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Flywheel Energy Storage Market Opportunity, Growth Drivers, Industry Trend Analysis, and Forecast 2025 - 2034

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Abstracts

The Global Flywheel Energy Storage Market was valued at USD 1.3 billion in 2024 and is estimated to grow at a CAGR of 4.2% to reach USD 1.9 billion by 2034. This growth is being driven by the increasing demand for efficient, reliable, and sustainable energy storage solutions across various industries. Flywheels are becoming increasingly critical in addressing the challenges associated with grid stability, power backup, and integrating renewable energy sources. As the need for clean, uninterrupted power continues to rise, flywheels are emerging as a highly effective technology for short-duration energy storage, offering fast charge/discharge cycles and remarkable durability. Their nearly instantaneous response time makes them an attractive choice for applications where timing and reliability are paramount, from industrial operations to advanced energy systems.

The flywheel energy storage market is gaining traction across a variety of sectors. Notably, data centers, which rely heavily on constant power supply, are turning to flywheels to ensure continuous operations. The growing role of hybrid energy systems, where flywheels are paired with batteries to optimize power management, is also fueling adoption. Flywheels are now integral to dynamic load management, fast charging, and maintaining grid frequency regulation, serving utilities, transportation, defense, aerospace, and other industries. They are increasingly being used in transit systems to capture and reuse energy, lowering operational costs and energy consumption. Flywheels are also helping utilities stabilize voltage, handle peak demand loads, and support renewable energy inputs, making them a critical component of the global transition to sustainable energy systems.

The utility sector led the market in 2024, accounting for 55.3% of the total share. This

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growth is largely attributed to supportive regulatory frameworks and the rising demand for rapid-response storage solutions in smart grids and decentralized energy networks. Flywheels are becoming a vital part of real-time grid management, particularly in advanced grid systems where they enable the integration of distributed energy sources and virtual power plants. Their role in electric vehicle charging infrastructure is also expanding, helping to ease the strain on the grid during high-demand fast charging sessions. As electric vehicle adoption grows, the need for flywheel systems to stabilize and ensure efficient charging infrastructure will continue to increase.

In the U.S., the Flywheel Energy Storage Market generated USD 72 million in 2024, fueled by strong government support for power quality enhancement, grid resilience, and the promotion of renewable energy sources. Backed by significant policy initiatives, flywheel technologies are rapidly being deployed in utility-scale projects and critical defense infrastructure, particularly for microgrid applications.

Leading market players include Energiestro, POWERTHRU, PUNCH Flybrid, VYCON, Langley Holdings, STORNETIC, Amber Kinetics, BC New Energy, Adaptive Balancing Power, and OXTO Energy. These companies are enhancing their market positions through strategic collaborations with utilities, heavy investments in research and development to improve efficiency and scalability, and expanding their presence in emerging markets. Their efforts are focusing on hybrid systems, integrating flywheels with batteries or renewable energy technologies, patenting advanced flywheel designs, and exploring public-private partnerships to grow their operations.

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CHAPTER 7 COMPANY PROFILES

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