

Master-Thesis:

Modeling Demand Response using Potential Games

Context:

Recent literature on microgrid energy management systems (EMS) proposes the use of potential games for optimizing energy management in an islanded microgrid. This approach can guarantee the existence of a stable optimal operating point (Nash Equilibria) despite having different optimization objectives from different grid actors.

Your tasks:

Your objective in this thesis is to implement an energy management system in a simulation environment. The energy management system should use an approach based on potential-games for microgrid EMS. The simulations will be done on a typical test systems for microgrid and on a synthetic grid built on top of a city map. Here, typical load data and profiles of renewable energy sources (RES) have to be accounted for. The student will evaluate the performance of the algorithm by changing different optimization parameters such as problem size and number of constraints. Furthermore, electric loads and and RES 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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