

Innovative. Cosmopolitan. Responsible.

The Institute for New Energy Systems (InES) is one of three institutes for applied research at Ingolstadt University of Applied Sciences (THI). It bundles the research activities in the fields of Building Energy Systems, Industrial Energy Systems, Energy Systems Engineering, Geoenery and Technology Transfer & International Projects within THI. Outstanding bachelor and master students have the best development opportunities at InES.

Bachelor / Master thesis

PV forecast for the energy management system for the digital farm of the future

Background:

Agricultural operations often generate electrical energy themselves and also have larger consumers themselves, but these are not coupled together. Since the consumers would all have to be measured individually, optimization of the energy flow is not possible directly.

Therefore, the [FarmErgy](#) project deals with the development of algorithms for the evaluation and optimization of energy flow on farms.

To this end, AI models are being developed to identify selected electrical loads on farms based on the equipment-specific power signature and trained with self-measured data. With this data, an energy management system is designed, developed and tested on a farm. The most widespread source of electrical energy of our partner farms is through PV systems, so their forecasting is an essential point for the whole project.

Thus, with the help of the developed algorithms and the results based on them, the performance of agriculture can be optimized in terms of energy and the use of resources in agriculture can be ensured sustainably in the future.

Aim of the work:

Creation of the PV forecast for an energy management system that takes into account a wide variety of electrical generators, storage and sector coupling.

Tasks:

- Familiarization with the topic
- Literature research
- Design and implementation of the PV simulation
 - o Query weather forecast from databases
 - o Programming using Matlab/Python
- Documentation, presentation

Requirement Profile:

- Students in technical programs
- Reliable and independent way of working
- Experience in one or more of the following:
 - o Modeling of real systems
 - o Programming skills
 - o Power Engineering
 - o Literature research

Period: 3 - 6 months

Supervision: Julian Braun

Contact: abschlussarbeiten_ines@thi.de

