

Performance of off-grid PV systems

PVGIS-5 estimates of solar electricity generation

Provided inputs

Latitude/Longitude: 49.500, 8.500
Horizon: Calculated
Database used: PVGIS-SARAH
PV installed: 50 Wp
Battery capacity: 70 Wh
Cutoff limit: 30 %
Consumption per day: 15 Wh

Slope angle:

50 °

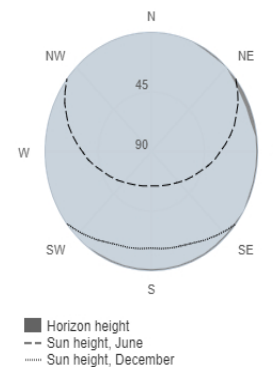
Azimuth angle

0 °

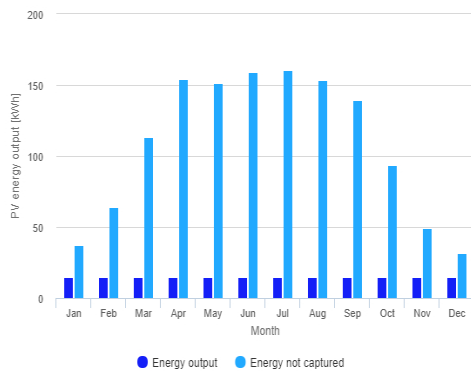
Simulation outputs

Percentage days with full battery: 93.36 %
Percentage days with empty battery: 0 %
Average energy not captured: 116.99 Wh
Average energy missing: 0 Wh

Outline of horizon at chosen location:



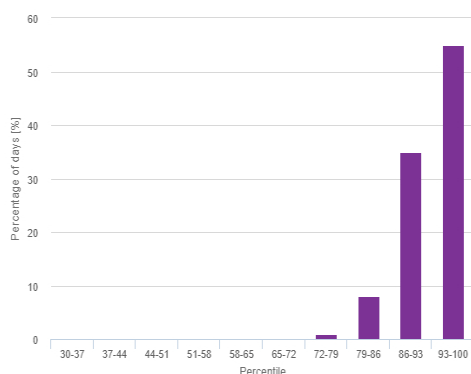
Power production estimate for off-grid PV:



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	15.0	37.5	77.1	0.0
February	15.1	63.9	92.6	0.0
March	15.0	113.3	99.7	0.0
April	15.0	154.5	100.0	0.0
May	15.0	151.4	100.0	0.0
June	15.0	159.4	100.0	0.0
July	15.0	160.7	100.0	0.0
August	15.0	153.6	100.0	0.0
September	15.0	139.4	100.0	0.0
October	15.0	93.9	98.7	0.0
November	14.9	49.5	85.6	0.0
December	15.0	31.9	67.2	0.0

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
30-37	0.0
37-44	0.0
44-51	0.0
51-58	0.0
58-65	0.0
65-72	0.0
72-79	1.0
79-86	8.0
86-93	35.0
93-100	55.0

Cs: Charge state at the end of each day [%].

Cb: percentage of days with this charge state [%].