RWTH AACHEN UNIVERSITY

E.ON Energy Research Center
ACS | Institute for Automation of Complex Power Systems

Hiwi/Master-Thesis:

Modeling, simulation and evaluation of Demand Side Response potential in Micro Grids

Context:

Within research project *Interflex* will be investigated how future micro grids should be optimally operated with huge penetration of RES and involving household flexibility. The evaluation of the impacts of using sources of flexibility in the integration of renewables is a hot topic in transition of the grid towards micro grid principles. The increasing amount of energy generation units in distribution systems brings up new requirements for grid planning and control. Main question in a nowadays power systems is how and is it possible to run with 100 % of renewables islanded without communication with the main grid. For integration of RES and optimal usage and operation of the grid, including household flexibility is necessary. Household flexibility in terms of thermal grid and households PVs plus batteries will play a huge role in providing flexibility in a future power systems.

Task:

Main task and goal of the thesis is to support balancing of the micro-grid when it is in islanded mode with as much as possible RES staying in islanded mode without compromising power quality. Assets in the Micro grid can be Wind turbine, PV-farm, Battery Storage system, balancing technologies like Hot Tap Water Boiler, Heat Pumps, and PV+Battery. For optimal operation of the micro grid, preferably some advance algorithms can be implemented such as Model Predictive control. One of the question that can be raised is: What is the optimal sizing/dispatching of flexibility so that we have minimal operational costs when we optimally use micro grid?

Your profile:

You should have a good overview of common micro grid principles and control, preferably modeling. Optimally you should have some experience in optimal power flow (OPF) problems and optimization methods. Preferably, you should have experience in Matlab/Simulink.

Contact:

Milica Bogdanovic

Tel: + +49 241 80 49752

mbogdanovic@eonerc.rwth-aachen.de