

Flywheel Energy Storage Systems Market By Component (Flywheel Rotor, Motor-Generator, Magnetic Bearings, Others), By Application (Uninterrupted Power Supply, Distributed Energy Generation, Transport, Data Centers, Others) : Global Opportunity Analysis and Industry Forecast, 2024-2033

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Abstracts

The flywheel energy storage systems market was valued at \$353.0 million in 2023, and is projected to reach \$744.3 million by 2033, growing at a CAGR of 7.8% from 2024 to 2033.

Flywheel energy storage system is an energy storage device that converts mechanical energy into electrical energy, achieving energy storage with the help of high-speed rotating flywheel. The system serves as a robust solution in applications that require fast charge and discharge cycles. The operation of flywheel energy storage system does not discharge of any hazardous chemicals, making it a sustainable and efficient alternative to traditional energy storage systems.

The growth of the global flywheel energy storage system is majorly driven by surge in demand for electricity across the globe and reliable power backup sources. For instance, India ranks as the world's third largest producer and consumer of electricity, boasting an installed power capacity of 429.96 GW as of January 31, 2024. Moreover, the need to reduce dependability of fossil fuel-based power backup plants, the necessity to reduce the greenhouse gas emissions, and promote the use of cleaner energy act as the key driving forces of the market. Increase in penetration of electric vehicles significantly contributes toward the market growth. This is attributed to the

fact that the use of flywheels has been gaining high traction for energy storage and recovery in electric vehicles, thereby enhancing efficiency and extending the service life of batteries. According to the International Energy Agency, a Paris-based autonomous intergovernmental organization, over 3 million electric vehicles were sold in the first quarter of 2024, around 25% higher as compared to 2023. This number is estimated to reach 17 million by the end of 2024, exhibiting a 20% year-on-year increase.

However, high capital investment required for flywheel energy storage systems restrains the growth of the market. Moreover, the need for precision engineering, advanced materials, and constant maintenance incur additional costs, which limit the market growth. Lower energy density of flywheels as compared to chemical batteries make them less suitable in applications that require long-duration energy storage, thus hampering their demand across the globe.

On the contrary, constant R&D to further increase the energy density of flywheels and make them more efficient and capable of storing more energy is expected to offer remunerative opportunities for the expansion of the global flywheel energy storage system market during the forecast period. For instance, Siemens Energy AG delivered the world's biggest 177-ton flywheel in Ireland in 2022. The flywheel arrived at the Moneypoint coal-fired power station on the southwestern coast in early May.

The global flywheel energy storage systems market is segmented on the basis of component, application, and region. By component, the market is classified into flywheel rotor, motor-generator, magnetic bearings, and others. On the basis of application, it is classified into uninterrupted power supply, distributed energy generation, transport, data centers, and others. Region wise, it is studied across areas such as North America, Europe, Asia-Pacific, and LAMEA.

Key Findings

On the basis of component, the flywheel rotor segment registers the highest growth.

By application, the uninterrupted power supply segment is expected to exhibit fastest growth during the forecast period.

Region wise, Asia-Pacific is anticipated to dominate the market by 2033.

Competition Analysis

Competitive analysis and profiles of the major players in the global Flywheel Energy Storage Systems Market include Langley Holdings plc, Amber Kinetics, Inc., Stornetic GmbH, Energiestro, VYCON, Beacon Power Systems, Kinetic Traction Systems, Inc., Langley Holdings Plc, Tesla, and ABB Ltd. These major players have adopted various key development strategies such as business expansion, new product launches, and partnerships, to gain a strong foothold in the flywheel energy storage systems market.

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Expanded list for Company Profiles

SWOT Analysis

Key Market Segments

By Component

Flywheel Rotor

Motor-Generator

Magnetic Bearings

Others

By Application

Uninterrupted Power Supply

Distributed Energy Generation

Transport

Data Centers

Others

By Region

North America

U.S.

Canada

Mexico

Europe

France

Germany

Italy

Spain

UK

Rest of Europe

Asia-Pacific

China

Japan

India

South Korea

Australia

Rest of Asia-Pacific

LAMEA

Brazil

South Africa

Saudi Arabia

UAE

Rest of LAMEA

Key Market Players

Langley Holdings plc

Amber Kinetics, Inc.

Stornetic GmbH

Energiestro

VYCON

Beacon Power Systems

Kinetic Traction Systems, Inc.

Langley Holdings Plc

Tesla

ABB Ltd.

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