

Project study

Algorithmic commercialization of utility-scale Battery Energy Storage Systems

Background

Due to the growing share of intermittent electricity production from renewable sources, it is becoming increasingly challenging and important to balance demand and supply and to stabilise the electricity system. Grid-scale Battery Energy Storage Systems (BESS) are a new and growing technology to address this need and therefore have a critical role to play in the transition to a clean energy supply. At the same time, BESS provide unique business opportunities. The underlying commercialization strategies require continuous monitoring and analysis of markets, grid systems, and further aspects such as battery degradation and weather conditions.

Entrix is an optimization and trading platform for grid-scale battery storage that accelerates the transition towards a clean energy future. Its mission is to enable the most effective use of green energy and to ensure the reliability of the future energy system. To this end the firm aims to provide asset owners and potential investors across the globe with battery operation solutions based on the latest research and technology in the field.

This project study is designed to support this effort by applying and testing state-of-the-art algorithms and methods to the problem of automated asset backed trading using a BESS.

Project outline

In this project study, individual modules of the algorithmic IT system should be investigated in detail. The work encompasses the implementation and performance measurement of algorithms as well as a broader investigation into the business case of a BESS storage operated on short-term electricity markets. The specific submodules for the project study will be defined according to the interests and experiences of the students. Examples include the analysis and modelling of electricity markets, market price predictions, or the (financial) optimization of the BESS system operation.

Research tasks & qualifications

Research tasks

- Help to develop and test Machine Learning algorithms to forecast power prices for intraday, day-ahead balancing markets and identify and describe key dynamics of these markets.
- Survey state-of-the-art algorithms used for algorithmic trading and possibly help to design novel approaches for optimisation of a BESS trading strategy.
- Explore the potential of Machine Learning and Artificial Intelligence to optimize the operation of a BESS.
- Help to develop back-testing systems to evaluate algorithms and models in terms of prediction / trading performance.

Your qualifications

- Experience and/or interest in data-driven decision-making on financial or commodity markets as well as in the analysis of such markets.
- Capability of transferring insights from the academic literature into implementable trading strategies.
- Ideally experience in data analysis, Machine Learning and algorithm development.
- Ability to explain your approaches to a non-expert audience.

This project study is co-supervised by Entrix GmbH, which will participate in the selection process of suitable candidates and in the detailed specification of the project. Entrix will offer remuneration according to a "Minijob" employment.

Qualified applicants are invited to send their electronic application to david.wozabal@tum.de.