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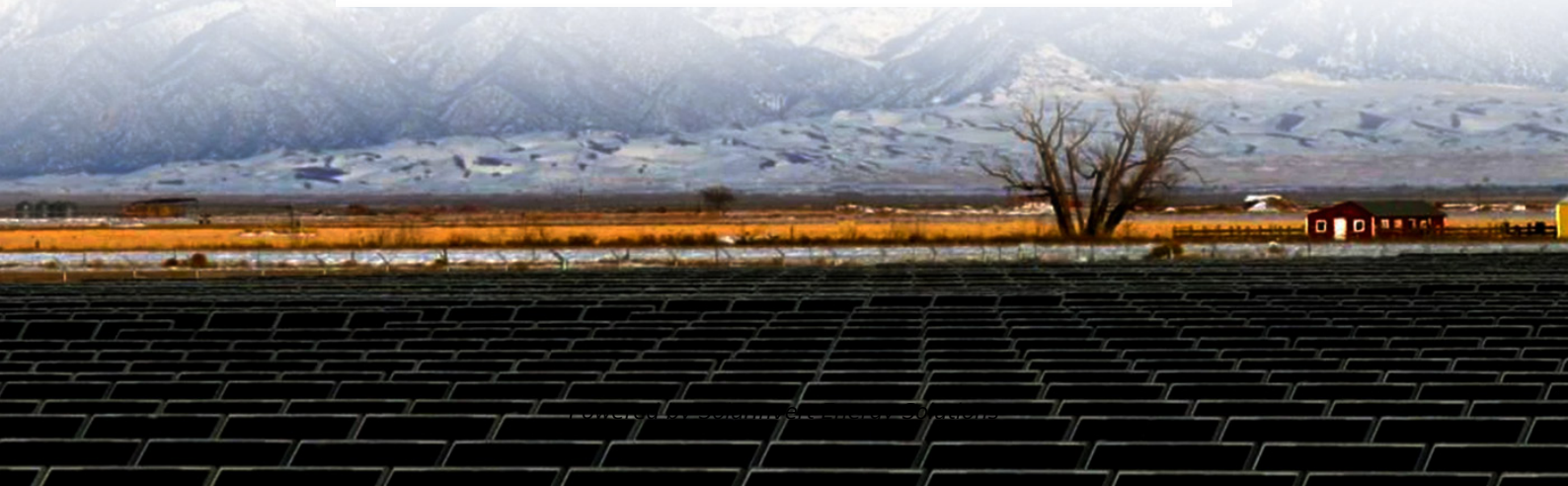
Strengthen the construction of power grid peak load regulation and energy storage



Overview

With the development of renewable energy and the increase of peak–valley load difference, amounts of power grids in Chinese urban regions present great insufficiency of peak-regulation capability in rece.

Why is peak-regulation important in power grids?

Peak-regulation in power grids needs to follow the fluctuation of renewable energy generation in addition to the variable load demands. Moreover, the wind power curve usually shows opposite increasing trend to the load curve, which requires more peak-regulation supply to guarantee the secure operation of power grids.

How to evaluate peak-regulation capacity of power grid?

The existing approaches for evaluating peak-regulation capability of power grid contains deterministic and probabilistic methods. In Yang et al. (2010), a deterministic model was proposed to calculate the maximum capacity of downward peak-regulation considering the constraints of unit parameters.

How can load-side resources support peak-regulation?

Under the guidance of policy, those load-side resources would provide more peak-regulation capacity. For example, Shanghai grid has organized virtual power plants to participant in the demand response market. The total clearing capacity is 151.5 MW. It effectively supports the peak-regulation of Shanghai grid.

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.

What is peak-regulation capability?

Also, the peak-regulation capability determines the renewable energy

consumption and power loads of cities by mitigating power output fluctuation in the regulation process of power grid.

Why is peak-regulation insufficiency a problem in urban power grids?

In recent years, the power load as well as the peak–valley load difference has increased greatly, causing the shortage of peak-regulation capacity in urban power grids. Furthermore, with the increasing penetration of renewable energy generation (Ahmad et al., 2021), the peak-regulation insufficiency issue becomes even more serious and complicated.

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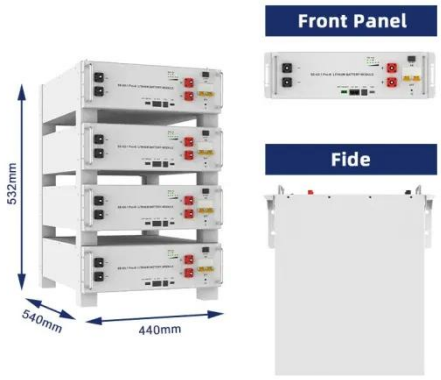

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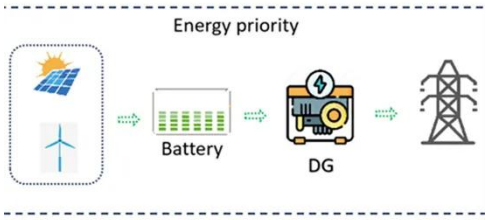

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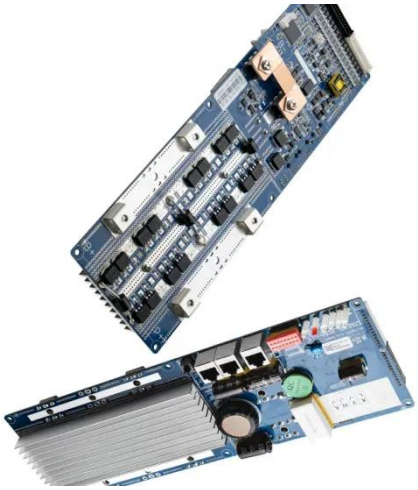

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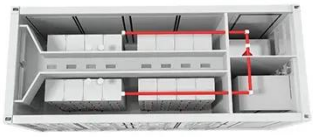

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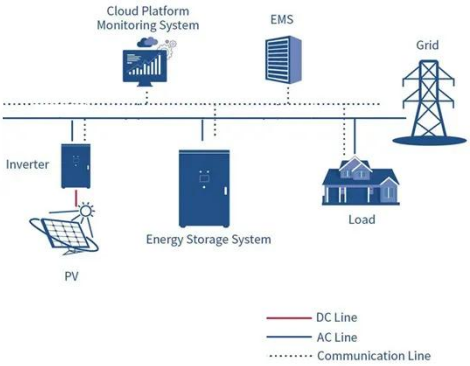

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