

SolarTech Power Solutions

Synchronous Power Control Inverter



Overview

Should synchronous generators be paired with grid-following inverters?

A potential interim solution using existing technologies is to pair synchronous condensers with grid-following inverters, which might prolong the stability of an operating power system while synchronous generators are turned off during periods of high renewable energy availability.

What is next-generation inverter control?

Existing power systems are dominated by synchronous generators with large rotational inertia and contain a small amount of inverter-interfaced generation. Next-generation inverter controls will enable architectures that are dominated by inverter-based resources.

What is power control in a grid forming inverter?

The power control is central to grid-forming inverters in realizing grid-support functionalities, such as the droop control or virtual inertia emulation. However, in these controls, the dynamic response of the instantaneous power usually suffers from overshoots and oscillations.

Who are the authors of grid-folling inverters & synchronous condensers?

Kenyon, Rick Wallace, Anderson Hoke, Jin Tan, Benjamin Kroposki, and Bri-Mathias Hodge. 2020. Grid-Following Inverters and Synchronous Condensers: A Grid-Forming Pair?

: Preprint. Golden, CO: National Renewable Energy Laboratory.

How do PV inverters respond to grid frequency variation?

After 14 s, setting $G_u = 0$, system switches to conventional DC voltage based GFM control (case 3). Then grid frequency steps to 50.05 Hz after $t=15s$, PV inverter responses to grid frequency variation and settles down according to the droop value with $10 \times 0.05/50=0.01MW$.

How synchronization unit is regulated?

As for the synchronization unit, the DC voltage is regulated by frequency deviation similar to the match control as shown in the yellow blocks of Fig. 1, the conventional DC voltage based GFM has stability risk in strong grid like the conventional power based GFM.

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