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Flywheels in renewable energy systems: A review of recent developments and future directions
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Abstract
Flywheels, an age-old mechanical device, serve to stabilize power output by counteracting fluctuations in rotational speed through their inertia. They find widespread use in various applications such as internal combustion engines and industrial machinery. A flywheel with a substantial moment of inertia is essential for minimizing variations in angular velocity. Despite its traditional nature, the flywheel is renowned for its remarkable energy efficiency and environmentally friendly attributes. Moreover, it boasts features like high cycle life, extended operational lifespan, impressive round-trip efficiency, high power density, and minimal environmental impact, enabling it to store virtually limitless energy. This article presents critical analysis of flywheel as a renewable system that concentrates on both variable inertia flywheels (VIF) and fixed inertia flywheels (FIF), with the fundamental concepts and real-world applications, a viewpoint that has not yet been discussed in reviews. © 2024 Author(s).

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