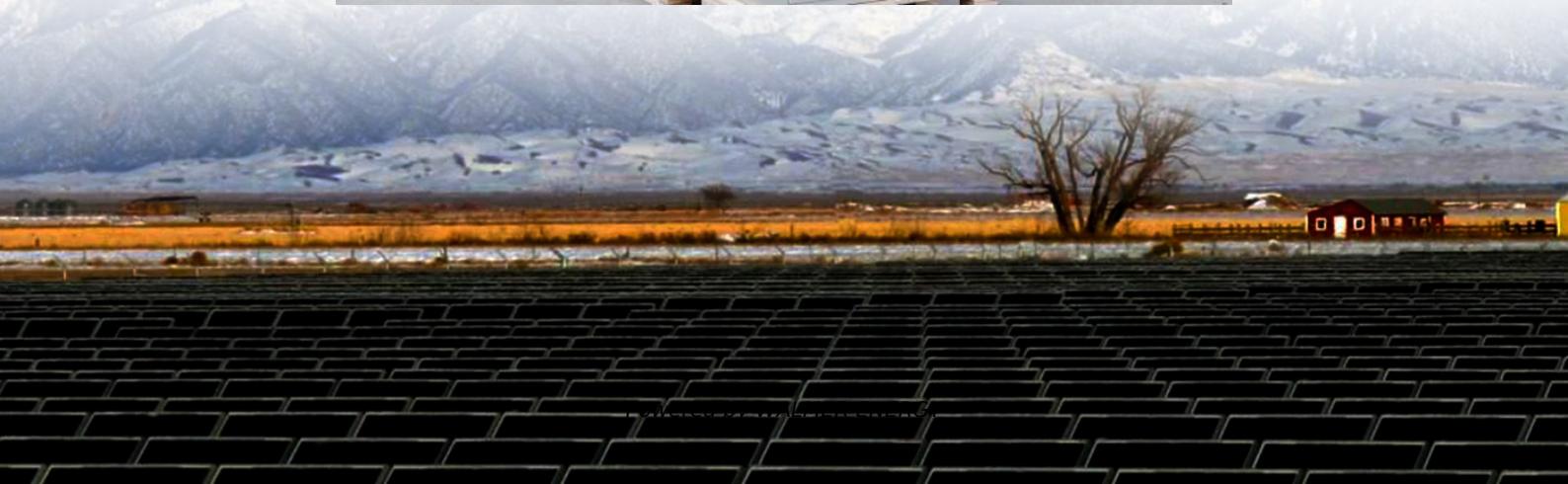




WALMER ENERGY

# New energy power station energy storage configuration plan





## Overview

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In view of the increasing trend of the proportion of new energy power generation, combined with the basic matching of the total potential supply and demand in the power market, this paper puts forward the bidding mode and the corresponding fluctuation suppression mechanism, and analyzes the feasibility of reducing the output fluctuation and improving the stability level of the system by installing energy storage systems. At the same time, through qualitative social utility analysis and quantitative energy storage capacity demand measurement, this strategy fully takes into consideration multiple key factors affecting the amount of energy storage configuration and gives a quantitative calculation formula, which provides new energy suppliers with an optimal cost-effective algorithm to calculate the best configuration.

Power market  
New energy units  
Energy storage configuration  
Fluctuation suppression mechanism.

With the rapid development of new energy, whether wind power and photovoltaic power should participate in the market competition becomes one of hot topics for many scholars. From the perspective of market fairness, the participation of new energy in the competition can effectively restore its market attributes and reflect the real power generation costs, which have effective means to cultivate the further development of new energy [1], [2]. On the other hand, the characteristics of fluctuating, randomness and intermittency of new energy power generation lead to its low utilization rate, and it is easy to cause problems such as the decrease of the system rotational inertia, and the difficulty of stable control of the grid frequency, voltage and power angle [3], [4]. With a large number of new energy units connected to the grid, the system's ability to withstand fluctuations and maintain stability is also a concern.

**2.1. Role of new energy units in bidding market**  
At present, in order to encourage the full consumption of new energy, most markets have not required new energy units to participate in market bidding. Affected by the 'carbon peak carbon neutralization' policy, new energy generation will see significant growth, both in terms of the total installed capacity and the relative installed proportion have improved significantly. If new energy units are still excluded from the market, it will be difficult to correctly reflect the real supply and demand of the market and to restore the real cost of generation. In



addition, considering the rapid decline in the cost of new energy power generation and the gradual withdrawal of the government subsidy, the new energy selli.

The market supply and demand curves for new energy units entering the market are shown in Fig. 1. In the picture, B1, B2, and B3 are the supply curves when the fluctuation suppression mechanism is not considered, the fluctuation suppression mechanism is considered, and the energy storage facilities are considered, respectively. When a new energy unit is penalized for exceeding the output limit, it is equivalent to increasing its cost, so the curve moves from B1 to B2. When new energy units are equipped with energy storage facilities, the cost of energy storage is hedged against the total amount of penalty, and the output power range increases, so the curve moves from B1 to B3. In addition, D1, D2, and D3 are the dema.

What is a new energy station?

New energy stations include renewable energy sources such as wind power and photovoltaic, gas turbine power generation, and energy storage system charging and discharging. During the normal operation of new energy stations, each equipment must meet its own constraints.

Can energy storage configuration schemes be tailored for new energy power plants?

This paper proposes tailored energy storage configuration schemes for new energy power plants based on these three commercial modes.

How energy storage system model is related to new energy stations?

The establishment of an energy storage system model is related to the revenue of new energy stations. This paper starts from the energy storage revenue model and energy storage cost model, and refines the energy storage system model.

Why is energy storage configuration important?

In the context of increasing renewable energy penetration, energy storage configuration plays a critical role in mitigating output volatility, enhancing absorption rates, and ensuring the stable operation of power systems.



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