

PDEOZE PowerContainer

Peak-valley electricity price differences and energy storage solutions



Overview

In terms of economic optimization, the core economic indicators for energy storage configuration depend on three main variables: 1) Peak-valley price difference (δp): the larger the difference, the greater the arbitrage potential for energy storage; 2) Limit electricity rate (γ): for every 1% increase in limit rate, project revenue decreases by approximately 0.02 RMB/kWh; 3) The cost of the energy storage system itself. Does peak-valley spread affect peak-shaving of the power grid?

Although wider peak-valley spread promotes cost-savings for LEM participants, the effects on peak-shaving of the power grid is marginal. This is because the peak-valley mechanism is still insufficient to identify all potential spikes in power supply, so the storage and reserve capacity resources cannot reach the efficient allocation.

What is the value of energy storage?

The value of energy storage is that the prosumer will store part of the surplus generation and use it for their own use when the electricity price is high.

How do C&I energy storage projects benefit from Peak-Valley arbitrage?

C&I energy storage projects in China mainly profit from peak-valley arbitrage while reducing demand charges by monitoring the inverters' power output in real time to prevent transformers of industrial parks from exceeding their capacity limits.

Does Peak-Valley pricing reflect the marginal costs principle?

To begin with, this study has demonstrated that peak-valley pricing policy designed to reflect the marginal costs principle and ensure trading activities in LEMs benefit consumers and prosumers at the expense of the power grid.

Why do we need a peak-valley mechanism?

This is because the peak-valley mechanism is still insufficient to identify all

potential spikes in power supply, so the storage and reserve capacity resources cannot reach the efficient allocation. As a result, to encourage storage and reserve capacity, peak-valley mechanism that more accurately coordinate supply and demand is needed.

What is the virtual price of energy storage use?

In summary, the virtual price of energy storage use is set as $E_{p, s, t} - j = E_{p, m} + 0.01$. To ensure that prosumers first sell electricity in the LEM before storing and then sending the excess to the grid, we set the virtual price of energy storage slightly lower than the feed-in tariff given by $E_{p, j} - s, t = E_{p, s} - g - 0.01$.

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In addition to reducing the peak-valley difference of transformer stations, additional

centralised energy storages will be allocated to realise peak-valley price arbitrage when the investment of ...

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