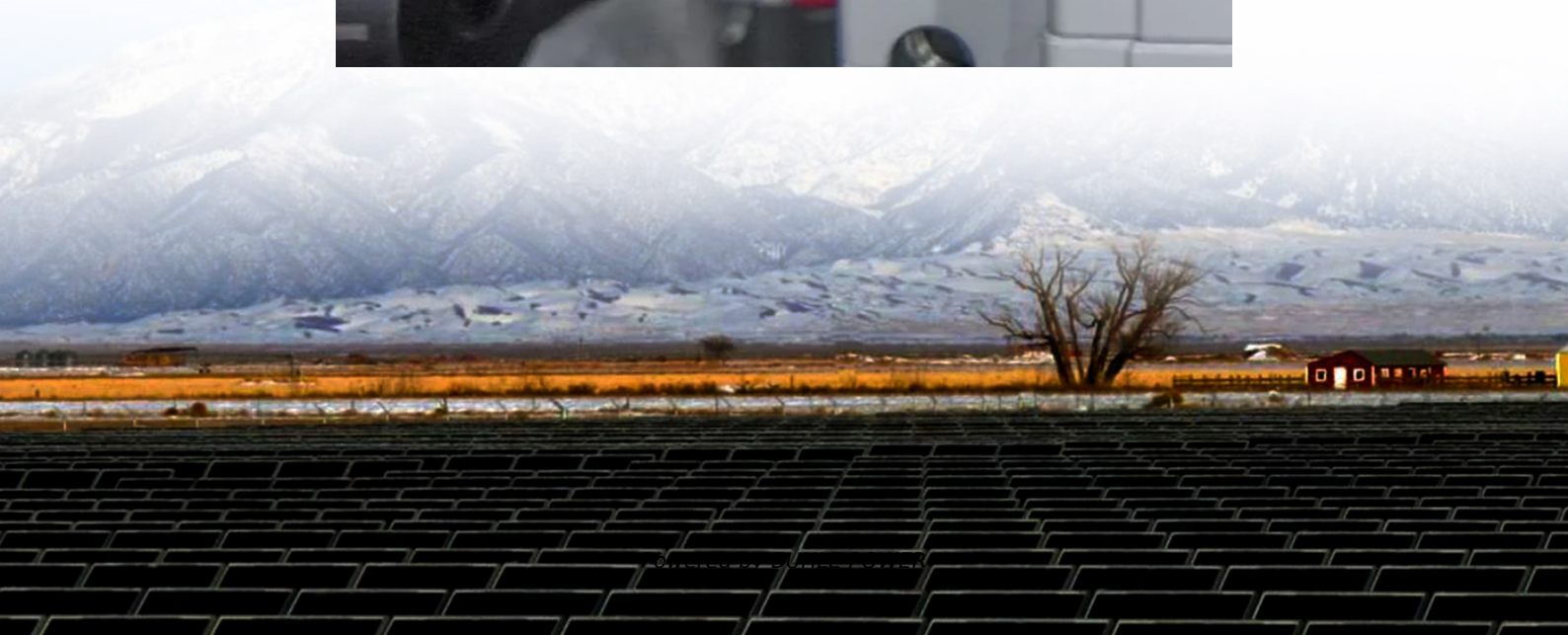


# **Grid-supported energy storage equipment**





## Overview

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Why do we need a grid-scale energy-storage system?

Under some conditions, excess renewable energy is produced and, without storage, is curtailed<sup>2,3</sup>; under others, demand is greater than generation from renewables. Grid-scale energy-storage (GSES) systems are therefore needed to store excess renewable energy to be released on demand, when power generation is insufficient<sup>4</sup>.

Which storage technologies are best suited for Energy Management and grid support?

Nearly all thermal, hydrogen, and mechanical storage technologies (excluding flywheels) are suited for long-duration energy management and grid support. In contrast, electrical storage and flywheels are better suited for short-duration storage, offering services such as transient voltage regulation and frequency control in the grid .

What is a hybrid grid-scale energy storage system?

**Hybrid Storage Systems** Hybrid grid-scale ESSs (HESSs) are designed to resolve the constraints of single-technology storage by integrating a variety of energy storage technologies, including batteries, supercapacitors, flywheels, pumped hydro, and compressed air. This approach improves grid stability, availability, and efficiency.

What are energy storage systems?

As a power reserve technology, energy storage systems (ESSs) offer flexible charging and discharging capabilities, playing a crucial role in reserve provision, response, and time-shifting for renewable energy integration .



## Grid-supported energy storage equipment

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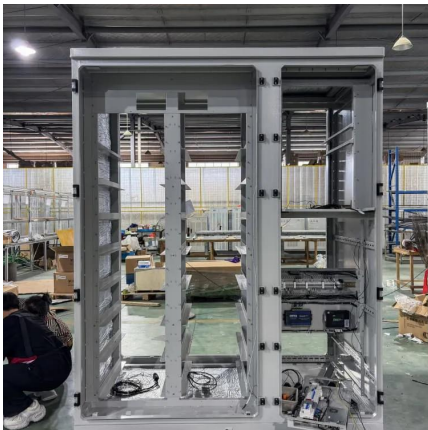






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