

Building a compensation mechanism for energy storage costs

Can a capacity tariff optimization model save the energy storage system cost?

If we do not consider the Stackelberg game mechanism, the capacity tariff of the energy storage plant is calculated as 584.76 CNY/MW according to the traditional method, which shows that the capacity tariff optimization model of the grid energy storage plant proposed in this paper can save the system cost.

How do energy storage operators make decisions?

Energy storage operators act as followers, making decisions regarding storage capacity and operational strategies based on the tariffs set by the grid. Their decision-making process incorporates historical capacity tariffs, operating costs, expected returns, and market dynamics.

How does energy storage make money?

In mature power markets, energy storage derives its revenue primarily from participating in energy and ancillary service markets, such as those for peak shaving and frequency regulation (John et al., 2022; Wu et al., 2021). Market-based pricing mechanisms dominate energy storage valuation.

How does a capacity tariff work for grid-side energy storage stations?

However, according to the current policy of regulatory pricing, particularly the “Opinions on Further Improving the Price Formation Mechanism for Pumped Storage Energy”, the capacity tariff for grid-side energy storage stations essentially functions as an equal annual payment mechanism for initial investment recovery.

What are system operating costs?

The system operating costs include thermal power unit operating costs, new energy curtailment penalty costs, pollutant treatment costs, energy storage arbitrage costs, and capacity tariffs to pay for energy storage.

How does capacity tariff work?

The results demonstrate that the proposed capacity tariff method effectively balances the storage revenue with grid operational costs, ensuring fair capacity tariffs. Compared to traditional capacity tariff methods, this approach enhances renewable energy use and reduces grid costs, supporting energy transition and sustainable development. 1.

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Sensitivity analysis is further conducted to offer valuable insights into cost-saving policies for four representative regions in China. The proposed operation and cost-sharing ...

Although these systems can save energy by storing energy for future use, their costs are difficult to control. Therefore, in order to compensate for the cost of energy storage systems, this article ...

The considered costs include (1) investment, operation, and maintenance (O& M) costs of WFs, PVFs, and BESS; (2) imported energy cost for loads and power losses from the ...

A well-designed compensation mechanism can help minimize the negative impacts and maximize the value of DG to all stakeholder groups, including distribution utilities, the DG system owner, ...

ABSTRACT Shared energy storage plays a crucial role in facilitating the low-carbon transition, serving as a flexible resource to mitigate the volatility of renewable energy. However, the core ...

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The energy tariff reflects the contribution of the peak regulating service to recoup the operational costs of pumping and generation [5]. Capacity tariffs reflect the contribution of ...

The possibility of establishing a new capacity payment for power plants has been under debate in China for years. If well-designed and open to competing clean-energy resources, a capacity ...

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