

Bachelor/Master Project

Electrical Storage and their Contribution to the Ancillary Services

Introduction: The German Government set the target to integrate 80% renewable energy resources by 2050, which means most of the generation units will be dependent on two main sources of RE (wind and solar). Both sources are dependent on natural fluctuations, which make them less reliable for a continuous supply and can cause mismatches between power supply and demand. In order to balance the mismatch between the power generation and consumption one way is to integrate electrical storage to store energy during over-production and supply during power shortage. The storages can be combined with industrial loads to provided ancillary services to the grid operator to prevent power curtailment from renewable energy sources and having smoother load profile.

Electrical storages have different reaction time and energy/power (MWh/MW) ratio and different technologies have their specific characteristics. Although, there are different technologies in the market for electrical storages, still researchers are carrying out projects to develop new more efficient and reliable techs.

Tasks: Within this project, it is desired to carry out the feasibility of electrical storage in providing ancillary services in RMS or quasi-dynamic simulative environment. The highlights of the topics are as follow:

- Literature review on state of the art of electrical storages
- Dynamic model of a storage with case studies on providing primary and secondary control reserves
- Storage model in PowerFactory or in Matlab/Simulink environment interfaced with PowerFactory
- Power balance study in presence of electrical storage

Requirements:

- Electrical power engineering background
- Interest in power managements/system/storage
- Basic knowledge of power system simulation software and a programming language

Nasratullah Mohseni, M1030, mohseni@iat.uni-bremen.de