EIEI POWER

Frequency regulation of Nordic energy storage power stations

Overview

Do energy storage stations improve frequency stability?

With the rapid expansion of new energy, there is an urgent need to enhance the frequency stability of the power system. The energy storage (ES) stations make it possible effectively. However, the frequency regulation (FR) demand distribution ignores the influence caused by various resources with different characteristics in traditional strategies.

What is the normal frequency range in the Nordic power system?

Normal state is shown in green, Alert state in yellow and Emergency state in red. In the Nordic power system the standard frequency range is 50 Hz ±100 mHz. During large imbalance events the frequency is allowed to transiently deviate ±1000 mHz for up to 60 seconds, after which the frequency has to settle within ±500 mHz.

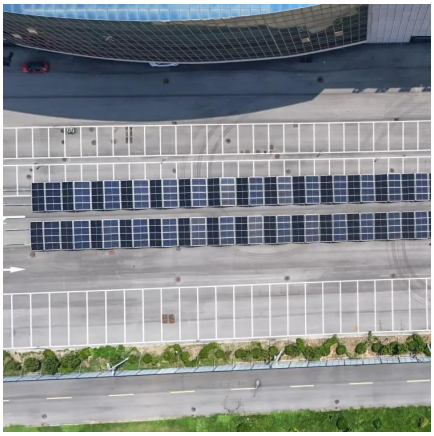
What is a Nordic power system?

The Nordic power system is designed for a nominal frequency of 50 Hz, however, the actual frequency always fluctuates around the nominal value depending on the imbalance between production and consumption. When there is more electricity production than consumption the frequency will start to increase and vice versa.

How many system states are there in the Nordic power system?

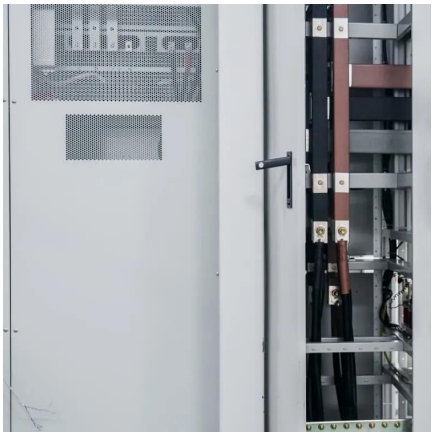
There are five different system states: Normal, Alert, Emergency, Blackout and Restoration . The first three of them are illustrated in Figure 2 with respect to frequency. Figure 2: System state limits with respect to frequency in the Nordic power system. Normal state is shown in green, Alert state in yellow and Emergency state in red.

Frequency regulation of Nordic energy storage power stations



[Lithium-Ion Battery Storage for Frequency Control]

Sep 11, 2022 · To investigate the possibility of providing inertial response and frequency regulation in the Nordic synchronous power system using battery energy storage systems in ...



[Economic Assessment of Battery Energy Storage for ...]

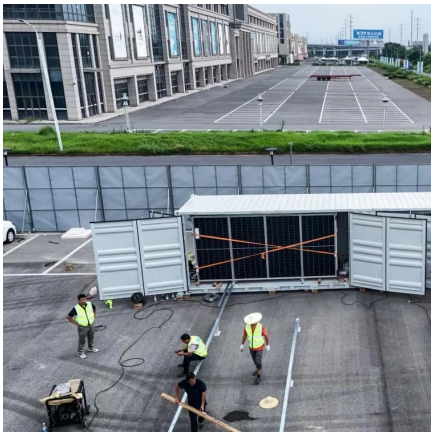
Abstract--The present work aims to determine the technical and economic implications of a Battery Energy Storage Sys-tem (BESS) to participate in different Frequency Containment ...

How is the frequency regulation of energy storage power stations

Apr 14, 2024 · Energy storage units provide essential services that not only enhance grid performance but also advance the efforts toward sustainable energy Transition. The ...

Power grid frequency regulation control strategy based on ...

Aug 29, 2025 · When energy storage stations are added to the power system to participate in grid frequency regulation, the following important factors need to be considered based on the ...



Novel Frequency Control Strategy for Photovoltaic Storage Power

Oct 20, 2024 · This paper proposes a new frequency regulation control strategy for photovoltaic and energy storage stations within new power systems based on Model Predictive Control ...

Power grid frequency regulation strategy of hybrid energy storage

Dec 25, 2023 · With the rapid expansion of new energy, there is an urgent need to enhance the frequency stability of the power system. The energy storage (ES) stations make it possible ...

[Overview of Frequency Control in the Nordic Power System]

Sep 20, 2024 · The amount of kinetic energy in the Nordic power system determines the required amount of FFR capacity to keep the frequency minimum above 49.0 Hz in case of a loss of the ...

[How is the frequency regulation of energy ...]

Apr 14, 2024 · Energy storage units provide essential services that not only enhance grid performance but also advance the efforts toward ...

[Overview of Frequency Control in the Nordic Power System]

Oct 11, 2024 · The amount of kinetic energy in the Nordic power system determines the required amount of FFR capacity to keep the frequency minimum above 49.0 Hz in case of a loss of the ...

Economic Assessment of Battery Energy Storage for Frequency Regulation

Jun 12, 2024 · The present work aims to determine the technical and economic implications of a Battery Energy Storage System (BESS) to participate in different Frequency Containment ...

Energy storage system and applications in power system frequency regulation

Sep 20, 2025 · Key research gaps are identified, and future directions are outlined to promote more adaptive, control-oriented use of ESSs under high RES penetration. This review ...

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