

Performance of grid-connected PV

PVGIS-5 estimates of solar electricity generation:

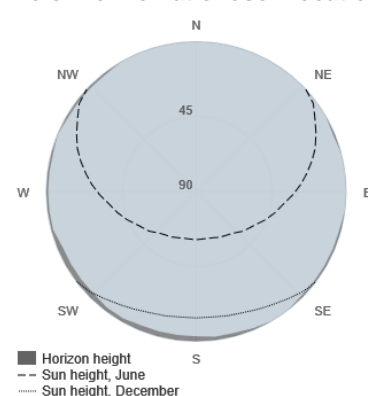
Provided inputs:

Latitude/Longitude: 52.078, 9.722
 Horizon: Calculated
 Database used: PVGIS-CMSAF
 PV technology: Crystalline silicon
 PV installed: 1 kWp
 System loss: 10 %

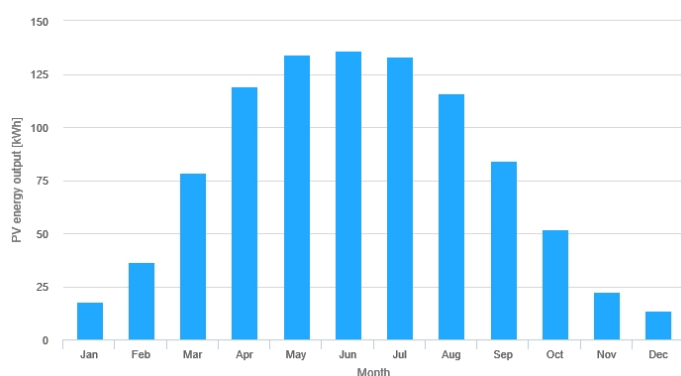
Simulation outputs

Slope angle: 12 °
 Azimuth angle: -27 °
 Yearly PV energy production: 942 kWh
 Yearly in-plane irradiation: 1130 kWh/m²
 Year to year variability: 37.30 %
 Changes in output due to:
 Angle of incidence: -3.8 %
 Spectral effects: 1.7 %
 Temperature and low irradiance: -5 %
 Total loss: -16.3 %

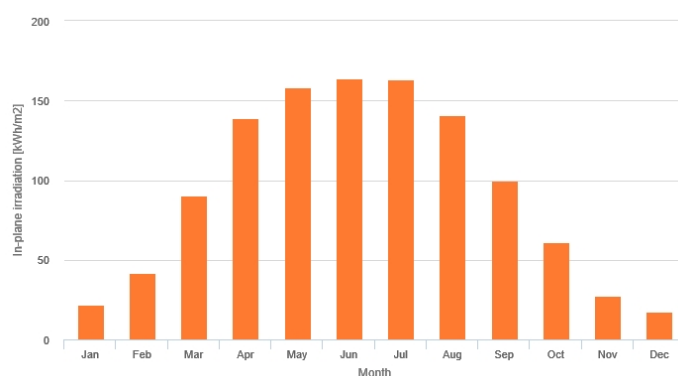
Outline of horizon at chosen location:



Monthly energy output from fix-angle PV system:



Monthly in-plane irradiation for fixed-angle:



Monthly PV energy and solar irradiation

Month	Em	Hm	SDm
January	17.6	21.7	3.84
February	36.5	42	8.7
March	78.7	90.1	10.4
April	119	139	16.3
May	134	158	19.6
June	136	164	15.3
July	133	163	13.1
August	116	141	11.2
September	84.1	100	8.41
October	51.8	61.3	7.79
November	22.3	27.5	6.32
December	13.6	17.6	3.08

Em: Average monthly electricity production from the given system [kWh].

Hm: Average monthly sum of global irradiation per square meter received by the modules of the given system [kWh/m²].

SDm: Standard deviation of the monthly electricity production due to year-to-year variation [kWh].