Test methodology for stationary residential battery storage

Background

The global market has seen exponential growth for stationary battery storage following the solar photovoltaic (PV) market, the urge for self-sufficiency and resilience. Despite the last years’ market development, the full potential of these systems is rarely realised, and standardised methods to evaluate the functional capacity are lacking.

The Swedish Energy Agency (Energimyndigheten) has given RISE the task of examining the available domestic market for stationary battery storage systems and developing a test method to analyse the performance and functionality of these systems. Similar test methods are available for other building products, e.g., heat pumps\(^1\), where a time-condensed test sequence is meant to mimic full-year operation and enable an evaluation of the systems.

The primary purpose of this project is to create a test sequence for residential battery storage systems that represents the operating conditions for a residential installation in Sweden.

Scope

- Market survey of available stationary battery systems on the domestic market
- Literature review – existing test methods for stationary battery systems and related products, proposed battery control algorithms and battery system grid services.
- Develop a test method for stationary battery systems and propose ways to evaluate the performance and functionality.
- Laboratory test of the proposed method on existing battery system installation

Your Profile(s)

We are looking for 1 or 2 students who are self-motivated and ambitious with excellent knowledge in programming (MATLAB and Python) and electrical engineering. Previous experience and interest in battery storage, communication protocols and IoT are preferred.

Location & Duration

This master thesis will be done at RISE Research Institutes of Sweden in collaboration with Chalmers University of Technology from January to June 2023.

You will primarily be in RISE’s office in Gothenburg (Sven Hultins Plats 5) and at the department of Electrical Power Engineering at Chalmers. There will also be visits to RISE’s laboratory facilities in Borås.

Contacts

Please submit a personal letter, grade transcript and CV to Patrik Ollas and Torbjörn Thiringer.

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Key Words

Stationary battery storage systems, power electronic converters, applied energy research.