

# Master thesis

## Reinforcement Learning for demand side management in residential buildings

### ■ Background

In order to react to the fluctuating electricity generation by renewable energy sources, flexible electrical loads are necessary. Especially, heat pumps and electric vehicles can react to the green energy of photovoltaic systems and wind turbines in residential buildings. Thus they can help to decarbonize the buildings sector while stabilizing the electricity grid. To use flexible loads intelligent control strategies are essential. One option for demand side management is the application of algorithms from the field of reinforcement learning. It is the task of an agent (building) to learn the optimal control actions on its own by using a simulation environment. The task of this thesis is to investigate the applicability of reinforcement learning for demand side management in the building sector.



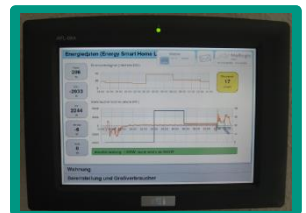
### ■ Tasks of the thesis

- Become familiar with an existing simulation environment (Python)
- Design and evaluation of state and action spaces of the agent and the reward function for different building types.
- Test and evaluation of different existing algorithms for solving the problem
- Possible extension of the scenario to many buildings (optimization of a residential area)



### ■ Requirements

- Interest in the field of reinforcement learning
- Interest in demand side management and smart grids
- Programming skills (first experience with Python is recommended)
- Responsible and motivated working attitude
- Good English or German language skills



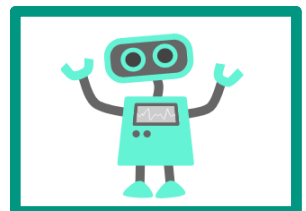
### ■ Formal aspects

- Begin: from now on or as you wish (duration: 6 months)
- Language: English or German



### ■ Application

- Short motivation letter (maximum 0.5 pages)
- Transcript of records of your study programs and a CV



### ■ Contact

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