

# Global Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) Market Growth 2019-2024

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## Abstracts

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The vanadium redox battery (VRB) (or Vanadium flow battery) is a type of rechargeable flow battery that employs vanadium ions in different oxidation states to store chemical potential energy. The vanadium redox battery exploits the ability of vanadium to exist in solution in four different oxidation states, and uses this property to make a battery that has just one electro active element instead of two. For several reasons, including their relatively bulky size, most vanadium batteries are currently used for grid energy storage, such as being attached to power plants or electrical grids.

Unlike other RFBs, vanadium redox flow batteries (VRBs) use only one element (vanadium) in both tanks, exploiting vanadium's ability to exist in several states. By using one element in both tanks, VRBs can overcome cross-contamination degradation, a significant issue with other RFB chemistries that use more than one element. The energy density of VRBs depends on the concentration of vanadium: the higher the concentration, the higher the energy density.

The global average price of Vanadium Redox Battery (VRB) is in the decreasing trend, from 4505 USD/KW in 2012 to 1916 USD/KW in 2016. With the situation of global economy, prices will be in decreasing trend in the following five years.

The classification of Vanadium Redox Battery (VRB) includes Carbon Paper Electrode and Graphite Felt Electrode, and the proportion of Graphite Felt Electrode in 2016 is about 55%, and the proportion is in increasing trend from 2012 to 2016.

Vanadium Redox Battery (VRB) is widely used for Large-Scale Energy Storage, Uninterruptible Power Supply and other field. The most proportion of Vanadium Redox Battery (VRB) is Large-Scale Energy Storage, and the proportion in 2016 is 52%.

According to this study, over the next five years the Vanadium Redox Battery (VRB) (All-

Vanadium Redox Flow Batteries) market will register a 43.7% CAGR in terms of revenue, the global market size will reach US\$ 2800 million by 2024, from US\$ 320 million in 2019. In particular, this report presents the global market share (sales and revenue) of key companies in Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) business, shared in Chapter 3.

This report presents a comprehensive overview, market shares, and growth opportunities of Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) market by product type, application, key manufacturers and key regions and countries.

This study considers the Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) value and volume generated from the sales of the following segments:

Segmentation by product type: breakdown data from 2014 to 2019, in Section 2.3; and forecast to 2024 in section 11.7.

Carbon Paper Electrode

Graphite Felt Electrode

Segmentation by application: breakdown data from 2014 to 2019, in Section 2.4; and forecast to 2024 in section 11.8.

Large-Scale Energy Storage

Uninterruptible Power Supply

Others

This report also splits the market by region: Breakdown data in Chapter 4, 5, 6, 7 and 8.

Americas

United States

Canada

Mexico

Brazil

APAC

China

Japan

Korea

Southeast Asia

India

Australia

Europe

Germany

France

UK

Italy

Russia

Spain

Middle East & Africa

Egypt

South Africa

Israel

Turkey

GCC Countries

The report also presents the market competition landscape and a corresponding detailed analysis of the major vendor/manufacturers in the market. The key manufacturers covered in this report: Breakdown data in in Chapter 3.

Sumitomo Electric Industries

Rongke Power

UniEnergy Technologies

redT Energy

Vionx Energy

Big Power

Australian Vanadium

Golden Energy Fuel Cell

H2, Inc.

In addition, this report discusses the key drivers influencing market growth, opportunities, the challenges and the risks faced by key manufacturers and the market as a whole. It also analyzes key emerging trends and their impact on present and future development.

## **RESEARCH OBJECTIVES**

To study and analyze the global Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) consumption (value & volume) by key regions/countries, product type and application, history data from 2014 to 2018, and forecast to

2024.

To understand the structure of Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) market by identifying its various subsegments.

Focuses on the key global Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) manufacturers, to define, describe and analyze the sales volume, value, market share, market competition landscape, SWOT analysis and development plans in next few years.

To analyze the Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) with respect to individual growth trends, future prospects, and their contribution to the total market.

To share detailed information about the key factors influencing the growth of the market (growth potential, opportunities, drivers, industry-specific challenges and risks).

To project the consumption of Vanadium Redox Battery (VRB) (All-Vanadium Redox Flow Batteries) submarkets, with respect to key regions (along with their respective key countries).

To analyze competitive developments such as expansions, agreements, new product launches, and acquisitions in the market.

To strategically profile the key players and comprehensively analyze their growth strategies.

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