

Totally Integrated Power

SIESTORAGE supporting grid operation



The challenge: **Ensuring grid availability**

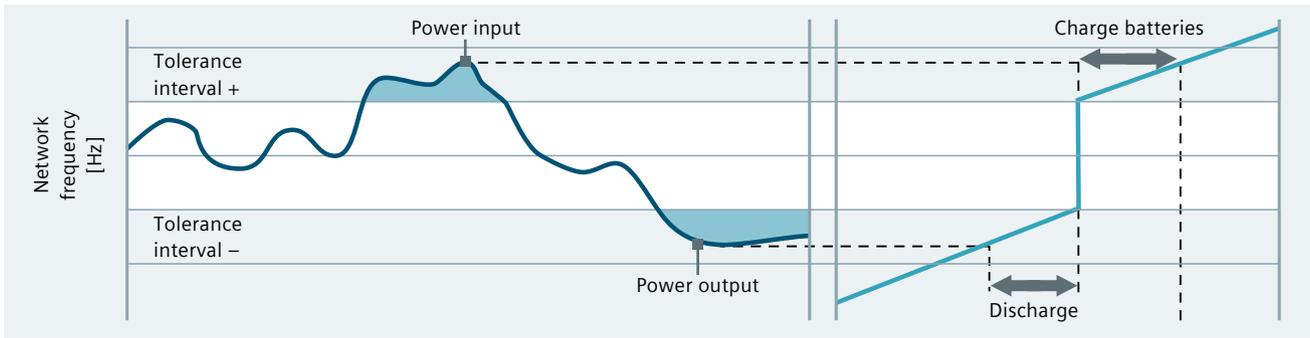
Grid operators are responsible for ensuring network availability so that power can flow from where it is generated to where it is consumed. This requires real-time complex balancing of all supply and demand resources. Increasing addition of variable renewable energy resources means that these balancing activities are becoming even more challenging. In addition, peak demand is growing faster than normal load, and less predictable generation resulting in congested corridors is adding to the challenge. Transmission system operators therefore increasingly rely on ancillary services such as frequency regulation to support their balancing activities, and distribution system operators increasingly seek new ways to manage load and power flows.

The solution:
SIESTORAGE energy storage system
SIESTORAGE offers a reliable alternative power supply solution, being more economic and resource-efficient at the same time. The system comprises very

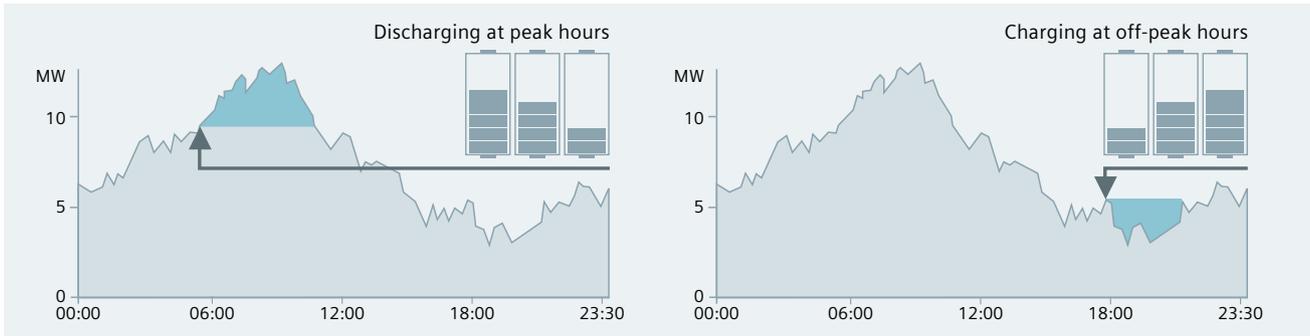
fast Li-ion battery technology as well as cutting-edge power electronics and automation to provide fast and accurate response services. SIESTORAGE can be seamlessly integrated into SCADA energy management and distribution management systems as well as into building or plant automation systems, allowing monitoring and programmable control that complies with operational or grid rules.

SIESTORAGE benefits from having a flexible modular design for sizing and scaling (from kW/kWh to MW/MWh sizes), and its redundant system architecture ensures a continuous and reliable power supply.

SIESTORAGE is supported by a comprehensive end-to-end expertise, including grid analysis, business case development, project planning, manufacturing, system integration, commissioning, and services. It can be installed in E-Houses, existing buildings, or even standard shipping-style containers.



Example of how SIESTORAGE helps to maintain system stability by controlling frequency



Example of how SIESTORAGE helps to improve grid stability and cost efficiency by balancing supply and demand

Applications and customer benefits

SIESTORAGE enables multiple applications for power grid operation while offering considerable economic benefits over its operational lifetime.

Ancillary services: Reserves and regulation

Traditionally, these services have been provided mainly by gas-fired power plants. However, these plants were not specifically designed for this task, and are substantially less efficient when operated outside their design parameters. Compared to the rate of change in the grid, they are also slow to respond, and grid operators using these resources often have to make further corrections beyond the initial deviation. SIESTORAGE on the other hand works actively with the grid and is extremely fast to respond. It can both store and inject energy, and consequently correct both upward and downward drifts.

Peak load management

Peak load is growing faster than normal load. To address a few hours of peak load, utilities have to purchase more costly energy at times of high demand, and possibly upgrade the entire grid infrastructure, too. At the same time, underutilized assets mean that system losses are higher. SIESTORAGE offers a solution to reduce power purchase costs and defer infrastructure upgrades.

By storing power during times of low demand and injecting power to support localized peaks, SIESTORAGE helps to reduce the cost of load management and enhance grid stability.

Congestion management

In addition to peak load, congestion also poses a problem for grid operators trying to move power from where it is produced to where it is consumed. Congestion is normally a result of the limiting capacity of the lines in between power generation and the load centers. Similar to peak demand, congestion is often time-specific. The normal solution is to upgrade the entire infrastructure; however, this is extremely expensive and is often delayed by planning objections. SIESTORAGE therefore offers a solution for utilities to move stored power to different parts of the network, bypassing congested areas and reducing the need for upgrades.

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