Implementation of Grid Ancillary Services in CoSES PHIL Lab Facility

The increasing penetration of renewable energy sources poses two primary challenges to power systems: (i) reduced power system inertia leading to faster dynamics, deteriorating frequency stability margins, and (ii) reduced sources of reactive power generation due to the limited capacity of power electronics-based inverter units, jeopardizing voltage stability. As a result, additional ancillary services are required to ensure the reliable operation of the power system. Battery Energy Storage Systems are an excellent choice for providing ancillary services due to fast response time and flexibility of use. However, the influence of delivering ancillary services on the battery's overall health is a critical point and determines the project's economic feasibility in the long run.

The aim of the thesis is to implement selected ancillary services at the CoSES lab facility while emulating a battery model on the Egston inverter unit and logging the power profiles from the emulated battery model. The recorded data will be used in a separate research study to analyze how these services affect the battery's health. (not part of this thesis).

Project Tasks:

1. Developing selected ancillary services control on Simulink.
2. Setting up the experiment in CoSES lab facility (two-bus model).
3. Deploying the model in CoSES lab facility.
4. Logging battery (emulated) power profiles.

Requirements:

1. Background in Electrical Engineering.
2. Good knowledge of Simulink.
3. Willingness to learn and team player.

If you are interested in this topic or have any questions regarding the subject matter, please don't hesitate to reach out.

Contact:

Prashant Pant

prashant.pant@tum.de