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Solar thermal power generation and energy storage peak regulation



Overview

Can concentrated solar power be used as a peak load regulation plant?

In spite of the discontinuous nature of solar energy, concentrated solar power (CSP) plant with thermal energy can not only stabilize output but also be operated as a peak load regulation plant in a multi-energy system.

Can a concentrated solar power plant with an electric heater join peak regulation?

Therefore, a concentrated solar power (CSP) plant equipped with an electric heater (EH) is implemented to join the peak regulation, and the joint peak regulation strategy between thermal power units (TPUs) and a CSP plant is proposed. Firstly, the peak regulation principle of a CSP plant with EH is analyzed in detail.

What are the three stages of peak regulation of thermal power units?

According to the output characteristics of thermal power units during peak regulation operation, they can be divided into three stages: regular peak regulation (RPR), deep peak regulation with out oil (DPR) and deep peak regulation with oil (DPRO), as shown in Figure 1. Schematic diagram of thermal power unit peaking process.

How to solve the insufficient peaking capacity of thermal power units?

Therefore, mobilizing flexibility resources is the core way to solve the insufficient system peaking capacity, among which flexibility transformation of thermal power units combined with energy storage equipment is the most feasible technical means at present [19, 20].

What is the load mode of peak regulation?

In the load mode of peak regulation, EH needs to meet operational constraints. The energy storage of TES should be within a reasonable range.

Can peak regulation reduce environmental pollution and operating pressure in TPUs?

Among them, the changes in carbon emission quality, total peaking cost of TPUs, and power supply ratio of new energy are the most significant. The results demonstrate that the incorporation of a CSP plant and a DPR unit for peak regulation can effectively mitigate both environmental pollution and operating pressure in TPUs.

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