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Energy storage system and deep peak load regulation

Overview

Due to the randomness and uncertainty of renewable energy output and the increasing capacity of its access to power system, the deep peak load regulation of power system has been greatly challenged. Th.

Do thermal power units provide deep peak regulation?

Specifically, first, the flexibility requirement of renewable integration is quantified, and the operating characteristics of thermal power units providing deep peak regulation are modeled. On this basis, a capacity optimization for BES is proposed considering peak regulation characteristics of thermal power units.

What is the optimal energy storage allocation model in a thermal power plant?

On this basis, an optimal energy storage allocation model in a thermal power plant is proposed, which aims to maximize the total economic profits obtained from peak regulation and renewable energy utilization in the system simultaneously, while considering the operational constraints of energy storage and generation units.

Do I need to charge the energy storage system for peak shaving?

The dispatching department calls it for free. When the output of thermal power unit is between (1 − k) Pthe and 0.5 Pthe, the thermal power unit has the ability for peak shaving. At this time, there is no need to charge the energy storage system for peak shaving. To avoid deep discharge in energy storage system, SOCmin is set to 20%.

How does peak regulation affect the operating state of thermal power units?

While at the phase of normal peak regulation, the operation cost increases as the power output increases. Therefore, for economic operation, the optimal operating state of thermal power units better be maintained near the lower limit of normal peak regulation. Fig. 3. Deep peak regulation cost of thermal units.

Is a capacity optimization for BES based on peak regulation characteristics?

On this basis, a capacity optimization for BES is proposed considering peak regulation characteristics of thermal power units. Extensive case studies on a modified IEEE system compared and analyzed the impacts of grid integration of different renewable mixes on the power system flexibility from thermal power units and energy storage.

What is the peak load and Valley load of energy storage system?

The load data was extracted from the historical data of typical daily load, as shown in Table 3. The peak load and valley load are 3475.94 MW and 2595.70 MW, respectively. The parameters of the energy storage system are shown in Table 2 .

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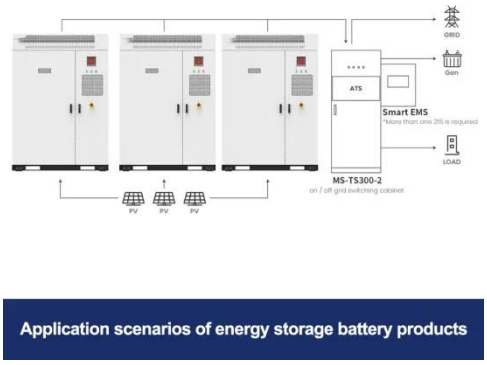

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