

# Residential Energy Storage, Blockchain and Energy Sharing Systems: Technologies and Global Market

<https://marketpublishers.com/r/RE113CABE84EN.html>

Date: January 2019

Pages: 195

Price: US\$ 1,375.00 (Single User License)

ID: RE113CABE84EN

## Abstracts

### Report Scope:

The scope of this market study includes the leading residential energy storage systems technologies that are currently in use globally. Residential home battery technologies are used across a number of industries and applications, such as automotive, renewable energy and telecommunications. The technologies discussed in this report are in use across the industries mentioned above and many more as well, as new sectors driven by product and technological innovation emerge.

The market analysis provided in this report is based on a variety of data sources. These include the most recent government, industry, academic and company data regarding the projected level of demand for residential energy storage systems technologies. This report quantifies battery storage technologies used in residential, including battery storage electrochemistries (e.g., lithium-ion and lead-acid) and all-in-one battery pack storage units (battery, inverter charger and battery management software) for residential electricity storage, as well as RES units that can share stored electricity. It does not include other components such as solar panels and charge controllers. Therefore, this report provides a comprehensive review of available data to provide a realistic and accurate assessment of this evolving market.

BCC Research analyzes each major residential energy storage systems technology, determines its current market status, examines its impact on future markets, and presents forecasts of growth over the next five years. Estimated values used are based on manufacturer's total revenues. Projected and forecast revenue values are in constant US dollars, unadjusted for inflation. Technological issues, including the latest trends, are assessed and discussed, as are the current and likely-to-appear regulatory

environments in support of this industry.

BCC Research analyzes the industry on a worldwide basis in terms of its manufacturing and use of residential energy storage systems. BCC Research examines government roles in support of residential energy storage systems technologies worldwide, including regulatory support and government requirements, for residential energy storage systems technologies. The report provides a review of the most relevant residential energy storage systems, discusses recent trends and sales, and provides industry overviews and market assessments for leading residential energy storage systems.

Report Includes:

45 data tables

A comprehensive overview of the global market for residential energy storage, blockchain and energy sharing systems

Analyses of global market trends, with data from 2017 to 2018, and projections of compound annual growth rates (CAGRs) through 2023

Characterization and quantification of market potential for residential energy storage market by product offerings, storage types, applications, end user industries and major geographies

Assess current market trends and technological updates along with the factors influencing the growth of residential energy storage market

A relevant patent analysis

Profiles of top market players within the industry including ACME Cleantech Solutions Pvt. Ltd., BMW Group, DMS Technologies, Exide Technologies GmbH and LG Chem Ltd.

## Contents

### **CHAPTER 1 INTRODUCTION**

Study Goals and Objectives  
Reasons for Doing This Study  
Scope of Report  
Information Sources  
Methodology  
Geographic Breakdown  
What the Industry is Saying  
Analyst's Credentials  
BCC Custom Research  
Related BCC Research Reports

### **CHAPTER 2 SUMMARY AND HIGHLIGHTS**

### **CHAPTER 3 MARKET AND TECHNOLOGY BACKGROUND**

Construction of Batteries  
Types of Electrochemical Compositions  
Residential Battery Storage Technologies and Components  
Battery Pack Design  
Design Overview  
Configuration of Cells in a Battery Pack  
Battery Pack Structural Design  
Cell Protection  
Battery Pack Control (Monitoring and Management)  
Battery Pack Use  
Solar Inverter Integration  
Safety System Design and Component Selection  
Residential Battery Storage Electrochemical Technologies  
Conventional Batteries  
How Rechargeable Batteries Work  
Lead-Acid Batteries  
Lithium-Ion Batteries  
Comparing Lead-Acid vs. Lithium-Ion  
Solar Battery Lifespan  
Other Electrochemistries

Differences Between Types of Nickel-Based Batteries  
Saltwater Batteries  
Best Batteries for Solar  
Comparison of RESS Battery Technologies  
OEM Strategy  
Battery Value Chain  
Recycling  
Introduction to Blockchain and Peer-to-Peer Energy Systems  
Introduction to Blockchain  
Blockchain and Energy Sharing Enabling Technology  
P2P Energy Trading Platform  
Flexibility-(P2P) Trading Platform  
Limitations of the Blockchain  
Storage Business Models and Revenues  
Domestic Solar + Storage Business Models and Revenues

## **CHAPTER 4 MARKET BREAKDOWN BY BATTERY ELECTROCHEMICAL TECHNOLOGY TYPE**

Lithium-Ion RESS Market  
Lead-Acid RESS Market  
Other Electrochemical RESS Market

## **CHAPTER 5 MARKET BREAKDOWN BY APPLICATION**

PV Rooftop + Storage RESS Market  
Bundled Systems  
Retrofit Systems  
Backup Power Residential Energy Storage Systems  
Electric Vehicle Recharging Residential Energy Storage Systems  
Energy Cost Management Residential Energy Storage Systems

## **CHAPTER 6 MARKET BREAKDOWN BY REGION**

European Residential Energy Storage Systems Market  
German Residential Energy Storage Systems Market  
Italy's Residential Energy Storage Systems Market  
U.K. Residential Energy Storage Systems Market  
France's Residential Energy Storage Systems Market

Austria's Residential Energy Storage Systems Market  
Rest of Europe Residential Energy Storage Systems Market  
Asia-Pacific Residential Energy Storage Systems Market  
Japan's Residential Energy Storage Systems Market  
Australia's Residential Energy Storage Systems Market  
Rest of Asia-Pacific Residential Energy Storage Systems Market  
North American Residential Energy Storage Systems Market  
U.S. Residential Energy Storage Systems Market  
Canada's Residential Energy Storage Systems Market  
ROW Residential Energy Storage Systems Market  
Analysis by Country

## **CHAPTER 7 PATENT REVIEW/ NEW DEVELOPMENTS**

Trends Over Time  
Patent Review by Region  
Patents Owned by International Companies  
Patents Concentrated in Relatively few Categories  
Leading Companies  
Patent Review by Software  
Patent Review by Storage

## **CHAPTER 8 ANALYSIS OF MARKET OPPORTUNITIES**

Competitive Analysis  
Key Players  
Market Drivers  
Challenges in the Residential Storage Market  
Clear Regulatory Framework  
A Level Playing Field by Eliminating Double Charging  
Clarity on Existing Regulations  
Standards to Enable a High-Quality Industry Run Safely  
Marketplaces for Services  
Building Regulations  
Net Metering  
Utilities Standing in the Way

## **CHAPTER 9 COMPANY PROFILES**

A123 SYSTEMS LLC  
ACME CLEANTECH SOLUTIONS PVT. LTD.  
ADARA POWER  
AMARA RAJA BATTERIES LTD.  
AMPEREX TECHNOLOGY LTD.  
BAE BATTERIEN GMBH  
BLUESKY ENERGY ENTWICKLUNGS UND PRODUKTIONS GMBH  
BMW GROUP  
BYD COMPANY LTD.  
C&D TECHNOLOGIES INC.  
CATL  
CERES POWER LTD.  
COMMEO GMBH  
CROWN BATTERY MANUFACTURING CO.  
DAEJIN BATTERY CO., LTD.  
DMS TECHNOLOGIES  
EAST PENN MANUFACTURING CO. INC.  
ECOCOACH AG  
ELECTROVAYA INC.  
ENERSYS  
ENPHASE ENERGY INC.  
E-ON BATTERIES  
E3/DC GMBH  
ELECTRIQ POWER INC.  
EVEREXCEED  
EXIDE TECHNOLOGIES GMBH  
FRONIUS INTERNATIONAL GMBH  
GENERAL ELECTRIC CO.  
GERMAN ENERGY SUPPLY GMBH (SENEC)  
GESS LTD.  
GS YUASA INTERNATIONAL  
HBL POWER SYSTEMS LTD.  
HOPPECKE BATTERIEN GMBH & CO. KG  
IBC SOLAR AG  
JOHNSON CONTROLS INC.  
KOKAM CO. LTD.  
KYOCERA CORP.  
LECLANCH? GMBH  
LG CHEM LTD.

MAXWELL TECHNOLOGIES INC.  
MERCEDES-BENZ ENERGY GMBH  
MICROTEX ENERGY PRIVATE LTD.  
NEDAP  
NISSAN CO. LTD.  
PANASONIC CORP.  
PRIMUS POWER CORP.  
POWERBALL SYSTEMS AG  
POWERSVOLT LTD.  
REDFLOW LTD.  
REDT ENERGY STORAGE PLC  
SAFT GROUPE S.A.  
SAMSUNG SDI CO. LTD.  
SHARP ELECTRONICS CORP.  
SHENZHEN BAK BATTERY CO., LTD.  
SIMPLIPHI POWER INC.  
SMA SOLAR TECHNOLOGY AG  
SONNEN GMBH  
SONY ENERGY DEVICES CORP.  
STORAGE BATTERY SYSTEMS LLC  
SU-KAM POWER SYSTEMS LTD.  
SUNVERGE ENERGY LLC  
TESLA INC.  
TESVOLT GMBH  
TIANJIN LISHEN BATTERY CO. LTD.  
TOSHIBA CORP.  
TROJAN BATTERY CO.  
VALENCE TECHNOLOGY INC.  
VARTA AKTIENGESELLSCHAFT  
VICTRON ENERGY B.V.  
VIZN ENERGY SYSTEMS INC.  
VOLTSTORAGE GMBH  
WANXIANG GROUP CORP.  
ZEN ENERGY

## **CHAPTER 10 APPENDIX: ACRONYMS**

## List Of Figures

### LIST OF FIGURES

Summary Table: Global Market for Residential Energy Storage, by Battery Type, Through 2023

Table 1: Lead-acid Battery Costs, by Application, 2003

Table 2: Lead-Acid and Advanced Lead-Acid Battery Costs, by Application, 2020

Table 3: Lithium-Ion Subcategory Comparison

Table 4: Lithium-Ion Battery Features

Table 5: Lithium-Ion Battery Costs, by Benefit, 2010

Table 6: Lead-Acid vs. Lithium-Ion Battery Technology

Table 7: Sodium Sulfur Battery Costs, by Application

Table 8: Comparison of Select Battery Technologies

Table 9: Battery Technology Comparison

Table 10: Lead-Acid Battery Pros and Cons

Table 11: Lithium-Ion Battery Pros and Cons

Table 12: Nickel-Based Battery Pros and Cons

Table 13: Saltwater Battery Pros and Cons

Table 14: Efficiency of Recycling for Various Elements in Selected Processes for NMC and LFP Chemistries

Table 15: Global Market for Residential Energy Storage Systems, by Battery Technology, Through 2023

Table 16: Global Market for Lithium-Ion Residential Energy Storage Systems, by Battery Technology, Through 2023

Table 17: Global Market for Lead-Acid Residential Energy Storage Systems, by Battery Technology, Through 2023

Table 18: Global Market for Other Electrochemicals Residential Energy Storage Systems, by Battery Technology, Through 2023

Table 19: Global Market for Residential Energy Storage Systems, by Application, Through 2023

Table 20: Global Market Volume for Residential Energy Storage Systems, by Installation Type, Through 2023

Table 21: Global Market for PV Rooftop + Storage Residential Energy Storage Systems, by Application, Through 2023

Table 22: Global Market for Backup Power Residential Energy Storage Systems, by Application, Through 2023

Table 23: Global Market for Electric Vehicle Recharging Residential Energy Storage Systems, by Application, Through 2023



Table 24: Global Market for Energy Cost Management Residential Energy Storage Systems, by Application, Through 2023

Table 25: Global Market for Residential Energy Storage Systems, by Region, Through 2023

Table 26: Global Market Volume for Residential Energy Storage Systems, by Region, Through 2023

Table 27: European Market for Residential Energy Storage Systems, by Country, Through 2023

Table 28: German Market for Residential Energy Storage Systems, Through 2023

Table 29: Italian Market for Residential Energy Storage Systems, Through 2023

Table 30: The U.K. Market for Residential Energy Storage Systems, Through 2023

Table 31: French Market for Residential Energy Storage Systems, Through 2023

Table 32: Austria's Market for Residential Energy Storage Systems, Through 2023

Table 33: Rest of Europe Market for Residential Energy Storage Systems, Through 2023

Table 34: Asia-Pacific Market for Residential Energy Storage Systems, by Country, Through 2023

Table 35: Japanese Market for Residential Energy Storage Systems, Through 2023

Table 36: Australian Market for Residential Energy Storage Systems, Through 2023

Table 37: Rest of Asia-Pacific Market for Residential Energy Storage Systems, Through 2023

Table 38: North American Market for Residential Energy Storage Systems, by Country, Through 2023

Table 39: U.S. Market for Residential Energy Storage Systems, Through 2023

Table 40: Canadian Market for Residential Energy Storage Systems, Through 2023

Table 41: ROW Market for Residential Energy Storage Systems, Through 2023

Table 42: Global Market for Residential Energy Storage Systems, by Country, Through 2023

Table 43: Abbreviations Used in the Residential Energy Storage Systems Market

Table 44: Report Sources

## **LIST OF FIGURES**

Summary Figure: Global Market for Residential Energy Storage, by Battery Type, 2017-2023

Figure 1: Overview of Electrochemistries Used to Manufacture Batteries

Figure 2: Cells in Parallel vs. Strings in Parallel

Figure 3: Residential Home Battery System Diagram

Figure 4: Rechargeable Battery Types

Figure 5: Lead-Acid Battery Functions and Components

Figure 6: Lead-Acid Charge States

Figure 7: Lithium-Ion Battery Function and Components

Figure 8: Cycle Life, Moderate Climate

Figure 9: Cycle Life Comparison for Extreme Climate

Figure 10: Capacity vs. Discharge Rate for VRLA and Lithium-ion

Figure 11: Capacity Available vs. Temperature for VRLA and Lithium-ion

Figure 12: Capacity Available vs. Temperature

Figure 13: Voltage Comparison of Various Chemistries

Figure 14: Inside a Nickel-Cadmium Battery

Figure 15: Nickel-Metal Hydride

Figure 16: Comparison of Energy Density in Battery Cells

Figure 17: Comparison of Technology Maturity and Anticipated R&D Expenditure

Figure 18: Saltwater Battery Construction

Figure 19: Side-by-Side Comparison of ~20 kWh Battery Storage

Figure 20: OEM Battery Pack Manufacturing Strategies

Figure 21: Battery Assembly Process

Figure 22: Global Market Shares of Lithium-Ion Battery Reserves, by Country, 2017

Figure 23: Centralized vs. Distributed Payment Transactions

Figure 24: Illustrative Cost and Revenue Stack for Solar-Plus-Storage

Figure 25: Ownership and Power Flows for Domestic Solar-plus-storage: Homeowner-owned Model

Figure 26: Stakeholder Relationship Map for Domestic Solar-plus-storage: Homeowner-Owned Model

Figure 27: Ownership and Power Flows for Domestic Solar-Plus-Storage: Aggregator-Owned Model

Figure 28: Stakeholder Relationship Map for Domestic Solar-Plus-Storage: Aggregator-Owned Model

Figure 29: Global Market for Residential Energy Storage Systems, by Battery Technology, 2017-2023

Figure 30: Global Market Shares of Residential Energy Storage Systems, by Battery Technology, 2018

Figure 31: Global Market for Lithium-Ion Residential Energy Storage Systems, by Battery Technology, 2017-2023

Figure 32: Lithium-Ion Battery Price, 2010-2017

Figure 33: Global Market for Lead-Acid Residential Energy Storage Systems, by Battery Technology, 2017-2023

Figure 34: Initial Acquisition Cost per Lead-Acid Battery

Figure 35: Global Market for Other Electrochemicals Residential Energy Storage

Systems, by Battery Technology, 2017-2023

Figure 36: Global Market for Residential Energy Storage Systems, by Battery Technology

Figure 37: Global Market for Residential Energy Storage Systems, by Application, 2017-2023

Figure 38: Global Market Share of Residential Energy Storage Systems, by Application, 2018

Figure 39: Global Market for Residential Energy Storage Systems, by Installation Type, 2017-2023

Figure 40: Photovoltaic Panel Gross Price Per Watt, 2014-2017

Figure 41: Global Market for PV Rooftop + Storage Residential Energy Storage Systems, 201-2023

Figure 42: Simplified Economics of New Domestic Solar-plus-storage Units

Figure 43: Simplified Economics of Retrofit Domestic Solar-plus-storage Units

Figure 44: Global Market for Backup Power Residential Energy Storage Systems, by Application, 2017-2023

Figure 45: Global Market for Electric Vehicle Recharging Residential Energy Storage Systems, 2017-2023

Figure 46: Global Market for Energy Cost Management Residential Energy Storage Systems, 2017-2023

Figure 47: Cost Savings with Time-of-Use Electricity Tariffs, 2017-2023

Figure 48: Global Market for Residential Energy Storage Systems, 2017-2023

Figure 49: Global Market for Residential Energy Storage Systems, by Region, 2017-2023

Figure 50: Global Market Share of Residential Energy Storage Systems, by Region, 2018

Figure 51: Global Market Volume for Residential Energy Storage Systems, by Region, 2017-2023

Figure 52: European Market for Residential Energy Storage Systems, by Country, 2017-2023

Figure 53: European Market Shares of Residential Energy Storage Systems, by Country, 2018

Figure 54: German Market for Residential Energy Storage Systems, 2017-2023

Figure 55: German Market Volume for Residential Energy Storage System Installations, 2017-2023

Figure 56: Retail Electricity, PV Only, and PV + Storage Prices in Germany, 2010-2018

Figure 57: Italian Market for Residential Energy Storage Systems, 2017-2023

Figure 58: Retail Electricity Prices in Italy, 2010-2018

Figure 59: The U.K. Market for Residential Energy Storage Systems, 2017-2023

- Figure 60: Retail Electricity Prices in the U.K., 2010-2018
- Figure 61: French Market for Residential Energy Storage Systems, 2017-2023
- Figure 62: Retail Electricity Prices in France, 2010-2018
- Figure 63: Austria's Market for Residential Energy Storage Systems, 2017-2023
- Figure 64: Retail Electricity Prices in Austria, 2010-2018
- Figure 65: Rest of Europe Market for Residential Energy Storage Systems, 2017-2023
- Figure 66: Retail Electricity Prices in Portugal and Spain, 2010-2018
- Figure 67: Asia-Pacific Market for Residential Energy Storage Systems, by Country, 2017-2023
- Figure 68: Asia-Pacific Market Share of Residential Energy Storage Systems, by Country, 2017
- Figure 69: Japanese Market for Residential Energy Storage Systems, 2017-2023
- Figure 70: Australian Market for Residential Energy Storage Systems, 2017-2023
- Figure 71: Rest of Asia-Pacific Market for Residential Energy Storage Systems, 2017-2023
- Figure 72: North American Market for Residential Energy Storage Systems, by Country, 2017-2023
- Figure 73: North American Market Share of Residential Energy Storage Systems, by Country, 2018
- Figure 74: U.S. Market for Residential Energy Storage Systems, 2017-2023
- Figure 75: U.S. Residential Energy Storage Systems Off-grid vs Grid-connected Forecast, 2016-2023
- Figure 76: U.S. Market Share of Residential Energy Storage Systems, by Installation Type, 2017
- Figure 77: U.S. Quarterly Residential Energy Storage System Deployments, 2013-2018
- Figure 78: Canadian Market for Residential Energy Storage Systems, 2017-2023
- Figure 79: ROW Market for Residential Energy Storage Systems, 2017-2023
- Figure 80: Global Market for Residential Energy Storage Systems, by Country, 2017-2023
- Figure 81: Global Market Share of Residential Energy Storage Systems, by Country, 2018
- Figure 82: Renewable Energy Patents Granted by the USPTO, 2001-2017
- Figure 83: Number of Renewable Energy Patents Granted by the USPTO, 2001-2017

## I would like to order

Product name: Residential Energy Storage, Blockchain and Energy Sharing Systems: Technologies and Global Market

Product link: <https://marketpublishers.com/r/RE113CABE84EN.html>

Price: US\$ 1,375.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/RE113CABE84EN.html>

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**

Customer signature \_\_\_\_\_

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

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

