

Performance of off-grid PV systems

PVGIS-5 estimates of solar electricity generation

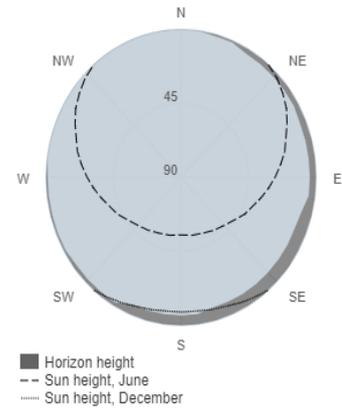
Provided inputs

Latitude/Longitude: 58.178, -7.036 Slope angle: 37 °
 Horizon: Calculated Azimuth angle: -120 °
 Database used: PVGIS-SARAH
 PV installed: 12000 Wp
 Battery capacity: 1200 Wh
 Cutoff limit: 5 %
 Consumption per day: 600 Wh

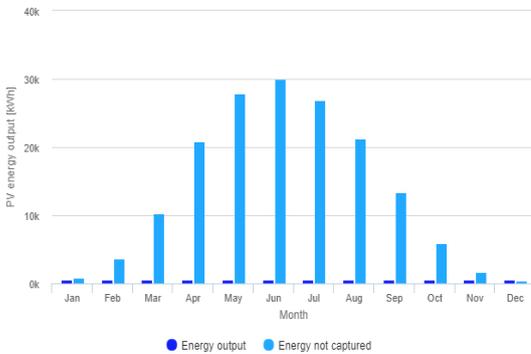
Simulation outputs

Percentage days with full battery: 96.35 %
 Percentage days with empty battery: 0.57 %
 Average energy not captured: 14139.32 Wh
 Average energy missing: 231.39 Wh

Outline of horizon at chosen location:



Power production estimate for off-grid PV:



Battery performance for off-grid PV system:

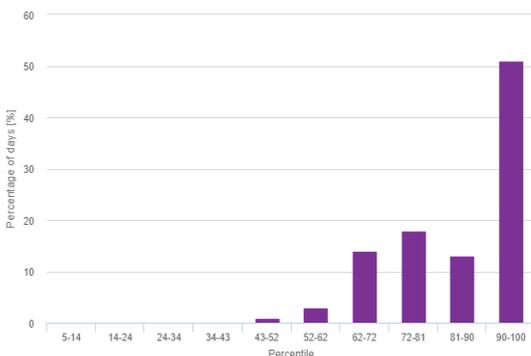


Monthly average performance

Month	E_d	E_l	f_f	f_e
January	598.9	826.5	85.3	2.4
February	600.8	3648.8	100.0	0.0
March	600.6	10284.4	100.0	0.0
April	601.3	20844.1	100.0	0.0
May	601.6	27822.2	100.0	0.0
June	600.4	29965.0	100.0	0.0
July	599.0	26895.8	100.0	0.0
August	598.4	21275.7	100.0	0.0
September	598.7	13330.5	100.0	0.0
October	599.5	5958.5	100.0	0.0
November	597.9	1715.7	97.8	0.0
December	586.4	379.4	73.9	4.3

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 [%].

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



Cs	Cb
5-14	0.0
14-24	0.0
24-34	0.0
34-43	0.0
43-52	1.0
52-62	3.0
62-72	14.0
72-81	18.0
81-90	13.0
90-100	51.0

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

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