



Isolated Grids are exposed to rising global fuel costs, a reliance on diesel and heavy fuel oil, along with significant grid instability issues as more renewable energy is put onto the grid

The rapid response and high durability of Temporal Power's flywheel technology can enable operators to increase flexibility while maximizing the use of existing assets



remote communities



mining sites



islands

Flywheels for Isolated Grids

Solutions for the Challenges Facing Isolated Grids

Energy storage is being recognized as a key to addressing many of the issues faced by isolated grids. Temporal Power's flywheel technology can be configured as a flexible grid asset to provide a world-leading solution for a number of potential applications including:

- ▶ Frequency Control
- ▶ VAR and power quality support
- ▶ Ramp rate control
- ▶ Spinning and regulation reserve
- ▶ Reducing renewable energy curtailment

Flywheel Energy Storage Capabilities

- ▶ **Reducing fuel costs:** With high global fuel prices, isolated grids running primarily on diesel or heavy fuel oil are facing significantly elevated costs of production, especially where generation assets must operate below optimal efficiency. Flywheels displace fossil fuel generators by reducing the need to operate these units for spinning reserve, ramp rate and power quality control.
- ▶ **Maintain or enhance grid stability:** As demand increases so does the requirement for ancillary services that support the stability and reliability of the electricity system. Intermittent sources can also increase the need for services such as spinning and regulation reserve. Flywheels are quick to respond to changes on the grid and can provide grid support services more efficiently than conventional generation.
- ▶ **Integrating renewable energy sources:** Renewable energy can provide cost effective, clean energy for many isolated grids, however, managing the intermittent nature of sources such as wind and solar can create operational challenges. Flywheels can smooth the intermittent power output, reduce short-duration, high ramping of these resources, and enable greater utilization of power which would otherwise be curtailed.



temporal

Temporal Power's flywheel technology lowers costs, is environmentally friendly and boasts utility grade durability

Lowers the cost to operate the grid

- ▶ **Millisecond response** means Temporal Power delivers power exactly when it's needed, making Temporal Power flywheels 3 to 5 times more effective than typical generators
- ▶ **Balancing of the grid** allows for more expensive generators to be turned off, saving money, fuel and emissions
- ▶ **Low lifecycle cost** with minimal maintenance over Temporal Power flywheel's 20 year operating life

An environmentally friendly energy storage solution

- ▶ **Fully recyclable and uses non-exotic materials**, allowing for low cost and high availability of components
- ▶ **No harmful chemicals or emissions are used as** Temporal Power utilizes fully recyclable components, offering significant environmental benefits compared to competing technologies
- ▶ **Use of recycled steel** positions Temporal Power's flywheel as one of the greenest solutions for energy storage worldwide

The grid demands utility grade durability

- ▶ **Highest energy** flywheels in the world, ideal for utility scale use for multi-megawatt energy storage projects
- ▶ **Full depth of discharge capability** with unlimited cycling, making use of the full range of energy capacity, without any loss in performance
- ▶ **Scalable design** offering tremendous flexibility as flywheels are typically arrayed in modules of 10 flywheels, but can be combined to provide almost any system size required

Flywheel Energy Storage at a Glance

<i>Rated output power range</i>	<i>500 kW/1 MW</i>
<i>Energy storage capacity per flywheel</i>	<i>50 kWh</i>
<i>Duration at rated power</i>	<i>6-15 min</i>
<i>Operational life</i>	<i>>20 years</i>

temporal
high-performance energy storage

2-3750A Laird Rd | Mississauga | ON | Canada | L5L 0A6
Tel: 905.581.4474 | info@temporalpower.com | temporalpower.com
[@TemporalPower](https://twitter.com/TemporalPower) [Temporal Power Ltd.](https://www.linkedin.com/company/temporal-power)