



UNIVERSITÀ  
DEGLI STUDI DI TRIESTE



Rapporti OM

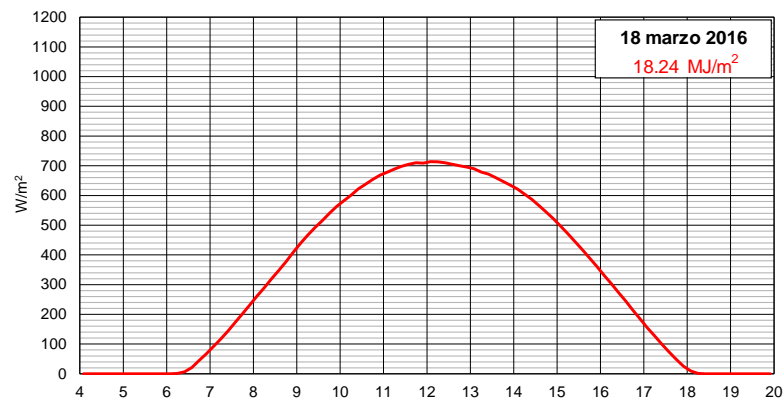
N. 179

Tullio Quaia  
Stefano Cirilli

# TRIESTE

## Irradianza solare globale

### 2016



---

Trieste 2018

**INDICE**

Ringraziamenti	4
Riferimenti	4
Riassunto 2016 e valori normali	5
Grafici di irradianza solare 2016	6
Tabella dell'irradiazione giornaliera	37

## TRIESTE

### Irradianza solare globale

### 2016

*Tullio Quaia, Stefano Cirilli*

Questo rapporto aggiorna i dati orari di irradianza solare globale registrati a Trieste dal 1971 (Stravisi, 1986*b*; Stravisi *et al.*, 1986; Stravisi, 2004*c,d*, 2005, 2006, 2007, 2008, 2009, 2010, 2011; Stravisi & Cirilli, 2012, 2013, 2014; Quaia *et al.*, 2017; Quaia & Cirilli, 2017) a tutto il 2016. Il piranometro è lo stesso (Kipp & Zonen CM11 n. 882127) usato negli anni precedenti presso la stazione meteorologica di Trieste del Dipartimento di Matematica e Geoscienze (DMG) di piazza Hortis n° 1, sita sul tetto dell'I.S.I.S. Nautico 'Tommaso di Savoia Duca di Genova'. Il supporto del piranometro, collocato sul palo di sostegno degli anemometri, guarda a sud (fig. 1). I dati di irradianza media su intervalli successivi di 10 minuti sono memorizzati da un datalogger Nesa TMF500; la costante di calibrazione utilizzata (Stravisi, 2004*c*) è  $4.95 \text{ mV}/(\text{W}/\text{m}^2)$ .



**Fig. 1** - La stazione meteorologica DMG-Trieste con il piranometro Kipp & Zonen CM11 sul supporto sud.

La serie annuale è corretta per la deriva dello zero sommando giornalmente una costante in modo che i dati notturni risultino pari al loro valore medio di  $-4 \text{ W}/\text{m}^2$ ; successivamente i dati degli intervalli di 10 min notturni (elevazione del sole sull'orizzonte astronomico  $\leq -1.5^\circ$ ) sono posti uguali a zero.

I dati di irradianza solare globale medi in 10 min sono memorizzati come numeri interi espressi in watt al metro quadrato ( $\text{W}/\text{m}^2$ ); successivamente sono convertiti in dati di irradiazione totale in 10 min, espressi in kilojoule al metro quadrato ( $\text{kJ}/\text{m}^2$ ) e


arrotondati all'intero. I totali giornalieri di irradiazione sono espressi in megajoule al metro quadrato ( $\text{MJ/m}^2$ ) e arrotondati a due decimali. L'ultima riga di ogni mese riporta l'irradiazione totale mensile. E' usato il tempo medio dell'Europa centrale CET = UTC+1, pari al tempo coordinato universale (tempo medio di Greenwich) più un'ora, ovvero l'ora solare locale.


Sono riportati i grafici giornalieri della serie di irradianza solare globale 2016 (in  $\text{W/m}^2$ ) consistente in dati medi su intervalli consecutivi di 10 minuti (Stravisi, 2004d). Su ciascun grafico viene anche indicato il valore dell'irradiazione totale giornaliera ( $\text{MJ/m}^2$ ).

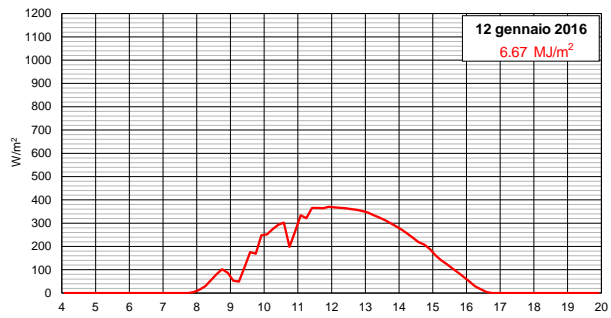
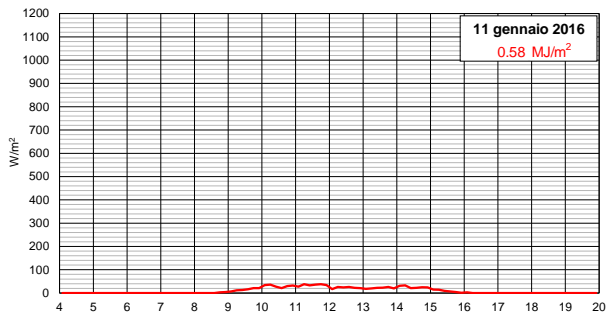
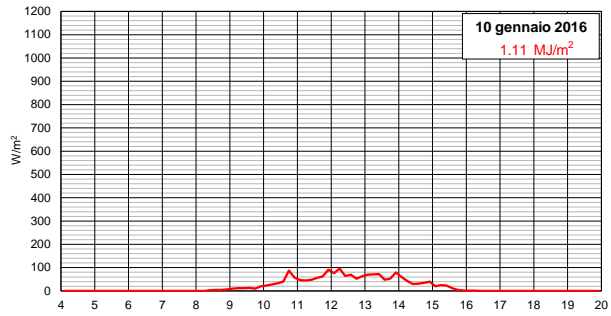
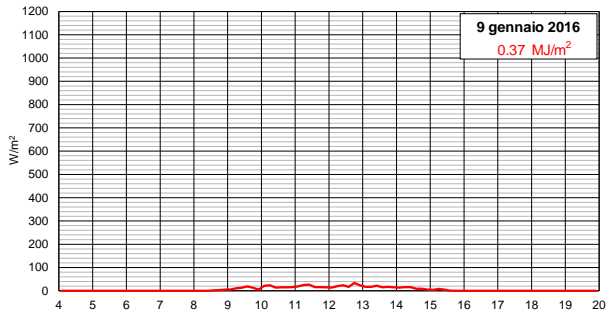
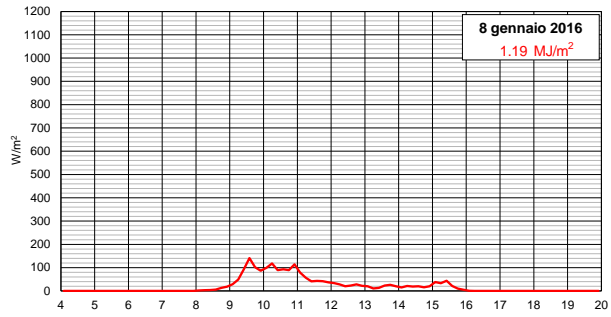
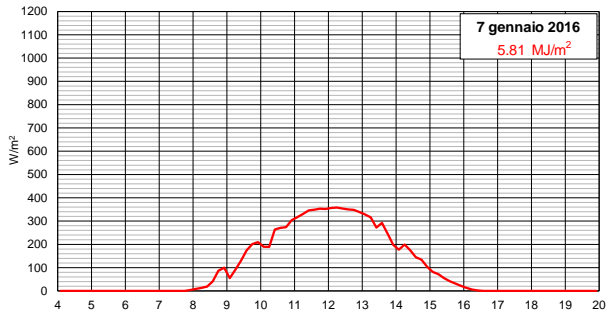
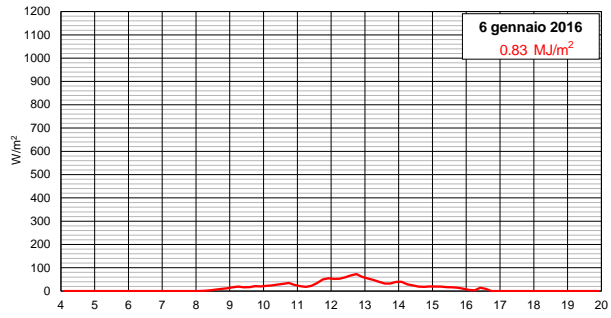
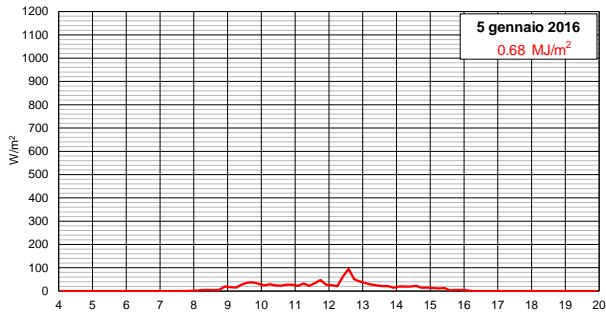
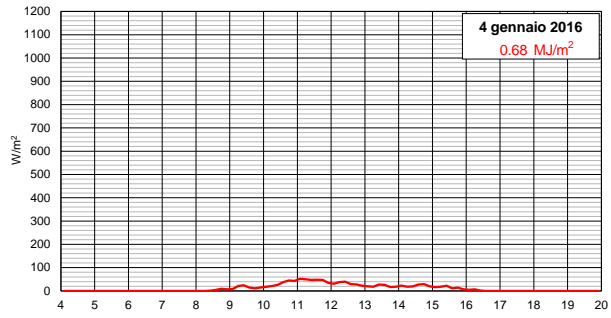
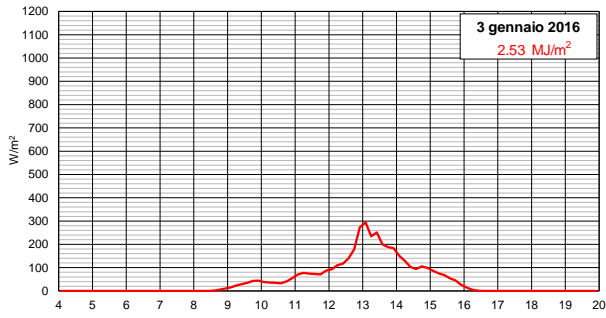
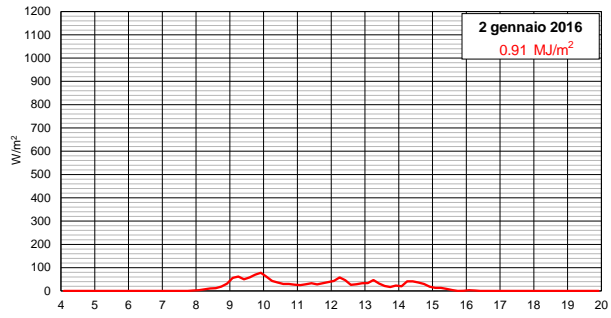
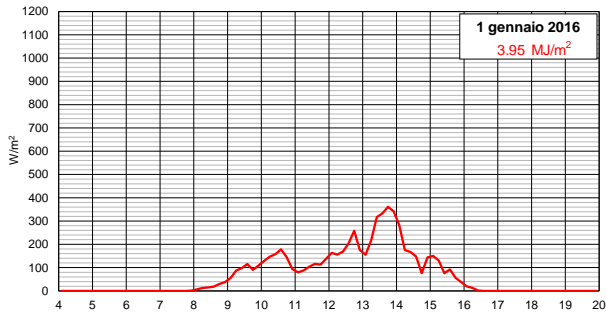
**Ringraziamenti** - Ringraziamo la famiglia Stravisi per aver reso possibile, con il finanziamento del Premio di Ricerca 'Franco Stravisi' istituito nel 2016 presso l'Ateneo triestino, la prosecuzione di questa linea di ricerca, iniziata negli anni '80 dal compianto Professor Stravisi e da lui coordinata sempre con competenza, dedizione e appassionato entusiasmo fino alla sua prematura scomparsa. E' alla sua memoria che dedichiamo, riconoscendo, questo lavoro.

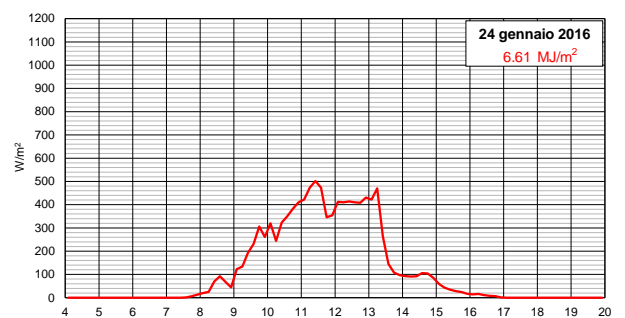
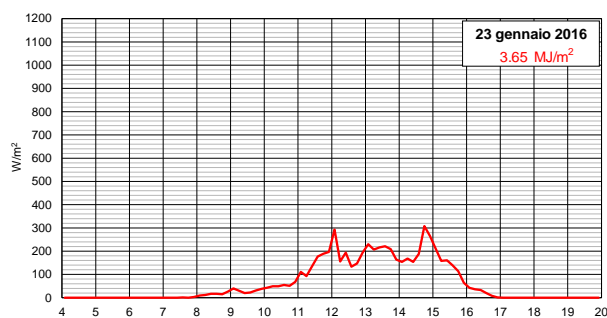
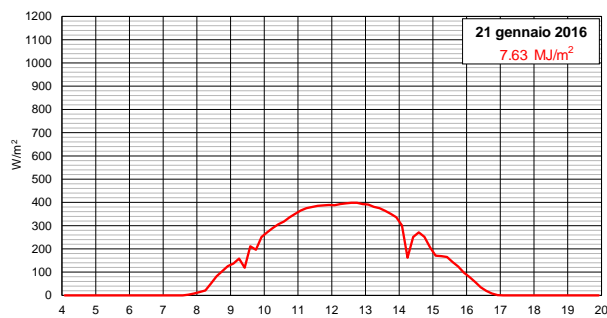
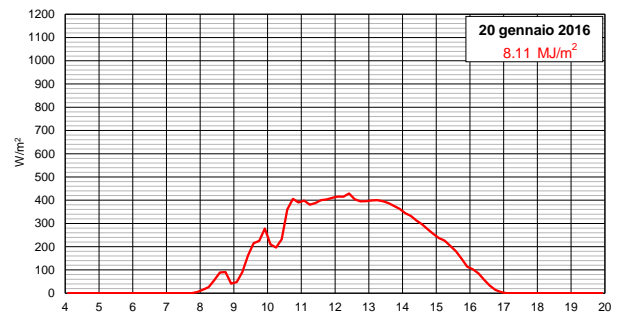
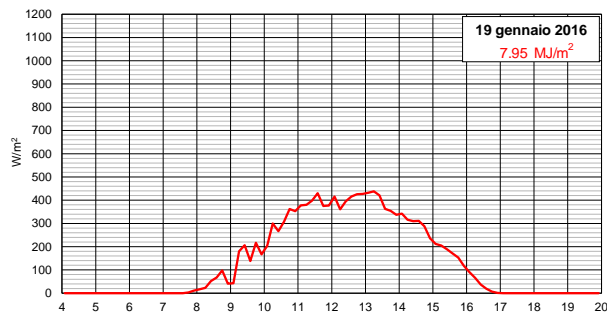
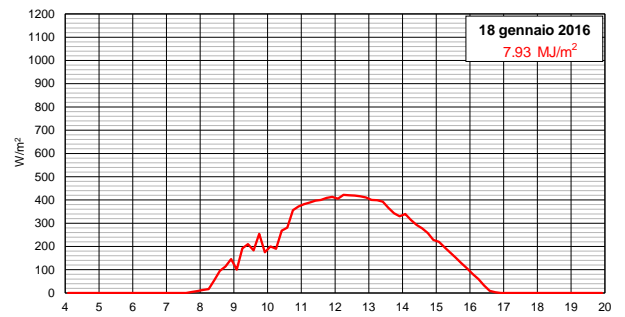
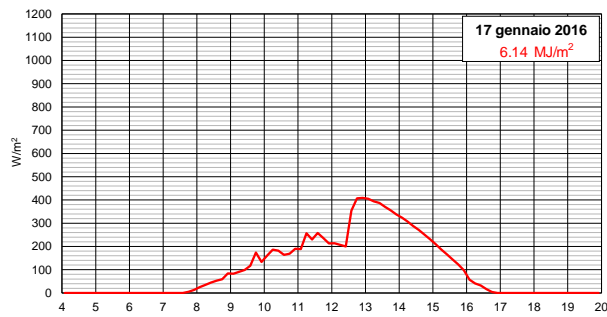
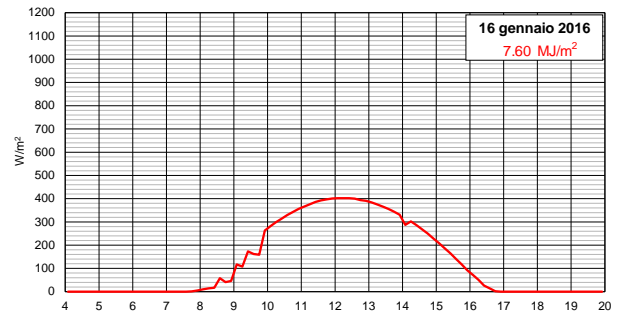
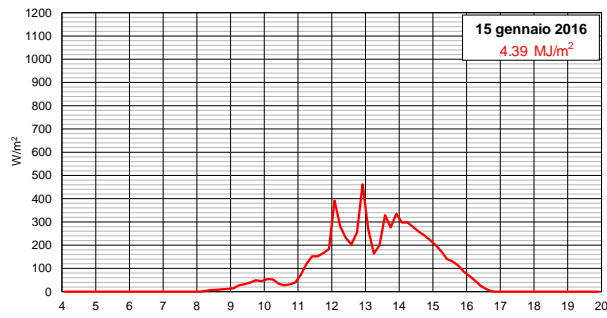
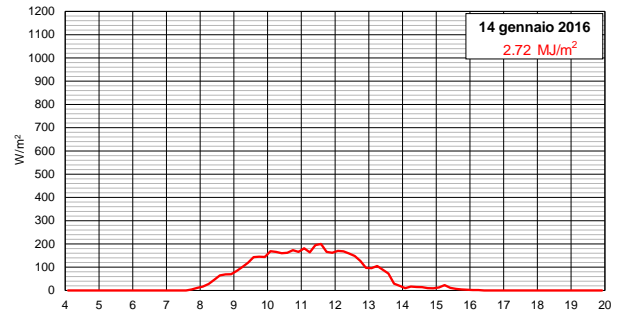
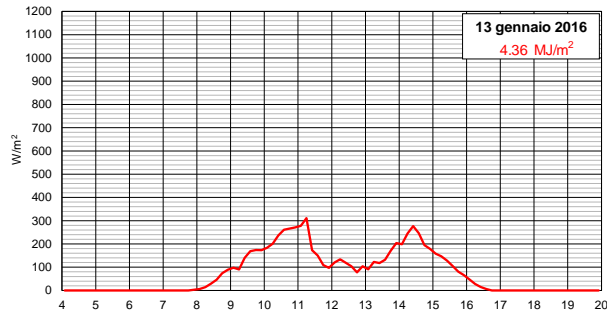
## Riferimenti

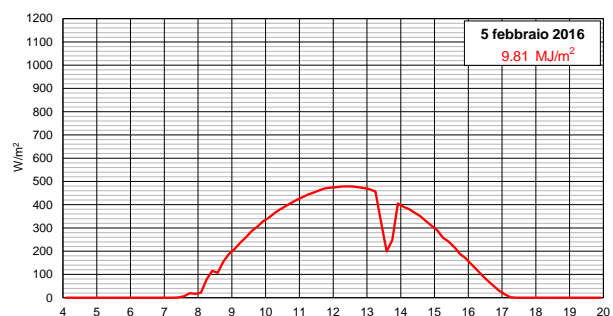
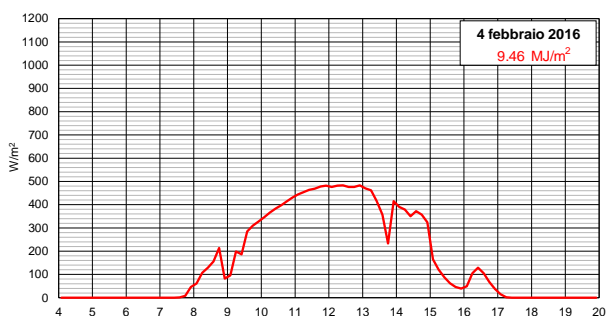
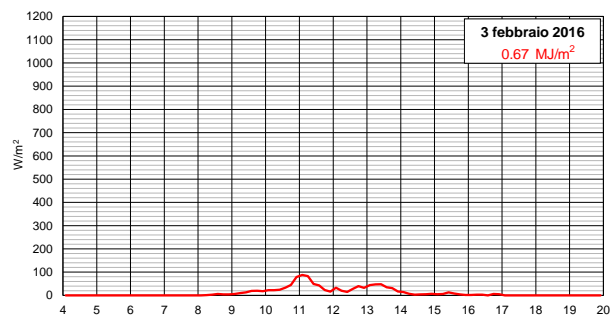
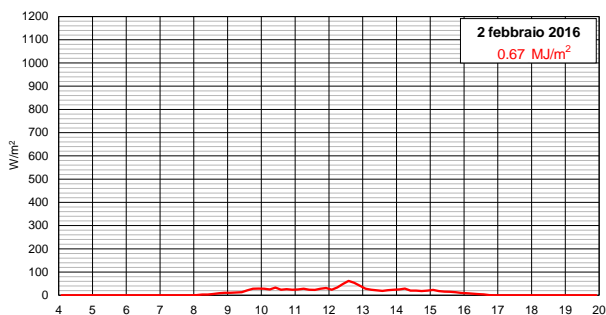
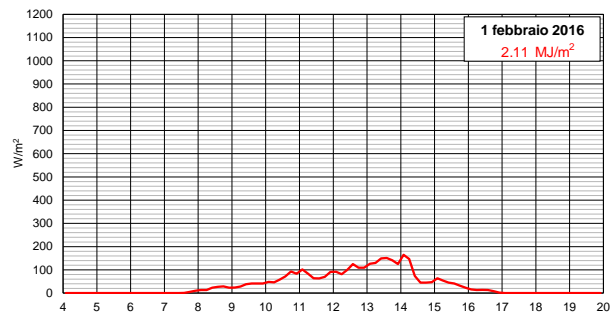
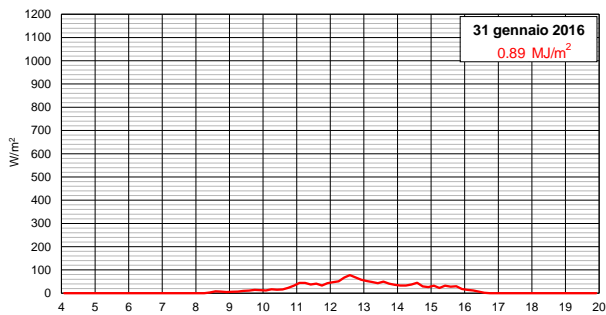
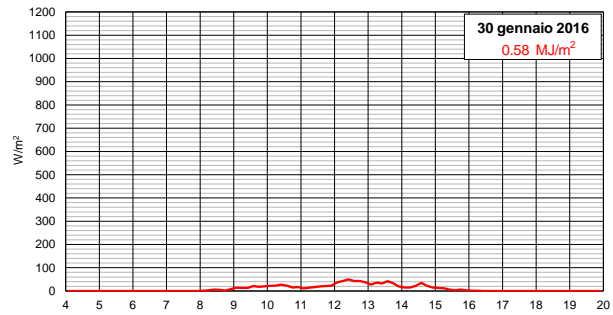
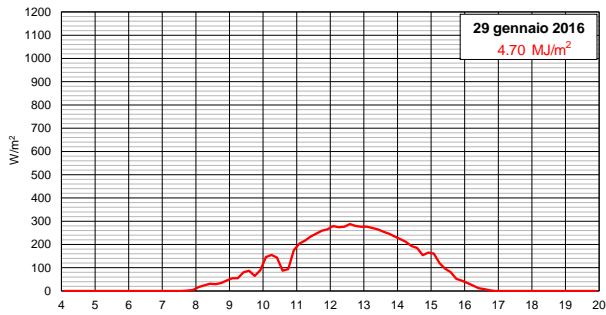
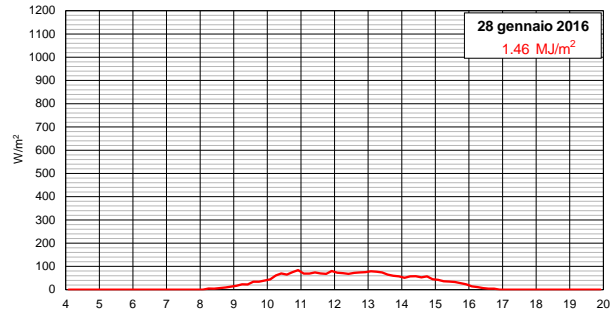
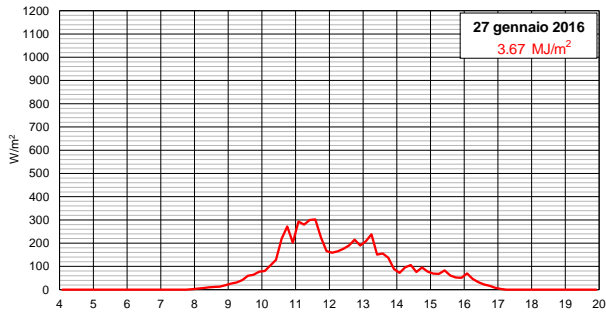
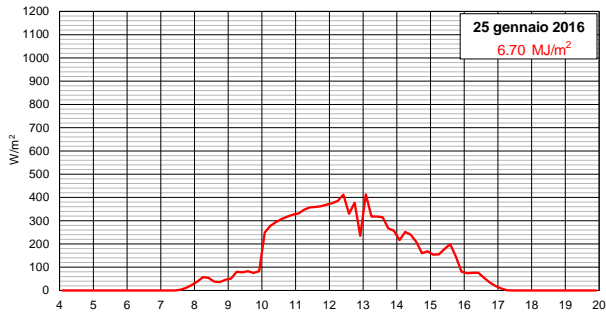
- POLLI S. (1939): *Cinquant'anni di misure eliografiche a Trieste*, Riv. Meteorol., 1, 3/4, 1-8.
- POLLI S. (1940): *Radiazione solare globale a Trieste*, La Ricerca Scient., 10, 706-710.
- QUAIA T., CIRILLI S. (2017): *Trieste - Irradianza solare globale 2015*, N. 176, 37 pag.
- QUAIA T., CIRILLI S., STRAVISI F. (2017): *Trieste - Irradianza solare globale 2014*, N. 170, 37 pag.
- STRAVISI F. (1986 a): *Effemeridi del sole per Trieste*, CNR, Istituto Talassografico di Trieste, Rapporti sez. fisica, RF 2, 10 pag.
- STRAVISI F. (1986 b): *Irradiazione solare globale a Trieste: dati orari 1971-1980*, CNR, Ist. Talassografico Trieste, Rapporti sez. fisica, RF 8, 68 pag.
- STRAVISI F. (2004 a): *La meteorologia a Trieste*, in: G.C. Cortemiglia, "La variabilità del clima locale relazionata ai fenomeni di cambiamento globale", Pàtron ed. Bologna, 245-288.
- STRAVISI F. (2004 b): *Dati orari di eliofania - Trieste 1886-2003*, 104, (04/6), 237 pag.
- STRAVISI F. (2004 c): *Trieste - dati orari di irradianza solare 1971-2003*, 105, (04/7), 154 pag.
- STRAVISI F. (2004 d): *Grafici di irradianza solare, Trieste 1971-2003*, 106, (04/8), 1690 pag.
- STRAVISI F. (2005): *Trieste, dati orari di eliofania e di irradianza solare 2004*, 108, (05/2), 134 pag.
- STRAVISI F. (2006): *Trieste, dati orari di eliofania e di irradianza solare 2005*, 116, (06/3), 134 pag.
- STRAVISI F. (2007): *Trieste, dati orari di eliofania e di irradianza solare 2006*, 124, (07/5), 134 pag.
- STRAVISI F. (2008): *Trieste, dati orari di eliofania e di irradianza solare 2007*, 128, (08/4), 134 pag.
- STRAVISI F. (2009): *Trieste, dati orari di eliofania e di irradianza solare 2008*, 133, (09/4), 134 pag.
- STRAVISI F. (2010): *Trieste, dati orari di eliofania e di irradianza solare 2009*, 138, (10/4), 134 pag.
- STRAVISI F. (2011): *Trieste, dati orari di eliofania e di irradianza solare 2010*, 144, (11/5), 134 pag.
- STRAVISI F., CIRILLI S. (2012): *Trieste - dati orari di irradianza solare 2011*, N. 149, 132 pag.
- STRAVISI F., CIRILLI S. (2013): *Trieste - Irradianza solare globale 2012*, N. 155, 38 pag.
- STRAVISI F., CIRILLI S. (2014): *Trieste - Irradianza solare globale 2013*, N. 159, 36 pag.
- STRAVISI F., PIERI G., FERRARO S. (1986): *Irradiazione solare globale a Trieste: dati orari 1981-1985*, CNR, Ist. Talassografico Trieste, Rapporti sez. fisica, RF 13, 106 pag.

Università di Trieste, Dipartimento di Matematica e Geoscienze Stazione meteorologica di TRIESTE ANNO 2016	
	Irradiazione solare globale /(MJ/m <sup>2</sup> )
GEN	122.46
FEB	147.32
MAR	338.05
APR	484.01
MAG	603.82
GIU	663.52
LUG	751.18
AGO	689.13
SET	461.03
OTT	282.62
NOV	138.93
DIC	169.05
anno	4851.11

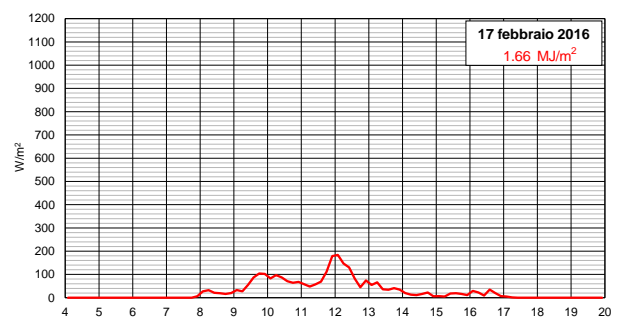
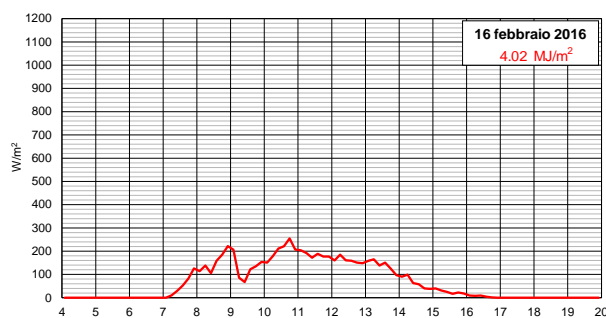
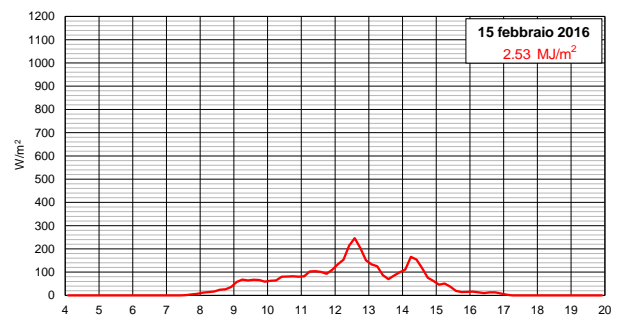
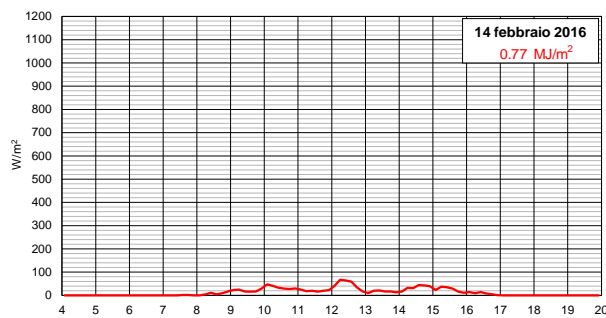
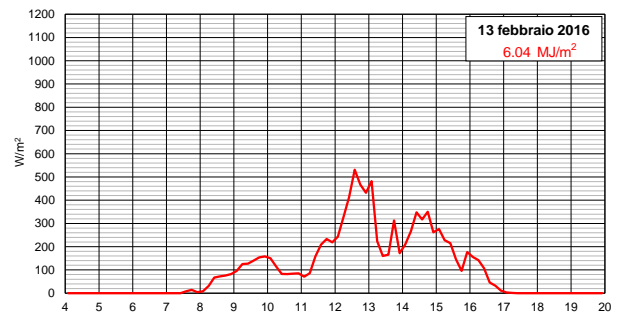
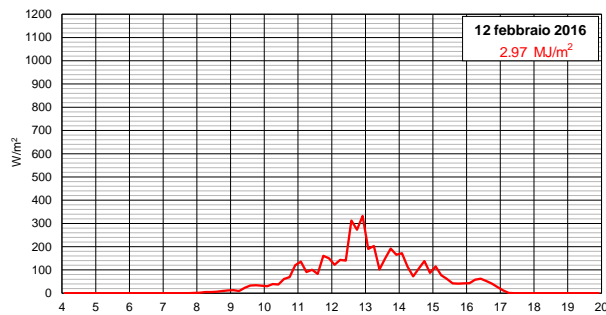
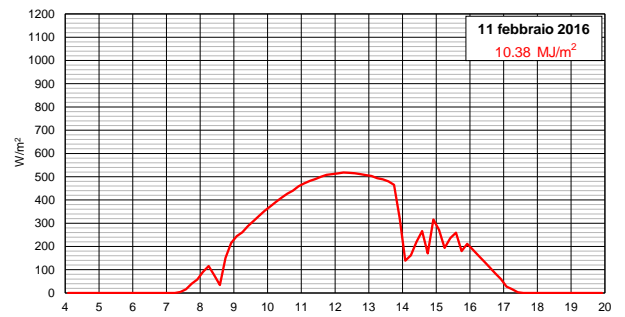
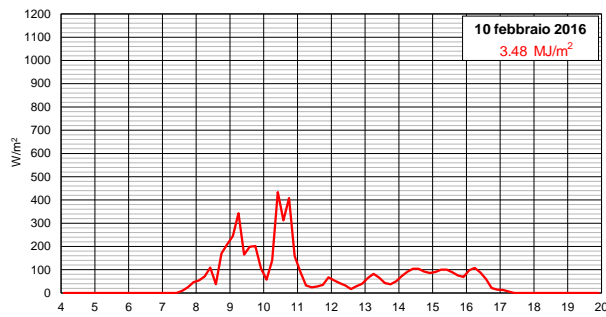
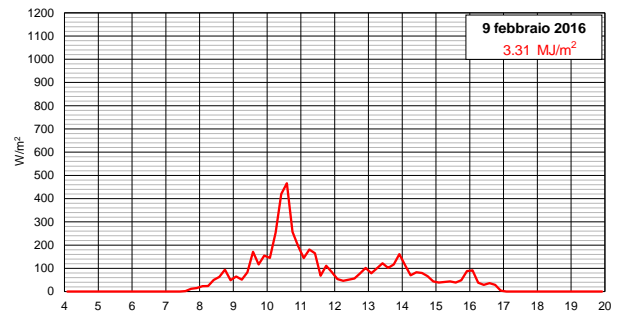
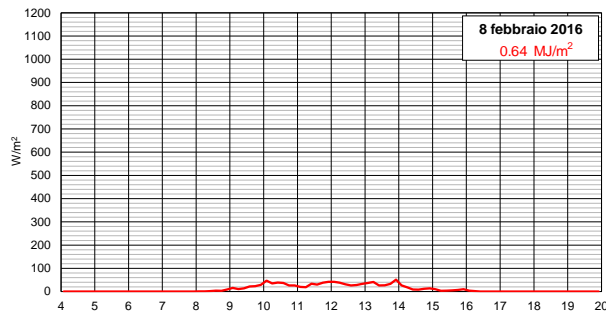
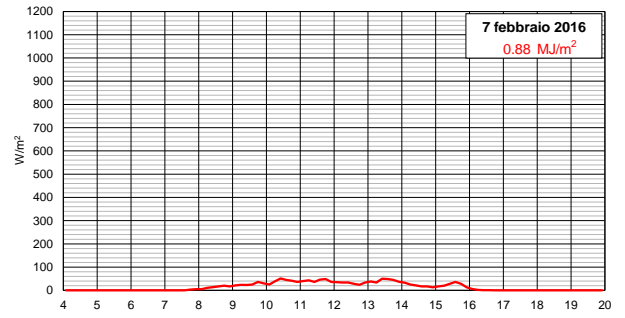
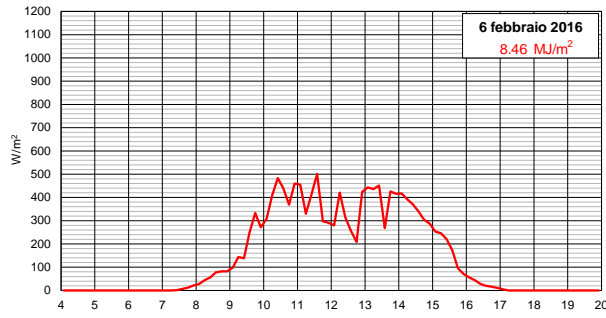
Università di Trieste, Dipartimento di Matematica e Geoscienze Stazione meteorologica di TRIESTE Valori normali 2001 – 2010				
	Irradiazione solare /(MJ/m <sup>2</sup> )		Rapporto d/g	Eliofania /h
	globale	diffusa	%	
GEN	138.74	58.79	42.4	102.9
FEB	206.51	85.64	41.5	125.6
MAR	352.30	151.09	42.9	160.9
APR	479.66	190.69	39.8	195.7
MAG	626.73	236.07	37.7	266.7
GIU	674.76	248.10	36.8	274.4
LUG	719.98	224.72	31.2	319.3
AGO	606.89	198.66	32.7	287.3
SET	438.81	158.46	36.1	216.9
OTT	274.07	114.28	41.7	146.1
NOV	142.92	66.94	46.8	99.6
DIC	120.63	49.84	41.3	103.7
anno	4782.01	1783.28	37.3	2299.0

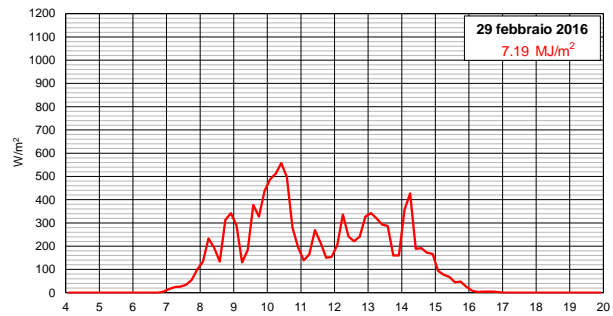
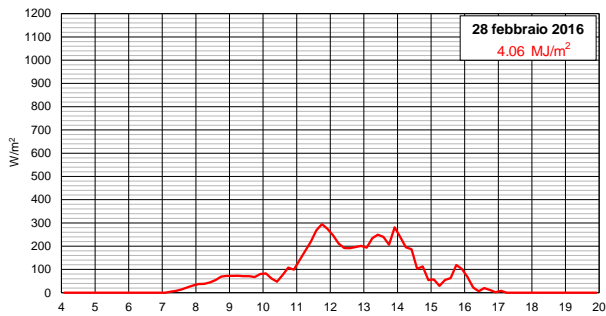
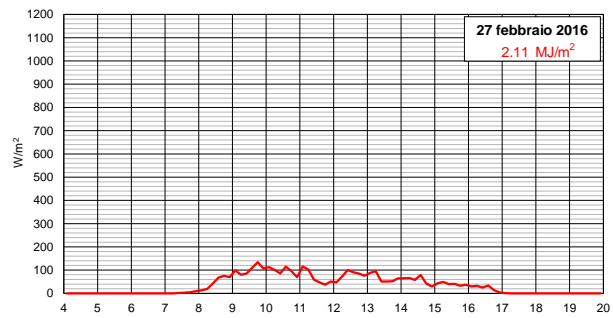
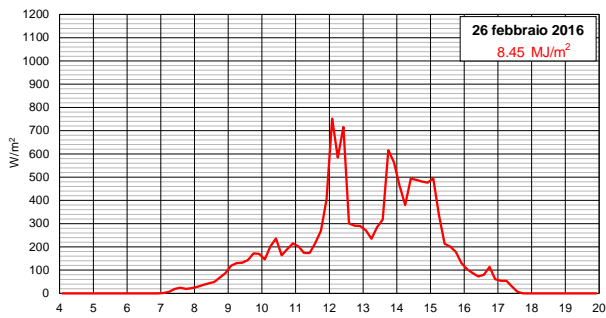
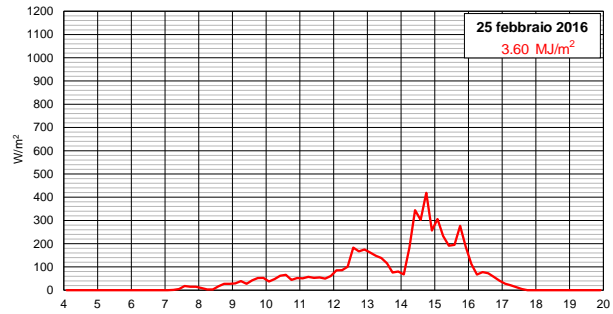
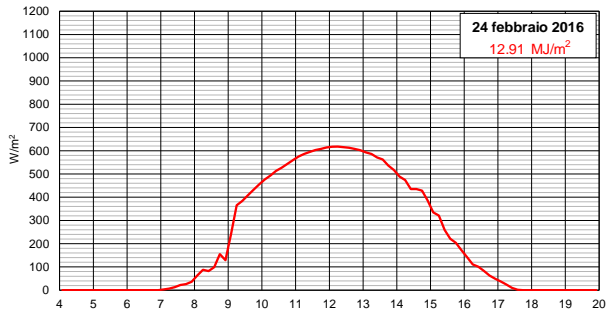
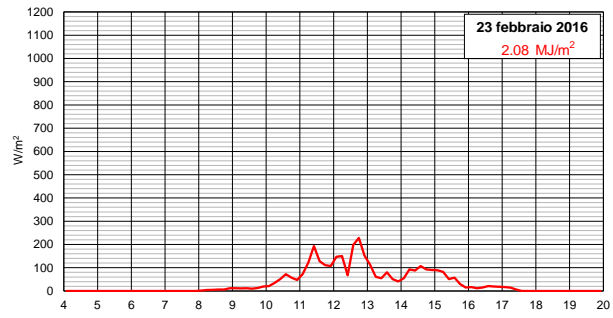
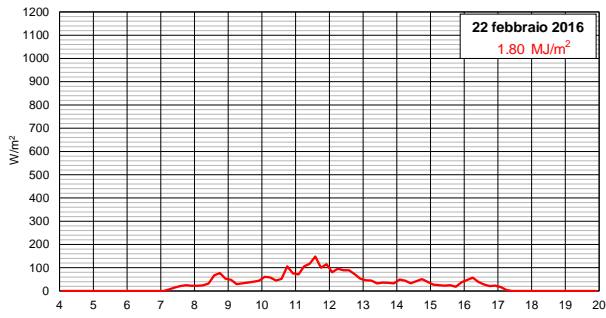
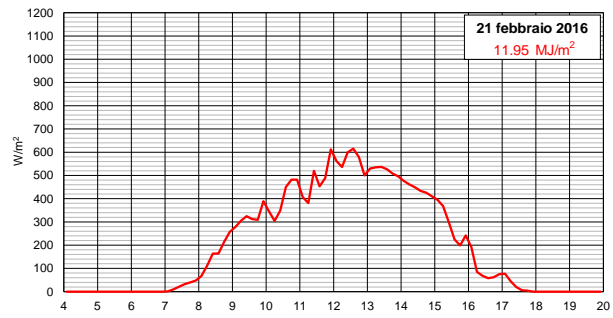
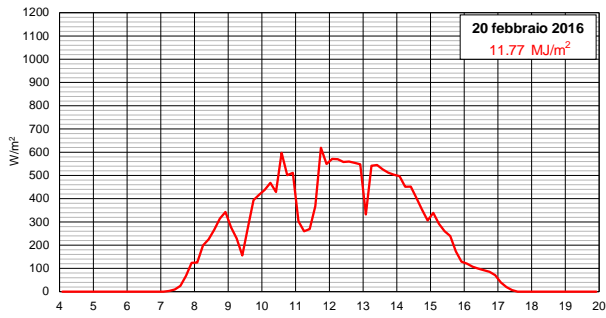
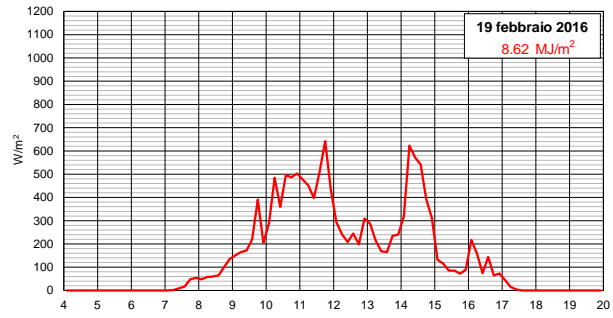
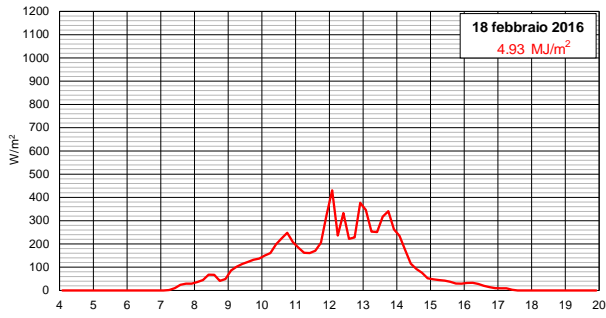


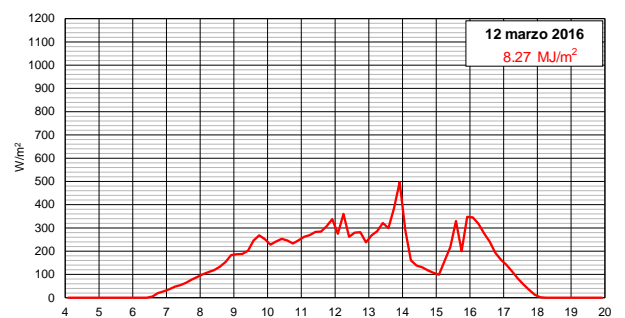
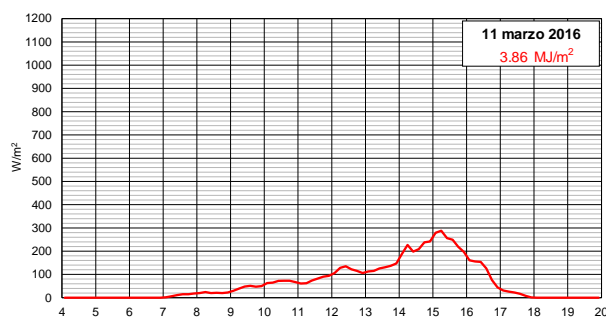
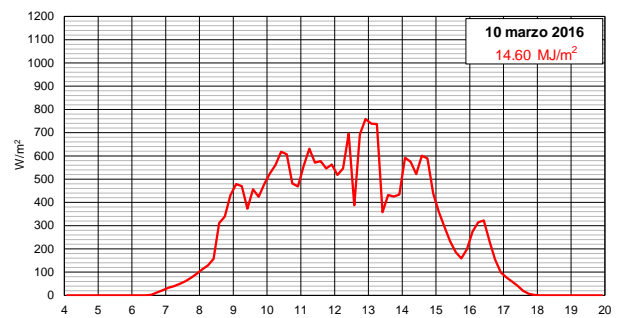
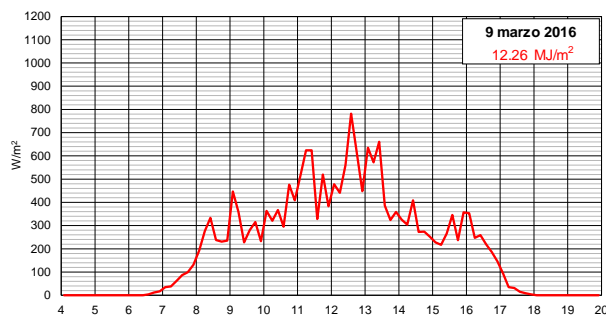
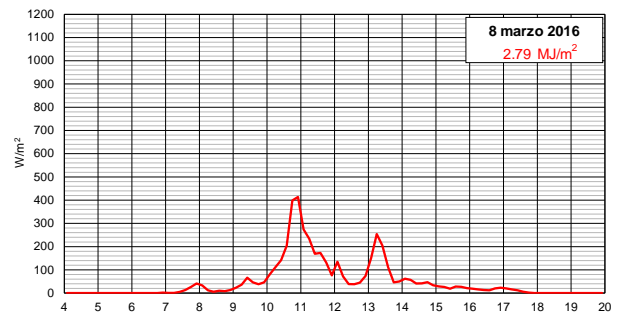
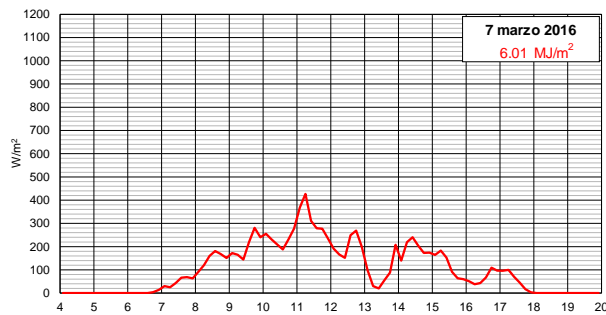
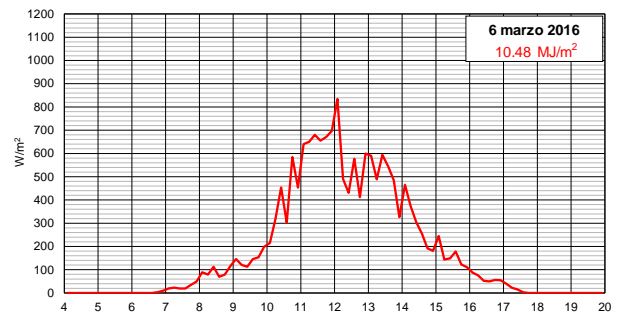
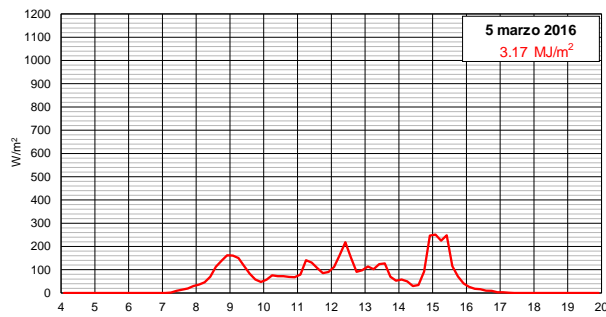
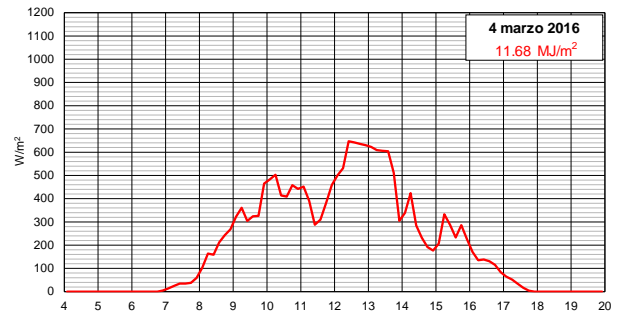
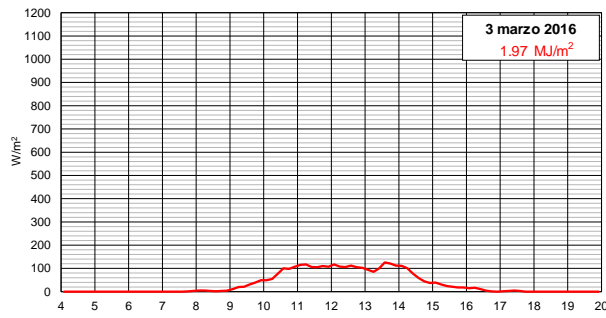
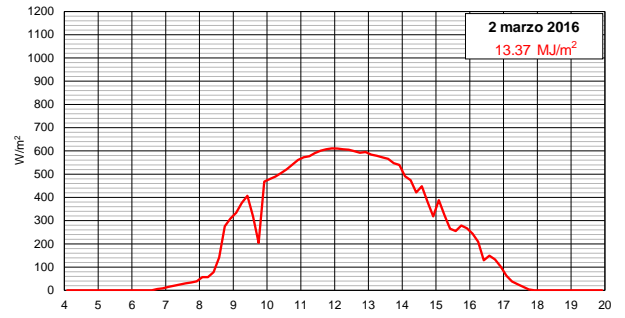
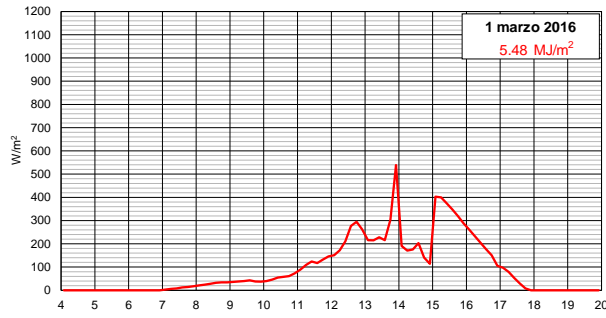


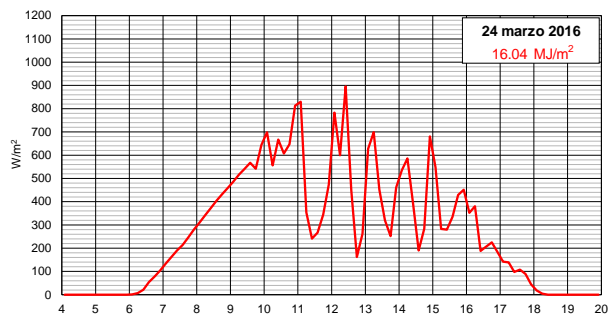
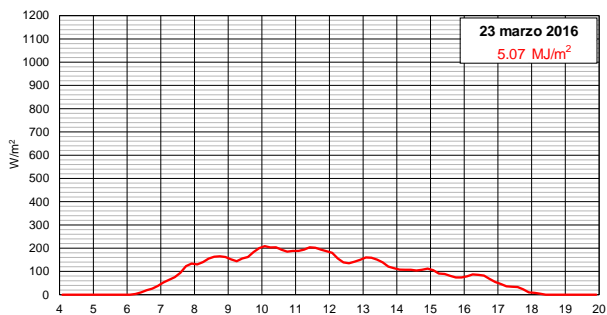
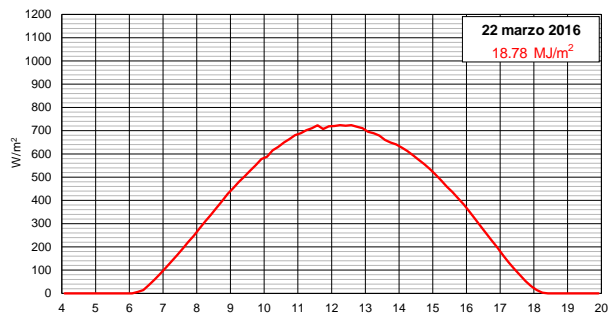
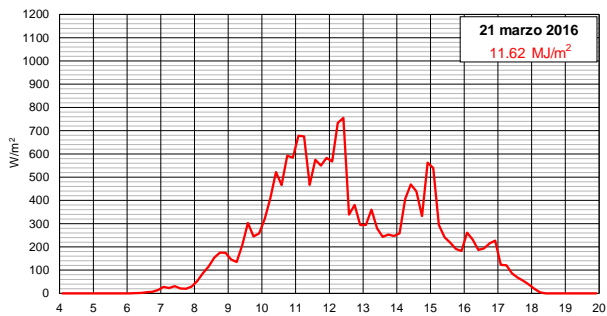
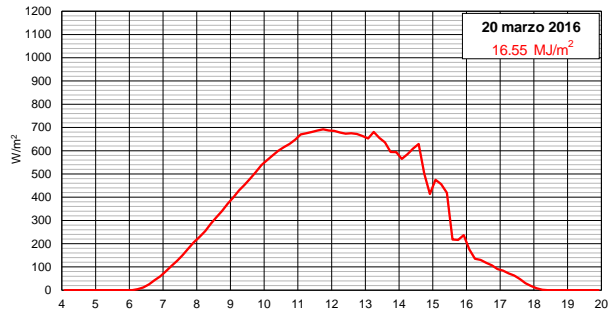
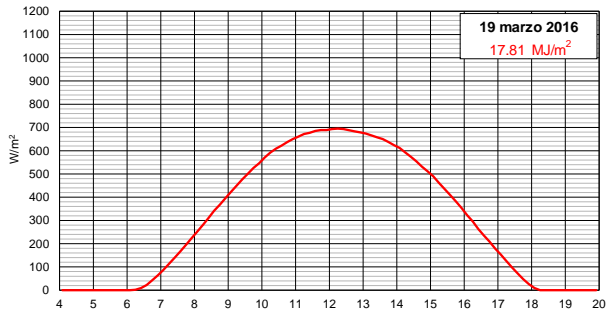
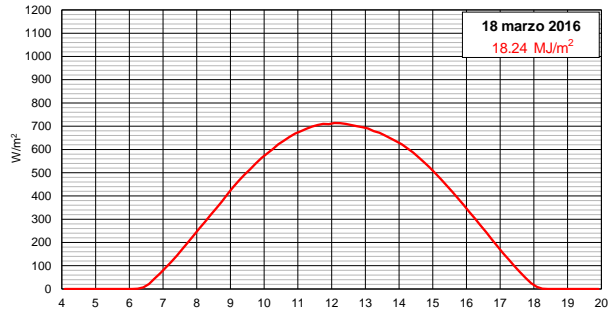
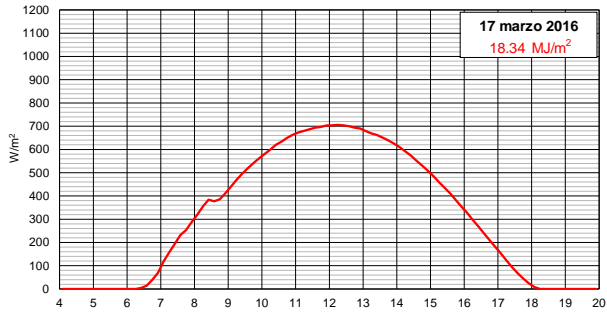
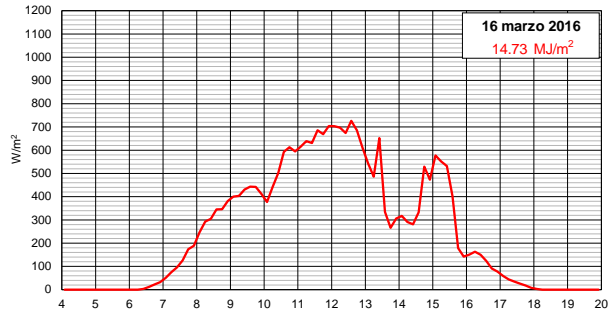
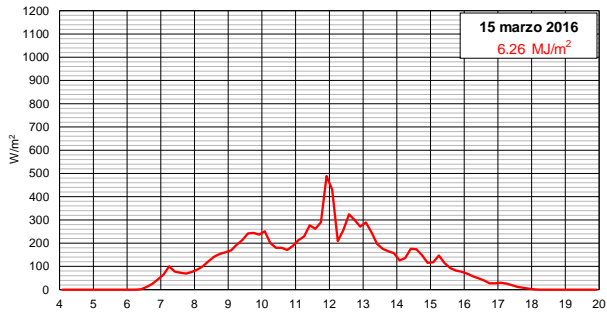
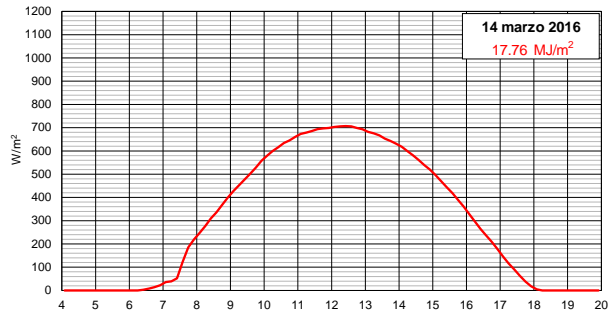
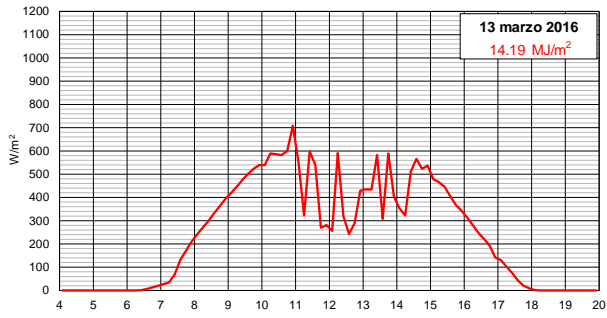


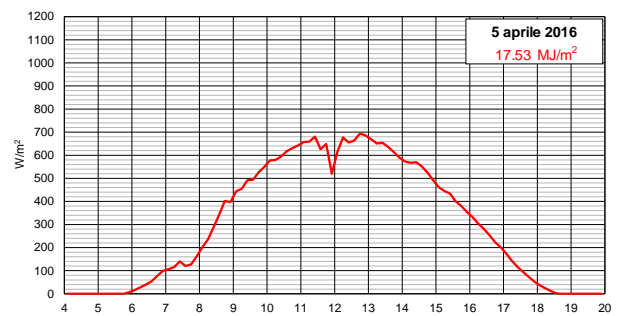
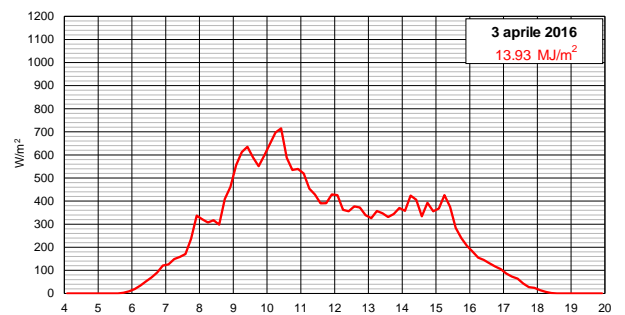
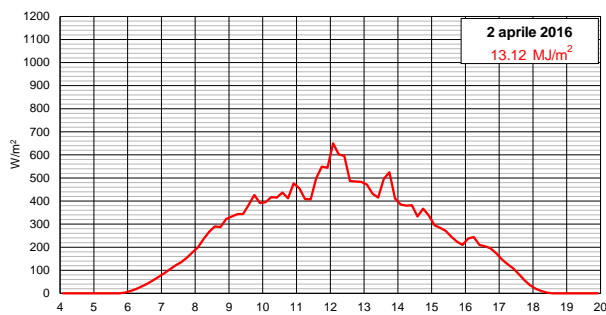
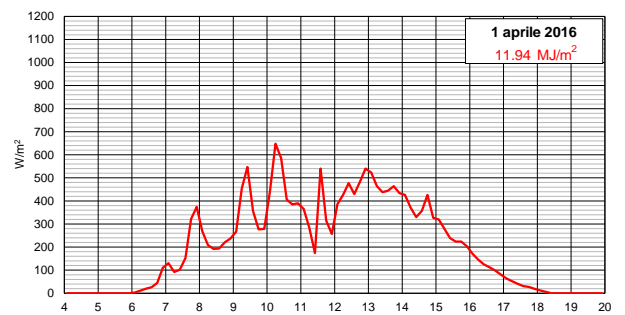
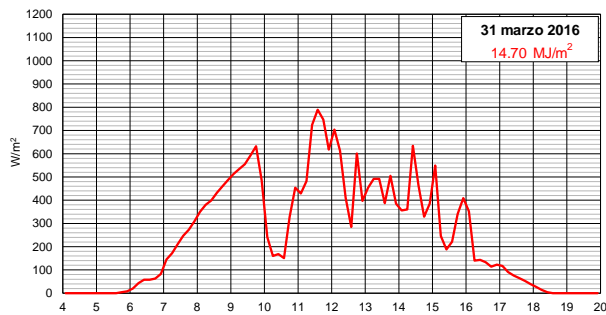
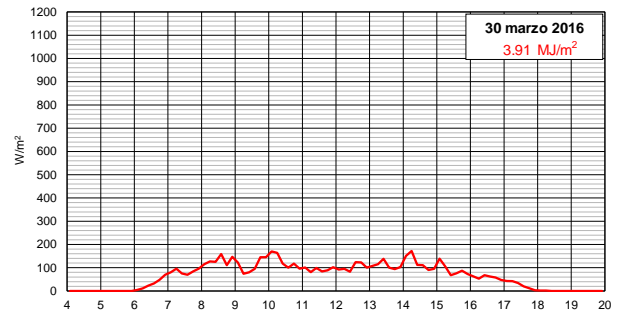
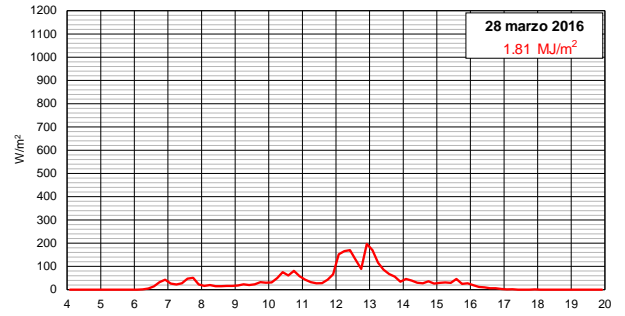
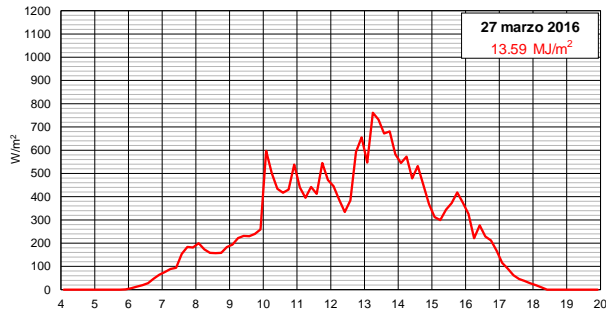
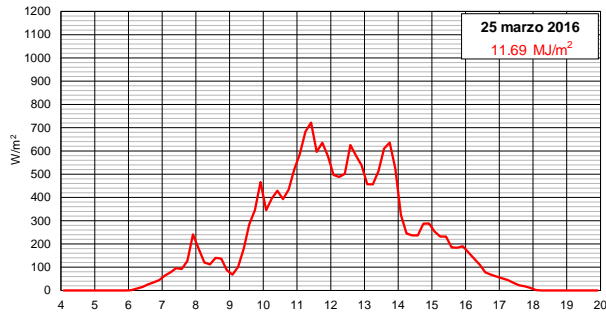


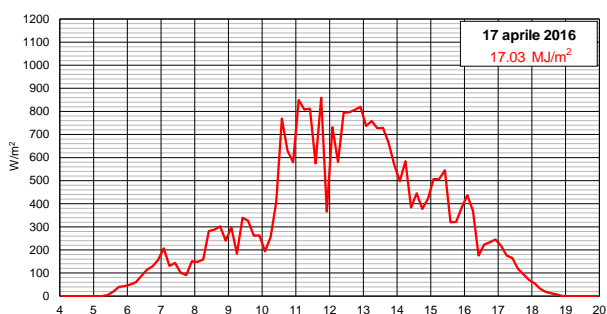
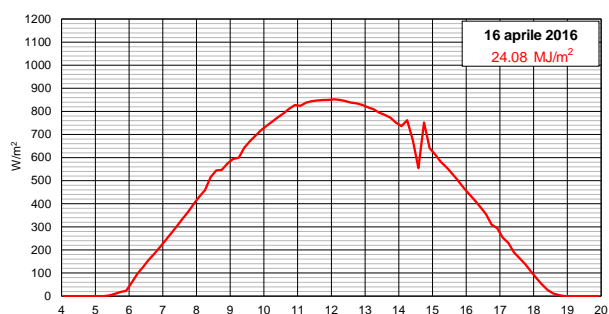
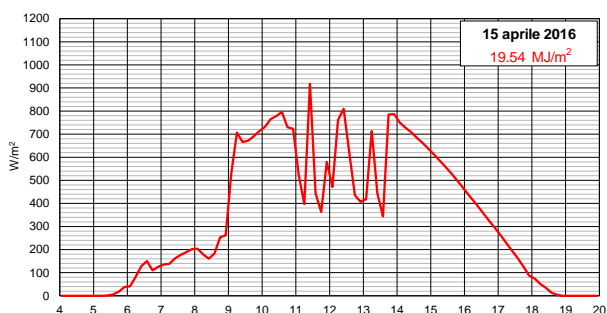
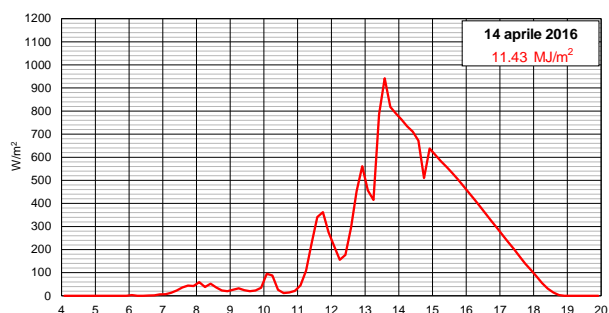
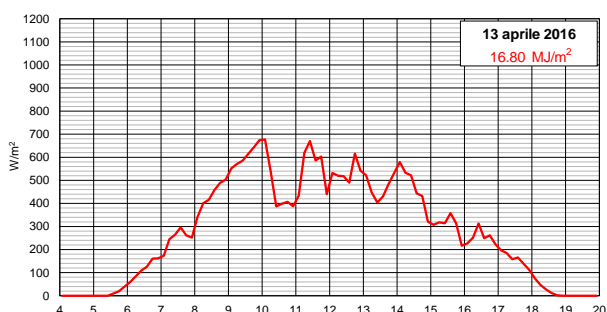
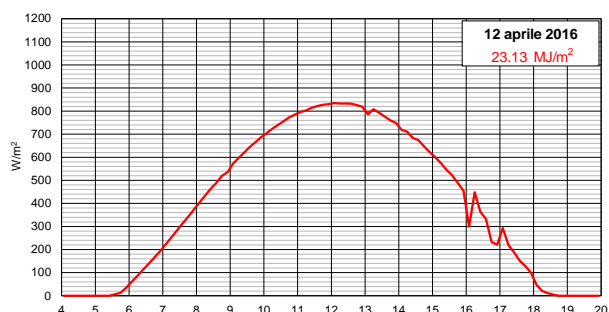
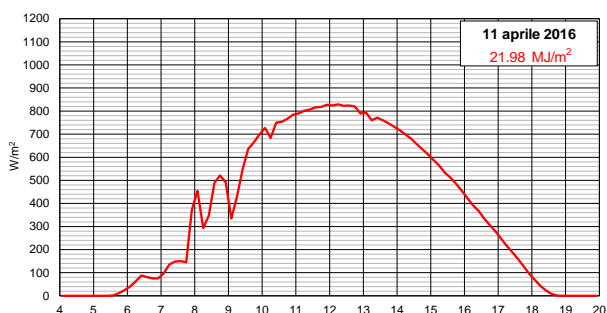
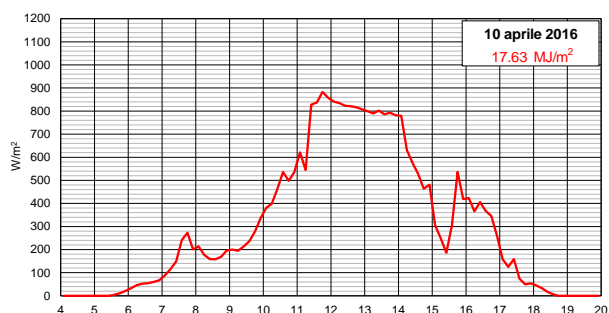
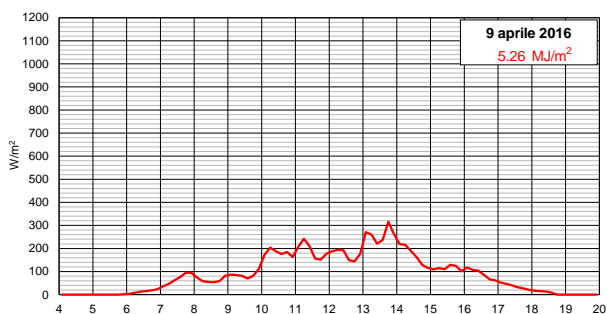
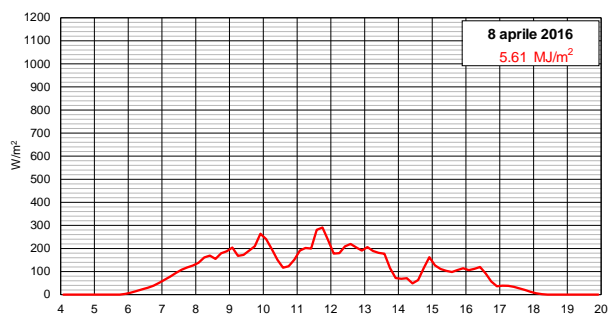
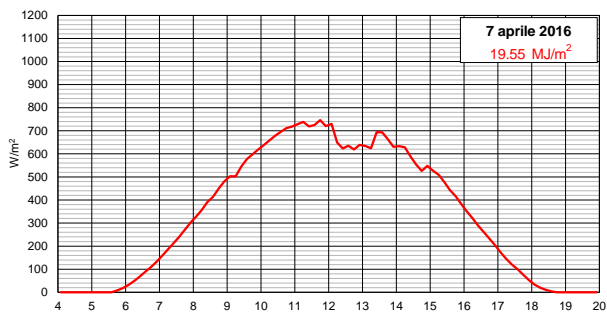
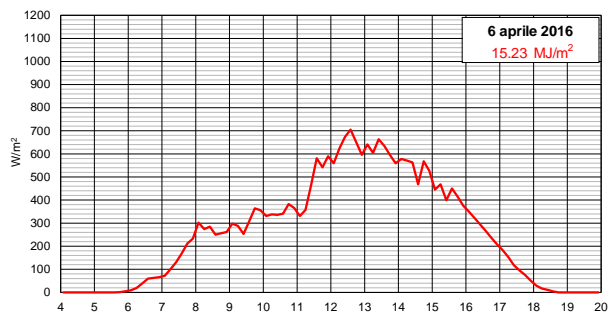


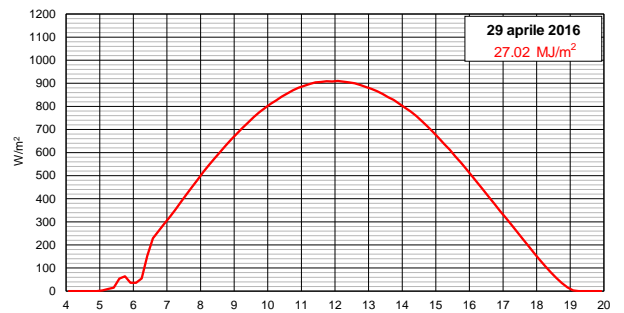
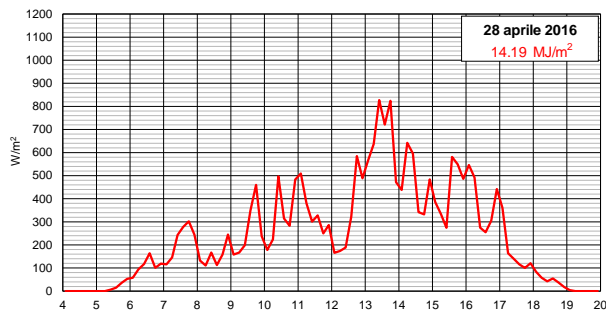
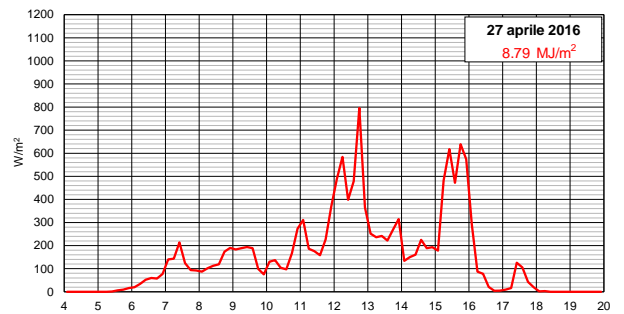
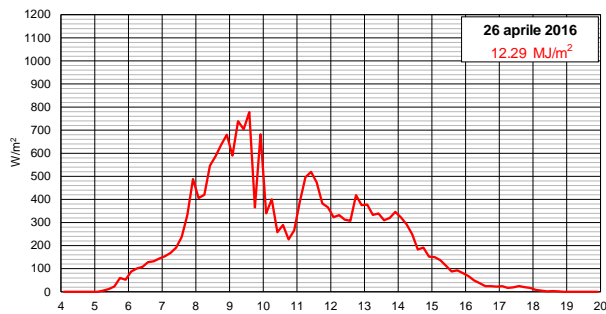
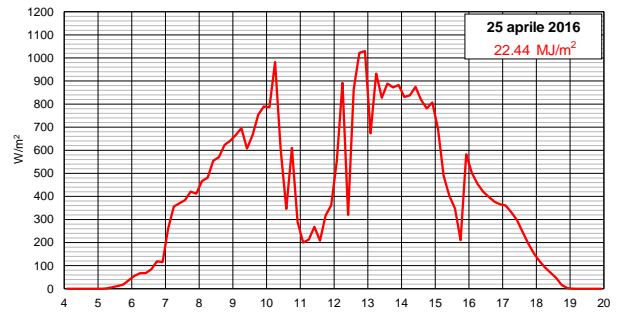
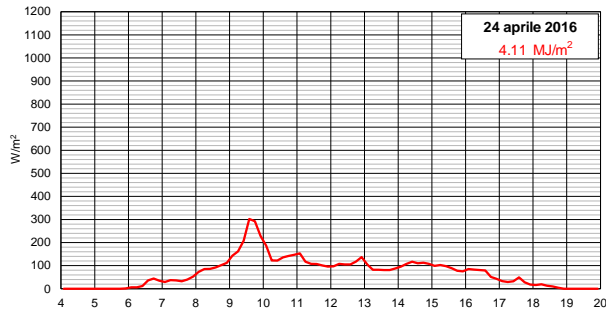
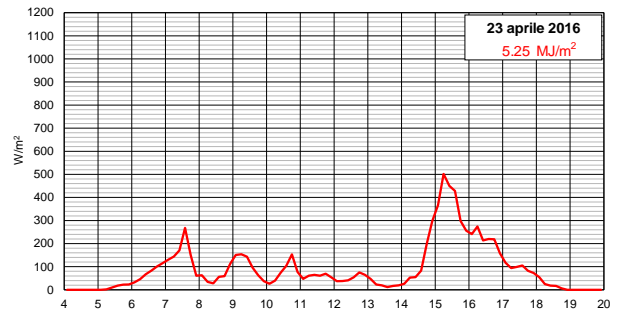
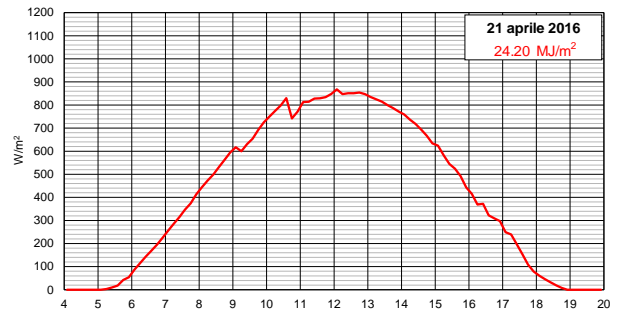
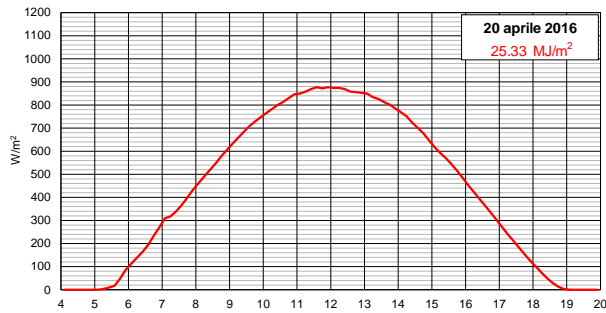
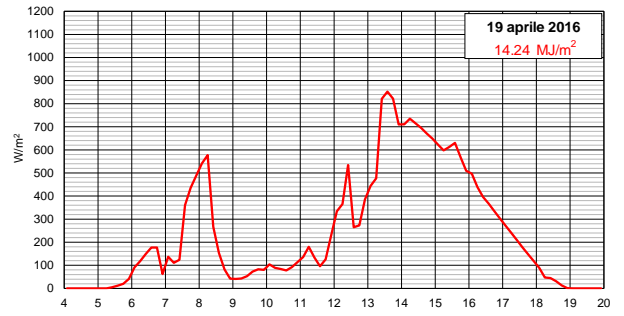




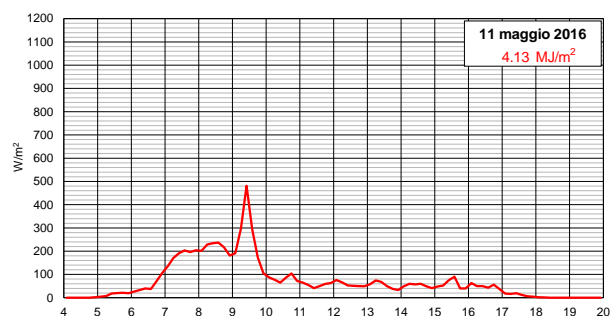
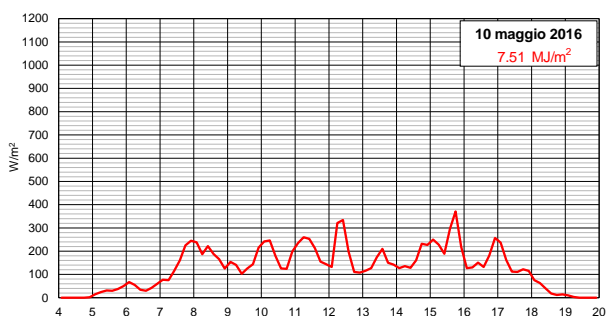
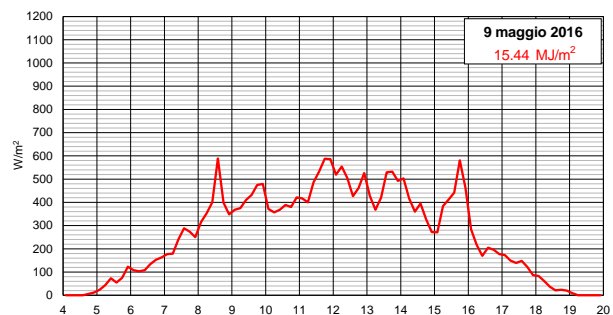
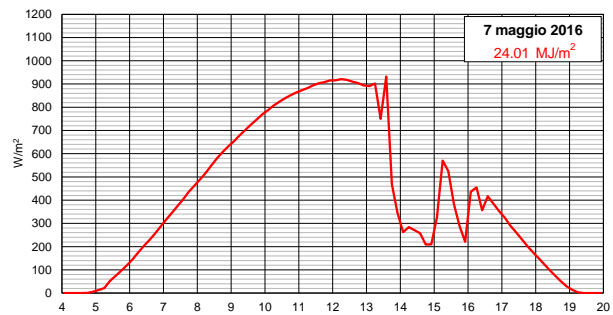
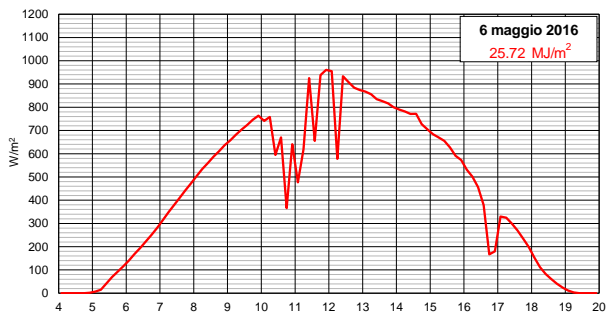
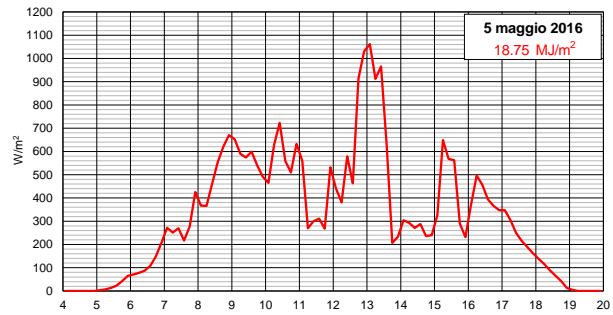
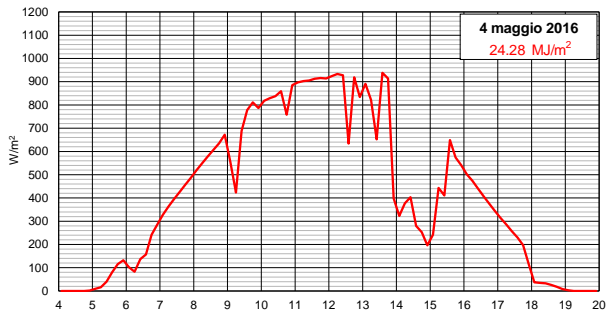
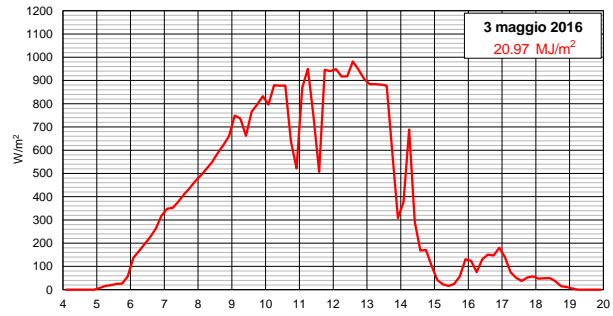
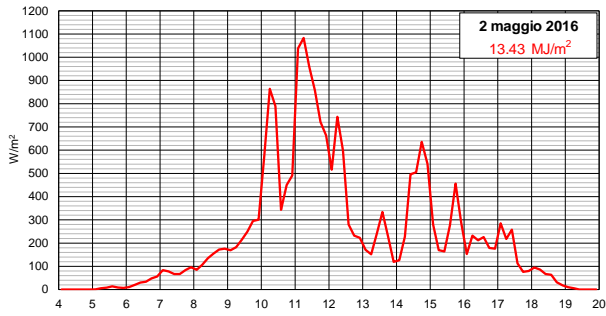
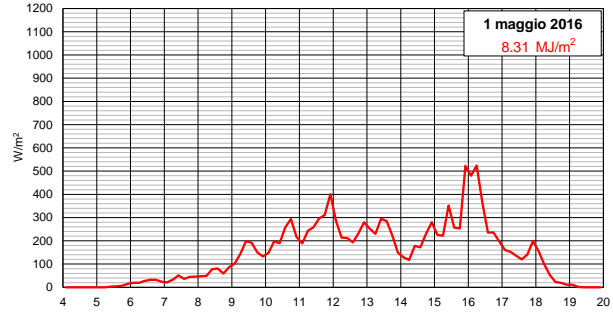
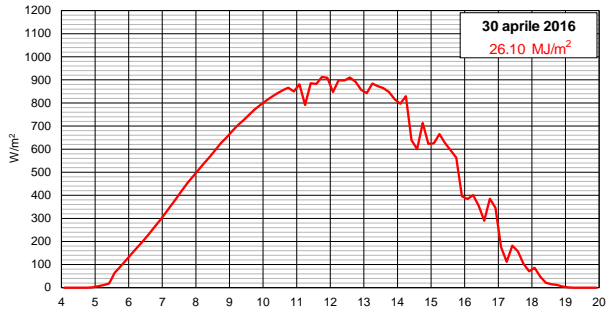




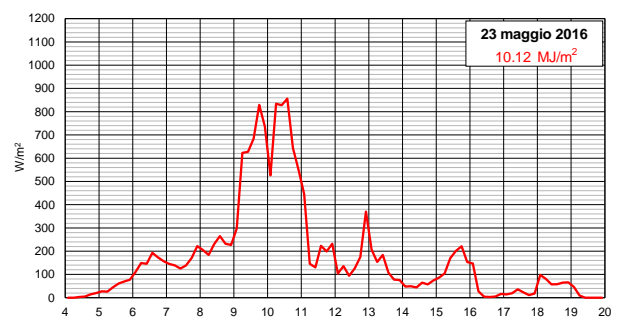
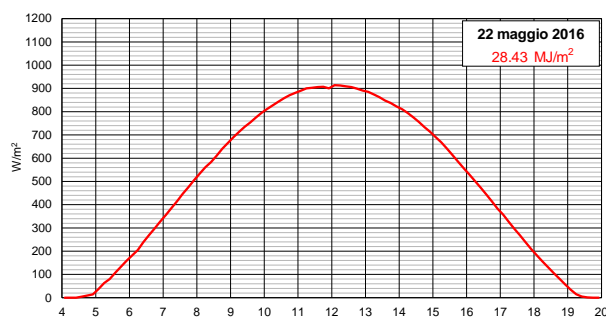
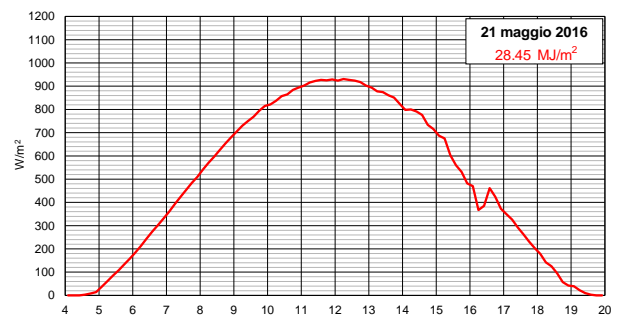
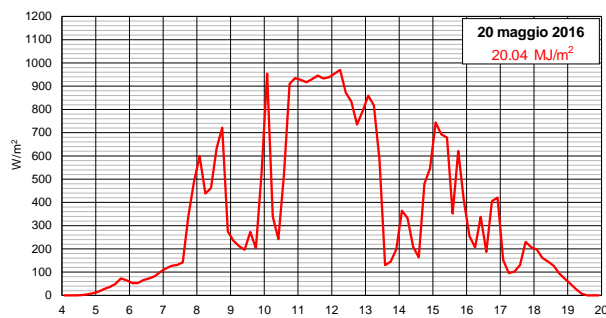
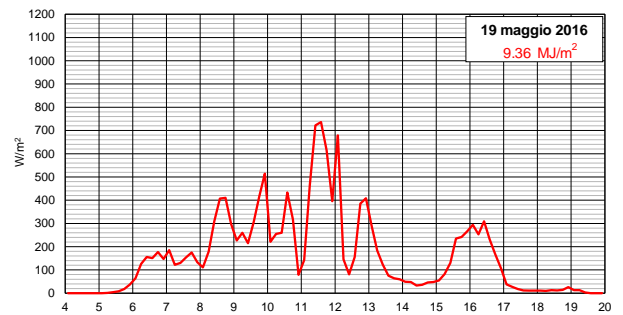
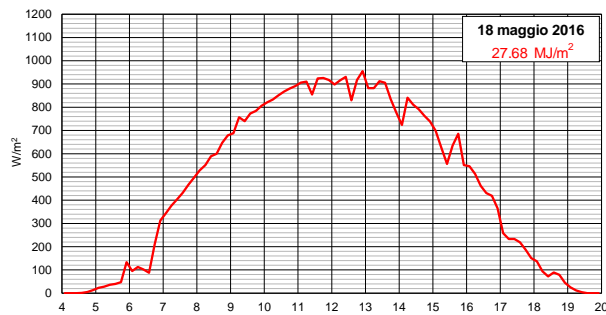
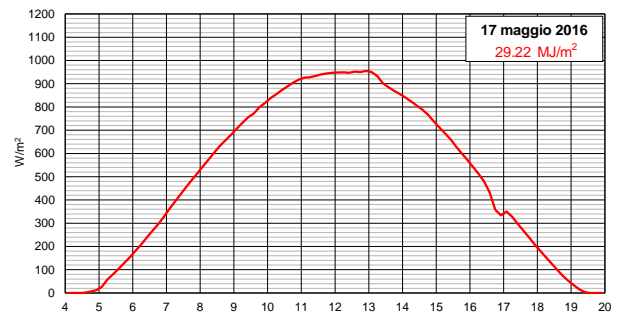
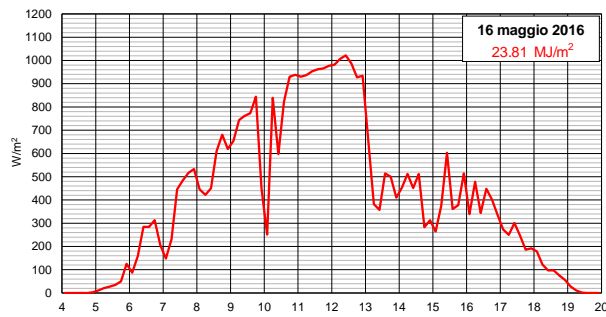
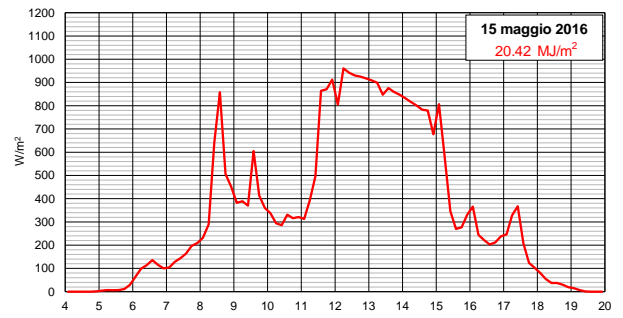
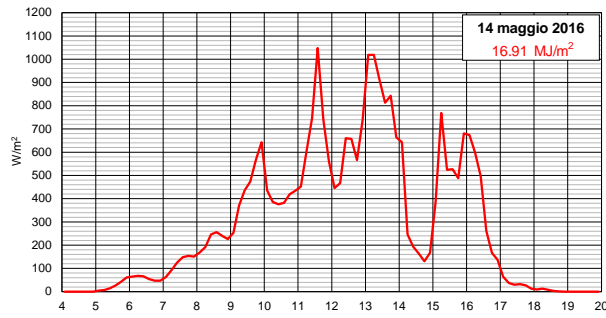
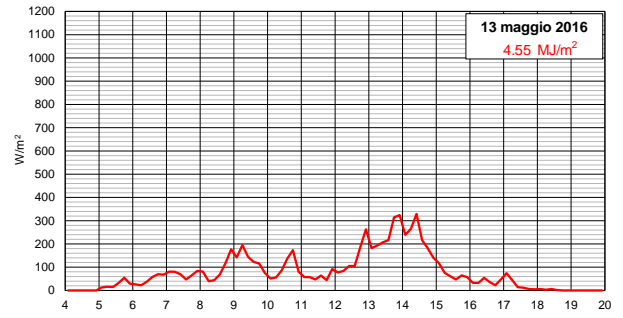
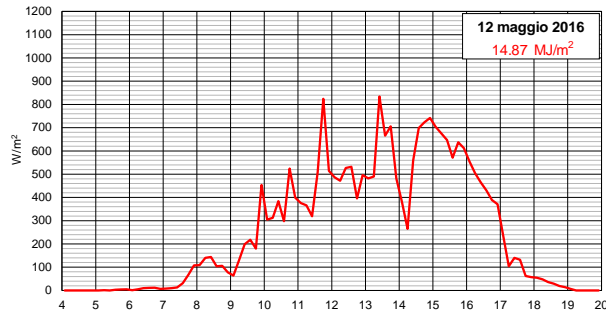


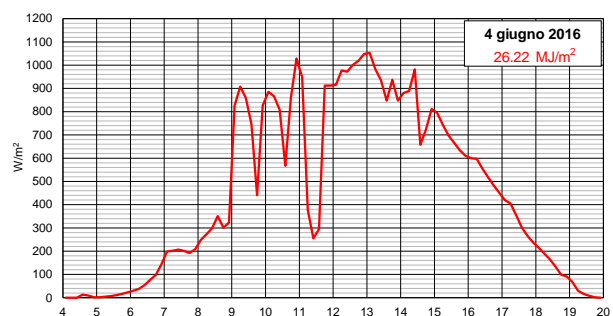
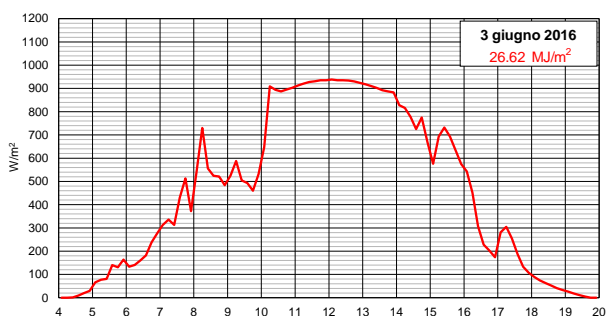
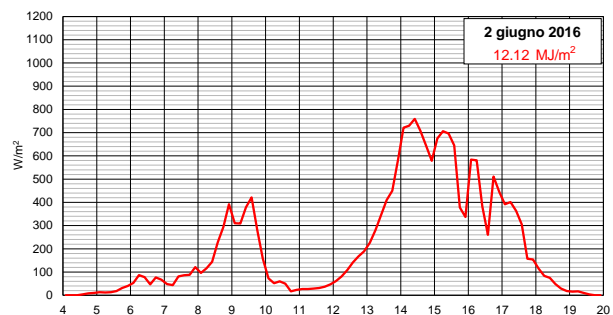
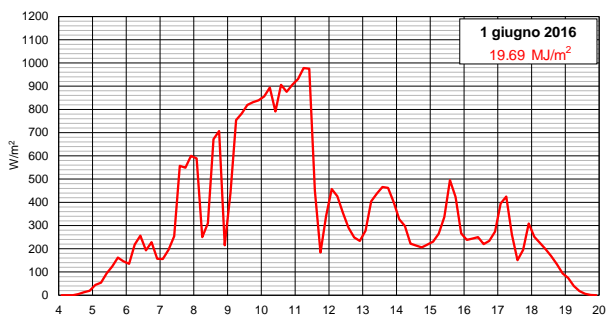
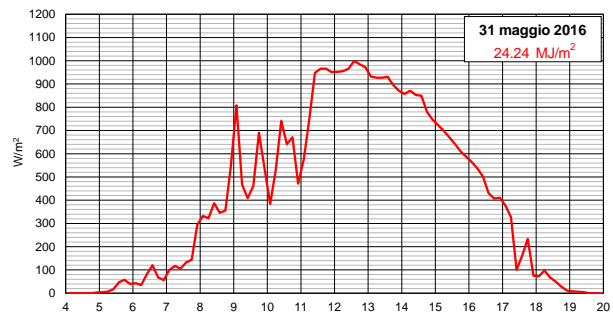
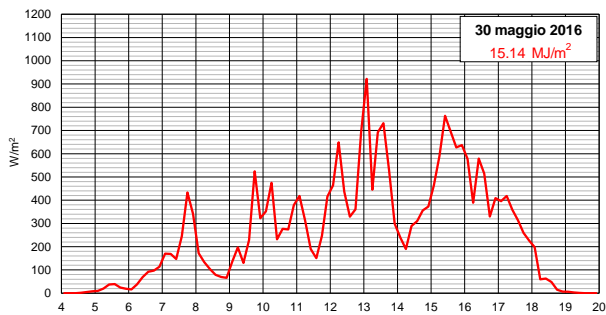
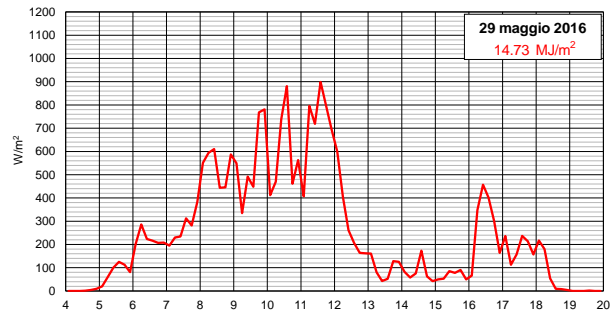
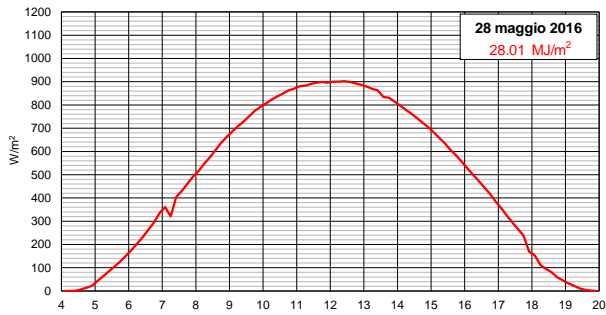
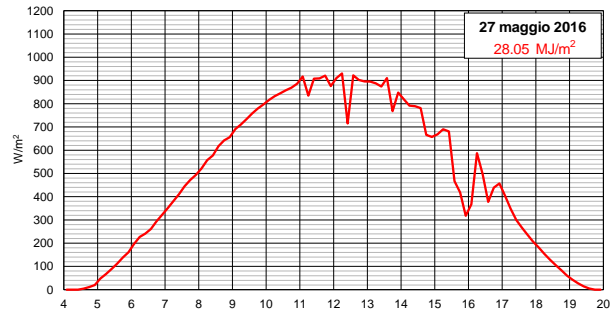
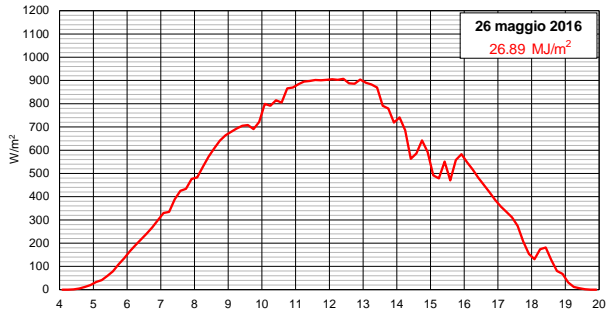
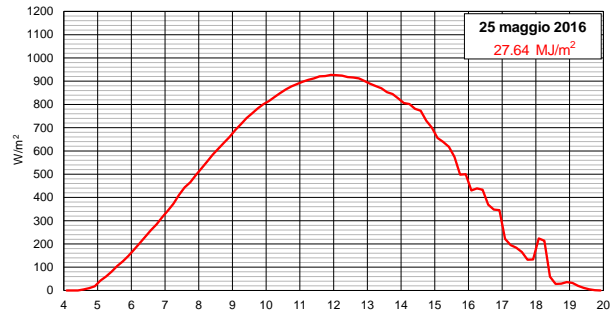
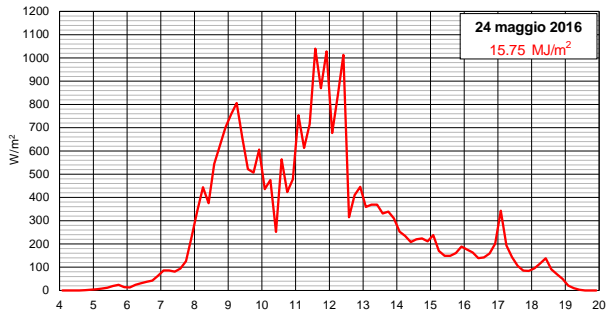


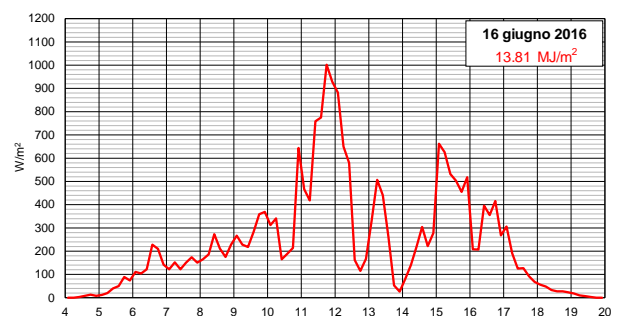
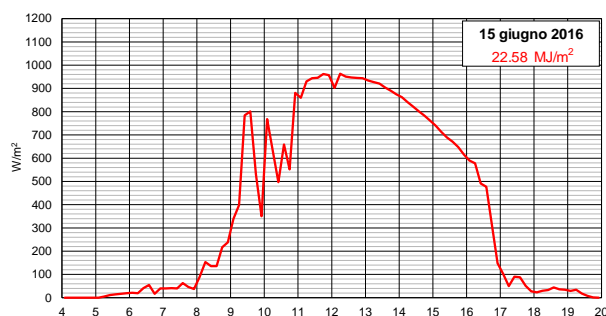
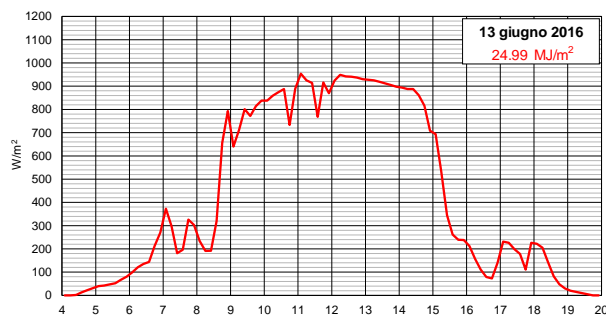
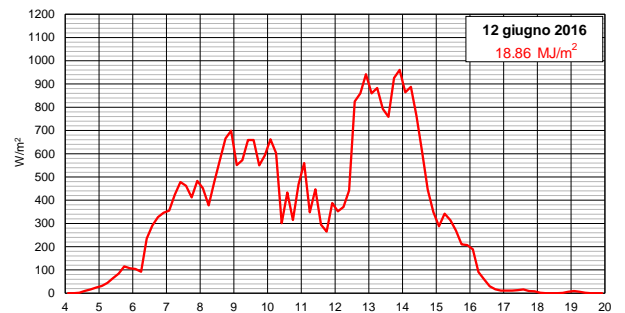
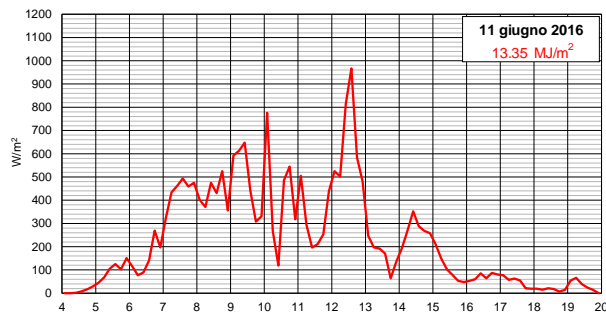
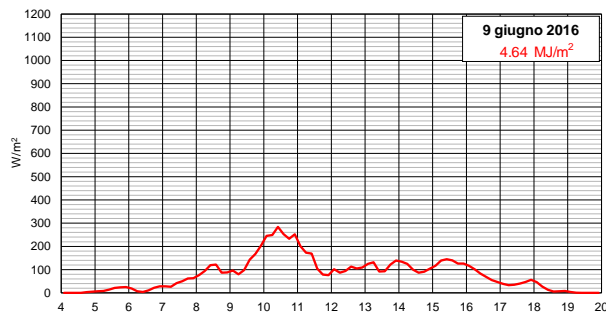
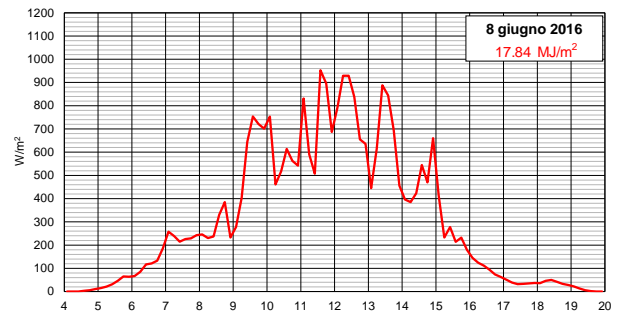
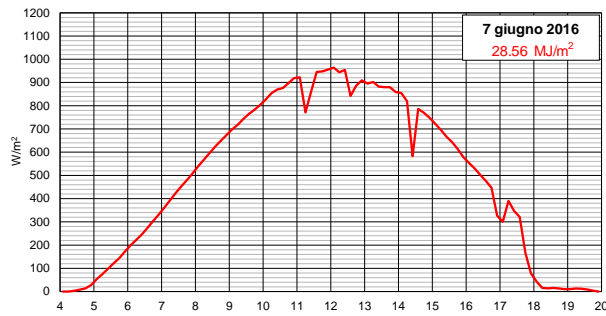
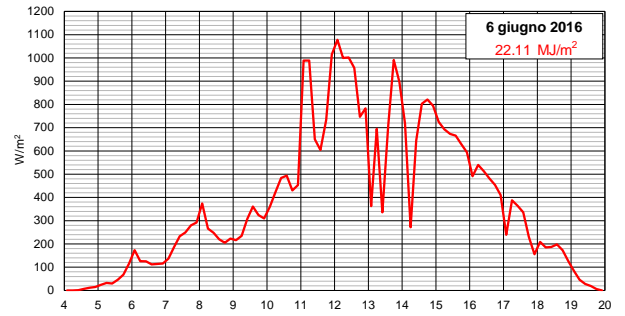


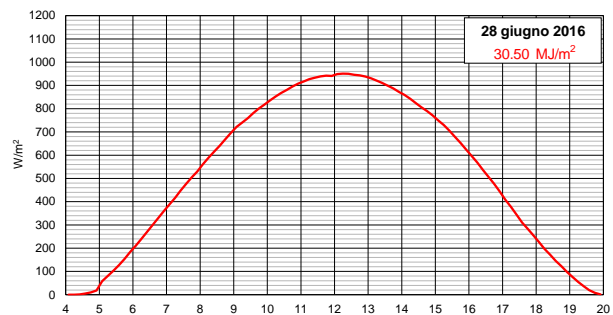
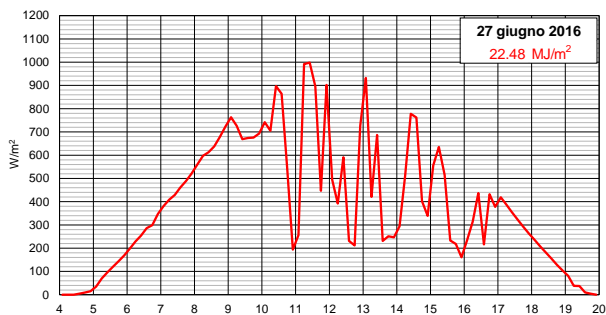
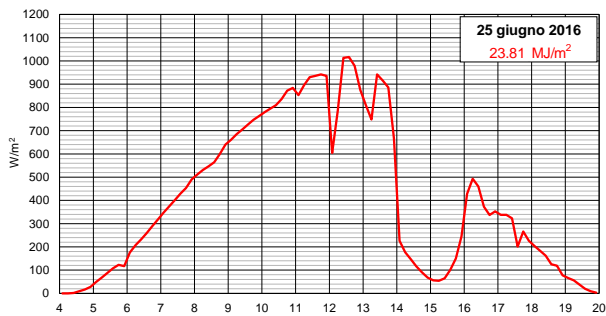
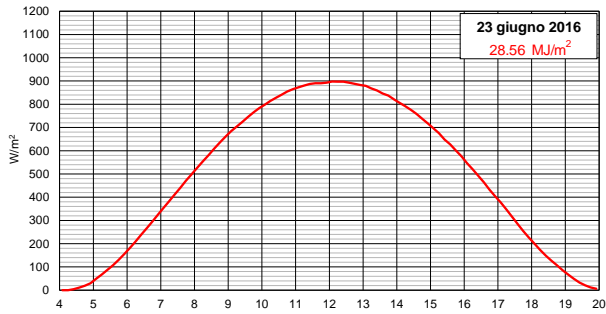
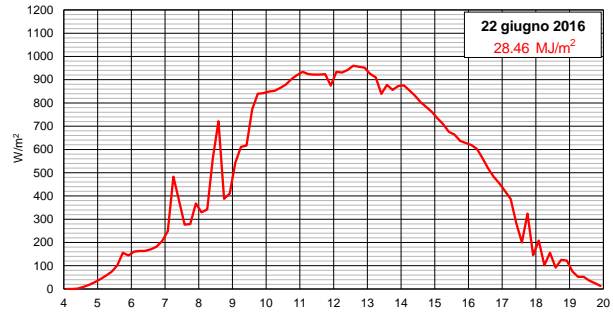
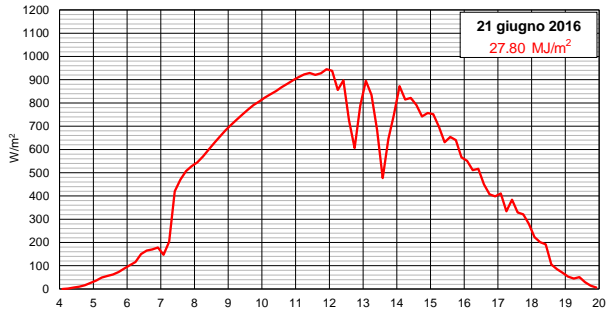
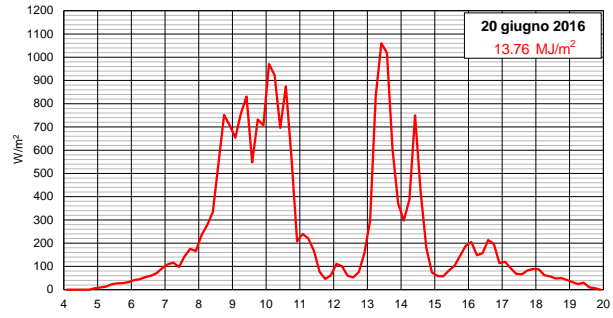
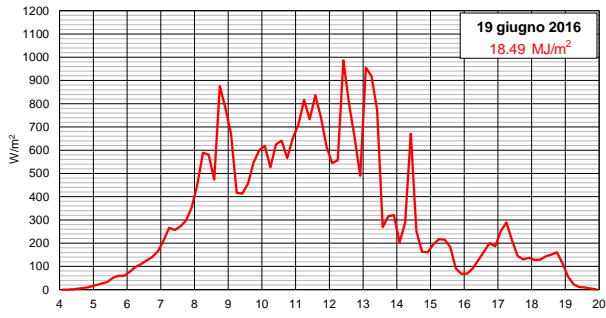
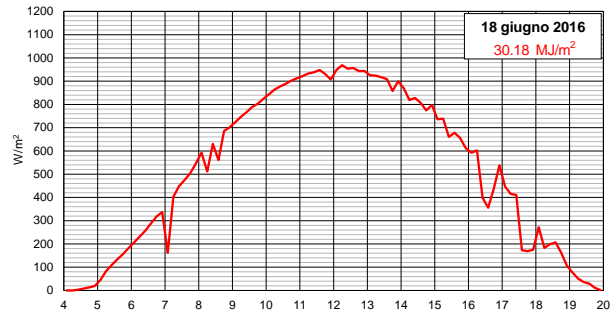
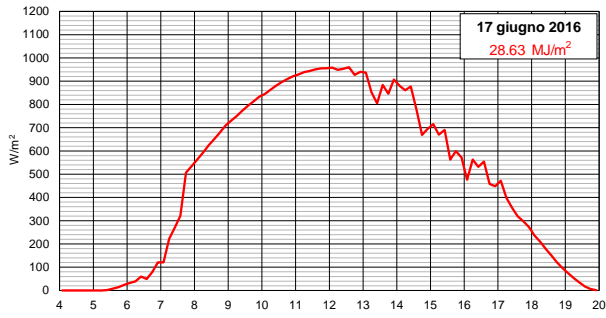


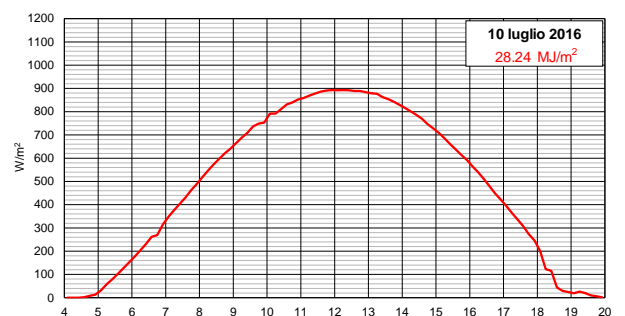
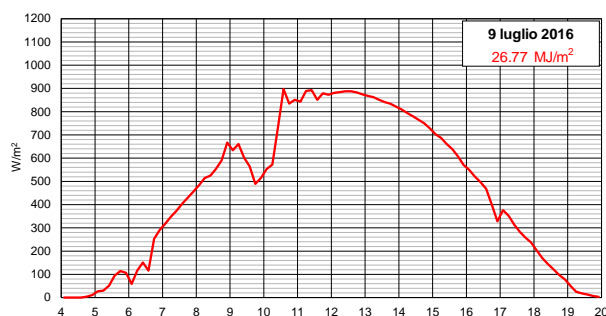
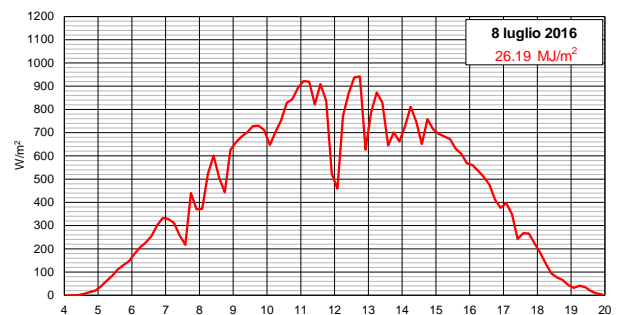
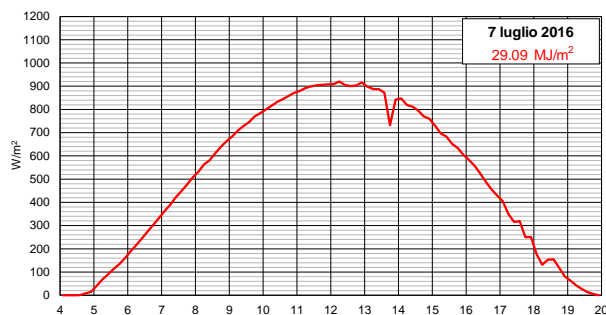
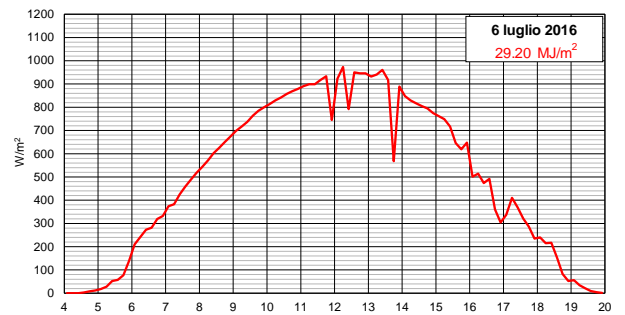
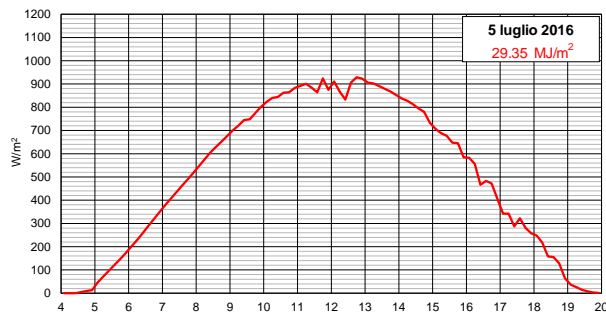
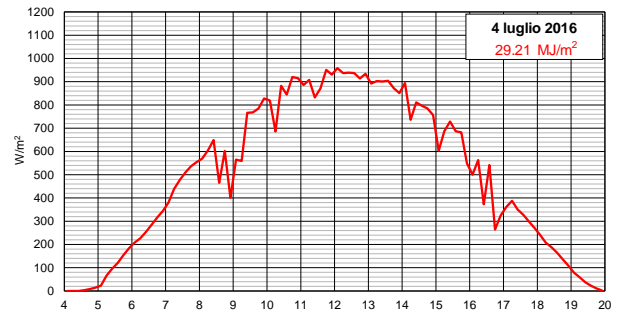
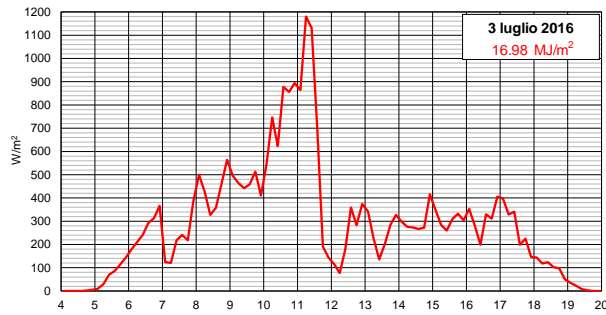
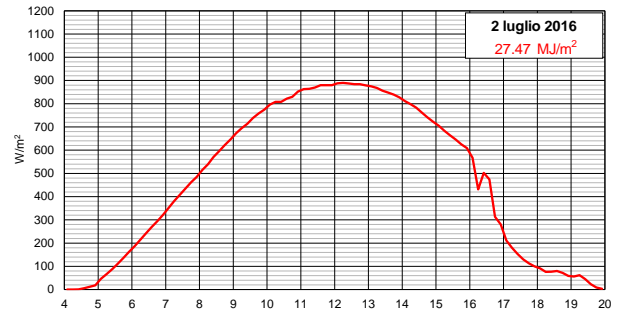
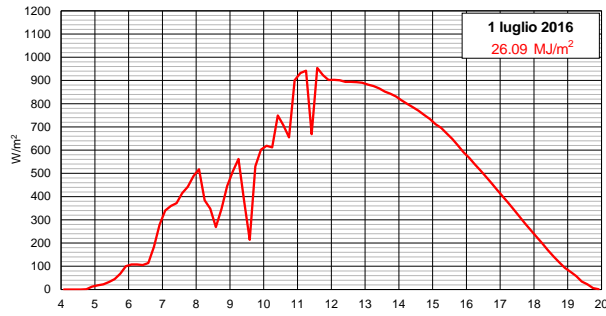
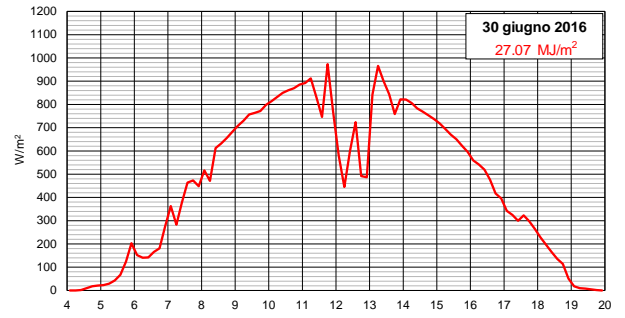
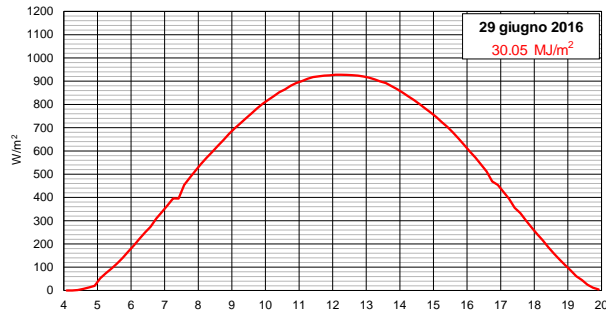


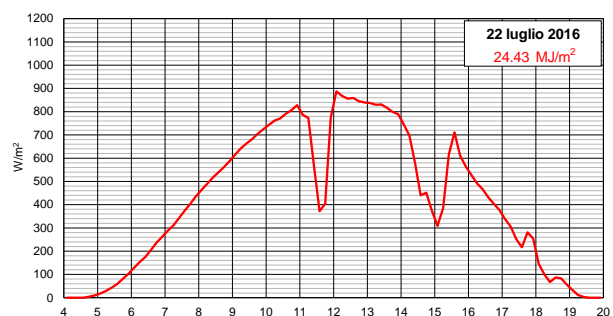
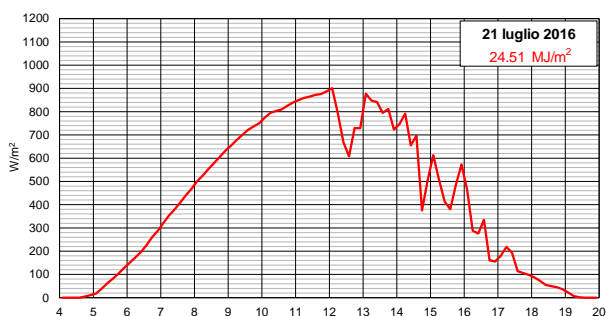
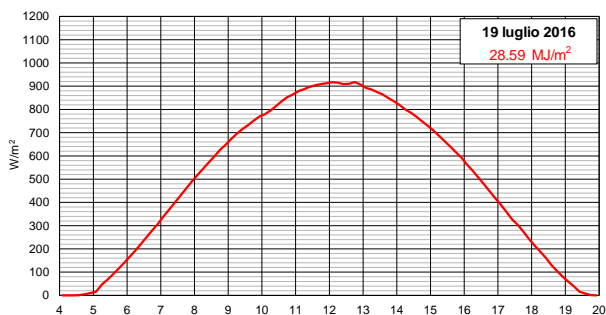
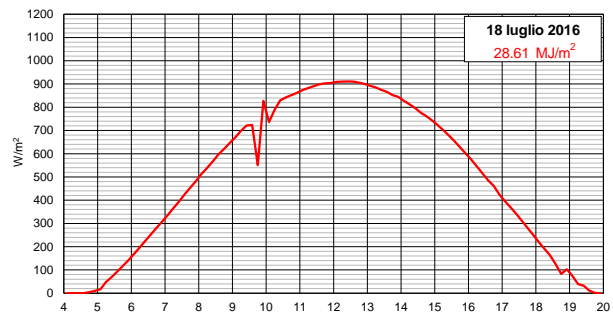
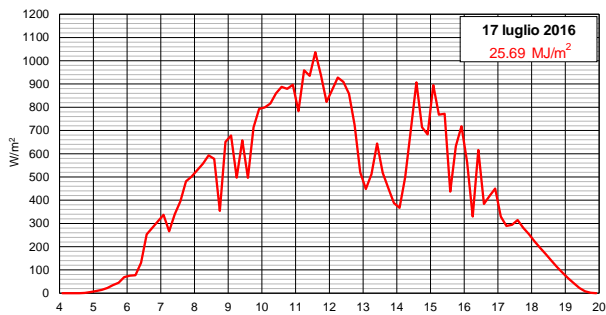
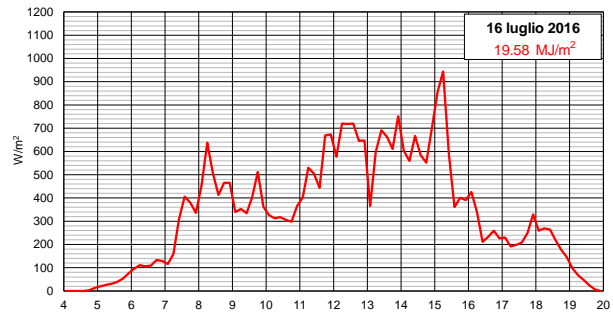
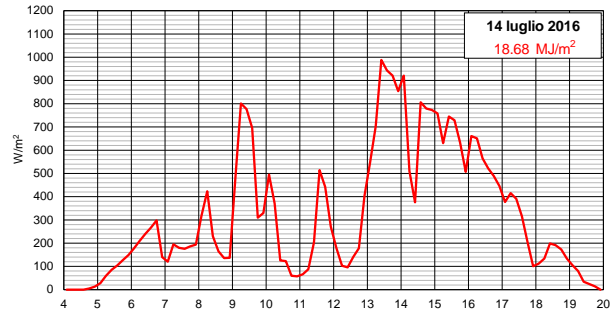
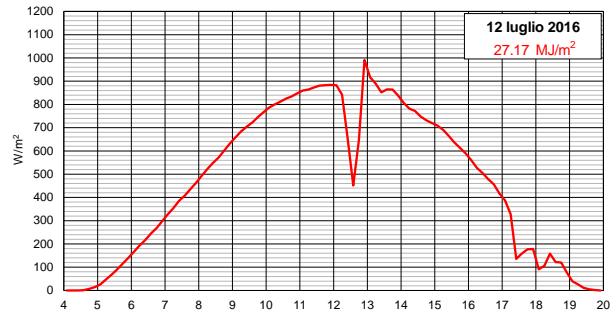
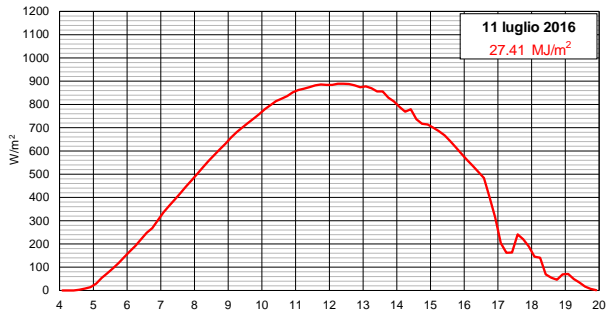




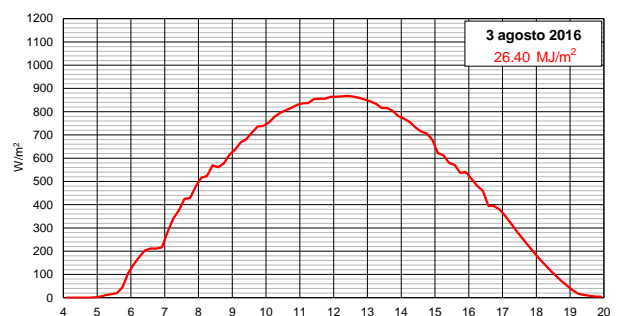
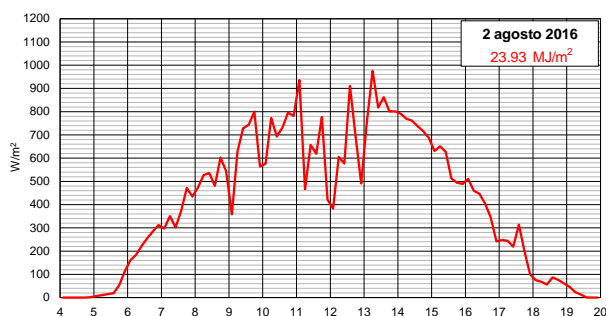
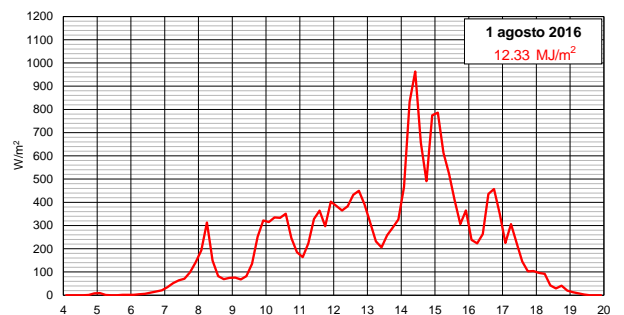
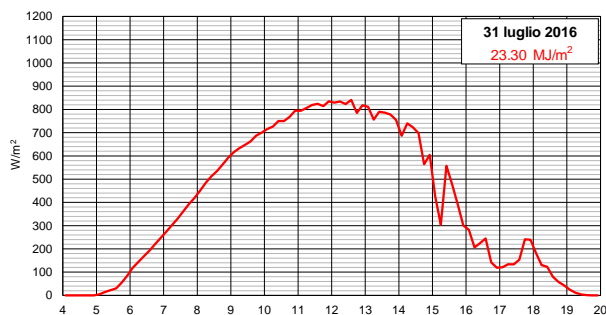
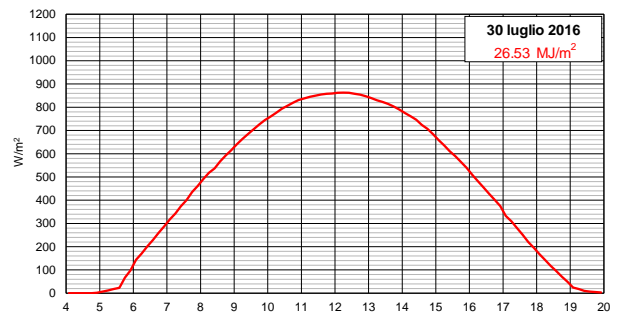
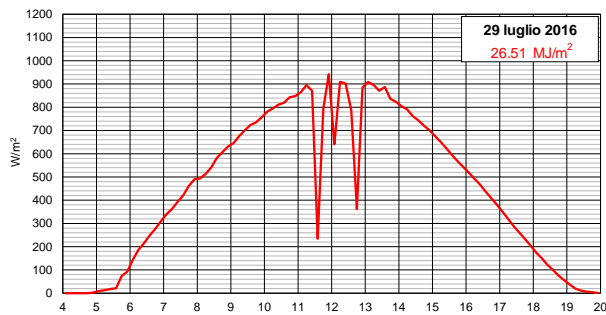
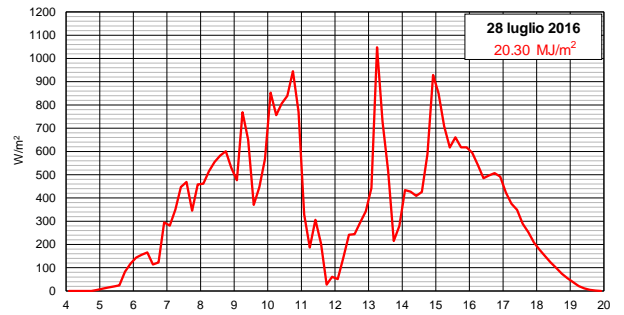
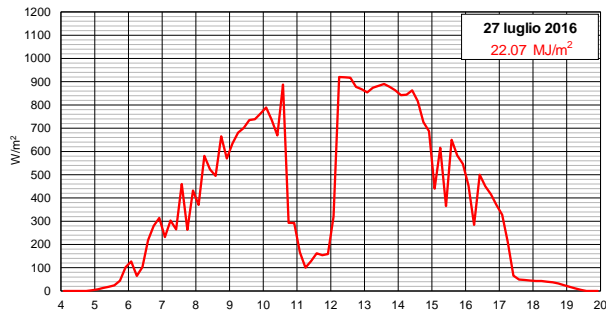
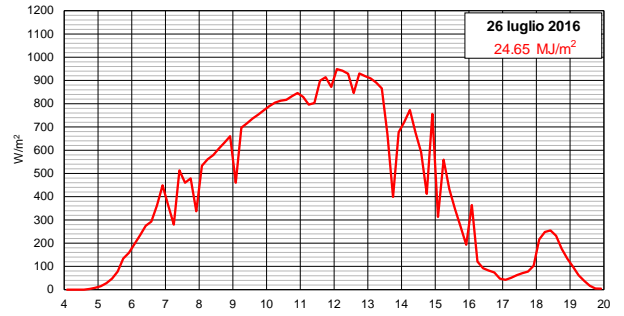
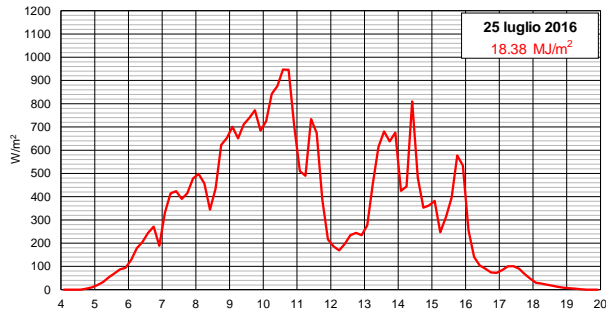
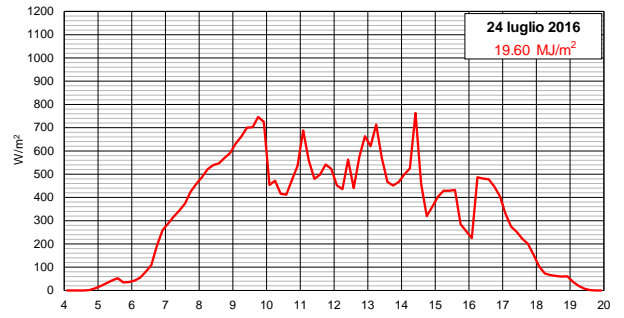


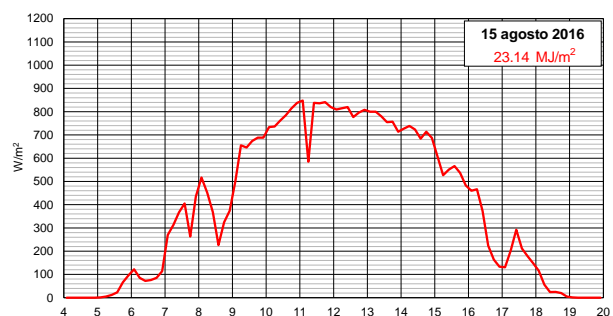
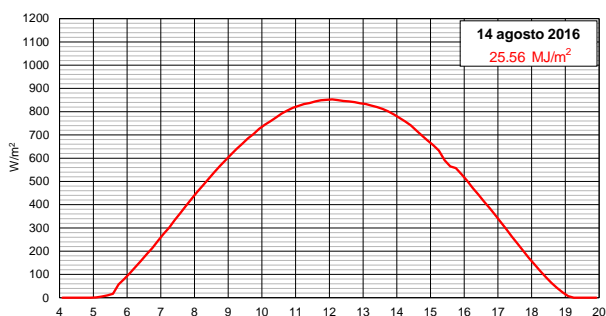
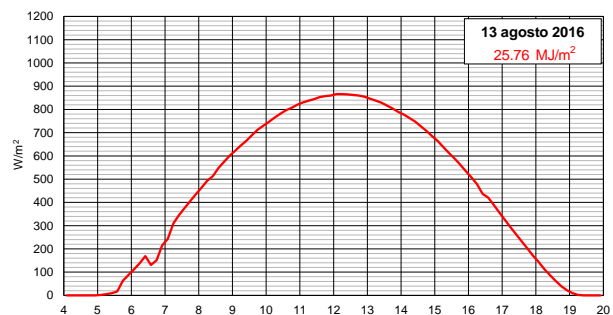
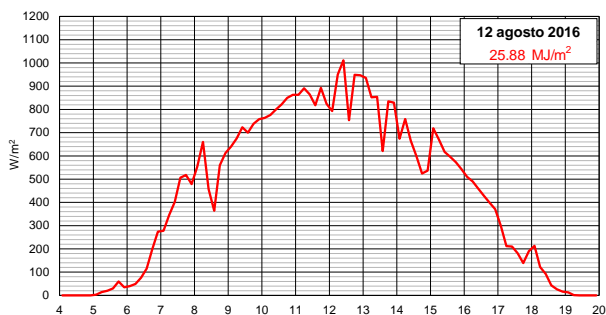
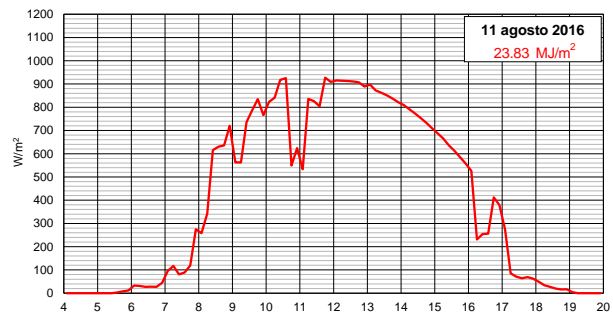
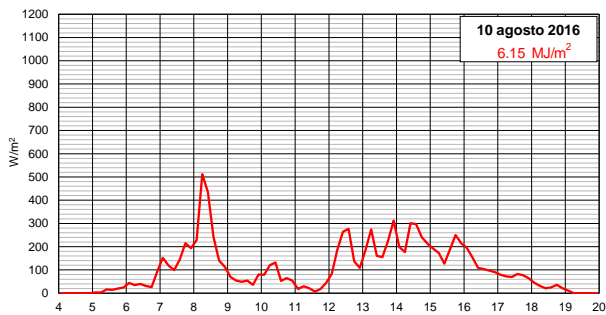
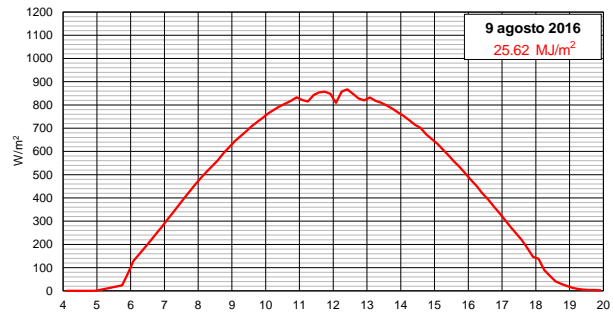
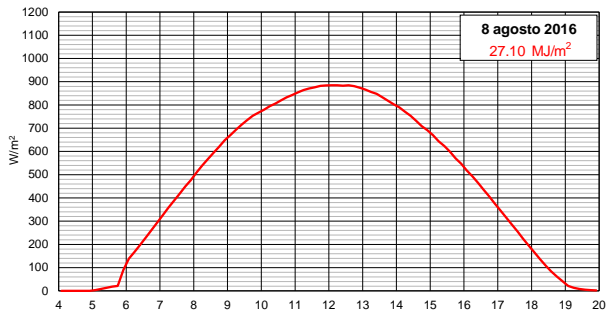
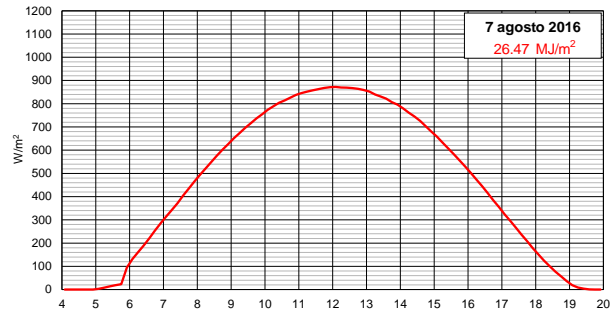
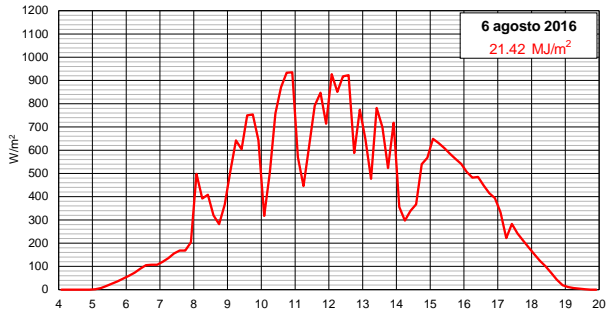
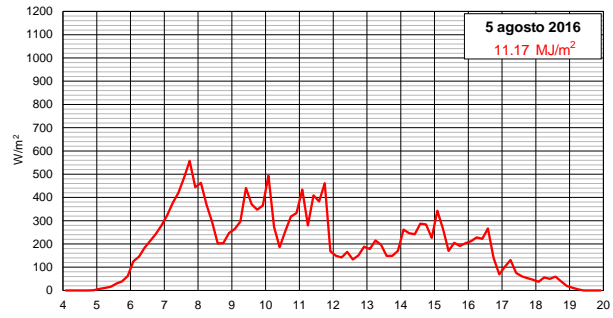
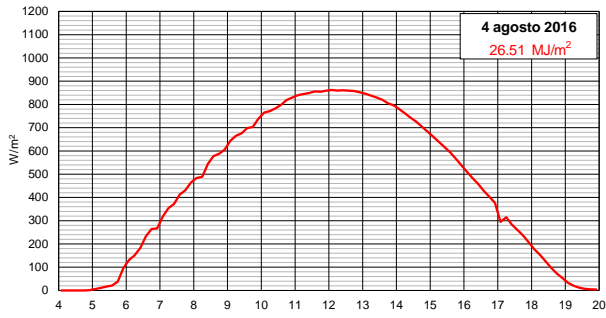




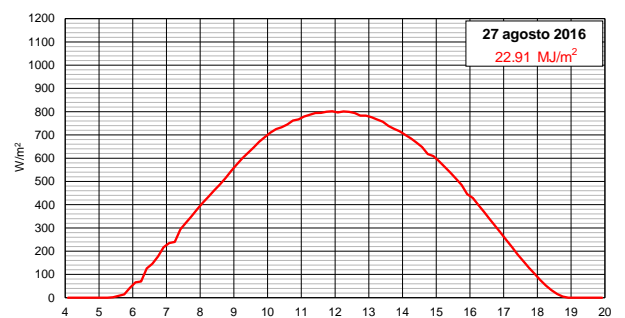
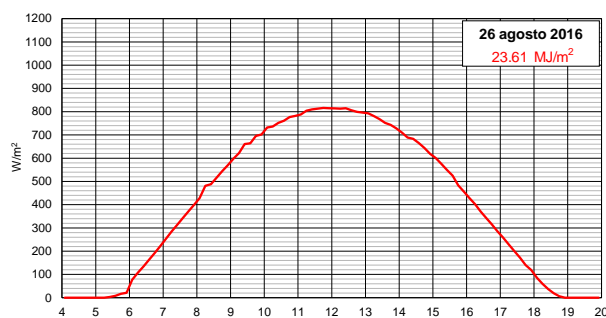
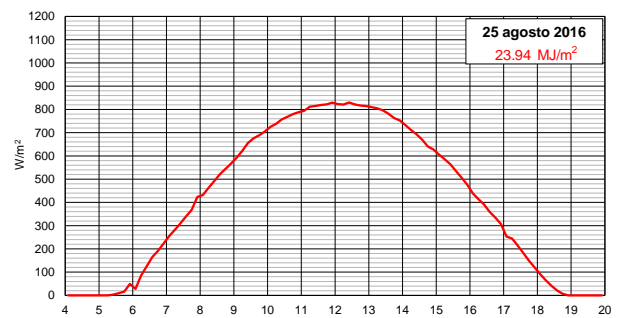
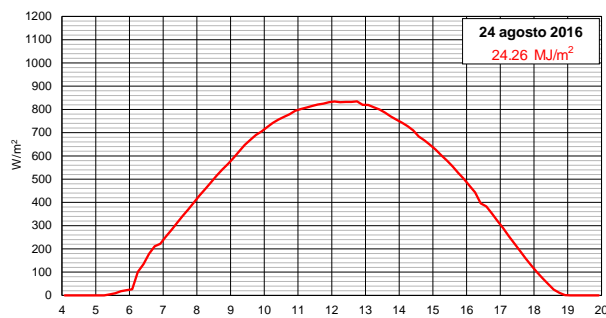
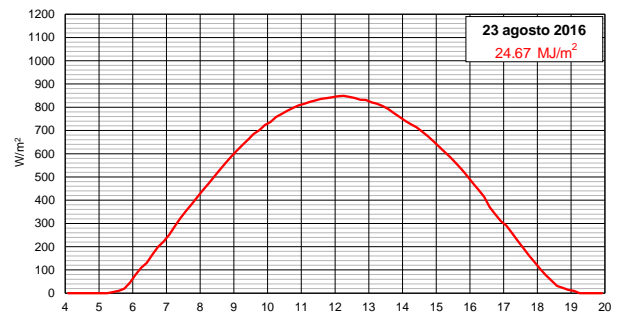
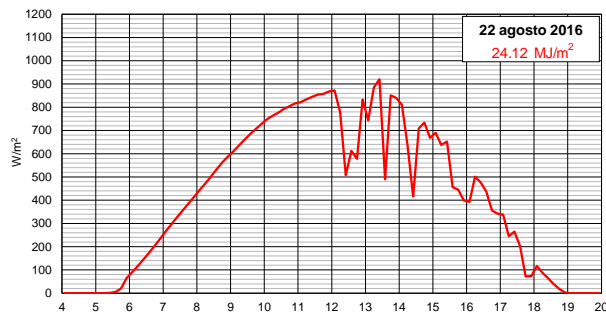
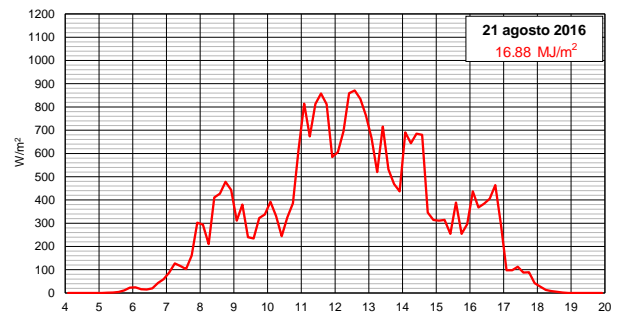
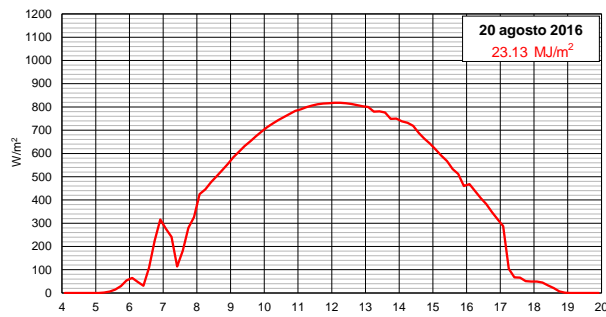
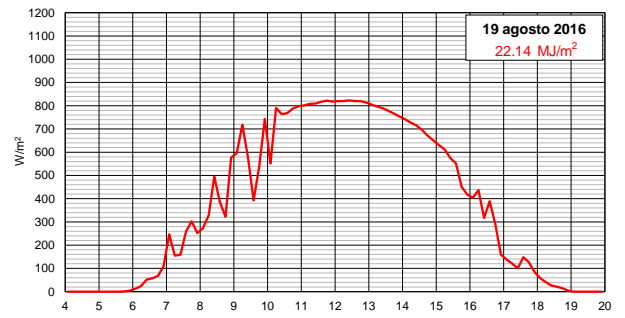
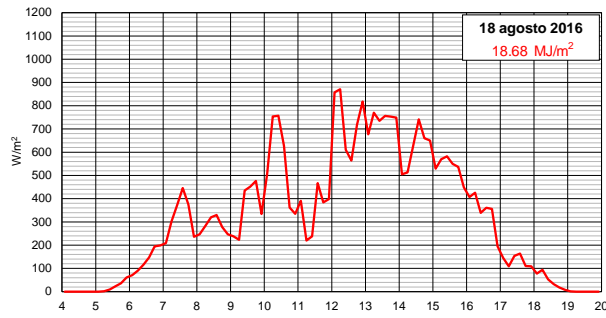
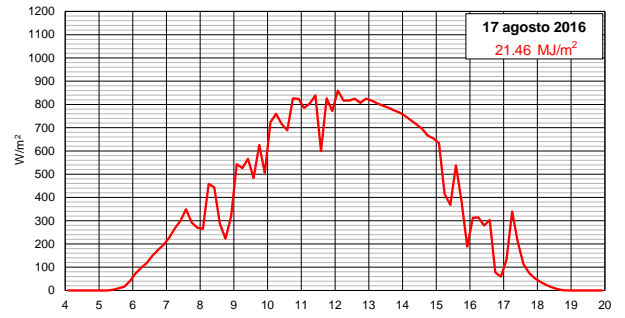
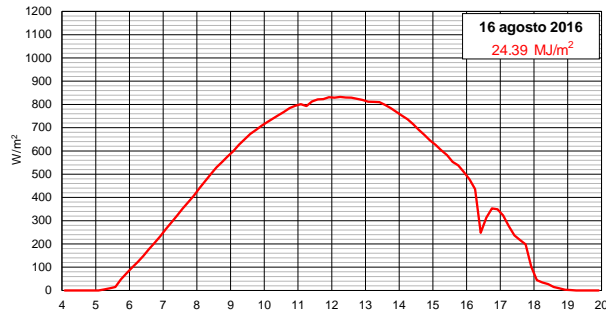


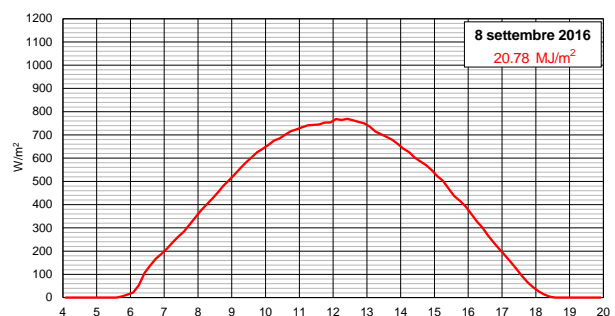
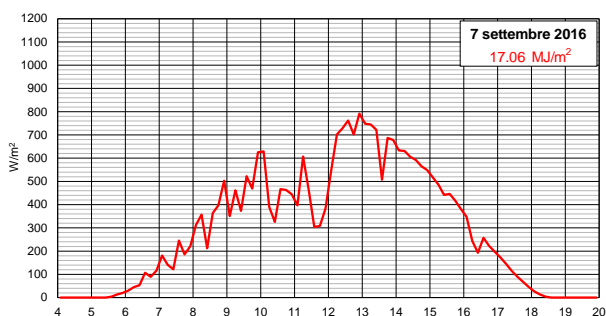
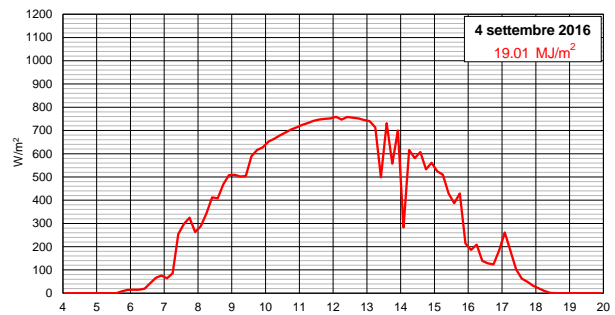
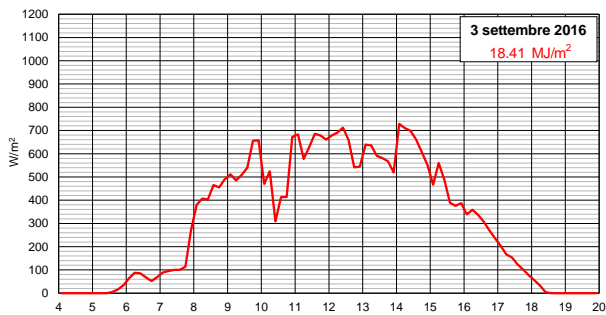
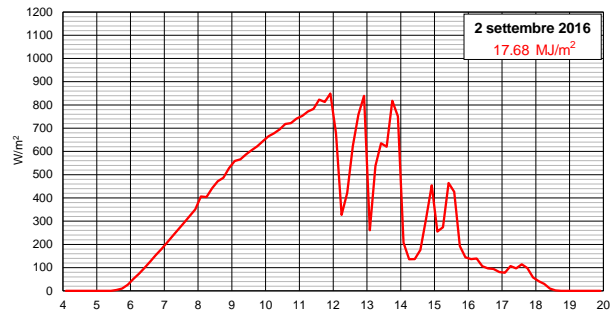
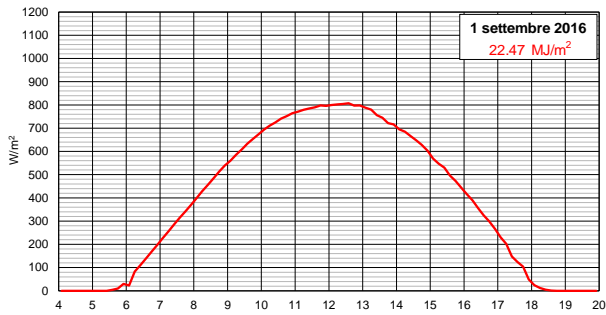
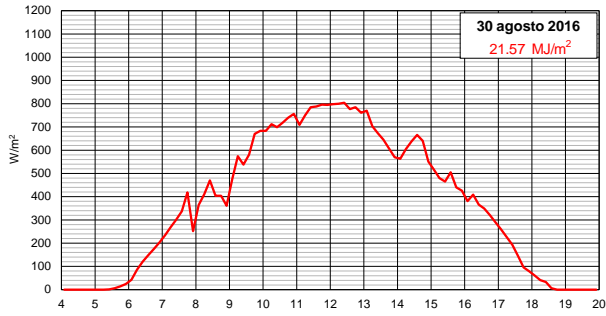
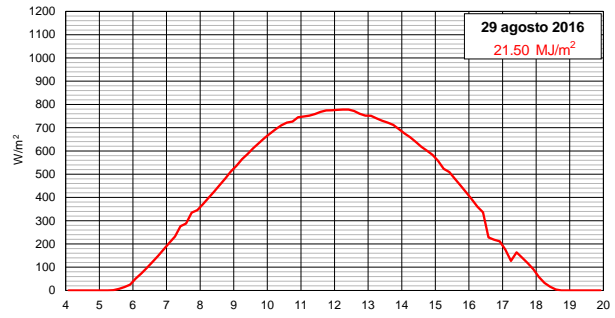
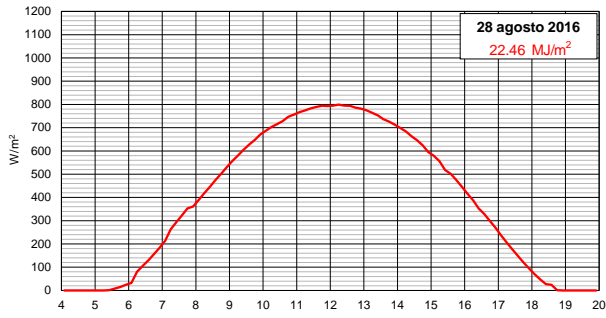


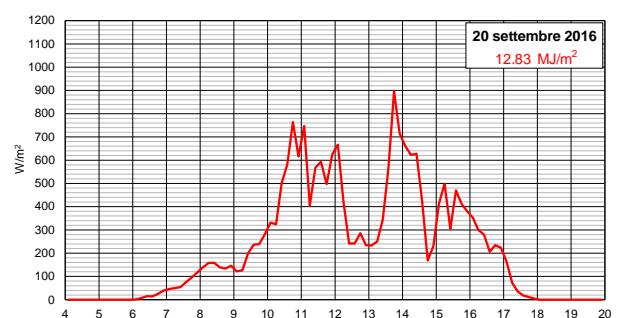
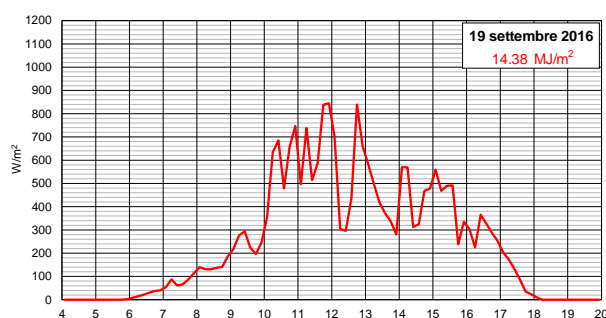
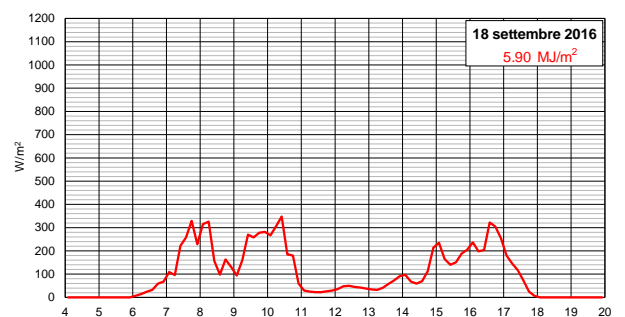
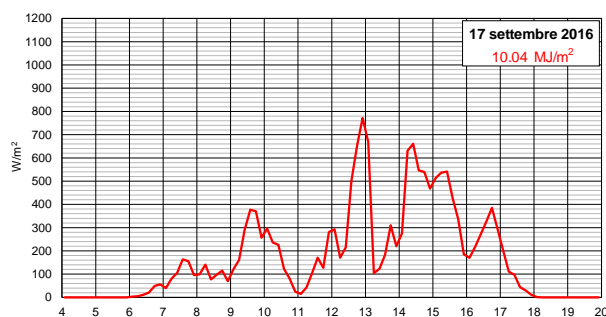
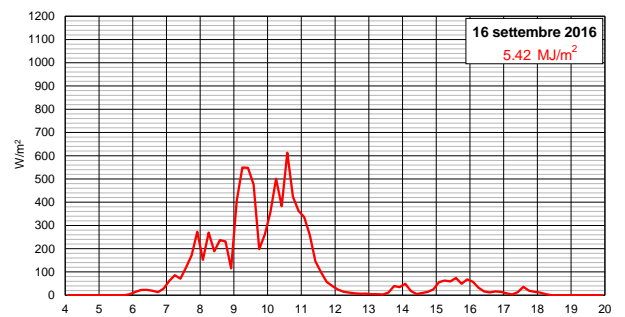
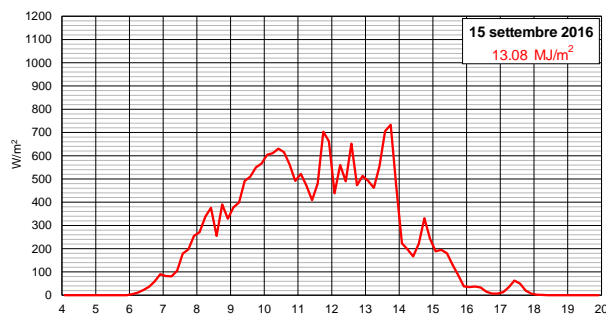
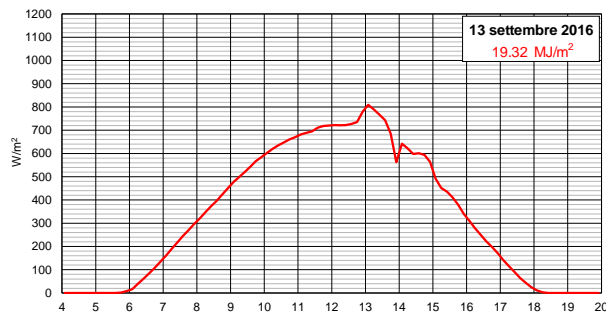
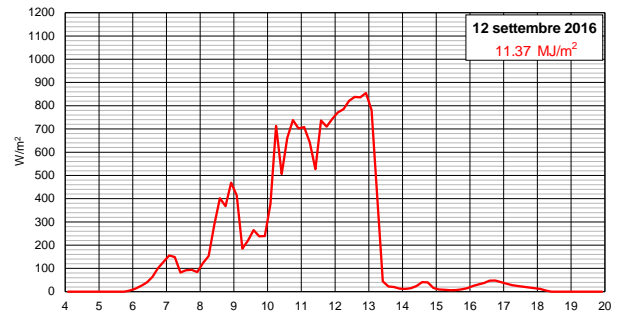
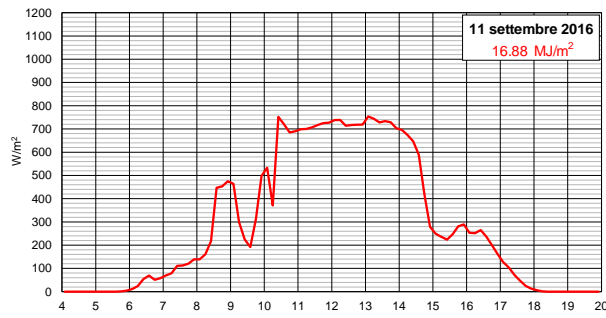
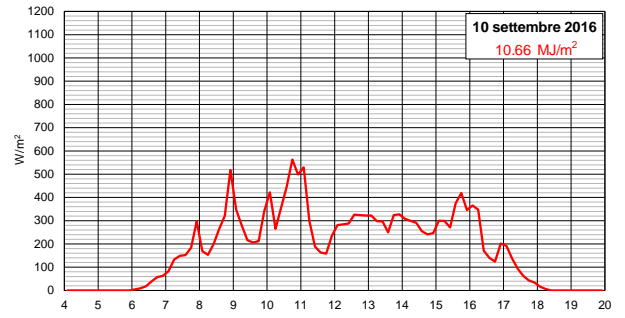


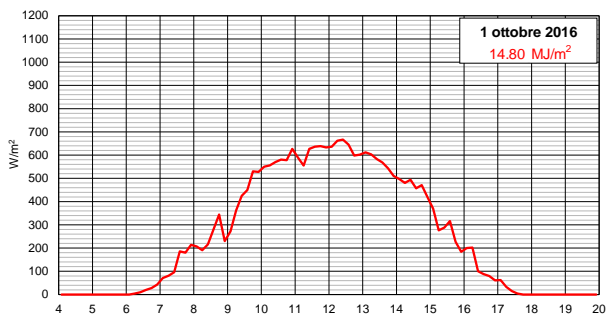
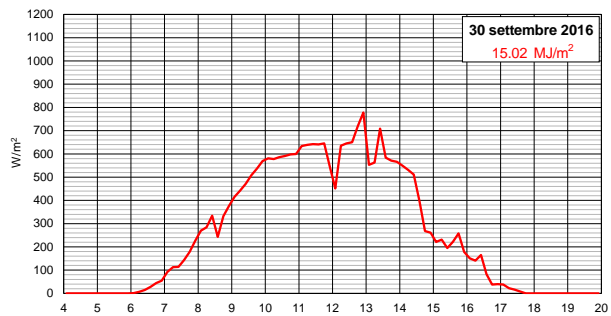
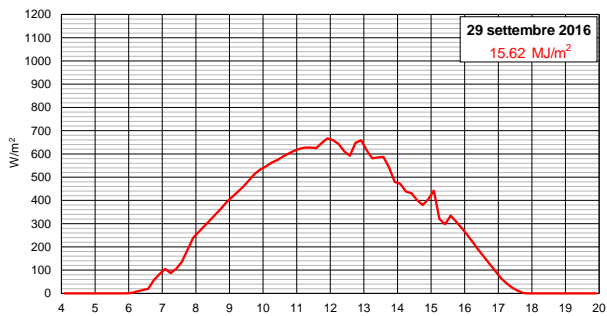
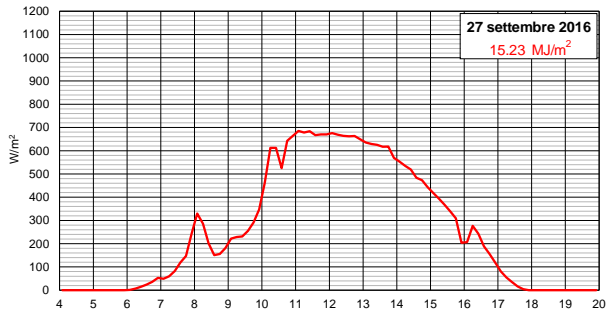
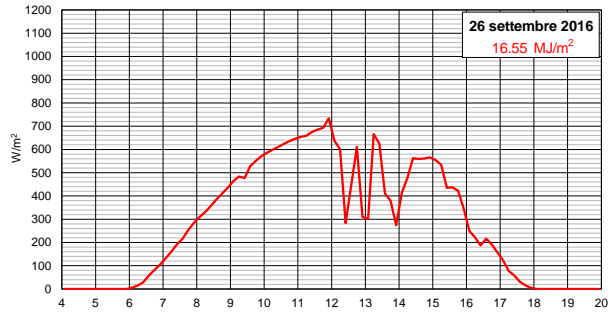
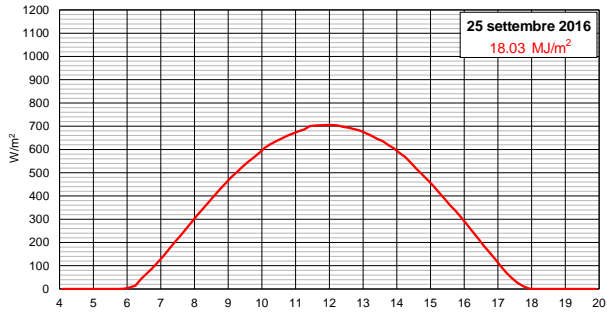
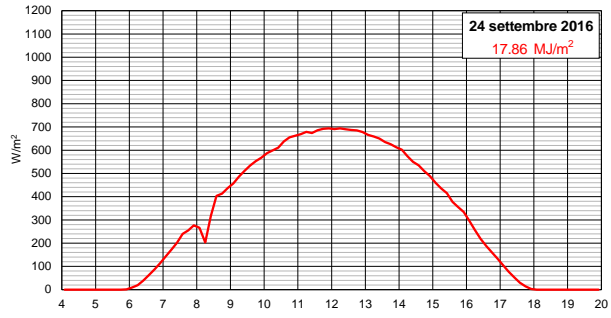
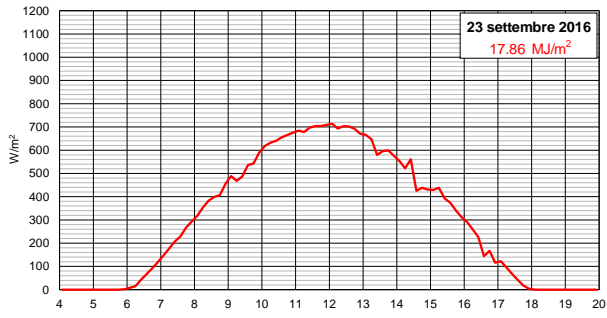
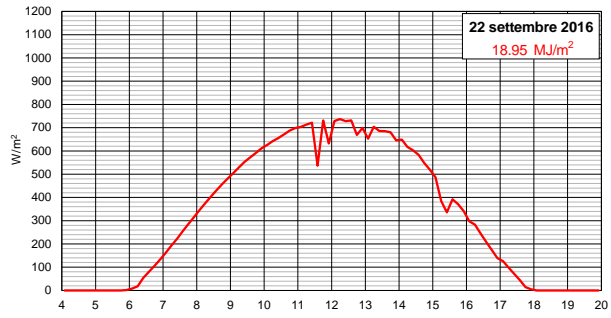
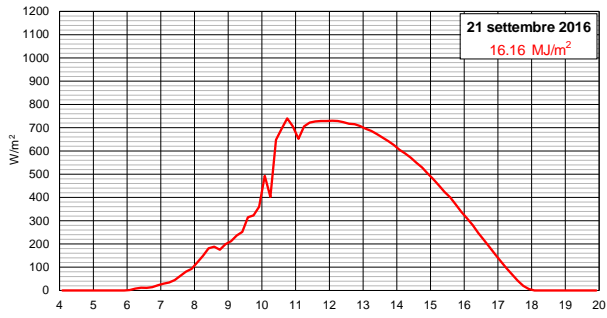


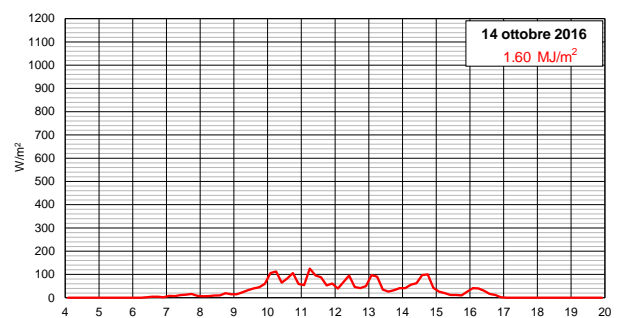
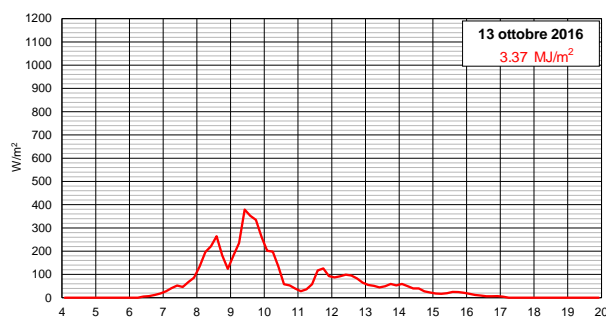
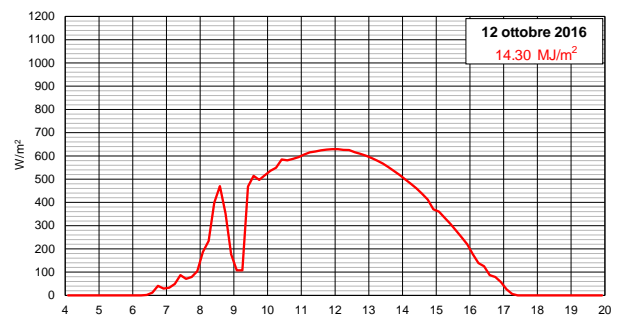
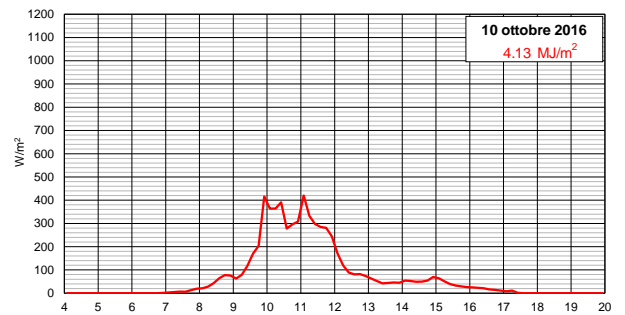
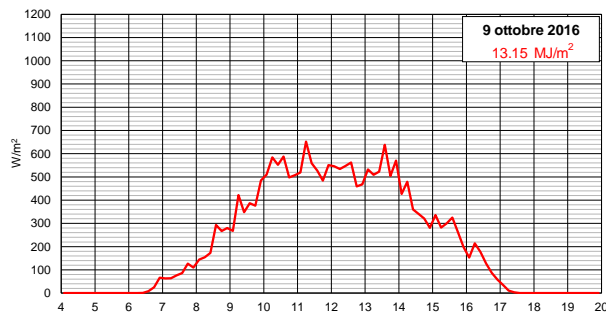
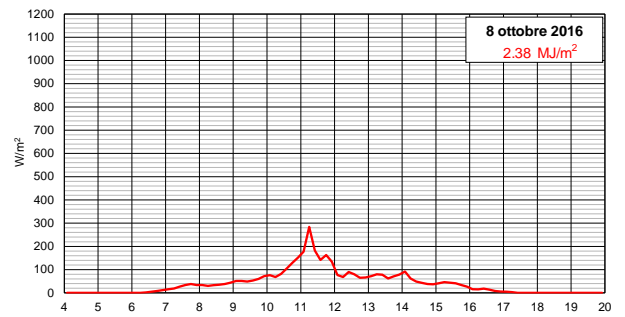
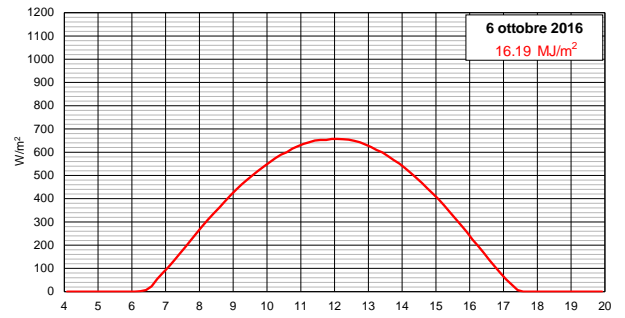
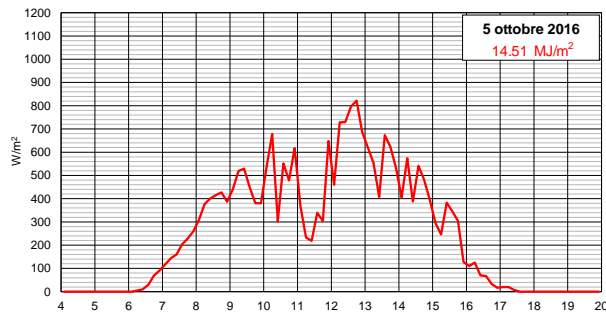
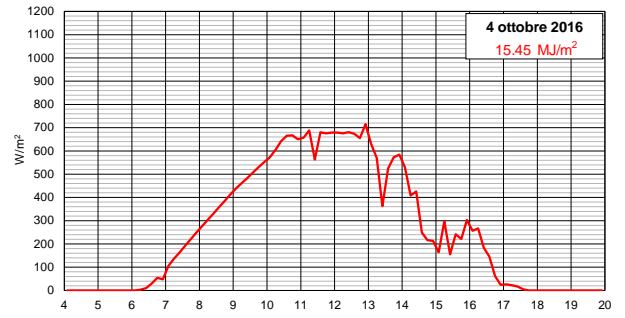
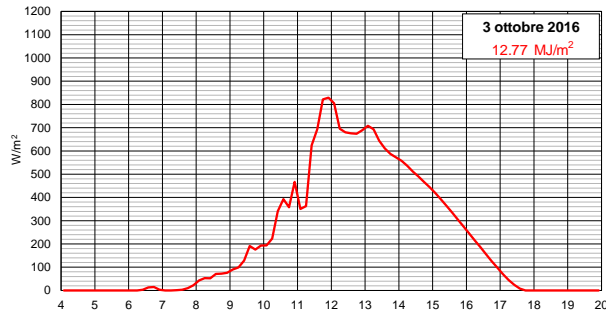


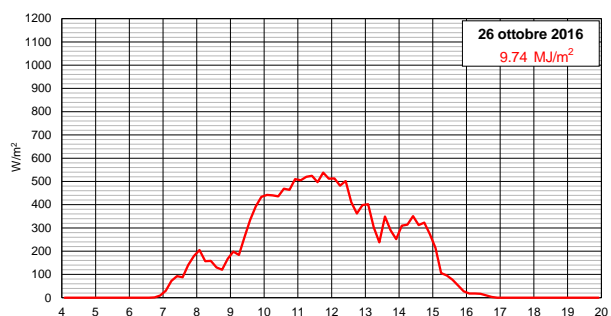
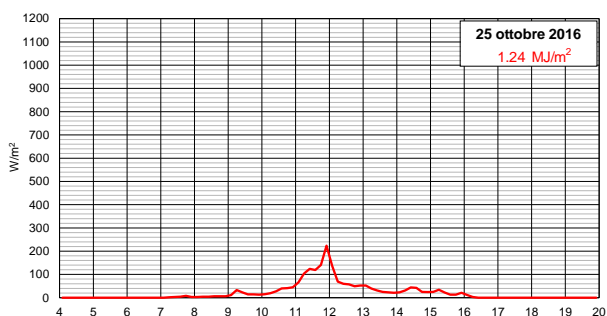
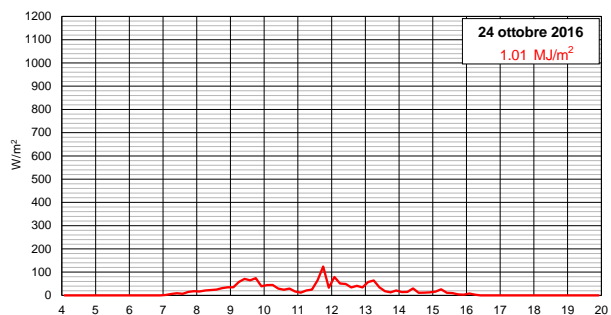
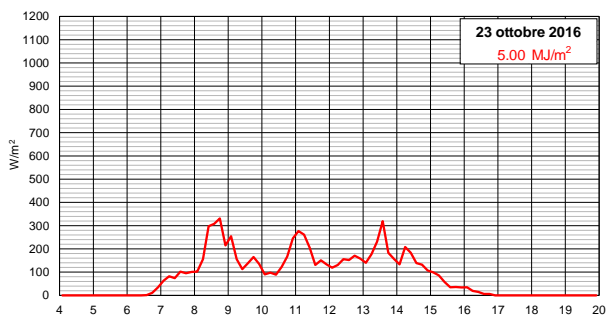
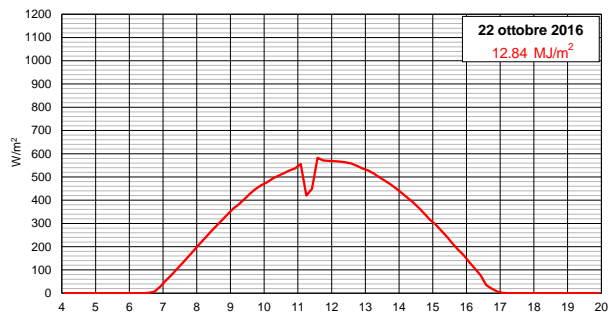
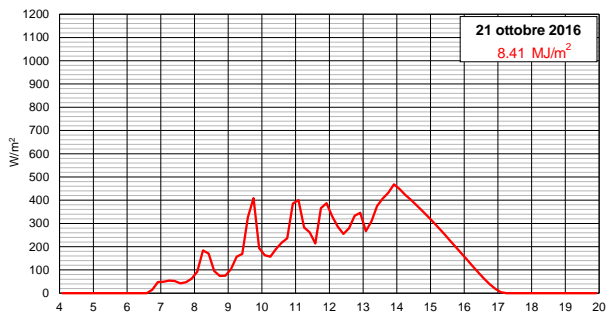
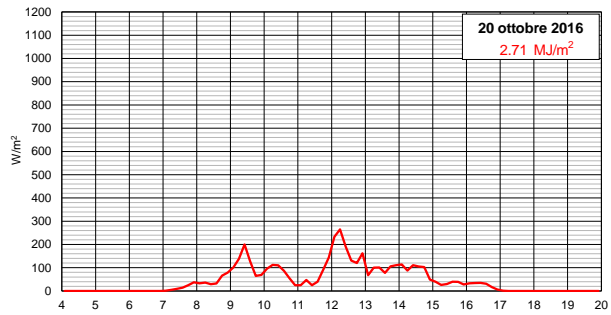
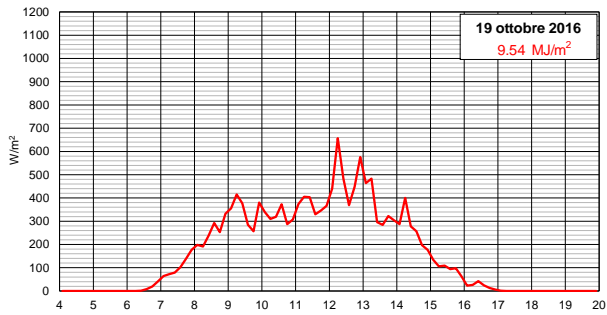
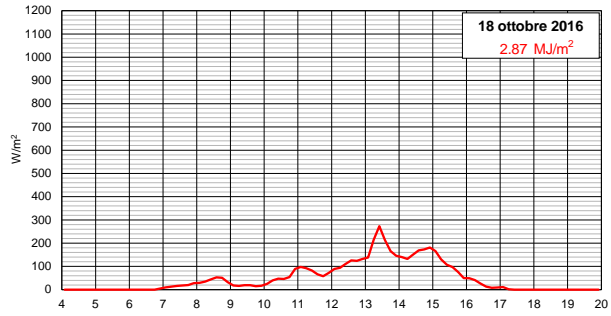
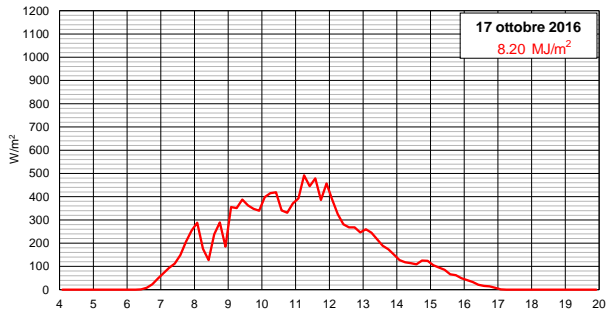
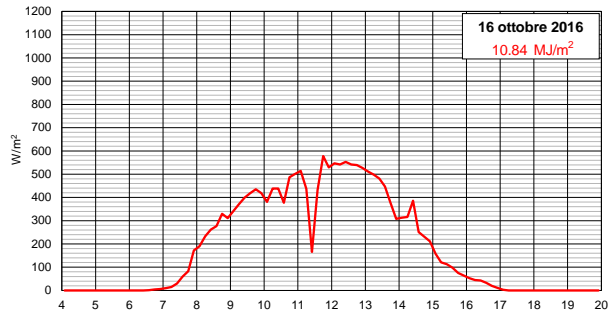
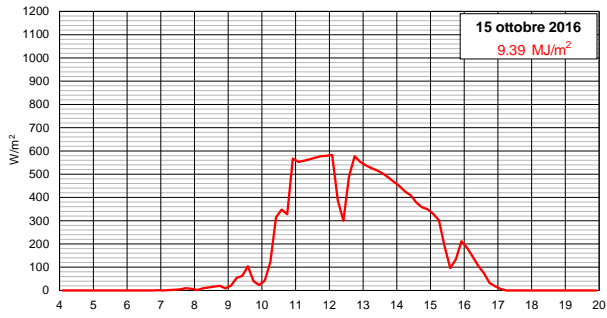


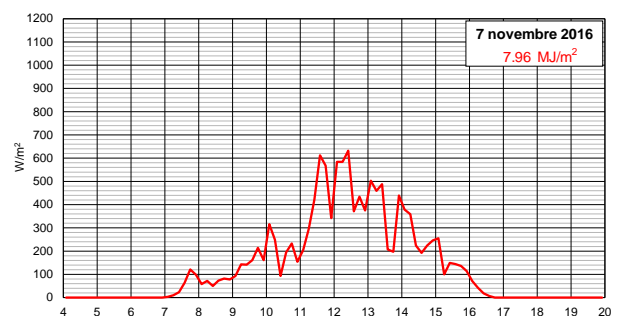
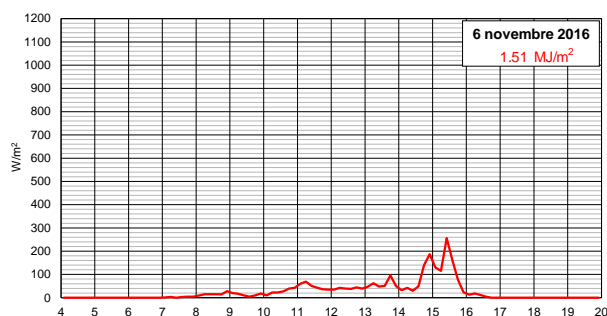
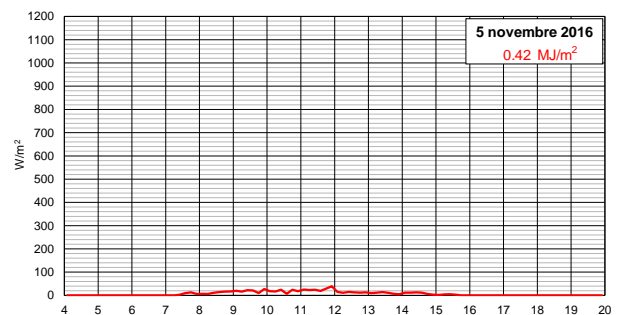
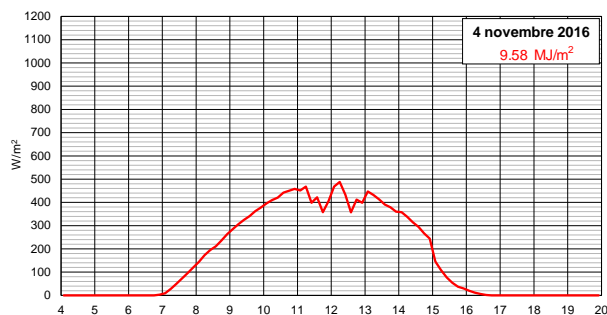
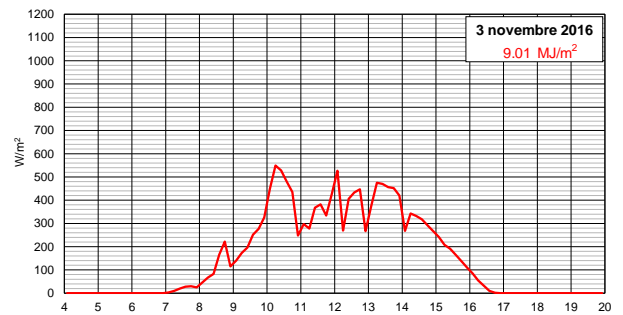
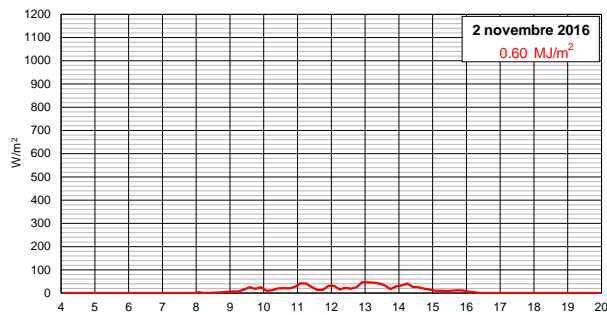
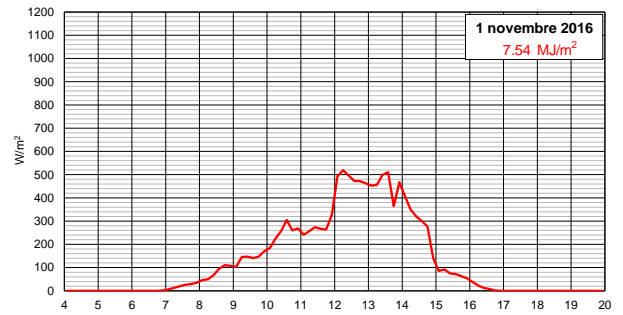
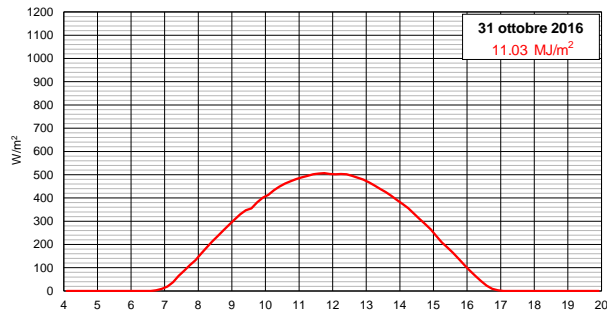
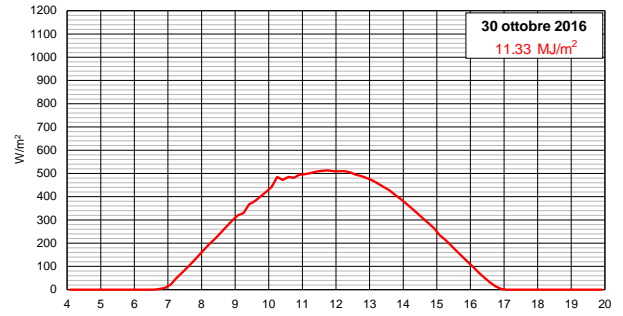
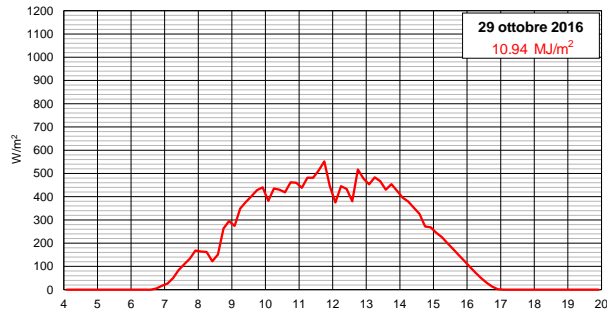
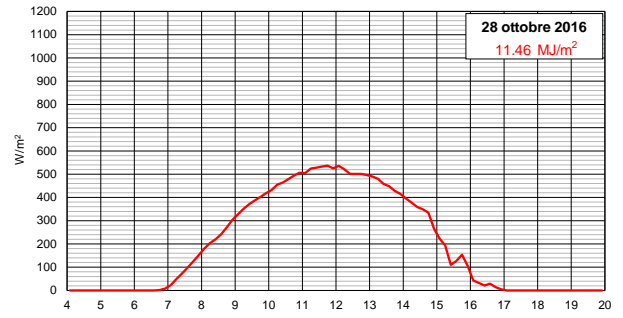
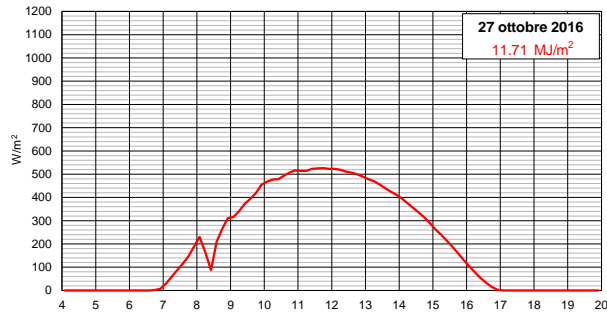




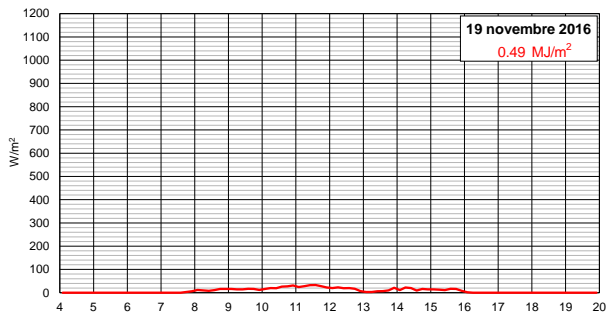
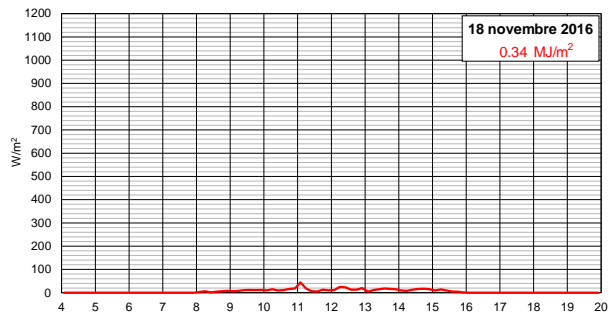
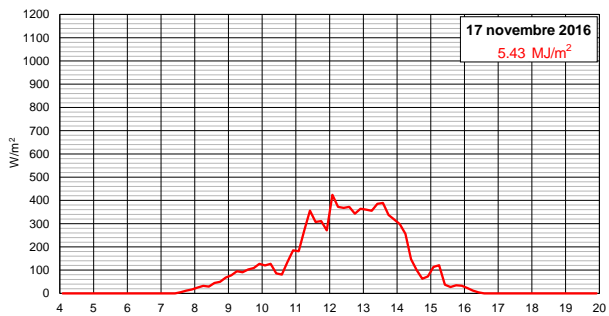
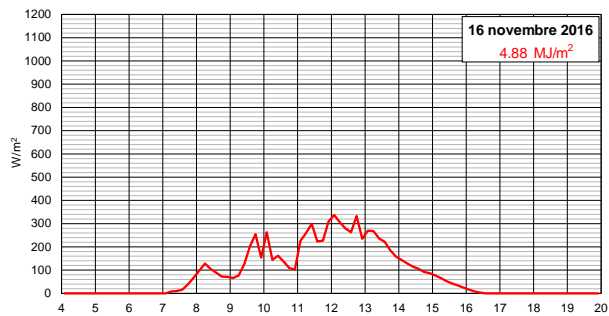
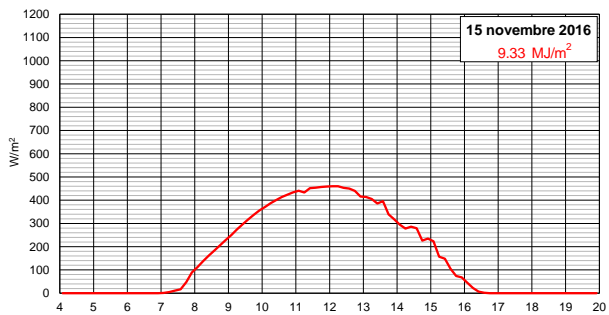
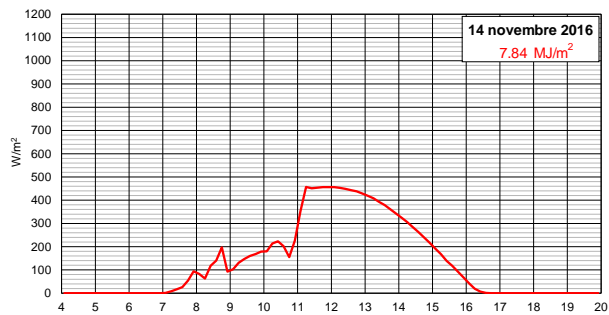
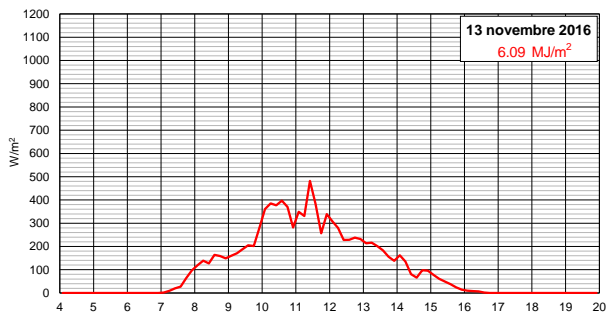
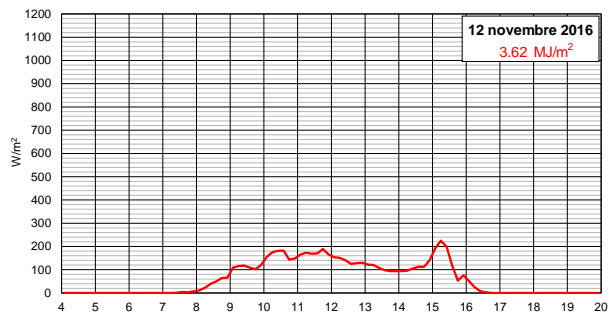
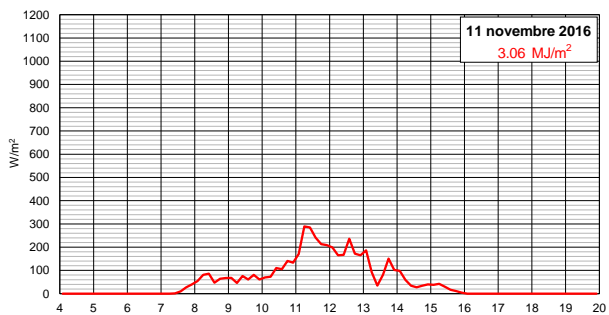
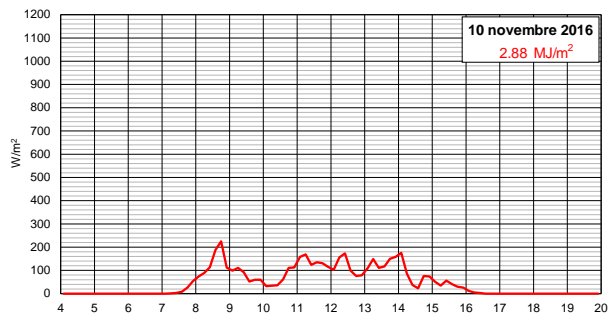
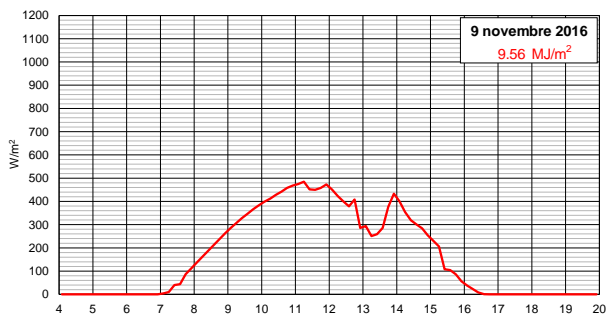
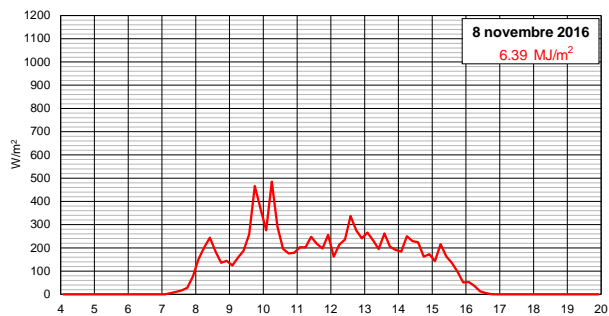




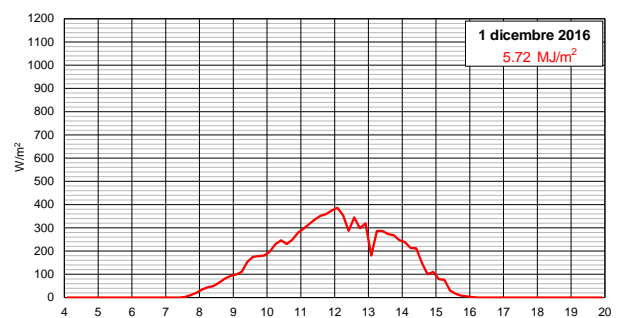
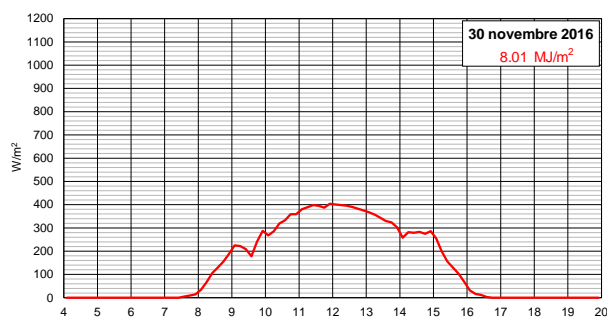
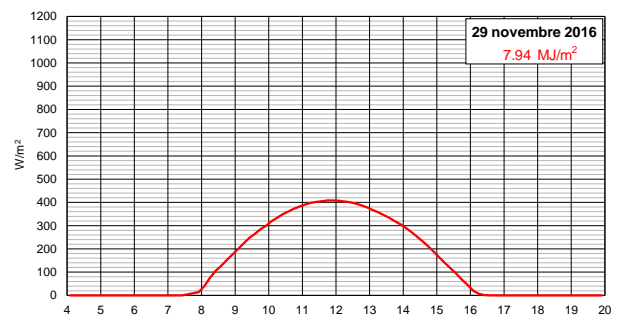
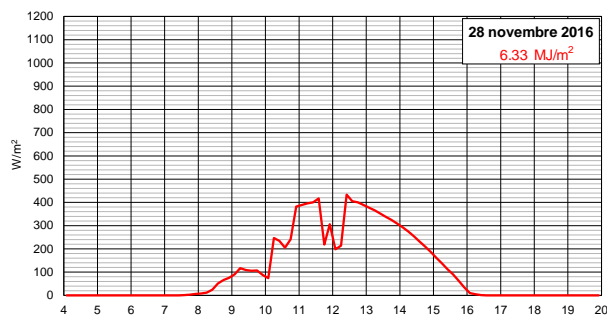
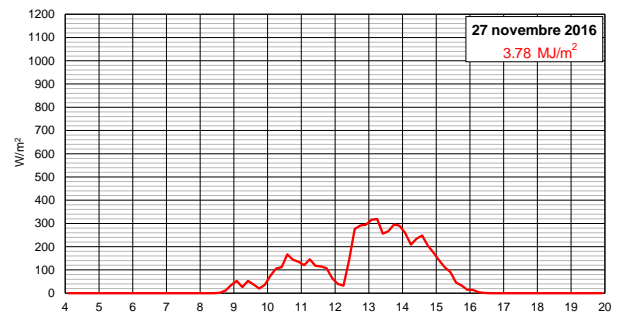
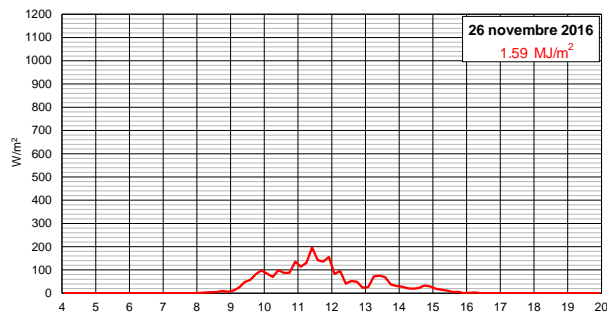
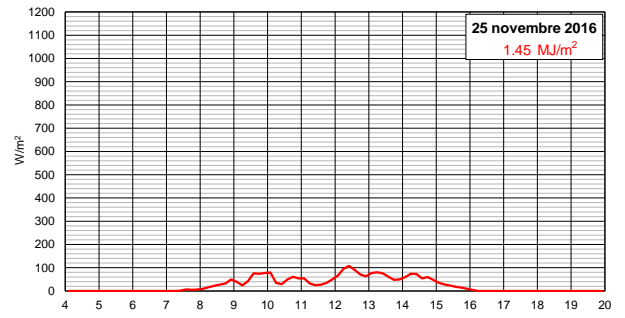
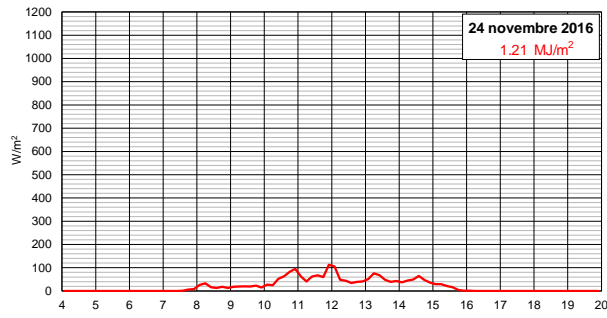
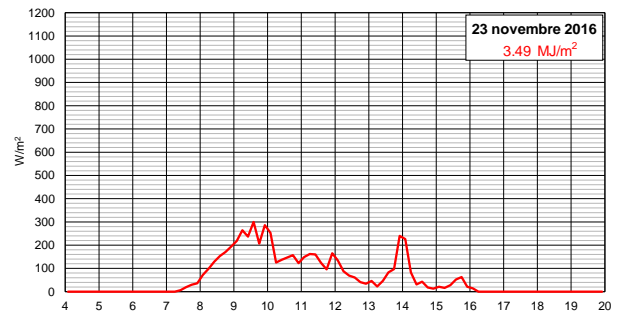
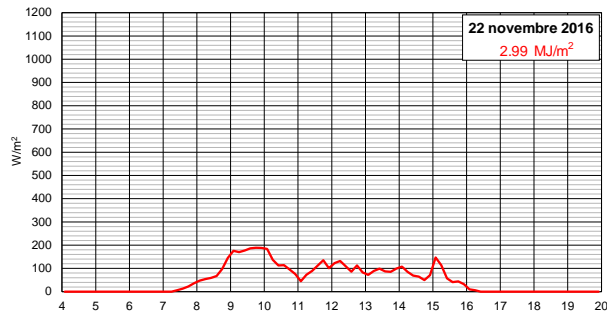
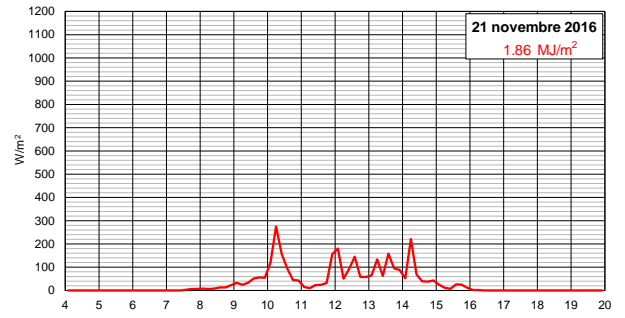
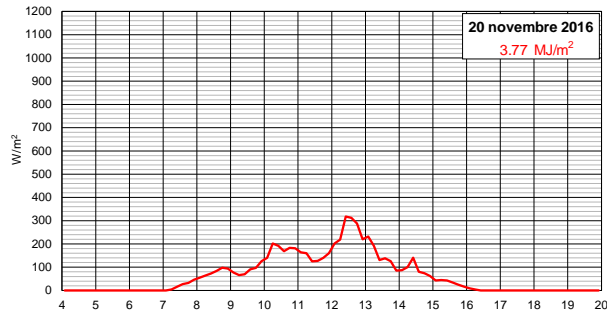


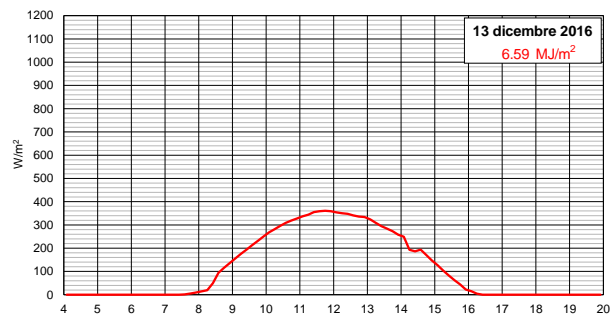
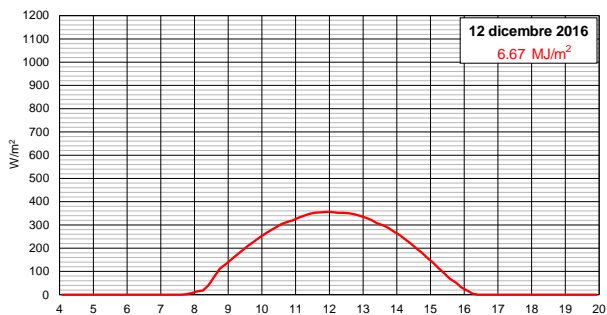
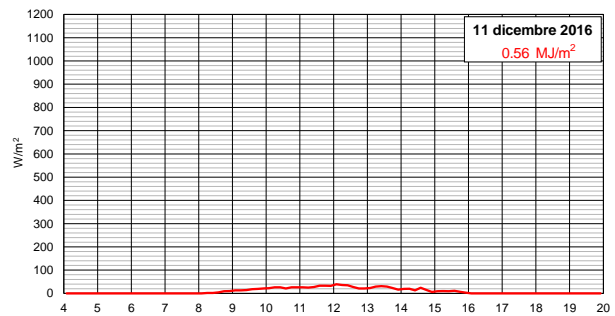
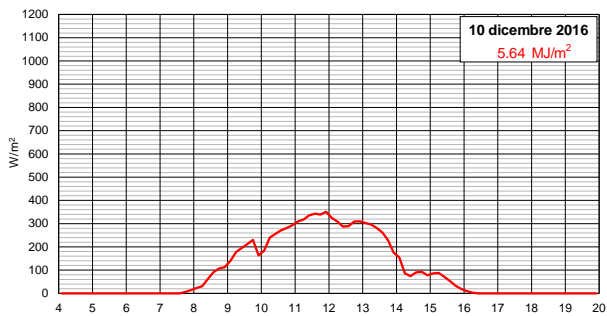
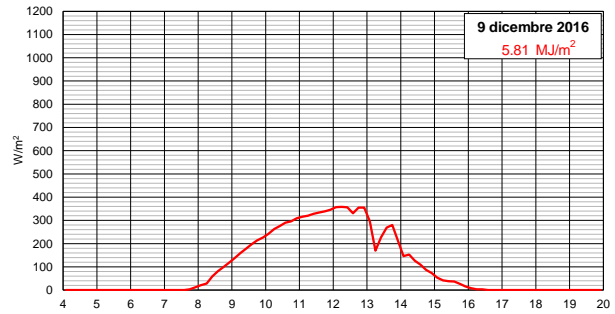
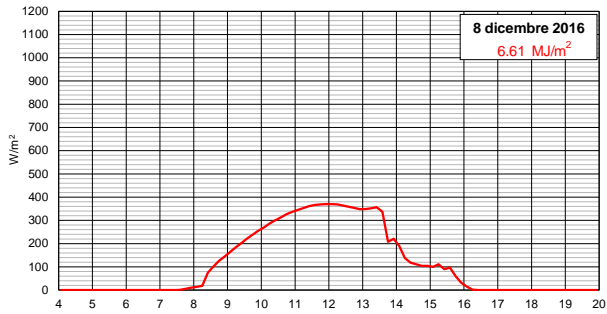
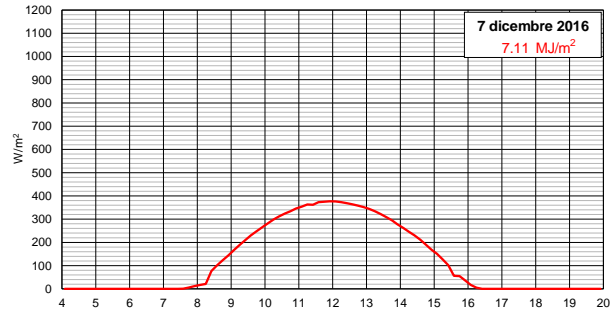
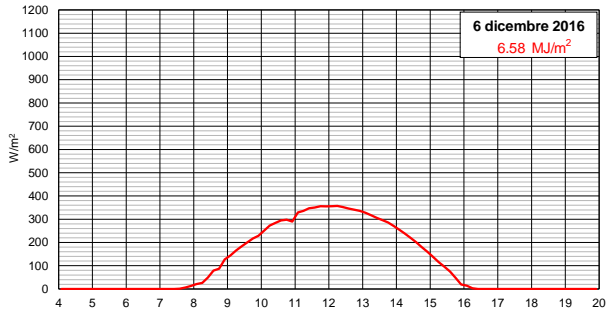
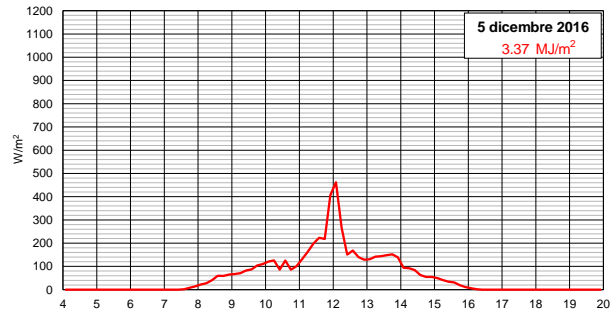
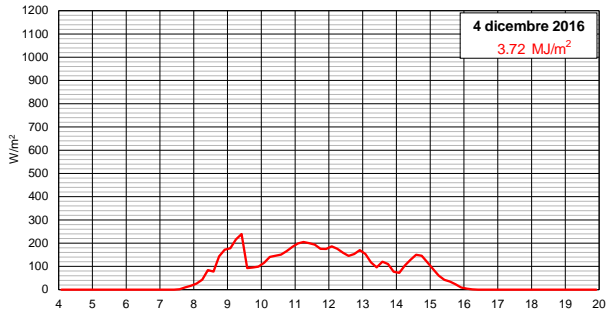
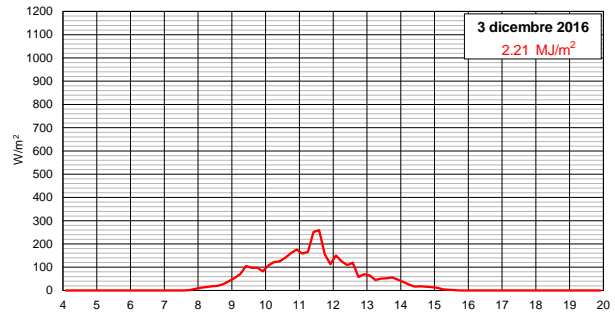
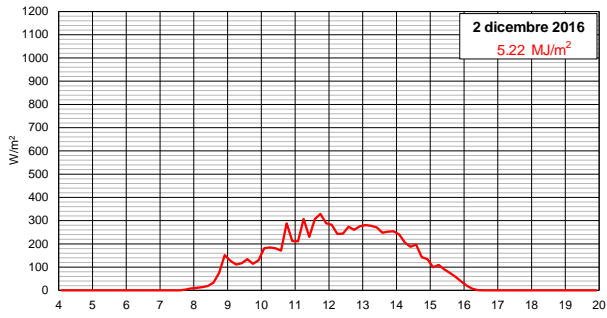


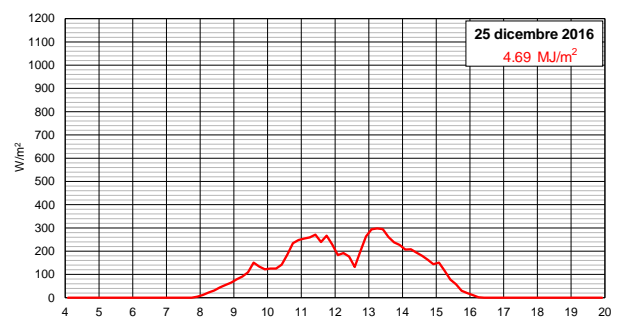
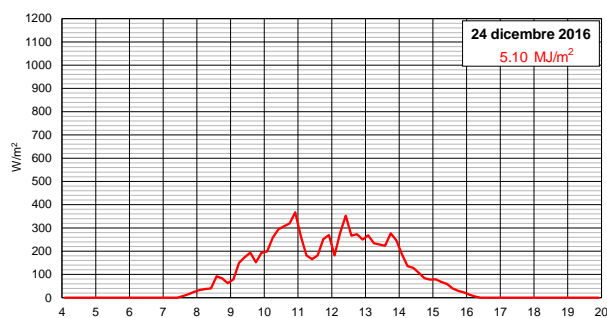
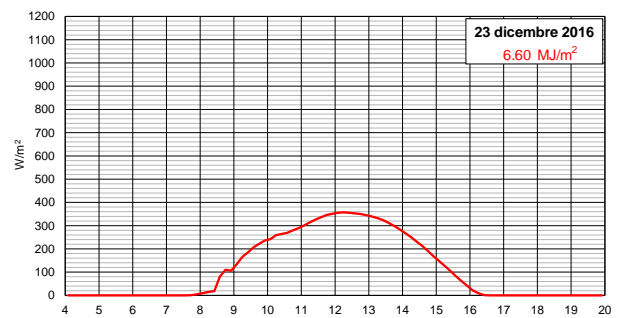
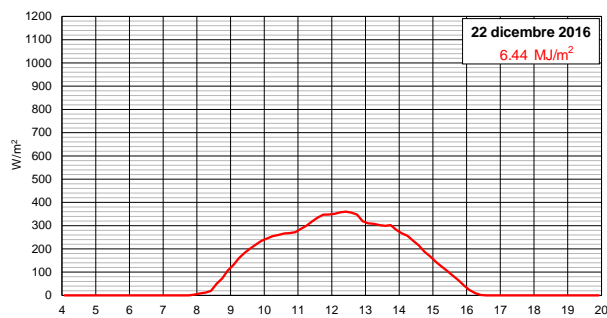
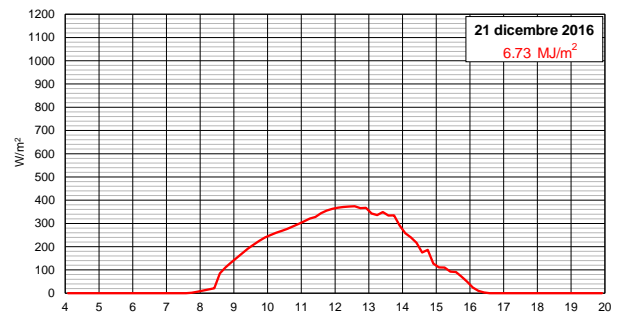
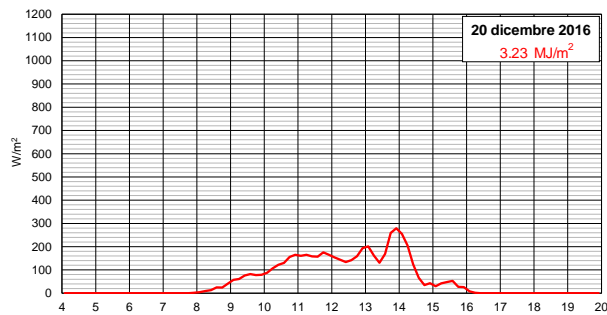
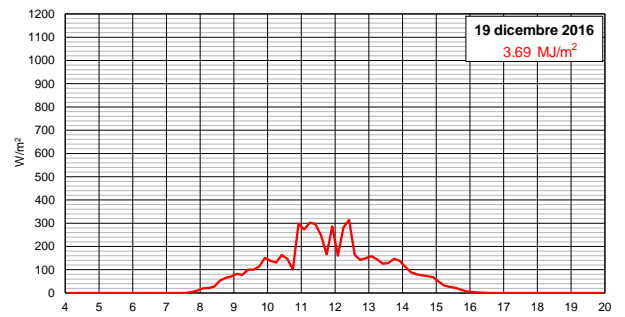
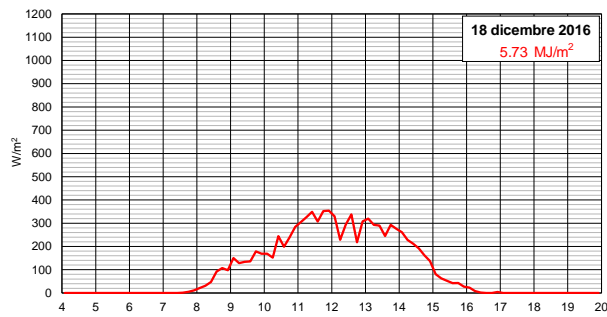
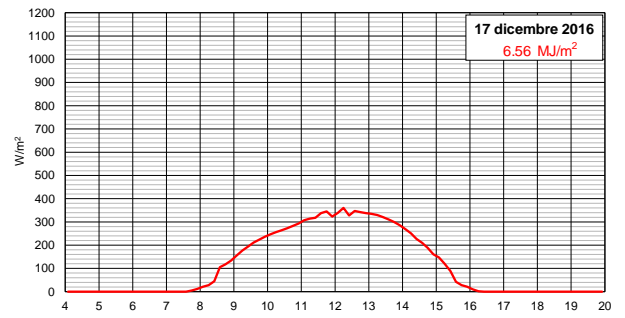
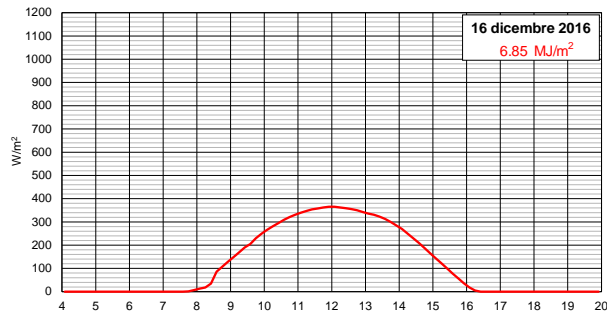
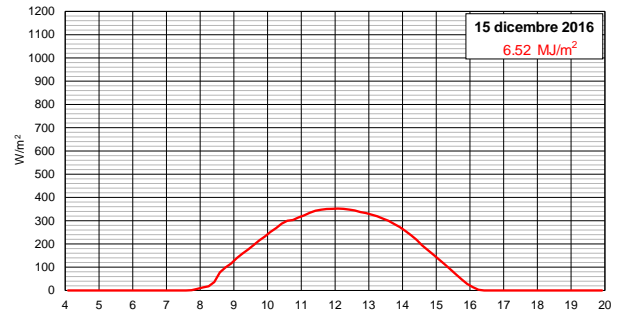
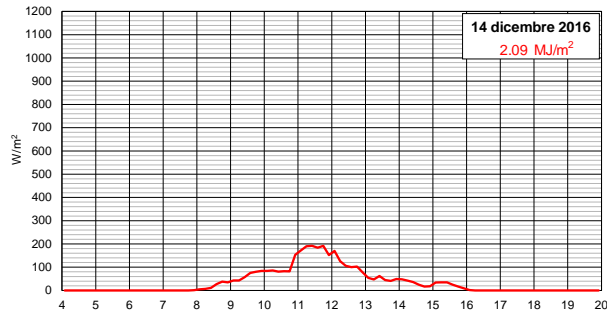


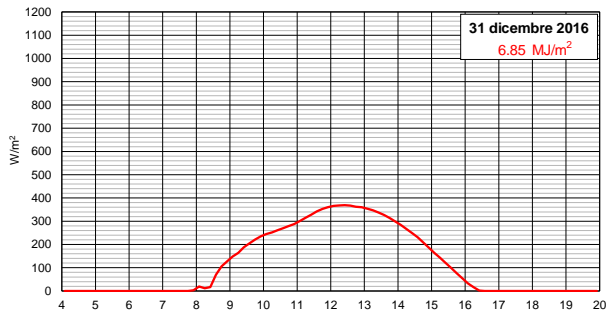
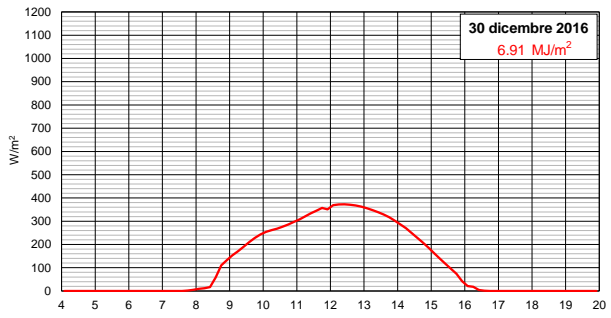
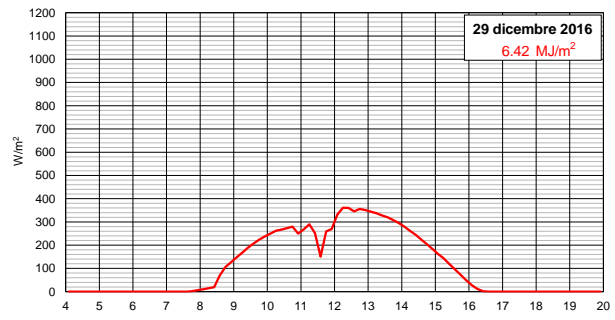
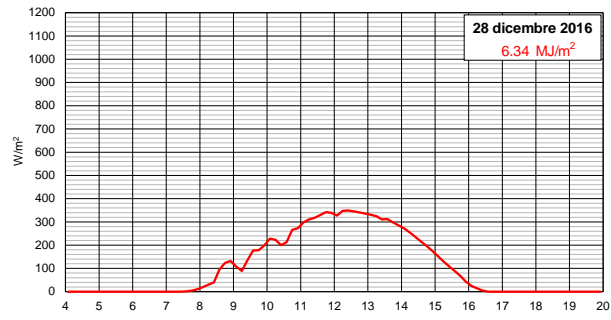
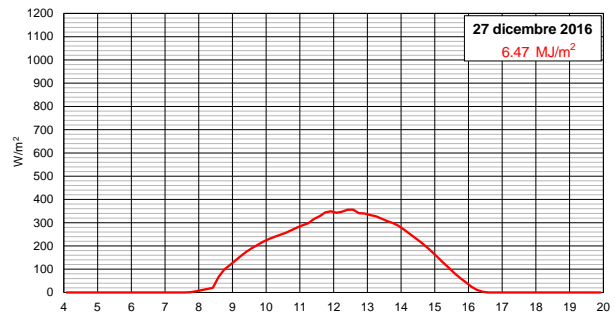
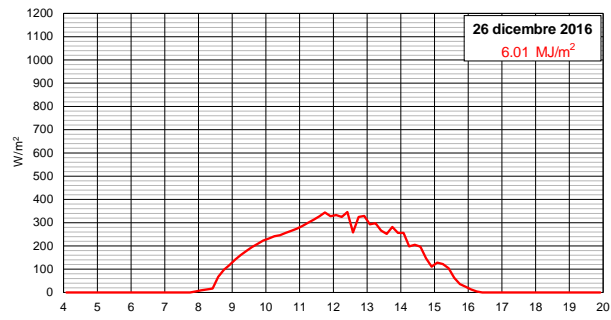












o o o



**TRIESTE 2016** Irradiazione solare globale giornaliera /(MJ/m<sup>2</sup>) 4851.11 MJ/m<sup>2</sup>

	GEN	FEB	MAR	APR	MAG	GIU	LUG	AGO	SET	OTT	NOV	DIC
1	3.95	2.11	5.48	11.94	8.31	19.69	26.09	12.33	22.47	14.80	7.54	5.72
2	0.91	0.67	13.37	13.12	13.43	12.12	27.47	23.93	17.68	5.04	0.60	5.22
3	2.53	0.67	1.97	13.93	20.97	26.62	16.98	26.40	18.41	12.77	9.01	2.21
4	0.68	9.46	11.68	11.98	24.28	26.22	29.21	26.51	19.01	15.45	9.58	3.72
5	0.68	9.81	3.17	17.53	18.75	20.81	29.35	11.17	13.28	14.51	0.42	3.37
6	0.83	8.46	10.48	15.23	25.72	22.11	29.20	21.42	9.21	16.19	1.51	6.58
7	5.81	0.88	6.01	19.55	24.01	28.56	29.09	26.47	17.06	14.30	7.96	7.11
8	1.19	0.64	2.79	5.61	26.98	17.84	26.19	27.10	20.78	2.38	6.39	6.61
9	0.37	3.31	12.26	5.26	15.44	4.64	26.77	25.62	18.11	13.15	9.56	5.81
10	1.11	3.48	14.60	17.63	7.51	16.15	28.24	6.15	10.66	4.13	2.88	5.64
11	0.58	10.38	3.86	21.98	4.13	13.35	27.41	23.83	16.88	12.35	3.06	0.56
12	6.67	2.97	8.27	23.13	14.87	18.86	27.17	25.88	11.37	14.30	3.62	6.67
13	4.36	6.04	14.19	16.80	4.55	24.99	19.91	25.76	19.32	3.37	6.09	6.59
14	2.72	0.77	17.76	11.43	16.91	15.77	18.68	25.56	17.39	1.60	7.84	2.09
15	4.39	2.53	6.26	19.54	20.42	22.58	9.44	23.14	13.08	9.39	9.33	6.52
16	7.60	4.02	14.73	24.08	23.81	13.81	19.58	24.39	5.42	10.84	4.88	6.85
17	6.14	1.66	18.34	17.03	29.22	28.63	25.69	21.46	10.04	8.20	5.43	6.56
18	7.93	4.93	18.24	11.94	27.68	30.18	28.61	18.68	5.90	2.87	0.34	5.73
19	7.95	8.62	17.81	14.24	9.36	18.49	28.59	22.14	14.38	9.54	0.49	3.69
20	8.11	11.77	16.55	25.33	20.04	13.76	24.32	23.13	12.83	2.71	3.77	3.23
21	7.63	11.95	11.62	24.20	28.45	27.80	24.51	16.88	16.16	8.41	1.86	6.73
22	5.55	1.80	18.78	22.35	28.43	28.46	24.43	24.12	18.95	12.84	2.99	6.44
23	3.65	2.08	5.07	5.25	10.12	28.56	22.89	24.67	17.86	5.00	3.49	6.60
24	6.61	12.91	16.04	4.11	15.75	28.12	19.60	24.26	17.86	1.01	1.21	5.10
25	6.70	3.60	11.69	22.44	27.64	23.82	18.38	23.94	18.03	1.24	1.45	4.69
26	6.51	8.45	12.92	12.29	26.89	21.51	24.67	23.61	16.55	9.74	1.59	6.01
27	3.67	2.11	13.59	8.79	28.05	22.48	22.07	22.91	15.23	11.71	3.78	6.47
28	1.46	4.06	1.81	14.19	28.01	30.50	20.30	22.46	16.49	11.46	6.33	6.34
29	4.70	7.19	10.12	27.02	14.73	30.05	26.51	21.50	15.62	10.94	7.94	6.42
30	0.58		3.91	26.10	15.14	27.07	26.53	21.57	15.02	11.33	8.01	6.91
31	0.89		14.70		24.24		23.30	22.16		11.03		6.85
	<b>122.46</b>	<b>147.32</b>	<b>338.05</b>	<b>484.01</b>	<b>603.82</b>	<b>663.52</b>	<b>751.18</b>	<b>689.13</b>	<b>461.03</b>	<b>282.62</b>	<b>138.93</b>	<b>169.05</b>