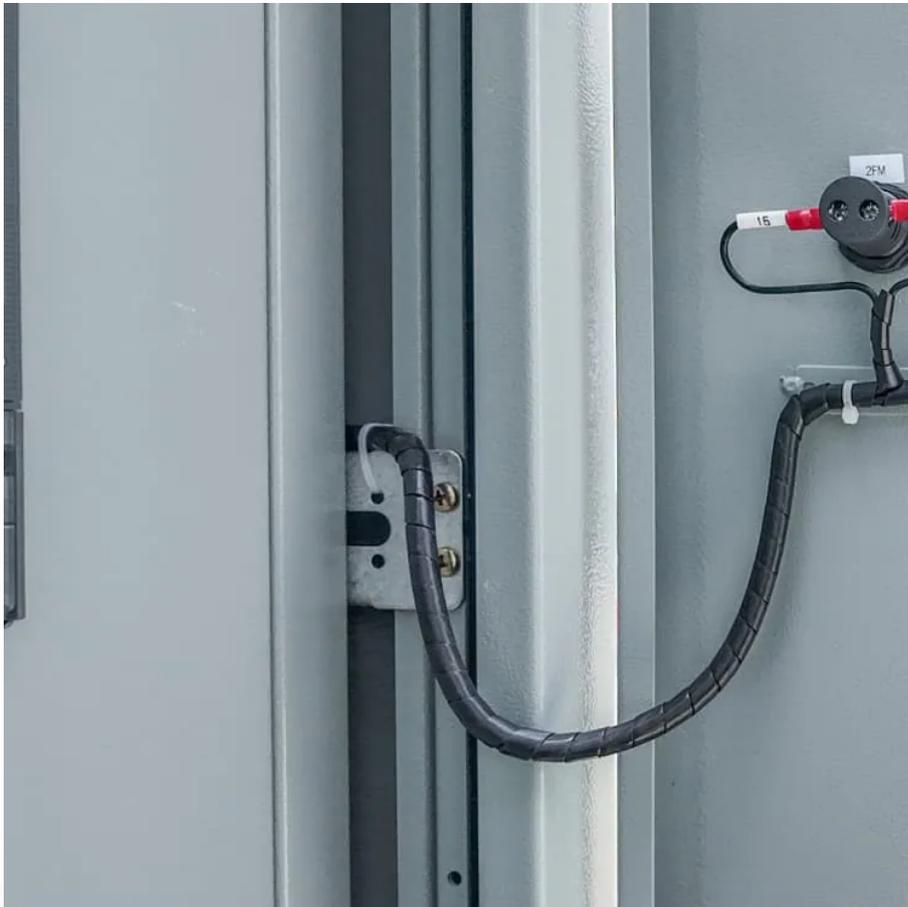


# Practical application of industrial energy storage





## Overview

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Chemical Energy Storage systems, including hydrogen storage and power-to-fuel strategies, enable long-term energy retention and efficient use, while thermal energy storage technologies facilitate waste heat recovery and grid stability. Why do we need energy storage systems?

Decarbonizing the energy sector is essential, with the Energy Storage Systems (ESS) being of great importance in the achievement of this goal. These technologies enhance the integration of renewable sources, improving supply stability and efficiency, thus facilitating the transition to a more sustainable energy model .

How efficient are electrochemical storage systems?

Electrochemical storage systems, notably lithium-ion batteries, have demonstrated round-trip efficiencies as high as 90% and energy densities of approximately 150–250 Wh/kg [31, 33].

What are the challenges of energy storage?

The ability to integrate the capabilities of storage technologies to the specific requirements of each industrial process is one of the main challenges of energy storage, with the selection of the optimal storage system depending on the needs of the industrial process.

How effective is rock thermal storage?

However, the effectiveness of rock thermal storage depends on factors such as thermal conductivity, porosity, and heat transfer efficiency, influencing system scalability and energy dispatch capabilities . Liquid Air Energy Storage (LAES) is a cryogenic storage solution that uses the liquefaction of air at  $-196^{\circ}\text{C}$  to store energy .



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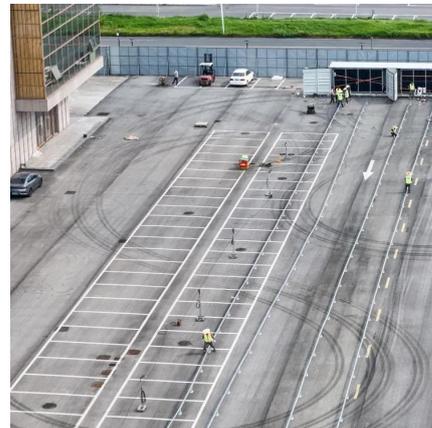


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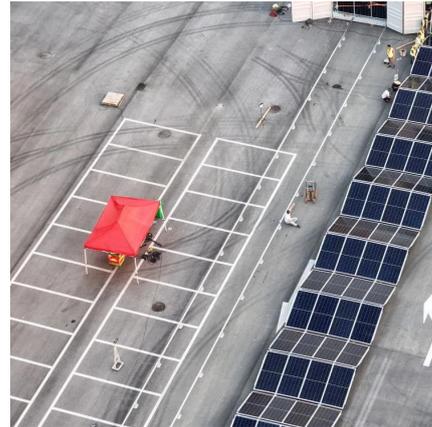
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