



University of Stuttgart
Germany

Institute of Combustion and Power Plant Technology
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Announcement

Master Thesis

Analysis of System Stability through Passive Balancing by Balance Responsible Parties

→ Can also be modified and carried out as a bachelor or student research project

Background

In the course of the energy transition, the volatility of renewable energy plants can lead to larger deviations between the traded and actual amounts of energy produced. These deviations provide an opportunity for BRP (Balance Responsible Parties) to actively participate in balancing the energy in the control areas. Through so-called passive balancing the BRP can intentionally introduce an energy generation deviation in order to improve the energy balance in the control area. However, these BRP deviations can have a significant impact on system behaviour, and uncontrolled passive balancing can even lead to frequency instability.

Objective

In this work, an existing simulation model used for passive balancing will be analyzed for system stability and further developed. Conditional BRP decisions regarding market participation during the current quarter hours will be analyzed, and their effects on system behavior will be simulated. The model should be applicable to transmission grids with multiple control areas and analyzed accordingly. In this exciting thesis you will work on a current research topic at the intersection of the technology and economics of energy transmission and trading.

Approach and tasks

1. Literature review for familiarization
2. Analysis and further development of an existing model
3. Evaluation and interpretation of the impact of the behavior of multiple BRP on network stability
4. Assessment and summary of the results

Requirements

- Reliable and independent working
- Interest in energy generation, transmission, and energy economics
- Basic knowledge of Python

Start date: immediately

Interested students please contact

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