

Semester Thesis/IDP

Development of a data-based tool to improve the efficiency of photovoltaic systems based on after-sales services

Motivation

The expansion of renewable energies in Germany is currently proceeding quickly to mitigate global climate change and achieve national climate targets. Alongside wind power, solar energy is a key component of this energy transition. After installation of a PV system, usually the efficiency is not monitored, leading to suboptimal power outputs. Thus, the potential of customer support after the installation of PV modules is not fully exploited and after-sales services like maintenance and cleaning provide the potential to maintain the performance of the system after installation.

Thesis topic

The goal of this thesis is to develop a data-based tool to identify PV systems with potential for optimization through after-sales services. A data set with inverter data from around 100 PV systems is available at the chair. This and other data can be used to identify the PV systems that benefit most from after-sales services like maintenance or cleaning of the modules. By exploiting this optimization potential, a relevant contribution to the energy transition can be achieved. Further options for after-sales services can optionally be explored as part of this IDP. You are encouraged to contribute your own ideas and to compare multiple ML-based or heuristic approaches.

What you get

- Contribute to scientific research in the highly future-oriented field of renewable energies
- The opportunity to implement your own ideas
- In case of excellent working performance: opportunity for a follow-up thesis work (master's thesis)

Contact

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Work packages

- Literature review on approaches to maintain PV efficiency after installation
- Research and preparation of suitable data sets
- Development of a data-based software tool to detect efficiency-enhancing after-sales services for PV systems
- Documentation, validation, and analysis of the results

Requirements

- Passion for the energy transition and related technologies
- Programming experience in Python
- Independent and structured way of working
- Very good German or English language skills

I am looking forward to receive your application with a CV, current overview of grades (+ any other documents) and a brief motivation. **The semester thesis/IDP can be conducted either in German or English.**

Start date

As of now

Workplace

FTM (Garching Forschungszentrum) or remote