

Flow Battery Market by Offering (Energy Storage Systems), Battery Type (Vanadium Redox Flow Batteries, Zinc-Bromine Flow Batteries), Material, Ownership, Application, End User (Utilities, Commercial & Industrial), and Geography - Global Forecast to 2031

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Abstracts

'Flow Battery Market by Offering (Energy Storage Systems), Battery Type (Vanadium Redox Flow Batteries, Zinc-bromine Flow Batteries), Material, Ownership, Application, End User (Utilities, Commercial & Industrial), and Geography—Global Forecast to 2031.'

The research report titled 'Flow Battery Market by Offering (Energy Storage Systems), Battery Type (Vanadium Redox Flow Batteries, Zinc-bromine Flow Batteries), Material, Ownership, Application, End User (Utilities, Commercial & Industrial), and Geography—Global Forecast to 2031' provides an in-depth analysis of global flow battery market in five major geographies and emphasizes on the current market trends, market sizes, market shares, recent developments, and forecasts till 2031.

The global flow battery market is projected to reach \$1.03 billion by 2031, at a CAGR of 16.5% during the forecast period of 2024–2031.

The growth of the flow batteries market is mainly driven by the high demand for flow batteries in utility applications and increasing investments in renewable energy. However, the lack of standardization in the development of flow battery systems and the high initial costs of flow battery manufacturing restrain the growth of this market.

Furthermore, technological innovation and the growing demand for backup power

among data centers are expected to offer significant growth opportunities for players operating in the flow batteries market. However, the declining rate of flow battery deployment and disruptions in the supply of raw materials for battery manufacturing may hinder the growth of this market. Additionally, advancements in flow batteries and energy storage as a service are prominent trends in the flow batteries market.

The global flow battery market is segmented by offering (batteries, energy storage systems, and services), battery type (vanadium redox flow batteries, zinc-bromine flow batteries, all-iron flow batteries, and other flow batteries), material (zinc-bromine, vanadium, hydrogen-bromine, and other materials), ownership (customer-owned, third-party-owned, and utility-owned), application (peak shaving, load shifting, transmission & distribution, frequency regulation, commercial, EV charging, residential, and other applications), and end user (utilities, commercial & industrial, EV charging stations, off-grid & micro-grid power, residential, and other end users). The study also evaluates industry competitors and analyzes the market at geographical levels.

Based on offering, the global flow batteries market is segmented into batteries, energy storage systems, and services. In 2024, the energy storage systems segment is expected to account for the largest share of the global flow battery market. The large market share of this segment is attributed to various factors, as redox flow batteries are a relatively new advanced technology for storing large quantities of energy. These batteries enhance flexibility, reduce environmental risks, and improve response times to energy demands.

However, the battery segment is projected to register the highest CAGR during the forecast period due to the various benefits offered by flow batteries, such as scalability, long cycle life, durability, and rapid response. Also, flow batteries can be used for storing energy from intermittent renewable sources like wind and solar power, enabling grid stabilization.

Based on battery type, the global flow batteries market is segmented into vanadium redox flow batteries, zinc-bromine flow batteries, all-iron flow batteries, and other flow batteries. In 2024, the vanadium redox flow batteries segment is expected to account for the largest share of the global flow battery market. The large market share of this segment is attributed to various factors, as vanadium redox flow batteries are considered promising electrochemical energy storage systems due to their efficiency, flexibility, and scalability. Moreover, VRFBs have a long cycle life and can store large amounts of energy, making them suitable for grid energy storage and renewable energy

integration.

Additionally, the same segment is projected to register the highest CAGR during the forecast period.

Based on material, the global flow batteries market is segmented into zinc-bromine, vanadium, hydrogen-bromine, and other materials. In 2024, the vanadium segment is expected to account for the largest share of the global flow battery market. The large market share of this segment is attributed to various factors as vanadium in the flow batteries allows for efficient and reversible electrochemical reactions, making it a key component of this energy storage technology.

Additionally, the same segment is projected to register the highest CAGR during the forecast period.

Based on ownership, the global flow batteries market is segmented into customer-owned, third-party-owned, and utility-owned. In 2024, the utility-owned segment is expected to account for the largest share of the global flow battery market. The growth of this segment is driven by the increasing demand for utility-scale ancillary services and the growing need to deliver peak loads to consumers through flow battery-powered ESS instead of extending power lines and transformers.

Additionally, the same segment is projected to register the highest CAGR during the forecast period.

Based on application, the global flow batteries market is segmented into peak shaving, load shifting, transmission & distribution, frequency regulation, commercial, EV charging, residential, and other applications. In 2024, the load shifting segment is expected to account for the largest share of the global flow battery market. The growth of this segment is driven by various factors, as flow batteries can be easily scaled up or down to meet specific energy storage needs. This makes them suitable for a wide range of applications, from residential to utility-scale projects. Also, flow batteries have a longer cycle life compared to many other energy storage technologies, such as lithium-ion batteries.

Additionally, the same segment is projected to register the highest CAGR during the forecast period.

Based on end user, the global flow batteries market is segmented into utilities,

commercial & industrial, EV charging stations, off-grid & micro-grid power, residential, and other end users. In 2024, the utilities segment is expected to account for the largest share of the global flow battery market. The expansion of this segment can be attributed to the escalating endeavors of market players to introduce flow batteries that align with the environmental, longevity, and safety objectives of the utility industry. Additionally, the increasing utilization of Battery Energy Storage Systems (BESS) across various applications further contributes to this growth.

Additionally, the same segment is projected to register the highest CAGR during the forecast period.

Based on geography, the flow battery market is segmented into North America, Europe, Asia-Pacific, Latin America, and the Middle East & Africa. In 2023, Asia-Pacific is expected to account for the largest share of the global flow battery market. The expansion of the flow battery market in the Asia-Pacific region is credited to the rising investments in energy storage. Governments in burgeoning economies within the APAC region are implementing new policies aimed at enhancing the reliability and quality of power distribution facilities for residential customers, thereby contributing to the market's growth.

Additionally, Asia-Pacific is projected to record the highest CAGR during the forecast period.

The key players operating in the global flow batteries market include Invinity Energy Systems PLC (Jersey), Sumitomo Electric Industries, Ltd. (Japan), ESS Tech, Inc. (U.S.), Redflow Limited (Japan), StorEn Technologies, Inc. (U.S.), LION Alternative Energy PLC (England), CEC Science & Technology Co., Ltd. (China), StorTera Ltd (U.K.), Largo Inc. (U.S.), ViZn Energy, Inc. (U.S.), VRB ENERGY (U.S.), Primus Power Solutions (U.S.), SCHMID Energy Systems GmbH (Germany), Stryten Energy (Georgia), and Delectrik Systems Pvt. Ltd (India).

Key Questions Answered in the Report:

Which are the high-growth market segments in terms of offering, battery type, material, ownership, application, and end user?

What is the historical market size for the global flow battery market?

What are the market forecasts and estimates for 2024–2031?

What are the major drivers, restraints, opportunities, challenges, and trends in the global flow battery market?

Who are the major players in the global flow battery market, and what are their market shares?

What is the competitive landscape like?

What are the recent developments in the global flow battery market?

What are the geographic trends and high-growth countries?

Who are the local emerging players in the global flow battery market, and how do they compete with other players?

Flow Battery Market Assessment—by Offering

Energy Storage Systems

Batteries

Services

Flow Battery Market Assessment—by Battery Type

Vanadium Redox Flow Batteries

Zinc-bromine Flow Batteries

All-iron Flow Batteries

Other Flow Batteries

Flow Battery Market Assessment—by Material

Vanadium

Zinc-bromine

Hydrogen-bromine

Other Materials

Flow Battery Market Assessment—by Ownership

Utility-owned

Third-party-owned

Customer-owned

Flow Battery Market Assessment—by Application

Load Shifting

Peak Shaving

Commercial

Transmission & Distribution

EV Charging

Residential

Frequency Regulation

Other Applications

Flow Battery Market Assessment—by End User

Utilities

Commercial & Industrial

Off-grid & Micro-grid Power

EV Charging Station

Residential

Other End Users

Flow Battery Market Assessment—by Geography

North America

U.S.

Canada

Asia-Pacific

China

Japan

India

South Korea

Rest of Asia-Pacific

Europe

U.K.

Germany

Italy

France

Spain

Rest of Europe

Latin America

Middle East & Africa

Related Reports:

Battery Energy Storage System Market by Battery Type, Offering, Connection Type, Ownership, Energy Capacity, and Application (Residential, Commercial, and Utilities) - Global Forecast to 2030

<https://www.meticulousresearch.com/product/battery-energy-storage-system-market-5336>

Battery Management Systems Market by Component (Hardware, Software), Topology (Centralized BMS, Modular BMS), Battery Types (Li-ion Battery, Lead-acid Battery), Application (Automotive, Industrial), and Geography - Global Forecast to 2030

<https://www.meticulousresearch.com/product/battery-management-systems-market-5486>

Zinc-air Battery Market by Type (Primary Type, Secondary Type), Voltage Type (Up to 12 V, 12 V to 36 V, More than 36 V), Application, and Geography - Global Forecast to 2030

<https://www.meticulousresearch.com/product/zinc-air-battery-market-5420>

EV Battery Management Market by Vehicle Type (Electric Cars, LCV, HCV, E-scooters & Motorcycles, and E-bikes), Configuration, Design, Topology, Voltage, Cell Balancing Method, and Geography - Global Forecast to 2029

<https://www.meticulousresearch.com/product/ev-battery-management-market-5337>

Solid-state Battery Market by Type (Thin Film Batteries, Bulk Batteries, and Other Batteries), Capacity (Less than 20mAh, 21mAh to 500mAh, and Above 500mAh), Application, and Geography - Global Forecasts to 2029

<https://www.meticulousresearch.com/product/solid-state-battery-market-5246>

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