**MV/LV control (optimal power flow) algorithm implementation for operating EVs in future power systems (smart cities)**

**Our Profile:**

The researchers affiliated with the Institute for Automation of Complex Power Systems work at developing the science and technology to support the transition to the next generation energy grid. Recent progresses in power electronics and communication systems are key elements in supporting this transition. In particular, the integration of power electronics and communication systems is opening the door to a complete new way of thinking the way energy flows are managed from generation to utilization.

**Context:**

Within research project *ALigN* will be investigated how future grids should be operated with huge penetration of RES and electric vehicles (EVs). Although there are many papers focusing on EVs integration not many comprehensive frameworks taking into account all aspects of EVs integration are done. Especially interesting for the student can be introduction of solid-state transformer and representation of it in power flow calculations.

**Your Tasks:**

As a first task of the student is going to be translating already developed OPF MV algorithm (implemented in MATLAB) to Python. Therefore, Python knowledge is mandatory, preferably PyPower as well. As future tasks, these can be seen as extension of this work:

- Translating already existing algorithm to Python
- Understanding concept, and algorithm itself
- Connecting MV OPF with developed LV OPF
- In already existing controller hardware in the loop set up implementation of developed EMS

Depending on the interests of the student, the tasks can be expanded in several directions. Beside the conceptual tasks, occasional support in administrative and organizational tasks is expected. Supervision is possible in English, but for some tasks German knowledge could be needed.
**Your profile:**

We are searching for a Master Student or Bachelor student of electrical engineering, Computer Science, or related study programs. Basic knowledge in programming, MATLAB, Python and/or optimization is needed. Optimally you should have some experience in implementation of energy balance problems, power flow and optimization methods in Python and preferably in Matlab/Simulink. However, the student will have the chance to extend his skills during the work at our institute. Willingness to learn and to work actively on the topic is expected.

**Our offer:**

We offer a HIWI contract with 10 hours per week. We are looking for a long-term cooperation. There is the possibility to extend this work to a bachelor or Master/Diploma thesis.

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