

Why is site selection important in pumped storage power plants?

Pumped storage power plants (PSPP), as an important clean energy technology, have great potential for energy storage and conditioning. However, site selection is the primary issue in PSPP construction, which directly affects its economics, environmental impact and social acceptability.

Why are energy storage stations important?

When the frequency fluctuates, energy storage stations can swiftly respond to the frequency changes in the power system, offering agile regulation capabilities and maintaining system stability [10]. Thus, the participation of energy storage stations is also crucial for ensuring the safety and stability of operations in the power system [11].

How do energy storage power stations work?

Each part of the energy storage power station contributes. The pumped storage system handles relatively slow power fluctuations. Lithium batteries allocate the power portion between high and low frequencies. The supercapacitor mainly takes on the high-frequency part where the frequency change is the fastest.

What is rated power configured for the energy-type storage system?

where is the rated power configured for the energy-type storage system, is the rated power configured for the hybrid-type storage system, is the rated power configured for the power-type storage system, is the charging coefficient of the energy storage, and is the discharging coefficient of the energy storage.

What is a mixed energy storage station?

The mixed energy storage station was set to assist the thermal power units in primary frequency regulation. Fixed K droop control was implemented in the storage control mode. Under the renewable energy penetration rate of 25%, the system grid interface inertia constant M is 7.5.

What are the energy storage parameters?

The energy storage parameters are shown in Table 2. Among them, the units of k_1 , k_2 , and k_3 are $\text{yuan} \cdot (\text{MW})^{-1}$; $\text{yuan} \cdot (\text{MWh})^{-1}$, respectively. The discount rate ρ is 6%, and the initial water storage of pumped storage is 0.5 (0.5 indicates that the current water storage of the pumped storage is half of the full storage).

In this paper, considering the important function of pumped-storage power station (PPS) in promoting the "source-grid-load-storage" synergy and complement in the construction ...

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