

# **Can MMC energy storage provide inertia for the power grid**





## Overview

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How is grid inertia maintained?

Grid inertia is maintained by the kinetic energy produced or absorbed by the rotor's mass, as shown in the following equation . where  $E_{kin}$  represents the kinetic energy,  $\omega_r$  the rated velocity of the rotor, and  $J$  the moment of inertia. However, the penetration of RESs reduces the inertia in the power grid.

Do SGS reduce the inertia in a power grid?

However, the penetration of RESs reduces the inertia in the power grid. SGS could assure inertia and grid stability only if the penetration of RESs is less than its capacity in the power system . So, more the penetration of RESs increases, more the inertia of the system decreases.

How do inertia enhancement parameters affect grid stability?

The following section explores how these parameters affect grid stability and establishes a framework for assessing the effectiveness of various inertia enhancement methods. Techniques like VSMs, ESSs, SCs, and WTs depend on optimized parameters settings to emulate inertia successfully and support frequency stability.

Does grid-forming provide inertia?

The grid-forming performance demonstrated in simulation results verifies that the proposed control structure and the proposed design method can successfully provide inertia and effectively manage the energy on the DC side.



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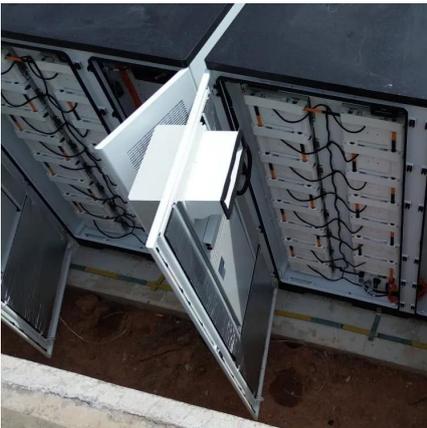


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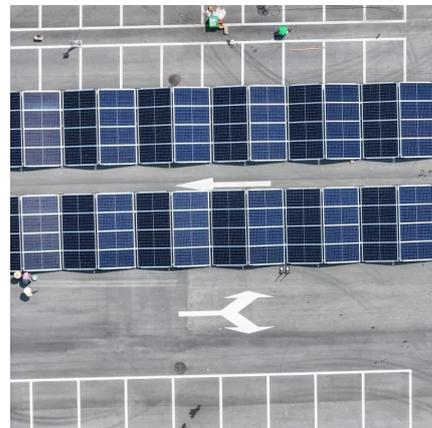


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