Interdisciplinary Project (IDP) for Informatics students - SS 2018

Coupling of python-based and GAMS-based energy system models

Motivation

At the Chair of Renewable and Sustainable Energy Systems, former researchers have developed energy system modeling frameworks for expansion planning and for unit commitment. The expansion planning modeling framework is named *urbs* and is open-source ([Link for the Github repository](#)). The unit commitment modeling framework, *evrys*, is loosely similar to *urbs* but uses GAMS instead of pyomo for the mathematical modeling. It is therefore not open-source. Currently, the models use similar inputs in different layouts. The outputs of the expansion planning model are processed manually to be fed into the unit commitment model. For our case studies at the chair, we would like to use both models systematically by improving the coding and the communication between them.

Goals and milestones

The project is suitable for a team of two students. The students (S1 and S2) can share their ideas on how to restructure the code of the unit commitment model, *evrys*, and how to uniformize the layouts of the inputs and outputs of *urbs* and *evrys* for a user-friendly model coupling. The model framework *urbs* can be considered as a reference. They will also document their work, so that the *evrys* model and the pre- and post-processing codes for *urbs* and *evrys* can be published. Each student is responsible for specific tasks which will be graded. The project has the following milestones:

1. Uniformizing the layouts of the inputs and outputs of *urbs* and *evrys* (S1)
2. Translating *evrys* from GAMS into Pyomo (S2)
3. Updating the pre- and post-processing codes accordingly in Python (S1 and S2)
4. Publishing *evrys* and the pre- and post-processing codes in Github (S1 and S2)

Requirements

- Proficiency in Python (especially Pandas)
- Knowledge of pyomo and GAMS is a plus
- Knowledge of Matlab is a plus (some pre-processing tools are currently written in Matlab and need to be translated into Python)

Theoretical part

We recommend attending the lecture "Modeling of energy systems" which is offered in the summer term in German ([Link](#)).

Supervisor

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