

Quick Start PV toolbox Humasol

The goal of the toolbox is to reduce the amount of time students must spend to dimension their installation. This leaves more time to focus on the contribution that is new to the project. The PV toolbox allows to compute the solar energy produced over a period using historical data. Several profiles are saved: averages, max, min production over the selected data. The toolbox also computes parameters such as the panel efficiency based on temperature variations. The required inputs, code structure and outputs will now be briefly presented.

Required Inputs

- Solar Data

The toolbox assumes historical data from solcast (<https://toolkit.solcast.com.au/historical>) is used. Students can make an account and request free credits for academic work. These can then be used to request the full time series for the project location. A lot of parameters can be requested from the solcast. Be sure to select them all to make sure you have all the required information to construct the pv profiles.

Time Series Request

Time series data is a historical record of solar radiation data and other weather parameters for a specified location.

Map Copy & Paste


Location search

Latitude

Longitude

Enter a location

Add Location



No.	Latitude	Longitude	Fixed Tilt Angle (?)	Fixed Tilt Azimuth (?)	Horizontal Single-Axis Tracker Azimuth (?)	Availability	Remove
1	4.051056	9.767869				✓ Available	

☐ Use optimal values

Up to 20 locations can be submitted. 19 Remaining

Date Period

☒ Full record based on selected locations (the longest history available)

☐ A range of years:

From

Until

☐ Select your own start and end dates

Time Granularity

☒ Basic (60 minute granularity)

☐ Extended (Native satellite, 5, 10, 15, 30, and 60 minute granularity)

Parameters ?

☒ GHI

☒ EBH

☒ DNI

☒ DHI

☒ Air temp

☒ Zenith

☒ Azimuth

☒ Cloud Opacity

☒ Dewpoint

☒ Wind speed

☒ Wind direction

☒ Relative humidity

☒ Precipitable water

☒ Snow depth

☒ Surface pressure

☒ GTI Horizontal Single-Axis Tracker

☒ GTI fixed tilt

☒ Albedo

Total Cost: \$400.00

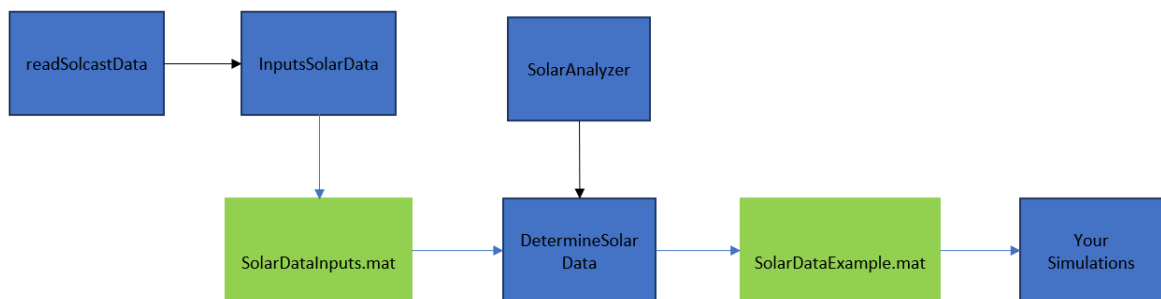
\$120.00 CREDIT REMAINING

Continue to Checkout >

- **User Defined Inputs:** These are specified in the “InputsSolarData” file. Here you create a mat file that can then be used to store all the parameters and solcast data so you don’t have to compute them every time as they are quite large!

Code Structure

There are three main files in the toolbox. “InputsSolarData” defines the input parameters and data used to compute the PV profiles. Here the data from solcast is read and all user defined parameters should be defined. The results can be stored in SolarDataInputs for later calls. The second file is the “SolarAnalyzer” class. This is a collection of functions used to compute parameters, profiles and statistics for the solar data. Finally in the file “DetermineSolarData” the functions defined in the “SolarAnalyzer” class are used to compute the solar profiles. These are then stored for later use in simulations. Finally there is also a script that shows how to read in the data from solcast: “readSolcastData”.



Code outputs

- Profiles for the solar irradiation and PV production based on historical data
 - Daily, hourly, user defined and per minute resolution is offered
 - Total production and a number of other values of interest are also given → tailor to your needs!
- Plots showing the data
 - Full timeseries of the days
 - Minimal, average, and maximal daily profile
 - Other can be requested with finer timesteps from the data
- Statistics concerning the data:
 - The minimal, average, and maximal daily production over considered period
 - A histogram with the distribution of the solar production
 - A cumulative histogram showing how many days have a production lower than a certain threshold
 - The number of days considered risky or not (depending on user defined thresholds)