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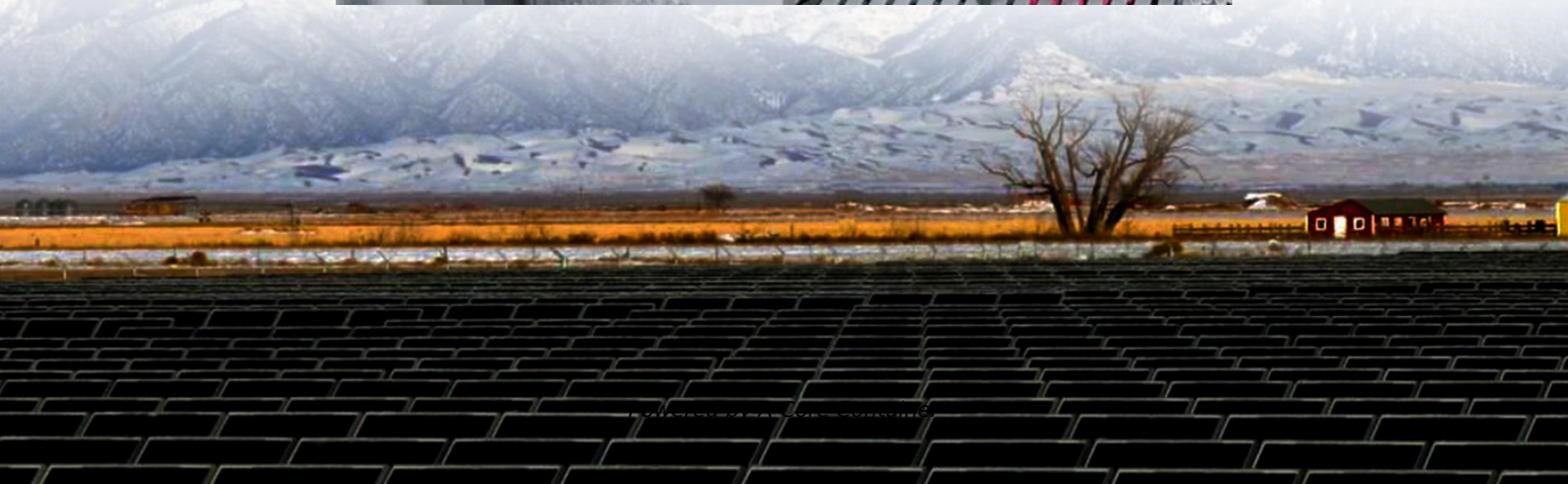
Energy storage frequency modulation power station project



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Overview

Using MATLAB/Simulink, we established a regional model of a primary frequency regulation system with hybrid energy storage, with which we could obtain the target power required by the system when continuous load disturbance of the regional power grid causes frequency fluctuation.Do hybrid energy storage power stations improve frequency regulation?

To leverage the efficacy of different types of energy storage in improving the frequency of the power grid in the frequency regulation of the power system, we scrutinized the capacity allocation of hybrid energy storage power stations when participating in the frequency regulation of the power grid.

What is dynamic frequency modulation model?

The dynamic frequency modulation model of the whole regional power grid is composed of thermal power units, energy storage systems, nonlinear frequency difference signal decomposition, fire-storage cooperative fuzzy control power distribution, energy storage system output control and other components. Fig. 1.

How to control frequency modulation of energy storage battery?

By adjusting the output of the energy storage battery according to the fixed sagging coefficient, the power can be quickly adjusted and has a better frequency modulation effect. Based on the adaptive droop coefficient and SOC balance, a primary frequency modulation control strategy for energy storage has been recommended .

Do energy storage stations improve frequency stability?

With the rapid expansion of new energy, there is an urgent need to enhance the frequency stability of the power system. The energy storage (ES) stations make it possible effectively. However, the frequency regulation (FR) demand distribution ignores the influence caused by various resources with different characteristics in traditional strategies.

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 is the frequency modulation of hybrid energy storage?

Under the four control strategies of A, B, C and D, the hybrid energy storage participating in the primary frequency modulation of the unit |Δ fm | is 0.00194 p.u.Hz, excluding the energy storage system when the frequency modulation |Δ fm | is 0.00316 p.u.Hz, compared to a decrease of 37.61 %.

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