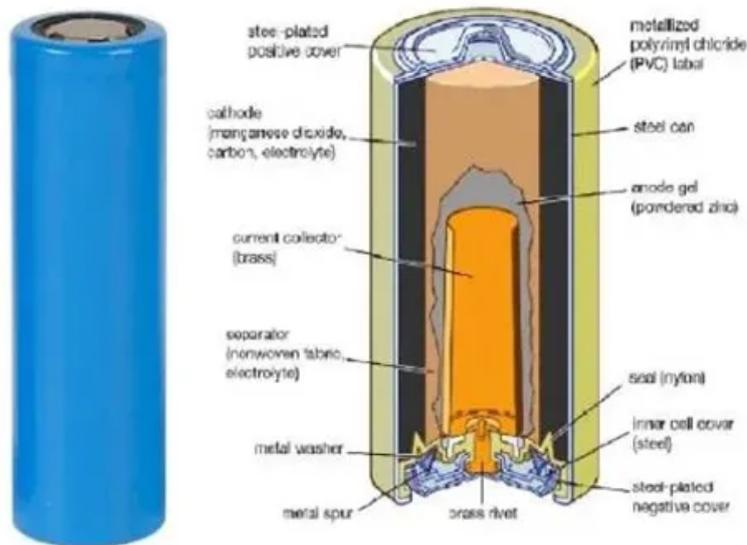


ContainerPower Energy Solutions

Proportion of grid-connected suppliers of communication base station inverters



Overview

How do inverter based resources affect power system operation and stability?

The increasing integration of inverter based resources (IBR) in the power system has a significant multi-faceted impact on the power system operation and stability. Various control approaches are proposed for IBRs, broadly categorized into grid-following and grid-forming (GFM) control strategies.

Should we transition to a grid with more inverter-based resources?

Transitioning to a grid with more inverter-based resources poses major challenges because the operation of future power systems must be based on a combination of the physical properties and control responses of traditional, large synchronous generators as well as those of numerous and diverse inverter-based resources (see Figure ES-1).

Do grid-forming inverters provide voltage support in weak grids?

Thus, grid-forming inverters can be especially helpful in providing voltage support in weak grids (IEEE/NERC 2018; NERC 2019). In general, Q-V droop enables multiple generation units to be connected in parallel, limits voltage deviations on a system, and mitigates reactive power flows between units.

What is a grid forming inverter?

In contrast, grid-forming units are predominantly used for voltage regulation instead of current regulation, reactive power can vary for voltage support, and grid-forming inverters natively provide uninterrupted power during islanded conditions.²⁵

What is an inverter based resource?

NERC uses the term “inverter-based resource” to refer generally to BPS-connected facilities that have a power electronic interface between the ac grid and the source of electricity. Copyright 2023 North American Electric Reliability Corporation. All rights reserved.³ What are the key components of

inverter-based resources?

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What are grid-forming inverter-based generation sources?

We refer to these generation sources as grid-forming. Today's inverter-based generation sources generally use phase-locked loops (PLLs), which rely on externally generated voltages by synchronous machines to operate (Yazdani and Iravani 2010; Golestan et al. 2017). We refer to these types of inverter-based generation as grid-following inverters.

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