

Battery Energy System Modeling and Optimization for Frequency Reserve Market

Abstract

The increasing penetration of renewable energy sources has led to the need for more flexible and responsive grid management. Battery energy storage systems (BESSs) have been identified as a promising technology to provide frequency reserve services to support the stability and reliability of the grid. In this thesis, we develop a BESS model to evaluate its performance and optimize its operation for providing frequency reserve services. The proposed model considers the electrochemical dynamics of the BESS, as well as its power and energy constraints. The optimization problem is formulated to maximize the revenue from frequency reserve services while ensuring the battery's integrity. Numerical simulations are performed to demonstrate the effectiveness of the proposed model and optimization approach.

Company Description

reLi is a pioneering startup that is revolutionizing the battery energy management space. Our innovative technology extends the life of stationary energy storage batteries by up to 35%, while also increasing energy cost savings by up to 70%.

Our innovative battery energy management system (BEMS) connects to batteries to monitor their performance in real-time, using advanced algorithms and IoT technology to optimize their usage and minimize degradation. This allows our customers to get the most out of their batteries, ensuring that they last longer and perform more efficiently.

We are committed to helping our customers save money and reduce the environmental impact of lithium-ion batteries, and we are constantly working to develop new and improved solutions to meet the evolving needs of the market.

Requirements

- A final year of bachelor's or master's degree in electrical engineering, energy engineering, or a related field.
- Knowledge and understanding of the principles and applications of battery energy storage systems.
- Familiarity with frequency reserve markets and their role in grid management.
- Experience with modeling and optimization techniques for energy systems.
- Strong analytical and problem-solving skills.
- Excellent written and verbal communication skills.
- The ability to work independently and as part of a team.
- A strong interest in conducting research and contributing to the field of battery energy storage systems.

Compensation and Benefits

- Startup work environment at HUB31
- Wide opportunity for networking and exposure to entrepreneurship
- Collaborative and inclusive work environment
- Opportunities for innovation
- Flexible work hours and the ability to work remotely when possible
- Being part of a diverse, dynamic and enthusiastic team

reLi is committed to creating a diverse environment and is proud to be an equal opportunity employer. All qualified applicants will receive consideration for employment without regard to race, colour, religion, gender, gender identity or expression, sexual orientation, national origin, genetics, disability or age.

Please send CV and motivation letter to info@relienergy.de