

What is peak load regulation?

To balance the peak-valley (off-peak) difference of the load in the system, the power system peak load regulation is utilized through adjustment of the output power and operating states of power generator units in both peak and off-peak hours.

Can a prefecture-level urban power system regulate peak load?

An integrated optimal scheduling model for power system peak load regulation with a suitable rolling optimization strategy is proposed. A real prefecture-level urban power system in southwest China and its modified test systems are used to test and verify the validity and effectiveness of the proposed methodology.

How does peak load regulation affect the power system?

The peak load regulation problem causes challenges to the power system, and countermeasures are studied on the demand side and the generation side. On the demand side, demand response programs encourage consumers to reduce and/or shift their electricity usage during peak hours.

How effective is peak-load regulation capacity planning?

Based on probabilistic production simulation, a novel calculation approach for peak-load regulation capacity was established in Jiang et al. (2017), which is still effective for peak-regulation capacity planning when some information of renewable energy and loads is absent.

Can thermal units be used in peak load regulation?

The proposed method was verified in a real prefecture-level urban power system in southwest China, and its modified test systems. The case studies demonstrated the intrinsic capacity of the thermal units in the system peak load regulation.

What is the optimal scheduling model for peak load regulation?

Establish the optimal scheduling model of power system peak load regulation based on the parameters of power grid units and load demand forecast values for window [Day k , Day $k+1$]. Solve the optimal scheduling model for window [Day k , Day $k+1$] to obtain optimal scheduling results. The optimal scheduling scheme for Day k is implemented.

Robust bidding strategy for multi-energy virtual power plant in peak-regulation ancillary service market considering uncertainties. Author links open ... and the total revenue is the least. Compared with Case 2 and 3, although more load compensation and energy storage costs are spent, the highest peak-regulation income is obtained in Case 4 ...

Assuming the rated capacity of the BESS is a constant value, the actual capacity of the BESS is determined by

the charge-discharge state. When the BESS serves as both a backup power source and load regulation, the probability distribution of the actual capacity fluctuates based on the load regulation time and the load regulation ratio.

However, when the TPGs conduct conventional peak load regulation, the 300-MW units are the main subjects in the peak load regulation to match the fluctuation of the wind power output. The 250-MW and 150-MW units conduct the peak load regulation according to the minimum allowable output, and only increase the output during the valley periods.

With the new round of power system reform, energy storage, as a part of power system frequency regulation and peaking, is an indispensable part of the reform. Among them, user-side small energy ...

1. Introduction. Carbon dioxide (CO₂) emissions are increasing due to the increasing demand for fossil fuels (Hino and Lejeune Citation 2012) plying clean and low-carbon technologies such as renewable energy, energy storage, nuclear power, Carbon Capture and Storage (CCS), energy efficiency, and new transport technologies will reduce Greenhouse ...

The optimal configuration of the rated capacity, rated power and daily output power is an important prerequisite for energy storage systems to participate in peak regulation on the grid side. Economic benefits are the main reason driving investment in energy storage systems. In this paper, the relationship between the economic indicators of an energy storage ...

The fast peak-load regulation capability of CFPP is the key. According to the available literature, the lowest load rate of thermal power plants is about 30 % [1] and the fastest load change rate is about 4.5 %/min [2]. However, some components of traditional steam Rankine cycle power plants, such as condensers, have large thermal inertia due to their large size and ...

Peak load regulation in power systems is required to accommodate high levels of power penetration. Wind power generation is a relatively mature technology using renewable energy ...

High penetration wind power grid with energy storage system can effectively improve peak load regulation pressure and increase wind power capacity. In this paper, a capacity allocation ...

With the increasing peak-valley difference of power grid and the increasing proportion of nuclear power supply structure, it is imperative for nuclear power to participate in Peak load regulation of power system. This article proposes a combined optimal dispatch model of nuclear-thermal-energy storage with nuclear power participating in equivalent peak load regulation. By the ...

Currently, to handle the uncertainty of high-permeability systems of RE, the use of ES combined with conventional units to enhance the system's multi-timescale regulation capability has become a hot topic [27,

28] Ref. [29], to optimize the ES dispatch, an optimal control strategy for ES peak shaving, considering the load state, was developed according to ...

1 INTRODUCTION. In China, the installed capacity for renewable energy, such as wind and solar power, has grown rapidly in recent years. At the end of 2018, the total installed capacity of wind and solar power in China was approximately 358 GW, with an average increase of 31.30% in the past five years, accounting for 18.9% of the total installed capacity. 1 Because ...

An analysis of energy storage capacity configuration for “photovoltaic + energy storage” power stations under different depths of peak regulation is presented. This paper also exploratively ...

Thereby, peak regulation tasks undertaken by gas-fired power plants have been popular in recent years [8, 9]. However, two problems are confronted by gas-fired power plants when participating in the peak regulation of the power system. Firstly, there are problems within the capacity mechanisms and peak regulation ability of gas-fired power ...

Reducing peak demand on the utility grid benefits both grid operators and consumers. However, achieving this goal while maintaining human comfort presents a significant challenge.

Background. Energy storage systems (ESSs) are becoming increasingly important as RESs become more prevalent in power systems. ESSs provide distinct benefits while also posing particular barriers ...

Finally, a local power grid in Northwest China is considered as a case study, and we establish regular, low-carbon, stochastic and comprehensive four peak-load regulation scenarios to analyze the ...

In recent years, China's power grids have been faced with the common problem of the peak-valley difference increasing year by year as well as facing increasingly severe peak regulation pressure due to significant changes to the structure of power consumption [1, 2]. Hydroelectric units play a very important role in the peak shaving and frequency regulation ...

In summary, based on the consideration of the deep peak load regulation mode of thermal power units [12], the case adds the consideration of energy storage and photovoltaic to more fully reflect the operation of the power system with high proportion of photovoltaic access, such like some cities in East China. It can be seen from the results ...

Nowadays, quantity of coal-fired power plant and its single unit capacity are greatly improved in China, and power grid's frequency and peak-load regulation range become wider. Based on the basic regulation theory and unit's characteristics, this paper indicates the limitations of unit's original control strategies and such limitations have produced great ...

Study on strategy of wind farm combined with distributed energy storage to realize synergetic-consensus frequency regulation . The frequency support control principle of DFIGs based on variable proportional speed regulation to achieve MPPT operation mode is shown in Fig. 1, where P_s is the output power of DFIG, ω_r is the WT rotor speed, k is the proportional speed ...

The optimal configuration of the rated capacity, rated power and daily output power is an important prerequisite for energy storage systems to participate in peak regulation on the grid side.

The different types of capacity of the thermal power unit include 600, 350, 300, 200, and 135 MW. The normal peak-load regulation rate of thermal power is 50%, deep peak-load regulation rate is 40%, and given oil peak-load regulation rate is 30%. The load cost is ...

The power system peak load regulation is conducted by adjusting the output power and operating states of the power generating units in both peak and off-peak hours. Three main peak load regulation modes (i.e. basic peak load regulation mode, deeper peak load regulation mode, and short-time startup and shutdown regulation mode) are considered in ...

Large-scale energy storage access to the power grid can assist the power system in peak shaving. Therefore, this paper establishes an energy storage peak shaving model considering carbon footprint cost and establishes a user-side carbon footprint cost model. On this basis, multi-objective optimization is carried out.

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