



MODERNIZATION SOLAR

# What is the minimum flywheel energy storage





## Overview

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Are flywheel energy storage systems feasible?

**Abstract** - This study gives a critical review of flywheel energy storage systems and their feasibility in various applications. Flywheel energy storage systems have gained increased popularity as a method of environmentally friendly energy storage.

How does a flywheel energy storage system work?

Flywheel Energy Storage Systems (FESS) rely on a mechanical working principle: An electric motor is used to spin a rotor of high inertia up to 20,000-50,000 rpm. Electrical energy is thus converted to kinetic energy for storage. For discharging, the motor acts as a generator, braking the rotor to produce electricity.

How do you calculate the storage energy of a flywheel?

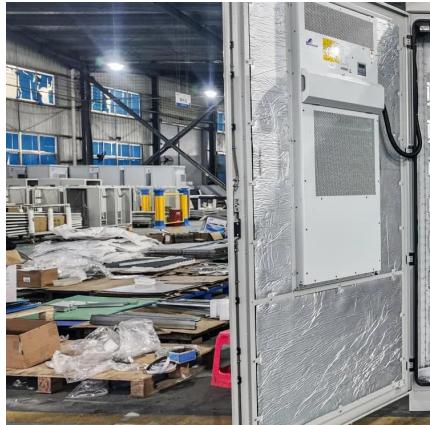
The minimum speed of the flywheel is typically half its full speed, the storage energy is given by  $\frac{1}{2} (12-0.52) I f_{wf}^2$  where  $I$  is the rotor moment of inertia in  $\text{kgm}^2$  and the  $w_f$  maximum rotational speed in  $\text{rad/s}$ . The power level is controlled by the size of the M/G, so this is independent of the rotor.

How can flywheels be more competitive to batteries?

The use of new materials and compact designs will increase the specific energy and energy density to make flywheels more competitive to batteries. Other opportunities are new applications in energy harvest, hybrid energy systems, and flywheel's secondary functionality apart from energy storage.



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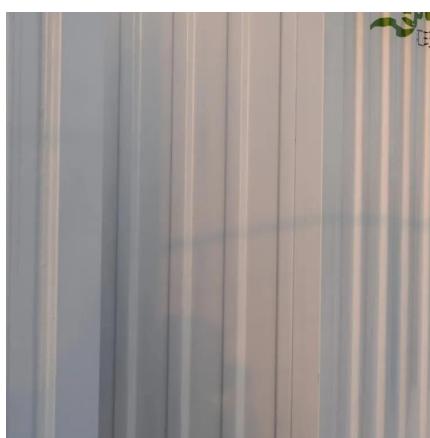


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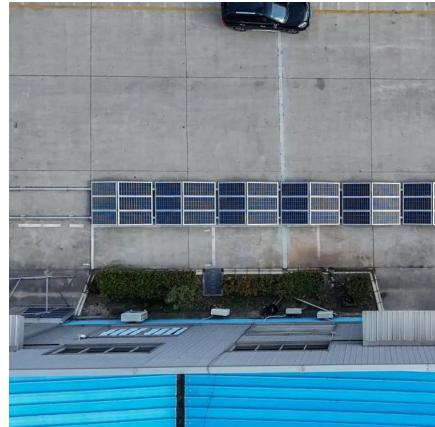
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