SolarInnovate Energy Solutions

# Conversion efficiency of wind and solar energy storage power station

## Overview

What is thermal storage wind-concentrated solar power system (tswcs)?

In this paper, a thermal storage wind-concentrated solar power system (TSWCS) is proposed in which the wind energy and solar energy are integrated/hybrid at TES level, ie. the surplus electricity is used to generated heat to be stored in the TES of the CSP system.

How to optimize wind and solar energy integration?

The optimization uses a particle swarm algorithm to obtain wind and solar energy integration's optimal ratio and capacity configuration. The results indicate that a wind-solar ratio of around 1.25:1, with wind power installed capacity of 2350 MW and photovoltaic installed capacity of 1898 MW, results in maximum wind and solar installed capacity.

What is the maximum wind and solar installed capacity?

The results indicate that a wind-solar ratio of around 1.25:1, with wind power installed capacity of 2350 MW and photovoltaic installed capacity of 1898 MW, results in maximum wind and solar installed capacity. Furthermore, installed capacity increases with increasing wind and solar curtailment rates and loss-of-load probabilities.

What is a battery energy storage system (BESS)?

To overcome these challenges, battery energy storage systems (BESS) have become important means to complement wind and solar power generation and enhance the stability of the power system.

What is the maximum integration capacity of wind and solar power?

At this ratio, the maximum wind-solar integration capacity reaches 3938.63 MW, with a curtailment rate of wind and solar power kept below 3 % and a loss of load probability maintained at 0 %. Furthermore, under varying loss of load probabilities, the total integration capacity of wind and solar power

increases significantly.

Can a CSP system convert solar heat into electricity?

CSP system is, however, able to convert the solar heat into electricity in large scale. Different from the PV system, a CSP system is normally equipped with a thermal energy storage system (TES) that is not as costly as a battery storage system. TES allows CSP plant to keep generating power when the solar resource is low or nil.

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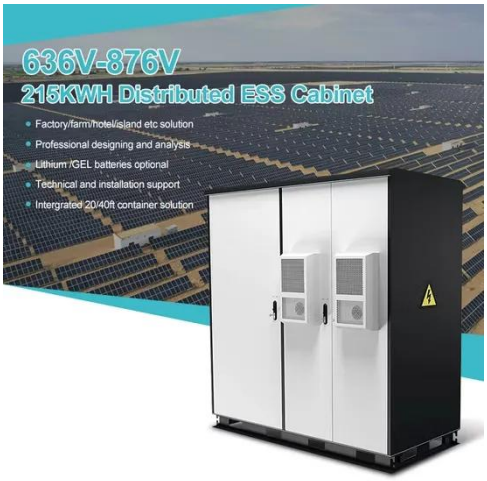


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