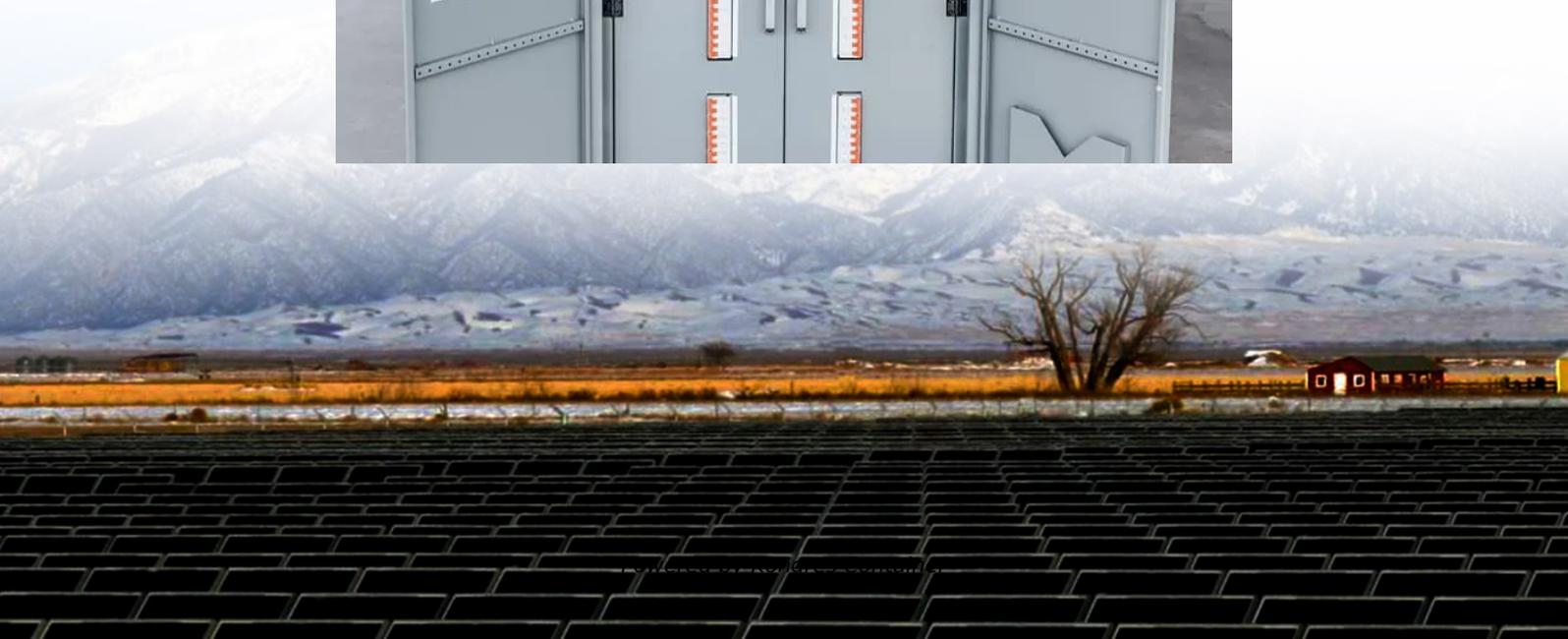


## Kongres Container

# The difference between bidirectional and unidirectional energy storage power supply



## Overview

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What is the significance of unidirectional and bidirectional power flow?

The significance of unidirectional and bidirectional power flow in different scenarios is explored. The importance of battery storage systems (BSSs) for grid stabilization, frequency regulation, and renewable energy integration is highlighted.

What are unidirectional and bidirectional converters?

In power electronic systems, unidirectional and bidirectional converters are two types of systems that have different capabilities in terms of power flow [ 29, 30, 31 ]: Unidirectional Converter: A unidirectional converter, as the name suggests, allows power flow in only one direction.

What is a bidirectional power supply?

A bidirectional power supply demands a different design approach compared to an equivalent unidirectional supply. A unidirectional AC/DC power supply designed for high efficiency uses wide bandgap (WBG) SiC or GaN power devices with a totem-pole power factor correction (PFC) front end driving a DC/DC topology such as an LLC resonant converter.

What is bidirectional power flow?

Bidirectional power flow is commonly seen in systems involving energy storage, renewable energy integration, and electric vehicle charging. For example, in a system with solar panels and a battery, power generated by the solar panels can be used to charge the battery, that is, unidirectional power flow from solar panels to the battery.

What is a unidirectional AC/DC power supply?

A unidirectional AC/DC power supply designed for high efficiency uses wide bandgap (WBG) SiC or GaN power devices with a totem-pole power factor correction (PFC) front end driving a DC/DC topology such as an LLC resonant

converter. Although the totem-pole PFC topology is bidirectional, the resonant LLC is not.

How does a grid-scale energy storage system work?

Figure 2 shows the main functional blocks in a grid-scale ESS that uses batteries to store energy. Bidirectional power supplies transfer AC power from the grid to the storage system and vice versa.

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