) 07:11 (6)	16:37 16:34
22	05:46 20:30	06:16 19:52	06:48 (9) 06:48	07:19 (8) 18:16	29 07:24 (6) 07:10 (6)	16:36 16:34
23	05:46 20:29	06:17 19:51	06:49 (9) 06:49	07:20 (8) 18:15	30 07:23 (6) 07:09 (6)	16:35 16:34
24	05:47 20:28	06:18 19:49	06:50 (9) 06:50	07:21 (8) 18:14	31 07:22 (6) 07:08 (6)	16:34 16:34
25	05:48 20:27	06:19 19:48	06:51 (9) 18:59	07:22 (8) 18:13	07:07 (6) 07:07 (6)	16:33 16:34
26	05:49 20:26	06:20 19:46	06:52 (9) 06:52	07:23 (8) 18:12	07:06 (6) 07:06 (6)	16:32 16:34
27	05:50 20:25	06:21 19:45	06:53 (9) 06:53	07:24 (8) 18:11	07:05 (6) 07:05 (6)	16:31 16:34
28	05:51 20:24	06:22 19:43	06:54 (9) 06:54	07:25 (8) 18:10	07:04 (6) 07:04 (6)	16:30 16:34
29	05:52 20:23	06:23 19:41	06:55 (9) 06:55	07:26 (8) 18:09	07:03 (6) 07:03 (6)	16:29 16:34
30	05:53 20:22	06:24 19:40	06:56 (9) 06:56	07:27 (8) 18:08	07:02 (6) 07:02 (6)	16:28 16:34
31	05:54 20:21	06:25 19:38	06:57 (9) 06:57	07:28 (8) 18:07	07:01 (6) 07:01 (6)	16:27 16:34
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	24	163	101	95		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	15	109	58	41		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Ute autorizzato:

VSB Neue Energien Deutschland GmbH

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DE-01069 Dresden

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Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DR - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (122)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28	07:15	06:38	06:46	06:00	05:30	05:30	05:55	06:26	06:57	06:32	07:08
	16:41	17:16	17:51	19:26	19:59	20:29	20:40	20:20	19:36	18:45	16:57	16:32
2	07:29	07:14	06:36	06:45	05:58	05:30	05:31	05:56	06:27	06:58	06:34	07:09
	16:42	17:17	17:52	19:27	20:00	20:29	20:40	20:19	19:35	18:43	16:56	16:32
3	07:29	07:13	06:35	06:43	05:57	05:29	05:32	05:57	06:29	06:59	06:35	07:10
	16:43	17:19	17:53	19:28	20:01	20:30	20:39	20:18	19:33	18:42	16:55	16:32
4	07:29	07:11	06:33	06:41	05:56	05:29	05:32	05:58	06:30	07:00	06:36	07:11
	16:44	17:20	17:54	19:29	20:02	20:31	20:39	20:17	19:31	18:40	16:54	16:32
5	07:29	07:10	06:32	06:40	05:54	05:28	05:33	05:59	06:31	07:02	06:37	07:12
	16:45	17:21	17:56	19:30	20:03	20:32	20:39	20:16	19:30	18:38	16:53	16:32
6	07:29	07:09	06:30	06:38	05:53	05:28	05:33	06:00	06:32	07:03	06:38	07:13
	16:46	17:22	17:57	19:31	20:04	20:32	20:39	20:14	19:28	18:37	16:51	16:31
7	07:29	07:08	06:28	06:36	05:52	05:28	05:34	06:01	06:33	07:04	06:40	07:14
	16:47	17:24	17:58	19:32	20:05	20:33	20:38	20:13	19:26	18:35	16:50	16:31
8	07:28	07:07	06:27	06:35	05:51	05:28	05:34	06:02	06:34	07:05	06:41	07:15
	16:48	17:25	17:59	19:34	20:06	20:34	20:38	20:12	19:25	18:33	16:49	16:31
9	07:28	07:06	06:25	06:33	05:50	05:27	05:35	06:03	06:35	07:06	06:42	07:16
	16:49	17:26	18:00	19:35	20:07	20:34	20:38	20:11	19:23	18:32	16:48	16:31
10	07:28	07:05	06:23	06:31	05:48	05:27	05:36	06:04	06:36	07:07	06:43	07:17
	16:50	17:28	18:01	19:36	20:08	20:35	20:37	20:09	19:21	18:30	16:47	16:31
11	07:28	07:03	06:22	06:30	05:47	05:27	05:37	06:05	06:37	07:08	06:45	07:17
	16:51	17:29	18:03	19:37	20:09	20:35	20:37	20:08	19:20	18:28	16:46	16:31
12	07:28	07:02	06:20	06:28	05:46	05:27	05:37	06:06	06:38	07:09	06:46	07:18
	16:52	17:30	18:04	19:38	20:10	20:36	20:36	20:07	19:18	18:27	16:45	16:31
13	07:27	07:01	06:18	06:26	05:45	05:27	05:38	06:07	06:39	07:10	06:47	07:19
	16:53	17:31	18:05	19:39	20:11	20:36	20:36	20:05	19:16	18:25	16:44	16:31
14	07:27	07:00	06:17	06:25	05:44	05:27	05:39	06:08	06:40	07:11	06:48	07:20
	16:54	17:33	18:06	19:40	20:12	20:37	20:35	20:04	19:14	18:24	16:43	16:32
15	07:27	06:58	06:15	06:23	05:43	05:27	05:40	06:09	06:41	07:13	06:49	07:21
	16:55	17:34	18:07	19:41	20:13	20:37	20:35	20:03	19:13	18:22	16:42	16:32
16	07:26	06:57	06:13	06:22	05:42	05:27	05:40	06:10	06:42	07:14	06:51	07:21
	16:56	17:35	18:08	19:42	20:14	20:38	20:34	20:01	19:11	18:20	16:41	16:32
17	07:26	06:56	06:12	06:20	05:41	05:27	05:41	06:11	06:43	07:15	06:52	07:22
	16:58	17:36	18:09	19:43	20:15	20:38	20:34	20:00	19:09	18:19	16:41	16:32
18	07:25	06:54	06:10	06:19	05:40	05:27	05:42	06:12	06:44	07:16	06:53	07:23
	16:59	17:38	18:10	19:44	20:16	20:38	20:33	19:58	19:07	18:17	16:40	16:33
19	07:25	06:53	06:08	06:17	05:39	05:27	05:43	06:13	06:45	07:17	06:54	07:23
	17:00	17:39	18:12	19:45	20:17	20:39	20:32	19:57	19:06	18:16	16:39	16:33
20	07:24	06:51	06:07	06:15	05:38	05:27	05:44	06:14	06:46	07:18	06:55	07:24
	17:01	17:40	18:13	19:47	20:18	20:39	20:31	19:55	19:04	18:14	16:38	16:34
21	07:23	06:50	06:05	06:14	05:38	05:27	05:45	06:15	06:47	07:19	06:57	07:25
	17:02	17:41	18:14	19:48	20:19	20:39	20:31	19:54	19:02	18:13	16:38	16:34
22	07:23	06:48	06:03	06:12	05:37	05:27	05:45	06:16	06:48	07:20	06:58	07:25
	17:04	17:43	18:15	19:49	20:20	20:39	20:30	19:52	19:01	18:11	16:37	16:34
23	07:22	06:47	06:02	06:11	05:36	05:28	05:46	06:17	06:49	07:22	06:59	07:26
	17:05	17:44	18:16	19:50	20:21	20:40	20:29	19:51	18:59	18:10	16:36	16:35
24	07:21	06:46	06:00	06:09	05:35	05:28	05:47	06:18	06:50	07:23	07:00	07:26
	17:06	17:45	18:17	19:51	20:22	20:40	20:28	19:49	18:57	18:08	16:36	16:36
25	07:21	06:44	05:58	06:08	05:34	05:28	05:48	06:19	06:51	06:24	07:01	07:26
	17:07	17:46	18:18	19:52	20:23	20:40	20:27	19:48	18:55	17:07	16:35	16:36
26	07:20	06:43	05:56	06:07	05:34	05:28	05:49	06:20	06:52	06:25	07:02	07:27
	17:09	17:47	18:19	19:53	20:24	20:40	20:26	19:46	18:54	17:06	16:35	16:37
27	07:19	06:41	05:55	06:05	05:33	05:29	05:50	06:21	06:53	06:26	07:03	07:27
	17:10	17:49	18:20	19:54	20:25	20:40	20:25	19:44	18:52	17:04	16:34	16:37
28	07:18	06:39	05:53	06:04	05:32	05:29	05:51	06:22	06:54	06:28	07:05	07:27
	17:11	17:50	18:22	19:55	20:25	20:40	20:24	19:43	18:50	17:03	16:34	16:38
29	07:17		06:51	06:02	05:32	05:30	05:52	06:23	06:55	06:29	07:06	07:28
	17:12		19:23	19:56	20:26	20:40	20:23	19:41	18:48	17:01	16:33	16:39
30	07:16		06:50	06:01	05:31	05:30	05:53	06:24	06:56	06:30	07:07	07:28
	17:14		19:24	19:57	20:27	20:40	20:22	19:40	18:47	17:00	16:33	16:40
31	07:16		06:48		05:31		05:54	06:25		06:31		07:28
	17:15		19:25		20:28		20:21	19:38		16:59		16:40
Ore potenziali eliofanía	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore												
Probabilità di eliofanía												
Tempo di operatività rid.												
Dir. del vento rid.												
Totale ridotto												
Totale effettivo												

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 66  
 Luca Di Grigoli / luca.digrigoli@vsv.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+Esistenti Recettore d'ombra: DS - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (123)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	18:38 (12) 20:29	05:30 20:40	05:55 20:20		06:26 19:36	06:57 18:45	06:32 16:57
2	07:28 16:42	07:13 17:17	06:36 17:52	06:45 19:27	05:58 20:00	18:39 (12) 20:29	05:30 20:40	05:56 20:19	5	19:01 (12) 19:06 (12)	06:27 19:35	06:33 16:56
3	07:29 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	18:40 (12) 20:29	05:32 20:39	05:57 20:18	12	18:57 (12) 19:09 (12)	06:28 19:33	06:35 16:55
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	18:40 (12) 20:31	05:32 20:39	05:58 20:17	16	18:55 (12) 19:11 (12)	06:29 19:31	06:36 16:54
5	07:29 16:45	07:10 17:21	06:32 17:56	06:40 19:30	05:54 20:03	18:41 (12) 20:31	05:28 20:39	05:59 20:16	20	18:53 (12) 19:13 (12)	06:31 19:30	06:37 16:53
6	07:29 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04	18:42 (12) 20:32	05:33 20:39	06:00 20:14	22	18:52 (12) 19:14 (12)	06:32 19:28	06:38 16:51
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05	18:43 (12) 20:33	05:28 20:38	06:01 20:13	24	18:51 (12) 19:15 (12)	06:33 19:26	07:04 16:50
8	07:28 16:48	07:07 17:25	06:27 17:59	06:35 19:33	05:51 20:06	18:44 (12) 20:33	05:28 20:38	06:02 20:12	26	18:50 (12) 19:16 (12)	06:34 19:25	07:05 16:49
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 20:07	18:46 (12) 20:34	05:27 20:38	06:03 20:11	28	18:49 (12) 19:17 (12)	06:35 19:23	07:06 16:48
10	07:28 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 20:08	18:49 (12) 20:35	05:27 20:37	06:04 20:09	29	18:48 (12) 19:17 (12)	06:36 19:21	07:07 16:47
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	05:47 20:09	18:59 (12) 20:35	05:27 20:37	06:05 20:08	29	18:48 (12) 19:17 (12)	06:37 19:19	07:08 16:46
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	05:27 20:36	05:37 20:36	06:06 20:05	31	18:47 (12) 19:18 (12)	06:38 19:18	07:09 16:45
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	05:27 20:36	05:38 20:36	06:07 20:05	31	18:47 (12) 19:18 (12)	06:39 19:16	07:10 16:44
14	07:27 16:54	06:59 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37	05:39 20:35	06:08 20:04	39	18:46 (12) 19:31 (6)	06:40 19:14	07:11 16:43
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37	05:40 20:35	06:09 20:02	42	18:46 (12) 19:32 (6)	06:41 19:13	07:12 16:42
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:37	05:40 20:34	06:10 20:01	43	18:46 (12) 19:33 (6)	06:42 19:11	07:14 16:41
17	07:26 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 19:03 (12)	05:27 19:03 (12)	05:41 20:33	06:11 20:00	43	18:46 (12) 19:33 (6)	06:43 19:09	07:15 16:41
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 19:05 (12)	05:27 19:05 (12)	05:42 20:33	06:12 19:58	44	18:46 (12) 19:33 (6)	06:44 19:07	07:16 16:40
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 19:07 (12)	05:27 19:07 (12)	05:43 20:32	06:13 19:57	43	18:46 (12) 19:33 (6)	06:45 19:06	07:17 16:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 19:07 (12)	05:27 19:07 (12)	05:44 20:31	06:14 19:55	41	18:46 (12) 19:32 (6)	06:46 19:04	07:18 16:38
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 19:24 (6)	05:27 19:24 (6)	05:45 20:31	06:15 19:54	37	18:47 (12) 19:31 (6)	06:47 19:02	07:19 16:38
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 19:25 (6)	05:27 19:25 (6)	05:45 20:30	06:16 19:52	32	18:47 (12) 19:29 (6)	06:48 19:00	07:20 16:37
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 19:26 (6)	05:28 19:26 (6)	05:46 20:29	06:17 19:51	24	18:48 (12) 19:12 (12)	06:49 18:59	07:22 16:36
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 19:27 (6)	05:28 19:27 (6)	05:47 20:28	06:18 19:49	21	18:49 (12) 19:10 (12)	06:50 18:57	07:23 16:36
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 19:28 (6)	05:28 19:28 (6)	05:48 20:27	06:19 19:48	17	18:51 (12) 19:08 (12)	06:51 18:55	07:24 16:36
26	07:20 17:09	06:42 17:47	05:56 18:19	06:07 19:53	05:34 19:26 (6)	05:28 19:26 (6)	05:49 20:26	06:20 19:46	12	18:53 (12) 19:05 (12)	06:52 18:54	07:25 16:35
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	05:33 19:25 (6)	05:29 19:25 (6)	05:50 20:25	06:21 19:44		06:53 18:52	06:26 17:04	07:27 16:34
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 19:24 (6)	05:29 19:24 (6)	05:51 20:25	06:22 19:43		06:54 18:50	06:27 17:03	07:28 16:34
29	07:17 17:12		06:51 19:23	06:02 19:56	05:32 19:23 (6)	05:30 19:23 (6)	05:52 20:23	06:23 19:41		06:55 18:55	06:29 17:01	07:28 16:33
30	07:16 17:14		06:50 19:24	06:01 19:57	05:31 19:09 (12)	05:30 19:09 (12)	05:53 20:22	06:24 19:40		06:56 18:47	06:30 17:00	07:28 16:40
31	07:15 17:15		06:48 19:25		05:31 20:28		05:54 20:21	06:25 19:38		06:31 16:59		07:28 16:40
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286
Totale, caso peggiore				472	229			711				
Probabilità di eliofania				0,48	0,47			0,67				
Tempo di operatività rid.				1,00	1,00			1,00				
Dir. del vento rid.				1,00	1,00			1,00				
Totale ridotto				0,48	0,47			0,67				
Totale effettivo				226	107			474				

Legenda della tabella:

Giorno del mese    Alba (hh:mm)    Tramonto (hh:mm)Minuti d'ombra    Inizio ombreggiamento (hh:mm)    Fine ombreggiamento (hh:mm)    (WTG che provoca l'inizio dell'ombreggiamento)    (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (124)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno		
1	07:29 16:41	07:15 17:16	07:35 (8) 07:39 (8)	06:38 17:51	06:46 19:26	07:21 (1) 07:46 (1)	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 17:17		06:36 17:52	06:45 19:27	07:19 (1) 07:46 (1)	05:58 20:00	05:30 20:30
3	07:29 16:43	07:13 17:19		06:35 17:53	06:43 19:28	07:19 (1) 07:47 (1)	05:57 20:01	05:29 20:30
4	07:29 16:44	07:12 17:20		06:33 17:55	06:41 19:29	07:18 (1) 07:47 (1)	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21		06:32 17:56	06:40 19:30	07:17 (1) 07:46 (1)	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23		06:30 17:57	06:38 19:31	07:17 (1) 07:47 (1)	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24		06:28 17:58	06:36 19:33	07:16 (1) 07:46 (1)	05:52 20:05	05:28 20:33
8	07:29 16:48	07:07 17:25		06:27 17:59	06:35 19:34	07:16 (1) 07:45 (1)	05:51 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26		06:25 18:00	06:33 19:35	07:16 (1) 07:45 (1)	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28		06:24 18:02	06:31 19:36	07:16 (1) 07:44 (1)	05:49 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29		06:22 18:03	06:30 19:37	07:16 (1) 07:43 (1)	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30		06:20 18:04	06:28 19:38	07:17 (1) 07:42 (1)	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31		06:19 18:05	06:27 19:39	07:18 (1) 07:40 (1)	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 17:33		06:17 18:06	06:25 19:40	07:20 (1) 07:39 (1)	05:44 20:12	05:27 20:37
15	07:27 16:55	06:58 17:34		06:15 18:07	06:23 19:41	07:21 (1) 07:36 (1)	05:43 20:13	05:27 20:37
16	07:26 16:57	06:57 17:35	07:17 (9)	06:14 18:08	06:22 19:42	07:24 (1) 07:34 (1)	05:42 20:14	05:27 20:38
17	07:26 16:58	06:56 17:36	07:18 (9)	06:12 18:09	06:20 19:43		05:41 20:15	05:27 20:38
18	07:25 16:59	06:54 17:38	07:14 (9)	06:10 18:11	06:19 19:44		05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	07:12 (9)	06:08 18:12	06:17 19:46		05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	07:11 (9)	06:07 18:13	06:16 19:47		05:38 20:18	05:27 20:39
21	07:24 17:02	06:50 17:41	07:13 (9)	06:05 18:14	06:14 19:48		05:38 20:19	05:27 20:39
22	07:23 17:04	06:49 17:43	07:08 (10)	06:03 18:15	06:13 19:49		05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	07:06 (10)	06:02 18:16	06:11 19:50		05:36 20:21	05:28 20:40
24	07:21 17:06	06:46 17:45	07:05 (10)	06:00 18:17	06:10 19:51		05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	07:04 (10)	05:58 18:18	06:08 19:52		05:34 20:23	05:28 20:40
26	07:20 17:09	06:43 17:47	07:05 (10)	05:57 18:19	06:07 19:53		05:34 20:24	05:29 20:40
27	07:19 17:10	06:41 17:49	07:13 (10)	05:55 18:20	06:05 19:54		05:33 20:25	05:29 20:40
28	07:18 17:11	07:39 (8) 07:40 (8)	06:40 17:50	05:53 18:22	06:31 (1) 06:38 (1)	06:04 19:55	05:32 20:26	05:29 20:40
29	07:17 17:12	07:38 (8) 07:40 (8)		06:51 19:23	07:27 (1) 07:42 (1)	06:02 19:56	05:32 20:26	05:30 20:40
30	07:17 17:14	07:37 (7) 07:40 (8)		06:50 19:24	07:24 (1) 07:43 (1)	06:01 19:58	05:31 20:27	05:30 20:40
31	07:16 17:15	07:36 (7) 07:40 (8)		06:48 19:25	07:23 (1) 07:45 (1)		05:31 20:28	
Ore potenziali eliofania	296	296	369	399	402	450	454	
Totale, caso peggiore	10	70	121	402	408			
Probabilità di eliofania	0,44	0,46	0,44	1,00	1,00	1,00	1,00	
Tempo di operatività rid.	1,00	1,00	1,00	1,00	1,00	1,00	1,00	
Dir. del vento rid.	1,00	1,00	1,00	1,00	1,00	1,00	1,00	
Totale ridotto	0,44	0,46	0,44	1,00	1,00	1,00	1,00	
Totale effettivo	4	32	53	192				

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering Progetto+ Esistenti Recettore d'ombra: DT - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (124)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:31 20:40	05:55 20:20	06:27 19:36	07:16 (1) 07:43 (1)	06:57 18:45	06:32 16:58	07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	07:15 (1) 07:43 (1)	06:58 18:43	06:34 16:56	07:09 16:32
3	05:32 20:40	05:57 20:18	06:29 19:33	07:14 (1) 07:43 (1)	06:59 18:42	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:13 (1) 07:42 (1)	07:01 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:12 (1) 07:42 (1)	07:02 18:38	06:37 16:53	07:12 16:32
6	05:33 20:39	06:00 20:15	06:32 19:28	07:12 (1) 07:42 (1)	07:03 18:37	06:38 16:52	07:13 16:31
7	05:34 20:39	06:01 20:13	06:33 19:26	07:12 (1) 07:42 (1)	07:04 18:35	06:40 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:12 (1) 07:41 (1)	07:05 18:33	06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:12 (1) 07:40 (1)	07:06 18:32	06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:12 (1) 07:39 (1)	07:07 18:30	06:43 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:13 (1) 07:38 (1)	07:08 18:28	06:45 16:46	07:18 16:31
12	05:37 20:37	06:06 20:07	06:38 19:18	07:14 (1) 07:37 (1)	07:09 18:27	06:46 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:15 (1) 07:35 (1)	07:10 18:25	06:47 16:44	07:19 16:32
14	05:39 20:35	06:08 20:04	06:40 19:14	07:16 (1) 07:32 (1)	07:11 18:24	06:48 16:43	07:20 16:32
15	05:40 20:34	06:09 20:03	06:41 19:13	07:19 (1) 07:29 (1)	07:13 18:22	06:49 16:42	07:21 16:32
16	05:40 20:34	06:10 20:01	06:42 19:11	07:14 18:20	07:14 18:20	06:51 16:41	07:21 16:32
17	05:41 20:34	06:11 20:00	06:43 19:09	07:15 (1) 18:19	07:15 18:19	06:52 16:41	07:22 16:33
18	05:42 20:33	06:12 19:58	06:44 19:08	07:16 (1) 18:17	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 19:06	07:17 (1) 18:16	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:32	06:14 19:55	06:46 19:04	07:18 (1) 18:14	07:18 18:14	06:55 16:38	07:24 16:34
21	05:45 20:31	06:15 19:54	06:47 19:02	07:19 (1) 18:13	07:19 18:13	06:57 16:38	07:25 16:34
22	05:46 20:30	06:16 19:52	06:48 19:01	07:20 (1) 18:11	07:20 18:11	06:58 16:37	07:25 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:22 (1) 18:10	07:22 18:10	06:59 16:36	07:26 16:35
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 (1) 18:08	07:23 18:08	07:00 16:36	07:26 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:24 (1) 18:07	06:24 18:07	07:01 16:35	07:27 16:36
26	05:49 20:26	06:20 19:46	06:52 18:54	07:25 (1) 17:06	06:25 17:06	07:02 16:35	07:27 16:37
27	05:50 20:26	06:21 19:45	06:53 18:52	07:26 (1) 17:04	06:26 17:04	07:04 16:34	07:27 16:37
28	05:51 20:25	06:22 19:43	06:54 18:50	07:27 (1) 17:03	06:28 17:03	07:05 16:34	07:28 16:38
29	05:52 20:24	06:23 19:41	06:55 18:49	07:28 (1) 17:01	06:29 17:01	07:06 16:33	07:28 16:39
30	05:53 20:22	06:25 19:40	06:56 18:47	07:29 (1) 17:00	06:30 17:00	07:07 16:33	07:28 16:40
31	05:54 20:21	06:26 19:38	06:57 18:42 (1)	07:30 (1)	06:31 16:59		07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286	
Totale, caso peggiore			381	127	14		
Probabilità di eliofania		0,67	0,58	0,44	0,40		
Tempo di operatività rid.		1,00	1,00	1,00	1,00		
Dir. del vento rid.		1,00	1,00	1,00	1,00		
Totale ridotto		0,67	0,58	0,44	0,40		
Totale effettivo		61	220	55	6		

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



# SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DU - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (125)

## Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTCs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1   07:28	09:12 (1)   07:15	06:38	06:46	06:00	05:30	05:31	05:55	06:27	06:57	06:32	07:08	09:06 (1)	
1   16:41	53   10:05 (1)   17:16	17:51	19:26	19:59	20:29	20:40	20:20	19:36	18:45	16:58	16:33	38   09:44 (1)	
2   07:29	09:13 (1)   07:14	06:36	06:45	05:58	05:30	05:31	05:56	06:28	06:58	06:34	07:09	09:05 (1)	
1   16:42	52   10:05 (1)   17:17	17:52	19:27	20:00	20:29	20:40	20:19	19:35	18:43	16:56	16:32	40   09:45 (1)	
3   07:29	09:14 (1)   07:13	06:35	06:43	05:57	05:29	05:32	05:57	06:29	06:59	06:35	07:10	09:04 (1)	
1   16:43	51   10:05 (1)   17:19	17:53	19:28	20:01	20:30	20:40	20:18	19:33	18:42	16:55	16:32	43   09:47 (1)	
4   07:29	09:14 (1)   07:12	06:33	06:41	05:56	05:29	05:32	05:58	06:30	07:01	06:36	07:11	09:04 (1)	
1   16:44	51   10:05 (1)   17:20	17:55	19:29	20:02	20:31	20:39	20:17	19:31	18:40	16:54	16:32	44   09:48 (1)	
5   07:29	09:16 (1)   07:10	06:32	06:40	05:55	05:29	05:33	05:59	06:31	07:02	06:37	07:12	09:03 (1)	
1   16:45	49   10:05 (1)   17:21	17:56	19:30	20:03	20:32	20:39	20:16	19:30	18:38	16:53	16:32	46   09:49 (1)	
6   07:29	09:17 (1)   07:09	06:30	06:38	05:53	05:28	05:33	06:00	06:32	07:03	06:38	07:13	09:03 (1)	
1   16:46	48   10:05 (1)   17:23	17:57	19:31	20:04	20:32	20:39	20:15	19:28	18:37	16:51	16:31	48   09:51 (1)	
7   07:29	09:18 (1)   07:08	06:28	06:36	05:52	05:28	05:34	06:01	06:33	07:04	06:40	07:14	09:03 (1)	
1   16:47	46   10:04 (1)   17:24	17:58	19:32	20:05	20:33	20:39	20:13	19:26	18:35	16:50	16:31	49   09:52 (1)	
8   07:28	09:19 (1)   07:07	06:27	06:35	05:51	05:28	05:35	06:02	06:34	07:05	06:41	07:15	09:03 (1)	
1   16:48	45   10:04 (1)   17:25	17:59	19:34	20:06	20:34	20:38	20:12	19:25	18:33	16:49	16:31	50   09:53 (1)	
9   07:28	09:20 (1)   07:06	06:25	06:33	05:50	05:27	05:35	06:03	06:35	07:06	06:42	07:16	09:03 (1)	
1   16:49	43   10:03 (1)   17:26	18:00	19:35	20:07	20:34	20:38	20:11	19:23	18:32	16:48	16:31	51   09:54 (1)	
10   07:28	09:22 (1)   07:05	06:23	06:31	05:49	05:27	05:36	06:04	06:36	07:07	06:43	07:17	09:03 (1)	
1   16:50	40   10:02 (1)   17:28	18:01	19:36	20:08	20:35	20:37	20:09	19:21	18:30	16:47	16:31	52   09:55 (1)	
11   07:28	09:23 (1)   07:03	06:22	06:30	05:47	05:27	05:37	06:05	06:37	07:08	06:45	07:18	09:03 (1)	
1   16:51	39   10:02 (1)   17:29	18:03	19:37	20:09	20:35	20:37	20:08	19:20	18:28	16:46	16:31	53   09:56 (1)	
12   07:28	09:24 (1)   07:02	06:20	06:28	05:46	05:27	05:37	06:06	06:38	07:09	06:46	07:18	09:02 (1)	
1   16:52	36   10:00 (1)   17:30	18:04	19:38	20:10	20:36	20:36	20:07	19:18	18:27	16:45	16:31	54   09:56 (1)	
13   07:27	09:27 (1)   07:01	06:18	06:26	05:45	05:27	05:38	06:07	06:39	07:10	06:47	07:19	09:02 (1)	
1   16:53	32   09:59 (1)   17:31	18:05	19:39	20:11	20:36	20:36	20:05	19:16	18:25	16:44	16:32	55   09:57 (1)	
14   07:27	09:29 (1)   07:00	06:17	06:25	05:44	05:27	05:39	06:08	06:40	07:11	06:48	07:20	09:03 (1)	
1   16:54	29   09:58 (1)   17:33	18:06	19:40	20:12	20:37	20:35	20:04	19:14	18:24	16:43	16:32	55   09:58 (1)	
15   07:27	09:31 (1)   06:58	06:15	06:23	05:43	05:27	05:40	06:09	06:41	07:13	06:49	07:21	09:03 (1)	
1   16:55	24   09:55 (1)   17:34	18:07	19:41	20:13	20:37	20:35	20:03	19:13	18:22	16:42	16:32	56   09:59 (1)	
16   07:26	09:35 (1)   06:57	06:13	06:22	05:42	05:27	05:40	06:10	06:42	07:14	06:51	07:21	09:03 (1)	
1   16:57	18   09:53 (1)   17:35	18:08	19:42	20:14	20:38	20:34	20:01	19:11	18:20	16:41	16:32	56   09:59 (1)	
17   07:26	09:40 (1)   06:56	06:12	06:20	05:41	05:27	05:41	06:11	06:43	07:15	06:52	07:22	09:04 (1)	
1   16:58	8   09:48 (1)   17:36	18:09	19:43	20:15	20:38	20:34	20:00	19:09	18:19	16:41	16:32	56   10:00 (1)	
18   07:25	06:54	06:10	06:19	05:40	05:27	05:42	06:12	06:44	07:16	06:53	07:23	09:04 (1)	
1   16:59	17:38	18:11	19:44	20:16	20:38	20:33	19:58	19:07	18:17	16:40	16:33	57   10:01 (1)	
19   07:25	06:53	06:08	06:17	05:39	05:27	05:43	06:13	06:45	07:17	06:54	07:23	09:04 (1)	
1   17:00	17:39	18:12	19:46	20:17	20:39	20:32	19:57	19:06	18:16	16:39	16:33	57   10:01 (1)	
20   07:24	06:51	06:07	06:16	05:38	05:27	05:44	06:14	06:46	07:18	06:55	07:24	09:05 (1)	
1   17:01	17:40	18:13	19:47	20:18	20:39	20:31	19:55	19:04	18:14	16:38	16:34	57   10:02 (1)	
21   07:23	06:50	06:05	06:14	05:38	05:27	05:45	06:15	06:47	07:19	06:57	07:25	09:05 (1)	
1   17:02	17:41	18:14	19:48	20:19	20:39	20:31	19:54	19:02	18:13	16:38	16:34	57   10:02 (1)	
22   07:23	06:49	06:03	06:12	05:37	05:27	05:45	06:16	06:48	07:21	06:58	07:25	09:05 (1)	
1   17:04	17:43	18:15	19:49	20:20	20:39	20:30	19:52	19:01	18:11	16:37	16:34	57   10:03 (1)	
23   07:22	06:47	06:02	06:11	05:36	05:28	05:46	06:17	06:49	07:22	06:59	07:26	09:06 (1)	
1   17:05	17:44	18:16	19:50	20:21	20:40	20:29	19:51	18:59	18:10	16:36	16:35	57   10:03 (1)	
24   07:21	06:46	06:00	06:10	05:35	05:28	05:47	06:18	06:50	07:23	07:00	07:26	09:07 (1)	
1   17:06	17:45	18:17	19:51	20:22	20:40	20:28	19:49	18:57	18:08	16:36	16:36	57   10:04 (1)	
25   07:21	06:44	05:58	06:08	05:34	05:28	05:48	06:19	06:51	06:24	07:01	7   09:18 (1)	07:26	09:07 (1)
1   17:07	17:46	18:18	19:52	20:23	20:40	20:27	19:48	18:55	17:07	16:35	8   09:26 (1)	16:36	57   10:04 (1)
26   07:20	06:43	05:56	06:07	05:34	05:28	05:49	06:20	06:52	06:25	07:02	9   09:13 (1)	07:27	09:07 (1)
1   17:09	17:47	18:19	19:53	20:24	20:40	20:26	19:46	18:54	17:06	16:35	18   09:31 (1)	16:37	57   10:04 (1)
27   07:19	06:41	05:55	06:05	05:33	05:29	05:50	06:21	06:53	06:26	07:04	10   09:10 (1)	07:27	09:08 (1)
1   17:10	17:49	18:20	19:54	20:25	20:40	20:25	19:45	18:52	17:04	16:34	24   09:34 (1)	16:37	56   10:04 (1)
28   07:18	06:39	05:53	06:04	05:32	05:29	05:51	06:22	06:54	06:28	07:05	11   09:08 (1)	07:28	09:09 (1)
1   17:11	17:50	18:22	19:55	20:25	20:40	20:25	19:43	18:50	17:03	16:34	29   09:37 (1)	16:38	56   10:05 (1)
29   07:17	06:37	06:51	06:02	05:32	05:30	05:52	06:23	06:55	06:29	07:06	12   09:08 (1)	07:28	09:10 (1)
1   17:12	17:51	19:23	19:56	20:26	20:40	20:23	19:41	18:48	17:01	16:33	32   09:40 (1)	16:39	55   10:05 (1)
30   07:16	06:36	06:50	06:01	05:31	05:30	05:53	06:24	06:56	06:30	07:07	13   09:07 (1)	07:28	09:10 (1)
1   17:14	17:52	19:24	19:57	20:27	20:40	20:22	19:40	18:47	17:00	16:33	35   09:42 (1)	16:40	55   10:05 (1)
31   07:16	06:35	06:48	06:00	05:31	05:31	05:54	06:25	06:57	06:31	07:01	14   09:08 (1)	07:28	09:11 (1)
1   17:15	17:53	19:25	19:58	20:28	20:40	20:21	19:38	18:45	17:00	16:33	35   09:42 (1)	16:40	54   10:05 (1)
Ore potenziali eliofania	296	296	369	399	450	454	461	429	375	345	297	286	
Totale, caso peggiore	664										146	1635	
Probabilità di eliofania	0,44										0,40	0,36	
Tempo di operatività rid.	1,00										1,00	1,00	
Dir. del vento rid.	1,00										1,00	1,00	
Totale ridotto	0,44										0,40	0,36	
Totale effettivo	293										59	594	

### Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra  
 Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm)  
 (WTG che provoca l'inizio dell'ombreggiamento)  
 (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (126)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	
1	07:28 16:41	07:15 17:16	06:38 17:51	06:57 (6) 07:05 (6)	06:46 19:26	07:05 (8) 19:59	06:00 20:29
2	07:29 16:42	07:14 17:17	06:36 17:52	06:56 (6) 07:06 (6)	06:45 19:27	07:03 (8) 20:00	05:58 20:29
3	07:29 16:43	07:13 17:19	06:35 17:53	06:54 (6) 07:07 (6)	06:43 19:28	07:02 (8) 20:01	05:57 20:30
4	07:29 16:44	07:12 17:20	06:33 17:55	06:52 (6) 07:06 (6)	06:41 19:29	07:02 (8) 20:02	05:56 20:31
5	07:29 16:45	07:10 17:21	06:32 17:56	06:52 (6) 07:07 (6)	06:40 19:30	07:02 (8) 20:03	05:55 20:32
6	07:29 16:46	07:09 17:23	06:30 17:57	06:51 (6) 07:06 (6)	06:38 19:31	07:03 (8) 20:04	05:53 20:32
7	07:29 16:47	07:08 17:24	06:28 17:58	06:51 (6) 07:05 (6)	06:36 19:32	07:05 (8) 20:05	05:52 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:53 (6) 07:04 (6)	06:35 19:34	05:51 20:06	06:16 (10) 20:34
9	07:28 16:49	07:06 17:26	06:25 18:00	06:54 (6) 07:02 (6)	06:33 19:35	05:50 20:07	06:14 (10) 20:34
10	07:28 16:50	07:05 17:28	06:23 18:02	06:31 19:36	05:49 20:08	10 20:08	06:14 (10) 20:35
11	07:28 16:51	07:03 17:29	06:22 18:03	06:30 19:37	06:48 (13) 20:09	05:47 20:09	06:13 (10) 20:35
12	07:28 16:52	07:02 17:30	06:20 18:04	06:28 19:38	06:47 (13) 20:10	05:46 20:10	06:13 (10) 20:36
13	07:27 16:53	07:01 17:31	06:19 18:05	06:27 19:39	06:45 (14) 20:11	05:45 20:11	06:13 (10) 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	06:44 (14) 20:12	05:44 20:12	06:13 (10) 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	06:42 (14) 20:13	05:43 20:13	06:14 (10) 20:37
16	07:26 16:57	06:57 17:35	06:13 18:08	06:22 19:42	06:41 (14) 20:14	05:42 20:14	06:14 (10) 20:38
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	06:40 (14) 20:15	05:41 20:15	06:15 (10) 20:38
18	07:25 16:59	06:54 17:38	06:10 18:11	06:19 19:44	06:41 (14) 20:16	05:40 20:16	06:16 (10) 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:46	05:39 20:17	5 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	5 20:18	05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	06:34 (9) 20:19	05:38 20:19	05:27 20:39
22	07:23 17:04	06:49 17:43	06:03 18:15	06:22 (7) 19:49	06:33 (9) 20:20	05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:02 18:16	06:20 (7) 19:50	06:32 (9) 20:21	05:36 20:21	05:28 20:40
24	07:21 17:06	06:46 17:45	06:00 18:17	06:19 (7) 19:51	06:32 (9) 20:22	05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:17 (7) 19:52	06:31 (9) 20:23	05:35 20:23	05:28 20:40
26	07:20 17:09	06:43 17:47	05:57 18:19	06:18 (7) 19:53	06:31 (9) 20:24	05:34 20:24	05:29 20:40
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	06:33 (9) 20:25	05:33 20:25	05:29 20:40
28	07:18 17:11	06:40 17:50	06:59 (6) 07:02 (6)	05:53 18:22	06:04 19:55	06:33 (9) 20:25	05:29 20:40
29	07:17 17:12		06:51 19:23	06:02 19:56	06:02 19:56	05:32 20:26	05:30 20:40
30	07:16 17:14		06:50 19:24	06:01 19:57	06:01 20:27	05:31 20:27	05:30 20:40
31	07:16 17:15		06:48 19:25	07:07 (8) 07:12 (8)	05:31 20:28	05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	107	454
Totale, caso peggiore		3	151	165		0,47	
Probabilità di eliofania		0,46	0,44	0,48		0,47	
Tempo di operatività rid.		1,00	1,00	1,00		1,00	
Dir. del vento rid.		1,00	1,00	1,00		1,00	
Totale ridotto		0,46	0,44	0,48		0,47	
Totale effettivo		1	66	79		50	

Legenda della tabella:

Giorno del mese Alba (hh:mm) Tramonto (hh:mm) Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario

Calcolo: ShadowFlickering\_Progetto+Esistenti Recettore d'ombra: DV - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (126)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:23 (10) 06:27 06:35 (10) 19:36	06:48 (13) 06:57 06:49 (13) 18:45	06:32 07:08 16:58 16:33	
2	05:31 20:40	05:56 20:19	06:23 (10) 06:28 06:34 (10) 19:35	06:58 18:43	06:34 07:09 16:56 16:32	
3	05:32 20:39	05:57 20:18	06:24 (10) 06:29 06:34 (10) 19:33	06:59 18:42	06:35 07:10 16:55 16:32	
4	05:32 20:39	05:58 20:17	06:24 (10) 06:30 06:33 (10) 19:31	07:01 18:40	06:36 07:11 16:54 16:32	
5	05:33 20:39	05:59 20:16	06:26 (10) 06:31 06:31 (10) 19:30	07:01 (8) 07:02 07:04 (8) 18:38	06:37 07:12 16:53 16:32	
6	05:33 20:39	06:00 20:15	06:32 19:28	06:58 (8) 07:03 07:06 (8) 18:37	06:38 07:13 16:52 16:31	
7	05:34 20:39	06:01 20:13	06:33 19:26	06:57 (8) 07:04 07:07 (8) 18:35	06:40 07:14 16:50 16:31	
8	05:35 20:38	06:02 20:12	06:34 19:25	06:56 (8) 07:05 07:07 (8) 18:33	06:41 07:15 16:49 16:31	
9	05:35 20:38	06:03 20:11	06:35 19:23	06:55 (8) 07:06 07:07 (8) 18:32	06:42 07:16 16:48 16:31	
10	05:36 20:37	06:04 20:09	06:36 19:21	06:56 (8) 07:07 07:07 (8) 18:30	06:43 07:17 16:47 16:31	
11	05:37 20:37	06:05 20:08	06:37 19:20	06:57 (8) 07:08 07:06 (8) 18:28	06:45 07:18 16:46 16:31	
12	05:37 20:36	06:06 20:07	06:38 19:18	06:58 (8) 07:09 07:04 (8) 18:27	06:46 07:18 16:45 16:31	
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	06:47 16:44 16:32	
14	05:39 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 16:43 16:32	
15	05:40 20:35	06:09 20:03	06:41 (9) 19:13	06:46 (9) 18:22	06:49 16:42 16:32	
16	05:40 20:34	06:10 20:01	06:39 (9) 19:11	06:42 18:20	06:51 16:41 16:32	
17	05:41 20:34	06:11 20:00	06:38 (9) 19:09	06:43 18:19	06:52 16:41 16:33	
18	05:42 20:33	06:12 19:58	06:38 (9) 19:08	06:44 18:17	06:53 16:40 16:33	
19	05:43 20:32	06:13 19:57	06:37 (9) 19:06	06:45 18:16	06:54 16:39 16:33	
20	05:44 20:31	06:14 19:55	06:38 (9) 19:04	06:46 18:14	06:55 16:38 16:34	
21	05:45 20:31	06:15 19:54	06:38 (9) 19:02	06:47 18:13	06:57 16:38 16:34	
22	05:46 20:30	06:16 19:52	06:39 (9) 19:01	06:48 18:11	06:58 16:37 16:35	
23	05:46 20:29	06:17 19:51	06:45 (9) 18:59	07:11 (7) 18:10	07:21 16:36 16:35	
24	05:47 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:26 16:36 16:36	
25	05:48 20:27	06:19 19:48	06:44 (14) 18:55	06:51 17:07	06:24 16:35 16:36	
26	05:49 20:26	06:20 19:46	06:42 (14) 18:54	06:52 17:06	06:25 16:35 16:37	
27	05:50 20:25	06:21 19:45	06:43 (14) 18:52	06:53 17:04	06:26 16:34 16:37	
28	05:51 20:24	06:22 19:43	06:44 (14) 18:50	06:54 17:03	06:28 16:34 16:38	
29	05:52 20:23	06:23 19:41	06:45 (14) 18:48	06:55 17:01	06:29 16:33 16:39	
30	05:53 20:22	06:25 19:40	06:46 (14) 18:47	06:56 17:00	06:30 16:33 16:40	
31	05:54 20:21	06:23 (10) 19:38	06:47 (13) 06:48 (13)	06:31 16:59	07:28 16:40	
Ore potenziali eliofania	461	429	375	345	297	286
Totale, caso peggiore	64	152	110	110		
Probabilità di eliofania	0,61	0,67	0,58	0,44		
Tempo di operatività rid.	1,00	1,00	1,00	1,00		
Dir. del vento rid.	1,00	1,00	1,00	1,00		
Totale ridotto	0,61	0,67	0,58	0,44		
Totale effettivo	39	101	64	48		

Legenda della tabella:

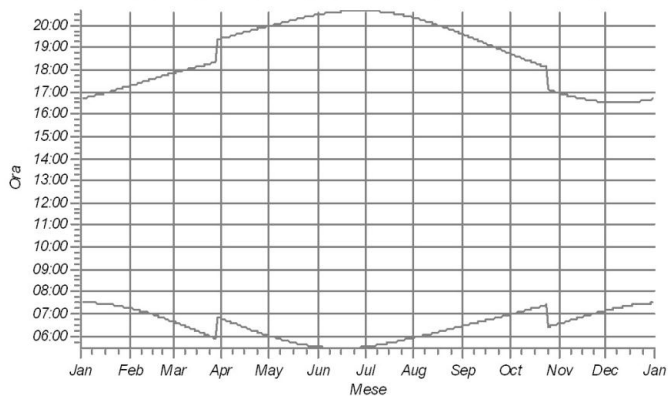
Giorno del mese Alba (hh:mm) Tramonto (hh:mm)Minuti d'ombra Inizio ombreggiamento (hh:mm) Fine ombreggiamento (hh:mm) (WTG che provoca l'inizio dell'ombreggiamento) (WTG che provoca l'ultimo ombreggiamento)



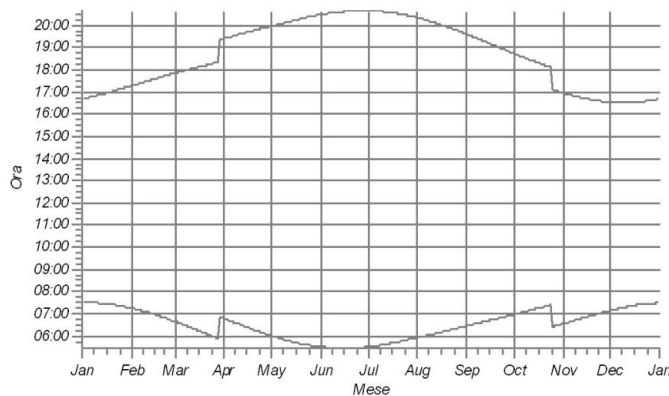
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

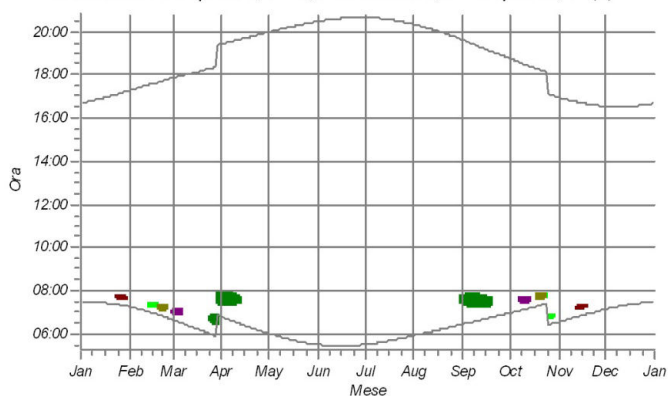
A: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (1)



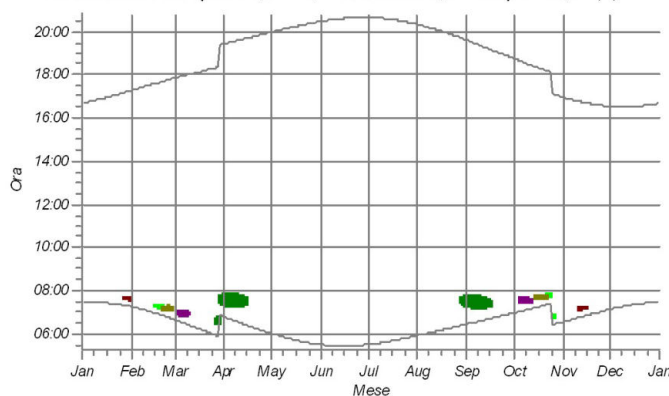
B: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (2)



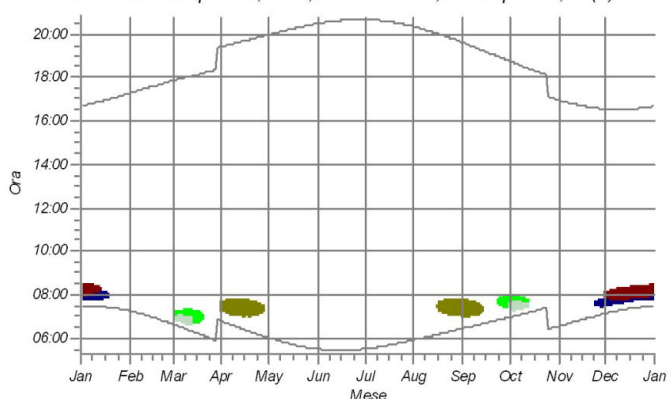
C: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (3)



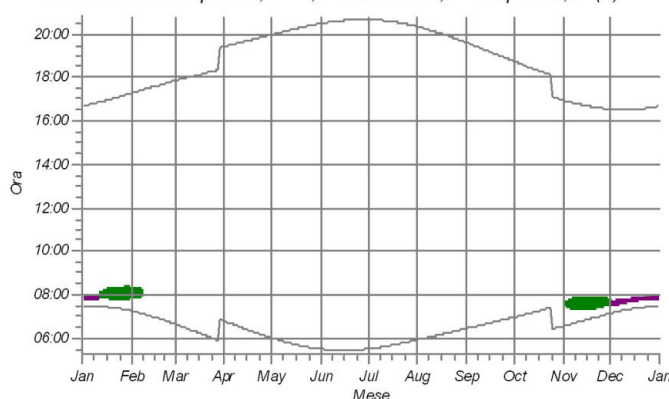
D: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (4)










E: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (5)



F: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6)



### WTG

- |   |  |   |   |
|---|--|---|---|
|  | 1: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (1)     |  | 10: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (5) |
|  | 7: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (2) |  | 11: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (6) |
|  | 8: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (3) |  | 14: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (9) |
|  | 9: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (4) |   |   |

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

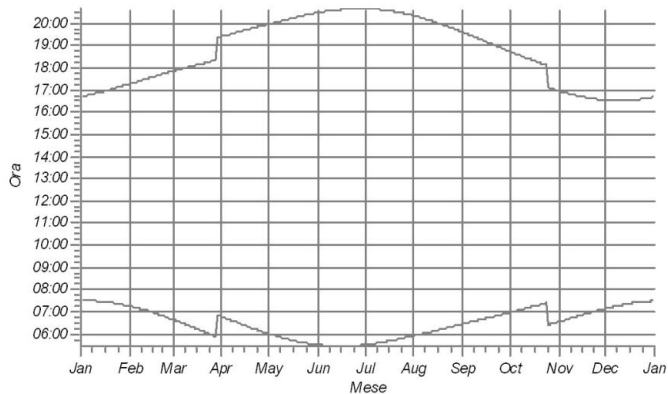
14/11/2023 14:53/3.6.355



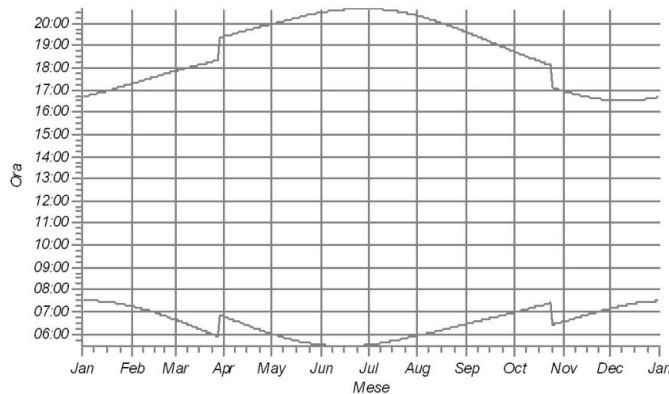
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

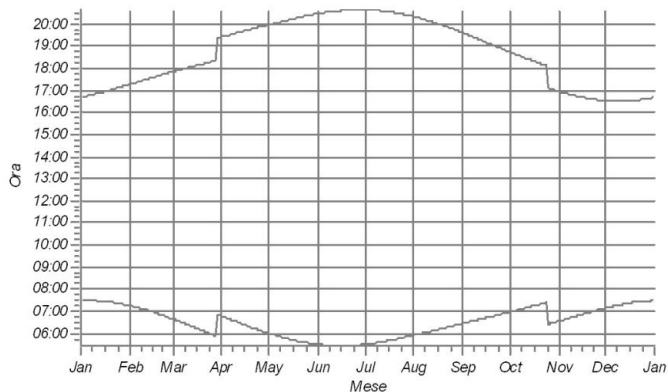
G: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)



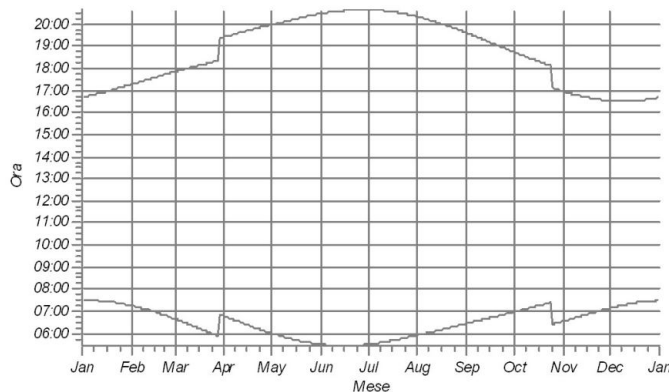
H: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)



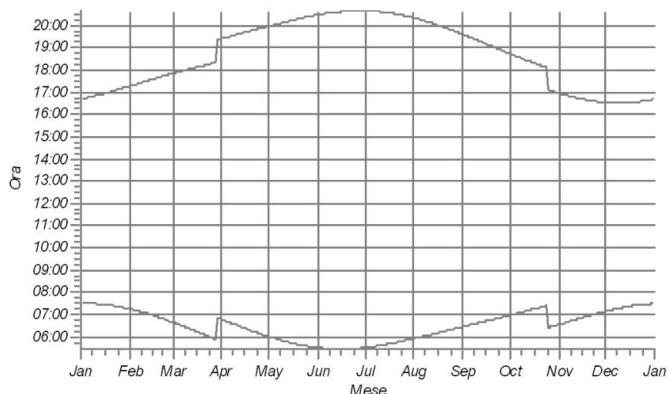
I: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (9)



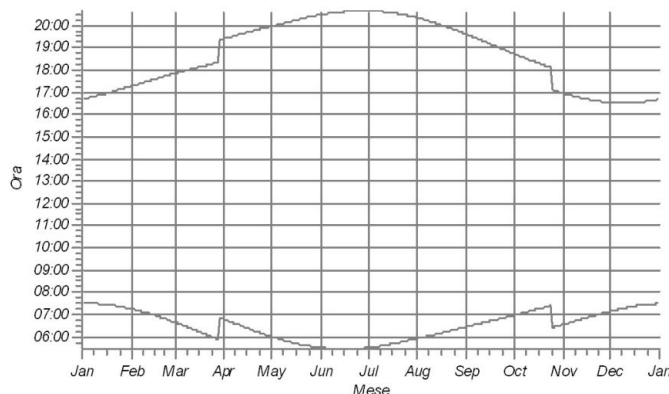
J: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (10)



K: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (11)



L: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (12)



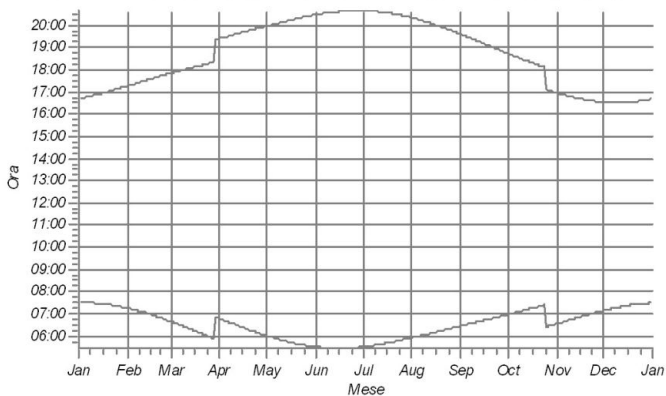
WTG



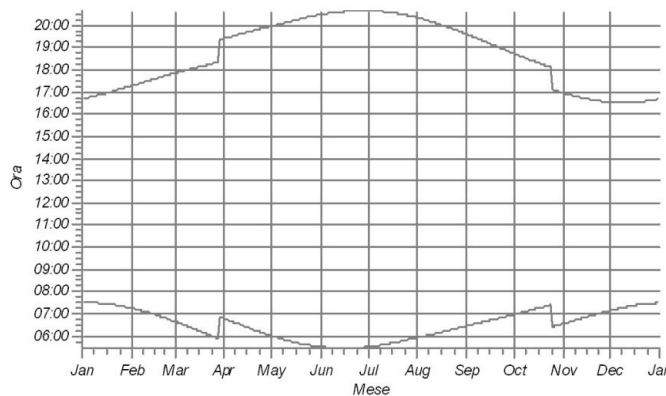
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

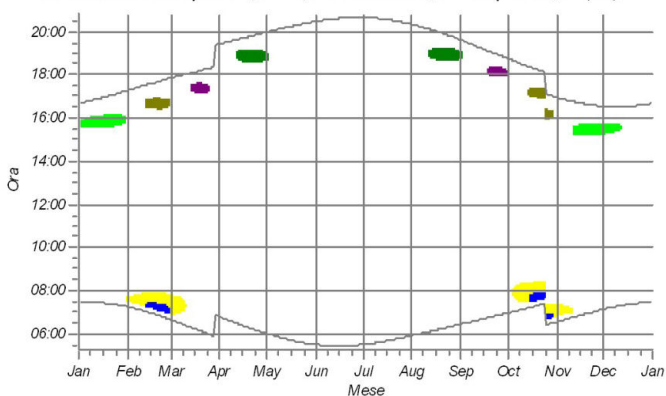
M: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (13)



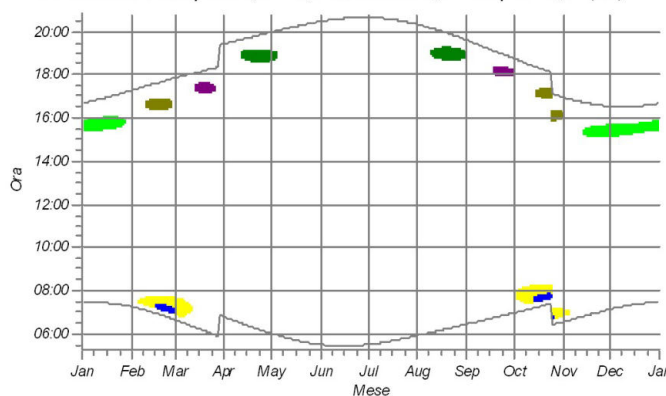
N: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)



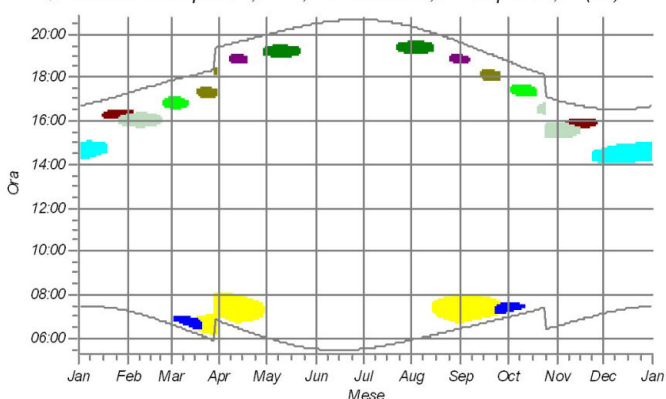
O: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)



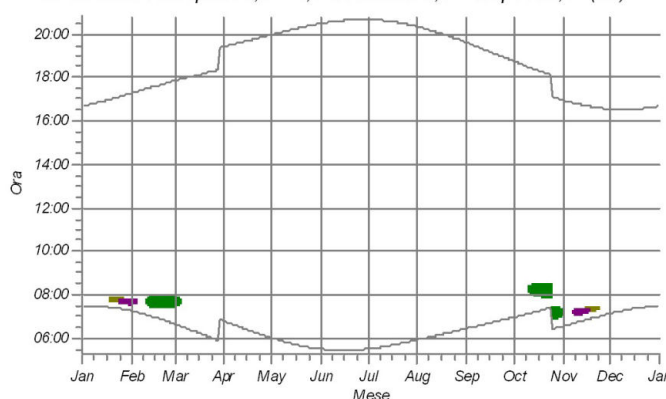
P: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (16)



Q: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)



R: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (18)



### WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)
- 8: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (3)
- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)

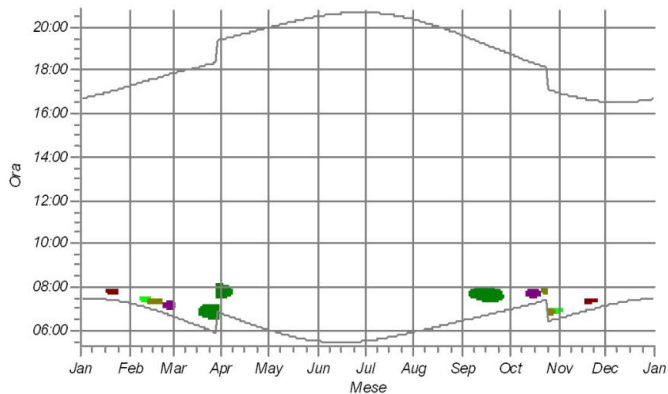
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)
- 13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)
- 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)



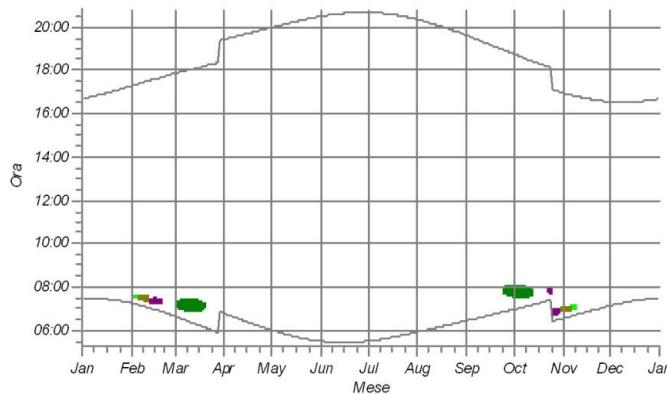
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

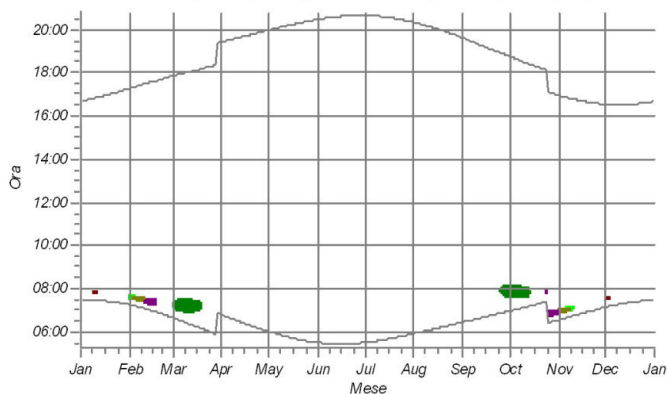
S: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)



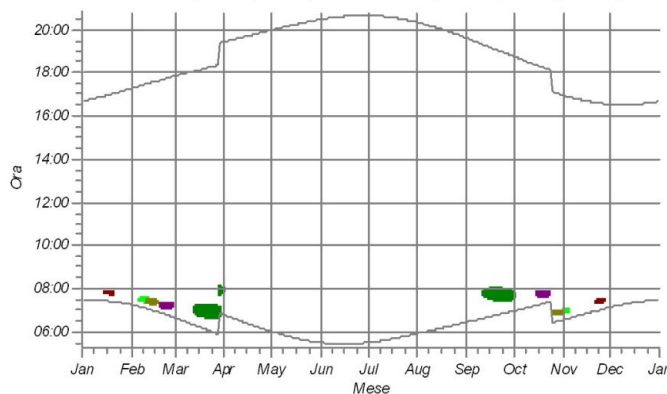
T: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (20)



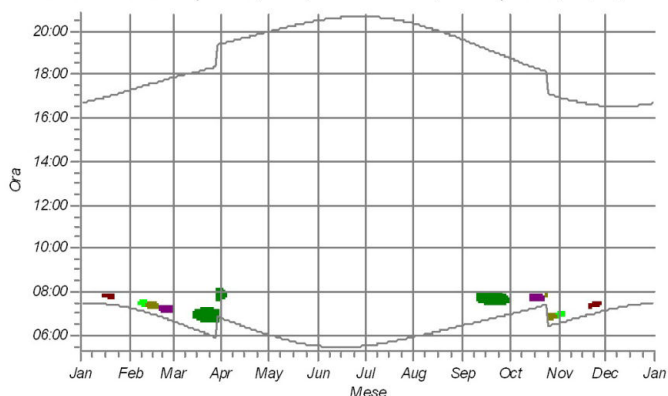
U: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (21)



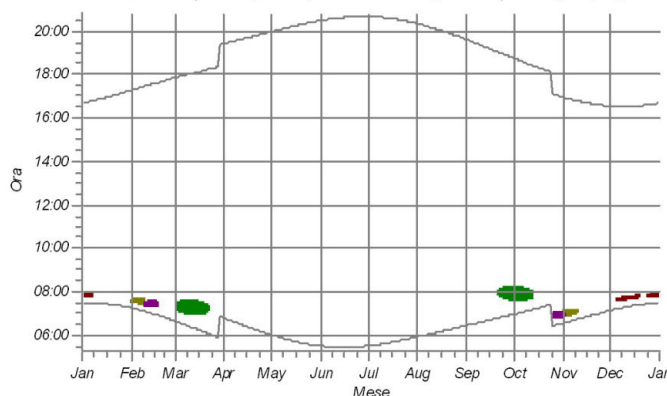
V: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)



W: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (23)



X: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (24)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)
- 8: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (3)

- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)

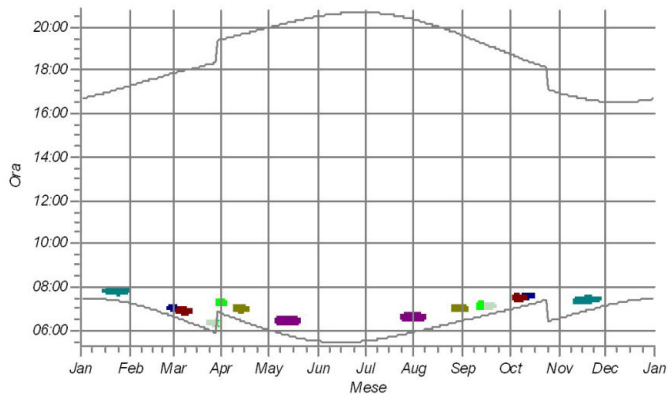




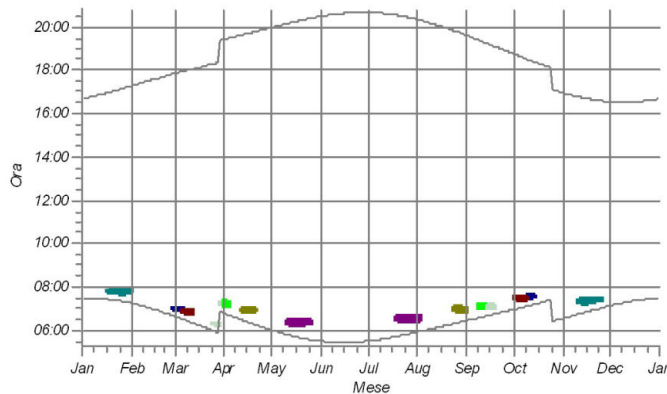
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

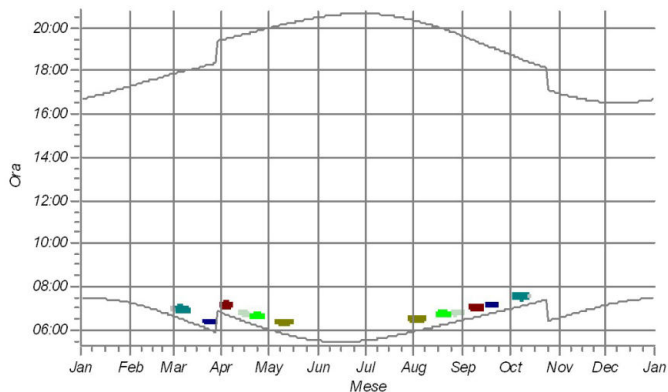
Y: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (25)



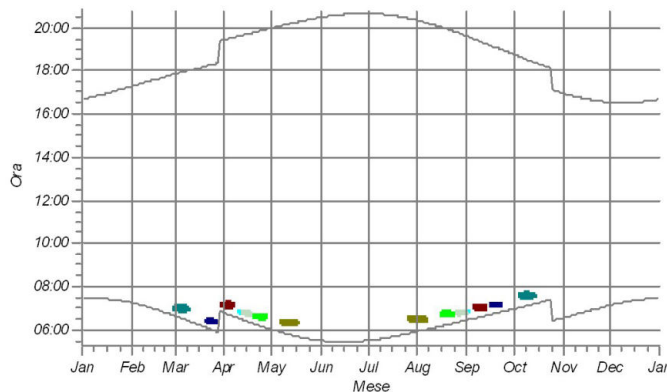
Z: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)



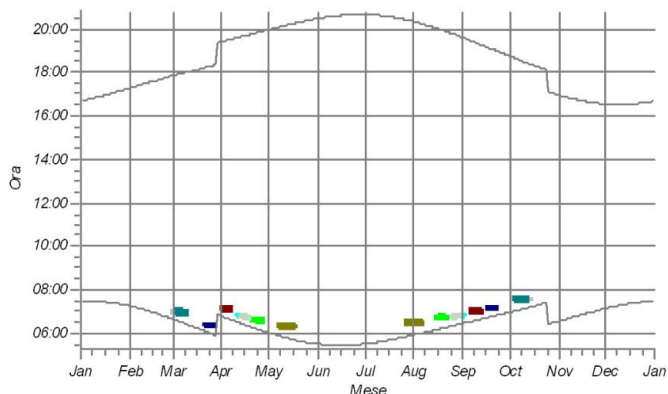
AA: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (27)



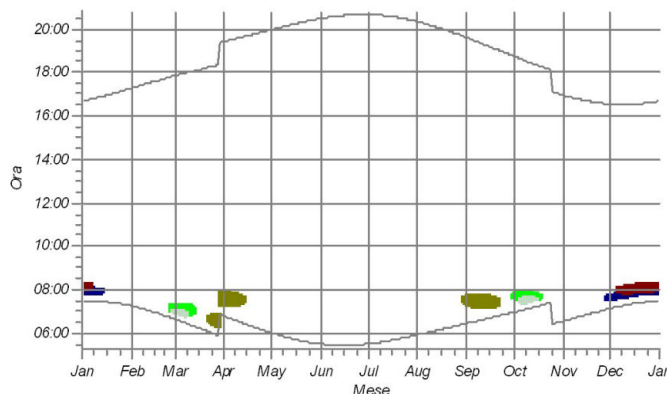
AB: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (28)












AC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (29)



AD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (30)



WTG

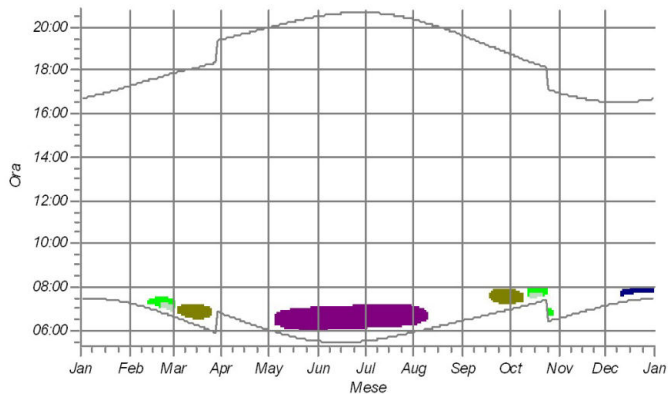
- |   |  |   |  |
|---|--|---|--|
|  | 6: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (1)  |  | 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6) |
|  | 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)  |  | 12: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (7) |
|  | 8: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (3)  |  | 13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8) |
|  | 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)  |  | 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9) |
|  | 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5) |   |  |



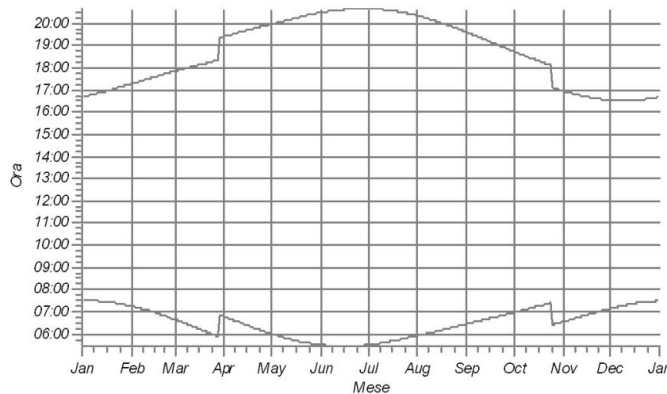
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

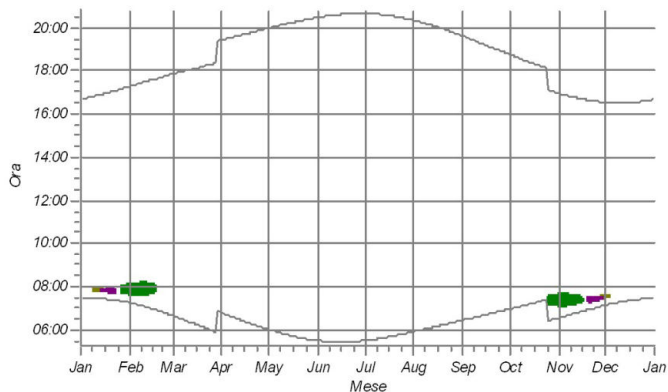
AE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)



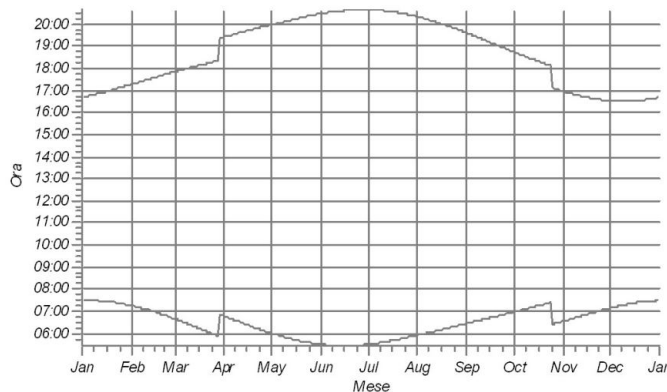
AF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (32)



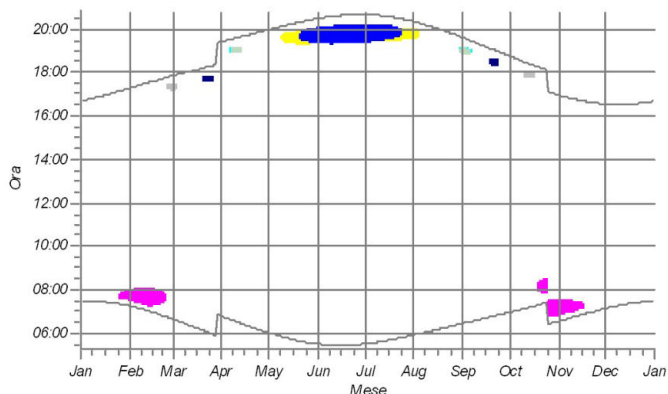
AG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (33)



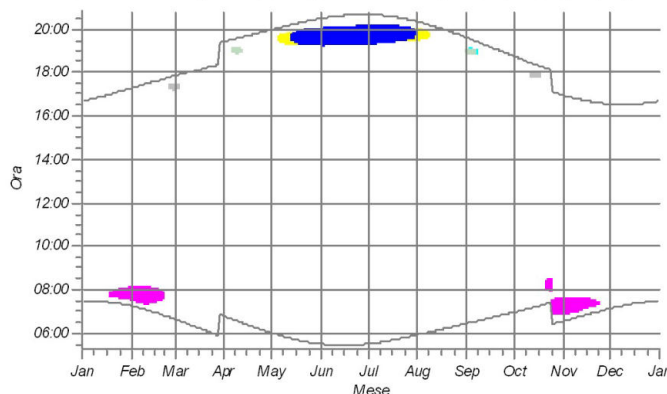
AH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (34)














AI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)



AJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (36)



WTG

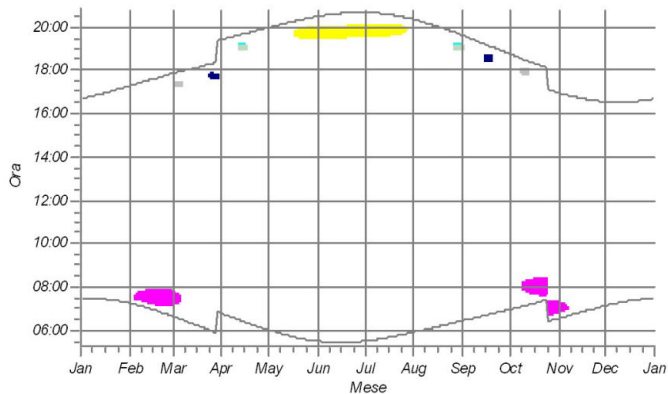
- |   |  |   |   |
|---|--|---|---|
|  | 1: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (1)     |  | 10: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (5) |
|  | 2: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (2)     |  | 11: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (6) |
|  | 3: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (3)     |  | 12: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (7) |
|  | 5: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (5)     |  | 13: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (8) |
|  | 7: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (2) |  | 14: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (9) |
|  | 9: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (4) |   |   |



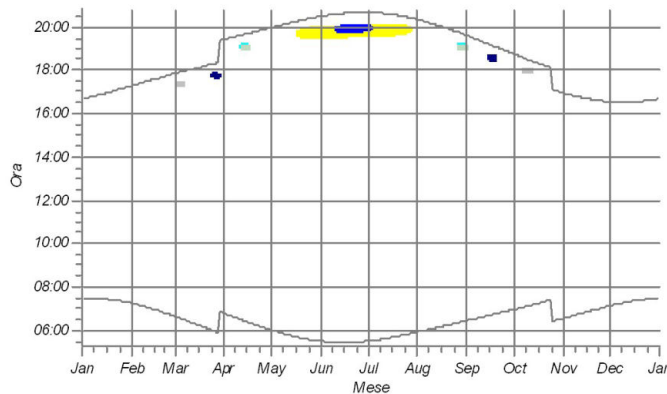
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

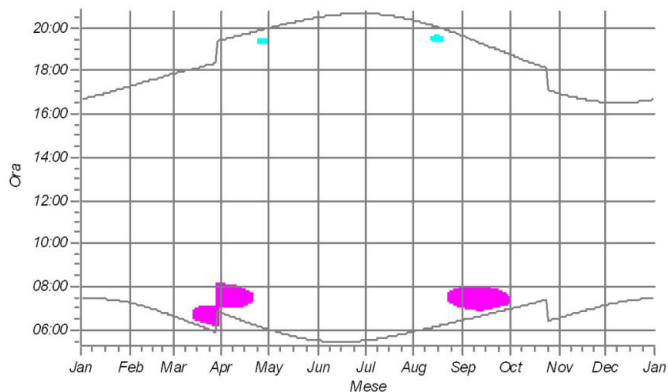
AK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (37)



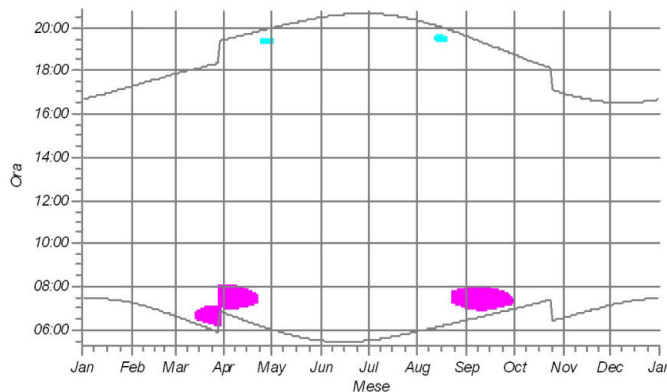
AL: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (38)



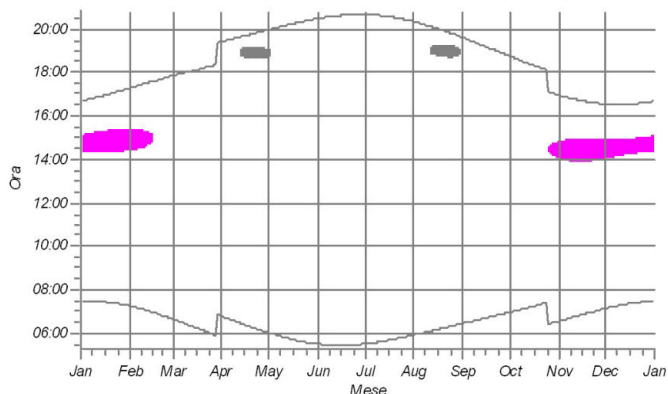
AM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (39)



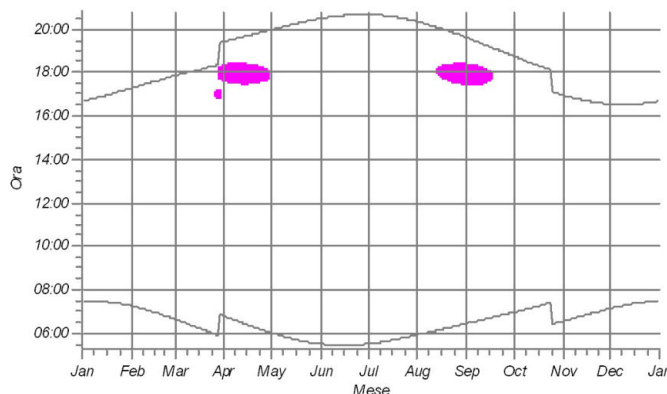
AN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (40)



AO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (41)



AP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (42)



WTG

- |  |   |  |  |
|--|---|--|--|
|  | 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2) |  | 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)  |
|  | 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3) |  | 12: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (7) |
|  | 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4) |  | 13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8) |
|  | 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5) |  | 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9) |

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

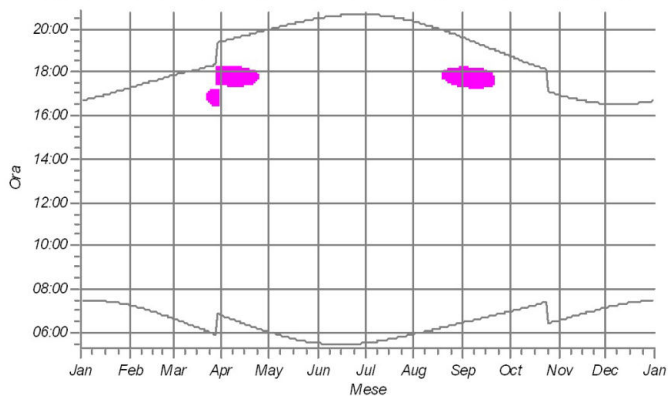
14/11/2023 14:53/3.6.355



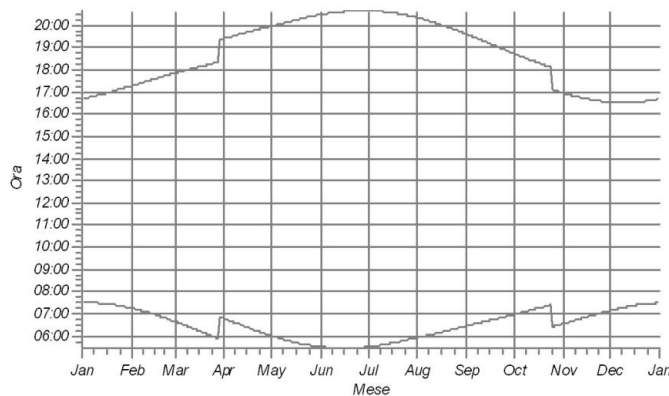
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

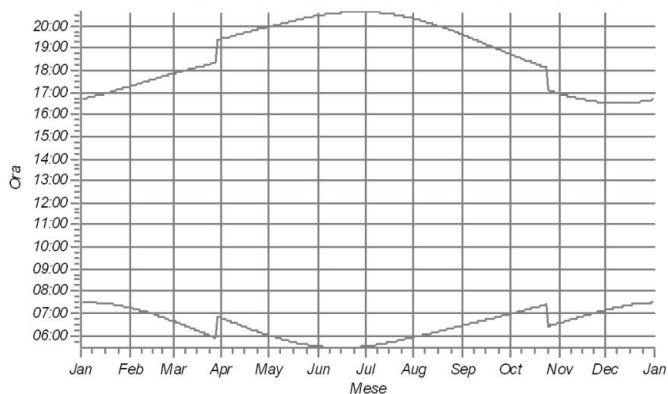
AQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (43)



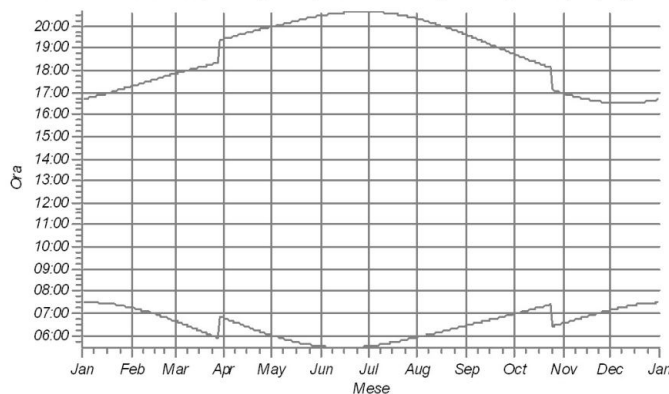
AR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (44)



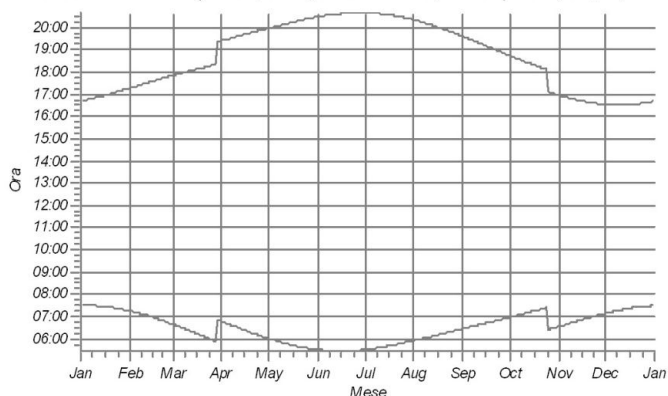
AS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (45)



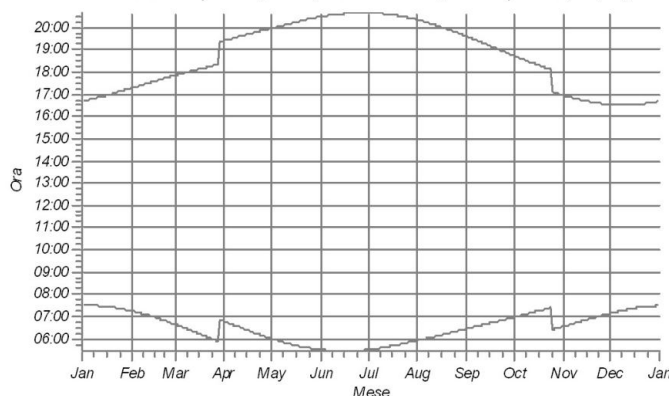
AT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (46)



AU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (47)



AV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (48)



WTG

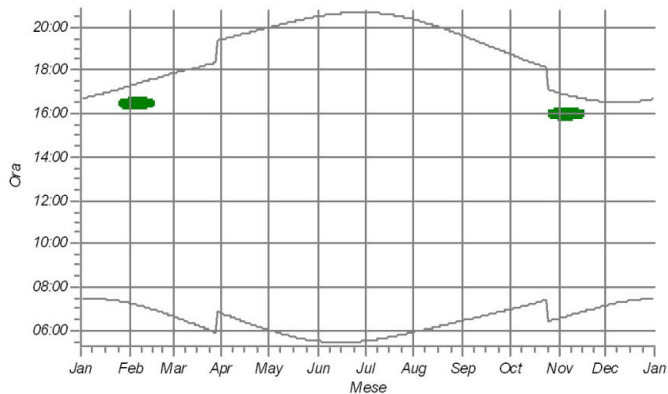
5: NORDEX N163/6.X 6600 163.0 IO! hub: 118,0 m (TOT: 199,5 m) (5)



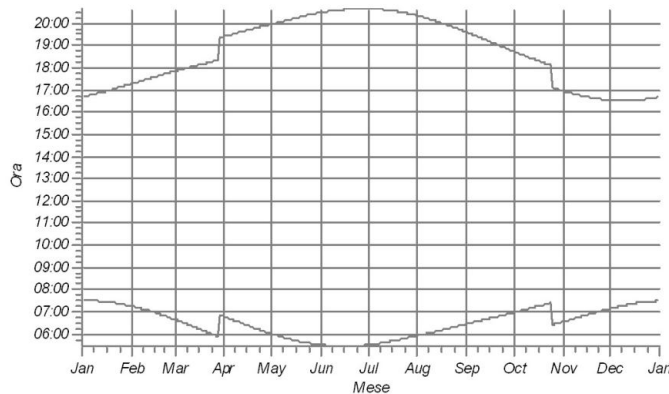
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

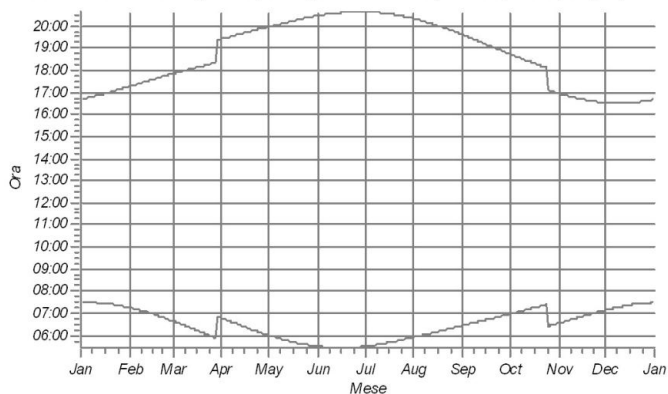
AW: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (49)



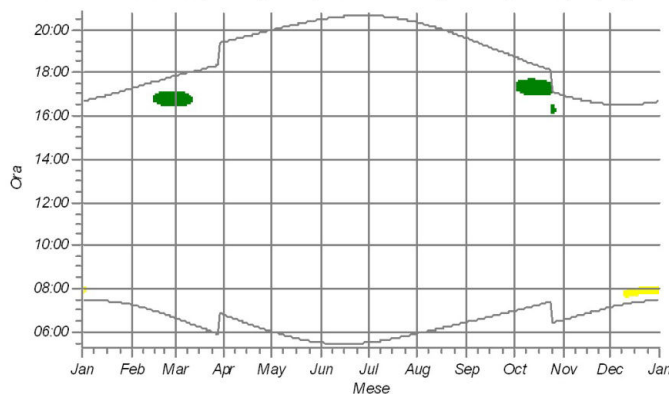
AX: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (50)



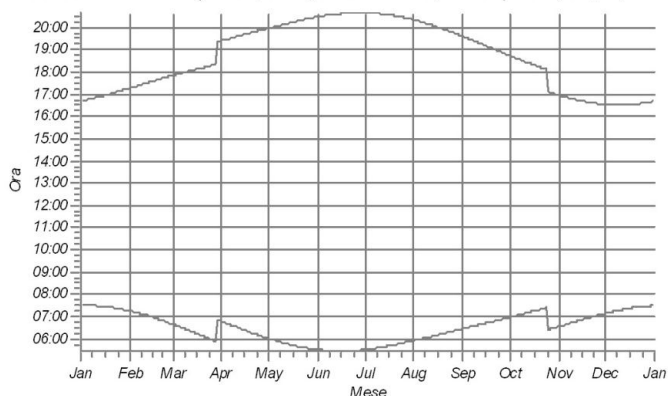
AY: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (51)



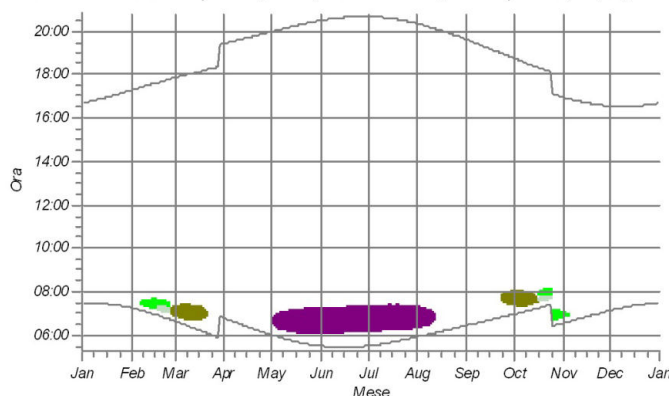
AZ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (52)



BA: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (53)



BB: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (54)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)

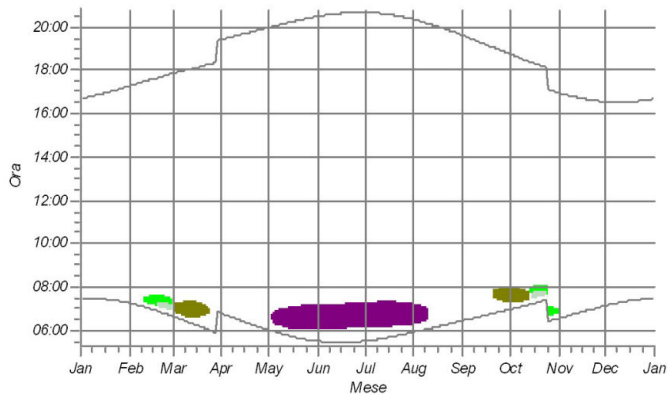
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)
- 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)



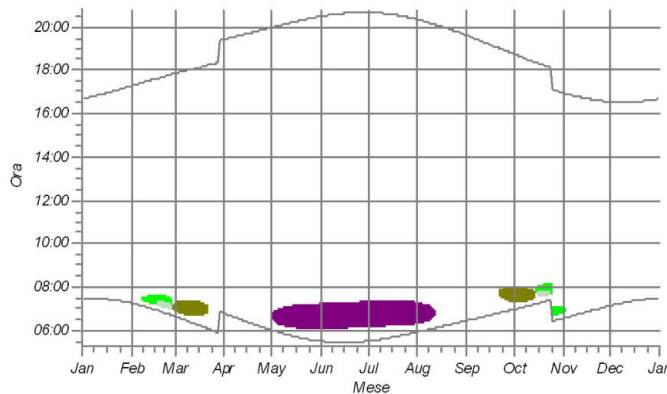
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

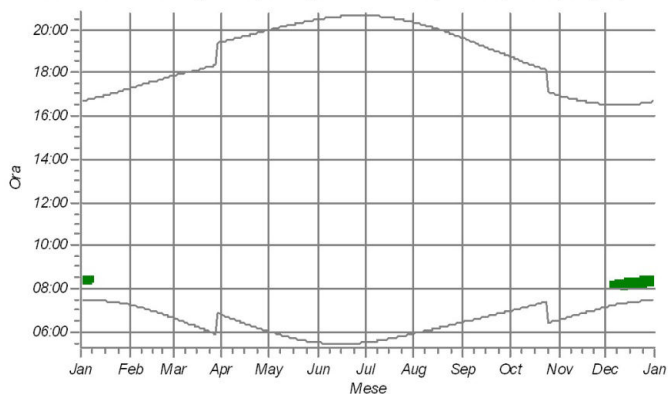
BC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (55)



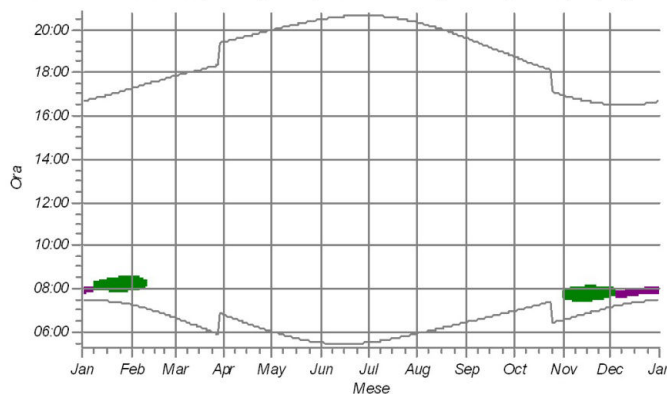
BD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (56)



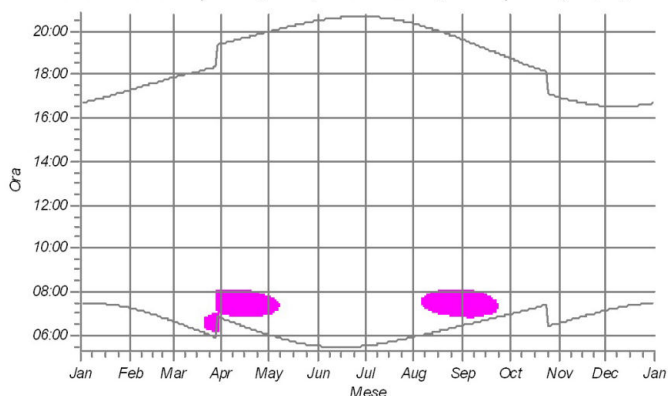
BE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (57)



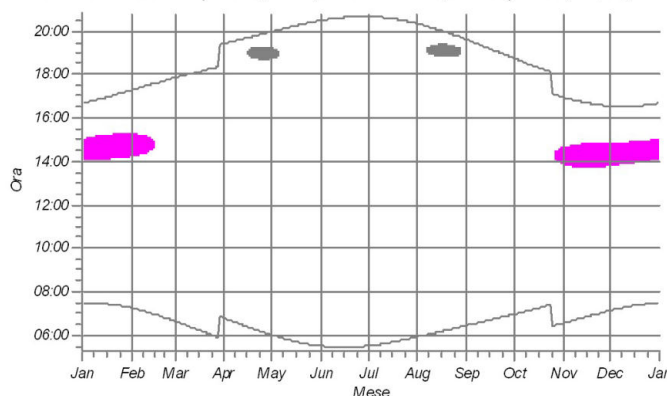
BF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (58)



BG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (59)



BH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (60)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)
- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)

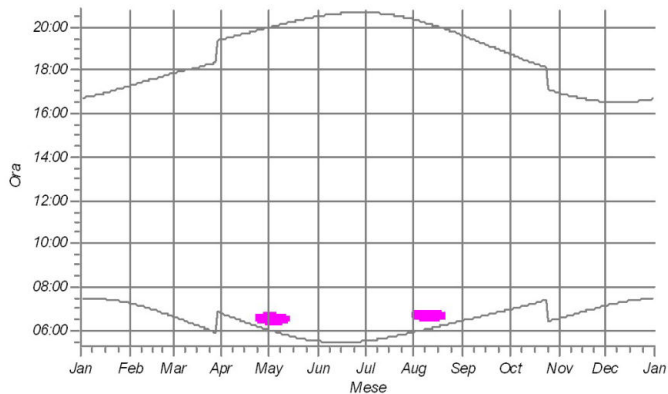
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)
- 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)



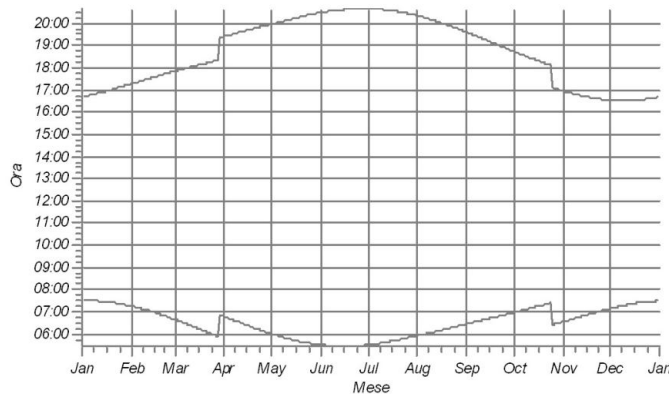
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

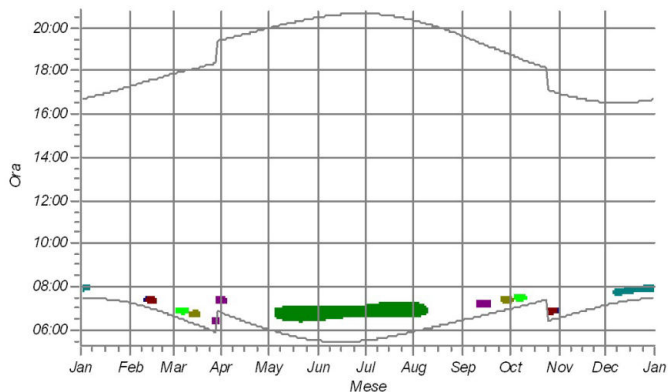
**BI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (61)**



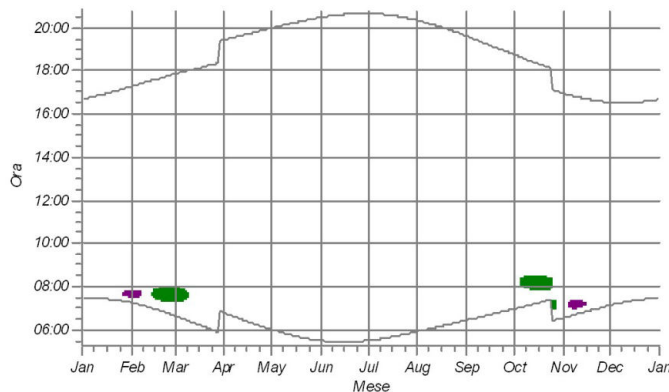
**BJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (62)**



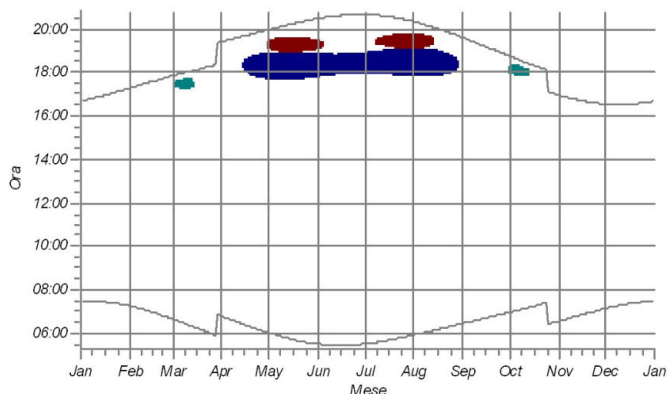
**BK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (63)**



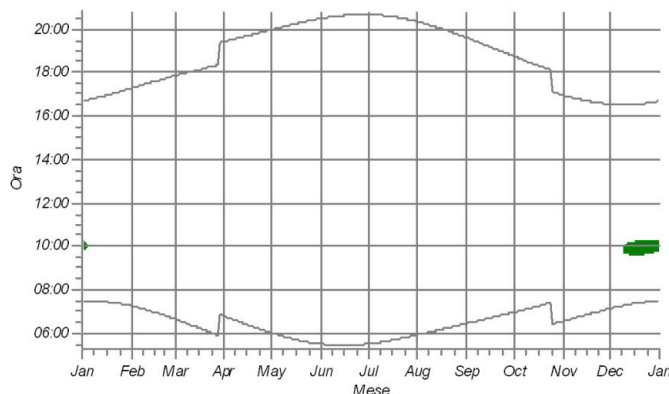
**BL: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (64)**










**BM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (65)**



**BN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (66)**



**WTG**

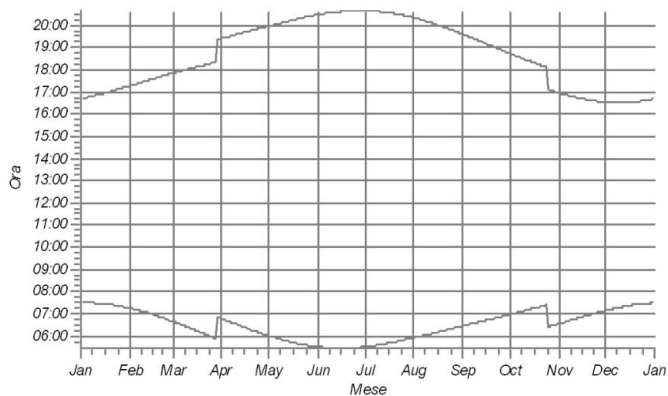
- |   |   |   |  |
|---|---|---|--|
|  | 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)     |  | 8: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (3)  |
|  | 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)     |  | 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)  |
|  | 6: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (1) |  | 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5) |
|  | 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2) |  | 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6) |



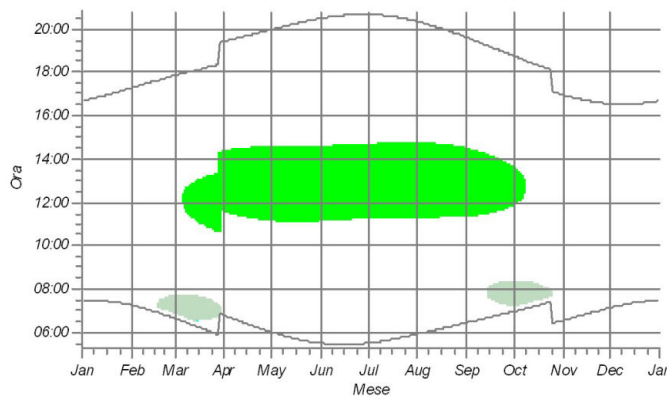
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

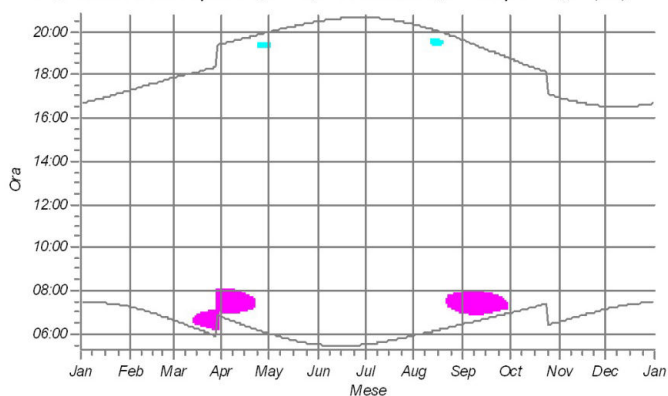
BO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (67)



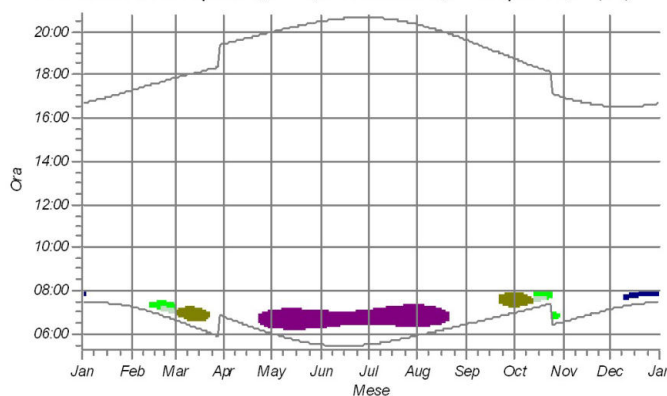
BP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (68)



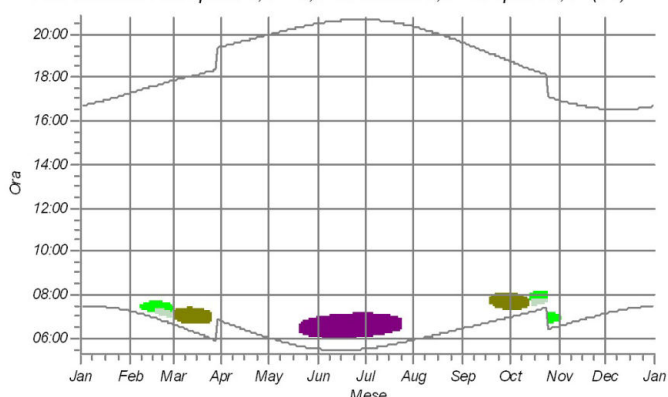
BQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (69)



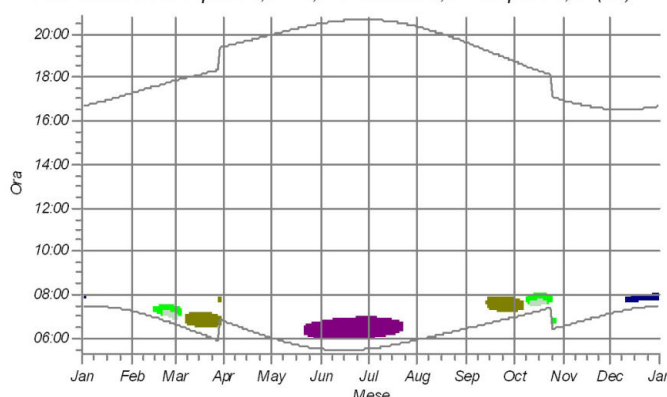
BR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (70)



BS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (71)



BT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (72)



WTG

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: magenta; margin-right: 5px;"></span> 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: darkblue; margin-right: 5px;"></span> 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: cyan; margin-right: 5px;"></span> 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: brown; margin-right: 5px;"></span> 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)</li> </ul> | <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: purple; margin-right: 5px;"></span> 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: cyan; margin-right: 5px;"></span> 13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)</li> <li><span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; margin-right: 5px;"></span> 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)</li> </ul> |
|---|---|

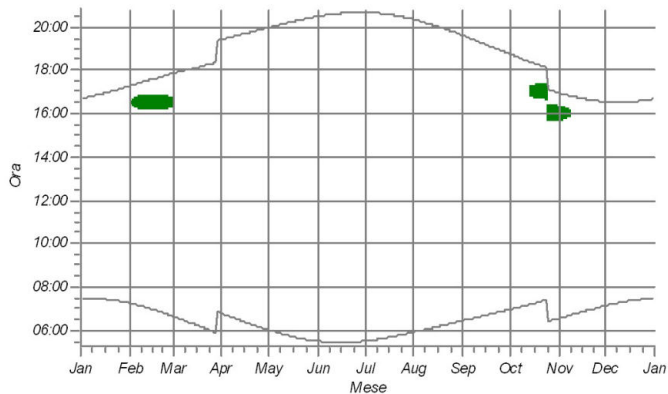




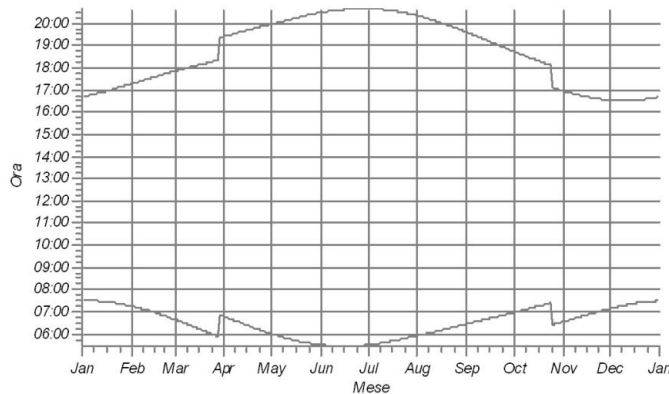
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

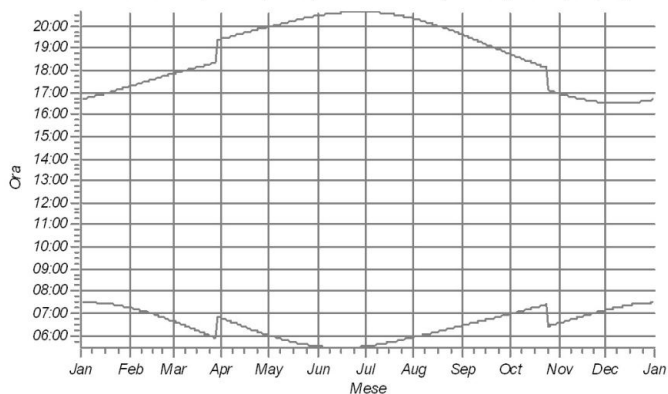
**BU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (73)**



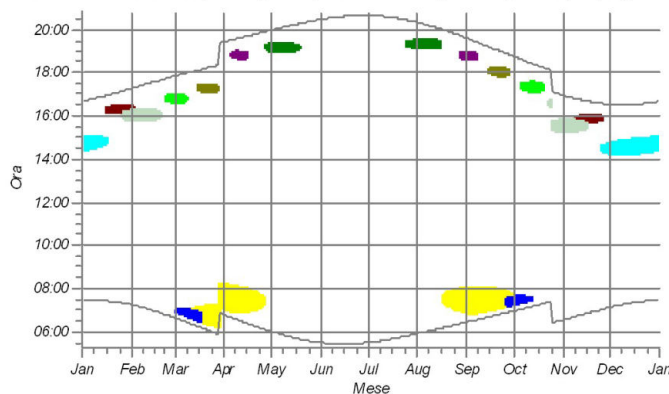
**BV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (74)**



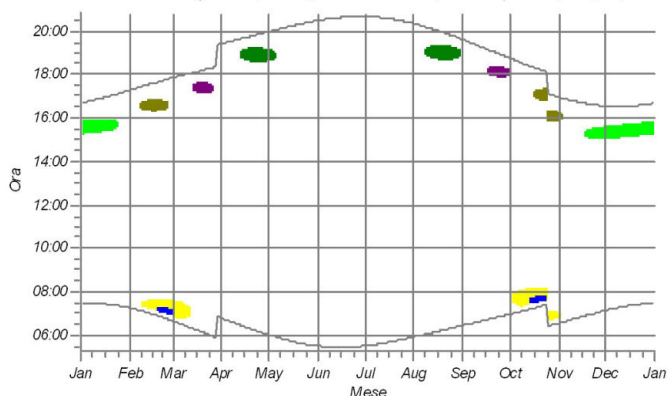
**BW: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (75)**



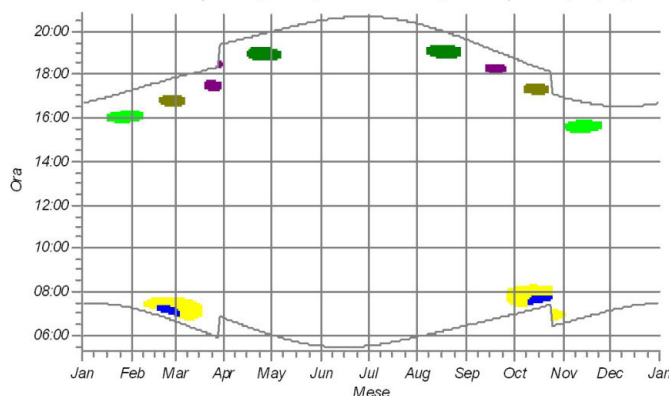
**BX: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (76)**












**BY: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (77)**



**BZ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (78)**



**WTG**

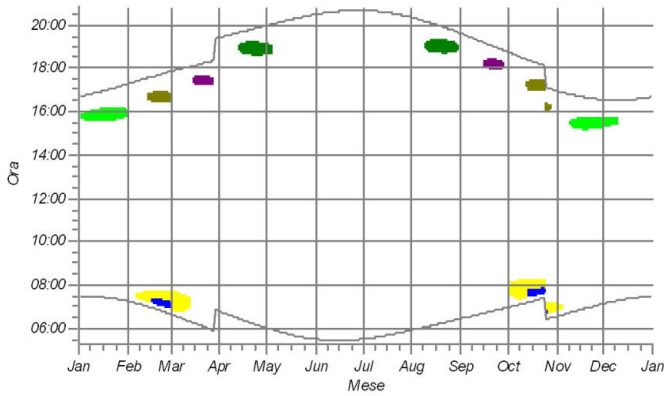
- |   |  |   |   |
|---|--|---|---|
|  | 1: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (1)     |  | 10: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (5) |
|  | 2: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (2)     |  | 11: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (6) |
|  | 3: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (3)     |  | 13: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (8) |
|  | 8: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (3) |  | 14: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (9) |
|  | 9: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (4) |   |   |



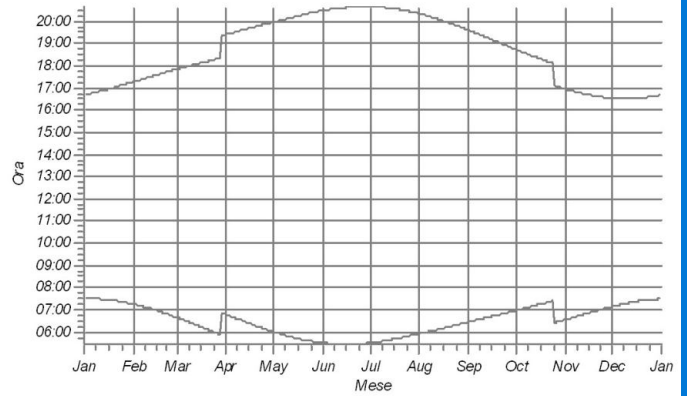
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

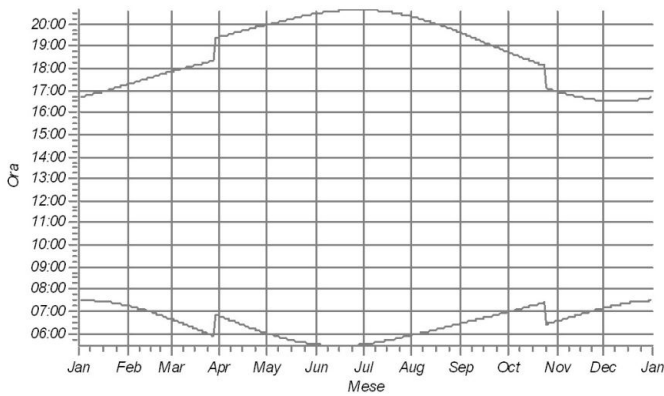
CA: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (79)



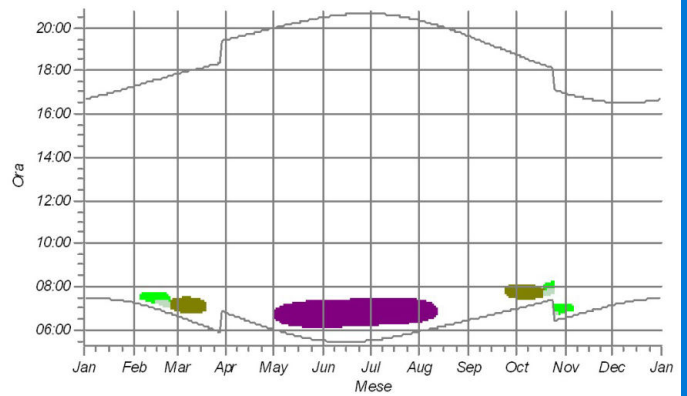
CB: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (80)



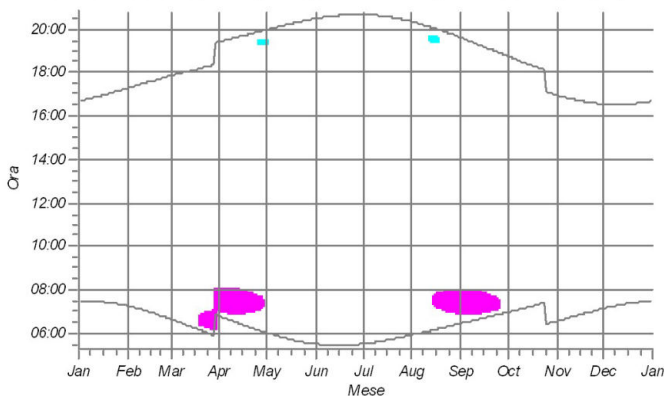
CC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (81)



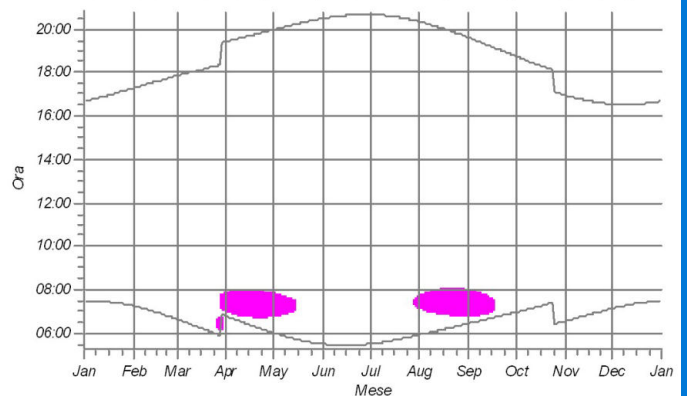
CD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (82)



CE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (83)



CF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (84)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)
- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)

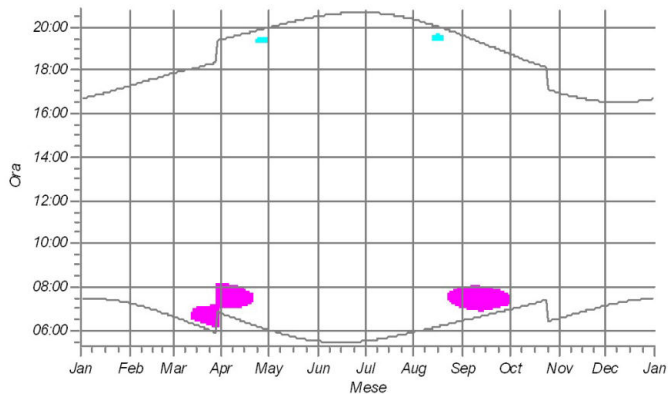
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)
- 13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)
- 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)



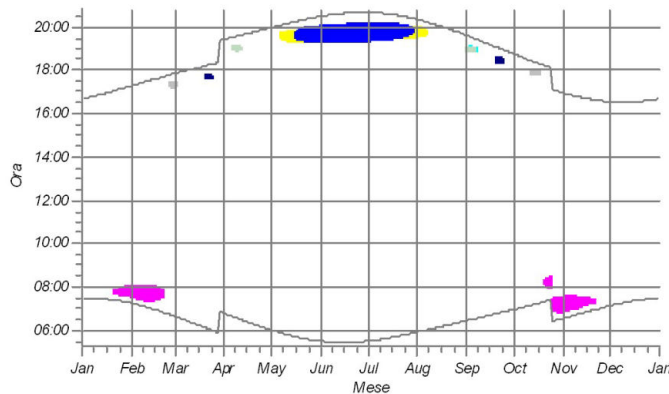
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

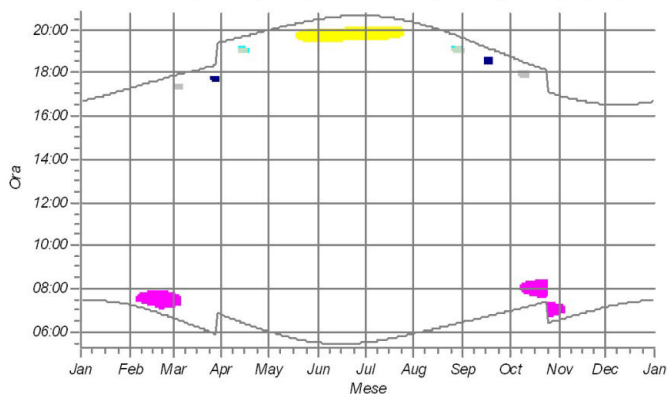
CG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (85)



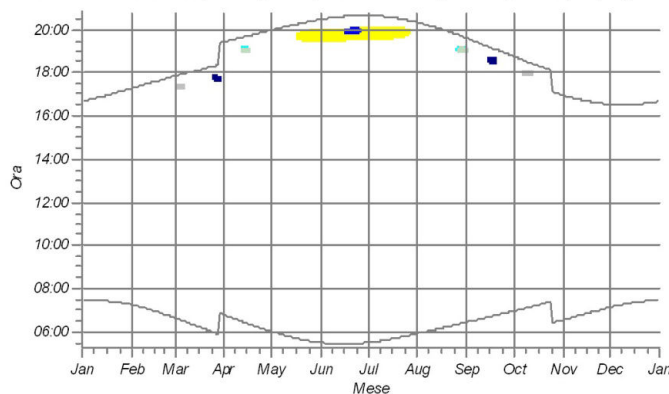
CH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (86)



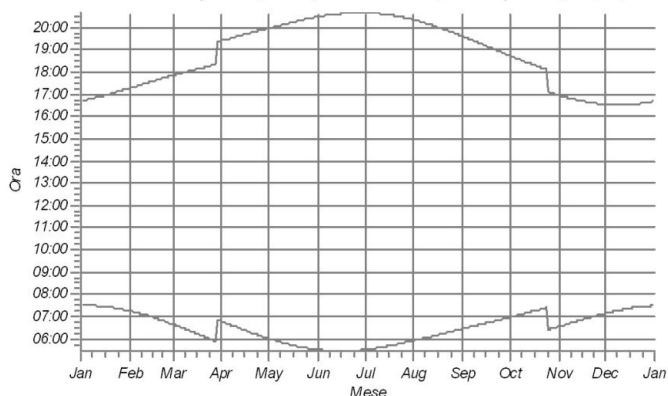
CI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (87)



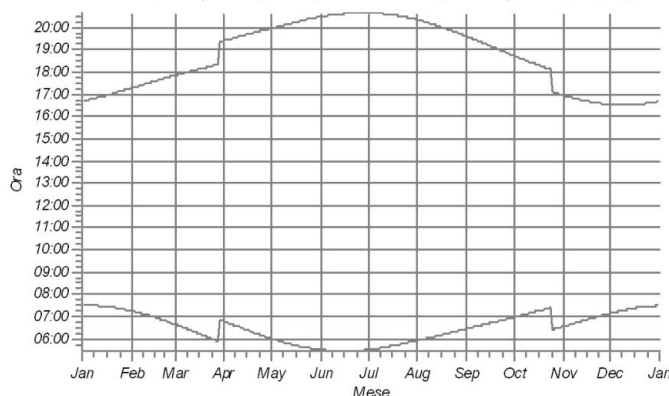
CJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (88)



CK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (89)



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



WTG

- 2: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)
- 3: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)
- 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)

- 12: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (7)
- 13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)
- 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

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DE-01069 Dresden

+49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

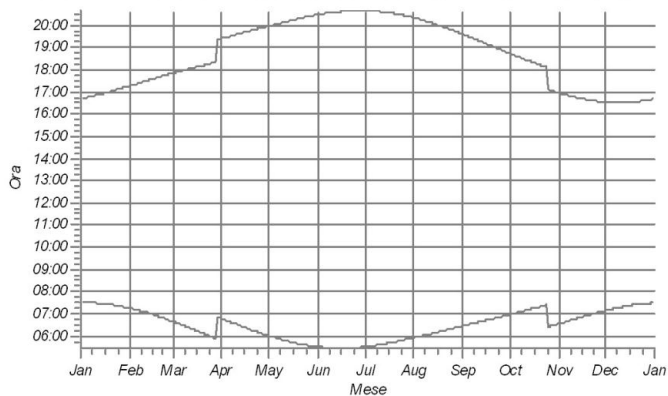
14/11/2023 14:53/3.6.355



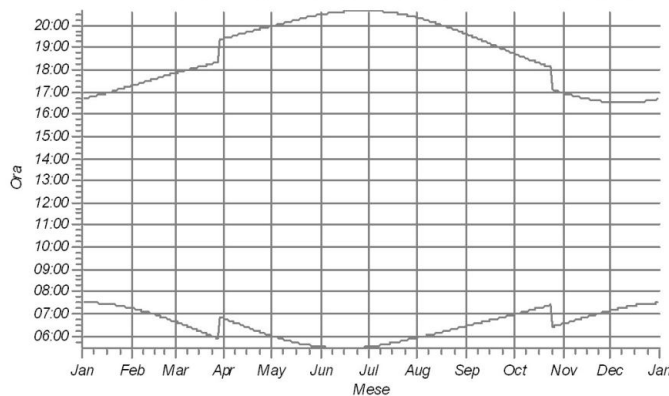
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

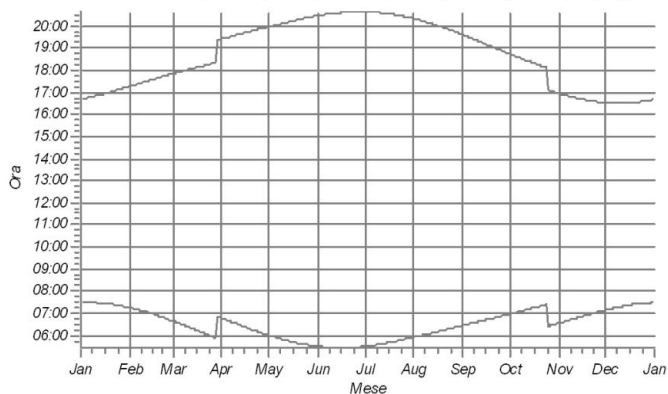
CM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (91)



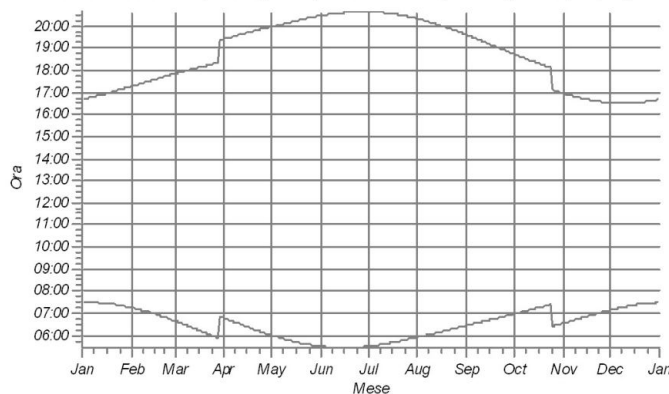
CN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (92)



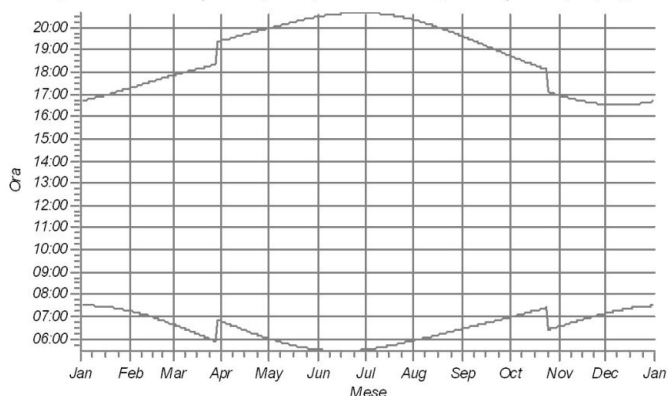
CO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (93)



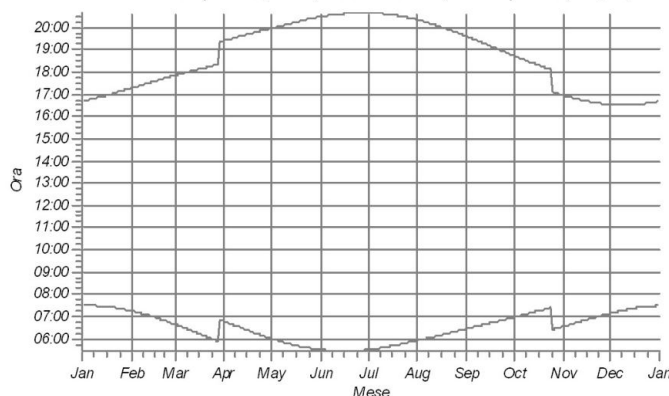
CP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (94)



CQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (95)



CR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (96)



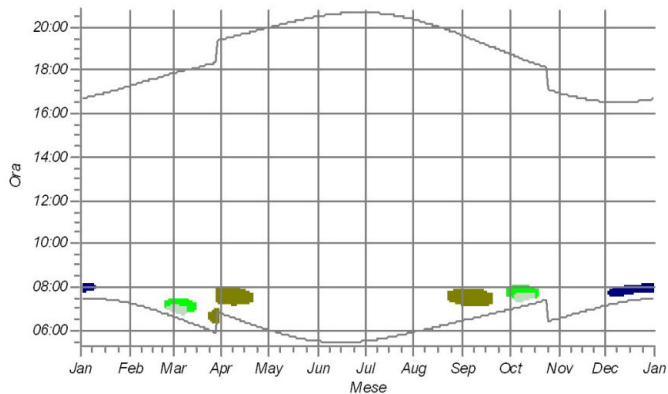
WTG



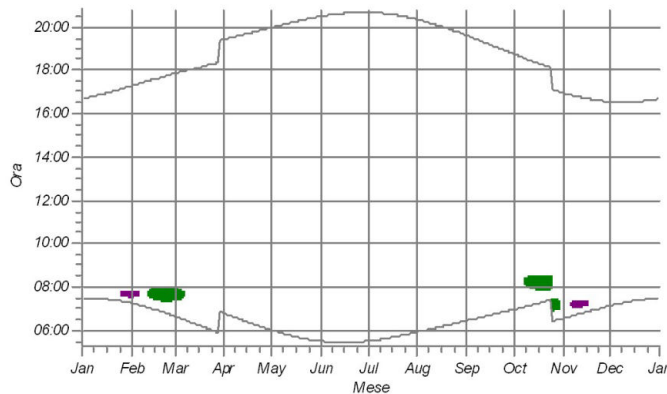
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

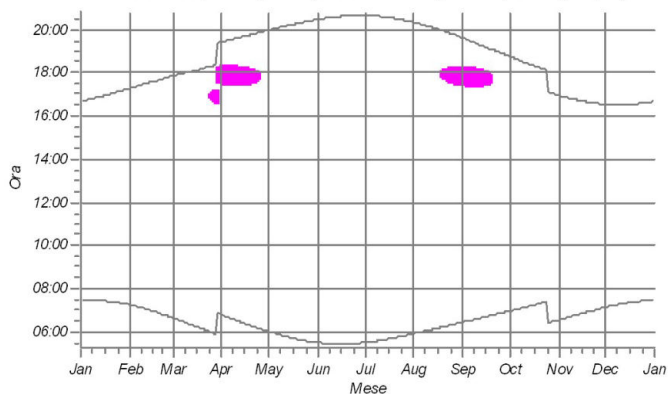
CS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (97)



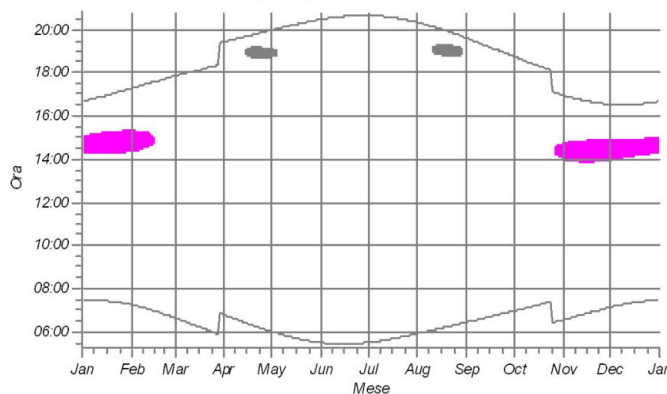
CT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (98)



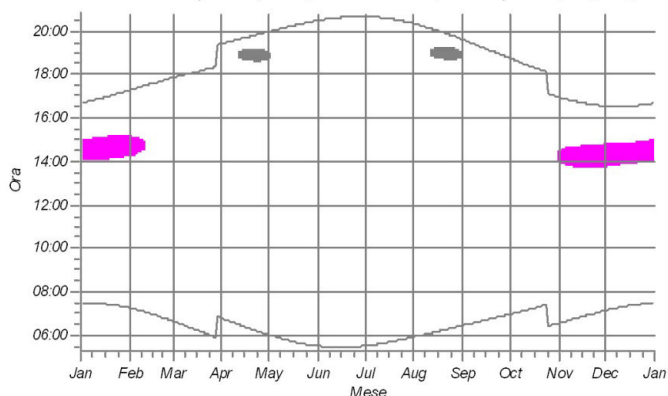
CU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (99)



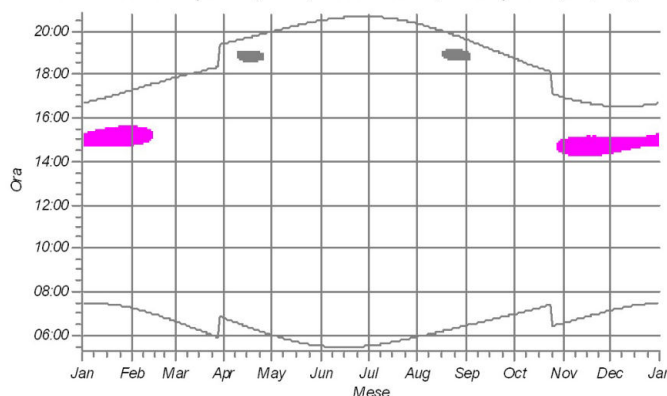
CV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (100)



CW: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (101)



CX: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (102)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)
- 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)

- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)
- 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uteute autorizzato:

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Redatto il:

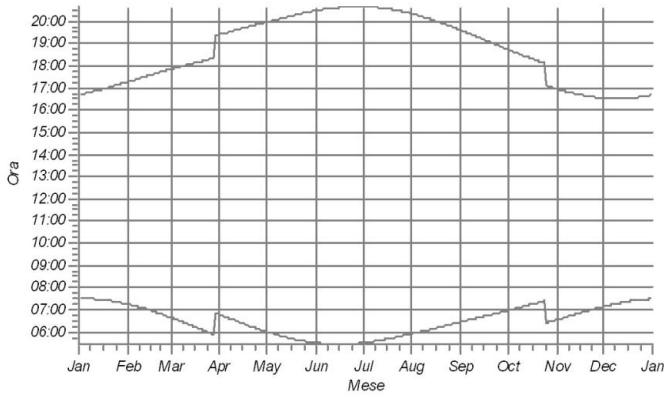
14/11/2023 14:53/3.6.355



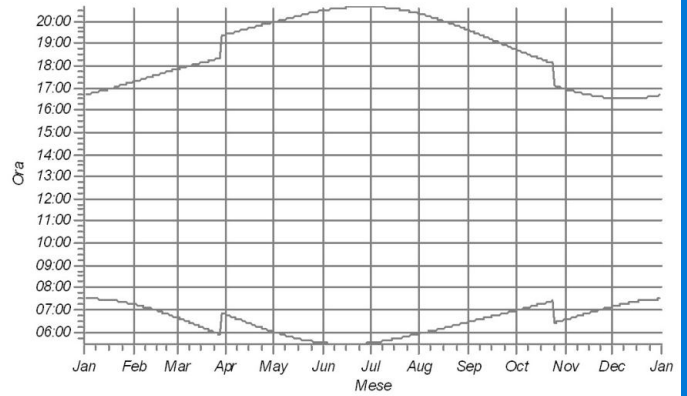
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

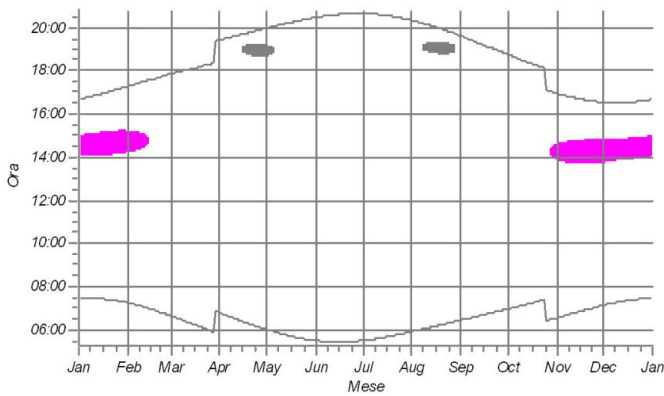
CY: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (103)



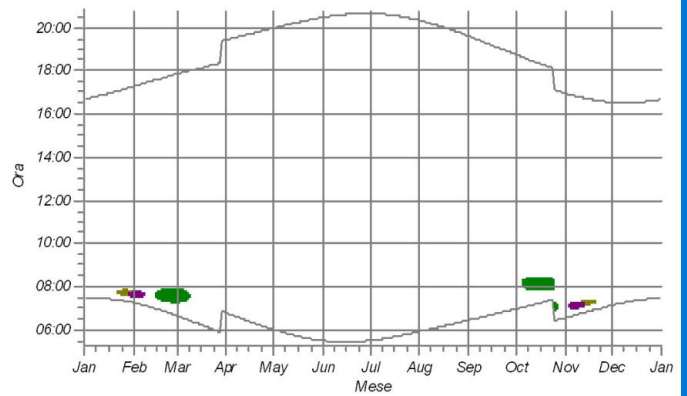
CZ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (104)



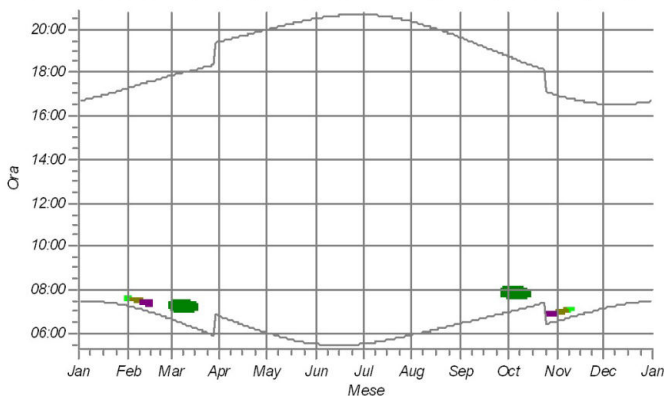
DA: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (105)



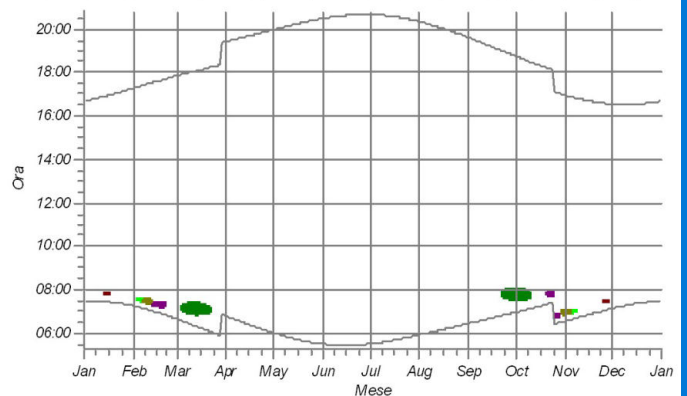
DB: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (106)



DC: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (107)



DD: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (108)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 4: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (4)
- 5: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)
- 8: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (3)

- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Redatto il:

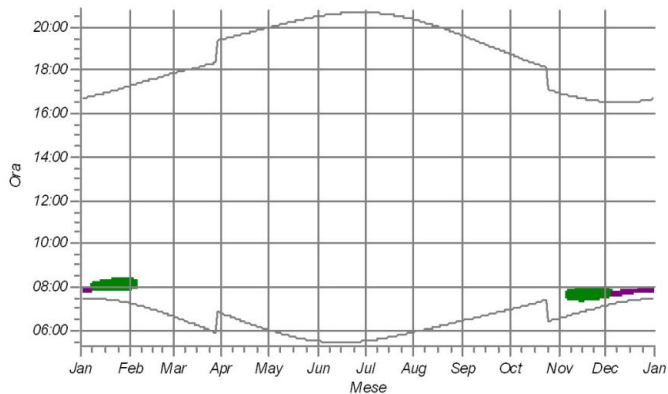
14/11/2023 14:53/3.6.355



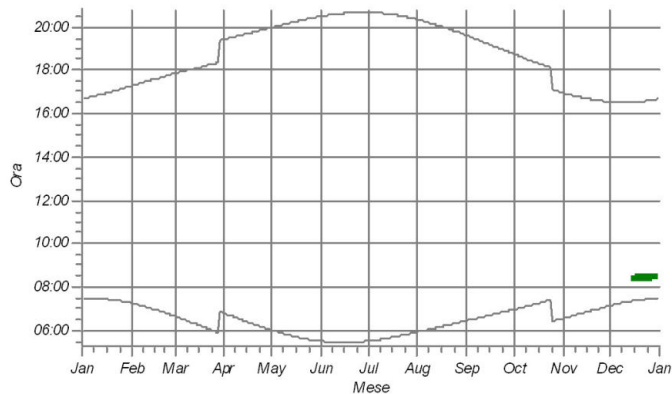
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

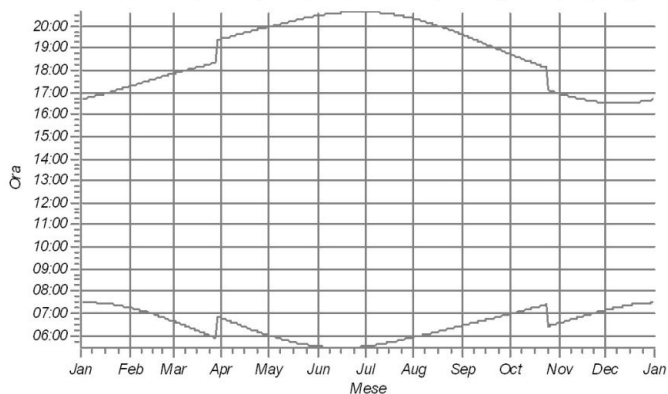
DE: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (109)



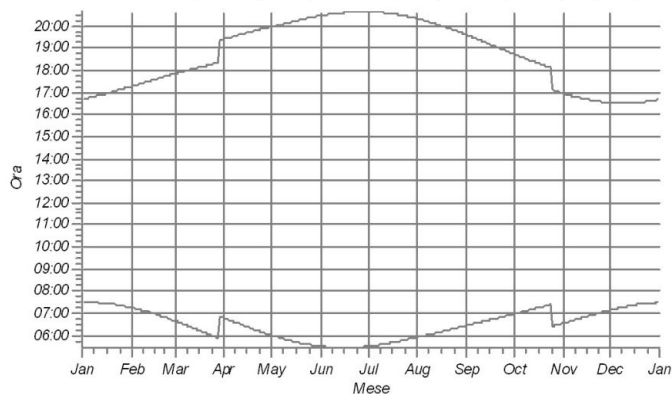
DF: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (110)



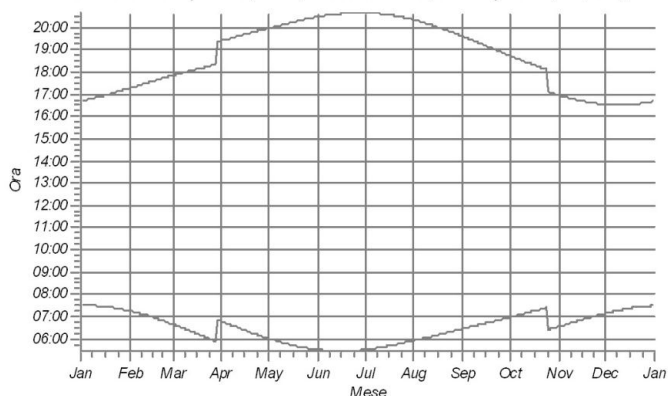
DG: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (111)



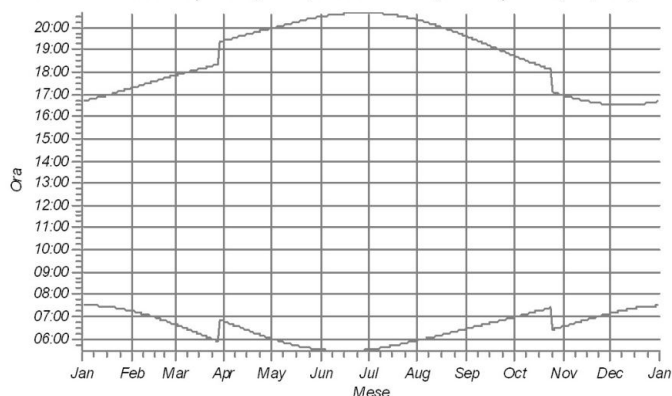
DH: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (112)



DI: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (113)



DJ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (114)



WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)

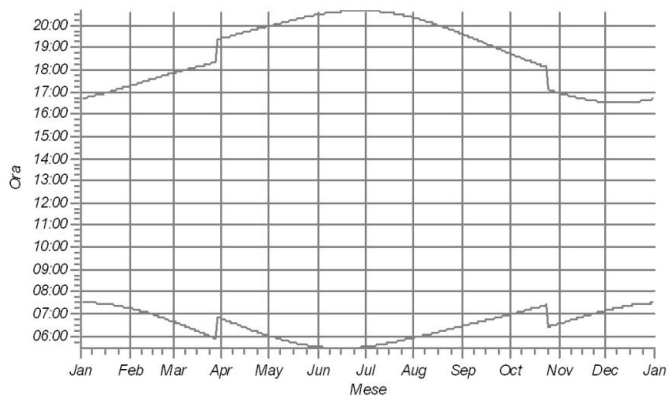
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)



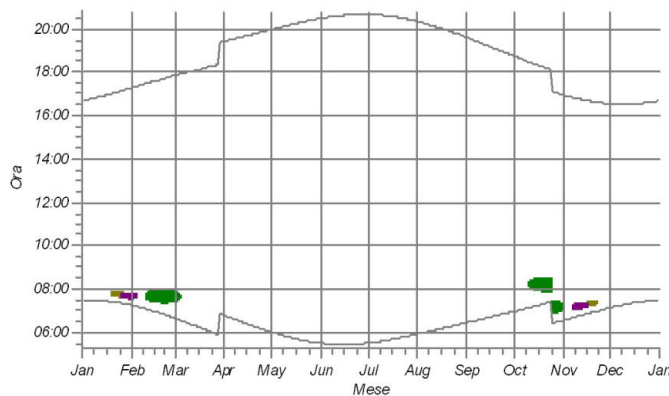
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

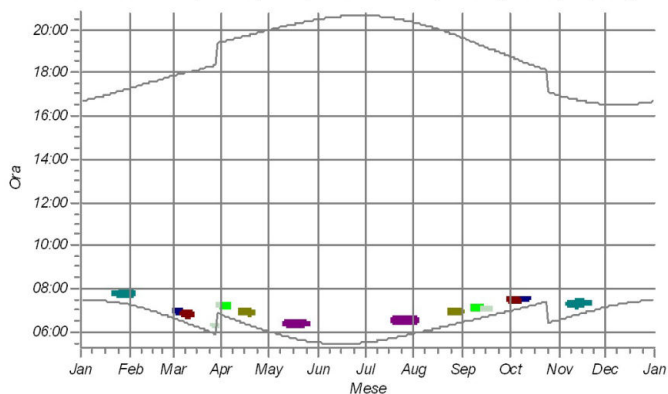
DK: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (115)



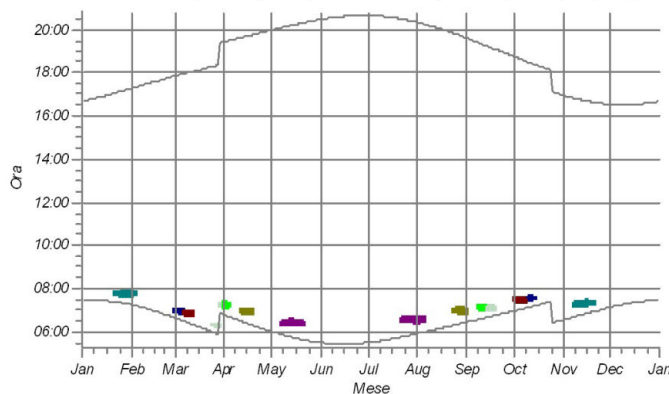
DL: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (116)



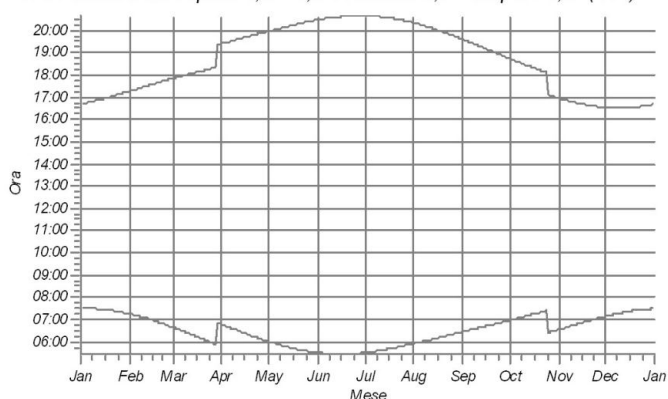
DM: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (117)



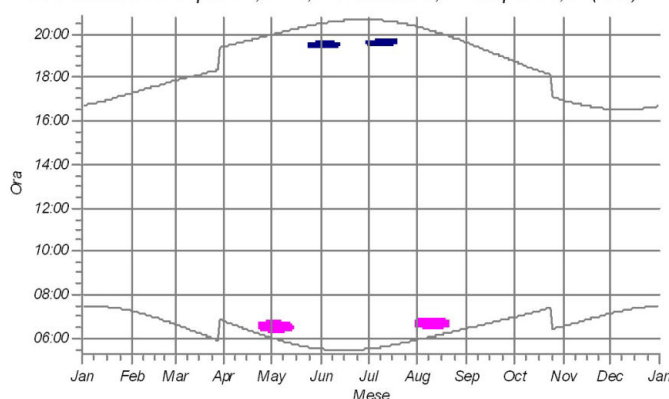
DN: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (118)



DO: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (119)



DP: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (120)



### WTG

- 1: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (1)
- 5: NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (5)
- 6: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (1)
- 7: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (2)
- 8: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (3)

- 9: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (4)
- 10: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (6)
- 14: Acciona AW 77/1500 CII 1500 77.0 !OI! hub: 60,0 m (TOT: 98,5 m) (9)



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Uteente autorizzato:

VSB Neue Energien Deutschland GmbH

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Redatto il:

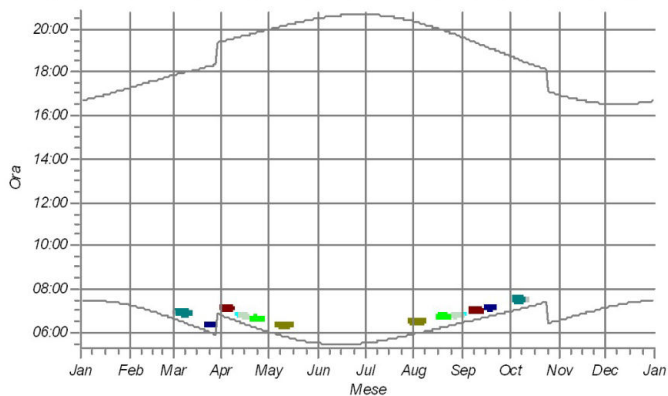
14/11/2023 14:53/3.6.355



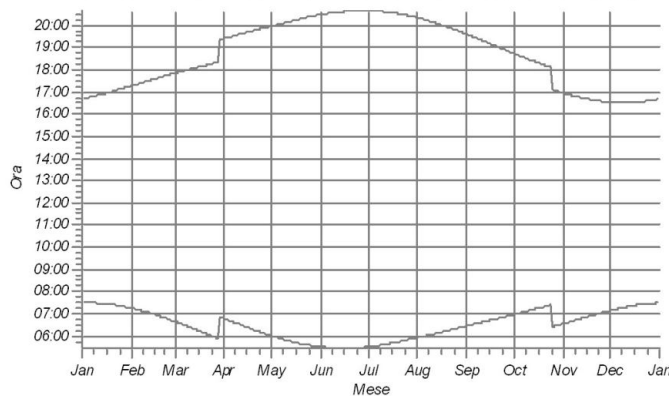
## SHADOW - Calendario, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

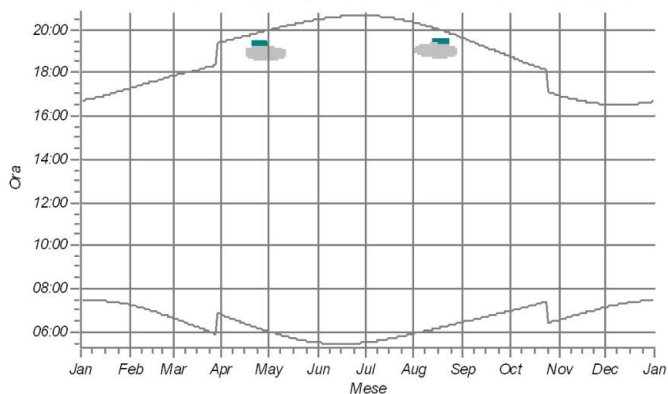
DQ: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (121)



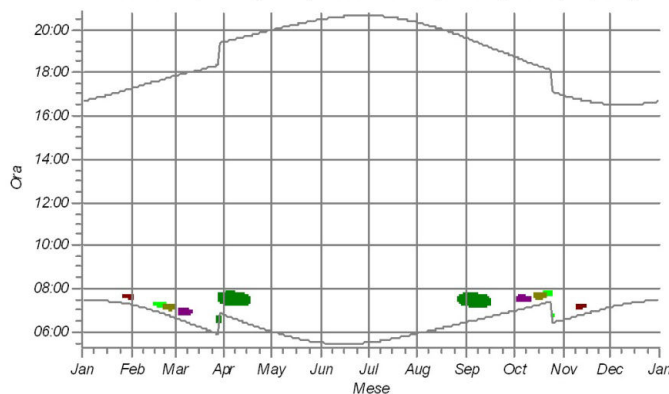
DR: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (122)



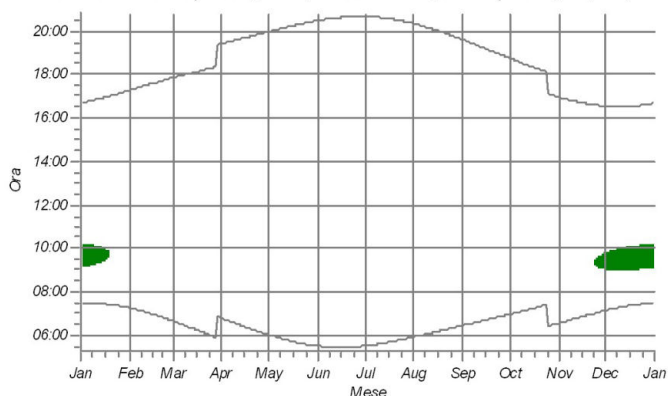
DS: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (123)



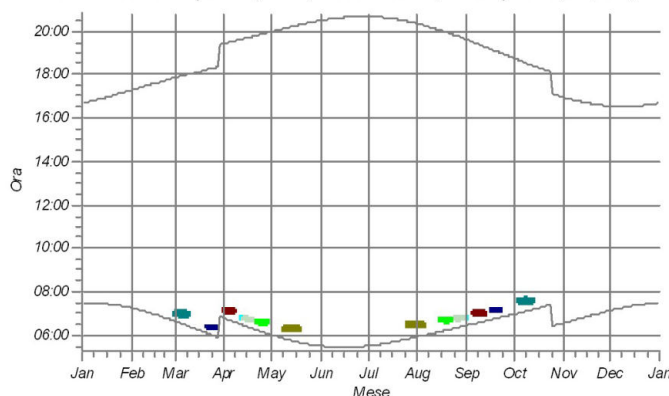
DT: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (124)



DU: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (125)



DV: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (126)



### WTG

- 1: NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)
- 6: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (1)
- 7: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (2)
- 8: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (3)
- 9: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (4)

- 10: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)
- 11: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)
- 12: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (7)
- 13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)
- 14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy
14/11/2023 14:53/3.6.355



SHADOW - Calendario per WTG

Calcolo: ShadowFlickering\_Progetto+ Esistenti WTG: 1 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Gennaio to Giugno) and rows for days (1 to 31). Each cell contains time intervals for shadowing. Summary rows at the bottom show 'Ore potenziali eliofania' and 'Somma minuti d'ombra' for each month.

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra
Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH

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Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 1 - NORDEX N163/6.X 6600 163.0 IO! hub: 118,0 m (TOT: 199,5 m) (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 06:39-07:04/25 20:40	05:55 19:09-19:34/25 20:20 06:41-07:10/29	06:26 07:16-07:44/28 19:36	06:57 07:34-08:12/38 18:45	06:32 15:46-16:17/31 16:58 07:09-07:36/27	07:08 09:06-09:44/38 16:33 07:36-07:58/22
2	05:31 06:40-07:05/25 20:40	05:56 19:09-19:34/25 20:19 06:41-07:10/29	06:28 07:15-07:45/30 19:35	06:58 07:33-08:11/38 18:43	06:34 15:45-16:15/30 16:56 07:39-07:51/12	07:09 09:05-09:45/40 16:32 07:38-07:57/19
3	05:32 06:40-07:06/26 20:39	05:57 19:08-19:35/27 20:18 06:42-07:09/27	06:29 07:14-07:47/33 19:33	06:59 07:33-08:11/38 18:42 17:23-17:25/2	06:35 15:46-16:15/29 16:55 07:09-07:53/44	07:10 09:04-09:47/43 16:32 07:39-07:55/16
4	05:32 06:40-07:06/26 20:39	05:58 19:08-19:35/27 20:17 06:43-07:08/25	06:30 07:13-07:46/33 19:31	07:00 07:33-08:10/37 18:40 17:16-17:31/15	06:36 15:45-16:14/29 16:54 07:09-07:55/46	07:11 09:04-09:48/44 16:32 07:42-07:49/7
5	05:33 06:40-07:07/27 20:39	05:59 19:08-19:34/26 20:16 06:44-07:06/22	06:31 07:12-07:47/35 19:30	07:02 07:34-08:10/36 18:38 17:13-17:33/20	06:37 15:45-16:12/27 16:53 07:09-07:56/47	07:12 09:03-09:49/46 16:32 08:04-08:15/11
6	05:33 06:39-07:07/28 20:39	06:00 19:08-19:34/26 20:14 06:46-07:05/19	06:32 07:12-07:47/35 19:28	07:03 07:34-08:19/45 18:37 17:11-17:34/23	06:38 07:10-07:58/48 16:51 15:46-16:12/26	07:13 09:03-09:51/48 16:31 08:03-08:16/13
7	05:34 06:39-07:08/29 20:38	06:01 19:08-19:34/26 20:13 06:48-07:03/15	06:33 07:12-07:49/37 19:26	07:04 07:35-08:21/46 18:35 17:09-17:35/26	06:40 07:10-07:59/49 16:50 15:45-16:11/26	07:14 09:03-09:52/49 16:31 08:03-08:18/15
8	05:35 06:39-07:08/29 20:38	06:02 18:59-19:33/34 20:12 06:51-06:59/8	06:34 07:12-07:51/39 19:25	07:05 07:35-08:23/48 18:33 17:08-17:36/28	06:41 07:10-07:59/49 16:49 15:46-16:11/25	07:15 09:03-09:53/50 16:31 08:03-08:19/16
9	05:35 06:39-07:08/29 20:38	06:03 18:57-19:32/35 20:11	06:35 07:12-07:53/41 19:23	07:06 07:36-08:24/48 18:32 17:06-17:37/31	06:42 07:12-08:00/48 16:48 15:47-16:11/24	07:16 09:03-09:54/51 16:31 08:03-08:20/17
10	05:36 06:39-07:09/30 20:37	06:04 18:55-19:32/37 20:09	06:36 07:12-07:54/42 19:21	07:07 07:38-08:25/47 18:30 17:05-17:37/32	06:43 07:12-08:01/49 16:47 15:47-16:10/23	07:17 09:03-09:58/55 16:31 08:03-08:21/18
11	05:37 06:39-07:10/31 20:37	06:05 18:53-19:30/37 20:08	06:37 07:13-07:54/41 19:20	07:08 07:39-08:26/47 18:28 17:05-17:38/33	06:45 07:13-08:01/48 16:46 15:48-16:10/22	07:17 09:03-10:01/58 16:31 08:03-08:22/19
12	05:37 06:38-07:10/32 20:36	06:06 18:51-19:29/38 20:07	06:38 07:14-07:55/41 19:18	07:09 07:40-08:26/46 18:27 17:04-17:38/34	06:46 07:15-08:02/47 16:45 15:48-16:09/21	07:18 09:02-10:02/60 16:31 08:02-08:22/20
13	05:38 06:38-07:10/32 20:36	06:07 18:50-19:28/38 20:05	06:39 07:15-07:55/40 19:16	07:10 07:42-08:27/45 18:25 17:04-17:38/34	06:47 07:17-08:02/45 16:44 15:50-16:08/18	07:19 09:02-10:04/62 16:32 08:02-08:23/21
14	05:39 06:39-07:11/32 20:35	06:08 18:49-19:26/37 20:04	06:40 07:16-07:56/40 19:14	07:11 07:45-08:27/42 18:24 16:58-17:37/39	06:48 07:19-08:02/43 16:43 15:51-16:07/16	07:20 09:03-10:06/63 16:32 08:03-08:24/21
15	05:40 06:38-07:11/33 20:35	06:09 18:48-19:24/36 20:03	06:41 07:17-07:56/39 19:13	07:13 07:52-08:27/35 18:22 16:55-17:37/42	06:49 07:22-08:02/40 16:42 15:53-16:05/12	07:21 09:03-10:08/65 16:32 08:03-08:25/22
16	05:40 06:38-07:11/33 20:34	06:10 18:47-19:16/29 20:01	06:42 07:18-07:57/39 19:11	07:14 07:52-08:27/35 18:20 16:52-17:36/44	06:51 07:23-08:03/40 16:41 15:57-16:03/6	07:21 09:03-10:08/65 16:32 08:03-08:26/23
17	05:41 06:38-07:12/34 20:34	06:11 18:47-19:16/29 20:00	06:43 07:19-07:58/39 19:09	07:15 07:52-08:28/36 18:19 16:50-17:36/46	06:52 07:23-08:03/40 16:41	07:22 09:04-10:10/66 16:32 08:04-08:28/24
18	05:42 06:38-07:12/34 20:33	06:12 18:46-19:16/30 19:58	06:44 07:21-07:58/37 19:07	07:16 07:52-08:28/36 18:17 16:49-17:36/47	06:53 07:24-08:02/38 16:40	07:23 09:04-10:11/67 16:33 08:04-08:29/25
19	05:43 06:38-07:13/35 20:32	06:13 18:45-19:16/31 19:57	06:45 07:24-07:58/34 19:06	07:17 07:52-08:28/36 18:16 16:48-17:35/47	06:54 07:25-08:03/38 16:39	07:23 09:04-10:11/67 16:33 08:04-08:29/25
20	05:44 06:38-07:13/35 20:31	06:14 18:44-19:15/31 19:55	06:46 07:24-07:58/34 19:04	07:18 07:53-08:27/34 18:14 16:47-17:34/47	06:55 07:25-08:03/38 16:38	07:24 09:05-10:12/67 16:34 08:05-08:30/25
21	05:45 06:38-07:12/34 20:31	06:15 18:44-19:14/30 19:54	06:47 07:24-07:58/34 19:02	07:19 07:53-08:27/34 18:13 16:46-17:32/46	06:57 07:26-08:02/36 16:38	07:25 09:05-10:12/67 16:34 08:05-08:30/25
22	05:45 06:38-07:13/35 20:30	06:16 18:44-19:14/30 19:52	06:48 07:25-08:00/35 19:01	07:21 07:56-08:27/32 18:11 16:46-17:32/46	06:58 07:26-08:02/36 16:37	07:25 09:06-10:13/67 16:34 08:06-08:31/25
23	05:46 06:38-07:13/35 20:29	06:17 18:43-19:13/30 19:51	06:49 07:26-08:05/39 18:59	07:22 07:55-08:27/32 18:10 16:45-17:30/45	06:59 07:28-08:02/34 16:36	07:26 09:06-10:13/67 16:35 08:06-08:31/25
24	05:47 06:38-07:13/35 20:28	06:18 18:43-19:12/29 19:49	06:50 07:27-08:07/40 18:57	07:23 07:57-08:26/29 18:08 16:44-17:28/44	07:00 07:29-08:02/33 16:36	07:26 09:07-10:14/67 16:36 08:07-08:32/25
25	05:48 06:38-07:13/35 20:27	06:19 18:43-19:11/28 19:48	06:51 07:27-08:08/41 18:55	06:24 06:57-07:29/32 17:07 15:44-16:25/41	07:01 09:18-09:26/8 16:35 07:30-08:01/31	07:26 09:07-10:14/67 16:36 08:07-08:32/25
26	05:49 19:15-19:32/17 20:26	06:20 18:44-19:09/25 19:46	06:52 07:28-08:09/41 18:54	06:25 06:58-07:32/34 17:06 15:44-16:19/35	07:02 09:13-09:31/18 16:35 07:31-08:01/30	07:27 09:07-10:14/67 16:37 08:08-08:32/24
27	05:50 19:14-19:32/18 20:25	06:21 07:26-07:36/10 19:45 18:44-19:08/24	06:53 07:29-08:10/41 18:52	06:26 06:59-07:33/34 17:04 15:44-16:20/36	07:04 09:10-09:34/24 16:34 07:31-08:00/29	07:27 09:08-10:13/65 16:37 08:09-08:32/23
28	05:51 19:12-19:32/20 20:24	06:22 07:29-07:38/15 19:43 18:45-19:06/21	06:54 07:30-08:10/40 18:50	06:28 07:00-07:34/34 17:03 15:44-16:19/35	07:05 09:08-09:37/29 16:34 07:33-07:59/26	07:28 09:09-10:14/65 16:38 08:09-08:32/23
29	05:52 19:12-19:33/21 20:23	06:23 07:20-07:40/20 19:41 18:46-19:04/18	06:55 07:31-08:11/40 18:48	06:29 07:01-07:35/34 17:01 15:44-16:18/34	07:06 09:08-09:40/32 16:33 07:34-08:00/26	07:28 09:10-10:13/63 16:39 08:10-08:31/21
30	05:53 19:11-19:34/23 20:22	06:24 07:19-07:41/22 19:40 18:47-19:01/14	06:56 07:34-08:12/38 18:47	06:30 07:04-07:36/32 17:00 15:45-16:19/34	07:07 09:07-09:42/35 16:33 07:35-07:59/24	07:28 09:10-10:13/63 16:40 08:10-08:31/21
31	05:54 19:10-19:34/24 20:21	06:25 07:17-07:42/25 19:38 18:50-18:57/7		06:31 07:07-07:36/29 16:59 15:46-16:18/32		07:28 09:11-10:12/61 16:40 08:11-08:31/20
Ore potenziali eliofania	461	429	375	345	297	286
Somma minuti d'ombra	1134	1146	1126	2187	1679	2467

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 2 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 07:51-07:59/8 16:41	07:14 07:35-07:36/1 17:16	06:38 06:57-07:43/46 17:51	06:46 07:05-08:09/64 19:26	06:00 19:58	05:30 19:26-19:57/31 20:29
2	07:28 07:52-07:58/6 16:42	07:13 07:34-07:38/4 17:17	06:36 06:55-07:41/46 17:52	06:45 07:03-08:08/65 19:27	05:58 20:00	05:30 19:26-19:57/31 20:29
3	07:29 16:43	07:12 07:33-07:39/6 17:19	06:35 06:54-07:40/46 17:53	06:43 07:01-08:07/66 19:28	05:57 20:01	05:29 19:27-19:58/31 20:30
4	07:29 16:44	07:11 07:32-07:41/9 17:20	06:33 06:52-07:38/46 17:54	06:41 07:00-08:07/67 19:29	05:56 20:02	05:29 19:28-19:58/30 20:31
5	07:29 16:45	07:10 07:30-07:41/11 17:21	06:31 06:51-07:38/47 17:56	06:39 06:58-08:06/68 19:30	05:54 20:03	05:28 19:28-19:58/30 20:32
6	07:29 16:46	07:09 07:29-07:43/14 17:22	06:30 06:49-07:36/47 17:57	06:38 06:56-08:05/69 19:31	05:53 19:31-19:38/7 20:04	05:28 19:29-19:58/29 20:32
7	07:28 16:47	07:08 07:28-07:44/16 17:24	06:28 06:47-07:35/48 17:58	06:36 06:55-08:05/70 19:32	05:52 19:28-19:41/13 20:05	05:28 19:30-19:59/29 20:33
8	07:28 16:48	07:07 07:27-07:45/18 17:25	06:27 06:46-07:35/49 17:59	06:35 06:53-08:04/71 19:33	05:51 19:27-19:43/16 20:06	05:28 19:30-19:59/29 20:33
9	07:28 16:49	07:06 07:26-07:46/20 17:26	06:25 06:44-07:33/49 18:00	06:33 06:52-08:04/72 19:35	05:50 19:24-19:43/19 20:07	05:27 19:30-19:59/29 20:34
10	07:28 16:50	07:05 07:24-07:46/22 17:28	06:23 06:42-07:31/49 18:01	06:31 06:50-08:02/72 19:36	05:48 19:23-19:44/21 20:08	05:27 19:31-19:59/28 20:35
11	07:28 16:51	07:03 07:23-07:47/24 17:29	06:22 06:41-07:30/49 18:03	06:30 06:48-08:01/73 19:37	05:47 19:23-19:45/22 20:09	05:27 19:32-19:59/27 20:35
12	07:28 16:52	07:02 07:22-07:48/26 17:30	06:20 06:39-07:28/49 18:04	06:28 06:48-08:00/72 19:38	05:46 19:22-19:46/24 20:10	05:27 19:32-20:00/28 20:36
13	07:27 16:53	07:01 07:21-07:49/28 17:31	06:18 06:37-07:26/49 18:05	06:26 06:48-07:59/71 19:39	05:45 19:22-19:46/24 20:11	05:27 19:33-20:00/27 20:36
14	07:27 16:54	07:00 07:19-07:48/29 17:33	06:17 06:36-07:24/48 18:06	06:25 06:49-07:58/69 19:40	05:44 19:21-19:47/26 20:12	05:27 19:33-20:00/27 20:37
15	07:26 16:55	06:58 07:18-07:49/31 17:34	06:15 06:34-07:21/47 18:07	06:23 06:49-07:56/67 19:41	05:43 19:21-19:47/26 20:13	05:27 19:33-20:00/27 20:37
16	07:26 16:56	06:57 07:16-07:49/33 17:35	06:13 06:32-07:17/45 18:08	06:22 06:49-07:54/65 19:42	05:42 19:21-19:48/27 20:14	05:27 19:33-20:00/27 20:37
17	07:26 16:58	06:55 07:15-07:49/34 17:36	06:12 06:30-07:11/41 18:09	06:20 06:50-07:53/63 19:43	05:41 19:21-19:49/28 20:15	05:27 19:33-20:00/27 20:38
18	07:25 16:59	06:54 07:14-07:50/36 17:38	06:10 06:29-07:08/39 18:10	06:18 06:50-07:51/61 19:44	05:40 19:21-19:49/28 20:16	05:27 19:34-20:00/26 20:38
19	07:25 17:00	06:53 07:12-07:49/37 17:39	06:08 06:27-07:08/41 18:12	06:17 06:52-07:50/58 19:45	05:39 19:21-19:50/29 20:17	05:27 19:34-20:01/27 20:38
20	07:24 17:01	06:51 07:11-07:49/38 17:40	06:07 06:25-07:09/44 18:13	06:15 06:52-07:47/55 19:46	05:38 19:21-19:50/29 20:18	05:27 19:35-20:02/27 20:39
21	07:23 17:02	06:50 07:09-07:48/39 17:41	06:05 06:24-07:10/46 18:14	06:14 06:54-07:46/52 19:48	05:37 19:21-19:51/30 20:19	05:27 19:35-20:02/27 20:39
22	07:23 17:04	06:48 07:08-07:49/41 17:42	06:03 06:22-07:10/48 18:15	06:12 06:54-07:43/49 19:49	05:37 19:22-19:53/31 20:20	05:27 19:35-20:02/27 20:39
23	07:22 17:05	06:47 07:06-07:48/42 17:44	06:01 06:20-07:10/50 18:16	06:11 06:56-07:40/44 19:50	05:36 19:22-19:53/31 20:21	05:28 19:35-20:02/27 20:39
24	07:21 17:06	06:45 07:05-07:48/43 17:45	06:00 06:18-07:10/52 18:17	06:09 06:58-07:37/39 19:51	05:35 19:22-19:53/31 20:22	05:28 19:36-20:02/26 20:40
25	07:21 17:07	06:44 07:03-07:46/43 17:46	05:58 06:17-07:11/54 18:18	06:08 07:00-07:34/34 19:52	05:34 19:22-19:54/32 20:23	05:28 19:36-20:02/26 20:40
26	07:20 17:08	06:42 07:02-07:46/44 17:47	05:56 06:15-07:10/55 18:19	06:07 07:02-07:31/29 19:53	05:34 19:23-19:55/32 20:24	05:28 19:35-20:02/27 20:40
27	07:19 17:10	06:41 07:00-07:45/45 17:49	05:55 06:13-07:10/57 18:20	06:05 07:05-07:27/22 19:54	05:33 19:23-19:55/32 20:24	05:29 19:36-20:03/27 20:40
28	07:18 17:11	06:39 06:59-07:44/45 17:50	05:53 06:12-07:11/59 18:21	06:04 07:10-07:23/13 19:55	05:32 19:25-19:56/31 20:25	05:29 19:36-20:03/27 20:40
29	07:17 17:12		06:51 07:10-08:10/60 19:23	06:02 19:56	05:32 19:25-19:56/31 20:26	05:30 19:36-20:03/27 20:40
30	07:16 17:14		06:50 07:08-08:09/61 19:24	06:01 19:57	05:31 19:25-19:57/32 20:27	05:30 19:36-20:04/28 20:40
31	07:15 17:15		06:48 07:07-08:10/63 19:25		05:31 19:25-19:57/32 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	14	779	1530	1620	684	836

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 2 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 19:36-20:03/27 20:40	05:55 19:33-19:56/23 20:20	06:26 06:47-08:00/73 19:36	06:57 07:17-08:06/49 18:45	06:32 06:54-07:16/22 16:57	07:08 16:32
2	05:31 19:36-20:04/28 20:19	05:56 19:34-19:55/21 20:19	06:27 06:48-08:00/72 19:35	06:58 07:19-08:08/49 18:43	06:33 06:55-07:15/20 16:56	07:09 16:32
3	05:31 19:36-20:04/28 20:39	05:57 19:34-19:54/20 20:18	06:28 06:49-08:01/72 19:33	06:59 07:20-08:09/49 18:42	06:35 06:57-07:15/18 16:55	07:10 16:32
4	05:32 19:36-20:04/28 20:39	05:58 19:35-19:53/18 20:17	06:29 06:50-08:01/71 19:31	07:00 07:21-08:10/49 18:40	06:36 06:58-07:14/16 16:54	07:11 16:32
5	05:33 19:35-20:04/29 20:39	05:59 19:37-19:52/15 20:16	06:30 06:51-08:01/70 19:30	07:01 07:22-08:11/49 18:38	06:37 06:59-07:12/13 16:53	07:12 16:31
6	05:33 19:35-20:05/30 20:39	06:00 19:39-19:50/11 20:14	06:32 06:52-08:01/69 19:28	07:03 07:23-08:11/48 18:36	06:38 07:01-07:12/11 16:51	07:13 16:31
7	05:34 19:35-20:05/30 20:38	06:01 19:42-19:46/4 20:13	06:33 06:53-08:02/69 19:26	07:04 07:24-08:12/48 18:35	06:40 07:02-07:11/9 16:50	07:14 16:31
8	05:34 19:34-20:05/31 20:38	06:02 20:12	06:34 06:54-08:02/68 19:25	07:05 07:25-08:12/47 18:33	06:41 07:03-07:09/6 16:49	07:15 16:31
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11	05:36 19:34-20:05/31 20:37	06:05 20:08	06:37 06:57-08:01/64 19:19	07:08 07:28-08:14/46 18:28	06:44 16:46	07:17 07:41-07:49/8 16:31
12	05:37 19:34-20:05/31 20:36	06:06 20:07	06:38 06:58-08:01/63 19:18	07:09 07:30-08:16/46 18:27	06:46 16:45	07:18 07:42-07:50/8 16:31
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15	05:40 19:33-20:04/31 20:35	06:09 07:16-07:32/16 20:03	06:41 07:01-08:00/59 19:13	07:12 07:33-08:18/45 18:22	06:49 16:42	07:21 07:45-07:54/9 16:32
16	05:40 19:33-20:04/31 20:34	06:10 07:12-07:36/24 20:01	06:42 07:02-07:59/57 19:11	07:14 07:34-08:18/44 18:20	06:50 16:41	07:21 07:45-07:55/10 16:32
17	05:41 19:33-20:04/31 20:33	06:11 07:09-07:39/30 20:00	06:43 07:03-07:59/56 19:09	07:15 07:35-08:18/43 18:19	06:52 16:40	07:22 07:46-07:56/10 16:32
18	05:42 19:33-20:04/31 20:33	06:12 07:06-07:41/35 19:58	06:44 07:04-07:58/54 19:07	07:16 07:37-08:19/42 18:17	06:53 16:40	07:23 07:47-07:57/10 16:33
19	05:43 19:32-20:03/31 20:32	06:13 07:04-07:44/40 19:57	06:45 07:05-07:57/52 19:06	07:17 07:38-08:19/41 18:16	06:54 16:39	07:23 07:47-07:57/10 16:33
20	05:44 19:32-20:03/31 20:31	06:14 07:02-07:47/45 19:55	06:46 07:06-07:56/50 19:04	07:18 07:39-08:19/40 18:14	06:55 16:38	07:24 07:48-07:58/10 16:33
21	05:45 19:32-20:02/30 20:31	06:15 07:00-07:49/49 19:54	06:47 07:07-07:55/48 19:02	07:19 07:40-08:19/39 18:13	06:56 16:37	07:24 07:48-07:58/10 16:34
22	05:45 19:32-20:02/30 20:30	06:16 06:58-07:51/53 19:52	06:48 07:08-07:54/46 19:00	07:20 07:41-08:19/38 18:11	06:58 16:37	07:25 07:49-07:59/10 16:34
23	05:46 19:32-20:01/29 20:29	06:17 06:57-07:52/55 19:51	06:49 07:09-07:53/44 18:59	07:22 07:43-08:19/36 18:10	06:59 16:36	07:25 07:49-07:59/10 16:35
24	05:47 19:32-20:01/29 20:28	06:18 06:55-07:54/59 19:49	06:50 07:10-07:52/42 18:57	07:23 07:44-08:19/35 18:08	07:00 16:36	07:26 07:49-07:59/10 16:35
25	05:48 19:32-20:00/28 20:27	06:19 06:54-07:55/61 19:48	06:51 07:11-07:51/40 18:55	06:24 06:45-07:19/34 17:07	07:01 16:35	07:26 07:50-08:00/10 16:36
26	05:49 19:32-20:00/28 20:26	06:20 06:53-07:56/63 19:46	06:52 07:12-07:49/37 18:54	06:25 06:46-07:18/32 17:05	07:02 16:34	07:27 07:50-08:00/10 16:37
27	05:50 19:31-19:59/28 20:25	06:21 06:52-07:57/65 19:44	06:53 07:13-07:57/44 18:52	06:26 06:48-07:19/31 17:04	07:03 16:34	07:27 07:50-08:00/10 16:37
28	05:51 19:31-19:58/27 20:24	06:22 06:51-07:58/67 19:43	06:54 07:14-08:00/46 18:50	06:27 06:49-07:18/29 17:03	07:05 16:34	07:27 07:51-08:01/10 16:38
29	05:52 19:32-19:58/26 20:23	06:23 06:49-07:59/70 19:41	06:55 07:15-08:03/48 18:48	06:29 06:50-07:17/27 17:01	07:06 16:33	07:28 07:51-08:00/9 16:39
30	05:53 19:32-19:57/25 20:22	06:24 06:48-07:59/71 19:40	06:56 07:16-08:05/49 18:47	06:30 06:52-07:18/26 17:00	07:07 16:33	07:28 07:51-08:00/9 16:39
31	05:54 19:32-19:57/25 20:21	06:25 06:47-07:59/72 19:38		06:31 06:53-07:17/24 16:59		07:28 07:51-08:00/9 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Somma minuti d'ombra	907	987	1716	1269	118	204

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 3 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	06:57-07:08/11 19:26	06:46 19:58	05:30 20:29
2	07:28 16:42	07:13 17:17	06:36 17:52	06:55-07:04/9 19:27	06:44 19:59	05:30 20:29
3	07:29 16:43	07:12 17:19	06:35 17:53	06:54-07:00/6 19:28	06:43 20:01	05:29 20:30
4	07:29 16:44	07:11 17:20	06:33 17:54	06:52-06:59/7 19:29	06:41 20:02	05:29 20:31
5	07:29 16:45	07:10 17:21	06:31 17:56	06:51-07:00/9 19:30	06:39 20:03	05:28 20:31
6	07:29 16:46	07:09 17:22	06:30 17:57	06:49-07:00/11 19:31	06:38 20:04	05:28 20:32
7	07:28 16:47	07:08 17:24	06:28 17:58	06:47-06:59/12 19:32	06:36 20:05	05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 17:59	06:46-07:00/14 19:33	06:34 20:06	05:27 20:33
9	07:28 16:49	07:06 17:26	06:25 18:00	06:44-06:59/15 19:34	06:33 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	06:23 18:01	06:42-06:58/16 19:36	06:31 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 18:02	06:41-06:58/17 19:37	06:30 20:09	05:27 20:35
12	07:27 16:52	07:02 17:30	06:20 18:04	06:39-06:56/17 19:38	06:28 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 18:05	06:37-06:55/18 19:39	06:26 20:11	05:27 20:36
14	07:27 16:54	06:59 17:33	06:17 18:06	06:36-06:54/18 19:40	06:25 20:12	05:27 20:37
15	07:26 16:55	06:58 17:34	06:15 18:07	06:34-06:52/18 19:41	06:23 20:13	05:27 20:37
16	07:26 16:56	06:57 17:35	06:13 18:08	06:32-06:50/18 19:42	06:22 20:14	05:27 20:37
17	07:26 16:58	06:55 17:36	06:12 18:09	06:30-06:47/17 19:43	06:20 20:15	05:27 20:38
18	07:25 16:59	06:54 17:38	06:10 18:10	06:29-06:45/16 19:44	06:18 20:16	05:27 20:38
19	07:24 17:00	06:53 17:39	06:08 18:11	06:29-06:41/12 19:45	06:17 20:17	05:27 20:38
20	07:24 17:01	06:51 17:40	06:07 18:13	06:11-07:20/9 19:46	06:15 20:18	05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:50-07:18/9 19:48	06:14 20:19	05:27 20:39
22	07:23 17:04	06:48 17:42	06:03 18:15	06:08-07:18/10 19:49	06:12 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:01 18:16	06:06-07:16/10 19:50	06:11 20:21	05:27 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:05-07:15/10 19:51	06:09 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:03-07:13/10 19:52	06:08 20:23	05:28 20:40
26	07:20 17:08	06:42 17:47	05:56 18:19	06:02-07:13/11 19:53	06:07 20:24	05:28 20:40
27	07:19 17:10	06:41 17:48	05:55 18:20	06:00-07:11/11 19:54	06:05 20:24	05:29 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:59-07:10/11 19:55	06:04 20:25	05:29 20:40
29	07:17 17:12		06:51 19:22		06:02 19:56	05:30 20:40
30	07:16 17:14		06:50 19:24		06:01 19:57	05:30 20:40
31	07:15 17:15		06:48 19:25		05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	0	119	261	0	577	1390

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 3 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 19:23-20:09/46 20:40	05:55 20:20	06:26 19:36	06:57 07:17-07:35/18 18:45	06:32 16:57	07:08 16:32
2	05:31 19:23-20:10/47 20:39	05:56 20:19	06:27 19:35	06:58 07:19-07:36/17 18:43	06:33 16:56	07:09 16:32
3	05:31 19:23-20:09/46 20:39	05:57 20:18	06:28 19:33	06:59 07:20-07:36/16 18:42	06:35 16:55	07:10 16:32
4	05:32 19:24-20:10/46 20:39	05:58 20:17	06:29 19:31	07:00 07:21-07:36/15 18:40	06:36 16:54	07:11 16:32
5	05:33 19:23-20:09/46 20:39	05:59 20:16	06:30 19:30	07:01 07:22-07:36/14 18:38	06:37 16:53	07:12 16:31
6	05:33 19:24-20:10/46 20:39	06:00 20:14	06:31 19:28	07:03 07:23-07:36/13 18:36	06:38 16:51	07:13 16:31
7	05:34 19:25-20:10/45 20:38	06:01 20:13	06:32 19:26	07:04 07:24-07:36/12 18:35	06:40 16:50	07:14 16:31
8	05:34 19:24-20:09/45 20:38	06:02 20:12	06:34 19:25	07:05 07:25-07:35/10 18:33	06:41 16:49	07:15 16:31
9	05:35 19:25-20:09/44 20:38	06:03 20:11	06:35 19:23	07:06 07:26-07:34/8 18:31	06:42 16:48	07:16 16:31
10	05:36 19:26-20:09/43 20:37	06:04 20:09	06:36 19:21	07:07 07:27-07:34/7 18:30	06:43 16:47	07:16 16:31
11	05:36 19:25-20:08/43 20:37	06:05 20:08	06:37 19:19	07:08 07:28-07:35/7 18:28	06:44 16:46	07:17 16:31
12	05:37 19:26-20:09/43 20:36	06:06 20:07	06:38 19:18	07:09 07:30-07:40/10 18:27	06:46 16:45	07:18 16:31
13	05:38 19:27-20:09/42 20:36	06:07 20:05	06:39 19:16	07:10 07:31-07:42/11 18:25	06:47 16:44	07:19 16:31
14	05:39 19:26-20:08/42 20:35	06:08 20:04	06:40 19:14	07:11 07:32-07:43/11 18:23	06:48 16:43	07:20 16:32
15	05:39 19:27-20:08/41 20:35	06:09 20:02	06:41 19:13	07:12 07:33-07:44/11 18:22	06:49 16:42	07:21 16:32
16	05:40 19:27-20:08/41 20:34	06:10 20:01	06:42 19:11	07:14 07:34-07:45/11 18:20	06:50 16:41	07:21 16:32
17	05:41 19:28-20:07/39 20:33	06:11 20:00	06:43 19:09	07:15 07:35-07:45/10 18:19	06:52 16:40	07:22 16:32
18	05:42 19:29-20:07/38 20:33	06:12 19:58	06:44 19:07	07:16 07:37-07:47/10 18:17	06:53 16:40	07:23 16:33
19	05:43 19:29-20:06/37 20:32	06:13 19:57	06:45 19:06	07:17 07:38-07:48/10 18:16	06:54 16:39	07:23 16:33
20	05:44 19:29-20:05/36 20:31	06:14 19:55	06:46 19:04	07:18 07:39-07:49/10 18:14	06:55 16:38	07:24 16:33
21	05:45 19:30-20:05/35 20:31	06:15 19:54	06:47 19:02	07:19 07:40-07:49/9 18:13	06:56 16:37	07:24 16:34
22	05:45 19:31-20:04/33 20:30	06:16 19:52	06:48 19:00	07:20 07:41-07:49/8 18:11	06:58 16:37	07:25 16:34
23	05:46 19:32-20:04/32 20:29	06:17 19:51	06:49 18:59	07:22 07:43-07:50/7 18:10	06:59 16:36	07:25 16:35
24	05:47 19:33-20:03/30 20:28	06:18 19:49	06:50 07:14-07:23/9 18:57	07:23 07:44-07:50/6 18:08	07:00 16:36	07:26 16:35
25	05:48 19:34-20:02/28 20:27	06:19 19:48	06:51 07:11-07:27/16 18:55	06:24 06:45-06:50/5 17:07	07:01 16:35	07:26 16:36
26	05:49 19:36-20:01/25 20:26	06:20 19:46	06:52 07:12-07:29/17 18:53	06:25 06:46-06:50/4 17:05	07:02 16:34	07:27 16:37
27	05:50 19:36-19:59/23 20:25	06:21 19:44	06:53 07:13-07:30/17 18:52	06:26 06:48-06:50/2 17:04	07:03 16:34	07:27 16:37
28	05:51 19:38-19:57/19 20:24	06:22 19:43	06:54 07:14-07:32/18 18:50	06:27 06:49-06:50/1 17:03	07:04 16:34	07:27 16:38
29	05:52 19:41-19:54/13 20:23	06:23 19:41	06:55 07:15-07:33/18 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	05:53 19:46-19:50/4 20:22	06:24 19:40	06:56 07:16-07:34/18 18:47	06:30 17:00	07:07 16:33	07:28 16:39
31	05:54 20:21	06:25 19:38		06:31 16:59		07:28 16:40
Ore potenziali eliofanía	461	429	375	345	297	286
Somma minuti d'ombra	1098	0	113	273	0	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering\_Progetto+ Esistenti WTG: 4 - NORDEX N163/6.X 6600 163.0 !OI! hub: 118,0 m (TOT: 199,5 m) (4)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanìa (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre		
1	07:28 16:41	07:14 17:16	06:38 17:51	06:46 19:26	06:00 19:58	18:48-19:07/19	05:30 20:29	05:30 20:40	05:55 20:20	06:26 19:36	18:44-18:58/14	06:57 18:45	06:32 16:57	07:08 16:32
2	07:28 16:42	07:13 17:17	06:36 17:52	06:44 19:27	05:58 19:59	18:49-19:06/17	05:30 20:29	05:31 20:39	05:56 20:19	06:27 19:35	18:45-18:56/11	06:58 18:43	06:33 16:56	07:09 16:32
3	07:28 16:43	07:12 17:19	06:35 17:53	06:43 19:28	05:57 20:01	18:50-19:04/14	05:29 20:30	05:31 20:39	05:57 20:18	06:28 19:33		06:59 18:41	06:35 16:55	07:10 16:32
4	07:29 16:44	07:11 17:20	06:33 17:54	06:41 19:29	05:56 20:02	18:52-19:02/10	05:29 20:31	05:32 20:39	05:58 20:17	06:29 19:31		06:36 18:40	07:11 16:54	07:11 16:32
5	07:29 16:45	07:10 17:21	06:31 17:56	06:39 19:30	05:54 20:03		05:28 20:31	05:33 20:39	05:59 20:16	06:30 19:30		07:01 18:38	06:37 16:53	07:12 16:31
6	07:28 16:46	07:09 17:22	06:30 17:57	06:38 19:31	05:53 20:04		05:28 20:32	05:33 20:39	06:00 20:14	06:31 19:28		07:02 18:36	06:38 16:51	07:13 16:31
7	07:28 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 20:05		05:28 20:33	05:34 20:38	06:01 20:13	06:32 19:26		07:04 18:35	06:39 16:50	07:14 16:31
8	07:28 16:48	07:07 17:25	06:27 17:59	06:34 19:33	05:51 20:06		05:27 20:33	05:34 20:38	06:02 20:12	06:33 19:25	19:05-19:09/4	07:05 18:33	06:41 16:49	07:15 16:31
9	07:28 16:49	07:06 17:26	06:25 18:00	06:33 19:34	05:50 20:07		05:27 20:34	05:35 20:38	06:03 20:11	06:34 19:23	19:01-19:12/11	07:06 18:31	06:42 16:48	07:16 16:31
10	07:28 16:50	07:04 17:27	06:23 18:01	06:31 19:36	05:48 20:08	18:47-18:58/11	05:27 20:35	05:36 20:37	06:04 20:09	06:36 19:21	18:59-19:14/15	07:07 18:30	06:43 16:47	07:16 16:31
11	07:28 16:51	07:03 17:29	06:22 18:02	06:30 19:37	05:47 20:09	18:45-18:59/14	05:27 20:35	05:36 20:37	06:05 20:08	06:37 19:19	18:57-19:15/18	07:08 18:28	06:44 16:46	07:17 16:31
12	07:27 16:52	07:02 17:30	06:20 18:04	06:28 19:38	05:46 20:10	18:43-19:01/18	05:27 20:36	05:37 20:36	06:06 20:07	06:38 19:18	18:56-19:16/20	07:09 18:27	06:46 16:45	07:18 16:31
13	07:27 16:53	07:01 17:31	06:18 18:05	06:26 19:39	05:45 20:11	18:42-19:01/19	05:27 20:36	05:38 20:36	06:07 20:05	06:39 19:16	18:55-19:17/22	07:10 18:25	06:47 16:44	07:19 16:31
14	07:27 16:54	06:59 17:33	06:17 18:06	06:16 19:40	05:44 20:12	18:40-19:01/21	05:27 20:37	05:39 20:35	06:08 20:04	06:40 19:14	18:53-19:17/24	07:11 18:23	06:48 16:43	07:20 16:32
15	07:26 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	18:40-19:03/23	05:27 20:37	05:39 20:35	06:09 20:02	06:41 19:13	18:51-19:18/27	07:12 18:22	06:49 16:42	07:20 16:32
16	07:26 16:56	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	18:39-19:04/25	05:27 20:37	05:40 20:34	06:10 20:01	06:42 19:11	18:50-19:18/28	07:13 18:20	06:50 16:41	07:21 16:32
17	07:26 16:58	06:55 17:36	06:12 18:09	06:20 19:43	05:41 20:15	18:40-19:07/27	05:27 20:38	05:41 20:33	06:11 20:00	06:43 19:09	18:49-19:18/29	07:15 18:19	06:52 16:40	07:22 16:32
18	07:25 16:59	06:54 17:37	06:10 18:09	06:18 19:43	05:40 20:16	18:39-19:08/29	05:27 20:38	05:42 20:33	06:12 19:58	06:44 19:07	18:48-19:18/30	07:16 18:17	06:53 16:40	07:23 16:33
19	07:24 17:00	06:53 17:39	06:08 18:11	06:17 19:45	05:39 20:17	18:40-19:09/29	05:27 20:38	05:43 20:32	06:13 19:57	06:45 19:06	18:47-19:17/30	07:17 18:16	06:54 16:39	07:23 16:33
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:46	05:38 20:18	18:39-19:10/31	05:27 20:39	05:44 20:31	06:14 19:55	06:46 19:04	18:47-19:17/30	07:18 18:14	06:55 16:38	07:24 16:33
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:37 20:19	18:40-19:11/31	05:27 20:39	05:44 20:31	06:15 19:54	06:47 19:02	18:46-19:16/30	07:19 18:13	06:56 16:37	07:24 16:34
22	07:23 17:04	06:48 17:42	06:03 18:15	06:12 19:49	05:37 20:20	18:40-19:10/30	05:27 20:39	05:45 20:30	06:16 19:52	06:48 19:00	18:44-19:15/31	07:20 18:11	06:58 16:37	07:25 16:34
23	07:22 17:05	06:47 17:44	06:01 18:16	06:11 19:50	05:36 20:21	18:41-19:11/30	05:27 20:39	05:46 20:29	06:17 19:51	06:49 18:59	18:43-19:13/30	07:22 18:10	06:59 16:36	07:25 16:35
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	05:35 20:22	18:40-19:11/31	05:28 20:39	05:47 20:28	06:18 19:49	06:50 18:57	18:42-19:12/30	07:23 18:08	07:00 16:36	07:26 16:35
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	05:34 20:23	18:41-19:11/30	05:28 20:40	05:48 20:27	06:19 19:48	06:51 18:55	18:42-19:10/28	06:24 17:07	07:01 16:35	07:26 16:36
26	07:20 17:08	06:42 17:47	05:56 18:19	06:06 19:53	05:34 20:24	18:42-19:11/29	05:28 20:40	05:49 20:26	06:20 19:46	06:52 18:53	18:41-19:08/27	06:25 17:05	07:02 16:34	07:27 16:37
27	07:19 17:10	06:41 17:48	05:55 18:20	06:05 19:54	05:33 20:24	18:42-19:10/28	05:29 20:40	05:50 20:25	06:21 19:44	06:53 18:52	18:41-19:06/25	06:27 17:04	07:03 16:34	07:27 16:37
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	05:32 20:25	18:44-19:10/26	05:29 20:40	05:51 20:24	06:22 19:43	06:54 18:50	18:41-19:04/23	06:28 17:03	07:04 16:34	07:27 16:38
29	07:17 17:12		06:51 19:22	06:02 19:56	05:32 20:26	18:46-19:09/23	05:29 20:40	05:52 20:23	06:23 19:41	06:55 18:48	18:41-19:02/21	06:29 17:01	07:06 16:33	07:28 16:39
30	07:16 17:13		06:50 19:24	06:01 19:57	05:31 20:27	18:46-19:08/22	05:30 20:40	05:53 20:22	06:24 19:40	06:56 18:47	18:42-19:01/19	06:30 17:00	07:07 16:33	07:28 16:39
31	07:15 17:15		06:48 19:25		05:31 20:28			05:54 20:21	06:25 19:38		18:42-19:00/18	06:31 16:59	07:28 16:40	
Ore potenziali eliofanìa	296	296	369	399	450		454	461	429	375	25	345	297	286
Somma minuti d'ombra	0	0	0	527	60		0	0	570			0	0	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 5 - NORDEX N163/6.X 6600 163.0 !O! hub: 118,0 m (TOT: 199,5 m) (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 14:06-15:11/65 16:41	07:14 14:18-15:32/74 17:16 07:35-08:03/28	06:38 07:14-07:42/28 17:51	06:46 17:29-18:17/48 19:26 07:05-08:04/59	06:00 06:21-06:44/23 19:58 06:51-07:46/55	05:30 20:28
2	07:28 14:07-15:12/65 16:42	07:13 14:19-15:32/73 17:17 07:34-08:04/30	06:36 07:15-07:40/25 17:52	06:44 17:28-18:18/50 19:27 07:03-08:03/60	05:58 06:21-06:45/24 19:59 06:52-07:45/53	05:30 20:29
3	07:28 14:07-15:13/66 16:43	07:12 14:19-15:31/72 17:19 07:33-08:04/31	06:35 07:17-07:38/21 17:53	06:43 17:27-18:18/51 19:28 07:01-08:03/62	05:57 06:21-06:45/24 20:00 06:52-07:43/51	05:29 20:30
4	07:28 14:07-15:14/67 16:44	07:11 14:20-15:30/70 17:20 07:31-08:04/33	06:33 07:20-07:35/15 17:54	06:41 17:27-18:20/53 19:29 07:00-08:03/63	05:56 06:20-06:44/24 20:02 06:53-07:42/49	05:29 20:31
5	07:28 14:07-15:15/68 16:45	07:10 14:21-15:30/69 17:21 07:30-08:04/34	06:31 17:55	06:39 17:26-18:20/54 19:30 06:58-08:01/63	05:54 06:21-06:44/23 20:03 06:54-07:41/47	05:28 20:31
6	07:28 14:08-15:17/69 16:46	07:09 14:23-15:30/67 17:22 07:29-08:04/35	06:30 17:57	06:38 17:25-18:20/55 19:31 06:56-08:01/65	05:53 06:21-06:43/22 20:04 06:55-07:40/45	05:28 20:32
7	07:28 14:08-15:18/70 16:47	07:08 14:24-15:29/65 17:24 07:28-08:04/36	06:28 17:58	06:36 17:26-18:21/55 19:32 06:56-08:02/66	05:52 06:22-06:43/21 20:05 06:56-07:39/43	05:28 20:33
8	07:28 14:08-15:18/70 16:48	07:07 14:26-15:28/62 17:25 07:27-08:04/37	06:27 17:59	06:34 17:25-18:20/55 19:33 06:54-08:01/67	05:51 06:22-06:42/20 20:06 06:58-07:38/40	05:27 20:33
9	07:28 14:08-15:19/71 16:49	07:06 14:27-15:26/59 17:26 07:26-08:04/38	06:25 18:00	06:33 17:25-18:20/55 19:34 06:53-08:01/68	05:49 06:23-06:41/18 20:07 06:58-07:35/37	05:27 20:34
10	07:28 14:09-15:20/71 16:50	07:04 14:29-15:25/56 17:27 07:24-08:03/39	06:23 18:01	06:31 17:26-18:21/55 19:35 06:53-08:01/68	05:48 06:23-06:39/16 20:08 07:00-07:34/34	05:27 20:34
11	07:28 14:09-15:22/73 16:51	07:03 14:32-15:24/52 17:29 07:23-08:03/40	06:22 18:02	06:30 17:26-18:20/54 19:37 06:51-08:01/70	05:47 06:25-06:38/13 20:09 07:02-07:32/30	05:27 20:35
12	07:27 14:09-15:22/73 16:52	07:02 14:35-15:22/47 17:30 07:22-08:03/41	06:20 18:04	06:28 17:26-18:20/54 19:38 06:51-08:01/70	05:46 06:27-06:36/9 20:10 07:04-07:29/25	05:27 20:36
13	07:27 14:10-15:23/73 16:53	07:01 14:37-15:17/40 17:31 07:20-08:02/42	06:18 06:37-06:47/10 18:05	06:26 17:26-18:20/54 19:39 06:50-08:00/70	05:45 06:31-06:32/1 20:11 07:07-07:27/20	05:27 20:36
14	07:27 14:09-15:24/75 16:54	06:59 14:43-15:06/23 17:32 07:19-08:01/42	06:17 06:35-06:52/17 18:06	06:25 17:27-18:19/52 19:40 06:49-07:59/70	05:44 07:10-07:23/13 20:12	05:27 20:36
15	07:26 14:10-15:25/75 16:55	06:58 07:18-08:00/42 17:34	06:15 06:34-06:55/21 18:07	06:23 17:28-18:19/51 19:41 06:49-07:59/70	05:43 20:13	05:26 20:37
16	07:26 14:10-15:25/75 16:56	06:57 07:16-07:58/42 17:35	06:13 06:32-06:57/25 18:08	06:22 17:28-18:18/50 19:42 06:49-07:58/69	05:42 20:14	05:27 20:37
17	07:25 14:10-15:26/76 16:58	06:55 07:15-07:57/42 17:36	06:12 06:30-06:59/29 18:09	06:20 17:30-18:18/48 19:43 06:49-07:58/69	05:41 20:15	05:27 20:38
18	07:25 14:10-15:27/77 16:59	06:54 07:14-07:56/42 17:37	06:10 06:29-07:01/32 18:10	06:18 17:30-18:17/47 19:44 06:48-07:57/69	05:40 20:16	05:27 20:38
19	07:24 14:11-15:28/77 17:00	06:53 07:12-07:53/41 07:46-07:47/1	06:08 06:27-07:02/35 18:11	06:17 17:32-18:16/44 19:45 06:48-07:56/68	05:39 20:17	05:27 20:38
20	07:24 14:11-15:28/77 17:01	06:51 07:11-07:52/41 07:45-07:49/4	06:06 06:25-07:02/37 18:13	06:15 17:33-18:15/42 19:46 06:48-07:55/67	05:38 20:18	05:27 20:39
21	07:23 14:11-15:29/78 17:02	06:50 07:09-07:50/41 07:44-07:51/7	06:05 06:24-07:04/40 18:14	06:14 17:36-18:14/38 19:47 06:48-07:55/67	05:37 20:19	05:27 20:39
22	07:23 14:12-15:30/78 17:03	06:48 07:10-07:50/40 07:44-07:53/9	06:03 06:22-07:04/42 18:15	06:12 17:36-18:13/37 19:49 06:48-07:53/65	05:37 20:20	05:27 20:39
23	07:22 14:12-15:30/78 17:05	06:47 07:10-07:49/39 07:43-07:55/12	06:01 06:20-07:04/44 18:16	06:11 17:38-18:12/34 19:50 06:48-07:53/65	05:36 20:21	05:27 20:39
24	07:21 14:12-15:30/78 17:06	06:45 07:10-07:48/38 07:42-07:56/14	06:00 16:42-17:03/21 18:17	06:09 06:30-06:39/9 06:48-07:51/63 19:51 17:38-18:10/32	05:35 20:22	05:28 20:39
25	07:20 14:13-15:31/78 17:07	06:44 07:10-07:47/37 07:41-07:57/16	05:58 16:39-17:06/27 18:18	06:08 06:27-06:41/14 17:40-18:09/29 19:52 06:48-07:51/63	05:34 20:23	05:28 20:40
26	07:20 14:13-15:31/78 17:08	06:42 07:11-07:47/36 07:40-07:58/18	05:56 16:37-17:08/31 18:19	06:06 06:26-06:43/17 17:42-18:07/25 19:53 06:49-07:51/62	05:34 20:23	05:28 20:40
27	07:19 14:13-15:31/78 17:10	06:41 07:12-07:45/33 07:40-08:00/20	05:55 16:34-17:09/35 18:20	06:05 06:24-06:43/19 17:44-18:04/20 19:54 06:49-07:49/60	05:33 20:24	05:29 20:40
28	07:18 14:15-15:32/77 17:11	06:39 07:12-07:43/31 07:39-08:01/22	05:53 16:33-17:11/38 18:21	06:04 06:23-06:44/21 17:47-18:01/14 19:55 06:49-07:49/60	05:32 20:25	05:29 20:40
29	07:17 14:15-15:32/77 17:12	06:38 08:01/23 07:38-08:01/23	05:52 07:10-08:05/55 19:22	06:02 06:22-06:45/23 19:56 06:50-07:48/58	05:32 20:26	05:29 20:40
30	07:16 14:16-15:32/76 17:13	06:37 08:02/25 14:16-15:32/76	06:49 17:30-18:14/44 19:23	06:01 06:21-06:44/23 07:08-08:05/57	05:31 20:27	05:30 20:40
31	07:15 14:17-15:32/75 17:15	06:48 17:29-18:15/46 07:36-08:03/27	06:48 17:29-18:15/46 19:25	06:50 07:47/57 07:06-08:04/58	05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	2482	1880	1136	3335	780	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Pedatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 5 - NORDEX N163/6.X 6600 163.0 IO! hub: 118,0 m (TOT: 199,5 m) (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre	
1	05:30 20:40	05:55 06:36-06:48/12 20:20 07:14-07:41/27	06:26 17:24-18:19/55 19:36 06:50-08:00/70	06:57 18:45	06:32 13:59-14:55/56 16:57 06:54-07:33/39	07:08 13:51-15:04/73 16:32	
2	05:31 20:39	05:56 06:35-06:49/14 20:19 07:12-07:43/31	06:27 17:24-18:19/55 19:35 06:51-07:59/68	06:58 18:43	06:33 13:56-14:56/60 16:56 06:55-07:33/38	07:09 13:52-15:03/71 16:32	
3	05:31 20:39	05:57 06:34-06:51/17 20:18 07:10-07:45/35	06:28 17:23-18:18/55 19:33 06:51-07:59/68	06:59 18:41	06:35 13:55-14:57/62 16:55 06:57-07:34/37	07:10 13:52-15:03/71 16:32	
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7	05:34 20:38	06:01 06:31-06:53/22 20:13 07:04-07:50/46	06:32 17:21-18:15/54 19:26 06:53-07:57/64	07:04 18:35	06:39 13:51-15:01/70 16:50 07:02-07:34/32	07:14 13:55-15:02/67 16:31	
8	05:34 20:38	06:02 06:30-06:53/23 20:12 07:03-07:51/48	06:33 17:21-18:14/53 19:24 06:54-07:57/63	07:05 18:33	06:41 13:50-15:02/72 16:49 07:03-07:34/31	07:15 13:55-15:02/67 16:31	
9	05:35 20:38	06:03 06:30-06:53/23 20:10 07:02-07:52/50	06:34 17:21-18:13/52 19:23 06:55-07:57/62	07:06 07:57-08:07/10 18:31	06:42 13:49-15:02/73 16:48 07:04-07:34/30	07:16 13:56-15:02/66 16:31	
10	05:36 20:37	06:04 06:30-06:53/23 20:09 07:01-07:53/52	06:35 17:21-18:11/50 19:21 06:56-07:57/61	07:07 07:52-08:10/18 18:30	06:43 13:49-15:03/74 16:47 07:06-07:34/28	07:16 13:56-15:01/65 16:31	
11	05:36 20:37	06:05 06:30-06:53/23 20:08 07:00-07:54/54	06:36 17:21-18:09/48 19:19 06:57-07:56/59	07:08 07:50-08:12/22 18:28	06:44 13:48-15:03/75 16:46 07:07-07:34/27	07:17 13:56-15:01/65 16:31	
12	05:37 20:36	06:06 06:30-06:53/23 20:07 06:59-07:55/56	06:37 17:21-18:08/47 19:18 06:58-07:56/58	07:09 07:49-08:15/26 18:27	06:46 13:47-15:03/76 16:45 07:08-07:33/25	07:18 13:57-15:01/64 16:31	
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15	05:39 20:35	06:09 06:31-06:51/20 17:54-18:10/16 20:02 06:57-07:57/60	06:41 17:23-18:01/38 19:12 07:01-07:55/54	07:12 07:44-08:18/34 18:22	06:49 13:46-15:04/78 16:42 07:12-07:32/20	07:20 13:59-15:01/62 16:32	
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27	05:50 20:25	06:21 17:30-18:20/50 19:44 06:50-08:00/70	06:53 07:13-07:39/26 18:52	07:26 06:48-07:30/42 17:04	07:03 13:49-15:04/75 16:34	07:27 14:04-15:06/62 16:37	
28	05:51 20:24	06:22 17:29-18:20/51 19:43 06:50-08:00/70	06:54 07:14-07:37/23 18:50	07:27 14:11-14:36/25 17:03	07:04 13:49-15:04/75 16:33	07:27 14:05-15:07/62 16:38	
29	05:52 07:25-07:29/4 20:23	06:23 17:27-18:20/53 19:41 06:50-08:00/70	06:55 07:15-07:34/19 18:48	07:29 14:06-14:48/42 17:01	07:05 13:50-15:03/73 16:33	07:28 14:06-15:08/62 16:39	
30	05:53 07:19-07:35/16 20:22	06:24 17:26-18:20/54 19:39 06:50-08:00/70	06:56 07:16-07:29/13 18:47	07:30 14:03-14:51/48 17:00	07:07 13:50-15:03/73 16:33	07:28 14:06-15:09/63 16:39	
31	05:54 06:39-06:45/6 20:21 07:16-07:38/22	06:25 17:25-18:19/54 19:38 06:50-08:00/70	 19:38 06:50-08:00/70	 16:59 06:53-07:33/40	 	07:28 14:06-15:10/64 16:40	
	Ore potenziali eliofania Somma minuti d'ombra	461 48	429 2812	375 2371	345 991	297 2734	286 1988

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 6 - Acciona AW 77/1500 CI 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 07:51-07:59/8 16:41	07:15 07:40-07:53/13 17:16	06:38 06:57-07:06/9 17:51	06:46 19:26	06:00 19:59	05:30 20:29
2	07:29 07:51-07:59/8 16:42	07:14 07:41-07:52/11 17:17	06:36 06:56-07:07/11 17:52	06:45 19:27	05:58 20:00	05:30 20:29
3	07:29 07:52-07:59/7 16:43	07:13 07:43-07:51/8 17:19	06:35 06:54-07:07/13 17:53	06:43 19:28	05:57 20:01	05:29 20:30
4	07:29 07:53-07:59/6 16:44	07:11 17:20	06:33 06:52-07:07/15 17:55	06:41 19:29	05:56 20:02	05:29 20:31
5	07:29 07:55-07:59/4 16:45	07:10 17:21	06:32 06:51-07:07/16 17:56	06:40 19:30	05:55 20:03	05:29 20:32
6	07:29 16:46	07:09 17:23	06:30 06:49-07:06/17 17:57	06:38 19:31	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 17:24	06:28 06:48-07:05/17 17:58	06:36 19:32	05:52 20:05	05:28 20:33
8	07:28 16:48	07:07 17:25	06:27 06:48-07:04/16 17:59	06:35 19:34	05:51 20:06	05:28 20:34
9	07:28 16:49	07:06 17:26	06:25 06:48-07:02/14 18:00	06:33 19:35	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 17:28	06:23 06:49-06:59/10 18:01	06:31 19:36	05:49 20:08	05:27 20:35
11	07:28 16:51	07:03 17:29	06:22 06:52-06:57/5 18:03	06:30 19:37	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 17:30	06:20 17:24-17:35/11 18:04	06:28 19:38	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 17:31	06:18 17:26-17:32/6 18:05	06:26 19:39	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 17:33	06:17 18:06	06:25 19:40	05:44 20:12	05:27 20:37
15	07:27 16:55	06:58 17:34	06:15 18:07	06:23 19:41	05:43 20:13	05:27 20:37
16	07:26 07:48-07:49/1 16:57	06:57 17:35	06:13 18:08	06:22 19:42	05:42 20:14	05:27 20:38
17	07:26 07:47-07:51/4 16:58	06:56 17:36	06:12 18:09	06:20 19:43	05:41 20:15	05:27 20:38
18	07:25 07:46-07:52/6 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38
19	07:25 07:46-07:54/8 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39
20	07:24 07:45-07:54/9 17:01	06:51 17:40	06:07 18:13	06:16 19:47	05:38 20:18	05:27 20:39
21	07:23 07:45-07:56/11 17:02	06:50 17:41	06:05 18:14	06:14 19:17-19:24/7 19:48	05:38 20:19	05:27 20:39
22	07:23 07:44-07:56/12 17:04	06:48 17:43	06:03 18:15	06:12 19:15-19:25/10 19:49	05:37 20:20	05:27 20:39
23	07:22 07:43-07:56/13 17:05	06:47 17:44	06:02 18:16	06:11 19:15-19:26/11 19:50	05:36 20:21	05:28 20:39
24	07:21 07:42-07:56/14 17:06	06:46 17:45	06:00 18:17	06:10 19:14-19:27/13 19:51	05:35 20:22	05:28 20:40
25	07:21 07:41-07:56/15 17:07	06:44 17:46	05:58 18:18	06:08 19:14-19:26/12 19:52	05:34 20:23	05:28 20:40
26	07:20 07:41-07:57/16 17:09	06:43 17:47	05:56 18:19	06:07 19:14-19:26/12 19:53	05:34 20:24	05:29 20:40
27	07:19 07:40-07:57/17 17:10	06:41 17:49	05:55 18:20	06:05 19:14-19:25/11 19:54	05:33 20:25	05:29 20:40
28	07:18 07:39-07:57/18 17:11	06:39 06:59-07:04/5 17:50	05:53 18:22	06:04 19:15-19:24/9 19:55	05:32 20:25	05:29 20:40
29	07:17 07:38-07:56/18 17:12		06:51 19:23	06:02 19:16-19:23/7 19:56	05:32 20:26	05:30 20:40
30	07:16 07:38-07:55/17 17:14		06:50 19:24	06:01 19:57	05:31 20:27	05:30 20:40
31	07:15 07:39-07:54/15 17:15		06:48 19:25		05:31 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	227	37	291	92	0	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+Esistenti WTG: 6 - Acciona AW 77/1500 CII 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (1)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	18:03-18:13/10 16:58	07:08 16:33
2	05:31 20:40	05:56 20:19	06:28 19:35	06:58 18:43	18:02-18:16/14 16:56	07:09 16:32
3	05:32 20:39	05:57 20:18	06:29 19:33	06:59 18:42	07:28-07:37/9 18:00-18:16/16 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 19:31	07:00 18:40	07:26-07:39/13 17:59-18:17/18 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 19:30	07:02 18:38	07:25-07:40/15 17:58-18:15/17 16:53	07:12 16:32
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 18:37	07:25-07:41/16 17:57-18:14/17 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 18:35	07:24-07:41/17 17:57-18:12/15 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 19:25	07:05 18:33	07:25-07:42/17 17:57-18:10/13 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 18:32	07:26-07:42/16 17:57-18:08/11 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 18:30	07:27-07:41/14 17:57-18:07/10 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 18:28	07:29-07:41/12 17:58-18:05/7 16:46	07:18 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	07:09 18:27	07:30-07:40/10 18:01-18:04/3 16:45	07:19 16:31
13	05:38 20:36	06:07 20:05	06:39 19:16	07:10 18:25	07:31-07:38/7 16:44	07:20 16:32
14	05:39 20:35	06:08 20:04	19:24-19:31/7 06:40	07:11 18:24	07:32-07:35/3 16:43	07:20 16:32
15	05:40 20:35	06:09 20:03	19:22-19:32/10 06:41	07:12 18:22	07:33-07:36/3 16:42	07:21 16:32
16	05:40 20:34	06:10 20:01	19:21-19:33/12 06:42	07:13 18:20	07:34-07:37/3 16:41	07:22 16:32
17	05:41 20:34	06:11 20:00	19:21-19:33/12 06:43	07:14 18:19	07:35-07:38/3 16:40	07:23 16:33
18	05:42 20:33	06:12 19:58	19:20-19:33/13 06:44	07:15 18:17	07:36-07:39/3 16:39	07:24 16:33
19	05:43 20:32	06:13 19:57	19:20-19:33/13 06:45	07:16 18:16	07:37-07:40/3 16:38	07:25 16:34
20	05:44 20:31	06:14 19:55	19:20-19:32/12 06:46	07:17 18:14	07:38-07:41/3 16:37	07:26 16:34
21	05:45 20:31	06:15 19:54	19:21-19:31/10 06:47	07:18 18:13	07:39-07:42/3 16:36	07:27 16:35
22	05:46 20:30	06:16 19:52	19:23-19:29/6 06:48	07:19 18:11	07:40-07:43/3 16:35	07:28 16:35
23	05:46 20:29	06:17 19:51	06:49 18:59	07:20 18:10	07:41-07:44/3 16:34	07:29 16:36
24	05:47 20:28	06:18 19:49	06:50 18:57	07:21 18:08	07:42-07:45/3 16:33	07:30 16:36
25	05:48 20:27	06:19 19:48	06:51 18:55	07:22 18:07	07:43-07:46/3 16:32	07:31 16:37
26	05:49 20:26	06:20 19:46	06:52 18:54	07:23 18:06	07:44-07:47/3 16:31	07:32 16:37
27	05:50 20:25	06:21 19:44	06:53 18:52	07:24 18:05	07:45-07:48/3 16:30	07:33 16:38
28	05:51 20:24	06:22 19:43	06:54 18:50	07:25 18:04	07:46-07:49/3 16:29	07:34 16:38
29	05:52 20:23	06:23 19:41	06:55 18:48	07:26 18:03	07:47-07:50/3 16:28	07:35 16:39
30	05:53 20:22	06:24 19:40	06:56 18:47	07:27 18:02	07:48-07:51/3 16:27	07:36 16:40
31	05:54 20:21	06:25 19:38	06:57 18:46	07:28 18:01	07:49-07:52/3 16:26	07:37 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Somma minuti d'ombra	0	95	0	300	229	185

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 7 - Acciona AW 77/1500 CI 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 07:51-08:05/14 16:41	07:15 17:16	06:38 06:57-07:05/8 17:51	06:46 19:26	06:00 17:47-18:50/63 19:58	05:30 19:24-19:34/10 20:29 17:54-18:48/54
2	07:29 07:51-08:05/14 16:42	07:14 17:17	06:36 06:56-07:05/9 17:52	06:45 19:27	05:58 17:46-18:50/64 20:00	05:30 19:24-19:34/10 20:29 17:54-18:47/53
3	07:29 07:51-08:05/14 16:43	07:12 17:19	06:35 06:54-07:04/10 17:53	06:43 19:28	05:57 17:46-18:51/65 20:01	05:29 19:25-19:34/9 20:30 17:54-18:48/54
4	07:29 07:51-08:05/14 16:44	07:11 17:20	06:33 06:52-07:02/10 17:54	06:41 19:29	05:56 17:45-18:50/65 20:02	05:29 19:25-19:35/10 20:31 17:55-18:48/53
5	07:29 07:51-08:05/14 16:45	07:10 17:21	06:32 06:52-07:01/9 17:56	06:40 19:30	05:54 17:45-18:51/66 20:03	05:28 19:25-19:34/9 20:32 17:55-18:47/52
6	07:29 07:51-08:05/14 16:46	07:09 17:23	06:30 06:54-06:59/5 17:57	06:38 19:31	05:53 17:45-18:51/66 20:04	05:28 19:26-19:34/8 20:32 17:56-18:47/51
7	07:29 07:51-08:05/14 16:47	07:08 17:24	06:28 17:58	06:36 19:32	05:52 17:45-18:51/66 20:05	05:28 19:26-19:34/8 20:33 17:57-18:47/50
8	07:28 07:51-08:05/14 16:48	07:07 17:25	06:27 17:59	06:35 19:33	05:51 17:45-18:51/66 20:06	05:28 19:27-19:34/7 20:33 17:58-18:47/49
9	07:28 07:50-08:04/14 16:49	07:06 17:26	06:25 18:00	06:33 19:35	05:50 17:45-18:52/67 20:07	05:27 19:27-19:33/6 20:34 17:58-18:47/49
10	07:28 07:50-08:05/15 16:50	07:05 17:28	06:23 18:01	06:31 19:36	05:48 17:45-18:52/67 20:08	05:27 19:28-19:33/5 20:35 17:58-18:46/48
11	07:28 07:50-08:05/15 16:51	07:03 07:23-07:25/2 17:29	06:22 18:03	06:30 19:37	05:47 17:45-18:51/66 20:09	05:27 19:29-19:33/4 20:35 17:59-18:46/47
12	07:28 07:49-08:04/15 16:52	07:02 07:22-07:26/4 17:30	06:20 18:04	06:28 19:38	05:46 17:45-18:51/66 20:10	05:27 19:30-19:32/2 20:36 17:59-18:46/47
13	07:27 07:50-08:04/14 16:53	07:01 07:21-07:26/5 17:31	06:18 18:05	06:26 19:39	05:45 17:45-18:51/66 20:11	05:27 18:00-18:46/46 20:36
14	07:27 07:51-08:04/13 16:54	07:00 07:19-07:24/5 17:33	06:17 18:06	06:25 19:40	05:44 17:45-18:51/66 20:12	05:27 18:00-18:47/47 20:37
15	07:26 07:52-08:03/11 16:55	06:58 17:34	06:15 18:07	06:23 18:16-18:25/9 19:41	05:43 17:46-18:51/65 20:13	05:27 18:00-18:47/47 20:37
16	07:26 07:54-08:03/9 16:57	06:57 17:35	06:13 18:08	06:22 18:09-18:31/22 19:42	05:42 17:46-18:51/65 20:14	05:27 18:01-18:47/46 20:37
17	07:26 07:57-08:00/3 16:58	06:56 17:36	06:12 18:09	06:20 18:06-18:35/29 19:43	05:41 17:47-18:51/64 20:15	05:27 18:01-18:47/46 20:38
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 18:03-18:37/34 19:44	05:40 17:47-18:51/64 20:16	05:27 18:01-18:47/46 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 18:01-18:39/38 19:45	05:39 17:47-18:50/63 20:17	05:27 18:01-18:47/46 20:39
20	07:24 17:01	06:51 17:40	06:07 17:41-17:45/4 18:13	06:15 17:58-18:40/42 19:47	05:38 17:47-18:50/63 20:18	05:27 18:03-18:48/45 20:39
21	07:23 17:02	06:50 17:41	06:05 06:24-06:27/3 18:14 17:40-17:46/6	06:14 17:57-18:42/45 19:48	05:38 17:47-18:50/63 20:19	05:27 18:03-18:48/45 20:39
22	07:23 07:44-07:45/1 17:04	06:48 17:43	06:03 06:22-06:28/6 18:15 17:39-17:46/7	06:12 17:55-18:43/48 19:49	05:37 17:48-18:50/62 20:20	05:27 18:03-18:48/45 20:39
23	07:22 07:43-07:44/1 17:05	06:47 17:44	06:02 06:20-06:27/7 18:16 17:39-17:46/7	06:11 17:54-18:45/51 19:50	05:36 17:49-18:50/61 20:21	05:28 18:02-18:48/46 20:39
24	07:21 17:06	06:45 17:45	06:00 06:19-06:28/9 18:17 17:39-17:46/7	06:09 17:53-18:46/53 19:51	05:35 17:49-18:49/60 20:22	05:28 18:03-18:49/46 20:40
25	07:21 17:07	06:44 17:46	05:58 06:17-06:26/9 18:18 17:41-17:49/8	06:08 17:51-18:46/55 19:52	05:34 19:27-19:30/3 20:23 17:50-18:50/60	05:28 18:03-18:49/46 20:40
26	07:20 17:09	06:42 07:02-07:04/2 17:47	05:56 06:17-06:25/8 18:19 17:41-17:49/8	06:07 17:50-18:47/57 19:53	05:34 19:26-19:31/5 20:24 17:50-18:49/59	05:28 18:03-18:49/46 20:40
27	07:19 07:40-07:41/1 17:10	06:41 07:00-07:05/5 17:49	05:55 06:18-06:22/4 18:20 17:41-17:48/7	06:05 17:49-18:47/58 19:54	05:33 19:24-19:32/8 20:25 17:50-18:49/59	05:29 18:04-18:50/46 20:40
28	07:18 07:39-07:40/1 17:11	06:39 06:59-07:06/7 17:50	05:53 17:42-17:48/6 18:21	06:04 17:49-18:48/59 19:55	05:32 19:25-19:33/8 20:25 17:51-18:49/58	05:29 18:03-18:50/47 20:40
29	07:17 07:38-07:39/1 17:12		06:51 19:23	06:02 17:48-18:49/61 19:56	05:32 19:24-19:33/9 20:26 17:51-18:48/57	05:30 18:03-18:50/47 20:40
30	07:16 07:37-07:38/1 17:14		06:50 19:24	06:01 17:47-18:49/62 19:57	05:31 19:24-19:34/10 20:27 17:52-18:49/57	05:30 19:34-19:36/2 20:40 18:03-18:50/47
31	07:15 07:36-07:37/1 17:15		06:48 19:25		05:31 19:24-19:34/10 20:28 17:53-18:48/55	
Ore potenziali eliofanía	296	296	369	399	450	454
Somma minuti d'ombra	228	30	157	723	2007	1527

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utenente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+Esistenti WTG: 7 - Acciona AW 77/1500 CI 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (2)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 19:33-19:37/4 20:40 18:03-18:50/47	05:55 17:55-19:01/66 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 07:32-07:47/15 16:33
2	05:31 19:33-19:38/5 20:40 18:03-18:51/48	05:56 17:55-19:01/66 20:19	06:27 19:35	06:58 18:43	06:33 16:56	07:09 07:33-07:48/15 16:32
3	05:32 19:32-19:38/6 20:39 18:03-18:51/48	05:57 17:55-19:01/66 20:18	06:29 19:33	06:59 18:42	06:35 16:55	07:10 07:34-07:48/14 16:32
4	05:32 19:33-19:39/6 20:39 18:03-18:52/49	05:58 17:55-19:01/66 20:17	06:30 19:31	07:00 18:40	06:36 16:54	07:11 07:35-07:49/14 16:32
5	05:33 19:32-19:39/7 20:39 18:03-18:53/50	05:59 17:55-19:01/66 20:16	06:31 19:30	07:02 18:38	06:37 16:53	07:12 07:36-07:50/14 16:32
6	05:33 19:32-19:40/8 20:39 18:02-18:53/51	06:00 17:55-19:01/66 20:14	06:32 19:28	07:03 18:37	06:38 16:51	07:13 07:37-07:51/14 16:31
7	05:34 19:32-19:41/9 20:38 18:03-18:54/51	06:01 17:55-19:00/65 20:13	06:33 19:26	07:04 18:35	06:40 16:50	07:14 07:38-07:52/14 16:31
8	05:35 19:32-19:41/9 20:38 18:02-18:54/52	06:02 17:55-19:00/65 20:12	06:34 19:25	07:05 07:28-07:35/7 18:33	06:41 16:49	07:15 07:39-07:53/14 16:31
9	05:35 19:32-19:42/10 20:38 18:02-18:55/53	06:03 17:55-19:00/65 20:11	06:35 19:23	07:06 07:26-07:36/10 18:32	06:42 16:48	07:16 07:40-07:54/14 16:31
10	05:36 19:32-19:42/10 20:37 18:02-18:55/53	06:04 17:55-18:59/64 20:09	06:36 19:21	07:07 07:27-07:37/10 18:30	06:43 16:47	07:17 07:41-07:55/14 16:31
11	05:37 19:32-19:42/10 20:37 18:01-18:55/54	06:05 17:55-18:59/64 20:08	06:37 19:20	07:08 07:29-07:39/10 18:28	06:44 07:07-07:08/1 16:46	07:17 07:41-07:55/14 16:31
12	05:37 19:32-19:42/10 20:36 18:01-18:56/55	06:06 17:55-18:58/63 20:07	06:38 19:18	07:09 07:30-07:39/9 18:27	06:46 07:09-07:10/1 16:45	07:18 07:42-07:56/14 16:31
13	05:38 19:33-19:42/9 20:36 18:01-18:57/56	06:07 17:56-18:57/61 20:05	06:39 19:16	07:10 07:31-07:39/8 18:25	06:47 07:10-07:11/1 16:44	07:19 07:43-07:57/14 16:32
14	05:39 19:33-19:43/10 20:35 18:01-18:57/56	06:08 17:56-18:57/61 20:04	06:40 19:14	07:11 07:32-07:38/6 18:23	06:48 07:11-07:12/1 16:43	07:20 07:44-07:58/14 16:32
15	05:40 19:33-19:42/9 20:35 18:00-18:57/57	06:09 17:56-18:56/60 20:03	06:41 18:32-18:37/5 19:13	07:12 07:33-07:37/4 18:22	06:49 07:12-07:13/1 16:42	07:21 07:45-07:59/14 16:32
16	05:40 19:34-19:42/8 20:34 18:00-18:58/58	06:10 17:57-18:55/58 20:01	06:42 07:08-07:10/2 19:11 18:30-18:37/7	07:14 18:20	06:51 16:41	07:21 07:45-07:59/14 16:32
17	05:41 19:34-19:41/7 20:34 18:00-18:58/58	06:11 17:57-18:54/57 20:00	06:43 07:05-07:13/8 19:09 18:30-18:37/7	07:15 18:19	06:52 16:41	07:22 07:46-07:59/13 16:32
18	05:42 19:36-19:41/5 20:33 18:00-18:59/59	06:12 17:58-18:53/55 19:58	06:44 07:04-07:14/10 19:07 18:29-18:36/7	07:16 18:17	06:53 16:40	07:23 07:47-08:00/13 16:33
19	05:43 17:59-19:00/61 20:32	06:13 17:59-18:51/52 19:57	06:45 07:05-07:14/9 19:06 18:26-18:35/9	07:17 18:16	06:54 07:18-07:19/1 16:39	07:23 07:47-08:00/13 16:33
20	05:44 17:58-18:59/61 20:31	06:14 18:00-18:50/50 19:55	06:46 07:06-07:14/8 19:04 18:25-18:32/7	07:18 18:14	06:55 07:19-07:20/1 16:38	07:24 07:48-08:01/13 16:34
21	05:45 17:58-19:00/62 20:31	06:15 18:01-18:49/48 19:54	06:47 07:07-07:13/6 19:02 18:24-18:32/8	07:19 18:13	06:56 16:38	07:24 07:48-08:01/13 16:34
22	05:45 17:58-19:00/62 20:30	06:16 18:02-18:47/45 19:52	06:48 07:08-07:12/4 19:00 18:24-18:31/7	07:20 18:11	06:58 16:37	07:25 07:49-08:02/13 16:34
23	05:46 17:58-19:00/62 20:29	06:17 18:03-18:45/42 19:51	06:49 18:24-18:30/6 18:59	07:22 18:10	06:59 16:36	07:25 07:49-08:02/13 16:35
24	05:47 17:58-19:01/63 20:28	06:18 18:05-18:43/38 19:49	06:50 18:57	07:23 18:08	07:00 16:36	07:26 07:49-08:02/13 16:36
25	05:48 17:57-19:01/64 20:27	06:19 18:07-18:40/33 19:48	06:51 18:55	07:24 17:07	07:01 07:35-07:38/3 16:35	07:26 07:50-08:03/13 16:36
26	05:49 17:57-19:01/64 20:26	06:20 18:09-18:37/28 19:46	06:52 18:54	07:25 17:06	07:02 07:32-07:41/9 16:35	07:27 07:50-08:03/13 16:37
27	05:50 17:57-19:02/65 20:25	06:21 18:13-18:33/20 19:44	06:53 18:52	07:26 06:50-06:52/2 17:04	07:03 07:31-07:42/11 16:34	07:27 07:50-08:04/14 16:37
28	05:51 17:57-19:02/65 20:24	06:22 18:19-18:26/7 19:43	06:54 18:50	07:27 06:49-06:54/5 17:03	07:05 07:30-07:43/13 16:34	07:27 07:51-08:05/14 16:38
29	05:52 17:56-19:01/65 20:23	06:23 19:41	06:55 18:48	07:29 06:50-06:55/5 17:01	07:06 07:31-07:45/14 16:33	07:28 07:51-08:05/14 16:39
30	05:53 17:56-19:01/65 20:22	06:24 19:40	06:56 18:47	07:30 06:52-06:56/4 17:00	07:07 07:31-07:46/15 16:33	07:28 07:51-08:05/14 16:40
31	05:54 17:55-19:01/66 20:21	06:25 19:38		06:31 06:53-06:55/2 16:59		07:28 07:51-08:05/14 16:40
Ore potenziali eliofanía	461	429	375	345	297	286
Somma minuti d'ombra	1922	1497	110	82	72	426

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH  
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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+Esistenti WTG: 8 - Acciona AW 77/1500 CI 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 08:00-08:24/24 16:41 07:51-07:53/2	07:15 07:35-07:39/4 17:16 16:14-16:27/13	06:38 17:51	06:46 07:05-07:14/9 19:26	06:00 19:11-19:23/12 19:59	05:30 19:11-19:25/14 20:29
2	07:29 08:01-08:24/23 16:42 07:51-07:53/2	07:14 16:16-16:26/10 17:17	06:36 17:52	06:45 07:03-07:14/11 19:27	05:58 19:09-19:26/17 20:00	05:30 19:12-19:23/11 20:29
3	07:29 08:02-08:24/22 16:43 07:51-07:53/2	07:13 16:18-16:24/6 17:19	06:35 17:53	06:43 07:02-07:15/13 19:28	05:57 19:07-19:27/20 20:01	05:29 19:14-19:22/8 20:30
4	07:29 08:02-08:24/22 16:44 07:51-07:53/2	07:11 17:20	06:33 06:52-06:58/6 17:54	06:41 07:02-07:14/12 19:29	05:56 19:05-19:28/23 20:02	05:29 20:31
5	07:29 08:03-08:24/21 16:45 07:51-07:53/2	07:10 17:21	06:32 06:51-07:00/9 17:56	06:40 07:02-07:12/10 19:30	05:54 19:04-19:29/25 20:03	05:29 20:32
6	07:29 08:04-08:24/20 16:46 07:51-07:53/2	07:09 17:23	06:30 06:49-07:00/11 17:57	06:38 07:03-07:11/8 19:31	05:53 19:03-19:30/27 20:04	05:28 20:32
7	07:29 08:06-08:24/18 16:47	07:08 17:24	06:28 06:47-07:00/13 17:58	06:36 07:05-07:08/3 19:32	05:52 19:03-19:31/28 20:05	05:28 20:33
8	07:28 08:07-08:24/17 16:48	07:07 17:25	06:27 06:46-07:00/14 17:59	06:35 19:33	05:51 19:02-19:31/29 20:06	05:28 20:34
9	07:28 07:50-07:51/1 16:49 08:08-08:23/15	07:06 17:26	06:25 06:44-06:59/15 18:00	06:33 19:35	05:50 19:02-19:32/30 20:07	05:27 20:34
10	07:28 07:50-07:51/1 16:50 08:10-08:22/12	07:05 17:28	06:23 06:43-06:57/14 18:01	06:31 19:36	05:49 19:01-19:32/31 20:08	05:27 20:35
11	07:28 08:12-08:21/9 16:51	07:03 17:29	06:22 06:44-06:57/13 18:03	06:30 19:37	05:47 19:00-19:32/32 20:09	05:27 20:35
12	07:28 08:15-08:17/2 16:52	07:02 07:22-07:25/3 17:30	06:20 06:44-06:54/10 18:04	06:28 19:38	05:46 19:00-19:32/32 20:10	05:27 20:36
13	07:27 07:49-07:50/1 16:53	07:01 07:21-07:26/5 17:31	06:18 06:45-06:52/7 18:05	06:26 19:39	05:45 19:00-19:32/32 20:11	05:27 20:36
14	07:27 07:48-07:49/1 16:54	07:00 07:19-07:26/7 17:33	06:17 18:06	06:25 19:40	05:44 19:00-19:32/32 20:12	05:27 20:37
15	07:27 07:48-07:49/1 16:55	06:58 07:18-07:26/8 17:34	06:15 18:07	06:23 19:41	05:43 19:01-19:33/32 20:13	05:27 20:37
16	07:26 07:48-07:50/2 16:57	06:57 07:17-07:26/9 17:35	06:13 18:08	06:22 19:42	05:42 19:01-19:33/32 20:14	05:27 20:38
17	07:26 16:12-16:19/7 16:58 07:47-07:49/2	06:56 07:18-07:24/6 17:36	06:12 18:09	06:20 19:43	05:41 19:01-19:32/31 20:15	05:27 20:38
18	07:25 16:11-16:21/10 16:59 07:47-07:50/3	06:54 17:38	06:10 18:10	06:19 19:44	05:40 19:01-19:32/31 20:16	05:27 20:38
19	07:25 16:11-16:23/12 17:00 07:46-07:49/3	06:53 17:39	06:08 18:12	06:17 19:45	05:39 19:01-19:32/31 20:17	05:27 20:39
20	07:24 16:10-16:24/14 17:01 07:45-07:49/4	06:51 17:40	06:07 18:13	06:15 19:47	05:38 19:01-19:31/30 20:18	05:27 20:39
21	07:23 16:09-16:25/16 17:02 07:45-07:49/4	06:50 17:41	06:05 18:14	06:14 19:48	05:38 19:02-19:31/29 20:19	05:27 20:39
22	07:23 16:10-16:26/16 17:04 07:44-07:48/4	06:48 17:43	06:03 18:15	06:12 19:49	05:37 19:03-19:31/28 20:20	05:27 20:39
23	07:22 16:09-16:27/18 17:05 07:43-07:47/4	06:47 17:44	06:02 18:16	06:11 19:50	05:36 19:03-19:31/28 20:21	05:28 20:39
24	07:21 16:09-16:27/18 17:06 07:42-07:43/1	06:46 17:45	06:00 18:17	06:10 19:51	05:35 19:03-19:30/27 20:22	05:28 20:40
25	07:21 16:09-16:27/18 17:07 07:41-07:43/2	06:44 17:46	05:58 18:18	06:08 19:52	05:34 19:05-19:30/25 20:23	05:28 20:40
26	07:20 16:09-16:28/19 17:09 07:41-07:44/3	06:43 17:47	05:56 18:19	06:07 19:53	05:34 19:05-19:29/24 20:24	05:28 20:40
27	07:19 16:10-16:29/19 17:10 07:40-07:44/4	06:41 17:49	05:55 18:20	06:05 19:54	05:33 19:05-19:28/23 20:25	05:29 20:40
28	07:18 07:39-07:43/4 17:11 16:11-16:29/18	06:39 17:50	05:53 18:21	06:04 19:55	05:32 19:07-19:28/21 20:25	05:29 20:40
29	07:17 07:38-07:41/3 17:12 16:11-16:29/18		06:51 19:23	06:02 19:56	05:32 19:07-19:27/20 20:26	05:30 20:40
30	07:16 07:37-07:41/4 17:14 16:12-16:28/16		06:50 07:08-07:11/3 19:24	06:01 19:57	05:31 19:09-19:27/18 20:27	05:30 20:40
31	07:15 07:36-07:40/4 17:15 16:13-16:28/15		06:48 07:07-07:14/7 19:25		05:31 19:09-19:25/16 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	506	71	122	66	816	33

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+Esistenti WTG: 8 - Acciona AW 77/1500 CI 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (3)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 19:11-19:42/31 20:20	06:26 19:36	06:57 07:24-07:34/10 18:45	06:32 16:58	07:08 07:54-08:03/9 16:33
2	05:31 20:40	05:56 19:11-19:42/31 20:19	06:27 19:35	06:58 07:23-07:35/12 18:43	06:34 16:56	07:09 07:33-07:34/1 16:32 07:53-08:05/12
3	05:32 20:39	05:57 19:11-19:42/31 20:18	06:29 19:33	06:59 07:22-07:35/13 18:42	06:35 16:55	07:10 07:34-07:35/1 16:32 07:52-08:07/15
4	05:32 20:39	05:58 19:11-19:41/30 20:17	06:30 19:31	07:00 07:21-07:36/15 18:40	06:36 16:54	07:11 07:51-08:08/17 16:32
5	05:33 20:39	05:59 19:12-19:41/29 20:16	06:31 07:01-07:04/3 19:30	07:02 07:22-07:37/15 18:38	06:37 16:53	07:12 07:51-08:09/18 16:32
6	05:33 20:39	06:00 19:12-19:40/28 20:14	06:32 06:58-07:06/8 19:28	07:03 07:23-07:37/14 18:37	06:38 16:51	07:13 07:51-08:10/19 16:31 07:37-07:39/2
7	05:34 20:38	06:01 19:13-19:39/26 20:13	06:33 06:57-07:07/10 19:26	07:04 07:24-07:36/12 18:35	06:40 16:50	07:14 07:51-08:11/20 16:31 07:38-07:40/2
8	05:35 20:38	06:02 19:14-19:38/24 20:12	06:34 06:56-07:08/12 19:25	07:05 07:25-07:35/10 18:33	06:41 15:48-15:54/6 16:49	07:15 07:51-08:12/21 16:31 07:39-07:41/2
9	05:35 19:22-19:28/6 20:38	06:03 19:15-19:37/22 20:11	06:35 06:55-07:08/13 19:23	07:06 07:26-07:34/8 18:32	06:42 15:45-15:56/11 16:48	07:16 07:51-08:13/22 16:31 07:40-07:42/2
10	05:36 19:21-19:31/10 20:37	06:04 19:16-19:36/20 20:09	06:36 06:56-07:07/11 19:21	07:07 07:27-07:32/5 18:30	06:43 07:06-07:10/4 16:47 15:45-15:58/13	07:17 07:51-08:14/23 16:31 07:41-07:43/2
11	05:37 19:19-19:32/13 20:37	06:05 19:18-19:34/16 20:08	06:37 06:57-07:07/10 19:20	07:08 18:28	06:44 07:07-07:11/4 16:46 15:44-15:59/15	07:17 07:50-08:14/24 16:31 07:42-07:44/2
12	05:37 19:18-19:33/15 20:36	06:06 19:21-19:31/10 20:07	06:38 06:58-07:05/7 19:18	07:09 18:27	06:46 07:09-07:13/4 16:45 15:43-15:59/16	07:18 07:50-08:15/25 16:31 07:42-07:44/2
13	05:38 19:18-19:35/17 20:36	06:07 20:05	06:39 06:59-07:03/4 19:16	07:10 18:25	06:47 07:10-07:13/3 16:44 15:43-16:01/18	07:19 07:51-08:16/25 16:32 07:43-07:45/2
14	05:39 19:17-19:36/19 20:35	06:08 20:04	06:40 19:14	07:11 18:24	06:48 07:11-07:15/4 16:43 15:43-16:01/18	07:20 07:51-08:17/26 16:32 07:44-07:45/1
15	05:40 19:16-19:36/20 20:35	06:09 20:03	06:41 19:13	07:12 18:22	06:49 15:42-16:01/19 16:42 07:12-07:16/4	07:21 07:52-08:17/25 16:32 07:45-07:46/1
16	05:40 19:15-19:37/22 20:34	06:10 20:01	06:42 19:11	07:14 18:20	06:51 15:43-16:02/19 16:41 07:14-07:17/3	07:21 07:52-08:17/25 16:32 07:45-07:46/1
17	05:41 19:15-19:38/23 20:34	06:11 20:00	06:43 19:09	07:15 18:19	06:52 15:43-16:01/18 16:41 07:15-07:17/2	07:22 07:52-08:18/26 16:32 07:46-07:47/1
18	05:42 19:14-19:39/25 20:33	06:12 19:58	06:44 19:07	07:16 18:17	06:53 15:43-16:01/18 16:40 07:16-07:17/1	07:23 07:53-08:19/26 16:33 07:47-07:48/1
19	05:43 19:14-19:40/26 20:32	06:13 19:57	06:45 19:06	07:17 18:16	06:54 15:43-16:01/18 16:39 07:18-07:22/4	07:23 07:53-08:19/26 16:33
20	05:44 19:13-19:40/27 20:31	06:14 19:55	06:46 19:04	07:18 18:14	06:55 15:45-16:01/16 16:38 07:19-07:23/4	07:24 07:54-08:20/26 16:34
21	05:45 19:12-19:40/28 20:31	06:15 19:54	06:47 19:02	07:19 18:13	06:57 15:45-16:01/16 16:38 07:20-07:24/4	07:24 07:53-08:20/27 16:34
22	05:45 19:12-19:41/29 20:30	06:16 19:52	06:48 19:00	07:20 18:11	06:58 15:46-16:00/14 16:37 07:21-07:25/4	07:25 07:54-08:21/27 16:34
23	05:46 19:12-19:42/30 20:29	06:17 19:51	06:49 18:59	07:22 18:10	06:59 15:47-15:59/12 16:36 07:23-07:26/3	07:25 07:55-08:21/26 16:35
24	05:47 19:12-19:42/30 20:28	06:18 19:49	06:50 18:57	07:23 18:08	07:00 15:49-15:59/10 16:36 07:24-07:27/3	07:26 07:55-08:21/26 16:36
25	05:48 19:12-19:43/31 20:27	06:19 19:48	06:51 18:55	06:24 06:47-06:54/7 17:07	07:01 15:50-15:57/7 16:35 07:25-07:28/3	07:26 07:56-08:22/26 16:36 07:50-07:51/1
26	05:49 19:11-19:43/32 20:26	06:20 19:46	06:52 18:54	06:25 06:47-06:56/9 17:06	07:02 07:26-07:28/2 16:35	07:27 07:56-08:22/26 16:37 07:50-07:51/1
27	05:50 19:11-19:43/32 20:25	06:21 19:44	06:53 18:52	06:26 06:48-06:56/8 17:04	07:03 07:27-07:28/1 16:34	07:27 07:56-08:22/26 16:37 07:51-07:52/1
28	05:51 19:11-19:43/32 20:24	06:22 19:43	06:54 18:50	06:28 06:49-06:55/6 17:03	07:05 07:28-07:29/1 16:34	07:27 07:58-08:23/25 16:38 07:51-07:52/1
29	05:52 19:10-19:42/32 20:23	06:23 19:41	06:55 18:48	06:29 06:50-06:55/5 17:01	07:06 16:33	07:28 07:58-08:23/25 16:39 07:51-07:52/1
30	05:53 19:10-19:43/33 20:22	06:24 19:40	06:56 07:26-07:32/6 18:47	06:30 06:52-06:54/2 17:00	07:07 16:33	07:28 07:59-08:24/25 16:40 07:51-07:52/1
31	05:54 19:10-19:43/33 20:21	06:25 19:38		06:31 16:59		07:28 07:59-08:24/25 16:40 07:51-07:53/2
Ore potenziali eliofanía	461	429	375	345	297	286
Somma minuti d'ombra	565	298	84	151	322	745

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+Esistenti WTG: 9 - Acciona AW 77/1500 CI 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (4)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 15:20-15:49/29 16:41	07:15 07:35-07:37/2 17:16 15:53-16:16/23	06:38 06:57-07:23/26 17:51 16:38-17:01/23	06:46 07:08-07:22/14 19:26 11:39-14:19/160	06:00 11:14-14:30/196 19:59	05:30 11:13-14:32/199 20:29
2	07:29 15:20-15:50/30 16:42	07:14 07:34-07:37/3 17:17 15:54-16:16/22	06:36 06:55-07:23/28 17:52 16:37-17:01/24	06:45 07:07-07:20/13 19:27 11:37-14:20/163	05:58 11:14-14:30/196 20:00	05:30 11:13-14:31/198 20:29
3	07:29 15:21-15:50/29 16:43	07:13 07:33-07:37/4 17:19 15:55-16:15/20	06:35 06:54-07:24/30 17:53 16:38-17:01/23	06:43 07:08-07:20/12 19:28 11:37-14:21/164	05:57 11:14-14:30/196 20:01	05:29 11:13-14:31/198 20:30
4	07:29 15:21-15:51/30 16:44	07:11 07:32-07:36/4 17:20 15:56-16:15/19	06:33 06:52-07:23/31 17:54 16:38-17:01/23	06:41 07:08-07:17/9 19:29 11:35-14:22/167	05:56 11:12-14:30/198 20:02	05:29 11:14-14:32/198 20:31
5	07:29 15:21-15:52/31 16:45	07:10 07:31-07:34/3 17:21 15:56-16:13/17	06:32 06:51-07:24/33 17:56 16:39-17:01/22	06:40 07:09-07:15/6 19:30 11:33-14:22/169	05:54 11:12-14:30/198 20:03	05:28 11:13-14:31/198 20:32
6	07:29 15:22-15:54/32 16:46	07:09 07:29-07:33/4 17:23 15:58-16:12/14	06:30 06:49-07:23/34 12:00-12:17/17 17:57 16:39-16:59/20	06:38 11:33-14:23/170 19:31	05:53 11:12-14:30/198 20:04	05:28 11:14-14:32/198 20:32
7	07:29 15:23-15:55/32 16:47	07:08 07:28-07:34/6 17:24 16:00-16:11/11	06:28 06:48-07:22/34 11:46-12:27/41 17:58 16:40-16:58/18	06:36 11:31-14:23/172 19:32	05:52 11:12-14:30/198 20:05	05:28 11:14-14:32/198 20:33
8	07:28 15:23-15:56/33 16:48	07:07 07:27-07:36/9 17:25	06:27 06:48-07:22/34 11:40-12:34/54 17:59 16:41-16:57/16	06:35 11:30-14:24/174 19:33	05:51 11:12-14:30/198 20:06	05:28 11:15-14:32/197 20:34
9	07:28 15:23-15:56/33 16:49	07:06 07:26-07:37/11 17:26	06:25 06:47-07:21/34 16:43-16:55/12 18:00 11:34-12:38/64	06:33 11:29-14:25/176 19:35	05:50 11:12-14:31/199 20:07	05:27 11:15-14:33/198 20:34
10	07:28 15:24-15:58/34 16:50	07:05 07:24-07:37/13 17:28	06:23 06:46-07:19/33 16:46-16:51/5 18:01 11:29-12:42/73	06:31 11:28-14:25/177 19:36	05:48 11:12-14:31/199 20:08	05:27 11:15-14:32/197 20:35
11	07:28 15:25-15:59/34 16:51	07:03 07:23-07:38/15 17:29	06:22 06:47-07:19/32 18:03 11:26-12:46/80	06:30 11:27-14:25/178 19:37	05:47 11:11-14:30/199 20:09	05:27 11:15-14:32/197 20:35
12	07:28 15:24-15:59/35 16:52	07:02 07:22-07:39/17 17:30	06:20 06:46-07:16/30 18:04 11:22-12:49/87	06:28 11:26-14:26/180 19:38	05:46 11:11-14:30/199 20:10	05:27 11:15-14:33/198 20:36
13	07:27 15:25-16:00/35 16:53	07:01 07:21-07:39/18 17:31	06:18 06:46-07:14/28 18:05 11:18-12:51/93	06:26 11:25-14:26/181 19:39	05:45 11:11-14:30/199 20:11	05:27 11:16-14:33/197 20:36
14	07:27 15:26-16:02/36 16:54	07:00 07:19-07:39/20 17:33	06:17 06:47-07:13/26 18:06 11:16-12:55/99	06:25 11:25-14:27/182 19:40	05:44 11:11-14:30/199 20:12	05:27 11:16-14:33/197 20:37
15	07:27 15:27-16:02/35 16:55	06:58 07:18-07:39/21 17:34	06:15 11:13-12:57/104 18:07 06:47-07:12/25	06:23 11:23-14:27/184 19:41	05:43 11:12-14:31/199 20:13	05:27 11:16-14:33/197 20:37
16	07:26 15:28-16:03/35 16:57	06:57 07:16-07:38/22 17:35	06:13 11:10-12:58/108 18:08 06:48-07:10/22	06:22 11:22-14:27/185 19:42	05:42 11:12-14:31/199 20:14	05:27 11:16-14:33/197 20:38
17	07:26 15:28-16:03/35 16:58	06:56 07:15-07:38/23 17:36	06:12 11:07-13:00/113 18:09 06:50-07:09/19	06:20 11:22-14:27/185 19:43	05:41 11:12-14:31/199 20:15	05:27 11:17-14:33/196 20:38
18	07:25 15:29-16:03/34 16:59	06:54 07:14-07:38/24 17:38	06:10 11:05-13:03/118 18:10 06:51-07:06/15	06:19 11:20-14:27/187 19:44	05:40 11:11-14:31/200 20:16	05:27 11:17-14:34/197 20:38
19	07:25 15:30-16:07/37 17:00	06:53 07:12-07:37/25 17:39	06:08 11:02-13:04/122 18:12 06:54-07:03/9	06:17 11:20-14:28/188 19:45	05:39 11:11-14:31/200 20:17	05:27 11:17-14:34/197 20:39
20	07:24 15:31-16:08/37 17:01	06:51 07:11-07:36/25 17:40	06:07 11:00-13:05/125 18:13	06:15 06:36-06:42/6 19:47 11:19-14:28/189	05:38 11:11-14:30/199 20:18	05:27 11:18-14:35/197 20:39
21	07:23 15:32-16:09/37 17:02	06:50 07:09-07:35/26 17:41	06:05 10:58-13:08/130 18:14	06:14 06:34-06:43/9 19:48 11:19-14:28/189	05:38 11:11-14:30/199 20:19	05:27 11:18-14:35/197 20:39
22	07:23 15:35-16:11/36 17:04	06:48 07:08-07:35/27 17:43	06:03 10:56-13:09/133 18:15	06:12 06:33-06:44/11 19:49 11:18-14:28/190	05:37 11:12-14:31/199 20:20	05:27 11:18-14:35/197 20:39
23	07:22 15:37-16:12/35 17:05	06:47 07:06-07:33/27 17:44 16:44-16:54/10	06:02 10:54-13:10/136 18:16	06:11 06:32-06:44/12 19:50 11:18-14:29/191	05:36 11:12-14:31/199 20:21	05:28 11:18-14:35/197 20:39
24	07:21 15:39-16:13/34 17:06	06:46 07:05-07:33/28 17:45 16:42-16:57/15	06:00 10:52-13:12/140 18:17	06:09 06:32-06:44/12 19:51 11:17-14:29/192	05:35 11:11-14:31/200 20:22	05:28 11:19-14:36/197 20:40
25	07:21 15:41-16:13/32 17:07	06:44 07:03-07:31/28 17:46 16:40-16:57/17	05:58 10:50-13:13/143 18:18	06:08 06:31-06:42/11 19:52 11:16-14:29/193	05:34 11:12-14:31/199 20:23	05:28 11:19-14:35/196 20:40
26	07:20 15:43-16:15/32 17:09	06:42 07:02-07:29/27 17:47 16:40-16:59/19	05:56 10:48-13:14/146 18:19	06:07 06:31-06:42/11 19:53 11:16-14:29/193	05:34 11:12-14:31/199 20:24	05:28 11:18-14:35/197 20:40
27	07:19 15:45-16:15/30 17:10	06:41 07:00-07:25/25 17:49 16:38-17:00/22	05:55 10:46-13:14/148 18:20 06:15-06:22/7	06:05 06:33-06:41/8 19:54 11:15-14:29/194	05:33 11:12-14:31/199 20:25	05:29 11:19-14:36/197 20:40
28	07:18 15:46-16:16/30 17:11	06:39 06:59-07:25/26 17:50 16:38-17:01/23	05:53 06:14-06:24/10 18:21 10:45-13:16/151	06:04 06:33-06:38/5 19:55 11:15-14:29/194	05:32 11:13-14:31/198 20:25	05:29 11:19-14:36/197 20:40
29	07:17 15:47-16:16/29 17:12		06:51 07:12-07:24/12 19:23 11:43-14:17/154	06:02 11:15-14:30/195 19:56	05:32 11:12-14:31/199 20:26	05:30 11:19-14:36/197 20:40
30	07:16 15:48-16:16/28 17:14		06:50 07:10-07:23/13 19:24 11:42-14:17/155	06:01 11:14-14:29/195 19:57	05:31 11:13-14:31/198 20:27	05:30 11:20-14:37/197 20:40
31	07:15 07:36-07:37/1 17:15 15:51-16:16/25		06:48 07:09-07:24/15 19:25 11:41-14:19/158		05:31 11:13-14:31/198 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	1015	715	3658	5596	6155	5918

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

VSB Neue Energien Deutschland GmbH
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Pedatto il:
14/11/2023 14:53/3.6.355



SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 9 - Acciona AW 77/1500 CI 1500 77.0 IO! hub: 60,0 m (TOT: 98,5 m) (4)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

Table with columns for months (Luglio to Dicembre) and rows for days (1-31). Columns contain time ranges (hh:mm) and total minutes. Summary row at bottom: Ore potenziali eliofania (461, 6156, 6039, 375, 4613, 345, 1586, 297, 863, 286, 897) and Somma minuti d'ombra (6156, 6039, 4613, 345, 1586, 863, 897).

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra
Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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Pedatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 10 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)

### Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 07:51-07:53/2 16:41	07:15 17:16	06:38 06:57-07:23/26 17:51 16:38-16:57/19	06:46 07:18-07:56/38 19:26	06:00 19:59	05:30 20:29
2	07:29 16:42	07:14 07:34-07:36/2 17:17	06:36 06:55-07:24/29 17:52 16:38-16:56/18	06:45 07:17-07:56/39 19:27	05:58 20:00	05:30 20:29
3	07:29 16:43	07:13 07:33-07:37/4 17:19	06:35 06:54-07:25/31 17:53 16:39-16:56/17	06:43 07:15-07:57/42 19:28	05:57 20:01	05:29 20:30
4	07:29 16:44	07:11 07:32-07:38/6 17:20	06:33 06:52-07:25/33 17:54 16:40-16:54/14	06:41 07:13-07:56/43 19:29	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 07:31-07:39/8 17:21	06:32 06:51-07:26/35 17:56 16:43-16:52/9	06:40 07:11-07:56/45 19:30	05:54 06:20-06:22/2 20:03	05:28 20:32
6	07:29 16:46	07:09 07:29-07:38/9 17:23	06:30 06:49-07:26/37 17:57	06:38 07:10-07:56/46 19:31	05:53 06:18-06:25/7 20:04	05:28 20:32
7	07:29 16:47	07:08 07:28-07:38/10 17:24	06:28 06:47-07:25/38 17:58	06:36 07:09-07:55/46 19:32	05:52 06:17-06:26/9 20:05	05:28 20:33
8	07:28 16:48	07:07 07:27-07:37/10 17:25	06:27 06:46-07:26/40 17:59	06:35 07:07-07:54/47 19:33	05:51 06:15-06:27/12 20:06	05:28 20:34
9	07:28 07:50-07:51/1 16:49	07:06 07:26-07:34/8 17:26 16:32-16:38/6	06:25 06:44-07:25/41 18:00	06:33 07:07-07:54/47 19:35 06:59-07:05/6	05:50 06:14-06:27/13 20:07	05:27 20:34
10	07:28 07:50-07:52/2 16:50	07:05 07:25-07:32/7 17:28 16:28-16:41/13	06:23 06:42-07:24/42 18:01	06:31 06:56-07:53/57 19:36	05:49 06:14-06:27/13 20:08	05:27 20:35
11	07:28 07:50-07:52/2 16:51	07:03 07:23-07:30/7 17:29 16:27-16:43/16	06:22 06:41-07:24/43 18:03	06:30 06:54-07:52/58 19:37	05:47 06:13-06:27/14 20:09	05:27 20:35
12	07:28 07:49-07:52/3 16:52	07:02 07:22-07:30/8 17:30 16:26-16:44/18	06:20 06:39-07:23/44 18:04	06:28 06:53-07:51/58 19:38	05:46 06:13-06:27/14 20:10	05:27 20:36
13	07:27 07:49-07:52/3 16:53	07:01 16:25-16:46/21 17:31 07:21-07:28/7	06:18 06:38-07:21/43 18:05	06:26 06:51-07:50/59 19:39	05:45 06:13-06:26/13 20:11	05:27 20:36
14	07:27 07:49-07:53/4 16:54	07:00 16:24-16:47/23 17:33 07:19-07:28/9	06:17 06:37-07:21/44 18:06	06:25 06:50-07:49/59 19:40	05:44 06:13-06:25/12 20:12	05:27 20:37
15	07:27 07:48-07:51/3 16:55	06:58 16:24-16:48/24 17:34 07:18-07:28/10	06:15 06:36-07:20/44 18:07	06:23 06:49-07:47/58 19:41	05:43 06:14-06:25/11 20:13	05:27 20:37
16	07:26 16:57	06:57 16:23-16:49/26 17:35 07:17-07:27/10	06:13 06:35-07:19/44 18:08 17:15-17:23/8	06:22 06:49-07:04/15 19:42 07:05-07:46/41	05:42 06:14-06:24/10 20:14	05:27 20:38
17	07:26 16:58	06:56 16:23-16:50/27 17:36 07:15-07:26/11	06:12 06:35-07:18/43 18:09 17:12-17:25/13	06:20 06:49-07:02/13 19:43 07:05-07:43/38	05:41 06:15-06:23/8 20:15	05:27 20:38
18	07:25 16:59	06:54 16:24-16:52/28 17:38 07:16-07:25/9	06:10 06:34-07:17/43 18:10 17:11-17:26/15	06:19 06:48-07:01/13 19:44 07:04-07:40/36	05:40 06:16-06:21/5 20:16	05:27 20:38
19	07:25 07:46-07:47/1 17:00	06:53 16:24-16:52/28 17:39 07:12-07:23/11	06:08 17:10-17:27/17 18:12 06:34-07:16/42	06:17 06:50-07:00/10 19:45 07:05-07:40/35	05:39 20:17	05:27 20:39
20	07:24 07:45-07:47/2 17:01	06:51 16:24-16:53/29 07:11-07:18/7 17:40 07:19-07:21/2	06:07 17:08-17:28/20 18:13 06:33-07:14/41	06:15 06:50-06:57/7 19:47 07:05-07:38/33	05:38 20:18	05:27 20:39
21	07:23 07:45-07:49/4 17:02	06:50 16:25-16:54/29 17:41 07:09-07:18/9	06:05 17:09-17:29/20 18:14 06:34-07:13/39	06:14 07:07-07:38/31 19:48	05:38 20:19	05:27 20:39
22	07:23 07:44-07:49/5 17:04	06:48 07:08-07:18/10 17:43 16:26-16:56/30	06:03 17:08-17:29/21 18:15 06:33-07:11/38	06:12 07:08-07:37/29 19:49	05:37 20:20	05:27 20:39
23	07:22 07:43-07:49/6 17:05	06:47 07:06-07:17/11 17:44 16:27-16:57/30	06:02 17:08-17:29/21 18:16 06:29-07:08/39	06:11 07:09-07:35/26 19:50	05:36 20:21	05:28 20:39
24	07:21 07:42-07:49/7 17:06	06:46 07:05-07:16/11 17:45 16:30-16:58/28	06:00 06:27-07:05/38 18:17 17:08-17:28/20	06:10 07:10-07:33/23 19:51	05:35 20:22	05:28 20:40
25	07:21 07:41-07:48/7 17:07	06:44 07:04-07:16/12 17:46 16:32-16:58/26	05:58 06:25-07:02/37 18:18 17:09-17:28/19	06:08 07:12-07:30/18 19:52	05:34 20:23	05:28 20:40
26	07:20 07:41-07:48/7 17:09	06:43 07:02-07:19/17 17:47 16:33-16:59/26	05:56 06:23-07:00/37 18:19 17:10-17:27/17	06:07 07:15-07:28/13 19:53	05:34 20:24	05:28 20:40
27	07:19 07:40-07:47/7 17:10	06:41 07:00-07:21/21 17:49 16:34-16:58/24	05:55 06:21-06:58/37 18:20 17:10-17:26/16	06:05 19:54	05:33 20:25	05:29 20:40
28	07:18 07:39-07:46/7 17:11	06:39 06:59-07:23/24 17:50 16:37-16:58/21	05:53 06:21-06:56/35 18:21 17:12-17:25/13	06:04 19:55	05:32 20:25	05:29 20:40
29	07:17 07:39-07:46/7 17:12		06:51 07:20-07:54/34 19:23 18:14-18:22/8	06:02 19:56	05:32 20:26	05:30 20:40
30	07:16 07:41-07:44/3 17:14		06:50 07:19-07:55/36 19:24	06:01 19:57	05:31 20:27	05:30 20:40
31	07:15 17:15		06:48 07:19-07:56/37 19:25		05:31 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	83	743	1495	1129	143	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Pedatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 10 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (5)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 06:23-06:37/14 20:20	06:26 06:54-07:51/57 19:36	06:57 07:18-08:02/44 18:45	06:32 06:54-07:01/7 16:58 15:58-16:10/12	07:08 07:32-07:34/2 16:33
2	05:31 20:40	05:56 06:23-06:37/14 20:19	06:27 06:55-07:51/56 19:35	06:58 07:19-08:02/43 18:43	06:34 06:56-07:05/9 16:56 16:01-16:06/5	07:09 07:33-07:35/2 16:32
3	05:32 20:39	05:57 06:24-06:37/13 20:18	06:29 07:04-07:51/47 19:33 06:56-07:02/6	06:59 07:20-08:02/42 18:42	06:35 06:57-07:07/10 16:55	07:10 07:34-07:35/1 16:32
4	05:32 20:39	05:58 06:24-06:37/13 20:17	06:30 07:04-07:51/47 19:31	07:00 07:21-08:02/41 18:40	06:36 06:58-07:08/10 16:54	07:11 16:32
5	05:33 20:39	05:59 06:25-06:36/11 20:16	06:31 07:05-07:51/46 19:30	07:02 07:22-08:02/40 18:38	06:37 06:59-07:08/9 16:53	07:12 16:32
6	05:33 20:39	06:00 06:26-06:35/9 20:14	06:32 07:05-07:51/46 19:28	07:03 07:23-08:02/39 18:37	06:38 07:01-07:08/7 16:51	07:13 16:31
7	05:34 20:38	06:01 06:28-06:34/6 20:13	06:33 07:06-07:51/45 19:26	07:04 07:24-08:01/37 18:35	06:40 07:02-07:08/6 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	06:34 07:07-07:50/43 19:25	07:05 07:25-08:01/36 18:33 17:21-17:23/2	06:41 07:03-07:07/4 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 07:08-07:50/42 19:23	07:06 07:26-08:00/34 18:32 17:16-17:27/11	06:42 07:05-07:06/1 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 07:09-07:49/40 19:21	07:07 07:27-07:59/32 18:30 17:14-17:29/15	06:43 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 07:10-07:48/38 19:20	07:08 07:29-07:59/30 18:28 17:12-17:30/18	06:44 16:46	07:17 07:42-07:43/1 16:31
12	05:37 20:36	06:06 20:07	06:38 07:10-07:47/37 19:18	07:09 07:30-07:58/28 18:27 17:12-17:31/19	06:46 07:13-07:16/3 16:45	07:18 07:42-07:44/2 16:31
13	05:38 20:36	06:07 20:05	06:39 07:10-07:46/36 19:16	07:10 07:31-07:56/25 18:25 17:11-17:31/20	06:47 07:11-07:18/7 16:44	07:19 07:43-07:45/2 16:32
14	05:39 20:35	06:08 20:04	06:40 07:10-07:45/35 19:14 18:05-18:11/6	07:11 07:32-07:55/23 18:24 17:08-17:31/23	06:48 07:11-07:18/7 16:43	07:20 07:44-07:46/2 16:32
15	05:40 20:35	06:09 20:03	06:41 07:10-07:44/34 19:13 18:02-18:13/11	07:12 07:33-07:52/19 18:22 17:06-17:31/25	06:49 07:12-07:19/7 16:42	07:21 07:45-07:47/2 16:32
16	05:40 20:34	06:10 07:26-07:30/4 20:01	06:42 07:10-07:47/37 19:11 18:00-18:15/15	07:14 07:34-07:50/16 18:20 17:04-17:30/26	06:51 07:14-07:21/7 16:41	07:21 07:45-07:47/2 16:32
17	05:41 20:34	06:11 07:21-07:35/14 20:00	06:43 07:11-07:48/37 19:09 17:58-18:15/17	07:15 07:36-07:47/11 18:19 17:03-17:29/26	06:52 07:15-07:22/7 16:41	07:22 07:46-07:48/2 16:32
18	05:42 20:33	06:12 07:18-07:37/19 19:58	06:44 07:12-07:49/37 19:07 17:57-18:15/18	07:16 07:37-07:48/11 18:17 17:00-17:29/29	06:53 07:16-07:23/7 16:40	07:23 07:47-07:49/2 16:33
19	05:43 20:32	06:13 07:16-07:39/23 19:57	06:45 07:13-07:50/37 19:06 17:56-18:15/19	07:17 07:38-07:49/11 18:16 16:58-17:28/30	06:54 07:18-07:24/6 16:39	07:23 07:47-07:49/2 16:33
20	05:44 20:31	06:14 07:14-07:41/27 19:55	06:46 17:54-18:15/21 19:04 07:15-07:54/39	07:18 07:39-07:49/10 18:14 16:56-17:26/30	06:55 07:19-07:24/5 16:38	07:24 07:48-07:50/2 16:34
21	05:45 20:31	06:15 07:13-07:42/29 19:54	06:47 17:54-18:15/21 19:02 07:18-07:56/38	07:19 16:55-17:24/29 18:13 07:40-07:48/8	06:57 07:20-07:24/4 16:38	07:24 07:48-07:50/2 16:34
22	05:45 20:30	06:16 07:11-07:43/32 19:52	06:48 17:53-18:14/21 19:01 07:19-07:57/38	07:20 16:54-17:22/28 07:42-07:48/6 18:11 07:49-07:53/4	06:58 07:21-07:24/3 16:37	07:25 07:49-07:51/2 16:34
23	05:46 20:29	06:17 06:55-07:02/7 19:51 07:10-07:43/33	06:49 17:53-18:13/20 18:59 07:18-07:58/40	07:22 16:54-17:22/28 18:10 07:43-07:54/11	06:59 07:23-07:24/1 16:36	07:26 07:49-07:51/2 16:35
24	05:47 20:28	06:18 06:53-07:04/11 19:49 07:09-07:44/35	06:50 17:53-18:11/18 18:57 07:17-07:59/42	07:23 16:53-17:21/28 18:08 07:45-07:55/10	07:00 16:36	07:26 07:50-07:52/2 16:36
25	05:48 06:28-06:30/2 20:27	06:19 06:52-07:05/13 19:48 07:08-07:44/36	06:51 07:17-07:59/42 18:55 17:53-18:09/16	06:24 15:53-16:20/27 17:07 06:45-06:56/11	07:01 16:35	07:26 07:50-07:52/2 16:36
26	05:49 06:26-06:33/7 20:26	06:20 06:51-07:05/14 19:46 07:07-07:46/39	06:52 07:17-08:00/43 18:54 17:54-18:08/14	06:25 15:53-16:18/25 17:06 06:47-06:57/10	07:02 16:35	07:27 07:50-07:52/2 16:37
27	05:50 06:25-06:34/9 20:25	06:21 06:51-07:06/15 19:44 07:07-07:48/41	06:53 07:16-08:00/44 18:52 17:55-18:05/10	06:26 15:54-16:18/24 17:04 06:48-06:58/10	07:03 07:27-07:30/3 16:34	07:27 07:51-07:53/2 16:37
28	05:51 06:24-06:35/11 20:24	06:22 06:51-07:49/58 19:43	06:54 07:16-08:00/44 18:50	06:28 15:54-16:16/22 17:03 06:49-06:57/8	07:05 07:29-07:33/4 16:34	07:27 07:51-07:53/2 16:38
29	05:52 06:24-06:36/12 20:23	06:23 06:51-07:50/59 19:41	06:55 07:17-08:00/43 18:48	06:29 15:54-16:15/21 17:01 06:50-06:57/7	07:06 07:30-07:33/3 16:33	07:28 07:51-07:53/2 16:39
30	05:53 06:23-06:35/12 20:22	06:24 06:52-07:51/59 19:40	06:56 07:17-08:00/43 18:47	06:30 06:52-07:00/8 17:00 15:56-16:14/18	07:07 07:31-07:34/3 16:33	07:28 07:51-07:53/2 16:40
31	05:54 06:23-06:36/13 20:21	06:25 06:53-07:51/58 19:38		06:31 06:53-07:00/7 16:59 15:57-16:12/15		07:28 07:51-07:53/2 16:40
Ore potenziali eliofanía	461	429	375	345	297	286
Somma minuti d'ombra	66	706	1486	1211	157	46

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Urente autorizzato:

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Luca Di Grigoli / luca.digrigoli@vsb.energy  
Pedatto il:  
14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 11 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 07:51-08:01/10 16:41	07:15 07:35-07:46/11 17:16	06:38 06:57-07:13/16 17:51	06:46 07:17-07:26/9 19:26	06:00 06:21-07:01/40 19:59	05:30 06:04-07:17/73 20:29
2	07:29 07:51-08:01/10 16:42	07:14 07:34-07:46/12 17:17	06:36 06:57-07:07/10 17:52	06:45 07:18-07:23/5 19:27	05:58 06:20-07:02/42 20:00	05:30 06:03-07:16/73 20:29
3	07:29 07:51-08:01/10 16:43	07:13 07:33-07:45/12 17:19	06:35 06:54-07:07/13 17:53	06:43 07:18-07:23/5 19:28	05:57 06:20-07:03/43 20:01	05:29 06:03-07:17/74 20:30
4	07:29 07:51-08:01/10 16:44	07:11 07:33-07:45/12 17:20	06:33 06:52-07:06/14 17:55	06:41 07:18-07:23/5 19:29	05:56 06:18-07:03/45 20:02	05:29 06:03-07:18/75 20:31
5	07:29 07:51-08:01/10 16:45	07:10 07:33-07:44/11 17:21	06:32 06:52-07:06/14 17:56	06:40 18:49-18:50/1 19:30	05:55 06:18-07:03/45 20:03	05:29 06:02-07:17/75 20:32
6	07:29 07:51-08:01/10 16:46	07:09 07:34-07:42/8 17:23	06:30 06:50-07:04/14 17:57	06:38 18:45-18:54/9 19:31	05:53 06:17-07:04/47 20:04	05:28 06:02-07:17/75 20:32
7	07:29 07:51-08:01/10 16:47	07:08 07:37-07:38/1 17:24	06:28 06:50-07:02/12 17:58	06:36 18:43-18:56/13 19:32	05:52 06:17-07:04/47 20:05	05:28 06:02-07:18/76 20:33
8	07:28 07:51-07:57/6 16:48	07:07 07:37-07:38/1 17:25	06:27 06:51-07:01/10 17:59	06:35 18:42-18:56/14 19:34	05:51 06:17-07:05/48 20:06	05:28 06:02-07:18/76 20:34
9	07:28 07:50-07:56/6 16:49	07:06 07:37-07:38/1 17:26	06:25 06:51-06:59/8 18:00	06:33 18:42-18:58/16 19:35	05:50 06:16-07:06/50 20:07	05:27 06:02-07:19/77 20:34
10	07:28 07:51-07:55/4 16:50	07:05 07:25-07:29/4 17:28	06:23 06:54-06:55/1 18:01	06:31 18:41-18:58/17 19:36	05:49 06:15-07:07/52 20:08	05:27 06:01-07:18/77 20:35
11	07:28 07:51-07:55/4 16:51	07:03 07:23-07:30/7 17:29	06:22 06:54-06:55/1 18:03	06:30 18:40-18:58/18 19:37	05:47 06:14-07:08/54 20:09	05:27 06:01-07:18/77 20:35
12	07:28 07:51-07:55/4 16:52	07:02 07:22-07:32/10 17:30	06:20 06:54-06:55/1 18:04	06:28 18:41-18:59/18 19:38	05:46 06:11-07:08/57 20:10	05:27 06:01-07:19/78 20:36
13	07:27 07:49-07:50/1 16:53	07:01 07:21-07:32/11 17:31	06:18 06:54-06:55/1 18:05	06:26 18:41-18:58/17 19:39	05:45 06:11-07:09/58 20:11	05:27 06:01-07:19/78 20:36
14	07:27 07:48-07:50/2 16:54	07:00 07:19-07:32/13 17:33	06:17 17:22-17:30/8 18:06	06:25 18:43-18:58/15 19:40	05:44 06:10-07:10/60 20:12	05:27 06:01-07:19/78 20:37
15	07:27 07:48-07:50/2 16:55	06:58 07:18-07:32/14 17:34	06:15 17:19-17:32/13 18:07	06:23 18:43-18:57/14 19:41	05:43 06:10-07:11/61 20:13	05:27 06:01-07:19/78 20:37
16	07:26 07:48-07:51/3 16:57	06:57 07:17-07:31/14 17:35	06:13 17:17-17:32/15 18:08	06:22 18:44-18:55/11 19:42	05:42 06:09-07:12/63 20:14	05:27 06:01-07:19/78 20:38
17	07:26 07:47-07:51/4 16:58	06:56 07:15-07:29/14 17:36	06:12 17:16-17:33/17 18:09	06:20 18:46-18:53/7 19:43	05:41 06:08-07:12/64 20:15	05:27 06:01-07:19/78 20:38
18	07:25 07:47-07:52/5 16:59	06:54 07:14-07:25/11 17:38	06:10 17:16-17:34/18 18:10	06:19 18:44-18:55/11 19:44	05:40 06:08-07:13/65 20:16	05:27 06:01-07:20/79 20:38
19	07:25 07:46-07:52/6 17:00	06:53 07:14-07:23/9 17:39	06:08 17:15-17:35/20 18:12	06:17 18:44-18:55/11 19:45	05:39 06:07-07:13/66 20:17	05:27 06:02-07:21/79 20:39
20	07:24 07:45-07:52/7 17:01	06:51 07:11-07:22/11 17:40	06:07 17:14-17:35/21 18:13	06:15 18:44-18:55/11 19:47	05:38 06:07-07:13/66 20:18	05:27 06:02-07:21/79 20:39
21	07:23 07:45-07:52/7 17:02	06:50 07:09-07:18/9 17:41	06:05 17:15-17:37/22 18:14	06:14 18:44-18:55/11 19:48	05:38 06:06-07:13/67 20:19	05:27 06:02-07:21/79 20:39
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26	07:20 07:41-07:44/3 17:09	06:43 07:04-07:17/13 17:47	05:56 17:20-17:37/17 18:19	06:07 06:29-06:55/26 19:53	05:34 06:06-07:15/69 20:24	05:28 06:03-07:21/78 20:40
27	07:19 07:40-07:45/5 17:10	06:41 07:04-07:15/11 17:49	05:55 17:21-17:36/15 18:20	06:05 06:27-06:56/29 19:54	05:33 06:05-07:15/70 20:25	05:29 06:04-07:22/78 20:40
28	07:18 07:39-07:46/7 17:11	06:39 07:05-07:14/9 17:50	05:53 17:22-17:35/13 18:22	06:04 06:25-06:58/33 19:55	05:32 06:06-07:16/70 20:25	05:29 06:04-07:22/78 20:40
29	07:17 07:38-07:46/8 17:12	06:38 07:05-07:14/9 17:51	05:51 18:23-18:33/10 19:23	06:02 06:24-06:59/35 19:56	05:32 06:05-07:16/71 20:26	05:30 06:05-07:23/78 20:40
30	07:16 07:37-07:46/9 17:14	06:37 07:05-07:14/9 17:52	05:50 18:26-18:29/3 19:24	06:01 06:22-07:00/38 19:57	05:31 06:05-07:17/72 20:27	05:30 06:05-07:23/78 20:40
31	07:16 07:36-07:46/10 17:15	06:36 07:05-07:14/9 17:53	05:48 07:17-07:28/11 19:25	06:00 06:22-07:00/38 19:58	05:31 06:04-07:16/72 20:28	05:30 06:05-07:23/78 20:40
Ore potenziali eliofanía	296	296	369	399	450	454
Somma minuti d'ombra	169	280	454	378	1838	2317

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

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Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 11 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (6)

Assunzioni sui calcoli d'ombra

Probabilità di eliofanía (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 06:05-07:22/77 20:40	05:55 06:22-07:18/56 20:20	06:26 18:39-18:57/18 19:36	06:57 18:45	06:32 06:54-06:58/4 16:58	07:08 16:33
2	05:31 06:06-07:23/77 20:40	05:56 06:24-07:18/54 20:19	06:28 18:39-18:56/17 19:35	06:58 18:43	06:34 16:56	07:09 07:34-07:38/4 16:32
3	05:32 06:06-07:23/77 20:39	05:57 06:25-07:16/51 20:18	06:29 18:39-18:55/16 19:33	06:59 18:42	06:35 16:55	07:10 07:34-07:40/6 16:32
4	05:32 06:07-07:23/76 20:39	05:58 06:26-07:15/49 20:17	06:30 18:39-18:53/14 19:31	07:00 07:30-07:36/6 18:40	06:36 07:06-07:09/3 16:54	07:11 07:35-07:41/6 16:32
5	05:33 06:08-07:24/76 20:39	05:59 06:26-07:14/48 20:16	06:31 18:39-18:52/13 19:30	07:02 07:28-07:37/9 18:38	06:37 07:03-07:12/9 16:53	07:12 07:36-07:46/10 16:32
6	05:33 06:08-07:24/76 20:39	06:00 06:27-07:14/47 20:14	06:32 18:41-18:50/9 19:28	07:03 07:27-07:38/11 18:37	06:38 07:03-07:14/11 16:51	07:13 07:37-07:47/10 16:31
7	05:34 06:09-07:24/75 20:38	06:01 06:27-07:13/46 20:13	06:33 18:44-18:46/2 19:26	07:04 07:26-07:39/13 18:35	06:40 07:02-07:15/13 16:50	07:14 07:38-07:48/10 16:31
8	05:35 06:09-07:24/75 20:38	06:02 06:28-07:13/45 20:12	06:34 19:25	07:05 07:26-07:40/14 18:33	06:41 07:03-07:15/12 16:49	07:15 07:39-07:49/10 16:31
9	05:35 06:10-07:24/74 20:38	06:03 06:28-07:12/44 20:11	06:35 19:23	07:06 07:26-07:41/15 18:32	06:42 07:05-07:17/12 16:48	07:16 07:40-07:50/10 16:31
10	05:36 06:11-07:25/74 20:37	06:04 06:29-07:11/42 20:09	06:36 07:12-07:16/4 19:21	07:07 07:27-07:41/14 18:30	06:43 07:06-07:17/11 16:47	07:17 07:41-07:51/10 16:31
11	05:37 06:11-07:24/73 20:37	06:05 06:29-07:10/41 20:08	06:37 07:09-07:18/9 19:20	07:08 07:30-07:41/11 18:28	06:44 07:07-07:17/10 16:46	07:17 07:42-07:52/10 16:31
12	05:37 06:12-07:25/73 20:36	06:06 06:30-07:09/39 20:07	06:38 07:08-07:19/11 19:18	07:09 07:41-07:45/4 18:27	06:46 07:09-07:18/9 16:45	07:18 07:42-07:51/9 16:31
13	05:38 06:13-07:25/72 20:36	06:07 06:31-07:08/37 20:05	06:39 07:07-07:19/12 19:16	07:10 07:32-07:47/15 18:25	06:47 07:10-07:18/8 16:44	07:19 07:43-07:52/9 16:32
14	05:39 06:14-07:25/71 20:35	06:08 06:32-07:07/35 20:04	06:40 18:14-18:23/9 19:14	07:11 07:37-07:47/10 18:24	06:48 07:11-07:18/7 16:43	07:20 07:44-07:53/9 16:32
15	05:40 06:14-07:24/70 20:35	06:09 06:33-07:05/32 20:03	06:41 18:11-18:24/13 19:13	07:13 07:36-07:48/12 18:22	06:49 07:12-07:17/5 16:42	07:21 07:45-07:54/9 16:32
16	05:40 06:14-07:25/71 20:34	06:10 06:35-07:03/28 20:01	06:42 18:10-18:25/15 19:11	07:14 07:36-07:49/13 18:20	06:51 07:14-07:17/3 16:41	07:21 07:45-07:54/9 16:32
17	05:41 06:15-07:25/70 20:34	06:11 06:37-07:01/24 20:00	06:43 18:09-18:25/16 19:09	07:15 07:37-07:50/13 18:19	06:52 07:15-07:16/1 16:41	07:22 07:46-07:54/8 16:32
18	05:42 06:15-07:25/70 20:33	06:12 06:39-06:58/19 19:58	06:44 18:06-18:25/19 19:07	07:16 07:38-07:51/13 18:17	06:53 16:40	07:23 07:47-07:55/8 16:33
19	05:43 06:16-07:25/69 20:32	06:13 06:43-06:54/11 19:57	06:45 18:04-18:25/21 19:06	07:17 07:39-07:51/12 18:16	06:54 16:39	07:23 07:47-07:55/8 16:33
20	05:44 06:15-07:24/69 20:31	06:14 19:55	06:46 18:02-18:24/22 19:04	07:18 07:39-07:50/11 18:14	06:55 07:21-07:26/5 16:38	07:24 07:48-07:56/8 16:34
21	05:45 06:16-07:24/68 20:31	06:15 19:54	06:47 18:01-18:23/22 19:02	07:19 07:40-07:50/10 18:13	06:57 07:20-07:27/7 16:38	07:24 07:48-07:56/8 16:34
22	05:45 06:16-07:24/68 20:30	06:16 19:52	06:48 17:59-18:22/23 19:01	07:20 07:42-07:53/11 18:11	06:58 07:21-07:28/7 16:37	07:25 07:49-07:57/8 16:34
23	05:46 06:17-07:24/67 20:29	06:17 19:51	06:49 17:59-18:20/21 18:59	07:22 07:44-07:54/10 18:10	06:59 07:23-07:29/6 16:36	07:26 07:49-07:57/8 16:35
24	05:47 06:17-07:24/67 20:28	06:18 19:49	06:50 17:58-18:18/20 18:57	07:23 07:44-07:55/11 18:08	07:00 07:24-07:29/5 16:36	07:26 07:50-07:58/8 16:36
25	05:48 06:18-07:23/65 20:27	06:19 19:48	06:51 17:58-18:17/19 18:55	06:24 06:45-06:59/14 17:07	07:01 07:25-07:30/5 16:35	07:26 07:50-07:58/8 16:36
26	05:49 06:19-07:23/64 20:26	06:20 18:49-18:56/7 19:46	06:52 17:58-18:16/18 18:54	06:25 06:47-07:01/14 17:06	07:02 07:26-07:30/4 16:35	07:27 07:50-07:58/8 16:37
27	05:50 06:19-07:23/64 20:25	06:21 18:47-18:58/11 19:44	06:53 17:58-18:14/16 18:52	06:26 06:48-07:02/14 17:04	07:03 07:27-07:29/2 16:34	07:27 07:51-07:59/8 16:37
28	05:51 06:20-07:22/62 20:24	06:22 18:45-18:59/14 19:43	06:54 17:59-18:13/14 18:50	06:28 06:49-07:01/12 17:03	07:05 07:29-07:30/1 16:34	07:27 07:51-08:00/9 16:38
29	05:52 06:20-07:21/61 20:23	06:23 18:44-18:59/15 19:41	06:55 18:01-18:10/9 18:48	06:29 06:50-07:01/11 17:01	07:06 16:33	07:28 07:51-08:00/9 16:39
30	05:53 06:21-07:20/59 20:22	06:24 18:41-18:58/17 19:40	06:56 18:47	06:30 06:52-07:01/9 17:00	07:07 16:33	07:28 07:51-08:00/9 16:40
31	05:54 06:22-07:19/57 20:21	06:25 18:40-18:58/18 19:38		06:31 06:53-07:00/7 16:59		07:28 07:51-08:00/9 16:40
Ore potenziali eliofanía	461	429	375	345	297	286
Somma minuti d'ombra	2167	830	443	328	160	255

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 12 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (7)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:14 17:16	06:38 17:51	06:57-06:58/1 17:16-17:24/8	06:46 19:26	06:00 19:58
2	07:28 16:42	07:13 17:17	06:36 17:52	17:17-17:25/8 19:27	06:45 19:27	05:58 20:00
3	07:29 16:43	07:12 17:19	06:35 17:53	17:20-17:27/7 19:28	06:43 19:28	05:57 20:01
4	07:29 16:44	07:11 17:20	06:33 17:54	17:19-17:27/8 19:29	06:41 19:29	05:56 20:02
5	07:29 16:45	07:10 17:21	06:32 17:56	17:18-17:26/8 19:30	06:40 19:30	05:54 20:03
6	07:29 16:46	07:09 17:23	06:30 17:57	17:20-17:26/6 19:31	06:38 19:31	05:53 20:04
7	07:28 16:47	07:08 17:24	06:28 17:58	19:32	06:36 19:32	05:52 20:05
8	07:28 16:48	07:07 17:25	06:27 17:59	19:33	06:35 19:33	05:51 20:06
9	07:28 16:49	07:06 17:26	06:25 18:00	19:35	06:33 19:35	05:50 20:07
10	07:28 16:50	07:05 17:28	06:23 18:01	19:36	06:31 19:36	05:48 20:08
11	07:28 16:51	07:03 17:29	06:22 18:03	19:37	06:30 19:37	05:47 20:09
12	07:28 16:52	07:02 17:30	06:20 18:04	19:38	06:28 19:38	05:46 20:10
13	07:27 16:53	07:01 17:31	06:18 18:05	19:39	06:26 19:39	05:45 20:11
14	07:27 16:54	07:00 17:33	06:17 18:06	19:40	06:25 19:40	05:44 20:12
15	07:26 16:55	06:58 17:34	06:15 18:07	19:41	06:23 19:41	05:43 20:13
16	07:26 16:57	06:57 17:35	06:13 18:08	19:42	06:22 19:42	05:42 20:14
17	07:26 16:58	06:56 17:36	06:12 18:09	06:20 19:43	18:50-19:03/13 19:43	05:41 20:15
18	07:25 16:59	06:54 17:38	06:10 18:10	06:19 19:44	18:47-19:05/18 19:44	05:40 20:16
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	18:45-19:07/22 19:45	05:39 20:17
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	18:43-19:07/24 19:47	05:38 20:18
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	18:42-19:09/27 19:48	05:38 20:19
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	18:41-19:09/28 19:49	05:37 20:20
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	18:40-19:10/30 19:50	05:36 20:21
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:51	18:40-19:10/30 19:51	05:35 20:22
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:52	18:39-19:10/31 19:52	05:34 20:23
26	07:20 17:09	06:42 17:47	05:56 18:19	06:07 19:53	18:39-19:10/31 19:53	05:34 20:24
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:54	18:38-19:10/32 19:54	05:33 20:25
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:55	18:38-19:10/32 19:55	05:32 20:25
29	07:17 17:12		06:51 19:23	06:02 19:56	18:39-19:10/31 19:56	05:32 20:26
30	07:16 17:14		06:50 19:24	06:01 19:57	18:38-19:09/31 19:57	05:31 20:27
31	07:15 17:15		06:48 19:25			05:31 20:28
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	0	27	46	380	229	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSF Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 +49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 12 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (7)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:26 19:36	06:57 18:45	06:32 16:58	07:08 16:33
2	05:31 20:40	05:56 20:19	19:01-19:06/5 06:27 19:35	06:58 18:43	06:33 16:56	07:09 16:32
3	05:32 20:39	05:57 20:18	18:57-19:09/12 06:28 19:33	06:59 18:42	06:35 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	18:55-19:11/16 06:30 19:31	07:00 18:40	06:36 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	18:53-19:13/20 06:31 19:30	07:02 18:38	06:37 16:53	07:12 16:32
6	05:33 20:39	06:00 20:14	18:52-19:14/22 06:32 19:28	07:03 18:37	06:38 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	18:51-19:15/24 06:33 19:26	07:04 18:35	17:57-18:01/4 06:40 16:50	07:14 16:31
8	05:35 20:38	06:02 20:12	18:50-19:16/26 06:34 19:25	07:05 18:33	17:55-18:02/7 06:41 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	18:49-19:17/28 06:35 19:23	07:06 18:32	17:53-18:02/9 06:42 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	18:48-19:17/29 06:36 19:21	07:07 18:30	17:53-18:01/8 06:43 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	18:48-19:17/29 06:37 19:19	07:08 18:28	17:52-18:00/8 06:44 16:46	07:17 16:31
12	05:37 20:36	06:06 20:07	18:47-19:18/31 06:38 19:18	07:09 18:27	07:30-07:31/1 17:51-17:59/8 06:46 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	18:47-19:18/31 06:39 19:16	07:10 18:25	17:50-17:58/8 07:31-07:32/1 06:47 16:44	07:19 16:32
14	05:39 20:35	06:08 20:04	18:46-19:18/32 06:40 19:14	07:11 18:23	17:49-17:57/8 07:32-07:33/1 06:48 16:43	07:20 16:32
15	05:40 20:35	06:09 20:03	18:46-19:18/32 06:41 19:13	07:12 18:22	17:49-17:56/7 06:49 16:42	07:21 16:32
16	05:40 20:34	06:10 20:01	18:46-19:17/31 06:42 19:11	07:14 18:20	17:49-17:54/5 06:51 16:41	07:21 16:32
17	05:41 20:33	06:11 20:00	18:46-19:17/31 06:43 19:09	07:15 18:19	06:52 16:41	07:22 16:32
18	05:42 20:33	06:12 19:58	18:46-19:17/31 06:44 19:07	07:16 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	18:46-19:16/30 06:45 19:06	07:17 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	18:46-19:15/29 06:46 19:04	07:18 18:14	06:55 16:38	07:24 16:34
21	05:45 20:31	06:15 19:54	18:47-19:14/27 06:47 19:02	07:19 18:13	06:56 16:38	07:24 16:34
22	05:45 20:30	06:16 19:52	18:47-19:13/26 06:48 19:00	07:20 18:11	06:58 16:37	07:25 16:34
23	05:46 20:29	06:17 19:51	18:48-19:12/24 06:49 18:59	07:22 18:10	06:59 16:36	07:25 16:35
24	05:47 20:28	06:18 19:49	18:49-19:10/21 06:50 18:57	07:23 18:08	07:00 16:36	07:26 16:36
25	05:48 20:27	06:19 19:48	18:51-19:08/17 06:51 18:55	06:24 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 19:46	18:53-19:05/12 06:52 18:54	06:25 17:06	07:02 16:35	07:27 16:37
27	05:50 20:25	06:21 19:44	06:53 18:52	06:26 17:04	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 19:43	06:54 18:50	06:27 17:03	07:05 16:34	07:27 16:38
29	05:52 20:23	06:23 19:41	06:55 18:48	06:29 17:01	07:06 16:33	07:28 16:39
30	05:53 20:22	06:24 19:40	06:56 18:47	06:30 17:00	07:07 16:33	07:28 16:40
31	05:54 20:21	06:25 19:38	06:57 18:45	06:31 16:59	07:08 16:32	07:29 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Somma minuti d'ombra	0	616	0	75	0	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH  
 Schweizer Straße 3a  
 DE-01069 Dresden  
 + 49 (0) 351 / 211 83 - 46  
 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 13 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 14:18-15:01/43 16:41	07:14 17:16	06:38 06:57-06:59/2 17:51	06:46 19:26	06:00 19:58	05:30 20:29
2	07:29 14:19-15:01/42 16:42	07:14 17:17	06:36 06:55-06:59/4 17:52	06:45 19:27	05:58 20:00	05:30 20:29
3	07:29 14:19-15:02/43 16:43	07:12 17:19	06:35 06:54-06:59/5 17:53	06:43 19:28	05:57 20:01	05:29 20:30
4	07:29 14:20-15:02/42 16:44	07:11 17:20	06:33 06:52-06:59/7 17:54	06:41 19:29	05:56 20:02	05:29 20:31
5	07:29 14:21-15:02/41 16:45	07:10 17:21	06:32 06:51-06:59/8 17:56	06:40 19:30	05:54 20:03	05:28 20:32
6	07:29 14:22-15:02/40 16:46	07:09 17:22	06:30 06:49-06:58/9 17:57	06:38 19:00-19:04/4 19:31	05:53 20:04	05:28 20:32
7	07:29 14:23-15:02/39 16:47	07:08 17:24	06:28 06:47-06:57/10 17:58	06:36 18:58-19:06/8 19:32	05:52 20:05	05:28 20:33
8	07:28 14:24-15:02/38 16:48	07:07 17:25	06:27 06:46-06:57/11 17:59	06:35 18:57-19:05/8 19:33	05:51 20:06	05:28 20:33
9	07:28 14:25-15:01/36 16:49	07:06 17:26	06:25 06:44-06:56/12 18:00	06:33 18:56-19:05/9 19:35	05:50 20:07	05:27 20:34
10	07:28 14:26-15:01/35 16:50	07:05 17:28	06:23 06:42-06:54/12 18:01	06:31 06:50-06:51/1 19:36 18:57-19:06/9	05:48 20:08	05:27 20:35
11	07:28 14:28-15:01/33 16:51	07:03 17:29	06:22 06:41-06:53/12 18:03	06:30 06:48-06:49/1 19:37 18:57-19:06/9	05:47 20:09	05:27 20:35
12	07:28 14:28-15:00/32 16:52	07:02 17:30	06:20 06:39-06:51/12 18:04	06:28 06:47-06:48/1 19:38 18:59-19:08/9	05:46 20:10	05:27 20:36
13	07:27 14:30-15:00/30 16:53	07:01 17:31	06:18 06:37-06:48/11 18:05	06:26 19:00-19:09/9 19:39	05:45 20:11	05:27 20:36
14	07:27 14:31-14:58/27 16:54	07:00 17:33	06:17 06:36-06:45/9 18:06	06:25 18:59-19:08/9 19:40	05:44 20:12	05:27 20:37
15	07:26 14:33-14:57/24 16:55	06:58 17:34	06:15 18:07	06:23 19:00-19:08/8 19:41	05:43 20:13	05:27 20:37
16	07:26 14:36-14:56/20 16:56	06:57 17:35	06:13 18:08	06:22 19:00-19:07/7 19:42	05:42 20:14	05:27 20:37
17	07:26 14:38-14:53/15 16:58	06:56 17:36	06:12 18:09	06:20 19:02-19:06/4 19:43	05:41 20:15	05:27 20:38
18	07:25 14:41-14:50/9 16:59	06:54 17:38	06:10 18:10	06:19 19:44	05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 17:39	06:08 18:12	06:17 19:45	05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 17:40	06:07 18:13	06:15 19:47	05:38 20:18	05:27 20:39
21	07:23 17:02	06:50 17:41	06:05 18:14	06:14 19:48	05:38 20:19	05:27 20:39
22	07:23 17:04	06:48 17:43	06:03 18:15	06:12 19:49	05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 17:44	06:02 18:16	06:11 19:50	05:36 20:21	05:28 20:39
24	07:21 17:06	06:45 17:45	06:00 18:17	06:09 19:21-19:23/2 19:51	05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 17:46	05:58 18:18	06:08 19:20-19:26/6 19:52	05:34 20:23	05:28 20:40
26	07:20 17:09	06:42 17:47	05:56 18:19	06:07 19:19-19:27/8 19:53	05:34 20:24	05:28 20:40
27	07:19 17:10	06:41 17:49	05:55 18:20	06:05 19:18-19:27/9 19:54	05:33 20:25	05:29 20:40
28	07:18 17:11	06:39 17:50	05:53 18:21	06:04 19:19-19:27/8 19:55	05:32 20:25	05:29 20:40
29	07:17 17:12		06:51 19:23	06:02 19:20-19:27/7 19:56	05:32 20:26	05:30 20:40
30	07:16 17:14		06:50 19:24	06:01 19:20-19:25/5 19:57	05:31 20:27	05:30 20:40
31	07:15 17:15		06:48 19:25		05:31 20:28	
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	589	0	124	141	0	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm)inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 13 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (8)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:30 20:40	05:55 20:20	06:26 06:48-06:49/1 19:36 18:56-19:05/9	06:57 07:18-07:29/11 18:45	06:32 16:57	07:08 14:10-14:43/33 16:32
2	05:31 20:40	05:56 20:19	06:27 06:49-06:50/1 19:35 18:55-19:04/9	06:58 07:19-07:31/12 18:43	06:33 16:56	07:09 14:09-14:44/35 16:32
3	05:32 20:39	05:57 20:18	06:28 18:54-19:03/9 19:33	06:59 07:20-07:32/12 18:42	06:35 16:55	07:10 14:09-14:45/36 16:32
4	05:32 20:39	05:58 20:17	06:30 18:54-19:02/8 19:31	07:00 07:21-07:33/12 18:40	06:36 16:54	07:11 14:08-14:46/38 16:32
5	05:33 20:39	05:59 20:16	06:31 18:54-19:02/8 19:30	07:02 07:22-07:33/11 18:38	06:37 16:53	07:12 14:08-14:47/39 16:32
6	05:33 20:39	06:00 20:14	06:32 18:55-19:00/5 19:28	07:03 07:23-07:34/11 18:37	06:38 16:51	07:13 14:08-14:48/40 16:31
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 07:24-07:34/10 18:35	06:40 16:50	07:14 14:08-14:49/41 16:31
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 07:25-07:34/9 18:33	06:41 16:49	07:15 14:08-14:50/42 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 07:26-07:34/8 18:32	06:42 16:48	07:16 14:08-14:51/43 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 07:27-07:33/6 18:30	06:43 16:47	07:17 14:09-14:51/42 16:31
11	05:37 20:37	06:05 20:08	06:37 19:19	07:08 07:29-07:34/5 18:28	06:44 16:46	07:17 14:08-14:51/43 16:31
12	05:37 20:36	06:06 19:31-19:32/1 20:07	06:38 19:18	07:09 07:30-07:33/3 18:27	06:46 16:45	07:18 14:08-14:52/44 16:31
13	05:38 20:36	06:07 19:29-19:34/5 20:05	06:39 19:16	07:10 07:31-07:33/2 18:25	06:47 16:44	07:19 14:09-14:53/44 16:31
14	05:39 20:35	06:08 19:27-19:35/8 20:04	06:40 19:14	07:11 18:23	06:48 16:43	07:20 14:09-14:54/45 16:32
15	05:40 20:35	06:09 19:26-19:35/9 20:03	06:41 19:13	07:12 18:22	06:49 16:42	07:21 14:10-14:55/45 16:32
16	05:40 20:34	06:10 19:26-19:34/8 20:01	06:42 19:11	07:14 18:20	06:51 16:41	07:21 14:09-14:55/46 16:32
17	05:41 20:34	06:11 19:26-19:33/7 20:00	06:43 19:09	07:15 18:19	06:52 16:41	07:22 14:10-14:56/46 16:32
18	05:42 20:33	06:12 19:27-19:32/5 19:58	06:44 19:07	07:16 18:17	06:53 16:40	07:23 14:10-14:55/45 16:33
19	05:43 20:32	06:13 19:57 19:57	06:45 19:06	07:17 18:16	06:54 16:39	07:23 14:11-14:56/45 16:33
20	05:44 20:31	06:14 19:55 19:55	06:46 19:04	07:18 18:14	06:55 16:38	07:24 14:12-14:57/45 16:34
21	05:45 20:31	06:15 19:54 19:54	06:47 19:02	07:19 18:13	06:56 16:38	07:24 14:12-14:57/45 16:34
22	05:45 20:30	06:16 19:52 19:52	06:48 19:00	07:20 18:11	06:58 16:37	07:25 14:13-14:58/45 16:34
23	05:46 20:29	06:17 19:51 19:51	06:49 18:59	07:22 18:10	06:59 16:36	07:25 14:13-14:58/45 16:35
24	05:47 20:28	06:18 19:49 19:49	06:50 18:57	07:23 18:08	07:00 14:19-14:28/9 16:36	07:26 14:13-14:58/45 16:36
25	05:48 20:27	06:19 19:48 19:48	06:51 18:55	06:24 17:07	07:01 14:16-14:31/15 16:35	07:26 14:14-14:59/45 16:36
26	05:49 20:26	06:20 19:04-19:08/4 19:46	06:52 18:54	06:25 17:05	07:02 14:14-14:33/19 16:35	07:27 14:14-14:59/45 16:37
27	05:50 20:25	06:21 19:02-19:09/7 19:44	06:53 18:52	06:26 17:04	07:03 14:12-14:36/24 16:34	07:27 14:14-15:00/46 16:37
28	05:51 20:24	06:22 19:01-19:09/8 19:43	06:54 18:50	06:27 17:03	07:05 14:11-14:38/27 16:34	07:27 14:16-15:01/45 16:38
29	05:52 20:23	06:23 19:00-19:09/9 19:41	06:55 18:48	06:29 17:01	07:06 14:10-14:40/30 16:33	07:28 14:16-15:01/45 16:39
30	05:53 20:22	06:24 19:00-19:09/9 19:40	06:56 18:47	06:30 17:00	07:07 14:10-14:42/32 16:33	07:28 14:17-15:01/44 16:40
31	05:54 20:21	06:25 06:47-06:48/1 19:38 18:58-19:07/9		06:31 16:59		07:28 14:17-15:01/44 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Somma minuti d'ombra	0	90	64	112	156	1331

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Luca Di Grigoli / luca.digrigoli@vsb.energy  
 Redatto il:  
 14/11/2023 14:53/3.6.355



## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 14 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Gennaio	Febbraio	Marzo	Aprile	Maggio	Giugno
1	07:28 16:41	07:15 15:49-16:15/26 17:16	06:38 06:57-07:37/40 17:51	06:46 19:26	06:00 19:58	05:30 20:29
2	07:29 16:42	07:14 15:48-16:16/28 17:17	06:36 06:55-07:38/43 17:52	06:45 19:27	05:58 20:00	05:30 20:29
3	07:29 16:43	07:12 15:48-16:16/28 17:19	06:35 06:54-07:39/45 17:53	06:43 19:28	05:57 20:01	05:29 20:30
4	07:29 16:44	07:11 15:48-16:17/29 17:20	06:33 06:52-07:38/46 17:54	06:41 19:29	05:56 20:02	05:29 20:31
5	07:29 16:45	07:10 15:47-16:17/30 17:21	06:32 06:51-07:39/48 17:56	06:40 19:30	05:54 20:03	05:28 20:32
6	07:29 16:46	07:09 15:47-16:18/31 17:22	06:30 06:49-07:39/50 17:57	06:38 19:31	05:53 20:04	05:28 20:32
7	07:29 16:47	07:08 15:46-16:18/32 17:24	06:28 06:47-07:39/52 17:58	06:36 18:59-19:04/5 19:32	05:52 20:05	05:28 20:33
8	07:28 16:48	07:07 15:47-16:19/32 17:25	06:27 06:46-07:39/53 17:59	06:35 18:57-19:04/7 19:33	05:51 20:06	05:28 20:33
9	07:28 16:49	07:06 15:47-16:19/32 17:26	06:25 06:44-07:39/55 18:00	06:33 18:56-19:04/8 19:35	05:50 20:07	05:27 20:34
10	07:28 16:50	07:05 15:46-16:19/33 17:28	06:23 06:42-07:38/56 18:01	06:31 18:57-19:05/8 19:36	05:48 20:08	05:27 20:35
11	07:28 16:51	07:03 15:47-16:19/32 17:29	06:22 06:41-07:38/57 18:03	06:30 18:57-19:04/7 19:37	05:47 20:09	05:27 20:35
12	07:28 16:52	07:02 15:47-16:19/32 17:30	06:20 06:39-07:37/58 18:04	06:28 06:47-06:49/2 19:38 18:58-19:07/9	05:46 20:10	05:27 20:36
13	07:27 16:53	07:01 15:47-16:18/31 17:31	06:18 06:37-07:36/59 18:05	06:26 06:45-06:49/4 19:39 19:00-19:07/7	05:45 20:11	05:27 20:36
14	07:27 16:54	07:00 15:48-16:18/30 17:33	06:17 06:38-07:36/58 18:06	06:25 06:44-06:50/6 19:40 18:59-19:07/8	05:44 20:12	05:27 20:37
15	07:26 16:55	06:58 15:49-16:18/29 17:34	06:15 06:38-07:35/57 18:07	06:23 06:42-06:49/7 19:41 18:59-19:07/8	05:43 20:13	05:27 20:37
16	07:26 16:56	06:57 07:16-07:17/1 17:35 15:49-16:16/27	06:13 06:38-07:34/56 18:08	06:22 06:41-06:49/8 19:42 18:59-19:05/6	05:42 20:14	05:27 20:38
17	07:26 16:58	06:56 07:15-07:18/3 17:36 15:51-16:16/25	06:12 06:38-07:33/55 18:09	06:20 06:40-06:47/7 19:43	05:41 20:15	05:27 20:38
18	07:25 16:59	06:54 07:14-07:20/6 17:38 15:52-16:15/23	06:10 06:39-07:32/53 18:10	06:19 06:41-06:45/4 19:44	05:40 20:16	05:27 20:38
19	07:25 17:00	06:53 07:12-07:23/11 17:39 15:54-16:12/18	06:08 06:39-07:31/52 18:12	06:17 19:45	05:39 20:17	05:27 20:39
20	07:24 17:01	06:51 07:11-07:26/15 17:40 15:56-16:10/14	06:07 06:40-07:29/49 18:13	06:15 19:47	05:38 20:18	05:27 20:39
21	07:23 17:02	06:50 07:09-07:28/19 17:41 16:01-16:05/4	06:05 06:41-07:28/47 18:14	06:14 19:48	05:38 20:19	05:27 20:39
22	07:23 17:04	06:48 07:08-07:30/22 17:43	06:03 06:42-07:26/44 18:15	06:12 19:49	05:37 20:20	05:27 20:39
23	07:22 17:05	06:47 07:06-07:31/25 17:44	06:02 06:43-07:24/41 18:16 06:20-06:24/4	06:11 19:50	05:36 20:21	05:28 20:39
24	07:21 17:06	06:45 07:05-07:33/28 17:45	06:00 06:19-06:25/6 18:17 06:45-07:23/38	06:09 19:51	05:35 20:22	05:28 20:40
25	07:21 17:07	06:44 07:03-07:34/31 17:46	05:58 06:17-06:24/7 18:18 06:46-07:20/34	06:08 19:52	05:34 20:23	05:28 20:40
26	07:20 17:09	15:59-16:00/1 06:42 07:02-07:36/34 17:47	05:56 06:15-06:24/9 18:19 06:48-07:17/29	06:07 19:53	05:34 20:24	05:28 20:40
27	07:19 17:10	15:55-16:06/11 06:41 07:00-07:36/36 17:49	05:55 06:13-06:22/9 18:20 06:51-07:13/22	06:05 19:54	05:33 20:25	05:29 20:40
28	07:18 17:11	15:53-16:09/16 06:39 06:59-07:37/38 17:50	05:53 06:12-06:21/9 18:21 06:56-07:09/13	06:04 19:55	05:32 20:25	05:29 20:40
29	07:17 17:12	15:52-16:11/19 06:38 07:01-07:35/37 17:51	05:52 06:11-06:20/8 18:22 06:57-07:10/12	06:03 19:56	05:32 20:26	05:30 20:40
30	07:16 17:14	15:51-16:12/21 06:37 07:02-07:36/36 17:52	05:51 06:10-06:19/7 18:23 06:58-07:11/11	06:02 19:57	05:31 20:27	05:30 20:40
31	07:15 17:15	15:50-16:13/23 06:36 07:03-07:35/35 17:53	05:50 06:09-06:18/6 18:24 06:59-07:12/10	06:01 19:58	05:31 20:28	05:30 20:40
Ore potenziali eliofania	296	296	369	399	450	454
Somma minuti d'ombra	91	835	1367	111	0	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

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 Redatto il:  
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## SHADOW - Calendario per WTG

Calcolo: ShadowFlickering Progetto+ Esistenti WTG: 14 - Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m) (9)

Assunzioni sui calcoli d'ombra

Probabilità di eliofania (media ore giornaliere di insolazione) [CAMPOBASSO]

Gen Feb Mar Apr Mag Giu Lug Ago Set Ott Nov Dic  
 4,21 4,83 5,24 6,37 6,76 8,17 9,01 9,23 7,23 4,84 4,00 3,35

No operational time reduction. It is assumed the WTGs are always running with worst case wind direction.

	Luglio	Agosto	Settembre	Ottobre	Novembre	Dicembre
1	05:31 20:40	05:55 20:20	06:26 18:56-19:03/7 19:36	06:57 07:18-08:17/59 18:45	06:32 15:16-15:48/32 16:57	07:08 16:32
2	05:31 20:40	05:56 20:19	06:27 18:55-19:03/8 19:35	06:58 07:19-08:17/58 18:43	06:34 15:16-15:48/32 16:56	07:09 16:32
3	05:32 20:39	05:57 20:18	06:28 18:54-19:02/8 19:33	06:59 07:20-08:16/56 18:42	06:35 15:16-15:49/33 16:55	07:10 16:32
4	05:32 20:39	05:58 20:17	06:30 18:54-19:01/7 19:31	07:00 07:21-08:16/55 18:40	06:36 15:16-15:48/32 16:54	07:11 16:32
5	05:33 20:39	05:59 20:16	06:31 18:55-19:00/5 19:30	07:02 07:22-08:16/54 18:38	06:37 15:16-15:47/31 16:53	07:12 16:32
6	05:33 20:39	06:00 20:14	06:32 19:28	07:03 07:23-08:15/52 18:37	06:38 15:18-15:48/30 16:51	07:13 16:31
7	05:34 20:38	06:01 20:13	06:33 19:26	07:04 07:24-08:15/51 18:35	06:40 15:18-15:47/29 16:50	07:14 16:31
8	05:34 20:38	06:02 20:12	06:34 19:25	07:05 07:25-08:14/49 18:33	06:41 15:18-15:46/28 16:49	07:15 16:31
9	05:35 20:38	06:03 20:11	06:35 19:23	07:06 07:26-08:13/47 18:32	06:42 15:18-15:45/27 16:48	07:16 16:31
10	05:36 20:37	06:04 20:09	06:36 19:21	07:07 07:27-08:13/46 18:30	06:43 15:20-15:45/25 16:47	07:17 16:31
11	05:37 20:37	06:05 20:08	06:37 19:20	07:08 07:29-08:13/44 18:28	06:44 15:21-15:44/23 16:46	07:17 16:31
12	05:37 20:36	06:06 20:07	06:38 19:18	07:09 07:30-08:12/42 18:27	06:46 15:22-15:43/21 16:45	07:18 16:31
13	05:38 20:36	06:07 20:05	06:39 07:04-07:07/3 19:16	07:10 07:31-08:11/40 18:25	06:47 15:24-15:43/19 16:44	07:19 16:31
14	05:39 20:35	06:08 20:04	06:40 07:01-07:09/8 19:14	07:11 07:32-08:09/37 18:23	06:48 15:25-15:41/16 16:43	07:20 16:32
15	05:40 20:35	06:09 20:03	06:41 07:01-07:10/9 19:13	07:12 07:33-08:08/35 18:22	06:49 15:27-15:38/11 16:42	07:21 16:32
16	05:40 20:34	06:10 20:01	06:42 07:02-07:11/9 19:11	07:14 07:34-08:07/33 18:20	06:51 16:41	07:21 16:32
17	05:41 20:34	06:11 20:00	06:43 07:03-07:12/9 19:09	07:15 07:35-08:05/30 18:19	06:52 16:41	07:22 16:32
18	05:42 20:33	06:12 19:58	06:44 07:04-07:12/8 19:07	07:16 07:37-08:04/27 18:17	06:53 16:40	07:23 16:33
19	05:43 20:32	06:13 19:57	06:45 07:05-07:11/6 19:06	07:17 07:38-08:02/24 18:16	06:54 16:39	07:23 16:33
20	05:44 20:31	06:14 19:55	06:46 07:30-08:10/40 19:04	07:18 07:39-08:00/21 18:14	06:55 16:38	07:24 16:34
21	05:45 20:31	06:15 19:54	06:47 07:28-08:11/43 19:02	07:19 07:40-07:58/18 18:13	06:57 16:38	07:24 16:34
22	05:45 20:30	06:16 19:52	06:48 07:26-08:12/46 19:00	07:20 07:42-07:56/14 18:11	06:58 16:37	07:25 16:34
23	05:46 20:29	06:17 19:51	06:49 07:24-08:13/49 18:59	07:22 07:43-07:53/10 18:10	06:59 16:36	07:25 16:35
24	05:47 20:28	06:18 19:49	06:50 07:23-08:14/51 18:57	07:23 07:44-07:48/4 18:08	07:00 16:36	07:26 16:36
25	05:48 20:27	06:19 06:44-06:49/5 19:48	06:51 07:22-08:15/53 18:55	06:24 06:45-06:47/2 17:07	07:01 16:35	07:26 16:36
26	05:49 20:26	06:20 06:42-06:50/8 19:46	06:52 07:21-08:15/54 18:54	06:25 06:46-06:47/1 17:05	07:02 16:35	07:27 16:37
27	05:50 20:25	06:21 06:43-06:51/8 19:44	06:53 07:20-08:15/55 18:52	06:26 15:18-15:47/29 17:04	07:03 16:34	07:27 16:37
28	05:51 20:24	06:22 06:44-06:51/7 19:43	06:54 07:19-08:16/57 18:50	06:27 15:17-15:48/31 17:03	07:05 16:34	07:27 16:38
29	05:52 20:23	06:23 06:45-06:51/6 19:41	06:55 07:18-08:16/58 18:48	06:29 15:17-15:48/31 17:01	07:06 16:33	07:28 16:39
30	05:53 20:22	06:24 06:46-06:50/4 19:40	06:56 07:17-08:16/59 18:47	06:30 15:17-15:49/32 17:00	07:07 16:33	07:28 16:40
31	05:54 20:21	06:25 06:47-06:49/2 19:38	18:57-19:06/9	06:31 15:16-15:49/33 16:59		07:28 16:40
Ore potenziali eliofania	461	429	375	345	297	286
Somma minuti d'ombra	0	80	787	1185	389	0

Legenda della tabella:

Giorno del mese Alba (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra  
 Tramonto (hh:mm) Inizio ombreggiamento (hh:mm)-Fine ombreggiamento (hh:mm)/Minuti d'ombra



Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

Schweizer Straße 3a

DE-01069 Dresden

+ 49 (0) 351 / 211 83 - 46

Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

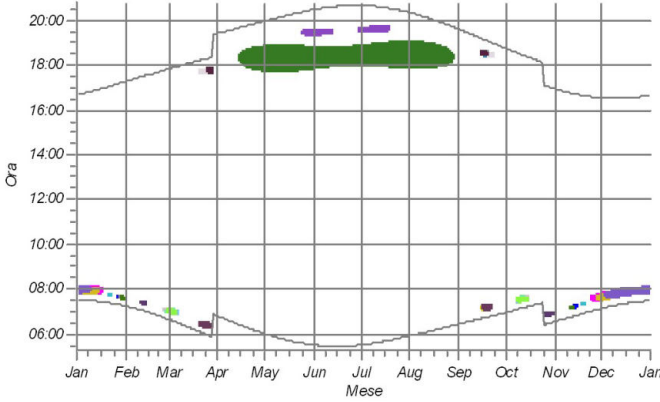
14/11/2023 14:53/3.6.355



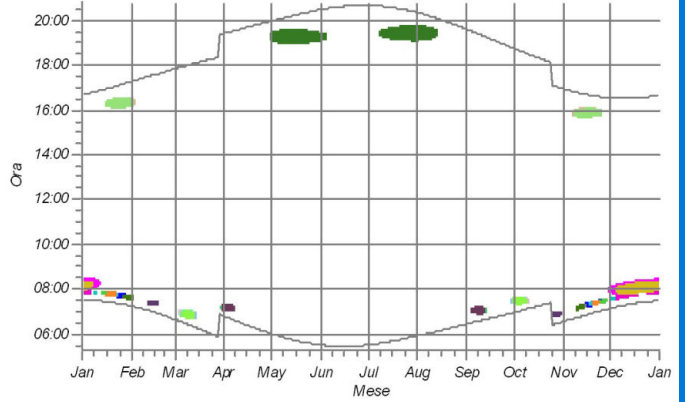
## SHADOW - Calendario per WTG, grafico

Calcolo: ShadowFlickering Progetto+ Esistenti

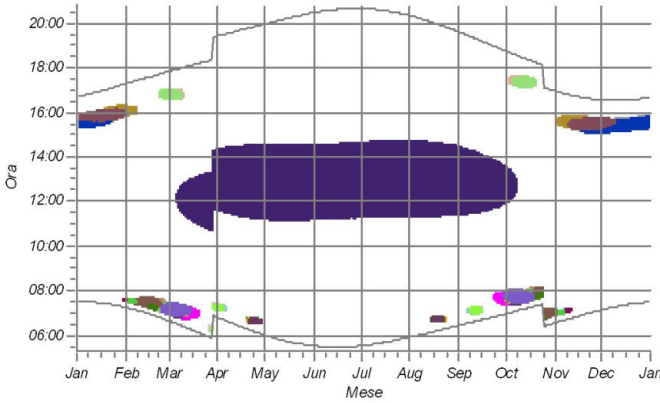
7: Acciona AW 77/1500 CII 1500 77.0 !O! hub : 60,0 m (TOT: 98,5 m) (2,



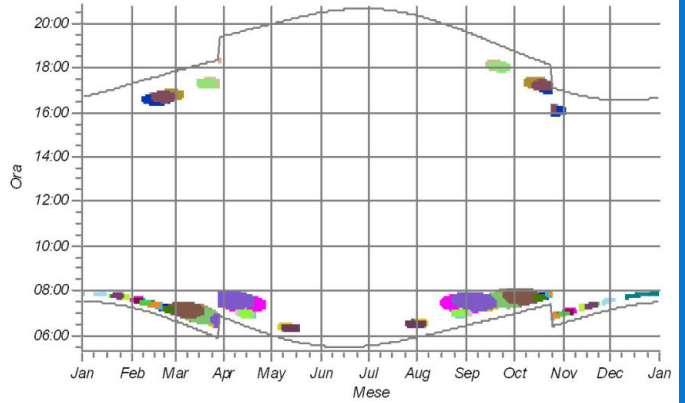
8: Acciona AW 77/1500 CII 1500 77.0 !O! hub : 60,0 m (TOT: 98,5 m) (3,



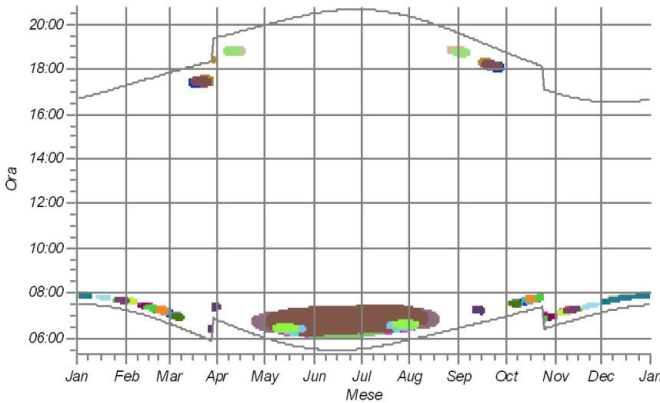
9: Acciona AW 77/1500 CII 1500 77.0 !O! hub : 60,0 m (TOT: 98,5 m) (4,



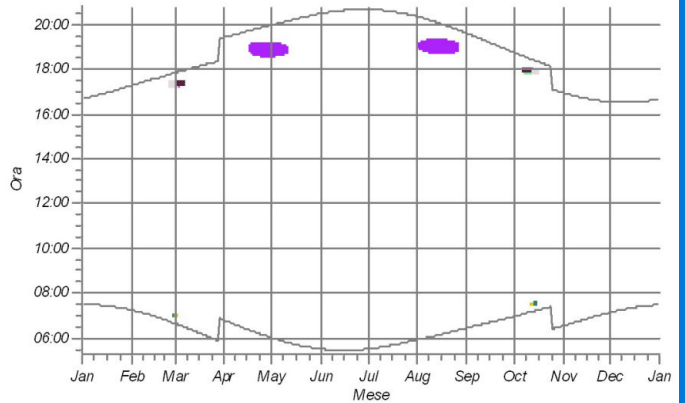
10: Acciona AW 77/1500 CII 1500 77.0 !O! hub : 60,0 m (TOT: 98,5 m) (5,



11: Acciona AW 77/1500 CII 1500 77.0 !O! hub : 60,0 m (TOT: 98,5 m) (6,



12: Acciona AW 77/1500 CII 1500 77.0 !O! hub : 60,0 m (TOT: 98,5 m) (7,



Receptori d'ombra

AA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (3)	AG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (21)	AK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (31)	BM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (53)	CK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (73)	DL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (103)
AB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (4)	AH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (22)	AL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (32)	BN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (54)	CL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (74)	DM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (104)
AC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (5)	AW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (23)	AM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (33)	BO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (55)	CM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (75)	DN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (105)
AD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (6)	AX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (24)	AN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (34)	BP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (56)	CN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (76)	DO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (106)
AE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (7)	AY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (25)	AO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (35)	BQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (57)	CO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (77)	DP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (107)
AF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (8)	AZ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (36)	BR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (58)	CP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (78)	DQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (108)
AG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (9)	AA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (27)	AQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (37)	BS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (59)	CC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (79)	DR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (109)
AH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (10)	AB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (28)	AR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (38)	BT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (60)	CD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (80)	DS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (110)
AI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (11)	AC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (29)	AS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (39)	BU Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (61)	CE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (81)	DT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (111)
AJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (12)	AD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (30)	AT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (40)	BV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (62)	CF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (82)	DU Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (112)
AK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (13)	AE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (31)	AV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (41)	BW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (63)	CG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (83)	DV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (113)
AL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (14)	AF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (32)	AW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (42)	BX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (64)	CH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (84)	

Progetto:

231114\_Shadow flickering\_Galdo\_rev01

Utente autorizzato:

VSB Neue Energien Deutschland GmbH

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Luca Di Grigoli / luca.digrigoli@vsb.energy

Redatto il:

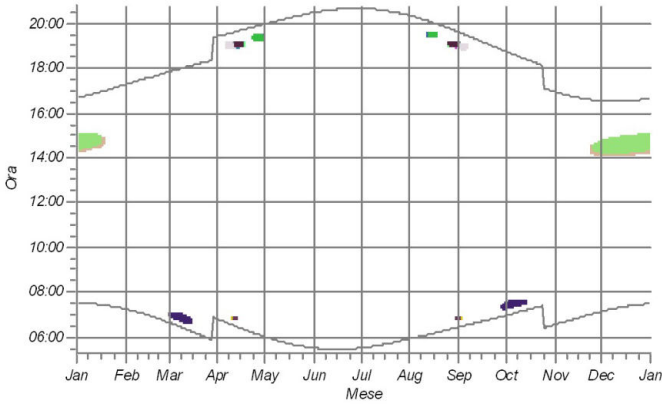
14/11/2023 14:53/3.6.355



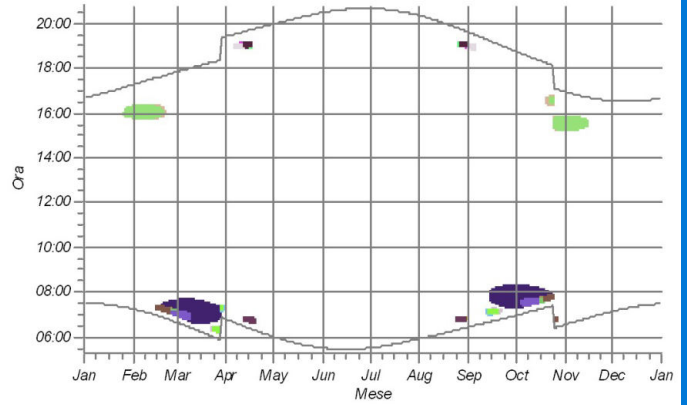
# SHADOW - Calendario per WTG, grafico

Calcolo: ShadowFlickering\_Progetto+ Esistenti

13: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m)



14: Acciona AW 77/1500 CII 1500 77.0 !O! hub: 60,0 m (TOT: 98,5 m)



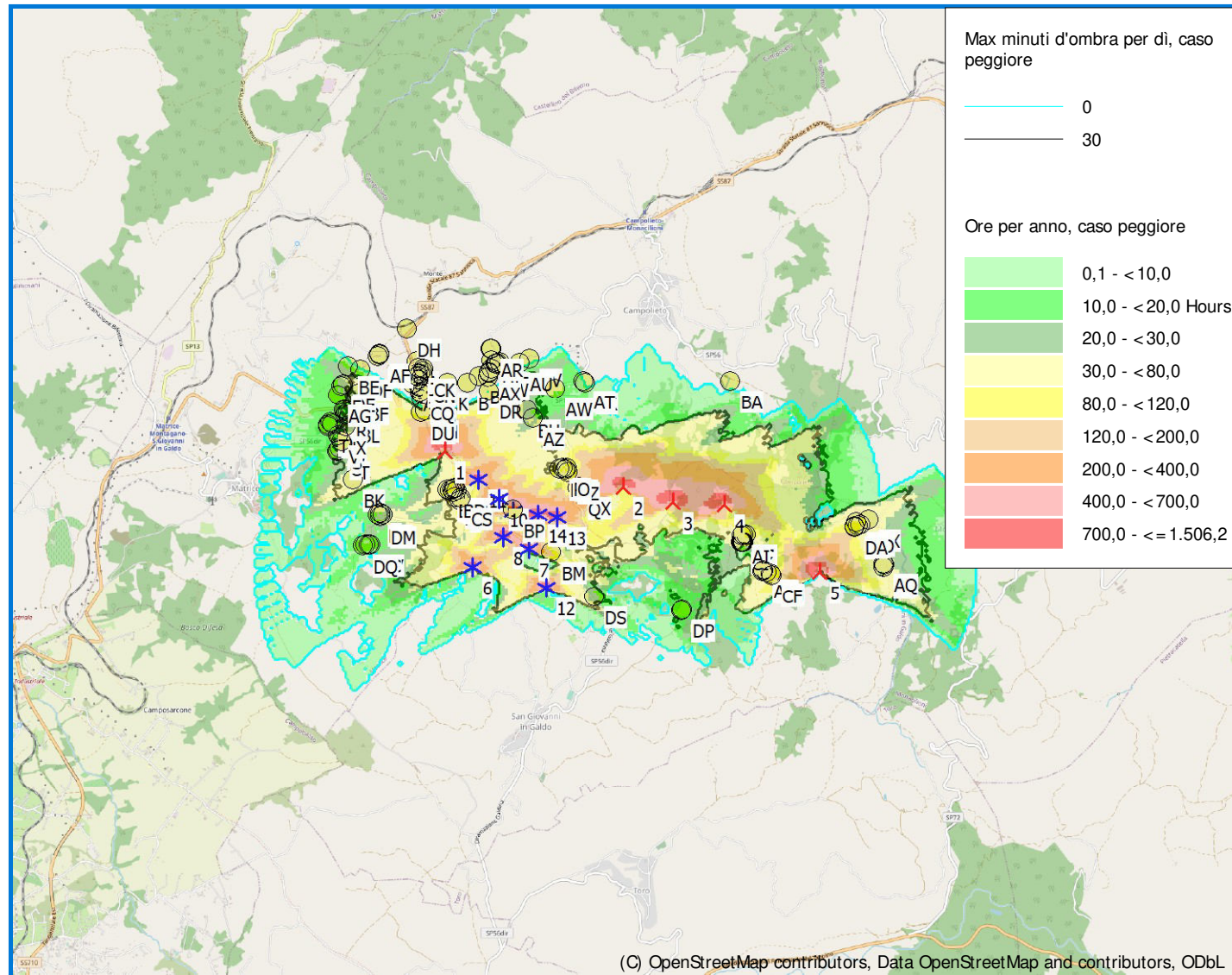
Receptor d'ombra

AC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (5)	AD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	AZ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	BZ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CB Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CC Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CD Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CE Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CF Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CG Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CH Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CI Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CJ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CK Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CL Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CM Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CN Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CO Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CP Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CQ Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CR Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CS Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CT Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CU Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CV Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CW Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CX Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CY Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)	CA Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 90.0° (26)
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Progetto:

231114\_Shadow flickering\_Galdo\_rev01



## SHADOW -

### Mappa

Calcolo:

ShadowFlickering\_Progetto+ Esistenti

Utente autorizzato:

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14/11/2023 14:53/3.6.355



Mappa: EMD OpenStreetMap , Scala di stampa 1:75.000, Centro mappa UTM (north)-WGS84 Zone: 33 Est: 480.270 Nord: 4.606.920

🚧 Nuova WTG      \* WTG preesistente      📍 Recettore d'ombra

Fonte altimetria: Height Contours: CONTOURLINE\_ONLINEDATA\_0.wpo (1)

Time step: 4 minuti, Day step: 14 giorni, Map resolution: 30 m, Visibility calculation: 15 m, Altezza dell'osservatore: 1,5 m