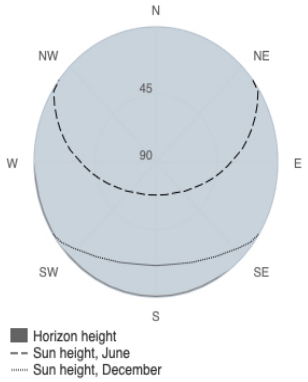
Performance of off-grid PV system

PVGIS-5 estimates of solar electricity generation

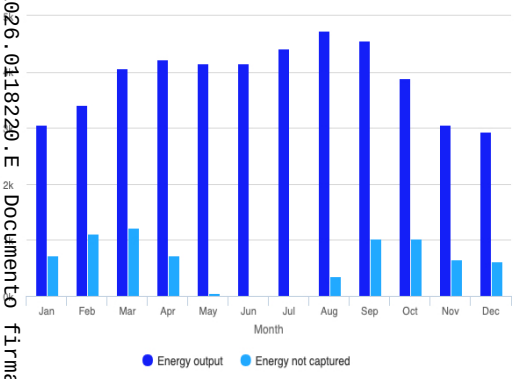
Provided inputs

Latitude/Longitude:	44.799,10.329	Slope angle:	90 °
Horizon:	Calculated	Azimuth angle	0 °
Database used:	PVGIS-SARAH3	**Simulation outputs**	
PV installed:	2000 Wp	Percentage days with full battery:	38.16 %
Battery capacity:	4800 Wh	Percentage days with empty battery:	61.08 %
Cutoff limit:	10 %	Average energy not captured:	1623.28 Wh
Consumption per day:	5000 Wh	Average energy missing:	1819.42 Wh

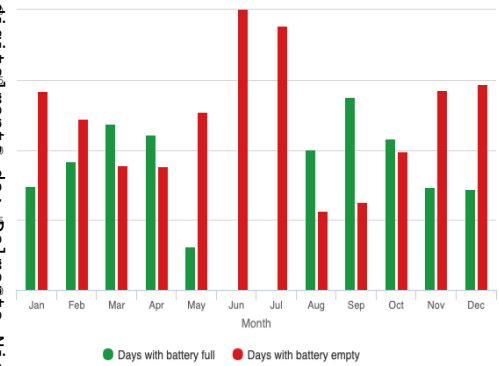
Outline of horizon at chosen location:



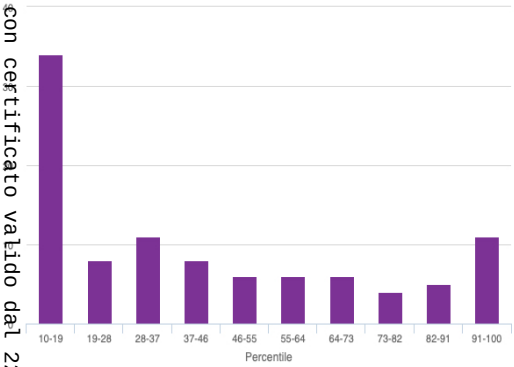
Power production estimate for off-grid PV:



Battery performance for off-grid PV system:



Probability of battery charge state at the end of the day:



Monthly average performance

Month	E_d	E_l	f_f	f_e
January	3050.5	718.6	36.9	71.2
February	3401.4	1114.9	46.0	61.1
March	4068.1	1215.1	59.4	44.6
April	4217.0	721.0	55.4	44.0
May	4153.3	53.8	15.4	63.7
June	4150.8	0.0	0.0	100.0
July	4423.4	0.0	0.0	94.4
August	4727.2	346.2	50.1	28.2
September	4558.7	1018.8	68.8	31.4
October	3883.2	1032.2	54.0	49.4
November	3059.4	646.6	36.8	71.4
December	2937.5	610.7	36.0	73.5

E_d: Average energy production per day [Wh/day].
E_l: Average energy not captured per day [Wh/day].
f_f: Percentage of days when battery became full [%].
f_e: Percentage of days when battery became empty [%].

Cs	Cb
10-19	34.0
19-28	8.0
28-37	11.0
37-46	8.0
46-55	6.0
55-64	6.0
64-73	6.0
73-82	4.0
82-91	5.0
91-100	11.0

Cs: Charge state at the end of each day [%].
Cb: Percentage of days with this charge state [%].

Report generated on 2026/04/16

Joint Research Centre