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Swedish energy storage system peak-valley arbitrage solution



Overview

The aim of this study is to economically analyze peak load shaving for Swedish industries. This is done using Li-Ion BESS and DSM, and to maximize the utilization of the BESS by including energy arbitrage and FFR market participation into the analysis. Do energy storage systems achieve the expected peak-shaving and valley-filling effect?

Abstract: In order to make the energy storage system achieve the expected peak-shaving and valley-filling effect, an energy-storage peak-shaving scheduling strategy considering the improvement goal of peak-valley difference is proposed.

What is energy arbitrage?

Energy arbitrage means that ESSs charge electricity during valley hours and discharge it during peak hours, thus making profits via the peak-valley electricity tariff gap [14]. Zafirakis et al. [15] explored the arbitrage value of long-term ESSs in various electricity markets.

Is a retrofitted energy storage system profitable for Energy Arbitrage?

Optimising the initial state of charge factor improves arbitrage profitability by 16 %. The retrofitting scheme is profitable when the peak-valley tariff gap is >114 USD/MWh. The retrofitted energy storage system is more cost-effective than batteries for energy arbitrage.

What is the scale of the energy storage system and operation strategy?

The scale of the energy storage system and operation strategy was related to the technical and economic performance of the coupling system , . In order to reduce the extra cost of the BESS, it is necessary to conduct the optimization research of the BESS and RE coupling system .

Are energy storage systems more cost-effective than batteries for Energy Arbitrage?

The retrofitted energy storage system is more cost-effective than batteries for energy arbitrage. In the context of global decarbonisation, retrofitting existing coal-fired power plants (CFPPs) is an essential pathway to achieving sustainable transition of power systems.

Is energy arbitrage profitability a sizing and scheduling Co-Optimisation model?

It proposes a sizing and scheduling co-optimisation model to investigate the energy arbitrage profitability of such systems. The model is solved by an efficient heuristic algorithm coupled with mathematical programming.

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