Wind power generation and thermal power peak regulation

What is deep peak regulation of thermal power plants?
Therefore,deep peak regulation (DPR) of thermal power plants remains one of the main peak regulation methods for the source side in China. The lower reserve capacity of thermal power plants is used to provide peak regulation power generation rights for renewable energy sources such as wind and solar energy.

What causes peak-regulation problems of wind power integrated power systems?
The peak-regulation problems of wind power integrated power systems were reviewed in Yuan et al. (2011). Moreover,some measurements for reducing the peak load were studied. Administrative factors and market barrierswere regarded as the main causes of renewable energy curtailment.

Are thermal power units a source of peak regulation?
As conventional power generation units,e.g.,thermal power units (TPU) and hydro units,are relatively more flexible in terms of regulation capacity compared with the renewable energy generation,they are the fundamental sources of peak regulation(Gao et al.,2020; Guan et al.,2022).

Does wind power need Peak-Valley regulation and frequency control?
This chapter introduces wind power's demand for peak-valley regulation and frequency control and suggests several measures such as utilization of thermal power generator, energy storage, and demand response. 6.1. Peak-Valley Regulation and Frequency Control Measures Adopted by Large-Scale Wind Power Bases

Why does peak load regulation cause wind power curtailment?
While the core reason why peak load regulation causes wind power curtailment is the inflexibility of the power source structure,the core reason why external transmission causes wind power curtailment is the inflexibility of power grids.

What is the difference between photovoltaic peak regulation and wind power profit?
The wind power profit and photovoltaic peak regulation are composed of the profit from electricity sales, the allocation cost, and the penalty for abandoning wind and light. The thermal power peak regulation profit is composed of compensation, allocation, and DPR costs. These are shown in Eqs. 7 - 9.

To enhance the system''s peak-load management and the integration of wind (WD) and photovoltaic (PV) power, this paper introduces a distributionally robust optimization scheduling strategy for a WD-PV thermal ...

With the continuous expansion of grid-connected wind, photovoltaic, and other renewable energy sources, their volatility and uncertainty pose significant challenges to system peak regulation. To enhance the ...

As conventional power generation units, e.g., thermal power units (TPU) and hydro units, are relatively more

flexible in terms of regulation capacity compared with the renewable energy ...

The fast peak regulation characteristics of the virtual power plant means that the virtual power plant has a faster second-level adjustment response capability than the thermal power plant, and it can also jointly peak ...

The lower reserve capacity of thermal power plants is used to provide peak regulation power generation rights for renewable energy sources such as wind and solar energy. The load side adopts demand response (DR) ...

The output of wind power generators could vary stochastically between zero and the rated capacity. The output could be low when the load demand is in peak hours, while it ...

606 FAN ET AL. FIGURE 1 Schematic diagram of thermal power unit peaking process. where H is the planning period, d is the discount rate; c g is the flexibility transformation cost per unit ...

The deep peak regulation of thermal power units increases the utilization of wind power, however, it also leads to high economic costs for the operation of thermal plants.

Reference established a three-layer robust planning model for energy storage system adapted to the uncertainty of wind power investment and thermal power unit retirement to balance the investment cost and operation ...

Wind and solar power generation are highly uncertain, intermittent, and random, leading to frequent deep peaking of coal-fired thermal power units, and the resulting coal consumption ...

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 ...