



BUHLE POWER

# Flywheel energy storage device for wind power station





## Overview

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Flywheel energy storage (FES) is an energy storage type with advantages in terms of its high power density, high round-trip efficiency (around 90%) [3], long-lasting nature (typically 20 years or 20,000 cycles or more) [4], cost-effectiveness in the long term, eco-friendliness, and ease of maintenance. Can a flywheel-based energy storage device improve power quality?

Power fluctuations of wind generators may affect power quality especially in weak or isolated grids. This paper proposes an energy management strategy for a flywheel-based energy storage device. The aim of the flywheel is to smooth the net power flow injected to the grid by a variable speed wind turbine.

What is a flywheel energy storage system?

Fig. 1 has been produced to illustrate the flywheel energy storage system, including its sub-components and the related technologies. A FESS consists of several key components: (1) A rotor/flywheel for storing the kinetic energy. (2) A bearing system to support the ro-tor/flywheel.

Why do wind turbines have a flywheel?

For high wind power values, part of the energy is stored in the flywheel. This energy is delivered to the grid during low wind power levels. Thus, the variability of power injected into grid is smoother than the power that would be injected by the wind turbine without flywheel support.

Does a flywheel need energy management?

Since the energy storage capability of the flywheel is limited it is necessary an energy management strategy to operate the system within its SoC limits. The flywheel need to maintain some energy stored to be able to supply power when the grid requires it.



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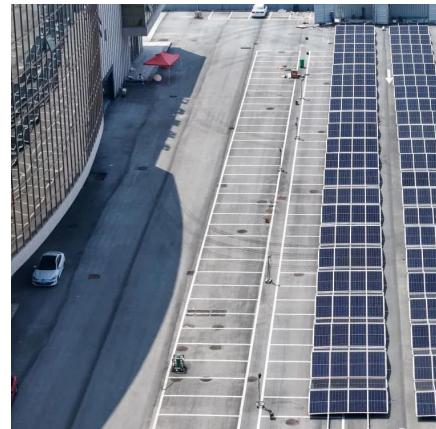


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### A review of flywheel energy storage systems: state of the art ...

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## Inertial Energy Storage Integration with Wind Power ...

Jun 30, 2024 · A new type of generator, a transgenerator, is introduced, which integrates the wind turbine and flywheel into one system, aiming to make flywheel-distributed energy storage ...



## A comprehensive review of Flywheel Energy Storage System ...

Jan 1, 2017 · Energy storage systems (ESSs) play a very important role in recent years. Flywheel is one of the oldest storage energy devices and it has several benefits. Flywheel Energy ...

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## Flywheel energy storage technologies for wind energy systems

Nov 6, 2025 · Flywheel energy storage has also been installed to compensate for wind power fluctuations and provide end-of-grid support, for example at Kalbarri, located on the northern ...



### Flywheel Energy Storage System

Flywheel energy storage system is an energy storage device that converts mechanical energy into electrical energy, breaking through the limitations of chemical batteries and achieving energy ...



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