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Energy storage configuration for new energy power stations



Overview

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This study proposes a shared energy storage strategy for renewable energy station clusters to address fossil fuel dependence and support the green energy transition. By leveraging the spatiotemporal complementarities of storage demands, the approach improves system performance and output tracking.

In this paper, an optimization method for energy storage is proposed to solve the energy storage configuration problem in new energy stations throughout battery entire life cycle. At first, the revenue model and cost model of the energy storage system are established based on the operational. Why is energy storage configuration important?

In the context of increasing renewable energy penetration, energy storage configuration plays a critical role in mitigating output volatility, enhancing absorption rates, and ensuring the stable operation of power systems.

What is a new energy station?

New energy stations include renewable energy sources such as wind power and photovoltaic, gas turbine power generation, and energy storage system charging and discharging. During the normal operation of new energy stations, each equipment must meet its own constraints.

How energy storage system model is related to new energy stations?

The establishment of an energy storage system model is related to the revenue of new energy stations. This paper starts from the energy storage revenue model and energy storage cost model, and refines the energy storage system model.

How can energy storage improve the operation of new energy stations?

The configuration of energy storage in new energy stations can effectively improve the operational efficiency of new energy stations, promote the consumption of new energy, and ensure the normal and stable operation of new energy stations. Currently, research on energy storage is also a hot topic [18, 19, 20, 21, 22, 23].

What is the optimal energy storage configuration?

Research on optimal energy storage configuration has mainly focused on users, power grids [17, 18], and multienergy microgrids [19, 20]. For new energy systems, the key goals are reliability, flexibility, and minimizing operational costs, with limited exploration of shared energy storage.

Can energy storage be used for charging a new energy station?

During peak periods of electricity prices from 10:00 am to 12:00 am and 6:00 pm to 9:00 pm, energy storage is used for discharge; at other times, energy storage can be used for charging. After optimization, the energy output of new energy station is shown in Fig. 3, energy output values are given by Table 2.

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