Review on Modelling a Microgrid with Python

Brief Description of the Project:

Microgrid systems are becoming increasingly vital for sustainable energy solutions, and the integration of artificial intelligence (AI) can enhance their efficiency. In this research internship, the student will explore the modelling of a microgrid using Python due to the focus on incorporating AI packages to interact with the microgrid model. The overarching goal is to conduct a brief review of existing AI packages, examining their functionalities, advantages, and disadvantages in the context of microgrid modelling.

Additionally, this research internship offers a flexibility, allowing students to explore multiple directions within microgrid modelling. Moreover, the opportunity exists to go deeply into a specific area of energy modeling, aligning with the educational preferences and interest of the student, thereby ensuring a tailored experience.

Key facts:

Supervisor(s): Sebastian Zieglmeier and Paal Engelstad (Department of Technology systems, ITS)

Preferred Background of Candidate(s): Electrical Engineering, Computer Science, Renewable Energy Systems, Mathematics or related fields are encouraged to apply. Knowledge of Python programming, Modelling or an interest in AI would be beneficial.

Number of Available Projects: 1-3 (As stated above multiple directions in this project are available, also providing flexibility for students to explore various aspects of microgrid modelling in which they are particularly interested. The possibility for group work exists.)

Preferred Project Period: The project period is flexible and will be determined collaboratively between the supervisor and the selected student.

Background and Outline of Project Work:

Microgrid models play a crucial role in designing resilient and sustainable future energy systems. The selected student(s) will focus on conducting a brief review of existing energy modeling packages relevant to microgrid modeling, with an emphasis on Python-based solutions capable of incorporating AI elements for enhanced functionality. Our approach is open-ended, allowing the student the freedom to explore diverse directions within microgrid and energy modeling.

Tasks may include (not all necessary):

1. Surveying and evaluating existing energy modeling packages pertinent to microgrid modeling.

2. Assessing the functionalities, advantages, and disadvantages of identified AI packages in the context of microgrid modeling.

3. Developing/programming a own microgrid model.

4. Suggestions of students regarding energy or microgrid modelling in general.

Expected Output:

The culmination of this research internship is anticipated to yield a brief report detailing the regarding task like a mini-survey of modeling packages or a documentation of the outcomes of the developed model.

Depending on the project's findings, there is potential for a publication or further cooperation e.g. in form of a master's thesis.

This internship presents a unique opportunity for motivated student(s) to contribute to the ongoing research at ITS and can level up their knowledge in Python programming, modelling, and sustainable energy solutions. The chosen candidate(s) will have the autonomy to guide their research direction, offering a valuable and enriching experience with the flexibility to explore various aspects of energy modeling based on their interests in close cooperation with the supervisors.