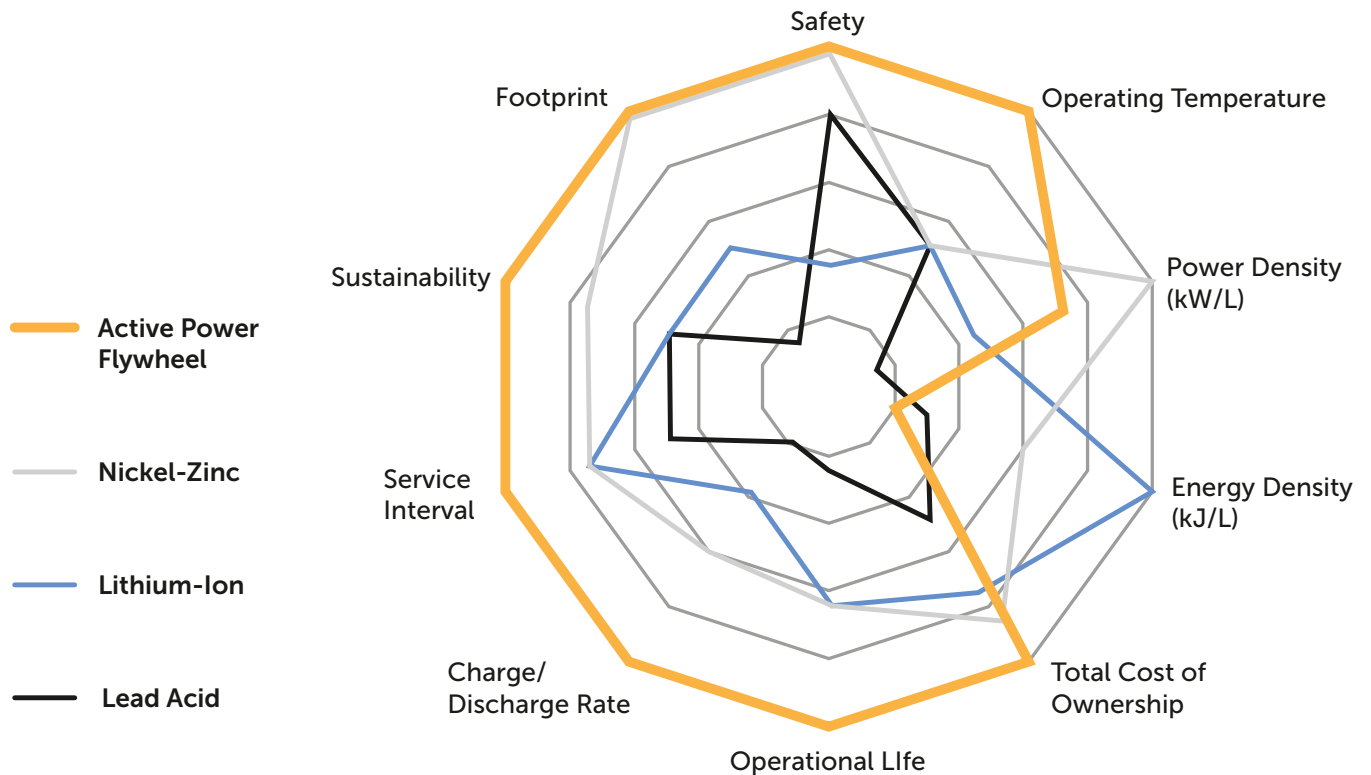




OPTIMIZING ENERGY STORAGE: UNVEILING THE ADVANTAGES OF FLYWHEEL UPS SYSTEMS OVER CHEMICAL BATTERIES



ENERGY STORAGE COMPARISON



In the dynamic landscape of energy storage, versatility is key. Each application has its own unique runtime demands, requiring tailored solutions. While energy-dense options are appealing for longer durations, it's power density that truly counts when rapid bursts of energy are needed, lasting a minute or less.

Introducing flywheel energy storage—a game-changer for UPS applications. Unlike conventional energy-dense alternatives, Active Power's flywheel UPS stands out with unparalleled benefits in sustainability, operational longevity, safety, footprint, and total cost of ownership.

Flywheel energy storage excels in critical power protection, where power density matters. Teamed with a standby generator our flywheel UPS offer a competitive, cost-effective, and space-efficient solution for prolonged runtime requirements.

Discover why our flywheel UPS is the ultimate choice for efficiency-driven businesses.

ACTIVE POWER FLYWHEEL UPS: BENEFITS AND ADVANTAGES

- ▶ **EXTENDED LIFESPAN:** Flywheels outlast traditional batteries with a remarkable lifespan of 20 years or more. In contrast, VRLA batteries demand replacement every 3-5 years, while Lithium-ion and Nickel-Zinc alternatives need changing every 10 years.
- ▶ **INSTANTANEOUS POWER WITH INERTIA:** Flywheel UPS systems store kinetic energy by spinning a large mass at high-speed. During power outages, the integrated electric machine within the flywheel provides immediate power without relying on chemical reactions and ensures seamless power output from the UPS. This swift response guarantees uninterrupted operation for critical systems.
- ▶ **FASTER DISCHARGE AND RECHARGE:** The flywheel UPS surpasses traditional battery UPS systems in terms of charge/discharge rates. Flywheels recharge significantly faster after an outage when connected to a generator compared to batteries. This means the UPS is ready to protect load in less time. The result is less generator run time, leading to fuel savings and reduced emissions. The overall effect is an enhanced efficiency and environmental friendliness of the power backup system.
- ▶ **ENVIRONMENTALLY CONSCIOUS:** Unlike batteries, flywheels steer clear of hazardous chemicals or materials, rendering them nearly 100% recyclable and easy to dispose of. They are an eco-friendly choice that aligns with sustainable practices.
- ▶ **SCALABLE POWER:** The scalability of our modular flywheel UPS systems shines as additional units can be easily incorporated to boost overall power capacity up to 2.67 MW.
- ▶ **CONSISTENT PERFORMANCE:** Flywheels maintain peak performance throughout their lifespan unlike batteries that are susceptible to capacity reduction over time.
- ▶ **COMPACT AND LIGHTWEIGHT:** Kinetic flywheels, being smaller and lighter than battery-based UPS systems, present a dual advantage of space savings and simplified installation.
- ▶ **LOW MAINTENANCE BURDEN:** Flywheels demand minimal upkeep, primarily involving yearly inspections and infrequent bearing changes. This reduces operational costs and diminishes the need for frequent interventions.
- ▶ **INTEGRATED DESIGN:** Our advanced integrated design seamlessly incorporates flywheel into the UPS enclosure footprint. Both components are meticulously manufactured and tested together at the Active Power ISO 9001:2015 certified factory in Austin, TX before shipment. This differs from battery UPS systems where the manufacturers of the UPS and batteries are always different, with integration occurring at the customer site for the first time.
- ▶ **OPTIMAL EFFICIENCY:** Boasting an on-line efficiency rating of up to 98% versus 96% or lower for battery UPS, Active Power CleanSource Flywheel UPS are highly efficient, contributing to cost-effective and sustainable energy solutions.
- ▶ **TEMPERATURE TOLERANCE:** Flywheels exhibit superior resistance to temperature variations compared to batteries, making them adaptable to a wider range of operating environments without compromising performance. Flywheels don't require the same level of cooling infrastructure, saving on equipment costs and lowering electricity bills.



CHEMICAL BATTERIES FOR UPS: DRAWBACKS AND DISADVANTAGES

- ▶ **LOW CYCLE LIFE:** Chemical batteries, such as lead-acid or lithium-ion, often have a finite number of charge-discharge cycles, requiring periodic replacements and impacting long-term use.
- ▶ **MAINTENANCE REQUIREMENTS:** In addition to costly battery monitoring systems, batteries require regular, frequent maintenance, including electrolyte level checks for lead-acid batteries or quarterly inspections for lithium-ion batteries. This adds operational complexity to an overall facilities plan.
- ▶ **INCREASED COOLING REQUIREMENTS:** Batteries must be kept in controlled climates of 25°C or lower to meet manufacturers specified operational life. Maintaining the batteries in a cool environment leads to higher electricity costs and additional HVAC requirements.
- ▶ **ENVIRONMENTAL CONTROL:** Battery rooms require expensive environmental control systems such as ventilation, hydrogen detection, and eye wash stations (for traditional VRLA batteries).
- ▶ **COMPLEXITY IN INTEGRATION:** Integrating battery storage into UPS systems requires expertise and careful planning to ensure compatibility, efficiency, and safety thus adding complexity to the setup process.
- ▶ **WEIGHT AND SIZE:** Chemical batteries can be heavy and bulky, potentially limiting their use in applications where space and weight are crucial factors.
- ▶ **SAFETY CONCERNS:** Some chemical batteries, like lithium-ion, are prone to safety issues such as overheating, thermal runaway, and fire, necessitating careful handling and costly safety measures. Some insurers won't fully cover specific perils linked to lithium batteries.
- ▶ **TEMPERATURE SENSITIVITY:** Chemical batteries can be sensitive to temperature extremes that affect their performance and lifespan.
- ▶ **LIMITED DEPTH OF DISCHARGE:** Some chemical batteries, such as lead-acid, must adhere to lower depth of discharge (DoD) limits (e.g. <80% DoD) to avoid damage. Discharging beyond these limits reduces their overall lifespan.
- ▶ **SUSTAINABILITY CONCERNS:** The raw material extraction, production and recycling processes of chemical batteries may contribute to environmental damage and raise sustainability concerns.
- ▶ **COST:** Chemical batteries, depending on the type and technology, may have higher manufacturing and maintenance costs, when compared to alternative energy storage solutions, that reduce the overall cost-effectiveness of UPS systems.



Learn more:
www.activepower.com/
or scan the QR code

Ask about Advantages over Battery Backed UPS



Active Power Inc. 2128 West Braker Lane, Austin, TX 78758

Active Power Inc. is a division of the Piller Group
Piller Australia | Piller China | Piller France | Piller Germany | Piller India | Piller Italy | Piller Singapore | Piller Spain | Piller UK | Piller USA

activepower.com