

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





## Overview

---

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.



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

---

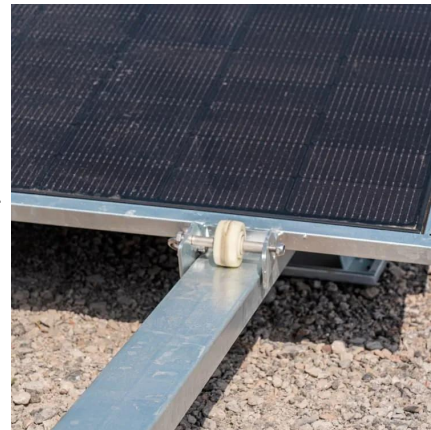


### **An Adaptive Inertia Support Control Strategy for Modular ...**

Dec 1, 2025 · Modular multilevel converter (MMC) has been widely used as critical interfaces between the grid and large-scale renewable energy sources (RESs). Due to its large number ...

### [Grid-Supported Modular Multi-level Energy Storage ...](#)

May 10, 2023 · At the same time, the energy storage technology based on power electronic technology can flexibly match the grid, but the traditional control method cannot use the ...



### **The Power Grid Inertia With High Renewable Energy Sources ...**

This review offers an in-depth examination of contemporary and emerging strategies to bolster grid inertia, with a focus on virtual synchronous machines (VSMs), advanced energy storage ...

### [Modular Multilevel Converter Synthetic Iner](#)

In a microgrid with high shares of renewables integrating through MMCs, sub- module (SM) capacitors can be used as energy storage to provide a degree of synthetic inertia for system

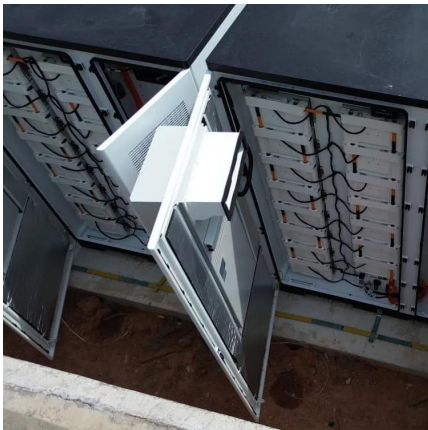


...



### [Coordinated Source-Network-Storage Inertia Control ...](#)

Sep 11, 2025 · ABSTRACT: In wind power transmission via modular multilevel converter based high voltage direct current (MMC-HVDC) systems, under traditional control strategies, MMC ...



### [Modular Multilevel Converter Synthetic Inertia-Based ...](#)

Jan 11, 2019 · Modular multilevel converters (MMCs) can be employed serving as an interface between the large-scale renewable generation and power grids. In a microgrid with high ...



### [A new enhanced synthetic inertia system for stability](#)

May 21, 2025 · By exploiting the inherent capacitive storage capability of MMC integrated with a battery energy storage system (BESS), the MMC-based IC can provide synthetic inertia and ...





## [Control of MMC-based Grid-Forming STATCOM with DC ...](#)

Jun 29, 2023 · The grid-forming performance demonstrated in simulation results verifies that the proposed control structure and the proposed design method can successfully provide inertia ...

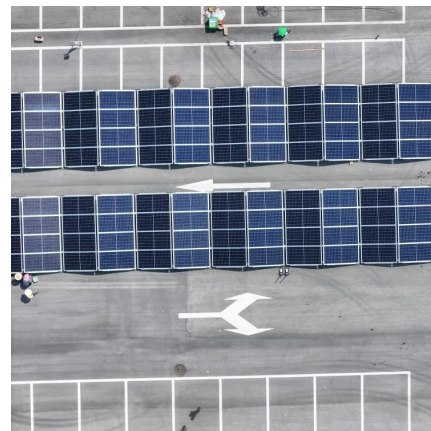


## [Coordinated Source-Network-Storage Inertia Control ...](#)

Jul 3, 2025 · First, the grid-side MMC station (GS-MMC) maps the frequency variations of the REG to direct current (DC) voltage variations through the frequency mapping control, and uses ...

## [A new enhanced synthetic inertia system for stability ...](#)

Aug 15, 2025 · By exploiting the inherent capacitive storage capability of MMC integrated with a battery energy storage system (BESS), the MMC-based IC can provide synthetic inertia and ...



## [The Power Grid Inertia With High Renewable ...](#)

This review offers an in-depth examination of contemporary and emerging strategies to bolster grid inertia, with a focus on virtual synchronous ...



## Contact Us

---

For technical specifications, project proposals, or partnership inquiries, please visit:  
<https://www.eiei.pl>

### Scan QR Code for More Information



<https://www.eiei.pl>