

## **Master-Thesis:**

### **Online Decentralized Optimization for E-mobility**

#### **Context:**

Intelligent power systems and smart grids aim to maintain a clean and sustainable energy supply for E-mobility. To do so, system operators would need an energy management system (EMS) that is responsible for scheduling the interactions of electric vehicles (EVs) and the grid. Due to the growing demand for E-mobility, the EMS must also employ a scalable algorithm. In this regard, the use of an online decentralized approach is envisioned to keep the optimization time reasonable despite the increasing EV usage.

#### **Your tasks:**

Your objective in this thesis is to implement a decentralized energy management system in a simulation environment. The simulations will be done on standard distribution test systems and on a synthetic grid built on top of a city map. Here, typical load data and models of EVs have to be accounted for. You will evaluate the performance of the algorithm by changing different optimization parameters such as problem size and number of constraints. Furthermore, electric loads and EVs have to be programmed in an agent-based way using MATLAB. Basic skills in Python are also needed to run an existing software that produces synthetic grids on top of OpenStreetMap.

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