

# The Global Market for Redox Flow Batteries 2024-2034

https://marketpublishers.com/r/GB7210DB2F99EN.html Date: February 2024 Pages: 136 Price: US\$ 1,250.00 (Single User License) ID: GB7210DB2F99EN

## **Abstracts**

The redox flow battery market shows strong potential for significant expansion as a longduration, sustainable energy storage solution able to uniquely meet demands emerging across utility, C&I, EV infrastructure, telecom and off-grid sectors. The Global Market for Redox Flow Batteries 2024-2034 provides a comprehensive analysis of the global market ranging from detailed technology overviews, current installed base and value chain, competitive landscape, regional market revenues and segmental forecasts to 2034, growth drivers and limitations.

The report offers insightful breakdowns covering all major flow battery chemistries including vanadium, zinc-bromine, iron-chromium, all-iron, zinc-iron, hydrogen-bromine, hydrogen-manganese and emerging organic types. Historical global market figures are provided along with granular 10-year annual growth projections by battery chemistry, key geography and major end use case markets like utility storage, behind-the-meter, UPS systems, EV infrastructure, remote area microgrids and telecom backup.

Additionally, the report outlines growth opportunities, trends, challenges, recent funding activities and actual fielded project examples in detail, equipping strategic decision makers with unparalleled insights into the next frontier of sustainable energy storage.

Report contents include:

**Technology Overviews** 

Operating principles

Chemistry types - vanadium, zinc-bromine, polysulfide bromine, iron-chromium, all-iron, zinc-iron, hydrogen-based



Emerging concepts - semi-solid, solar integration, metal-CO2

Hybrid flow batteries

Market Analysis

Drivers and trends

Installed base and outlook to 2034

Value chain assessment

Recent news and funding developments

Global installed sites and projects

**Competitor landscape** 

SWOT analysis

Cost structure comparisons

Applications roadmap

Segment market sizes by end-use case

**Company Profiles** 

50+ manufacturers covered. Companies covered include CellCube, Cerq, CMBlu Energy AG, Dalian Rongke Power, Invinity Energy Systems, StorEn Technologies, Sumitomo Electric etc. (Full list of companies in table of contents)

Overviews, value propositions

Technical partnerships -Installed base and capabilities

Market Data and Forecasts

2018-2034 granular projections



Revenues by chemistry type

End-use case market sizes

Regional market outlook

Growth Opportunities and Challenges

Scenario analysis

Future applications

Limitations to address



## Contents

### **1 INTRODUCTION**

- 1.1 Flow Battery Principles
- 1.2 Advantages and disadvantages
- 1.3 Types
  - 1.3.1 Redox flow batteries
    - 1.3.1.1 Vanadium redox flow batteries (VRFB)
    - 1.3.1.2 Zinc-bromine flow batteries (ZnBr)
    - 1.3.1.3 Polysulfide bromine flow batteries (PSB)
    - 1.3.1.4 Iron-chromium flow batteries (ICB)
    - 1.3.1.5 All-Iron flow batteries
    - 1.3.1.6 Zinc-iron (Zn-Fe) flow batteries
    - 1.3.1.7 Hydrogen-bromine (H-Br) flow batteries
    - 1.3.1.8 Hydrogen-Manganese (H-Mn) flow batteries
    - 1.3.1.9 Organic flow batteries
- 1.4 Emerging Flow-Batteries
  - 1.4.1 Semi-Solid Redox Flow Batteries
  - 1.4.2 Solar Redox Flow Batteries
  - 1.4.3 Air-Breathing Sulfur Flow Batteries
  - 1.4.4 Metal-CO2 Batteries
- 1.5 Hybrid Flow Batteries
  - 1.5.1.1 Zinc-Cerium Hybrid Flow Batteries
  - 1.5.1.2 Zinc-Polyiodide Flow Batteries
  - 1.5.1.3 Zinc-Nickel Hybrid Flow Batteries
  - 1.5.1.4 Zinc-Bromine Hybrid Flow Batteries
  - 1.5.1.5 Vanadium-Polyhalide Flow Batteries

## 2 MARKET ANALYSIS

- 2.1 Market drivers
- 2.2 Market trends
- 2.3 Current market and outlook
- 2.4 Value chain
- 2.5 Recent market news, funding and developments
- 2.6 Redox flow battery installations
- 2.7 Competitive landscape
- 2.8 SWOT analysis



- 2.9 Cost analysis
- 2.10 Applications roadmap
- 2.11 End Use Markets
  - 2.11.1 Utility grid energy storage
    - 2.11.1.1 Market overview
    - 2.11.1.2 Advantages
    - 2.11.1.3 Limitations
    - 2.11.1.4 Applications
    - 2.11.1.5 Market players
  - 2.11.2 Renewable energy storage
  - 2.11.2.1 Market overview
  - 2.11.2.2 Advantages
  - 2.11.2.3 Limitations
  - 2.11.2.4 Applications
  - 2.11.2.5 Market players
  - 2.11.3 UPS and backup systems
    - 2.11.3.1 Market overview
    - 2.11.3.2 Advantages
    - 2.11.3.3 Limitations
    - 2.11.3.4 Applications
    - 2.11.3.5 Market players
  - 2.11.4 Telecom network energy storage
    - 2.11.4.1 Market overview
    - 2.11.4.2 Advantages
    - 2.11.4.3 Limitations
    - 2.11.4.4 Applications
    - 2.11.4.5 Market players
  - 2.11.5 Electric vehicle charging
    - 2.11.5.1 Market overview
    - 2.11.5.2 Advantages
    - 2.11.5.3 Limitations
    - 2.11.5.4 Applications
    - 2.11.5.5 Market players
  - 2.11.6 Residential and C&I Storage
    - 2.11.6.1 Market overview
    - 2.11.6.2 Advantages
    - 2.11.6.3 Limitations
    - 2.11.6.4 Applications
    - 2.11.6.5 Market players



#### 2.11.7 Other

- 2.12 Global revenues for flow batteries, 2018-2034
- 2.12.1 By type
- 2.12.2 By end-use market
- 2.12.3 By region
- 2.13 Market challenges

### **3 COMPANY PROFILES**

- 3.1 Agora Energy Technologies Ltd.
- 3.2 Allegro Energy Pty. Ltd.
- 3.3 Australian Vanadium Limited
- 3.4 Australia VRFB ESS Company (AVESS)
- 3.5 Big Pawer
- 3.6 CEC Science & Technology Co., Ltd
- 3.7 CellCube
- 3.8 Cerq
- 3.9 CMBlu Energy AG
- 3.10 Dalian Rongke Power
- 3.11 Elestor
- 3.12 Energy Storage Industries
- 3.13 ESS Tech
- 3.14 Gelion Technologies
- 3.15 Green Energy Storage S.r.l. (GES)
- 3.16 H2 Inc.
- 3.17 HydraRedox Iberia S.L.
- 3.18 Invinity Energy Systems
- 3.19 Jolt Energy Storage Solutions
- 3.20 Kemiwatt
- 3.21 Korid Energy / AVESS
- 3.22 Largo, Inc.
- 3.23 Le System Co., Ltd
- 3.24 LIVA Power Management Systems GmbH
- 3.25 nanoFlocell
- 3.26 Nuriplan Co., Ltd.
- 3.27 Pinflow Energy Storage
- 3.28 Primus Power
- 3.29 Prolux Solutions
- 3.30 Quino Energy



- 3.31 Redox One
- 3.32 RedFlow
- 3.33 RFC Power Limited
- 3.34 Salgenx
- 3.35 SCHMID Group (Everflow)
- 3.36 Shanghai Electric Energy Storage Technology
- 3.37 Shen-Li High Tech
- 3.38 StorEn Technologies
- 3.39 Stryten Energy
- 3.40 Sumitomo Electric
- 3.41 Thorion Energy
- 3.42 thyssenkrupp
- 3.43 VanadiumCorp Resource Inc.
- 3.44 Vanevo GmbH
- 3.45 VFlowTech
- 3.46 Visblue A/S
- 3.47 ViZn Energy Systems Inc
- 3.48 Volterion GmbH
- 3.49 VoltStorage GmbH
- 3.50 VRB Energy
- 3.51 WattJoule
- 3.52 WeView

## **4 RESEARCH METHODOLOGY**

#### **5 REFERENCES**



## **List Of Tables**

### LIST OF TABLES

Table 1. Advantages and disadvantages of flow batteries.

Table 2. Comparison of different battery types.

Table 3. Summary of main flow battery types.

Table 4. Vanadium redox flow batteries (VRFB)-key features, advantages, limitations, performance, components and applications.

Table 5. Market players in Vanadium redox flow batteries (VRFB).

Table 6. Zinc-bromine (ZnBr) flow batteries-key features, advantages, limitations,

performance, components and applications.

Table 7. Market players in Zinc-Bromine Flow Batteries (ZnBr).

Table 8. Polysulfide bromine flow batteries (PSB)-key features, advantages, limitations, performance, components and applications.

Table 9. Iron-chromium (ICB) flow batteries-key features, advantages, limitations,

performance, components and applications.

Table 10. Market players in Iron-chromium (ICB) flow batteries.

Table 11. All-Iron flow batteries-key features, advantages, limitations, performance, components and applications.

Table 12. Market players in All-iron Flow Batteries.

Table 13. Zinc-iron (Zn-Fe) flow batteries-key features, advantages, limitations,

performance, components and applications.

Table 14. Market players in Zinc-iron (Zn-Fe) Flow Batteries.

Table 15. Hydrogen-bromine (H-Br) flow batteries-key features, advantages, limitations, performance, components and applications.

Table 16. Market players in Hydrogen-bromine (H-Br) flow batteries.

Table 17. Hydrogen-Manganese (H-Mn) flow batteries-key features, advantages,

limitations, performance, components and applications.

Table 18. Market players in Hydrogen-Manganese (H-Mn) Flow Batteries.

Table 19. Materials in Organic Redox Flow Batteries (ORFB).

Table 20. Key Active species for ORFBs

Table 21. Organic flow batteries-key features, advantages, limitations, performance, components and applications.

Table 22. Market players in Organic Redox Flow Batteries (ORFB).

Table 23. Zinc-Cerium Hybrid flow batteries-key features, advantages, limitations, performance, components and applications.

Table 24. Zinc-Polyiodide Hybrid Flow batteries-key features, advantages, limitations, performance, components and applications.



Table 25. Zinc-Nickel Hybrid Flow batteries-key features, advantages, limitations, performance, components and applications.

Table 26. Zinc-Bromine Hybrid Flow batteries-key features, advantages, limitations, performance, components and applications.

Table 27. Vanadium-Polyhalide Hybrid Flow batteries-key features, advantages, limitations, performance, components and applications.

Table 28. Market drivers for redox flow batteries.

Table 29. Market trends in redox flow batteries.

- Table 30. Redox flow battery value chain.
- Table 31. Recent market news, funding and developments in redox flow batteries.
- Table 32. Redox flow battery installations, current and planned.
- Table 33. Cost structure for redox flow battery systems.
- Table 34. Cost Comparison of Chemistries.
- Table 35. Applications of redox flow batteries in Utility Grid Energy Storage.
- Table 36. Market players in redox flow batteries in Utility Grid Energy Storage.
- Table 37. Application of flow batteries in renewable energy storage.
- Table 38. Market players in redox flow batteries in Renewable Energy Storage.
- Table 39. Application of flow batteries in UPS and backup systems.
- Table 40. Market players in redox flow batteries in UPS and backup systems.
- Table 41. Application of flow batteries in Telecom Network Energy Storage.
- Table 42. Market players in redox flow batteries in Telecom network energy storage.
- Table 43. Application of flow batteries in Electric vehicle charging.
- Table 44. Market players in redox flow batteries in electric vehicle charging.
- Table 45. Applications of flow batteries in Residential and C&I Storage.
- Table 46. Market players in redox flow batteries in Residential and C&I Storage.
- Table 47. Other markets and applications for redox flow batteries.
- Table 48. Global revenues for redox flow batteries, 2018-2034, by type (millions USD).
- Table 49. Global revenues for redox flow batteries, 2018-2034, by end-use market (millions USD).
- Table 50. Global revenues for flow batteries, 2018-2034, by region (millions USD).
- Table 51. Market challenges in redox flow batteries.





## **List Of Figures**

#### LIST OF FIGURES

- Figure 1. Scheme of a redox flow battery.
- Figure 2. Vanadium Redox Flow Battery schematic.
- Figure 3. SWOT analysis: Vanadium redox flow batteries (VRFB)
- Figure 4. Schematic of zinc bromine flow battery energy storage system.
- Figure 5. SWOT analysis: Zinc-Bromine Flow Batteries (ZnBr).
- Figure 6. SWOT analysis: Iron-chromium (ICB) flow batteries.
- Figure 7. SWOT analysis: Iron-chromium (ICB) flow batteries.
- Figure 8. Schematic of All-Iron Redox Flow Batteries.
- Figure 9. SWOT analysis: All-iron Flow Batteries.
- Figure 10. SWOT analysis: Zinc-iron (Zn-Fe) flow batteries.
- Figure 11. Schematic of Hydrogen-bromine flow battery.
- Figure 12. SWOT analysis: Hydrogen-bromine (H-Br) flow batteries.
- Figure 13. SWOT analysis: Hydrogen-Manganese (H-Mn) flow batteries.
- Figure 14. SWOT analysis: Organic redox flow batteries (ORFBs) batteries.
- Figure 15. Schematic of zinc-polyiodide redox flow battery (ZIB).
- Figure 16. SWOT analysis for redox flow batteries market.
- Figure 17. Redox flow batteries applications roadmap.
- Figure 18. Global revenues for redox flow batteries, 2018-2034, by type (millions USD).
- Figure 19. Global revenues for flow batteries, 2018-2034, by end-use market (millions USD).
- Figure 20. Global revenues for flow batteries, 2018-2034, by region (millions USD).
- Figure 21. Rongke Power 400 MWh VRFB.
- Figure 22. Gelion Endure battery.
- Figure 23. Portable desalination plant.
- Figure 24. Largo Model VCHARGE Advanced Vanadium Redox Flow Battery System.
- Figure 25. Schematic of the quinone flow battery.
- Figure 26. Salgenx S3000 seawater flow battery.
- Figure 27. VFlowTech's PowerCube.
- Figure 28. VoltStorage VDIUM C50.



#### I would like to order

Product name: The Global Market for Redox Flow Batteries 2024-2034 Product link: https://marketpublishers.com/r/GB7210DB2F99EN.html Price: US\$ 1,250.00 (Single User License / Electronic Delivery) If you want to order Corporate License or Hard Copy, please, contact our Customer Service: info@marketpublishers.com

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <u>https://marketpublishers.com/r/GB7210DB2F99EN.html</u>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name: Last name: Email: Company: Address: City: Zip code: Country: Tel: Fax: Your message:

\*\*All fields are required

Custumer signature \_\_\_\_\_

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <u>https://marketpublishers.com/docs/terms.html</u>

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970