

Environmental Sciences and Engineering Section Design Project 2021 (spring semester)

Proposition n°23

Automatization of the Optimized Inputs for Solar PV Financial Modelling

External Partner

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Description of the project

This project is mainly an optimisation problem that targets solar PV installations. For every PV project, there is an optimal configuration that will yield the best financial outcome for a given asset. It generally depends on the tariff structure and legislation, the yearly energy consumption and load profile, the installed PV capacity and configuration, and the climate data for a specific location. At the moment, finding the optimal configuration can be a long process as it requires a lot of back and forth between the PV modelling software and the financial model to try different options and compare their financials.

The objective of this project would be to create a tool to automate/calculate the initial optimized inputs to the PV modelling software. By inputting key parameters, i.e. satellite coordinates, type of panels, yearly energy consumption and load profile, the tool should be able to calculate the optimal row spacing, panel inclination and orientation, and installation size. With this information, the system can be designed on the PV modelling software and incorporated into the financial model, with no need to run numerous simulations.

Requirements –The students undertaking this project are expected to have good coding skills, preferably on python, along with an understanding of the PV environment.

Objective and goals

General objective: Create a tool to calculate the optimal configuration (including items such as optimal row spacing, panel inclination and orientation, and installation size) of a rooftop solar PV system given a set of inputs.

Goals

1. Understand the various considerations that go into PV system designs
2. Apply engineering knowhow to build an analytical tool (preferably in python) to optimize the row spacing and panel inclination to maximise energy generation
3. Take this one step further and build an analytical tool (preferably in python) to optimize the installation size to maximise the financial outcome
4. Apply research skills to improve upon and fill in gaps in the creation of the tool

Description of tasks

1. Scope out the project – Identify key input/output parameters and data sources for the inputs
2. Modelling and tool development – Utilize the data and knowhow around PV system design to develop a tool to generate the required PV system outputs for further detailed PV Modelling work.
3. Improve – Further improve upon the tool to create additional outputs or consider additional asset specific inputs to increase the tool's robustness and use cases.

Additional information (organisation, travel, etc.)

Before starting the work on the project, an initial kick-off meeting should take place between the selected students and Longevity Partners. This will be an opportunity to answer the students' questions and give more details on the expectations of this project.

In addition to the scheduled check-ins, the students will be able to get in touch with Longevity Partners while working on the project if queries arise.

The project will be fully conducted in English.