Master Thesis - Urban energy modelling for impact of residential EV car-sharing

Motivation

The ComfficientShare project, a part of the MCube - Mobility Cluster, tries to analyse the viability of an electric vehicle (EV) car-sharing scheme, made directly available in the regular parking spots of a residential building in Munich. The user base for car-sharing is picked from within the building community, a closed group of trustworthy neighbours. The project expectation is this grouping, leading to higher adoption of the sharing concept and a better management of the car fleet.

In this master thesis, you will create an urban energy system model of Munich, with the ComfficientShare car-sharing model being extrapolated as a scenario for city-wide acceptance. You will have a chance to be a part of the MCube research community, which is the leading mobility research cluster in Germany, with a long-term vision until the year 2030. The main tasks are as follows,

Tasks

- Extend the existing single building model to include car-sharing modes. Car-sharing as a Mixed Integer Linear Programming (MILP) process has been developed in prior works at the chair.

- Create a building profile database for the city of Munich, based on the building stock map, and heuristics on top of measured driving profiles at the ComfficientShare location.

- Create a Munich city grid model using the synthetic grid generation tool *pylovo*.

- Scenario analysis of residential car-sharing based on the building profile database applied to the Munich city grid model

- Documentation and reporting for the above tasks. A scientific publication on the final results is encouraged and will be supported by the chair.

Requirements

- Electrical, Mechanical or Informatics background is preferrable.

- Coursework experience on power system planning, energy system optimisation and convex optimisation methods is helpful.

- Experience with object oriented programming (Python, pandas and pyomo frameworks).

- Ability to work independently and a desire to learn.

Contact

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