

Comune  
di Morcone



Regione Campania



Comune  
di Pontelandolfo



Committente:

**RWE**

**RENEWABLES ITALIA S.R.L.**  
Via Andrea Doria, 41/G - 00192 Roma  
P.IVA/C.F. 06400370968  
pec: rwerenewablesitaliasrl@legalmail.it

Titolo del Progetto:

**Progetto per la realizzazione di una centrale eolica da 48,00 MW denominata "Lisa" nei comuni di Morcone (BN) e Pontelandolfo (BN), quale completamento del parco eolico "Morcone"**

Documento:

**PROGETTO DEFINITIVO**

Richiesta Autorizzazione Unica ai sensi del D. Lgs. 387 del 29/09/2003

N° Documento:

**PELS\_A.10**

ID PROGETTO:	<b>PELS</b>	DISCIPLINA:	<b>P</b>	TIPOLOGIA:	<b>R</b>	FORMATO:	<b>A4</b>
--------------	-------------	-------------	----------	------------	----------	----------	-----------

Elaborato:

**Relazione specialistica - Studi degli effetti di shadow flickering**

FOGLIO: SCALA: Nome file: **PELS\_A.10\_Studi\_shadow\_flickering.pdf**

Progettazione:

**R.T.P. D'Occhio - De Blasis**  
Via S. Angelo, 10 - 82020 Campolattaro (BN)

Progettisti:



Ing. Giuseppe Antonio De Blasis



Arch. Carmine D'Occhio

Rev:	Data Revisione	Descrizione Revisione	Redatto	Controllato	Approvato
00	21/09/2020	Prima emissione	R.T.P.D'Occhio - De Blasis	RWE	RWE

# PROGETTO PER LA REALIZZAZIONE DI UNA CENTRALE EOLICA DA 48,00 MW DENOMINATA “LISA”, NEI COMUNI DI MORCONE (BN) E PONTELANDOLFO (BN), QUALE COMPLETAMENTO DEL PARCO EOLICO “MORCONE”

Proponente: RWE RENEWABLES ITALIA S.R.L.

## STUDI SHADOW FLICKERING

---

### Sommario

1.	PREMESSA .....	2
2.	CRITERIO DI STIMA DELL’EFFETTO SHADOW FLICKERING.....	3
3.	ANALISI DEL FENOMENO E STIMA DELLE INTERFERENZE .....	5
4.	CONCLUSIONI .....	9
	Calcoli shadow .....	10

## 1. PREMESSA

Lo “shadow flicker” (*sfarfallio dell'ombra*) è l'espressione comunemente impiegata per descrivere l'effetto stroboscopico delle ombre proiettate dalle pale rotanti degli aerogeneratori eolici su un punto di interesse, allorquando il sole si trova alle loro spalle.

Il fenomeno si traduce in una variazione alternata di intensità luminosa che, a lungo andare, può provocare fastidio agli occupanti delle abitazioni le cui finestre risultano esposte al fenomeno stesso. Il fenomeno, ovviamente, risulta assente sia quando il sole è oscurato da nuvole o nebbia, sia quando, in assenza di vento, le pale del generatore non sono in rotazione.

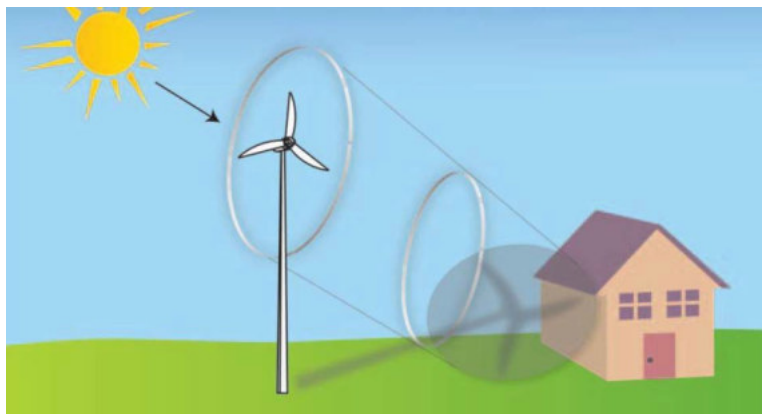
In particolare le frequenze che possono provocare un senso di fastidio sono comprese tra i 2,5 ed i 20 Hz (*Verkuijlen and Westra, 1984*).

Gli aerogeneratori utilizzati nel presente progetto hanno una velocità di rotazione di circa 12,1 giri/min e la frequenza di passaggio ( $0,7 \div 1,5$  Hz) risulta di gran lunga inferiore ai 2,50 Hz ritenuti quale limite inferiore del range considerato fastidioso per l'individuo.

Le relazioni spaziali tra un aerogeneratore ed un ricettore (abitazione), così come la direzione del vento risultano essere fattori chiave per la durata del fenomeno di shadow flicker.

Per distanze dell'ordine dei 300 m, il fenomeno in esame potrebbe verificarsi all'alba oppure al tramonto, ovvero in quelle ore in cui le ombre risultano molto lunghe per effetto della piccola elevazione solare.

Al di là di una certa distanza l'ombra smette di essere un problema perché il rapporto tra lo spessore della pala ed il diametro del sole diventa molto piccolo. Quindi, come è facile immaginare, la condizione più penalizzante corrisponde al caso in cui il piano del rotore risulta ortogonale alla congiungente ricettore – sole; infatti, in tali condizioni, l'ombra proiettata darà origine ad un cerchio di diametro pari al rotore del generatore eolico.



Sebbene il fenomeno possa essere percepito anche all'esterno, esso risulta evidente e fastidioso in quegli ambienti con finestrate rivolte verso le ombre. In generale, l'area soggetta a shadow flicker non si estende oltre i 500÷1000 m dall'aerogeneratore e le zone a maggiore impatto ricadono entro i 300 m di distanza dalle macchine con durata del fenomeno dell'ordine delle 200 ore all'anno; il flickering, se presente, non supera in genere i 20/30 minuti di durata nell'arco di una giornata.

La presente relazione tecnica ha lo scopo di stimare le aree interessate dalla possibile presenza del fenomeno rispetto agli aerogeneratori costituenti il parco eolico in progetto.

Tale stima determina quindi delle zone d'interesse, valutate in ragione delle ore/anno in cui il fenomeno può verificarsi, al fine di determinare l'interazione di dette zone con possibili ricettori sensibili presenti (*abitazioni ed edifici*).

## 2. CRITERIO DI STIMA DELL'EFFETTO SHADOW FLICKERING

Per la stima dello scado flickering, effettuata secondo lo standard "Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Shadowwurf-Hinweise)" è necessario in primo luogo determinare il percorso solare nella latitudine di riferimento della turbina.

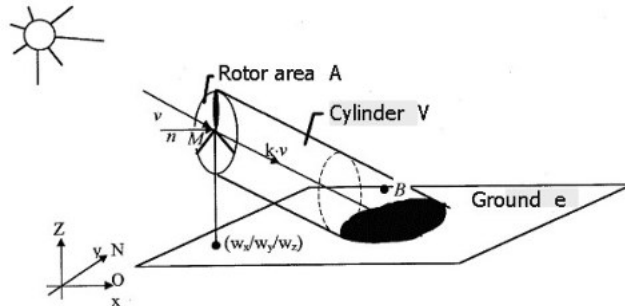


Fig. 1 - schematizzazione effetto shadow flickering

Per individuare ad un certo istante dell'anno la posizione del sole nel cielo in una determinata località è necessario definire alcuni angoli caratteristici:

- **altezza o altitudine solare  $\alpha$** : angolo formato tra la direzione dei raggi solari ed il piano orizzontale;
- **l'angolo zenitale  $z$** : angolo formato tra i raggi solari e la direzione dello zenit (complementare all'angolo  $\alpha$ );
- **l'azimut solare  $a$** : angolo formato tra la posizione sul piano orizzontale dei raggi solari e la direzione sud;
- **l'angolo orario  $h$** : distanza angolare tra il sole e la sua posizione a mezzogiorno lungo la sua traiettoria apparente sulla volta celeste;
- **latitudine  $L$** : angolo che la retta passante per la località considerata ed il centro della terra forma con il piano dell'equatore;
- **declinazione solare  $\delta$** : angolo che la direzione dei raggi solari forma a mezzogiorno, sul meridiano considerato, col piano equatoriale.

La posizione istantanea del sole, definita dall'altezza solare  $\alpha$  e dall'azimut solare  $a$ , è valutabile per mezzo delle relazioni:

$$\begin{aligned} \sin \alpha &= \sin L * \sin \delta + \cos L * \cos \delta * \cos h \\ \sin a &= (\cos \delta * \sin h) / \cos \alpha \end{aligned}$$

poiché l'azimut solare può assumere valori maggiori di  $90^\circ$ , mentre la funzione arcoseno fornisce per convenzione valori di  $a$  compresi tra  $-90^\circ$  e  $+90^\circ$ , è necessario, in questi casi, apporre delle correzioni ai valori calcolati.

La declinazione solare  $\delta$  è invece calcolata per mezzo della relazione approssimata di Cooper (*Solar Energy 1969 - The Absorption of Solar Radiation in Solar Stills*):

$$\delta = 23,45 \sin [360 * (284 + n) / 365] \text{ con } n \text{ l'ennesimo giorno dell'anno.}$$

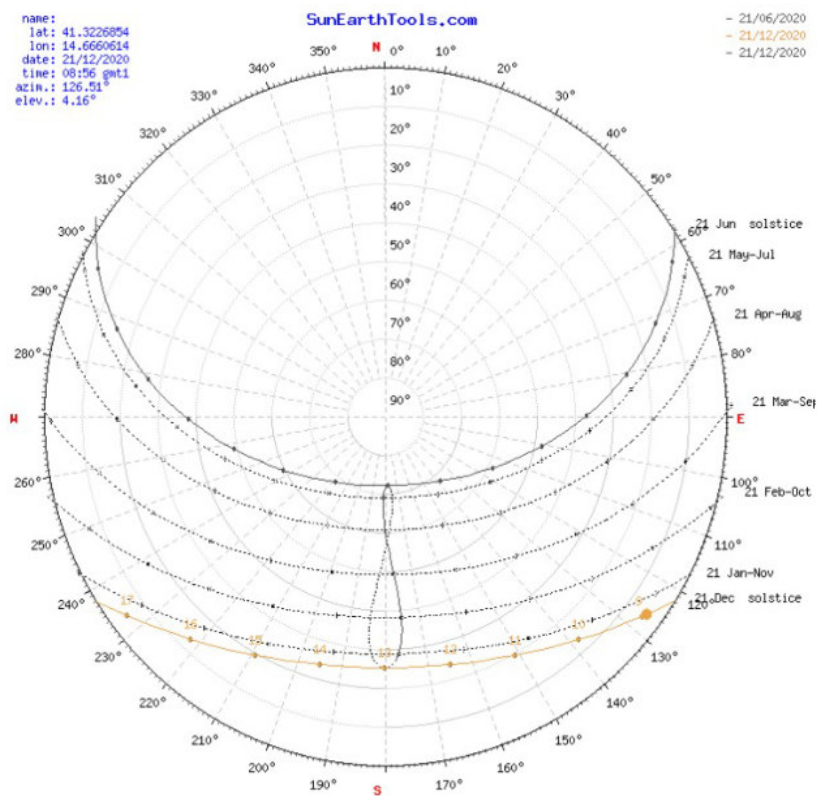
È possibile visualizzare, per mezzo di un diagramma polare, le traiettorie del sole nel corso dell'anno per una determinata località. Il diagramma, che è una proiezione delle traiettorie del sole sul piano orizzontale, è ottenibile

grafitando i valori dell'altezza solare e dell'azimut, calcolati con le precedenti relazioni e per la località considerata, in funzione del tempo solare e della declinazione.

Per mezzo di questi diagrammi è possibile determinare i periodi di tempo nei quali un punto di una superficie rimane in ombra a causa di ostacoli che intercettano i raggi del sole (*come in particolare le lame della turbina eolica*). Quando la distanza dell'ostacolo è grande rispetto alle dimensioni del ricevitore (*ad esempio una finestra*) è lecito considerare il ricevitore come puntiforme, poiché l'ombra tende a muoversi rapidamente sul ricevitore, che risulta pertanto completamente in ombra o completamente illuminato.

Per determinare quando l'ostacolo intercetta i raggi solari, bisogna rappresentare nel diagramma delle traiettorie solari la forma angolare dell'ostacolo come vista dal punto considerato, plottando su di esso l'azimut e l'altezza angolare dei punti del contorno con l'ostacolo stesso.

Di seguito si riporta il diagramma delle traiettorie solari definito per la località in cui ricade il parco eolico in progetto.



La stima dell'impatto dello scado flickering viene confrontata con le linee guida "Hinweise zur Ermittlung und Beurteilung der optischen Immissionen von Windenergieanlagen (WEA-Schattenwurf-Hinweise - unico riferimento presente)" che definisce i limiti per l'ombreggiamento:

- *angolo minimo del sole rispetto all'orizzonte  $\geq 3^\circ$ ;*
- *percentuale minima di copertura del sole della pala  $\geq 20\%$ ;*
- *valore limite inferiore con effetto trascurabile in termini di ore/anno in cui può verificarsi il fenomeno: 30 ore/anno di ombra astronomica;*
- *valore limite superiore con effetti sensibili in termini di ore/anno in cui può verificarsi il fenomeno: 100 ore/anno di ombra astronomica;*
- *distanza massima con effetti sensibili: 1 km dalla turbina (dato di letteratura).*

Inoltre, essendo di complessa definizione analitica, vengono considerate alcune semplificazioni a vantaggio di sicurezza quali:

- *turbina sempre in rotazione;*
- *rotore sempre orientato ortogonalmente all'asse sole-ricettore;*
- *non vengono considerati ostacoli tra turbina e ricettore quali schermi, alberi, fabbricati ecc;*
- *ricettori orientati verso la turbina*
- *ventosità massima della turbina con conseguente raggiungimento del valore massimo di frequenza del fenomeno.*

Alla luce di quanto esposto, al fine di poter eseguire una stima della possibile interferenza tra l'effetto flickering cagionato da una turbina su un possibile ricettore sensibile, vengono sovrapposte alla cartografia tecnica i diagrammi dell'evoluzione dell'effetto shadow flickering annuale e valutare quindi le possibili conseguenze sugli specifici ricettori interessati e conseguentemente individuare le possibili misure di mitigazione del fenomeno.

Tali misure potranno essere definite per ciascuna singola fattispecie; in via preliminare, e del tutto indicativa, si ritiene che queste possano essere strutturali (*siepi di protezione, barriere visive, alberature, tendaggi, blocco aerogeneratori in occorrenza del fenomeno*), ovvero non strutturali (*compensazione per mancata fruizione*).

### 3. ANALISI DEL FENOMENO E STIMA DELLE INTERFERENZE

Nella tabella che segue sono riportate coordinate puntuali dei singoli aerogeneratori, espresse nei sistemi di riferimento UTM WGS84 - fuso 33 N e GAUSS-BOAGA - Roma 40 fuso EST:

WTG	COORDINATE PIANE SISTEMA UTM WGS 84 - FUSO 33 NORD		COORDINATE PIANE SISTEMA GAUSS-BOAGA - ROMA 40 FUSO EST	
	EST	NORD	EST	NORD
WTG_01	471.160	4.574.545	2.491.170	4.574.552
WTG_02	471.660	4.574.670	2.491.669	4.574.677
WTG_03	472.146	4.574.606	2.492.155	4.574.614
WTG_04	472.826	4.574.668	2.492.835	4.574.676
WTG_05	473.213	4.574.337	2.493.222	4.574.344
WTG_06	473.811	4.574.396	2.457.820	4.574.404
WTG_07	474.149	4.574.030	2.494.158	4.574.038
WTG_08	474.654	4.573.871	2.494.663	4.573.879

*Coordinate degli aerogeneratori in progetto nei sistemi piani UTM WGS84 33N e Gauss-Boaga Roma 40 Est*

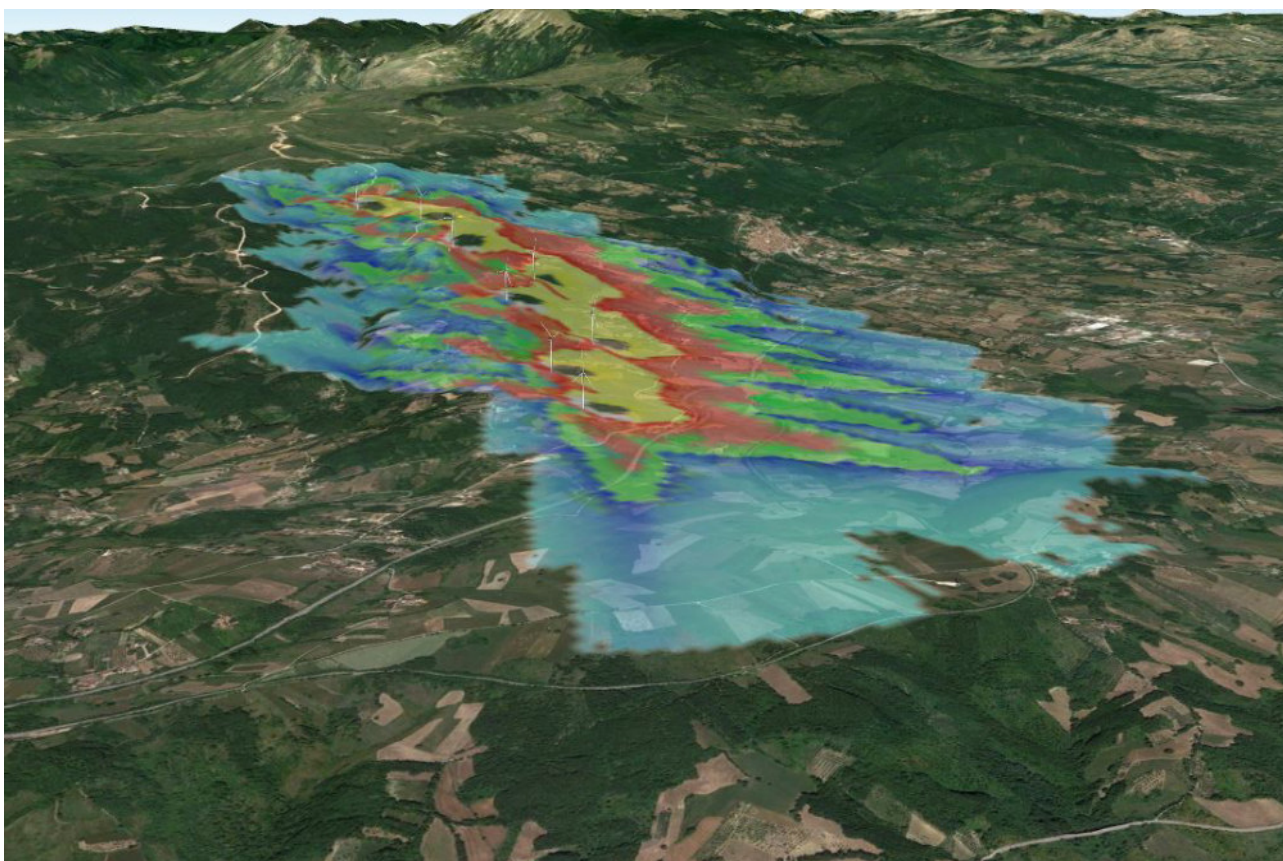
Al fine di verificare la sussistenza del fenomeno dello shadow flickering, sono state effettuate simulazioni in considerazione.

- *Diagramma solare riferito alla latitudine di realizzazione del parco*
- *Altezza complessiva dell'aerogeneratore comprensiva della pala*
- *Orientamento rispetto al recettore*
- *Posizione del sole*
- *Altezza minima sull'orizzonte 3°*
- *Probabilità di sole per Campobasso (che dista circa 27 km dal sito in oggetto).*

gen	feb	mar	apr	mag	giu	lug	ago	set	ott	nov	dic
4,21	4,83	5,24	6,37	6,76	8,17	9,01	9,23	7,23	4,84	4,00	3,3

- *Ore di funzionamento dell'impianto in base a dati statistici (3.200 ore)*
- *Non sono stati considerati ostacoli tra il recettore e la turbina eolica*
- *La simulazione è stata condotta non considerando l'orografia dei luoghi*

Al fine di valutare le possibili interferenze tra l'effetto shadow flickering delle turbine ed i ricettori sensibili è stata eseguita una scrupolosa analisi dei fabbricati presenti nell'area di interesse di cui se ne riporta l'estratto tabellare con le relative coordinate e la loro destinazione d'uso:



**RICETTORI SENSIBILI**

fid	X	y	Foglio	Particella	Categoria	Ore anno (valore atteso)	Note
A1	470788	4575116	65	484	A4	1,23	
A2	470901	4575401	65	438	A4	2,22	
A3	470916	4575437	65	501/462/455/583	A4	1,36	
A4	470895	4575493	65	525	A3	0,57	
A5	470860	4575519	65	60/61/62/330	A4	0,52	
A6	471634	4574915	65	494	A4	57,31	
A7	471894	4575147	78	769	A4/F2	11,13	
A8	472060	4575263	78	775	A4	13,52	
A9	471980	4575371	78	482	A2	6,4	
A10	471745	4575375	65	439/418/446/447/448/449	A2	2,09	
A11	472006	4575435	78	529	A2	3,09	
A12	472564	4574770	78	783	A3	28,37	
A13	472504	4574825	78	490	A3	26,42	
A14	472505	4575195	78	803	A3	12,58	
A15	472453	4575194	78	742	A3	12,32	
A16	472327	4575274	78	496/497	A2	7,26	
A17	472546	4575359	78	520	A2	4,48	
A18	473458	4574677	80	654/655/606	A3/A3/A3	37,19	
A19	473363	4574732	80	120	A3	33,49	
A20	473364	4574772	80	555	A2	30,24	
A21	473362	4574791	80	653	F6 IN ATTESA DI DICHIARAZIONE	28,18	
A22	473400	4574812	80	648	A4	26,23	
A23	473437	4574845	80	561	A7	22,39	
A24	473464	4574835	80	123	A4	24,29	
A25	473628	4574724	80	591	A4	32,35	
A26	473701	4574716	80	652	F6 IN ATTESA DI DICHIARAZIONE	35,05	
A27	473747	4574856	80	649	A2	15,54	
A28	474063	4574670	80	498	A2	24,23	
A29	473216	4574110	79	301	F3 IN CORSO DI COSTRUZIONE	0,1	Fabbricato diroccato
A30	473440	4573795	79	304	A2	0	
A31	473795	4573887	81	385	Fabb. Rurale	0,02	



A32	473791	4573820	81	378	A4	0,01
A33	473818	4573768	6	922	A3	0
A34	473869	4573741	6	966	A7	0
A35	474427	4573622	7	751	A7	0
A36	474434	4573583	7	8	A4	0
A37	474582	4573520	7	108	A3	0
A38	474596	4573479	7	777	A3	0
A39	474709	4573556	81	286	A4	0
A40	474865	4573603	81	398	A3	20,04
A41	474872	4573939	81	414	A4	21,05
A42	474886	4573989	81	224	A3	0
A43	474831	4573377	7	122	A4	0
A44	474941	4573413	7	779	A4	0
A45	474944	4573369	7	277/1074	A3	0
A46	475058	4573381	7	800	A4	0
A47	475078	4573393	7	961	A3	0
A48	471303	4575851	66	587	A4	0,13
A49	471347	4575988	66	634	A2	0
A50	471483	4575671	65	430	A4	1,05
A51	471494	4575715	65	478	A4	0,48
D1	470920	4575478	65	525	D10	1,03
D2	470923	4575486	65	526	D10	1,04
D3	472252	4575320	67	325	D10	9,07
D4	472304	4575321	67	310	D10	0,22
D5	472302	4575292	78	761	D10	8,17
D6	472432	4575195	78	741	D10	12,02
D7	472499	4575174	78	744	D10	15,21
D8	472454	4575145	78	739/744	D10	18,16
D9	472566	4574715	78	754	D10	18,53
D10	472584	4574700	78	782	D10	16,26
D11	473464	4573835	81	395	D7	0
D12	471268	4575859	66	610	D10	0,2
D13	471288	4575856	66	609	D10	0,16

#### 4. CONCLUSIONI

L'effetto dello shadow flickering sui potenziali ricettori presenti nell'area è trascurabile, poiché

- *Si presenta per periodi limitati dell'anno;*
- *Si presenta per un periodo molto limitato di minuti durante la giornata, tipicamente tra le 6 e le 7 del mattino o tra le 7 e le otto del mattino, e tipicamente per circa mezz'ora;*
- *Inoltre studi scientifici hanno accertato che frequenze inferiori a 10 Hz non hanno alcuna correlazione con attacchi di natura epilettica, mentre nel caso in esame l'effetto dell'ombra ha nel caso peggiore una frequenza di 0.8 Hz.*

I ricettori sensibili (*abitazioni ed edifici ad uso agricolo D10*) sono tutti interferenti con il fenomeno per un periodo inferiore a 50 ore/anno ad esclusione dei ricettori identificati *abitazione – A6 (57)*, *abitazione C21(50)* che presentano interferenze con il fenomeno di poco superiore a 50 ore anno.

Al fine di limitare ulteriormente il verificarsi di tali fenomeni di shadow flickering sui ricettori presenti sono comunque praticabili opere di mitigazione quali: piantumazione di alberi o piante sempre verdi prospicienti alle aperture finestrate degli edifici qualora rivolte verso gli aerogeneratori.

Infine per quanto attiene all'ombra che si manifesta sulla SS 87 notiamo che:

- È interessato dal fenomeno un tratto stradale di circa 4000 metri, con valori che vanno da 0 a 8 ore l'anno. Riteniamo, che anche in questo caso l'effetto dello shadow flickering, sia irrilevante.

I tecnici:

arch. Carmine D'Occhio

Ing. Giuseppe De Blasis

## SHADOW - Risultato principale

### 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

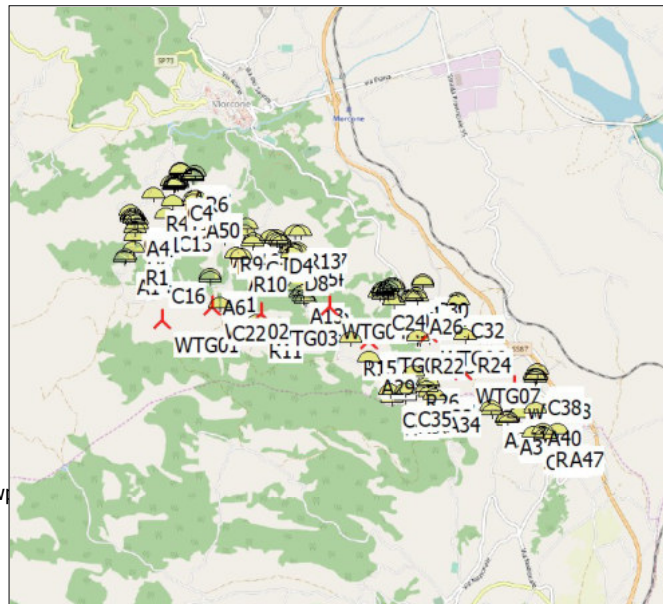
Altezza minima del sole sull'orizzonte 3 °  
 Passo giornaliero del calcolo 1 giorni  
 Passo temporale del calcolo 1 minuti

Probabilità di 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

Tempo di operatività  
 0 Somma  
 3.200 3.200

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: Elevation Grid Data Object: Prova\_03\_EMDGrid\_1.w  
 Ostacoli usati:  
 Eye height for map: 1,5 m  
 Risoluzione del grigliato: 1,0 m

All coordinates are in  
 Geo [deg]-WGS84



### WTG

WTG	Longitude	Latitude	Z	Dati/Descrizione	Tipo di WTG		Tipo generatore	Potenza nominale [kW]	Diametro rotore [m]	Altezza mozzo [m]	Dati di ombra	
					Valida	Prod.					Distanza di calcolo [m]	giri/min [giri/min]
WTG01	14,655408° E	41,321863° N	820,9	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	
WTG02	14,661374° E	41,323008° N	805,1	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	
WTG03	14,667181° E	41,322441° N	744,7	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	
WTG04	14,675294° E	41,323026° N	671,2	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	
WTG05	14,679939° E	41,320055° N	671,1	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	
WTG06	14,687082° E	41,320609° N	582,9	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	
WTG07	14,691136° E	41,317321° N	585,5	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	
WTG08	14,697178° E	41,315907° N	571,6	VESTAS V162-5.... Sì	VESTAS	V162-5.6-5.600	5.600	162,0	119,0	1.996	12,1	

### Recettore d'ombra-Immissione dati

n.	Longitude	Latitude	Z	Upper left		Upper right		Lower left		Lower right		Top elevation a.g.l. [m]	Bottom elevation a.g.l. [m]	Ampiezza [m]	Altezza [m]	Elevation a.g.l. [m]	Gradi Sud	Inclinazione della finestra [°]	Modo orientazione	Eye height for ZVI [m]
				Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude									
A1	14,650937° E	41,326992° N	861,9																	
A10	14,662354° E	41,329362° N	713,7																	
A11	14,665467° E	41,329915° N	693,5																	
A12	14,672169° E	41,323946° N	697,4																	
A13	14,671449° E	41,324432° N	710,0																	
A14	14,671449° E	41,327771° N	650,4																	
A15	14,670822° E	41,327756° N	659,2																	
A16	14,669320° E	41,328475° N	666,4																	
A17	14,671935° E	41,329245° N	629,6																	
A18	14,682861° E	41,323136° N	579,7																	
A19	14,681724° E	41,323630° N	594,5																	
A2	14,652223° E	41,329593° N	801,9																	
A20	14,681725° E	41,323987° N	594,0																	
A21	14,681700° E	41,324161° N	594,0																	
A22	14,682156° E	41,324346° N	591,7																	
A23	14,682359° E	41,324647° N	582,8																	
A24	14,682926° E	41,324559° N	576,9																	
A25	14,684896° E	41,323567° N	565,5	14,684890° E	41,323567° N	14,684902° E	41,323567° N	14,684890° E*	41,323567° N*	14,684902° E	41,323567° N	2,0	1,0	1,0*	1,0*	0,0*	90,0*	Monodirezionale	2,0	
A26	14,68758° E	41,323489° N	551,5																	
A27	14,686305° E	41,324759° N	530,4																	
A28	14,690083° E	41,323087° N	537,5																	
A29	14,679993° E	41,318016° N	669,2																	
A3	14,652429° E	41,329911° N	796,5																	
A30	14,682682° E	41,315191° N	648,8																	
A31	14,686923° E	41,316028° N	632,1																	
A32	14,686870° E	41,315423° N	627,7																	
A33	14,687195° E	41,314957° N	623,2																	
A34	14,687812° E	41,314713° N	618,7																	
A35	14,694477° E	41,313663° N	607,3																	
A36	14,694566° E	41,313311° N	605,6																	
A37	14,696334° E	41,312750° N	607,9																	
A38	14,696504° E	41,312376° N	609,0																	
A39	14,697852° E	41,313078° N	597,9																	
A4	14,652196° E	41,330395° N	795,9																	
A40	14,699720° E	41,313500° N	575,4																	
A41	14,699787° E	41,316534° N	555,9																	

continua alla pagina successiva...

## SHADOW - Risultato principale

...continua dalla pagina precedente

n.	Longitude	Latitude	Z	Upper left		Upper right		Lower left		Lower right		Top elevation a.g.l. [m]	Bottom elevation a.g.l. [m]	Ampiezza [m]	Altezza [m]	Elevation a.g.l. [m]	Gradi Sud [°]	Inclinazione della finestra [°]	Modo orientazione	Eye Height for ZVI [m]
				Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude									
A42	14,699943° E	41,316980° N	548,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A43	14,699317° E	41,311468° N	583,2											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A44	14,700630° E	41,311793° N	574,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A45	14,700672° E	41,311396° N	572,1											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A46	14,702032° E	41,311512° N	571,1											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A47	14,702271° E	41,311517° N	742,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A48	14,657048° E	41,333635° N	707,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A49	14,657571° E	41,334871° N	687,3											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A5	14,651771° E	41,330630° N	796,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A50	14,659210° E	41,332020° N	693,0											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A51	14,659346° E	41,332413° N	687,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A6	14,661057° E	41,325215° N	810,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A7	14,664149° E	41,327311° N	742,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A8	14,666125° E	41,328362° N	699,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
A9	14,665170° E	41,329336° N	699,3											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C1	14,657541° E	41,334794° N	687,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C10	14,651796° E	41,330761° N	793,0											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C11	14,652144° E	41,330761° N	788,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C12	14,652139° E	41,330557° N	793,2											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C13	14,655906° E	41,330976° N	732,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C14	14,651142° E	41,327113° N	857,2											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C15	14,654899° E	41,326288° N	840,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C16	14,655049° E	41,326252° N	838,0											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C17	14,662696° E	41,329684° N	709,4											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C18	14,662011° E	41,329274° N	714,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C19	14,666320° E	41,328611° N	696,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C2	14,657192° E	41,333724° N	704,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C20	14,669132° E	41,332368° N	654,0											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C21	14,661091° E	41,325485° N	804,0											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C22	14,662245° E	41,322889° N	798,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C23	14,671895° E	41,323867° N	700,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C24	14,681274° E	41,323791° N	594,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C25	14,681557° E	41,324239° N	593,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C26	14,682259° E	41,324376° N	590,4											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C27	14,682132° E	41,324134° N	591,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C28	14,682164° E	41,323855° N	590,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C29	14,682987° E	41,324402° N	577,4											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C3	14,657295° E	41,333683° N	704,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C30	14,686424° E	41,324963° N	527,1											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C31	14,690420° E	41,323241° N	534,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C32	14,690276° E	41,323160° N	532,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C33	14,682417° E	41,315125° N	649,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C34	14,682745° E	41,315028° N	646,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C35	14,684338° E	41,315209° N	633,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C36	14,699584° E	41,316503° N	558,3											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C37	14,699891° E	41,316415° N	555,3											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C38	14,699684° E	41,316241° N	561,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C39	14,696842° E	41,313908° N	606,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C4	14,657330° E	41,333604° N	705,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C40	14,699440° E	41,311422° N	582,1											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C41	14,700596° E	41,311162° N	569,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C42	14,700695° E	41,311192° N	569,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C43	14,700819° E	41,311180° N	569,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C44	14,702112° E	41,311261° N	569,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C45	14,702188° E	41,311356° N	569,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C5	14,656918° E	41,333585° N	709,2											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C6	14,657002° E	41,333539° N	709,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C7	14,656813° E	41,333431° N	710,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C8	14,659231° E	41,332324° N	689,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
C9	14,651677° E	41,331063° N	789,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D1	14,652491° E	41,330264° N	794,2											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D10	14,672418° E	41,323309° N	685,4											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D11	14,682970° E	41,315547° N	646,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D12	14,656532° E	41,333704° N	706,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D13	14,656870° E	41,333680° N	707,6											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D2	14,652529° E	41,330330° N	792,3											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D3	14,668416° E	41,328889° N	668,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D4	14,669034° E	41,328893° N	666,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D5	14,669024° E	41,328643° N	667,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D6	14,670574° E	41,327766° N	662,8											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D7	14,671374° E	41,327583° N	651,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D8	14,670834° E	41,327312° N	660,7											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
D9	14,672198° E	41,323444° N	689,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
R1	14,651975° E	41,327873° N	832,2											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
R10	14,664802° E	41,327292° N	739,2											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
R11	14,666551° E	41,321347° N	761,5											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
R13	14,671208° E	41,329232° N	639,9											1,0	1,0	1,0	0,0	90,0	Monodirezionale	2,0
R15	14,677809° E																			

## SHADOW - Risultato principale

### Risultati dei calcoli

Recettore d'ombra

#### Ombra, valore atteso

n. Ore d'ombra per anno  
[ore/anno]

A1	1:23
A10	2:09
A11	3:09
A12	28:37
A13	26:42
A14	12:58
A15	12:32
A16	7:26
A17	4:48
A18	37:19
A19	33:49
A2	2:22
A20	30:24
A21	28:18
A22	26:23
A23	22:39
A24	24:29
A25	32:35
A26	35:05
A27	15:54
A28	24:23
A29	0:10
A3	1:36
A30	0:00
A31	0:02
A32	0:01
A33	0:00
A34	0:00
A35	0:00
A36	0:00
A37	0:00
A38	0:00
A39	0:00
A4	0:57
A40	0:00
A41	20:04
A42	21:05
A43	0:00
A44	0:00
A45	0:00
A46	0:00
A47	0:00
A48	0:13
A49	0:00
A5	0:52
A50	1:05
A51	0:48
A6	57:31
A7	11:13
A8	13:52
A9	6:40
C1	0:00
C10	0:54
C11	0:58
C12	0:58
C13	0:09
C14	1:39
C15	7:20
C16	7:51
C17	2:01
C18	1:50
C19	12:49
C2	0:05

*continua alla pagina successiva...*

## SHADOW - Risultato principale

...continua dalla pagina precedente

### Ombra, valore atteso

n. Ore d'ombra per anno  
[ore/anno]

C20	6:58
C21	49:05
C22	16:48
C23	25:08
C24	31:46
C25	27:19
C26	26:01
C27	29:22
C28	32:50
C29	26:46
C3	0:05
C30	13:46
C31	21:29
C32	18:59
C33	0:00
C34	0:00
C35	0:00
C36	23:12
C37	14:43
C38	11:04
C39	0:00
C4	0:08
C40	0:00
C41	0:00
C42	0:00
C43	0:00
C44	0:00
C45	0:00
C5	0:19
C6	0:19
C7	0:25
C8	0:54
C9	0:50
D1	1:03
D10	16:26
D11	0:00
D12	0:20
D13	0:16
D2	1:04
D3	9:07
D4	7:22
D5	8:17
D6	12:02
D7	15:21
D8	18:16
D9	18:53
R1	3:56
R10	16:10
R11	0:01
R13	4:30
R15	6:42
R17	34:49
R18	33:26
R19	30:32
R2	3:47
R20	10:44
R21	11:52
R22	11:45
R23	20:10
R24	40:23
R25	33:22
R26	0:18
R27	0:00
R28	0:00

continua alla pagina successiva...

## SHADOW - Risultato principale

...continua dalla pagina precedente

### Ombra, valore atteso

n.	Ore d'ombra per anno [ore/anno]
R29	0:00
R3	0:23
R30	0:00
R31	0:00
R32	0:00
R33	0:00
R4	0:00
R5	0:00
R6	0:00
R6	0:00
R7	0:00
R8	4:39
R9	4:41

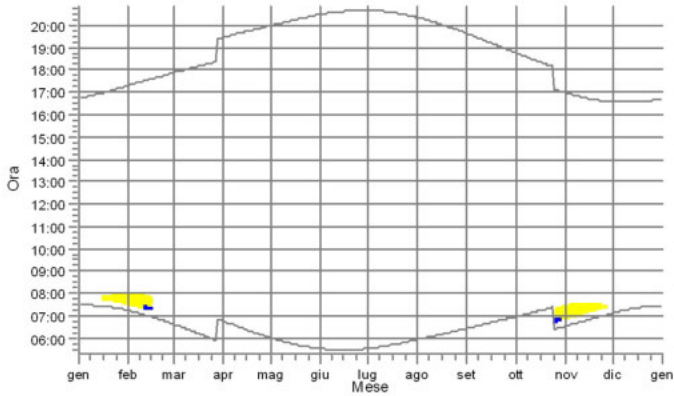
Ombreggiamento totale sui recettori d'ombra causato da ciascuna WTG

n.	Nome	Caso peggiore [ore/anno]	Atteso [ore/anno]
WTG01	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)	231:31	17:40
WTG02	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)	1009:56	89:23
WTG03	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)	520:48	35:23
WTG04	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)	657:03	38:19
WTG05	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)	708:05	64:12
WTG06	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)	744:18	76:59
WTG07	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)	475:05	53:05
WTG08	VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)	625:49	42:20

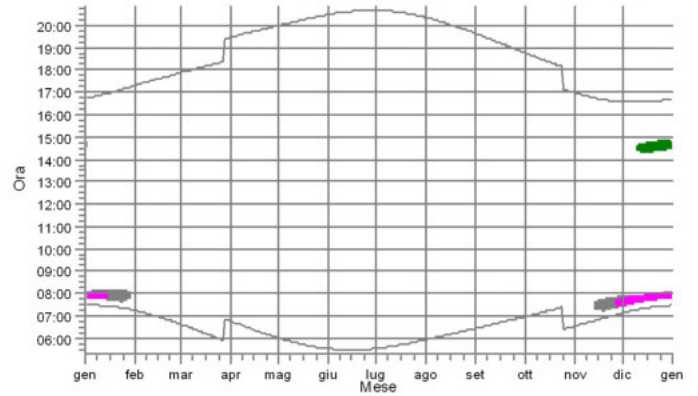
Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

## SHADOW - Calendario, grafico

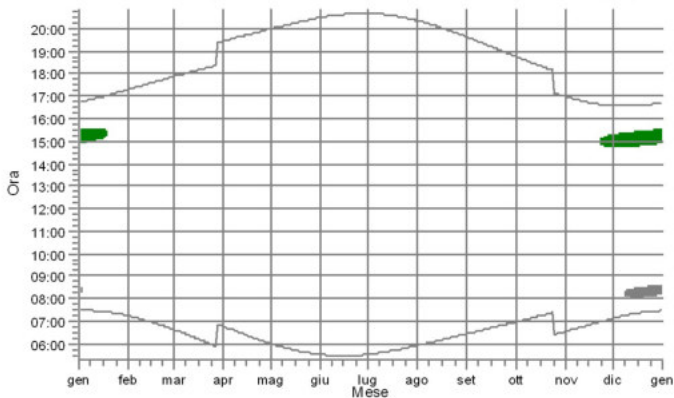
A1: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (26)



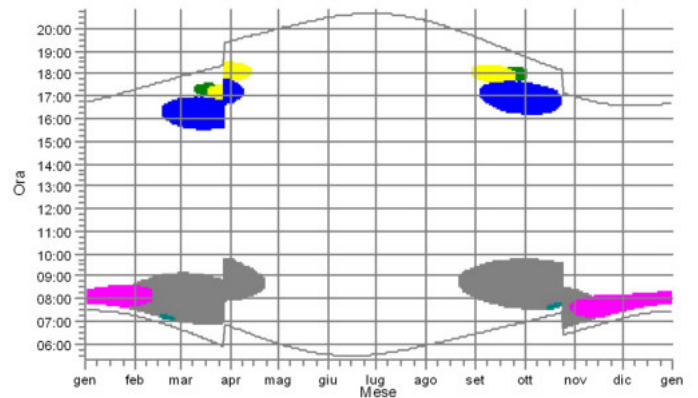
A10: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (35)



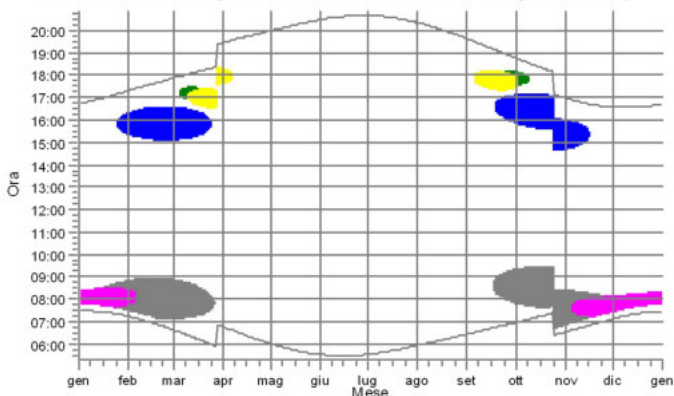
A11: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (36)



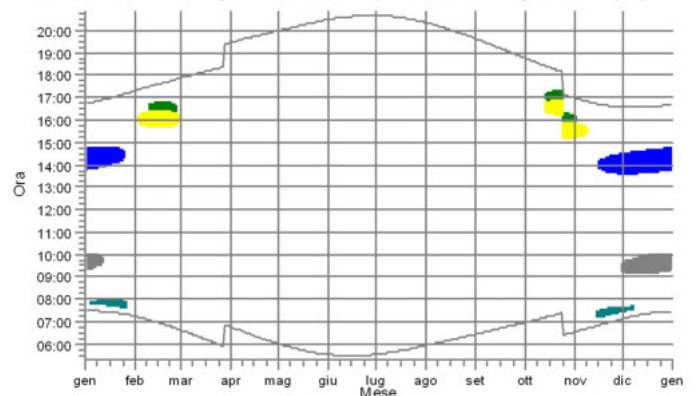
A12: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)



A13: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)



A14: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (42)



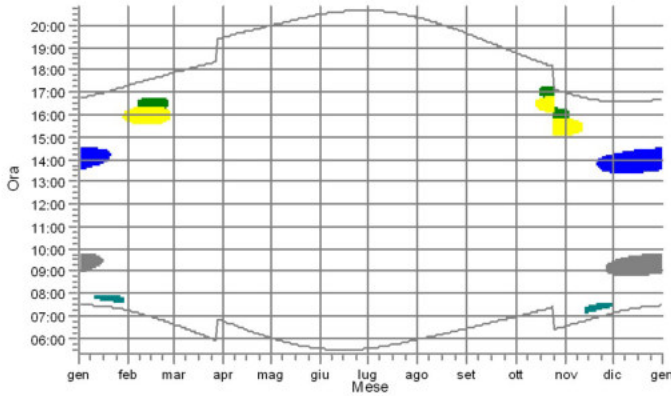
### WTG

- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)

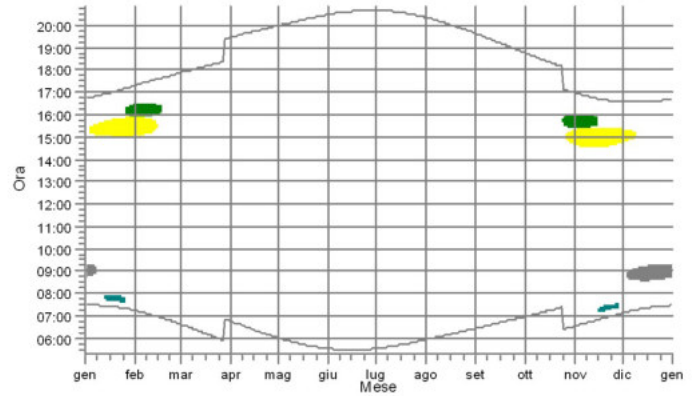


## SHADOW - Calendario, grafico

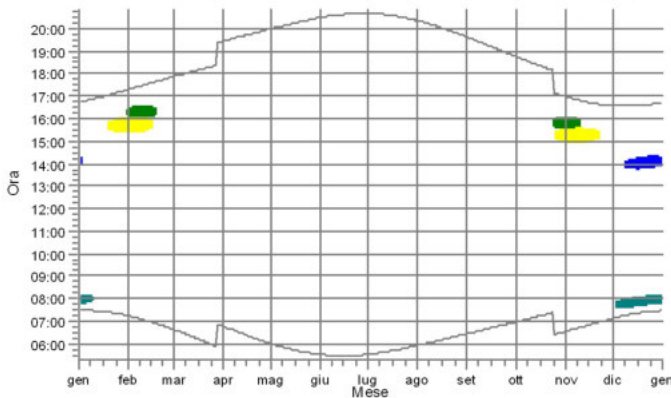
A15: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (41)



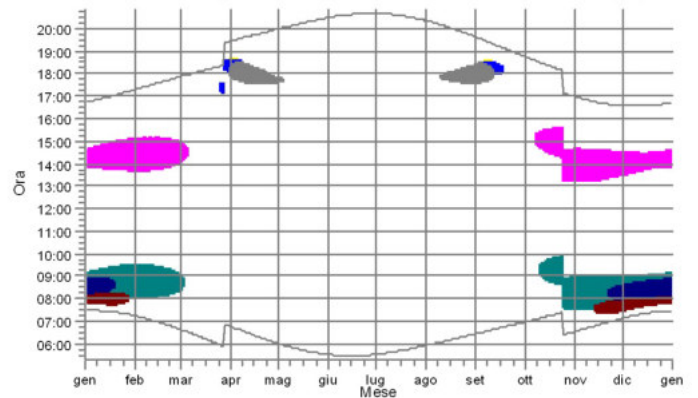
A16: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (40)



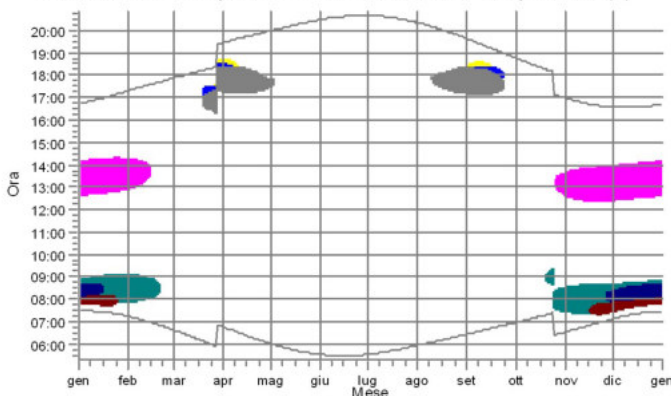
A17: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (43)



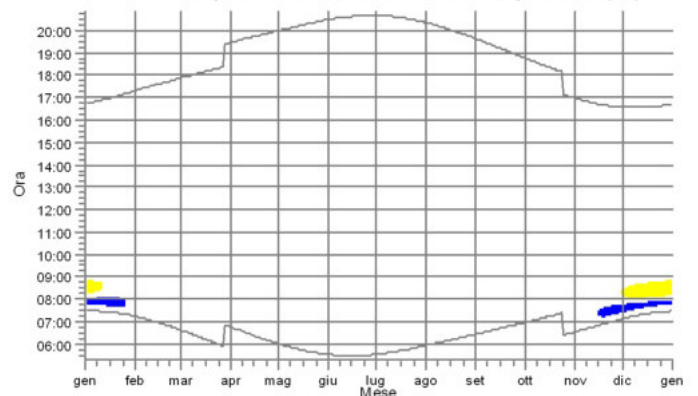
A18: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (15)



A19: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (9)



A2: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (27)

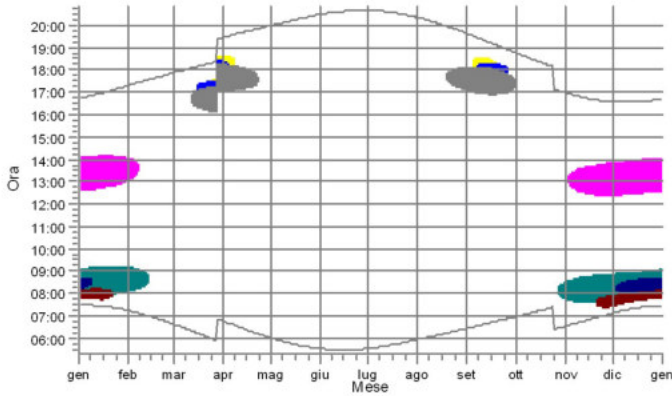


### WTG

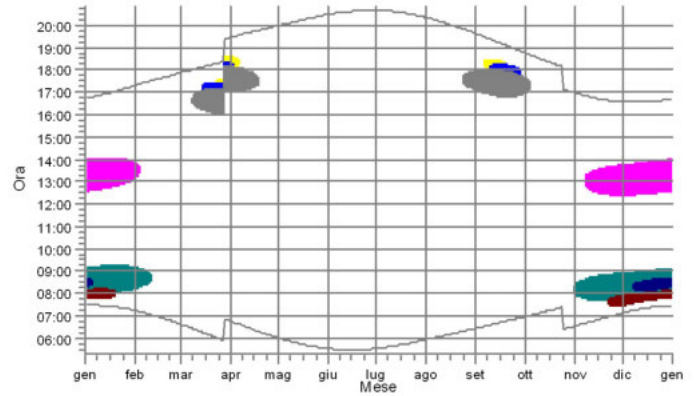
<span style="color: green;">■</span>	WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
<span style="color: yellow;">■</span>	WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
<span style="color: blue;">■</span>	WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
<span style="color: grey;">■</span>	WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
<span style="color: magenta;">■</span>	WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
<span style="color: teal;">■</span>	WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
<span style="color: darkblue;">■</span>	WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
<span style="color: brown;">■</span>	WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

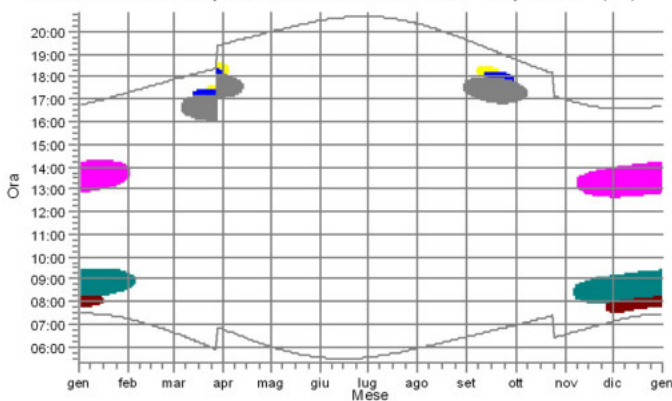
A20: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (10)



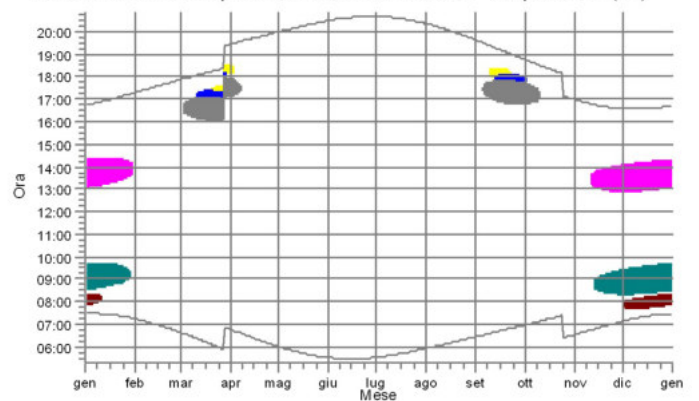
A21: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (11)



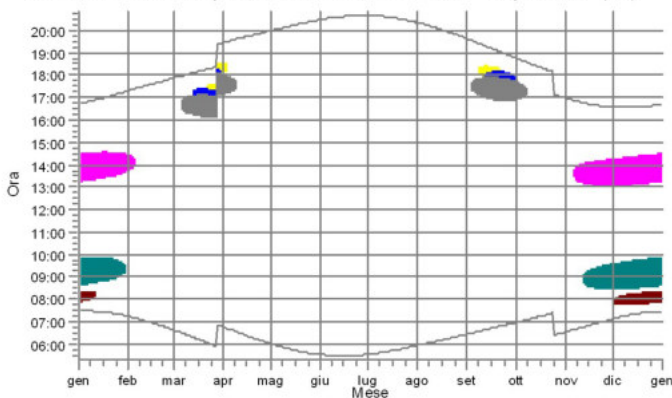
A22: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (12)



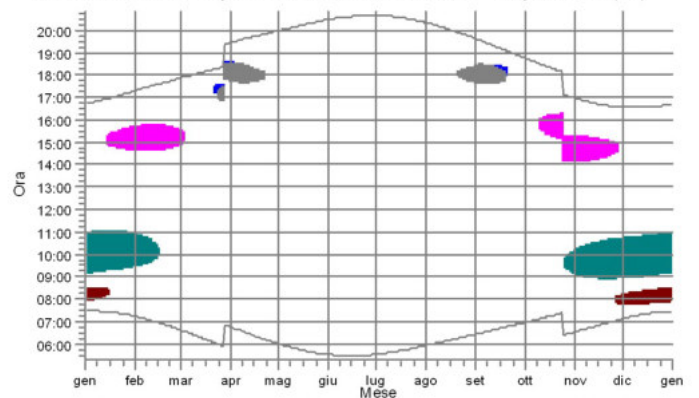
A23: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (13)










A24: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (14)



A25: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (16)

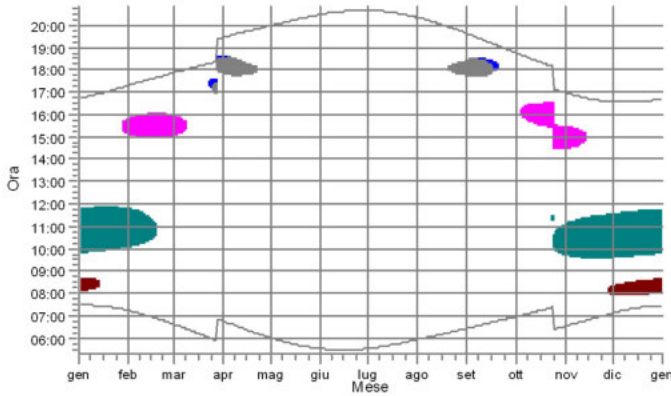


### WTG

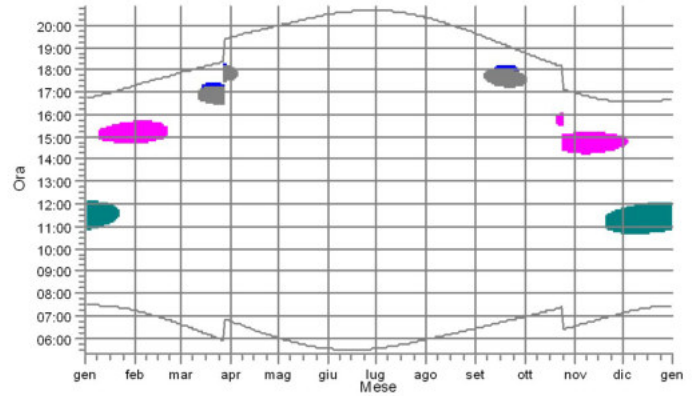
	WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
	WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
	WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
	WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
	WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
	WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
	WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

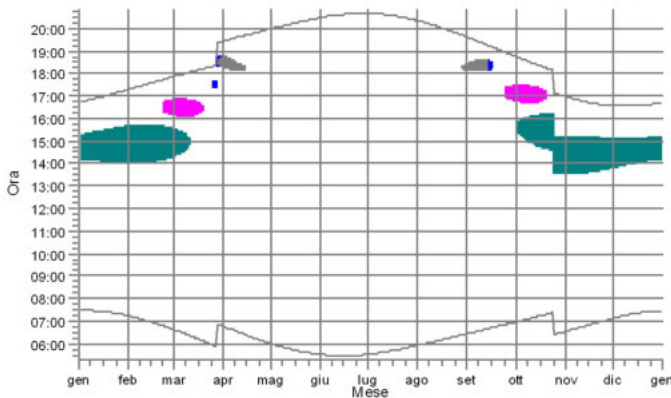
A26: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (17)



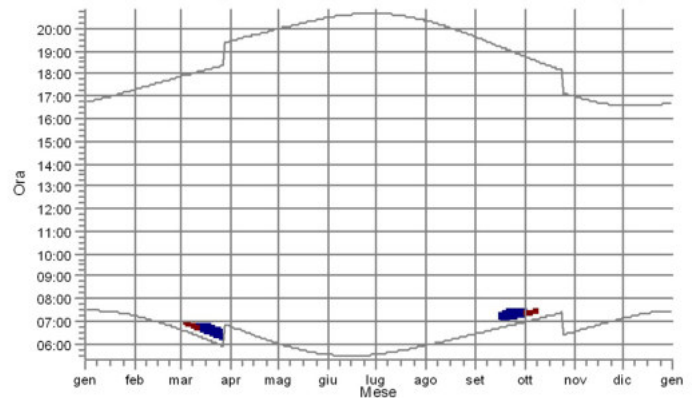
A27: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (18)



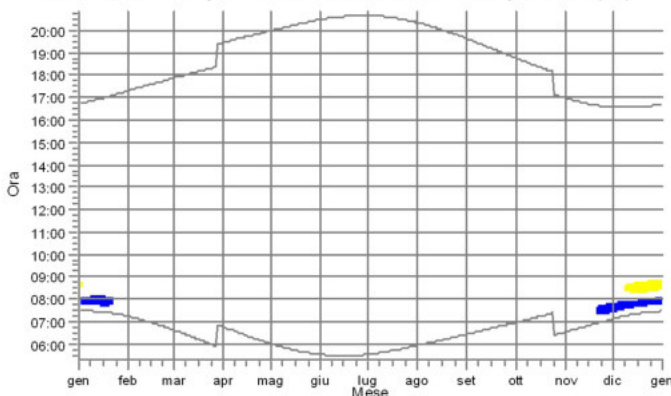
A28: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (19)



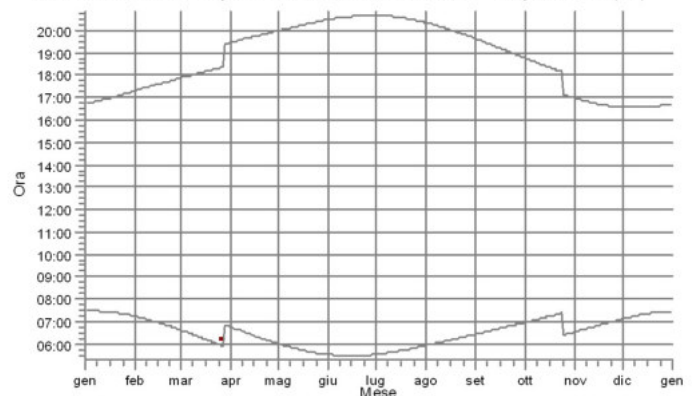
A29: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (57)



A3: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (28)



A30: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (45)

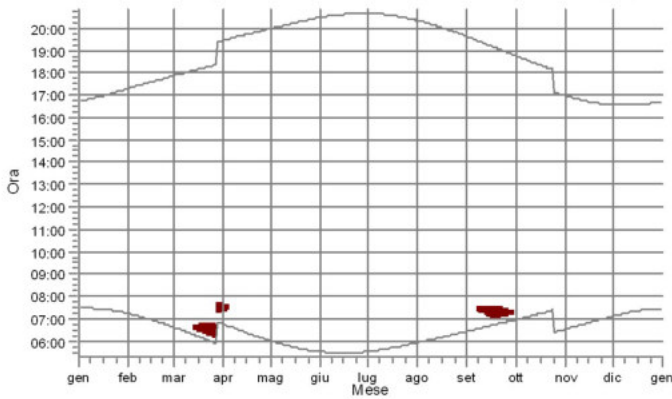


### WTG

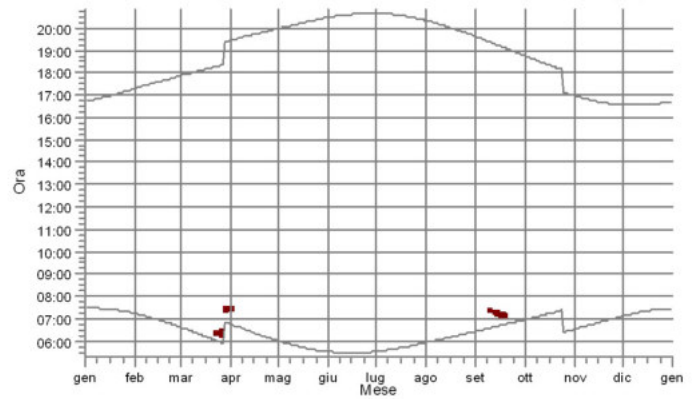
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
- WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

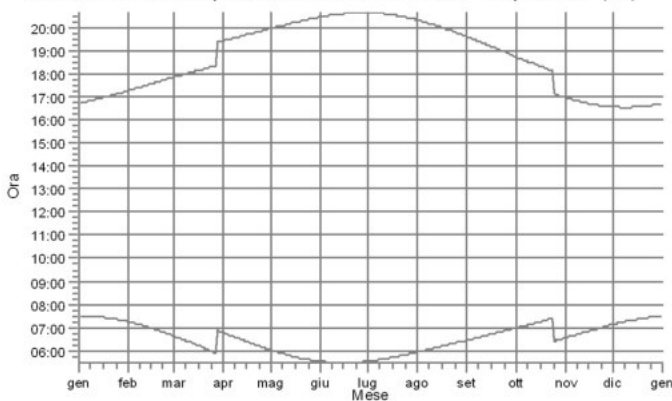
A31: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (24)



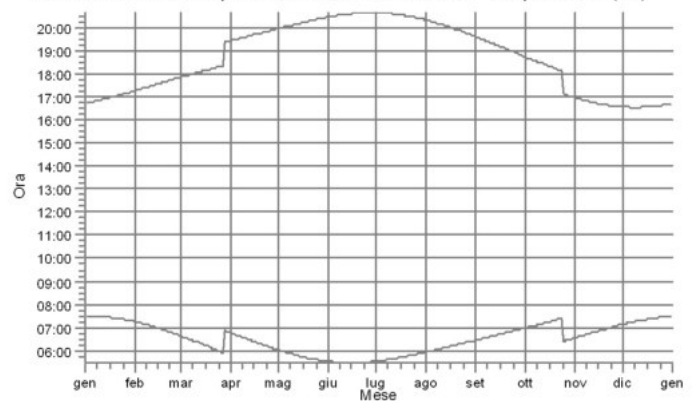
A32: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (44)



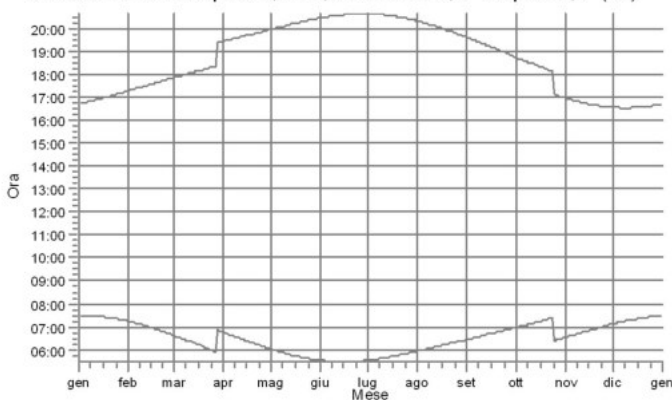
A33: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (46)



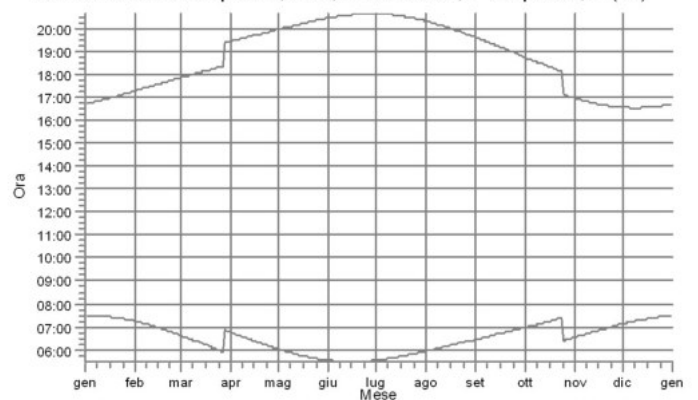
A34: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (47)



A35: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (48)



A36: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (49)

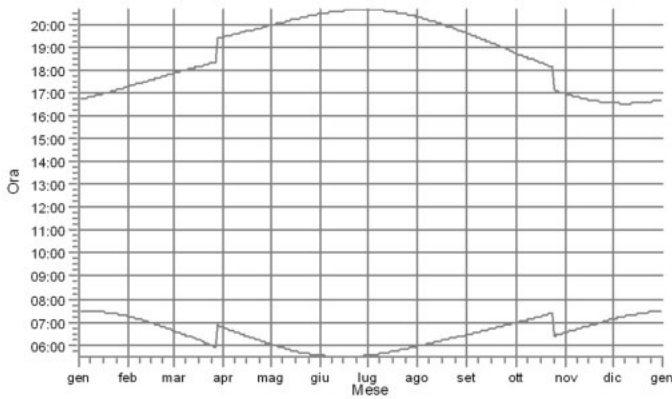


WTG

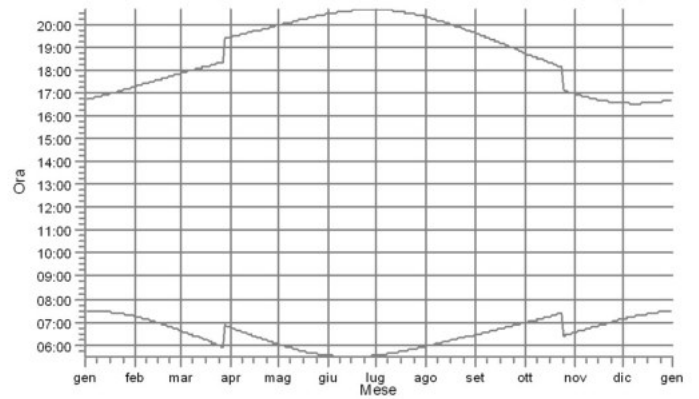
WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

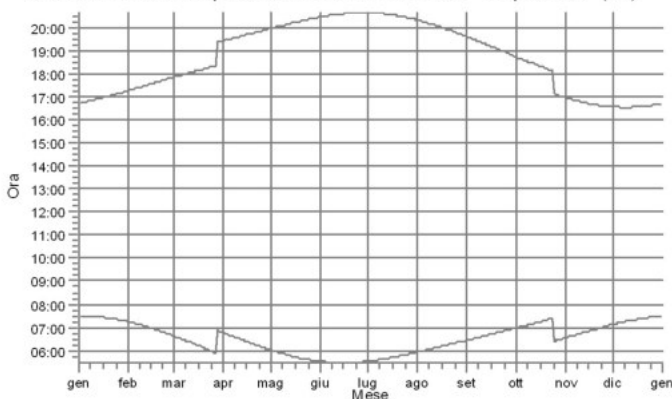
A37: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (50)



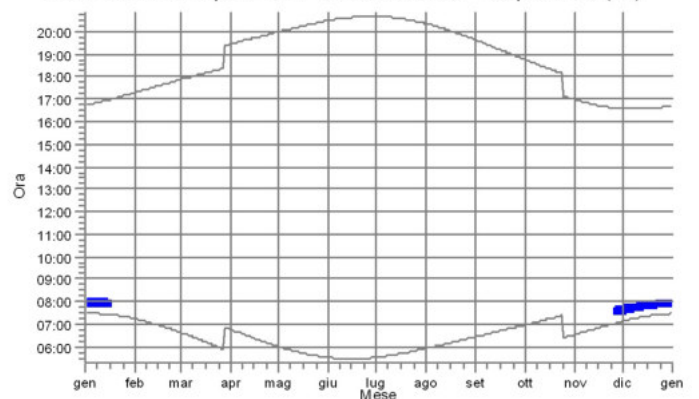
A38: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (51)



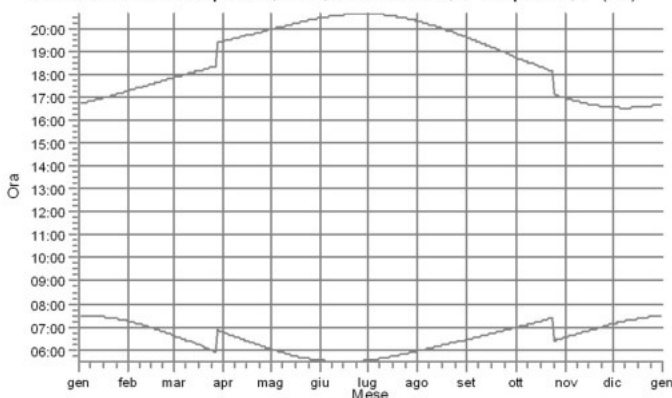
A39: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (23)



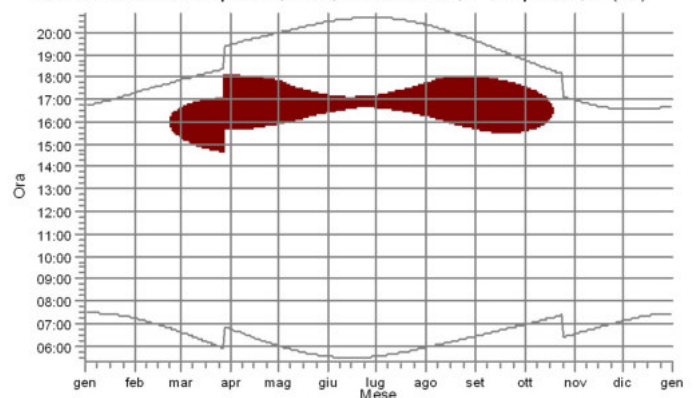
A4: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (29)



A40: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (22)



A41: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (21)

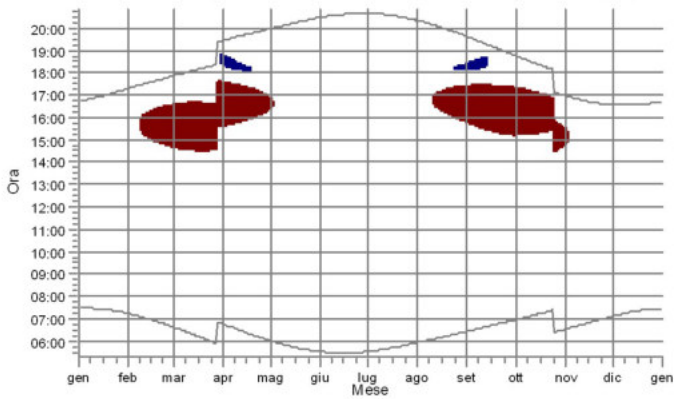


WTG

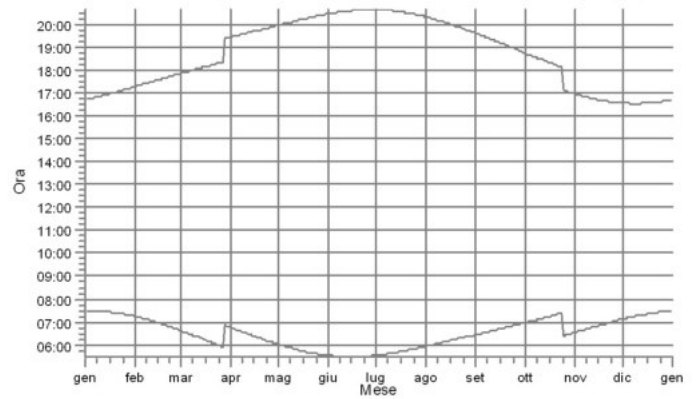
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

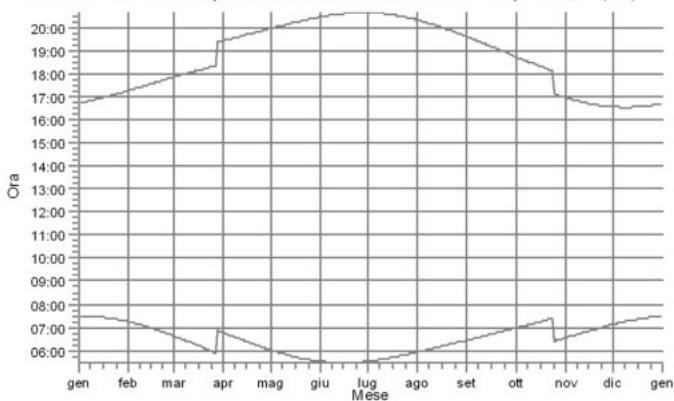
A42: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (20)



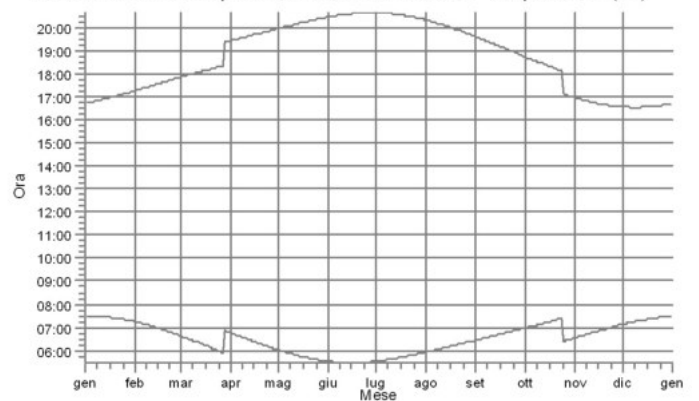
A43: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (52)



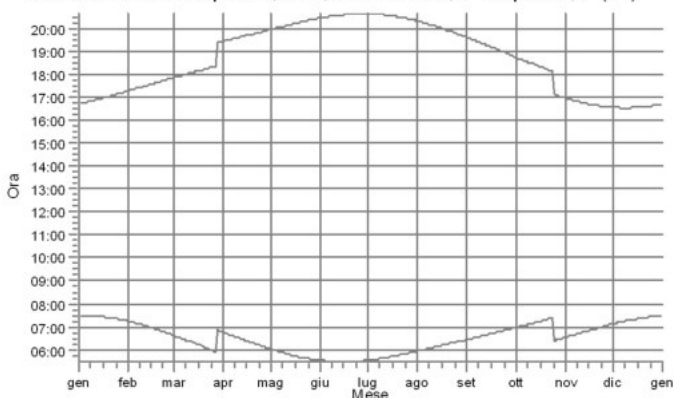
A44: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (53)



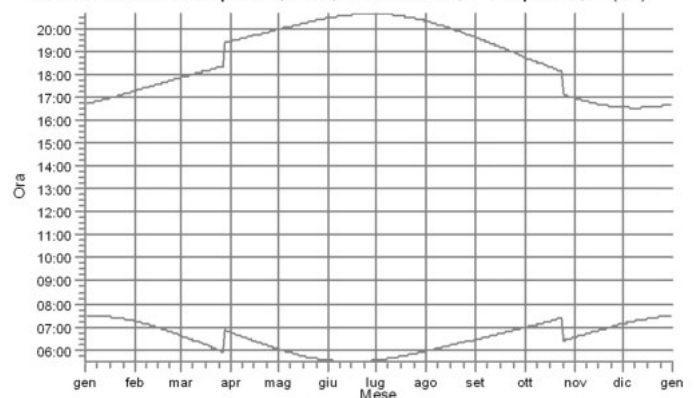
A45: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (54)



A46: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (55)



A47: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (56)

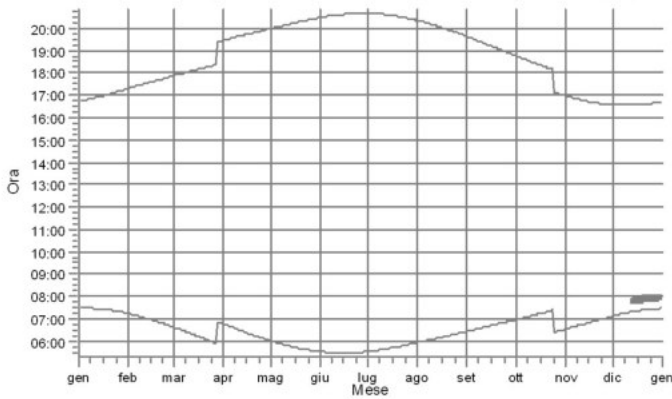


### WTG

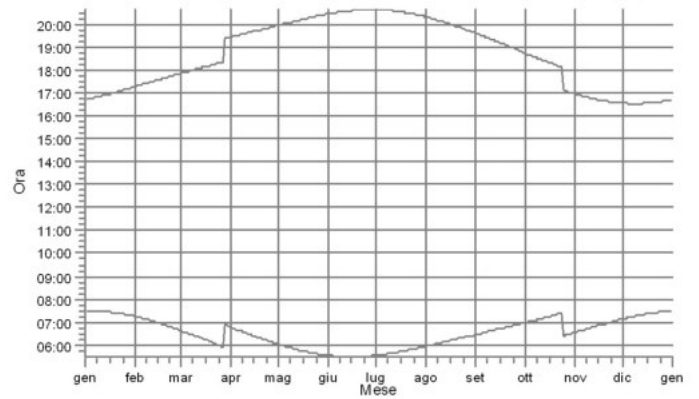
- WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

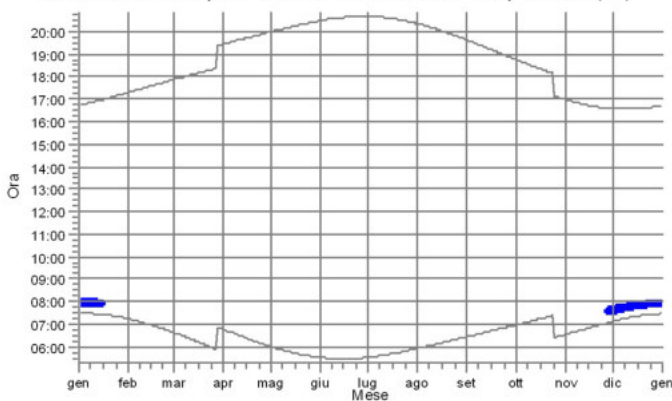
A48: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (31)



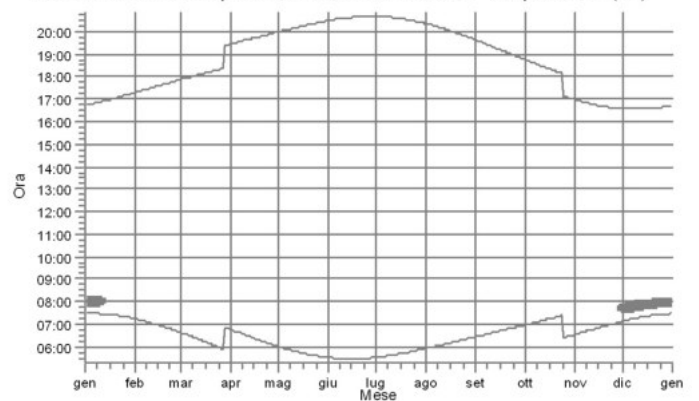
A49: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (32)



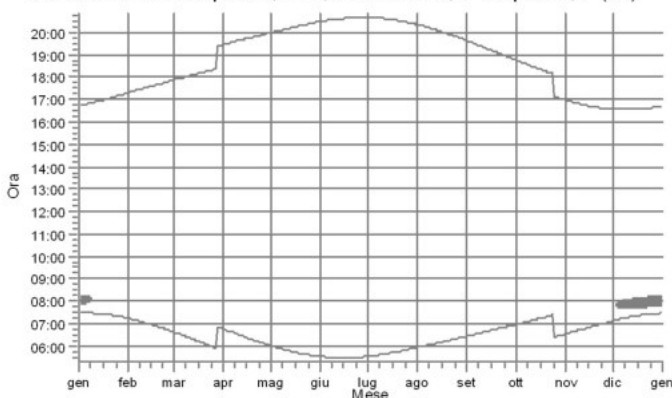
A5: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (30)



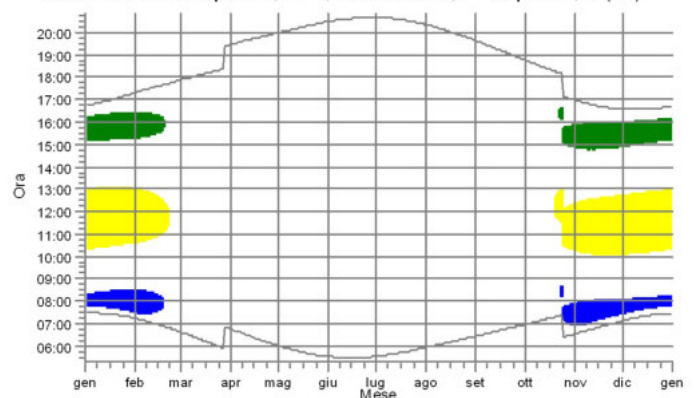
A50: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (33)



A51: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (34)



A6: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (25)

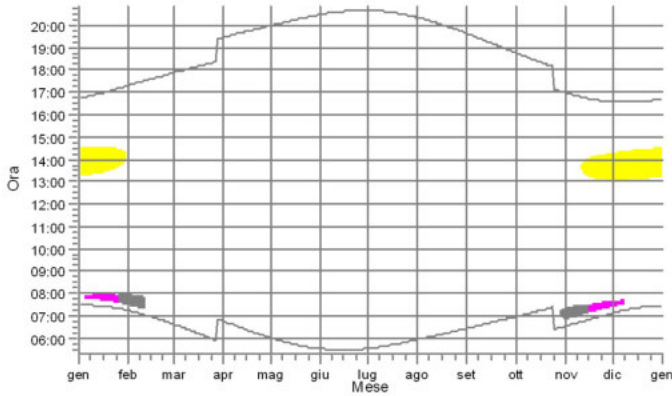


### WTG

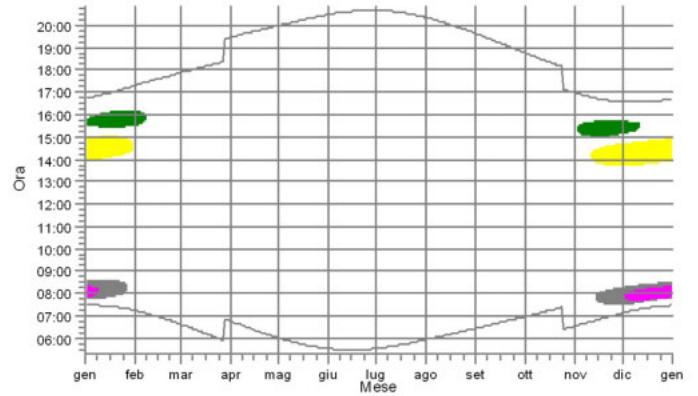
- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)

## SHADOW - Calendario, grafico

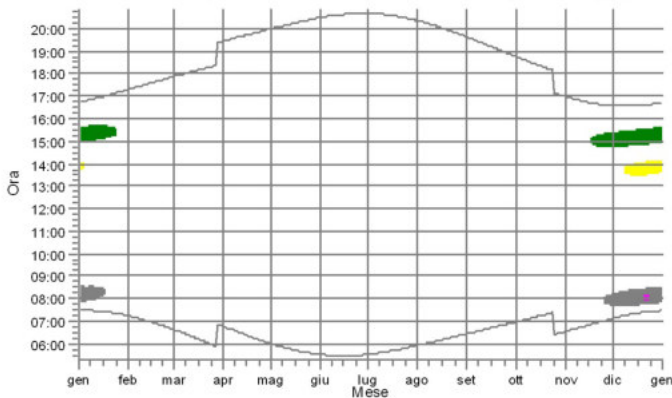
A7: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (39)



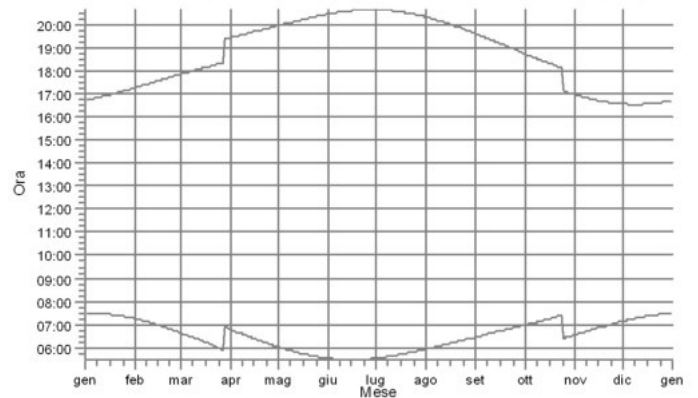
A8: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (38)



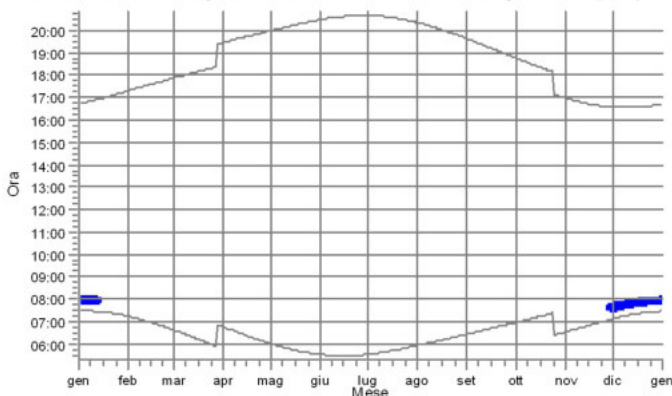
A9: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (37)



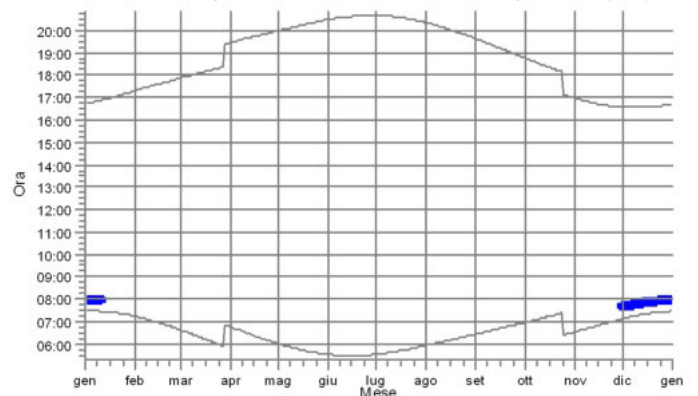
C1: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (146)



C10: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (136)



C11: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (137)



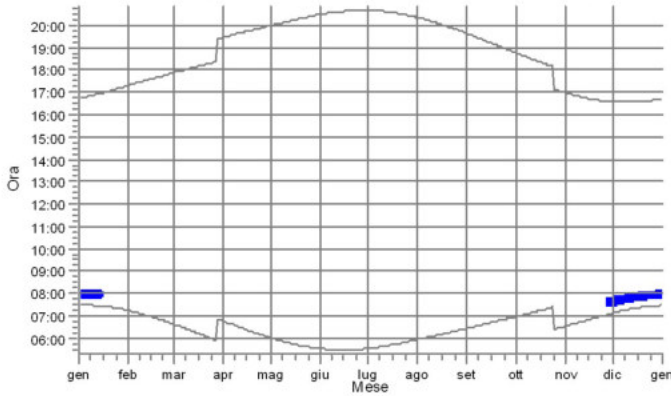
### WTG

- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)

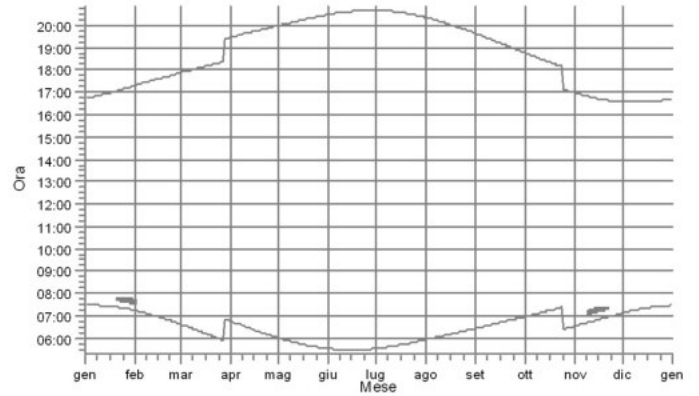


## SHADOW - Calendario, grafico

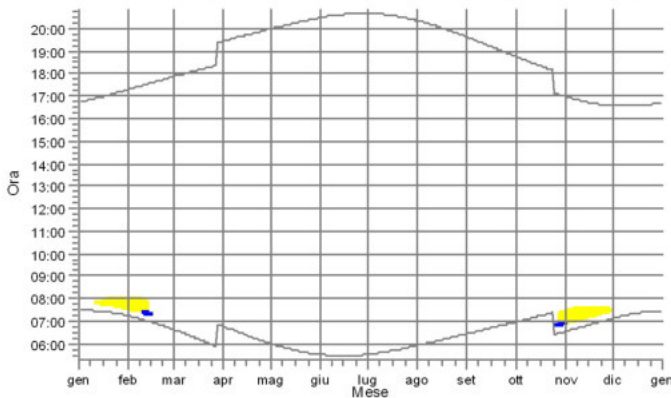
C12: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (135)



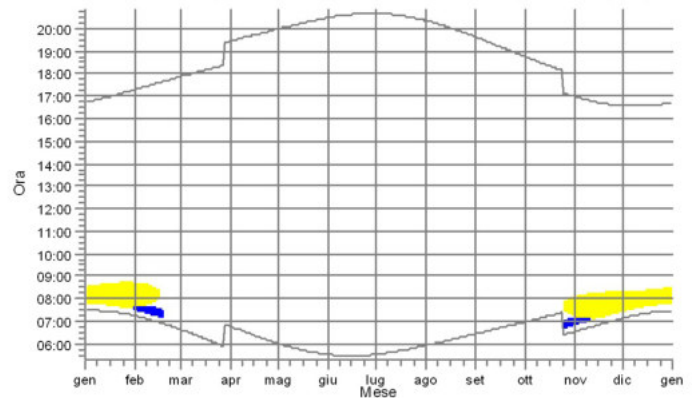
C13: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (139)



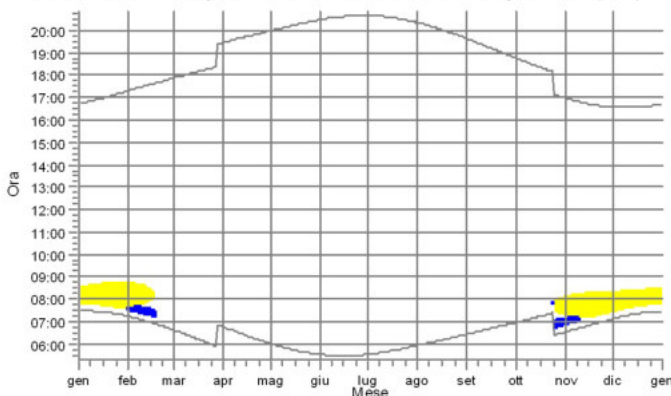
C14: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (134)



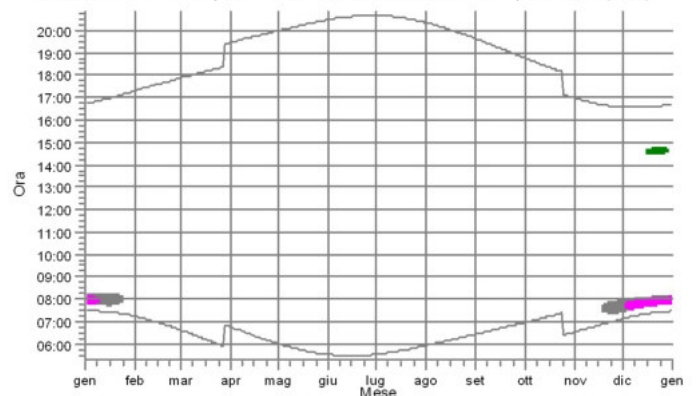
C15: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (133)



C16: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (132)



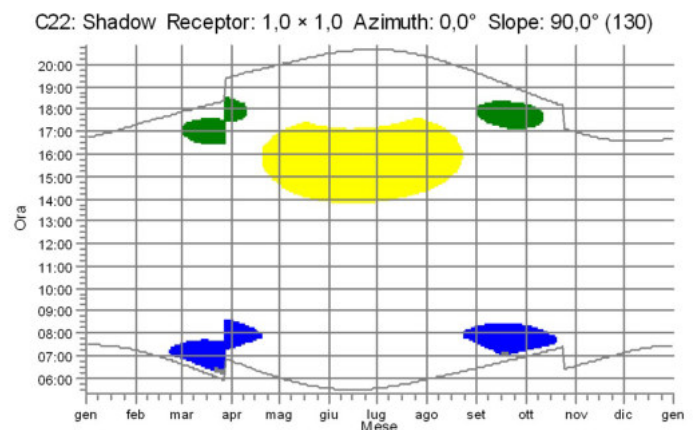
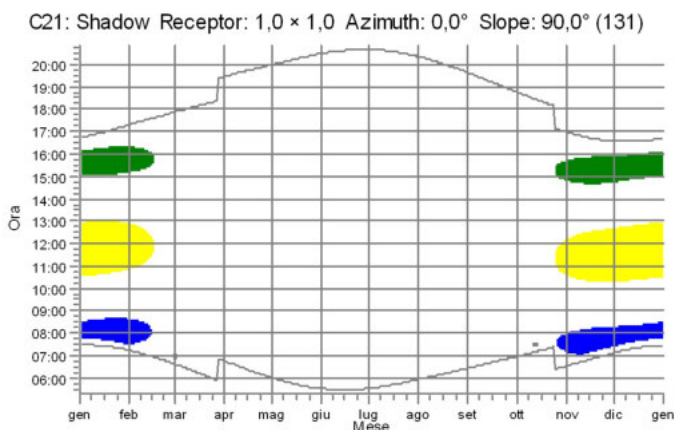
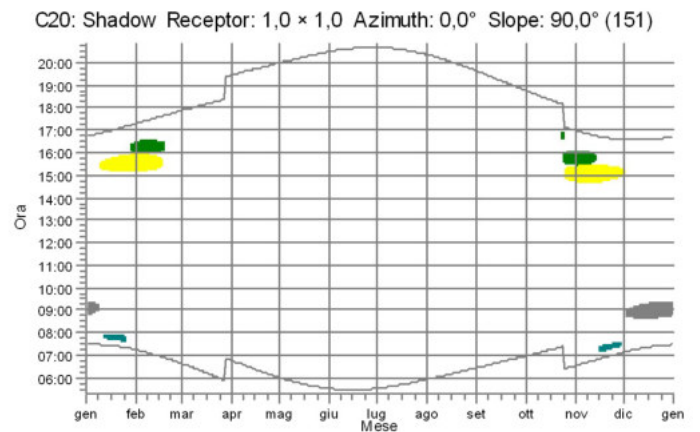
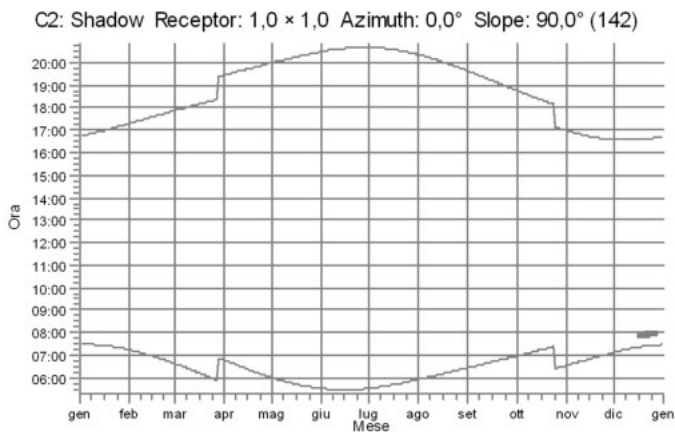
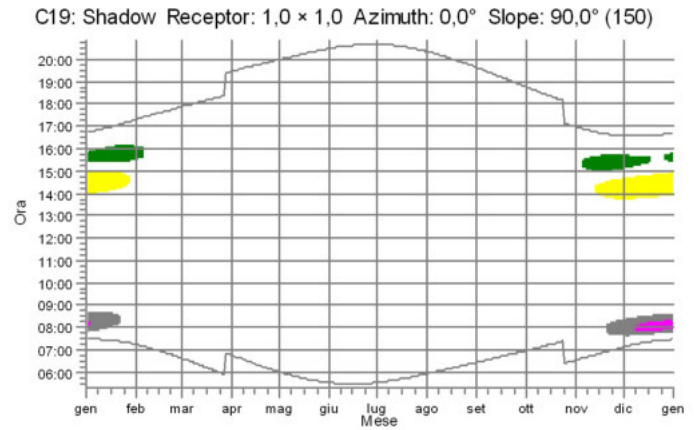
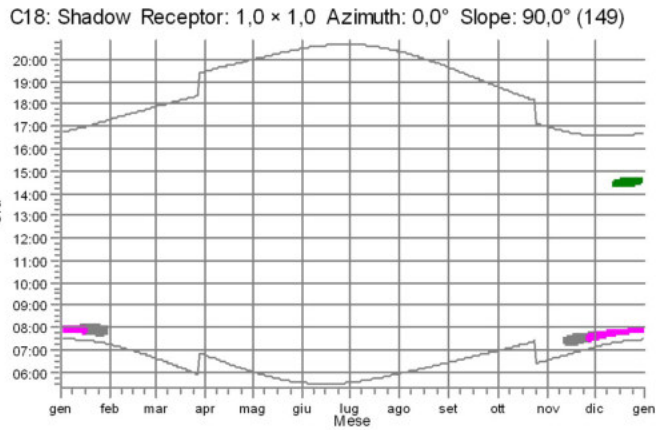
C17: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (148)



### WTG

- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)

## SHADOW - Calendario, grafico

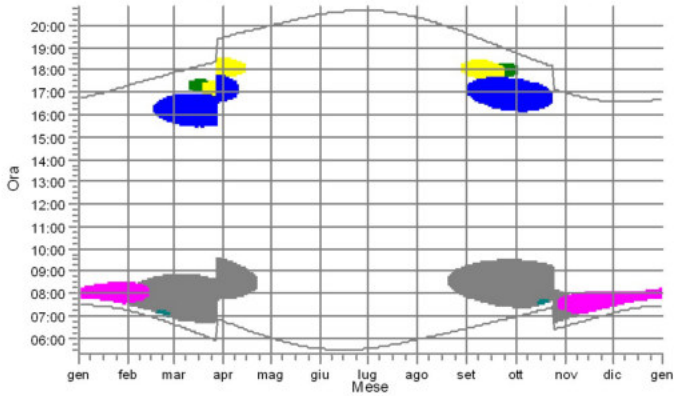


### WTG

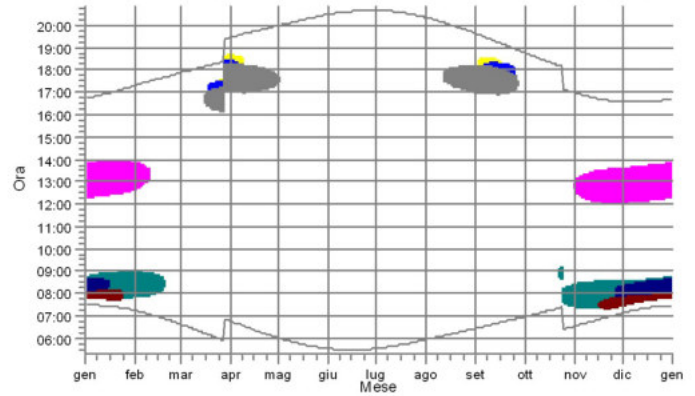
- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)

## SHADOW - Calendario, grafico

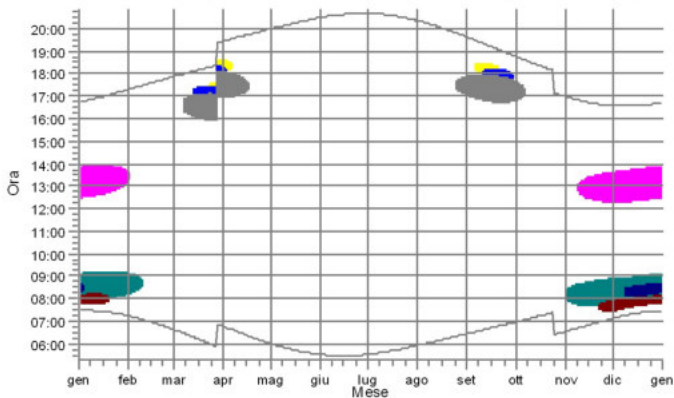
C23: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (116)



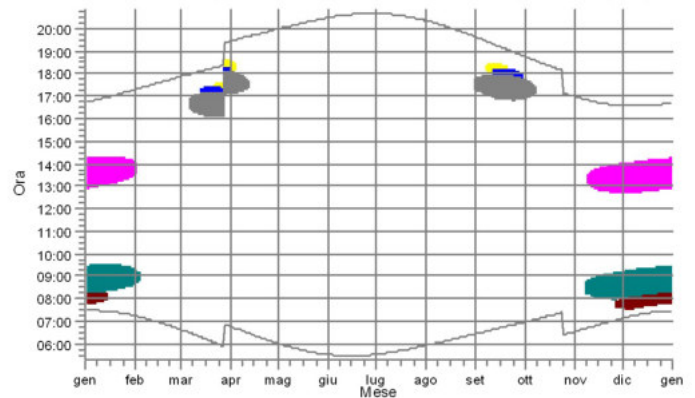
C24: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (117)



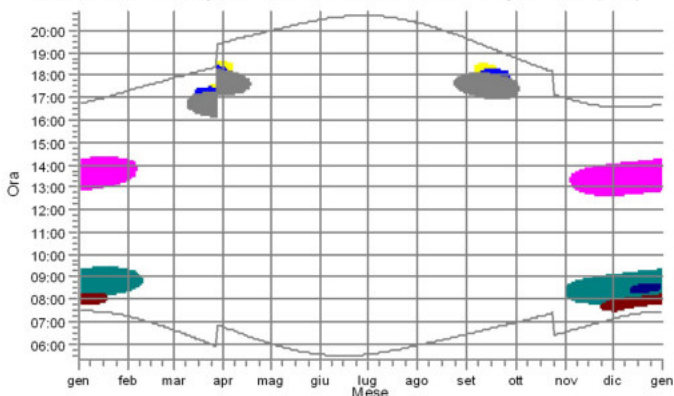
C25: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (120)



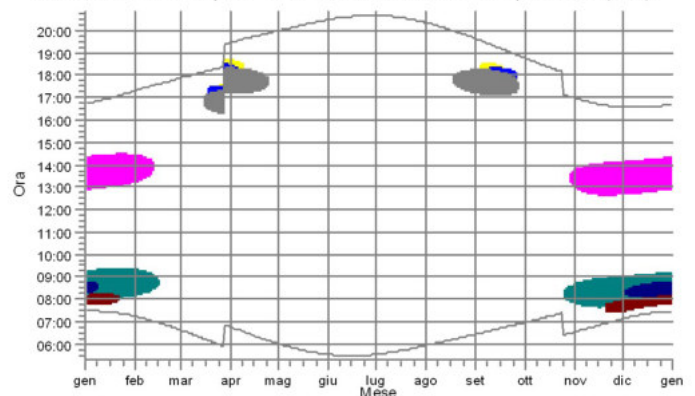
C26: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (121)



C27: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (119)



C28: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (118)

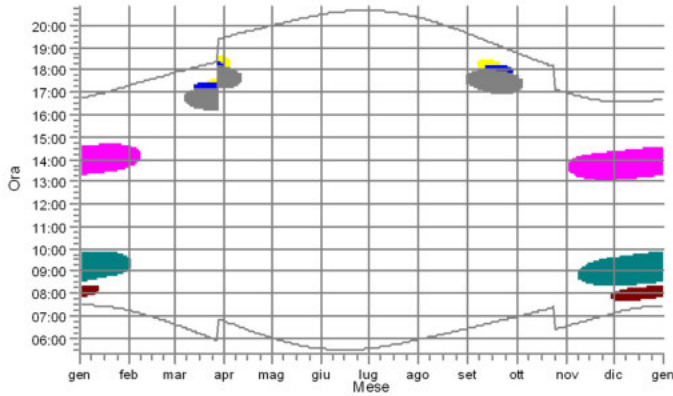


### WTG

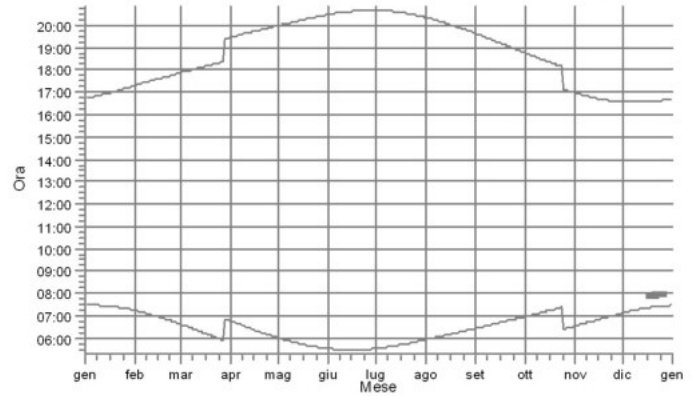
- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
- WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

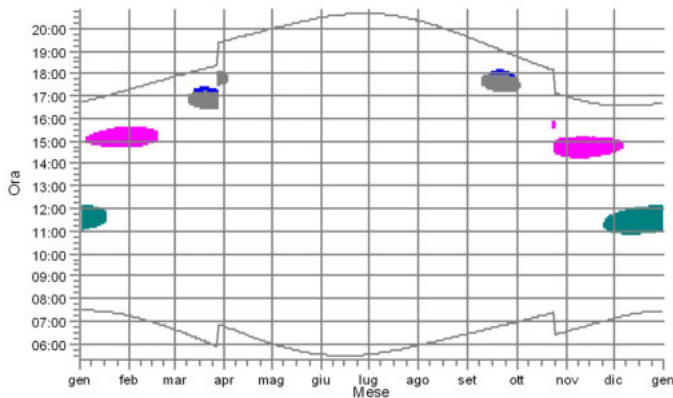
C29: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (122)



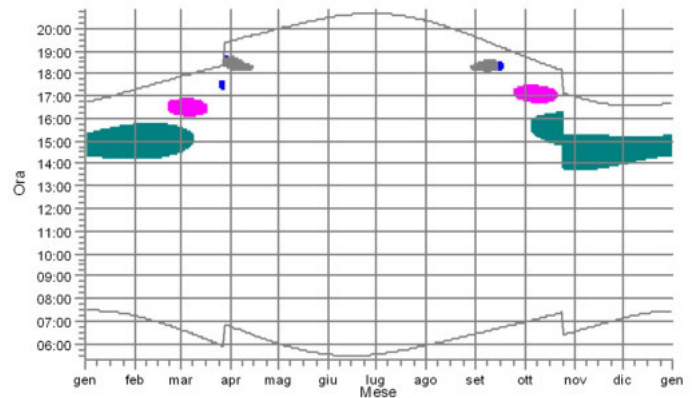
C3: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (143)



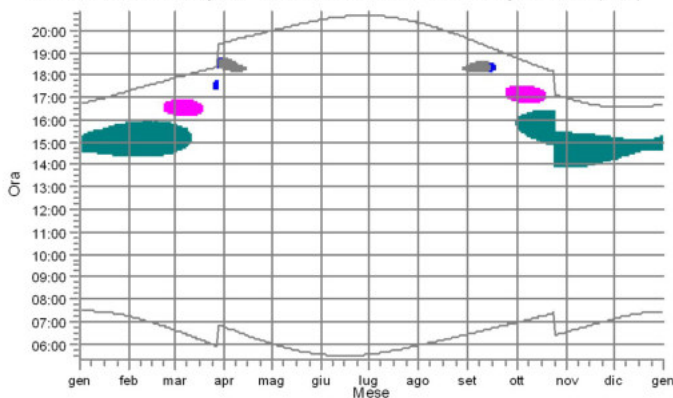
C30: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (123)



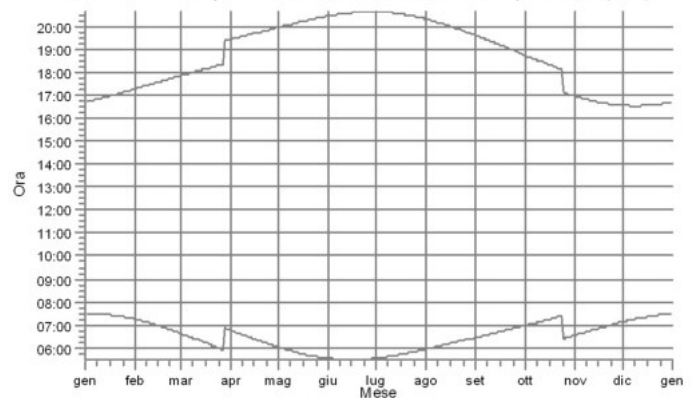
C31: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (125)









C32: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (124)



C33: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (153)

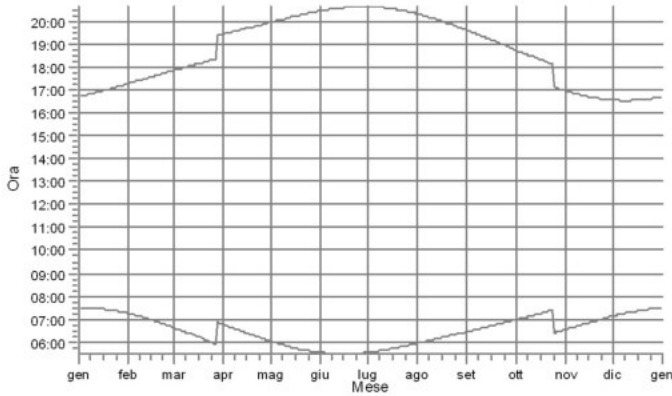


### WTG

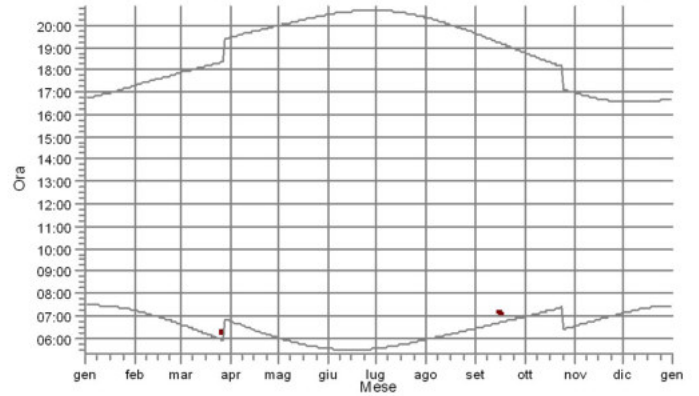
	WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
	WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
	WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
	WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
	WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
	WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

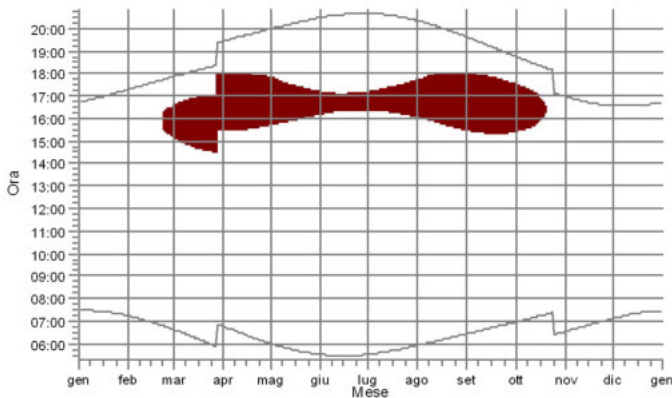
C34: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (154)



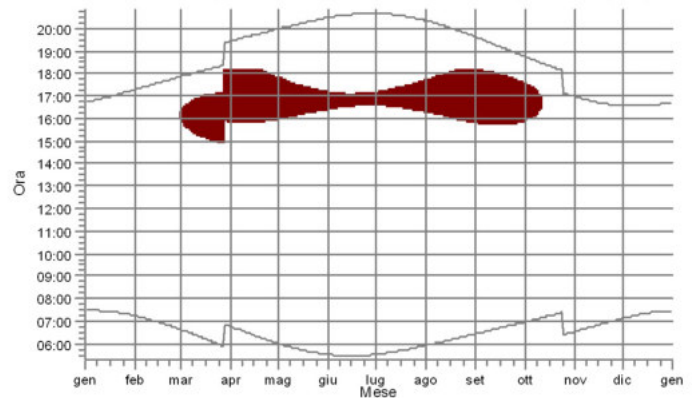
C35: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (152)



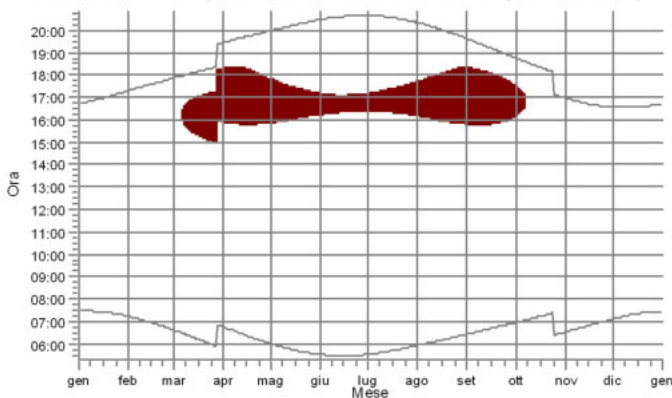
C36: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (126)



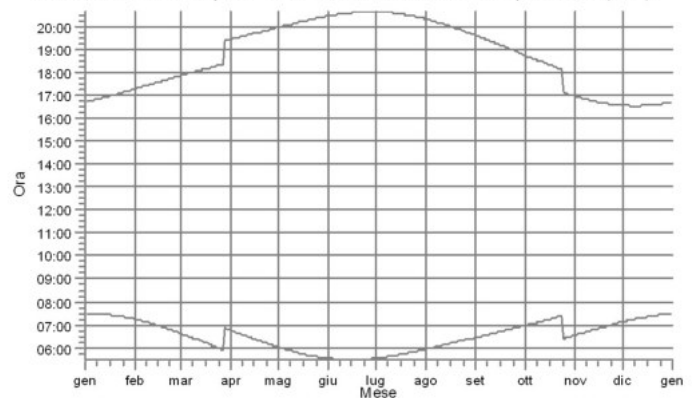
C37: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (127)



C38: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (128)



C39: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (129)

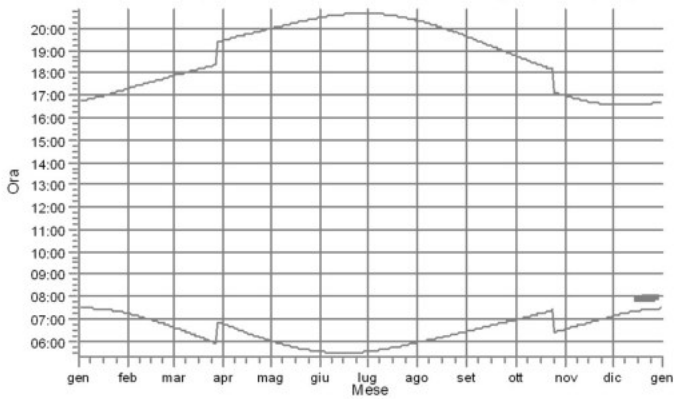


WTG

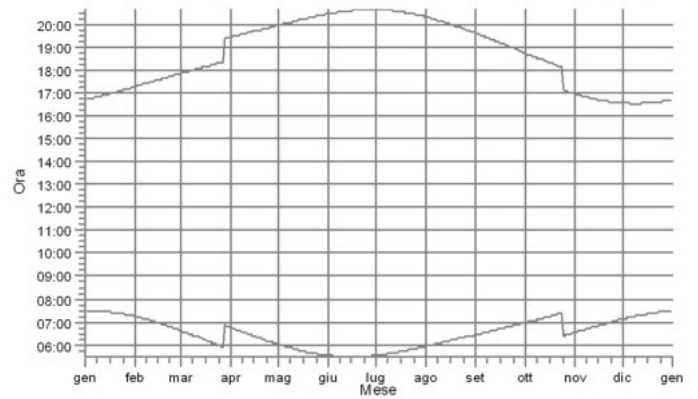
WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

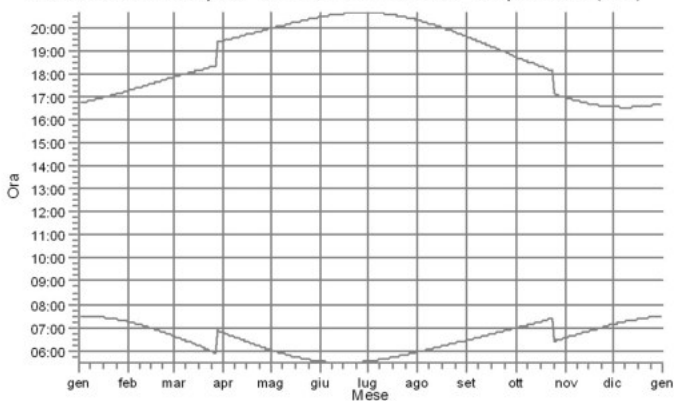
C4: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (144)



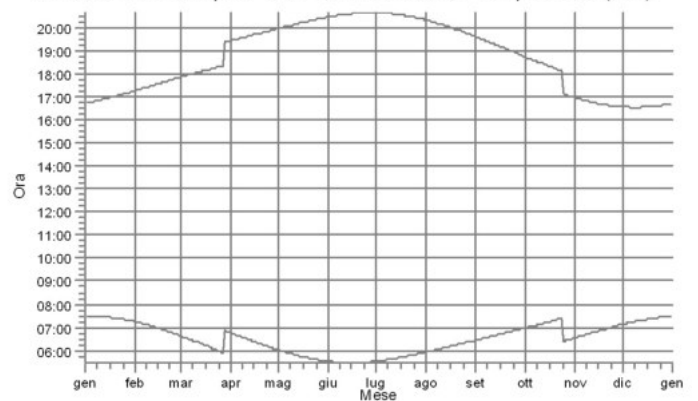
C40: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (155)



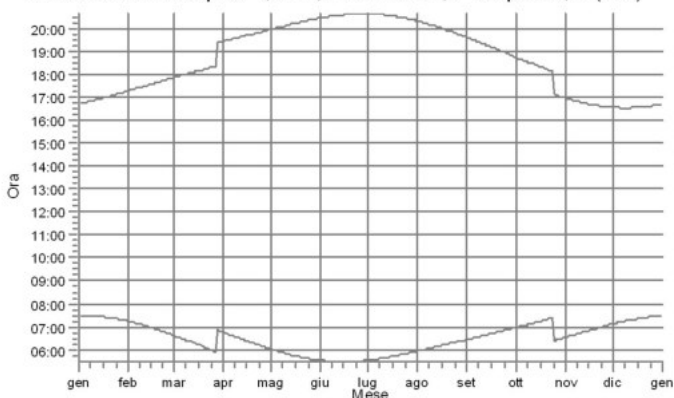
C41: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (156)



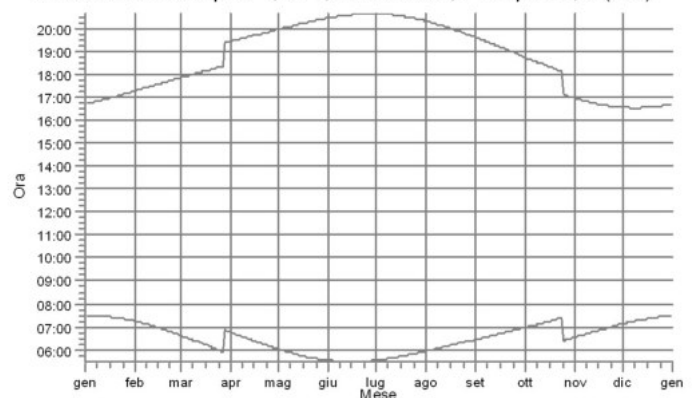
C42: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (157)



C43: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (158)



C44: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (159)

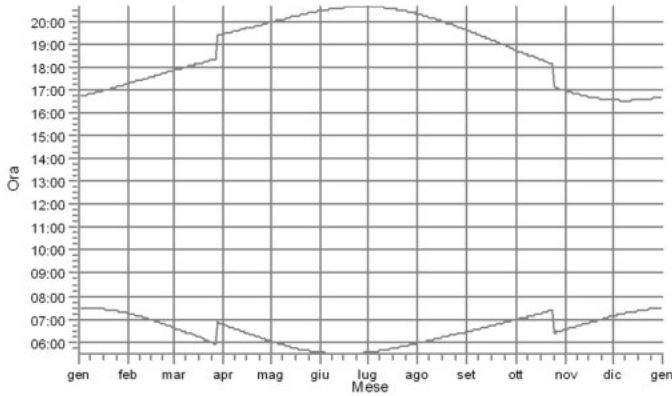


WTG

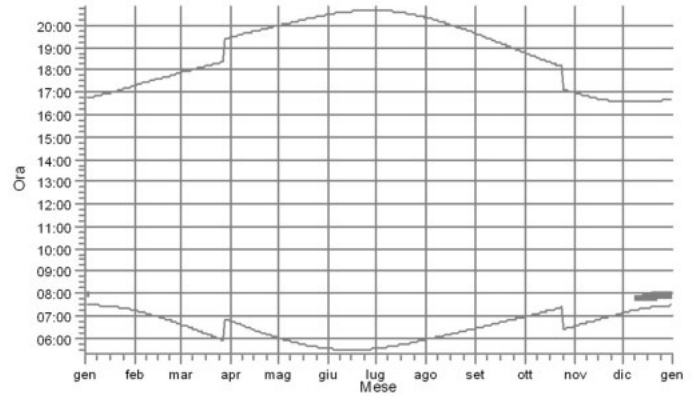
WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)

## SHADOW - Calendario, grafico

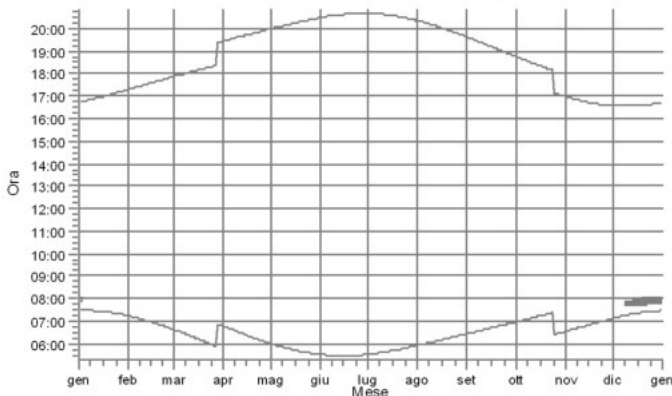
C45: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (160)



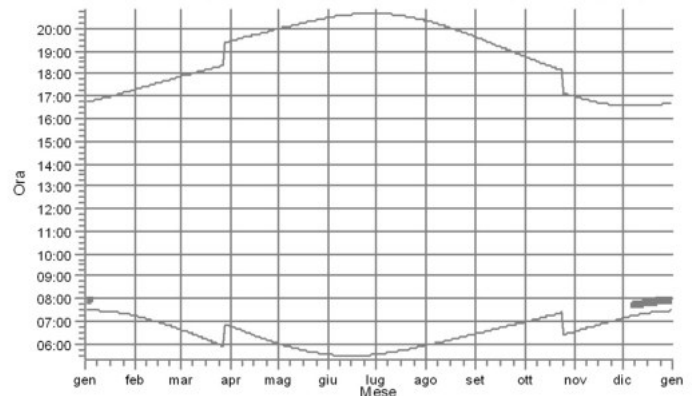
C5: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (140)



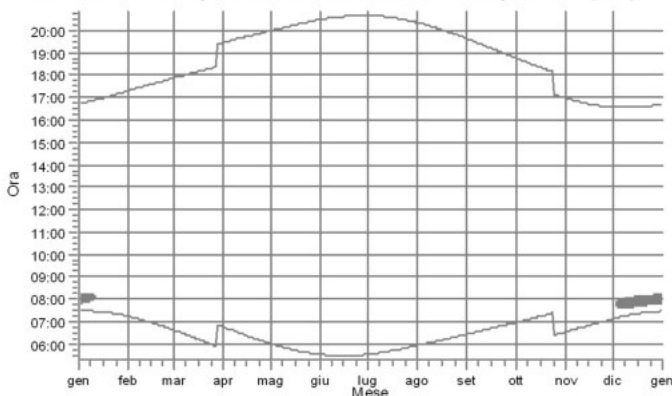
C6: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (141)



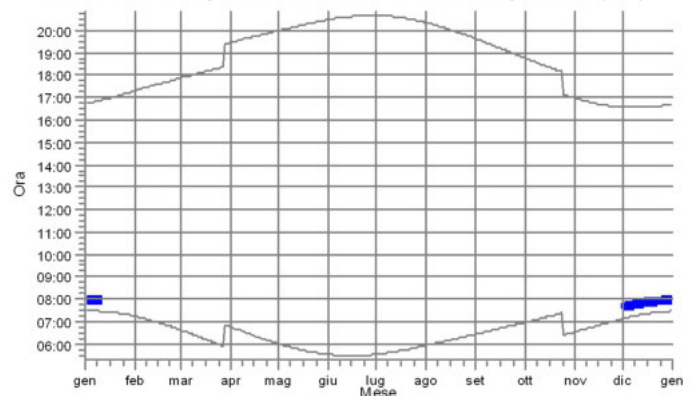
C7: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (145)



C8: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (147)



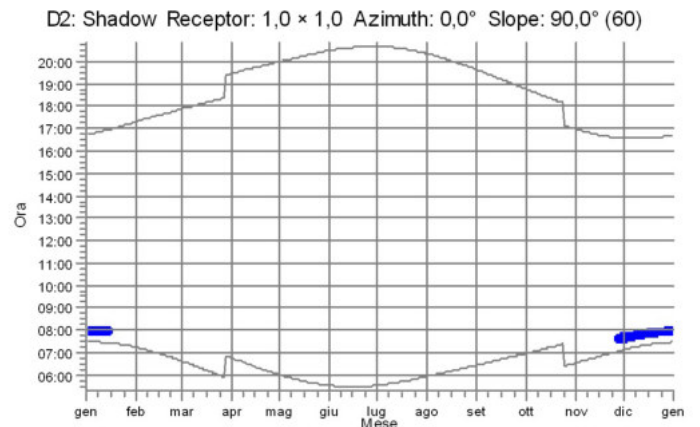
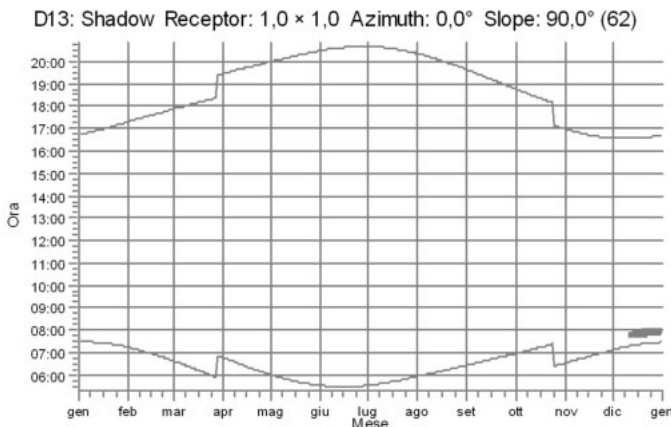
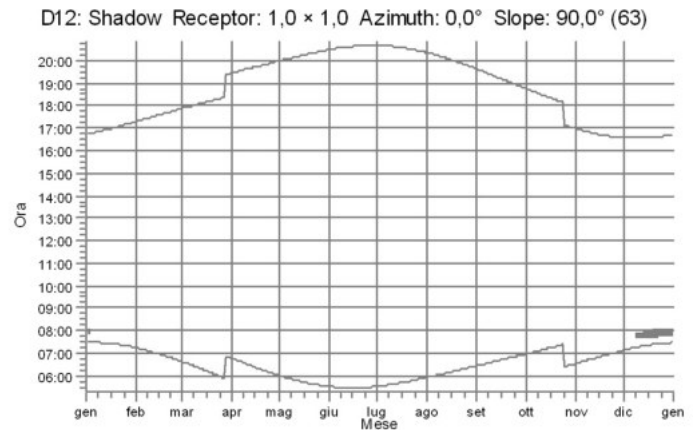
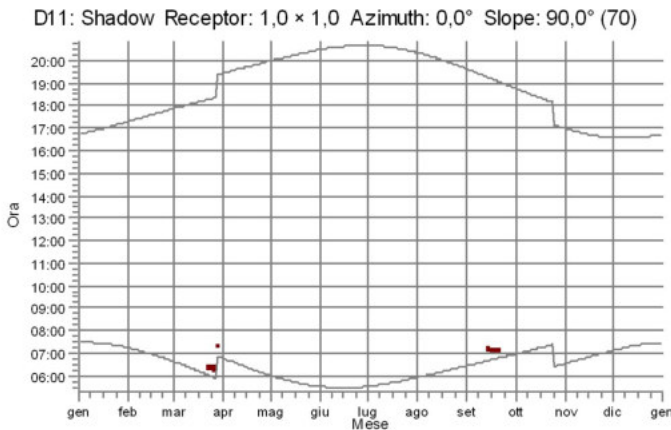
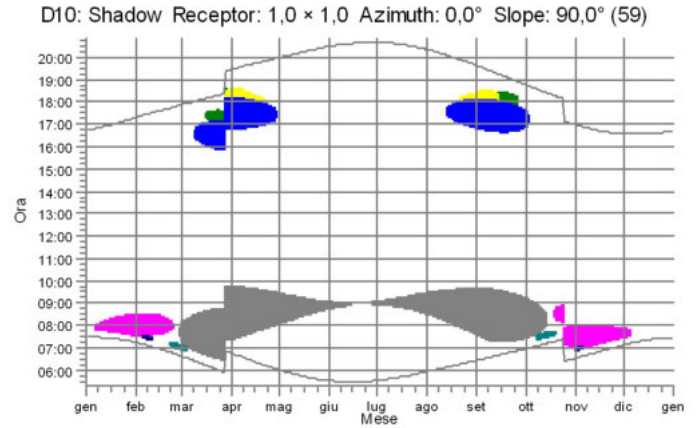
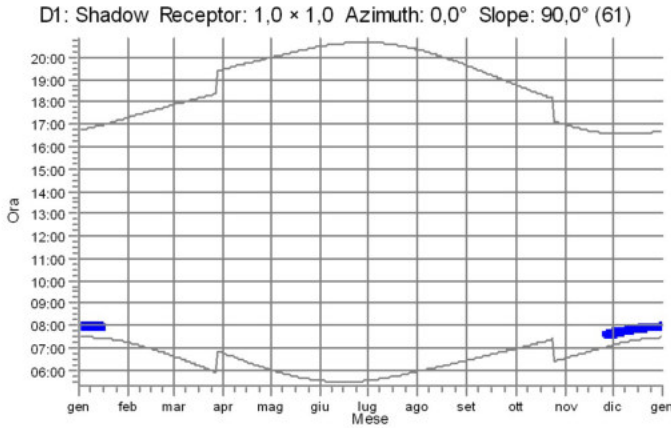
C9: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (138)



WTG

- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)

## SHADOW - Calendario, grafico



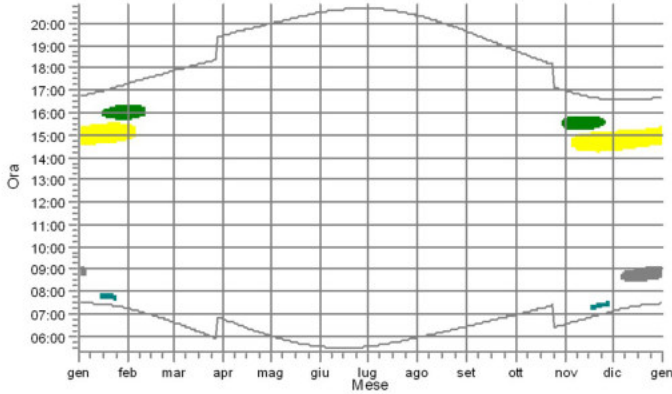
### WTG

- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
- WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

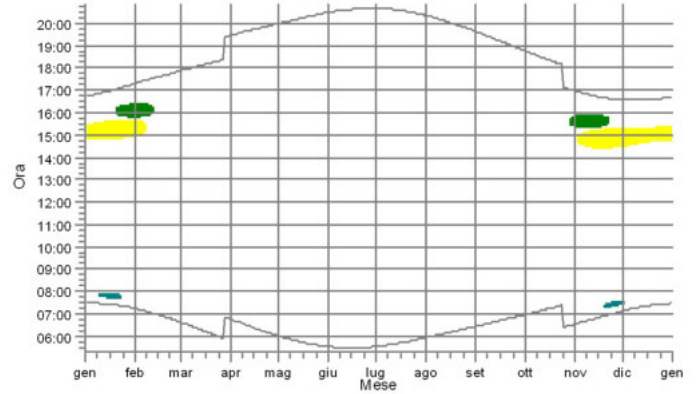


## SHADOW - Calendario, grafico

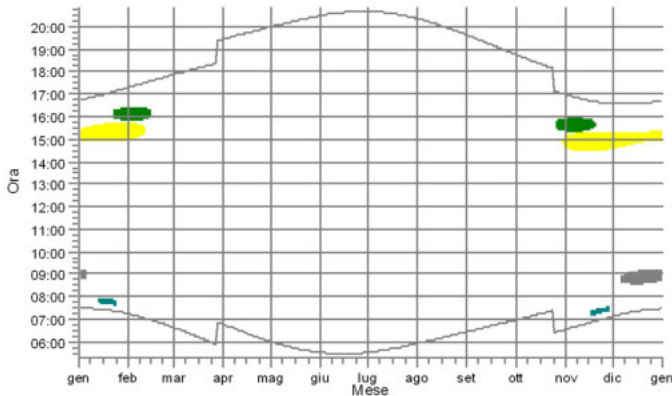
D3: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (65)



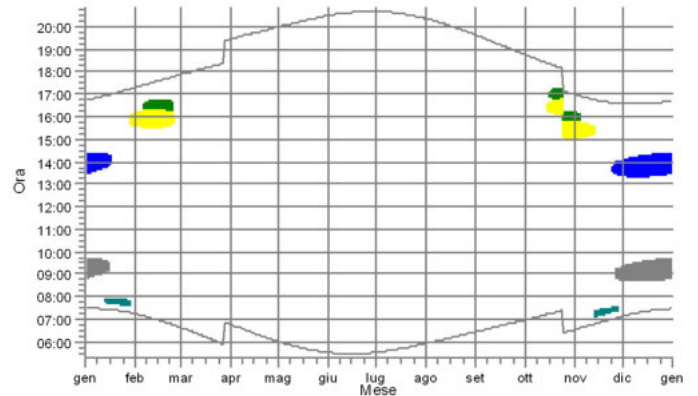
D4: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (64)



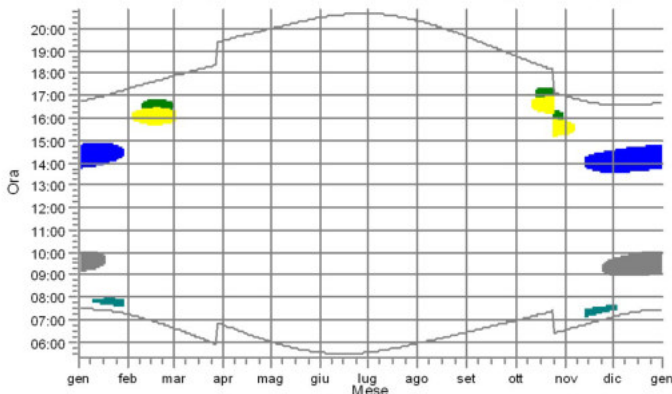
D5: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (66)



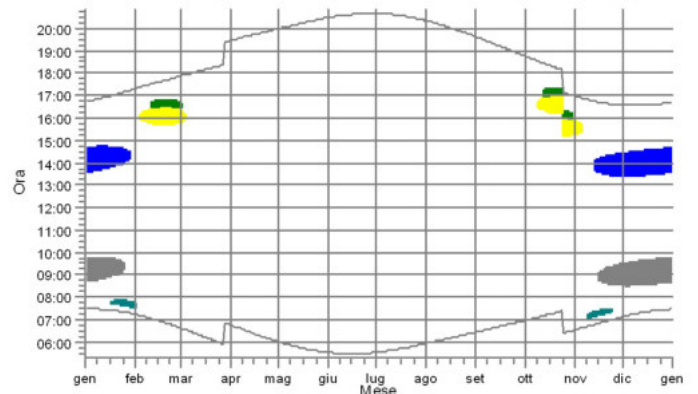
D6: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (67)



D7: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (69)



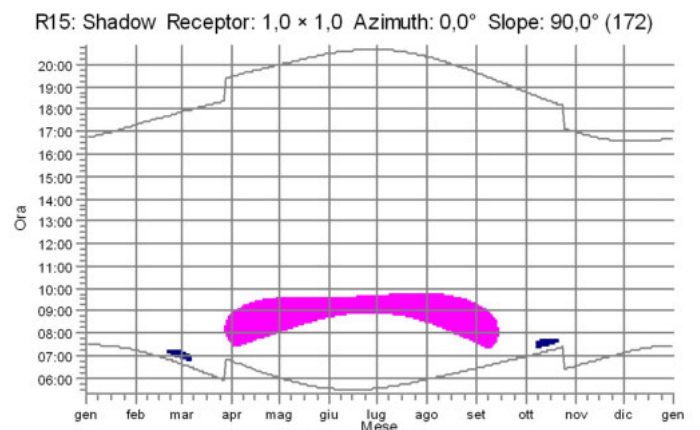
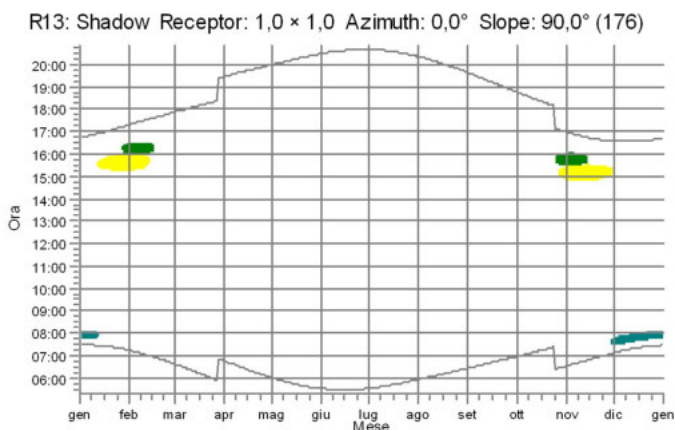
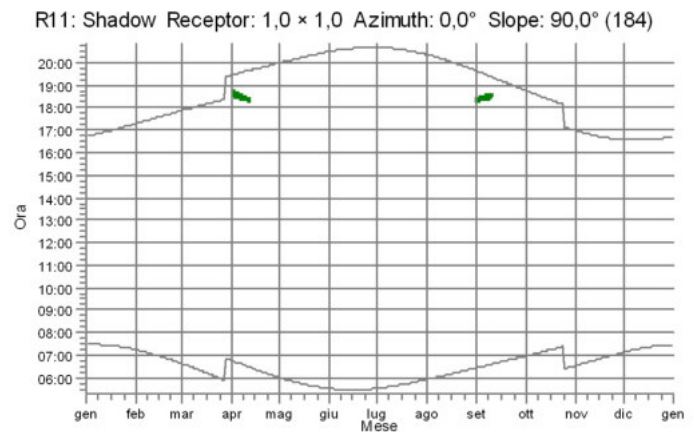
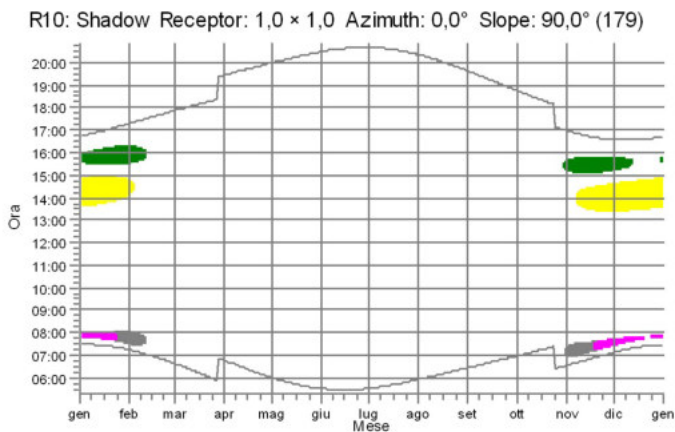
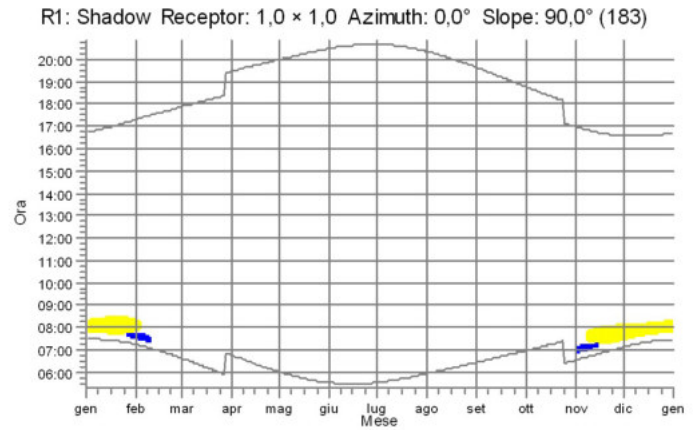
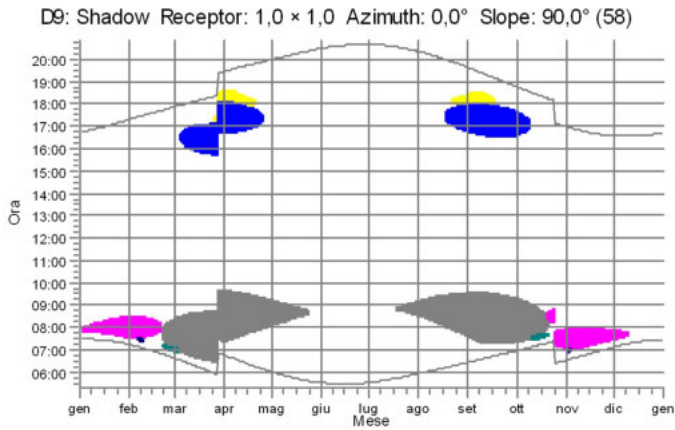
D8: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (68)



### WTG

- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)

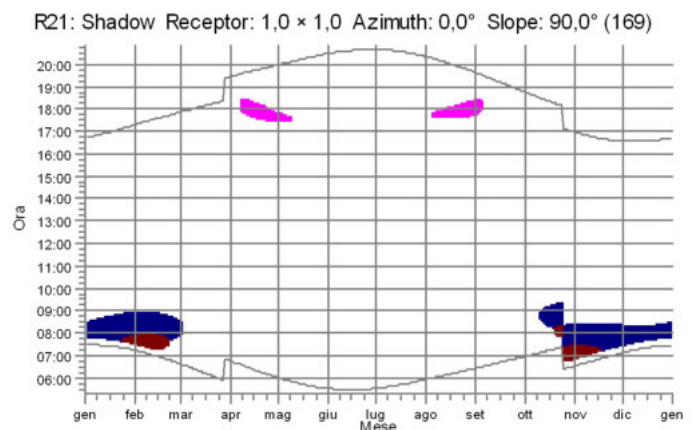
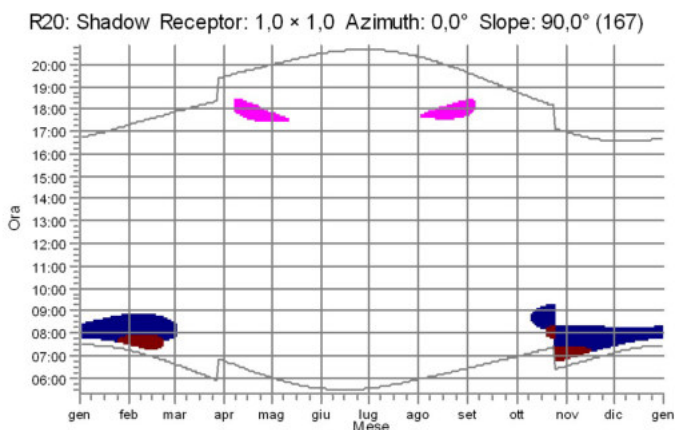
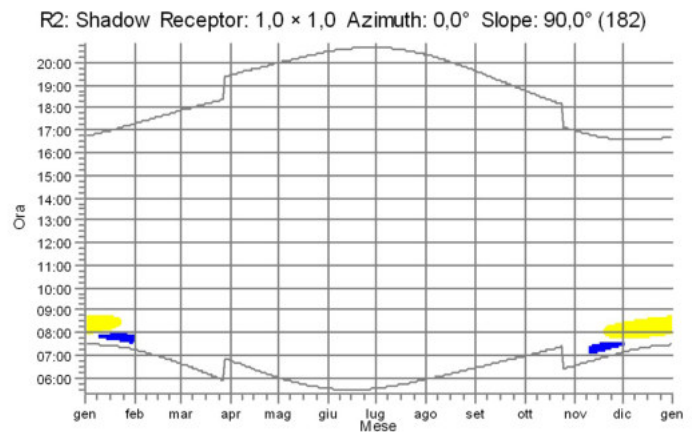
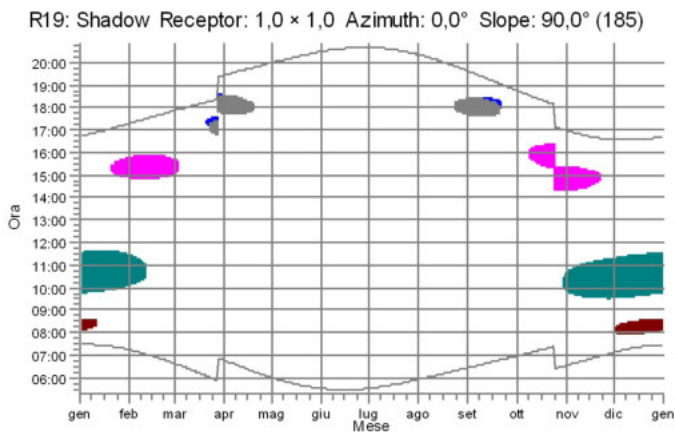
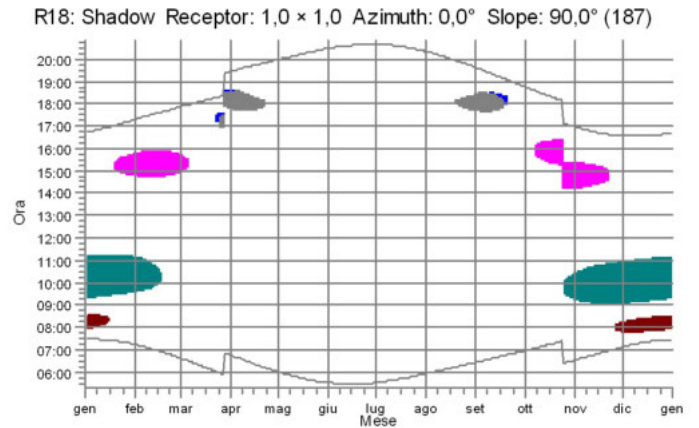
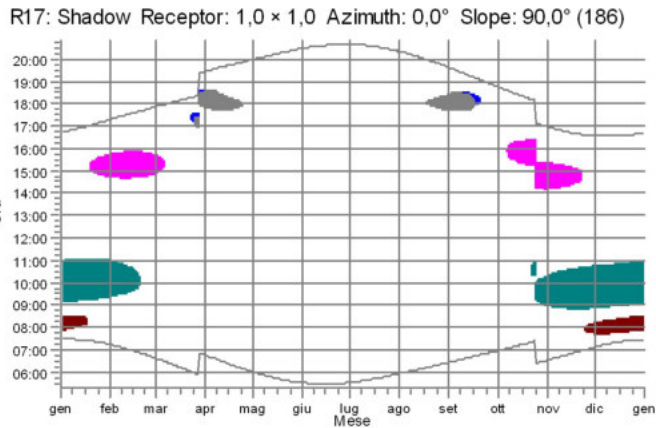
## SHADOW - Calendario, grafico










### WTG

- WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
- WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
- WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
- WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
- WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)

## SHADOW - Calendario, grafico

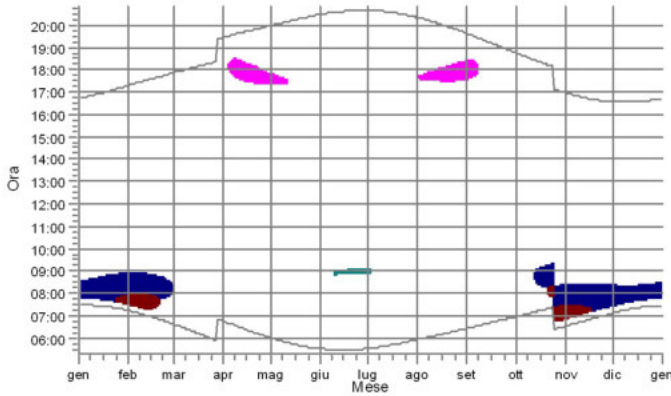


### WTG

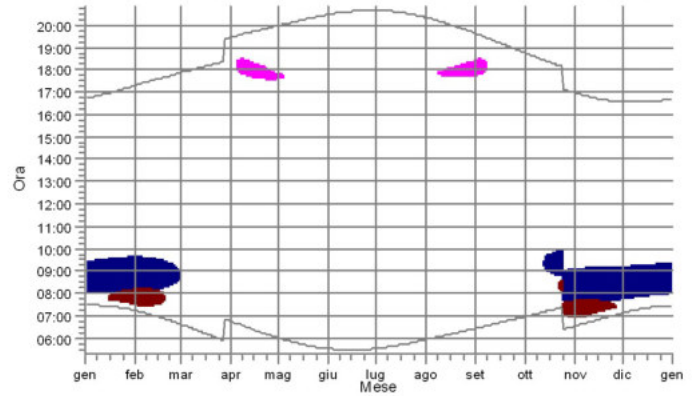
	WTG02: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (15)
	WTG03: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (20)
	WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
	WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
	WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
	WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
	WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

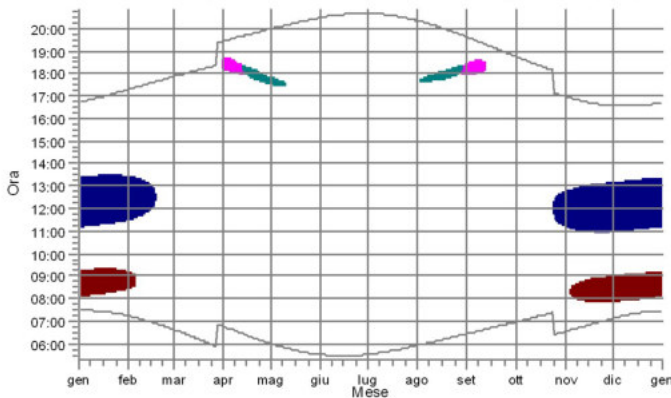
R22: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (168)



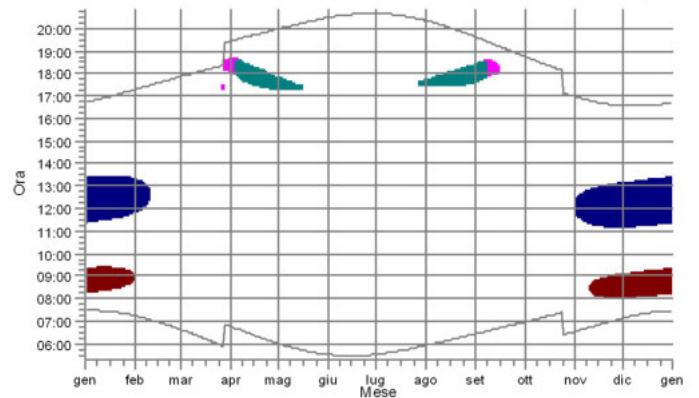
R23: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (188)



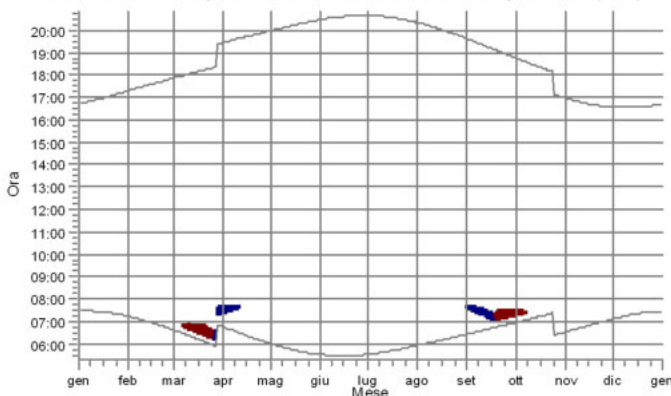
R24: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (171)



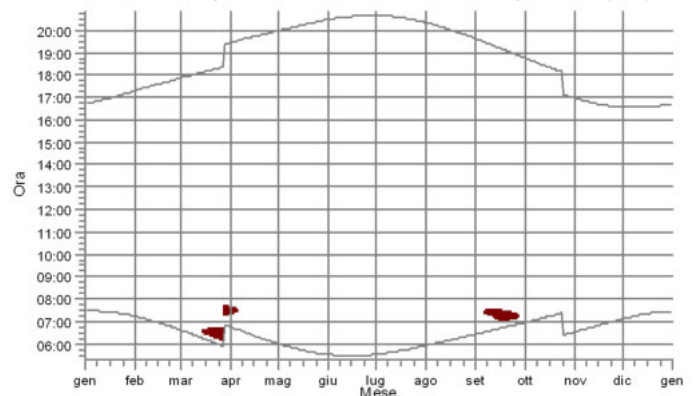
R25: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (170)



R26: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (190)



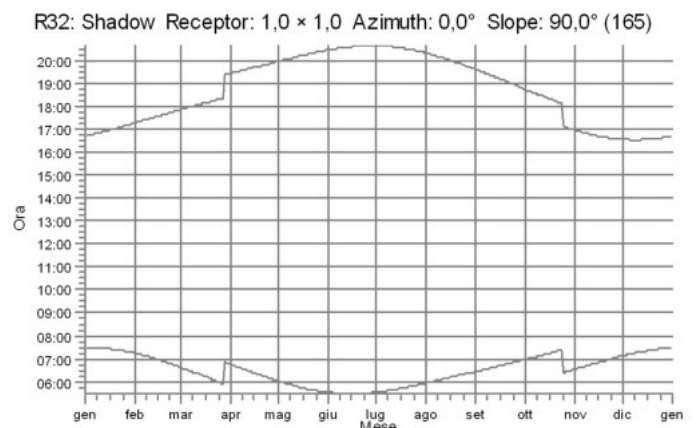
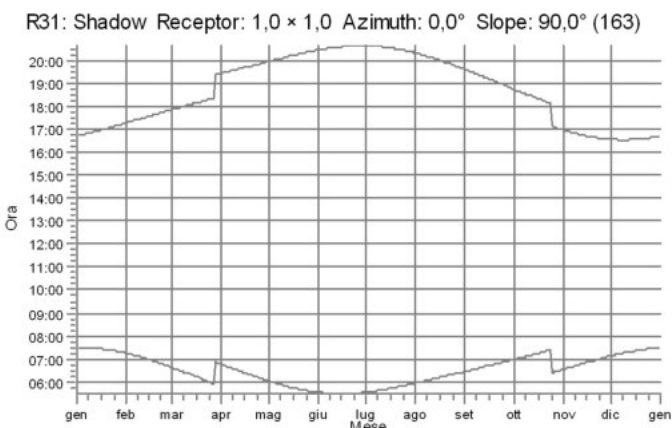
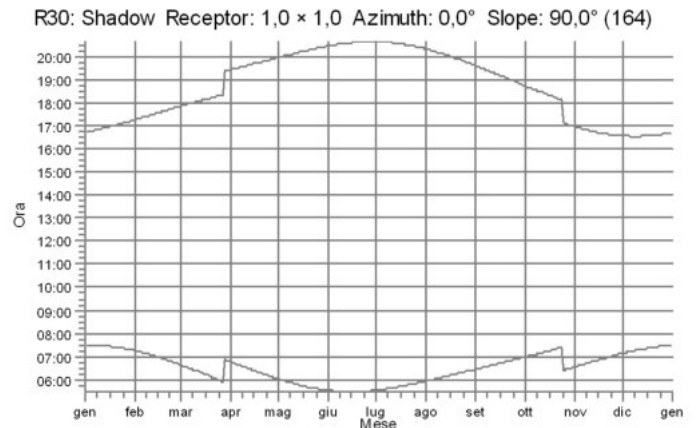
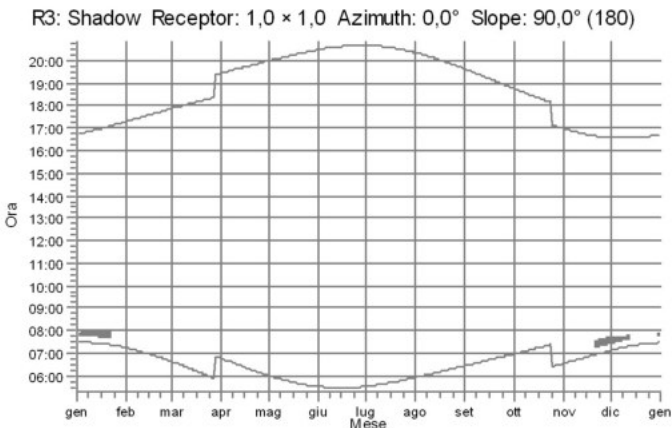
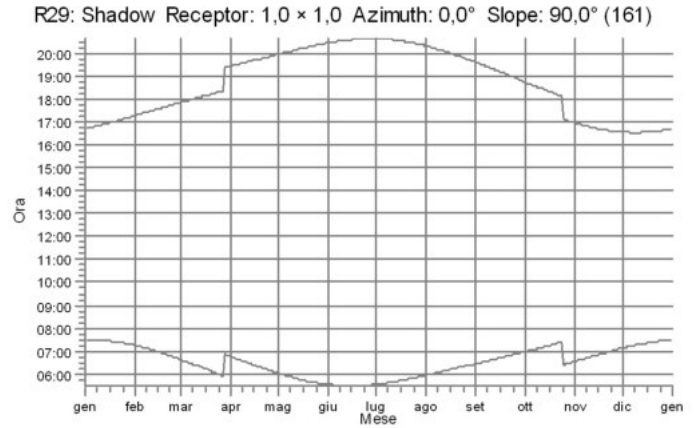
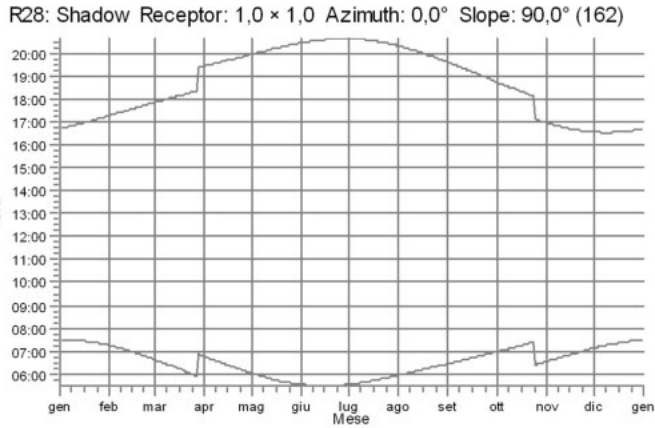
R27: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (189)



### WTG

- WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)
- WTG06: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (14)
- WTG07: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (13)
- WTG08: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (16)

## SHADOW - Calendario, grafico

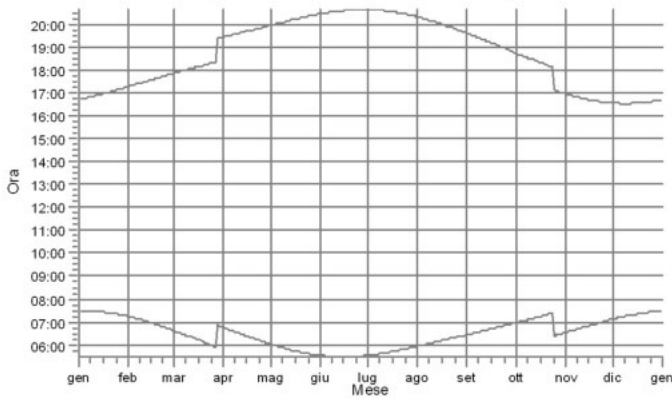


WTG

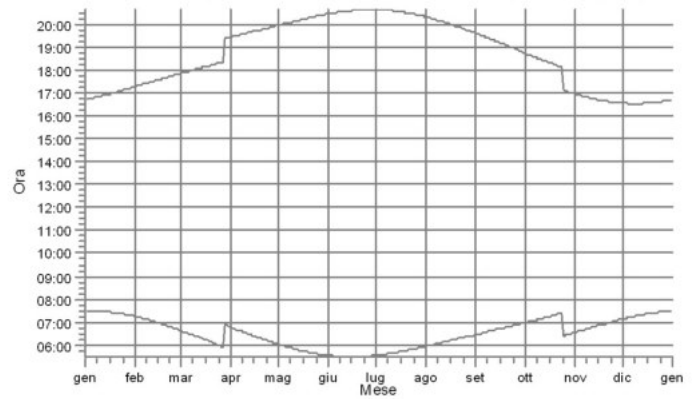
WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)

## SHADOW - Calendario, grafico

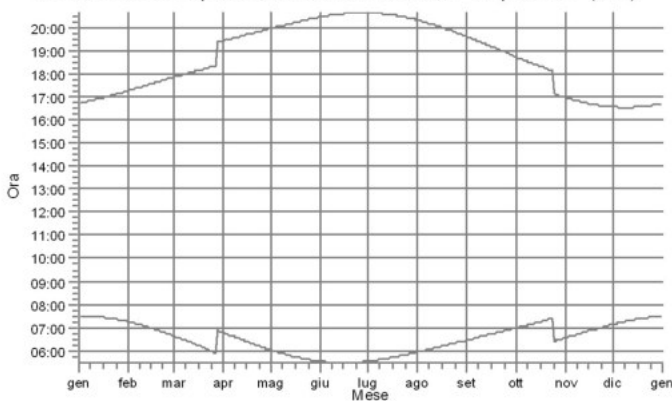
R33: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (166)



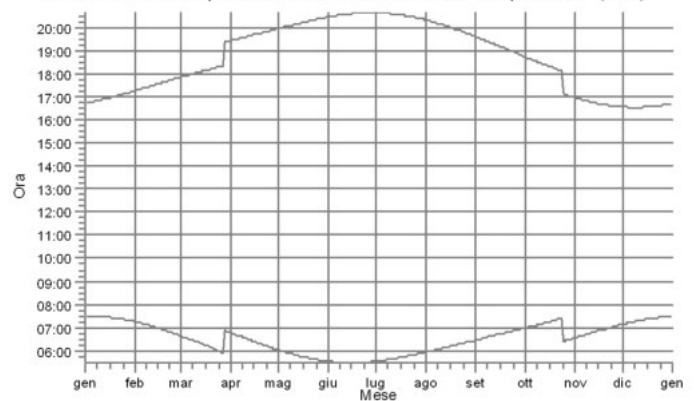
R4: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (181)



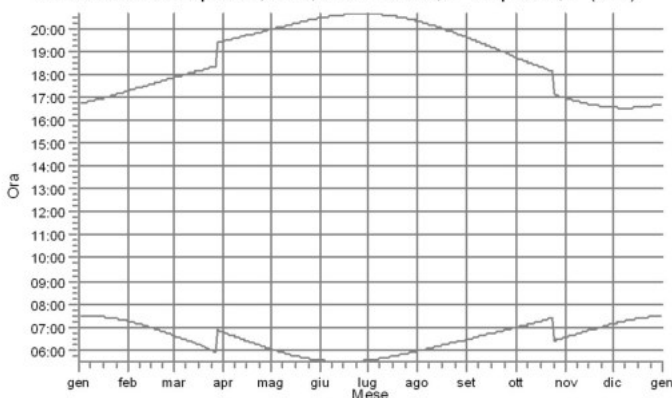
R5: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (191)



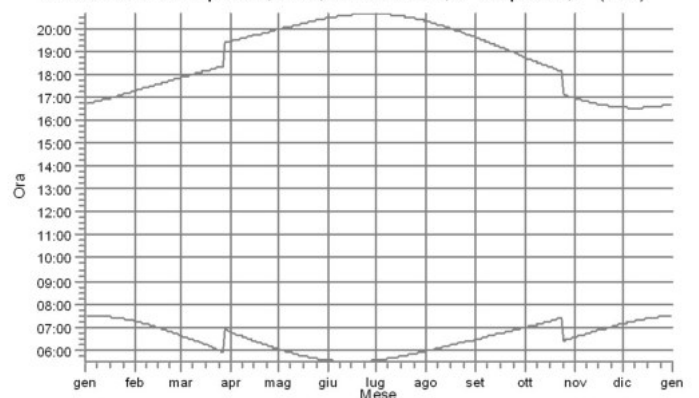
R6: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (192)



R6: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (193)

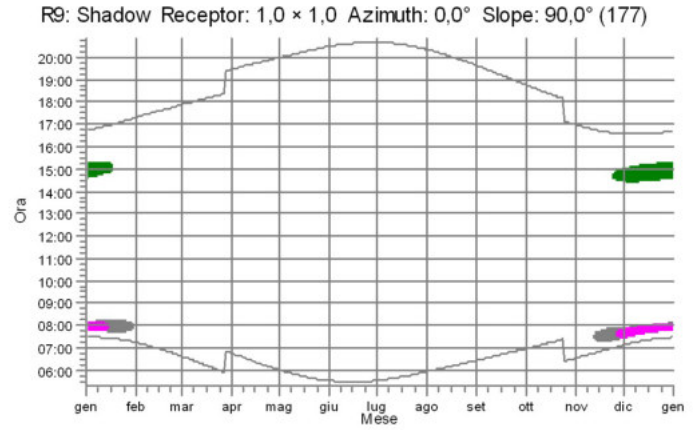
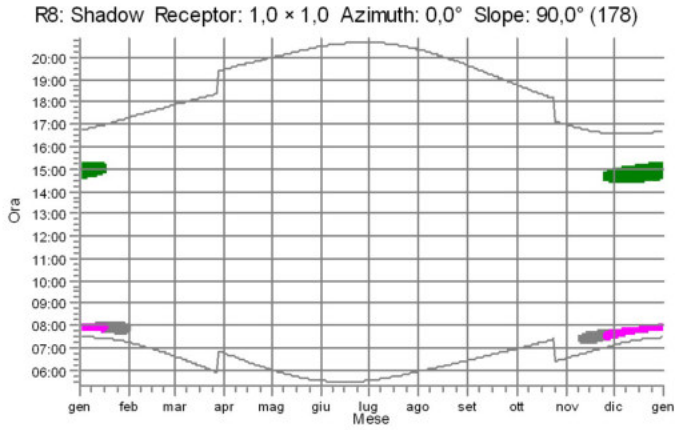


R7: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (194)






WTG

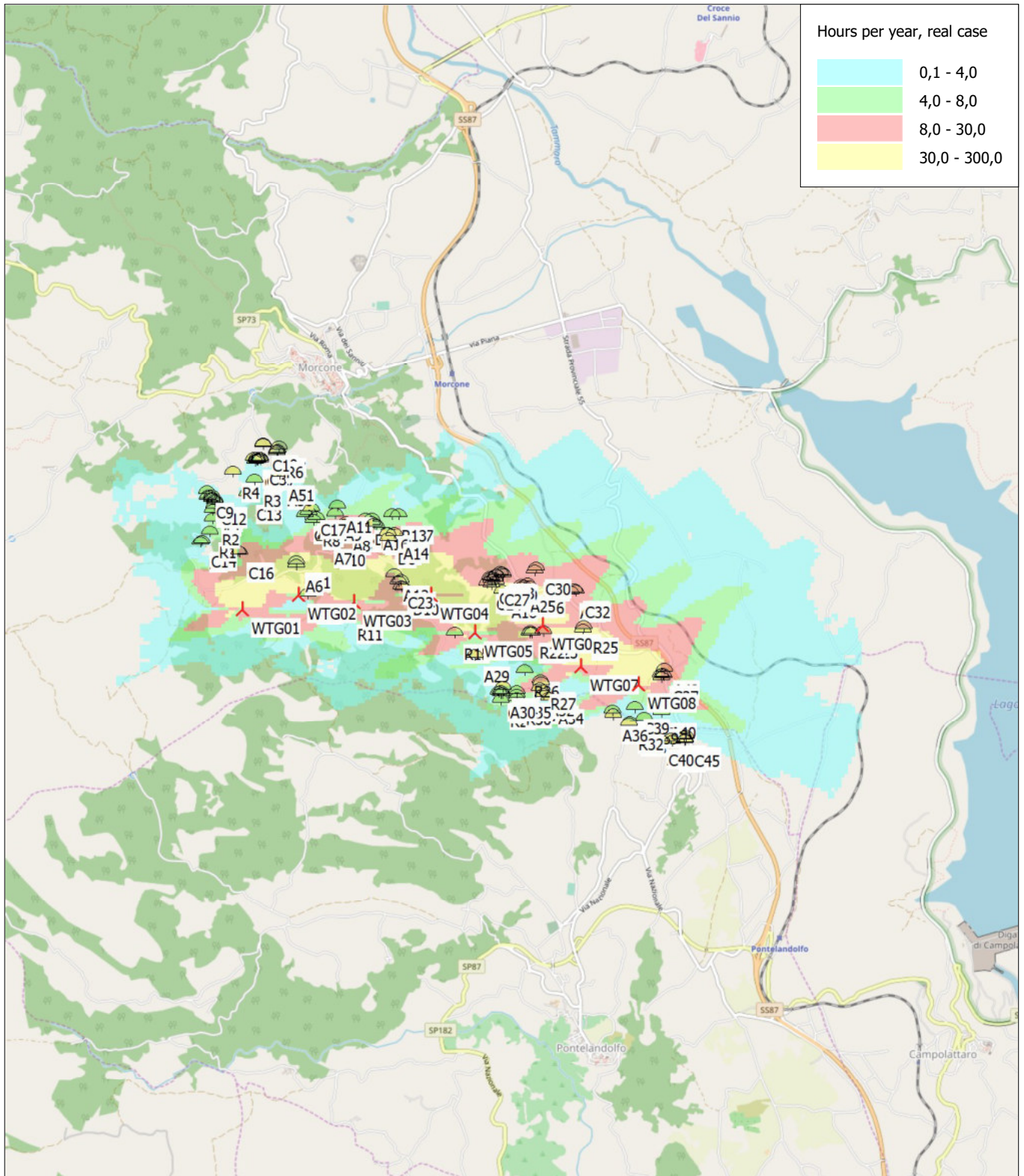
## SHADOW - Calendario, grafico



### WTG

-  WTG01: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (17)
-  WTG04: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (18)
-  WTG05: VESTAS V162-5.6 5600 162.0 !O! hub: 119,0 m (TOT: 200,0 m) (19)

## SHADOW - Mappa



0 500 1000 1500 2000 m

Mappa: EMD OpenStreetMap , Scala di stampa 1:50.000, Centro mappa Geo WGS84 Est: 14,683967° E Nord: 41,323332° N

Nuova WTG Recettore d'ombra

Flicker map level: Elevation Grid Data Object: Prova\_03\_EMDGrid\_1.wpg (11)