+44 20 8123 2220
info@marketpublishers.com

Liquid Cooling Market for Stationary Battery Energy Storage System (BESS) - A Global and Regional Analysis: Focus on Application, Product, and Country Level Analysis - Analysis and Forecast, 2024-2033

https://marketpublishers.com/r/LF13370587AEEN.html
Date: February 2025
Pages: 0
Price: US$ 5,500.00 (Single User License)
ID: LF13370587AEEN

Abstracts

Hard copy option is available on any of the options above at an additional charge of $500. Please email us at order@marketpublishers.com with your request.

This report will be delivered in 7-10 working days.Liquid Cooling Market for Stationary Battery Energy Storage System (BESS) Overview

The liquid cooling market for stationary battery energy storage system (BESS) is projected to reach $24.51 billion by 2033 from $4.23 billion in 2024, growing at a CAGR of 21.55% during the forecast period 2024-2033. The liquid cooling market for stationary battery energy storage system (BESS) is poised for strong growth, fueled by the increasing deployment of grid-related energy storage systems and the rising demand for renewable energy. However, challenges such as high initial costs, complex implementation, and concerns over system reliability and maintenance persist. Despite these hurdles, the liquid cooling market for stationary battery energy storage system (BESS) holds significant opportunities driven by the expanded adoption of renewable energy sources and continued technological advancements, making innovation and sustainability critical focal points for future development.

Introduction to the Liquid Cooling Market for Stationary Battery Energy Storage System (BESS)

The liquid cooling market for stationary battery energy storage system (BESS) refers to the segment of cooling technologies specifically designed to manage the thermal regulation of large-scale energy storage systems. Stationary BESS is used to stabilize

+44 20 8123 2220
info@marketpublishers.com

power grids, store renewable energy, and ensure consistent energy supply. During operation, these systems generate significant heat, which can affect their performance, safety, and lifespan. Liquid cooling systems provide a more efficient means of heat dissipation and temperature control compared to traditional air cooling methods, ensuring optimal performance, reducing the risk of overheating, and extending the life of the batteries in high-power applications.

Market Introduction

The liquid cooling market for stationary battery energy storage systems (BESS) has been a growing sector, driven by the need for efficient thermal management in large-scale energy storage. As renewable energy adoption increases, advanced cooling solutions are essential to ensure system safety and performance. Liquid cooling systems provide better heat dissipation and temperature control than traditional air cooling methods, reducing the risk of overheating and enhancing system reliability. These solutions are critical for high-power applications such as grid stabilization, renewable energy storage, and uninterruptible power supplies, positioning the liquid cooling market for stationary battery energy storage system (BESS) for continued growth and innovation.

Industrial Impact

The liquid cooling market for stationary battery energy storage system (BESS) significantly impacts industries by enhancing system efficiency, safety, and reliability. As renewable energy adoption rises, the demand for advanced cooling solutions becomes critical in maintaining the performance of large-scale energy storage systems. Liquid cooling reduces thermal stress, extends battery lifespan, and minimizes operational costs in high-power applications. This technology has been especially vital for industries relying on grid stabilization and uninterrupted power supply, driving the shift toward more sustainable energy practices while ensuring compliance with stringent environmental and safety standards.

Market Segmentation:

Segmentation 1: by Application

Utility-Scale Energy Storage

Commercial and Industrial Energy Storage

+44 20 8123 2220
info@marketpublishers.com

Residential Energy Storage

Microgrids

Others

Utility-Scale Energy Storage to Lead the Market (by Application)

Utility-scale energy storage is set to lead the liquid cooling market for stationary battery energy storage system (BESS), driven by its increasing share in energy storage capacity. By 2030, utility applications are projected to reach 86 GWh, reflecting the need for large-scale systems to support grid stability and renewable energy integration. Given the high energy demands and heat generation of utility-scale BESS, efficient liquid cooling systems have been vital for temperature management and reliability. As these projects expand, the demand for advanced cooling technologies will rise, driving innovation and supporting the scalability of BESS solutions.

Segmentation 2: by Power Capacity

Small-Scale ESS (10 MW)

Medium-Scale ESS (1 MW–10 MW) to Lead the Market (by Power Capacity)

Medium-scale energy storage systems (ESS) are set to dominate the liquid cooling market due to their optimal balance of capacity and scalability, particularly for commercial and industrial applications. With power capacities between 1 MW and 10 MW, these systems effectively address grid stability, peak shaving, and renewable energy integration. Liquid cooling is essential for maintaining battery performance, preventing overheating, and enhancing system longevity. For example, projects such as Hitachi Energy's 6 MW BESS in the Faroe Islands showcase the effectiveness of such systems in improving energy efficiency while supporting sustainability goals.

Segmentation 3: by Cooling Type

Active Liquid Cooling

+44 20 8123 2220
info@marketpublishers.com

Passive Liquid Cooling

Hybrid Liquid Cooling Systems

Active Liquid Cooling to Lead the Market (by Cooling Type)

Active liquid cooling is poised to lead the stationary BESS market due to its superior ability to manage high thermal loads in large-scale installations. As power capacity and battery density increase, active cooling systems using pumps and heat exchangers provide precise temperature control, enhancing reliability and extending battery life. With continuous heat generation in utility-scale projects, active liquid cooling outperforms air cooling in high-power applications. Companies such as Volvo Energy have already implemented these systems, ensuring optimal thermal management in varying environmental conditions and positioning active liquid cooling as the preferred solution for safety and operational efficiency.

Segmentation 4: by Cooling Fluid Type

Water-Based Coolants

Glycol-Based Coolants

Oil-Based Coolants

Synthetic Fluids

Others

Water-Based Coolants to Lead the Market (by Cooling Fluid Type)

Water-based coolants are set to dominate the liquid cooling market for stationary battery energy storage systems (BESS) due to their exceptional thermal efficiency, cost-effectiveness, and environmental safety. As lithium-ion batteries, with their high energy density and rapid charge cycles, increasingly power large-scale grid storage, the superior heat dissipation offered by water-based coolants ensures optimal performance and extended battery life. Additionally, their ability to operate through natural or forced convection with minimal environmental impact positions them as the ideal solution for

sustainable, high-capacity BESS installations projected to reach 426 GWh by 2040.

Segmentation 5: by Battery Chemistry Type

- Lithium-Ion Batteries
- Lead-Acid Batteries
- Others

Lithium-Ion Batteries to Lead the Market (by Battery Chemistry Type)

Lithium-ion batteries are expected to lead the liquid cooling market for stationary BESS due to their high energy density, long lifecycle, and fast charging capabilities. As renewable energy adoption grows, demand for efficient grid-scale storage solutions has surged. Lithium-ion technology, making up 93% of BESS installations globally in 2021, has been essential for maintaining grid stability and supporting renewable sources such as wind and solar. With temperature control critical to their performance, liquid cooling systems enhance battery lifespan and efficiency, positioning lithium-ion batteries as the dominant technology for large-scale, high-power storage applications.

Segmentation 6: by System Configuration Type

- Modular Cooling Systems
- Centralized Cooling Systems
- Distributed Cooling Systems

Centralized Cooling Systems to Lead the Market (by System Configuration Type)

Centralized cooling systems are set to dominate the liquid cooling market for stationary BESS due to their efficiency in managing large-scale energy storage installations. By offering unified temperature control across entire battery arrays, they enhance system performance, reduce complexity, and lower costs compared to independent units. These systems are ideal for utility-scale projects, providing superior thermal management for battery safety and longevity. With advanced solutions such as

+44 20 8123 2220
info@marketpublishers.com

LERETECH’s centralized cooling plant, which boosts storage capacity and efficiency, centralized systems have been increasingly critical for supporting renewable energy integration and grid stabilization.

Segmentation 7: by Region

- North America
- Europe
- Asia-Pacific
- Rest-of-the-World

Asia-Pacific Region to Lead the Market

The Asia-Pacific region is set to lead the liquid cooling market for stationary battery energy storage system (BESS), driven by its rapid renewable energy adoption and ambitious targets. China, accounting for nearly 60% of global renewable capacity additions by 2030, and India, aiming for 450 GW of renewable energy by the same year, have been key players. The intermittent nature of renewable energy sources highlights the need for efficient, large-scale energy storage. Liquid-cooled BESS has been crucial for managing thermal challenges and ensuring system reliability. As investments in solar and wind projects grow, the demand for advanced liquid cooling technologies will surge across the region.

Recent developments in the liquid cooling market for stationary battery energy storage system (BESS):

- In September 2024, Zhejiang Narada Power Source Co., Ltd. launched a new high-efficiency battery system designed to enhance grid-scale energy storage projects in China. This product launch highlights Narada's commitment to advancing energy storage solutions, supporting the country’s growing renewable energy infrastructure, and improving grid reliability.

- In June 2024, Contemporary Amperex Technology Co., Ltd. (CATL) entered into a strategic partnership with a European automotive company to supply battery storage systems for electric vehicles. This collaboration underscores CATL's

+44 20 8123 2220
info@marketpublishers.com

pivotal role in advancing battery technology for the electric vehicle industry, supporting the shift toward sustainable transportation solutions across Europe.

In December 2023, EVE Energy Co., Ltd. partnered with a European grid operator to deploy its large-format cylindrical batteries in grid-scale energy storage projects. This collaboration highlights the growing demand for advanced energy storage solutions to support grid stability and the integration of renewable energy sources across Europe. EVE Energy's involvement underscores its commitment to providing innovative, efficient battery technologies for large-scale energy infrastructure.

Demand – Drivers, Challenges, and Opportunities

Market Drivers

The primary drivers of the liquid cooling market for stationary battery energy storage systems (BESS) include the increasing deployment of grid-related energy storage systems and the growing demand for renewable energy sources. As renewable energy adoption accelerates, particularly with solar and wind power, grid stability and energy management have become critical. Projections indicate a fifteenfold increase in global grid-related energy storage by 2030, with liquid cooling systems essential for managing heat and ensuring battery safety and longevity. This trend has been fueled by declining renewable energy costs and policy incentives, positioning liquid cooling as a key technology in supporting large-scale energy storage expansion.

Market Restraints

The liquid cooling market for stationary battery energy storage system (BESS) has been facing several challenges, primarily due to high initial costs and the complexity of implementation. Liquid cooling systems require intricate designs, including pumps, heat exchangers, and specialized equipment, significantly increasing upfront expenses and making them less attractive for smaller projects. Additionally, these systems present maintenance challenges, as moving parts such as pumps and fluid circulation mechanisms can fail, leading to overheating or system failure. The risk of coolant degradation and contamination further complicates long-term maintenance. Retrofitting existing systems is also complex, adding logistical difficulties and raising operational costs, especially in large-scale installations.

+44 20 8123 2220
info@marketpublishers.com

Market Opportunities

The liquid cooling market for stationary battery energy storage system (BESS) offers significant opportunities driven by the rising adoption of renewable energy sources and technological advancements. As renewable energy projects expand, especially in sectors such as utilities and large industrial firms, the demand for efficient thermal management solutions grows. Liquid cooling, with its superior heat dissipation, is essential for high-capacity BESS, ensuring system reliability and longevity. Technological innovations, including AI-driven cooling and IoT-enabled monitoring, further enhance performance. New entrants can capitalize by offering advanced, energy-efficient solutions tailored to large-scale projects, particularly in regions with aggressive renewable energy targets.

How can this report add value to an organization?

Product/Innovation Strategy: This report provides a comprehensive product/innovation strategy for the liquid cooling market for stationary battery energy storage system (BESS), identifying opportunities for market entry, technology adoption, and sustainable growth. It offers actionable insights, helping organizations to meet environmental standards, gain a competitive edge, and capitalize on the increasing demand for eco-friendly solutions in various industries.

Growth/Marketing Strategy: This report offers a comprehensive growth and marketing strategy designed specifically for the liquid cooling market for stationary battery energy storage system (BESS). It presents a targeted approach to identifying specialized market segments, establishing a competitive advantage, and implementing creative marketing initiatives to optimize market share and financial performance. By harnessing these strategic recommendations, organizations can elevate their market presence, seize emerging prospects, and efficiently propel revenue expansion.

Competitive Strategy: This report crafts a strong competitive strategy tailored to the liquid cooling market for stationary battery energy storage system (BESS). It evaluates market rivals, suggests stand-out methods, and offers guidance for maintaining a competitive edge. By adhering to these strategic directives, companies can position themselves effectively in the face of market competition, ensuring sustained prosperity and profitability.

Research Methodology

+44 20 8123 2220
info@marketpublishers.com

Factors for Data Prediction and Modeling

The scope of this report focuses on several types of liquid cooling solutions for stationary BESS applications and products.

The base currency considered for the liquid cooling market for stationary battery energy storage system (BESS) analysis is U.S.$. Considering the average conversion rate for that particular year, currencies other than the U.S.$ have been converted to the U.S.$ for all statistical calculations.

The currency conversion rate has been taken from the historical exchange rate of the Oanda website.

Nearly all the recent developments from January 2021 to October 2024 have been considered in this research study.

The information rendered in the report results from in-depth primary interviews, surveys, and secondary analysis.

Where relevant information was not available, proxy indicators and extrapolation were employed.

Any economic downturn in the future has not been taken into consideration for the liquid cooling market for stationary battery energy storage system (BESS) estimation and forecast.

Technologies currently used are expected to persist through the forecast with no major technological breakthroughs.

Market Estimation and Forecast

This research study involves the usage of extensive secondary sources, such as certified publications, articles from recognized authors, white papers, annual reports of companies, directories, and major databases to collect useful and effective information for an extensive, technical, market-oriented, and commercial study of the liquid cooling market for stationary battery energy storage system (BESS).

The market engineering process involves the calculation of the market statistics, market

+44 20 8123 2220
info@marketpublishers.com

size estimation, market forecast, market crackdown, and data triangulation (the methodology for such quantitative data processes has been explained in further sections). The primary research study has been undertaken to gather information and validate the liquid cooling market for stationary battery energy storage system (BESS) numbers for segmentation types and industry trends of the key players in the market.

Primary Research

The primary sources involve industry experts from the liquid cooling market for stationary battery energy storage system (BESS) and various stakeholders in the ecosystem. Respondents such as CEOs, vice presidents, marketing directors, and technology and innovation directors have been interviewed to obtain and verify both qualitative and quantitative aspects of this research study.

The key data points taken from primary sources include:

validation and triangulation of all the numbers and graphs

validation of reports segmentation and key qualitative findings

understanding the competitive landscape

validation of the numbers of various segments for market type

percentage split of individual markets for geographical analysis

Secondary Research

This research study of the liquid cooling market for stationary battery energy storage system (BESS) involves extensive secondary research, directories, company websites, and annual reports. It also makes use of databases, such as ITU, Hoovers, Bloomberg, Businessweek, and Factiva, to collect useful and effective information for an extensive, technical, market-oriented, and commercial study of the global market.

Secondary research has been done to obtain crucial information about the industry’s value chain, revenue models, the market’s monetary chain, the total pool of key players, and the current and potential use cases and applications.

+44 20 8123 2220
info@marketpublishers.com

The key data points taken from secondary research include:

- segmentations and percentage shares
- data for market value
- key industry trends of the top players of the market
- qualitative insights into various aspects of the market, key trends, and emerging areas of innovation
- quantitative data for mathematical and statistical calculations

Key Market Players and Competition Synopsis

The companies profiled in the liquid cooling market for stationary battery energy storage system (BESS) have been selected based on input gathered from primary experts and analyzing company coverage, product portfolio, and market penetration.

Some of the prominent names in the liquid cooling market for stationary battery energy storage system (BESS) are:

- EVE Energy Co., Ltd.
- ShenZhen CEGN Co., Ltd.
- SUNGROW
- Vericom Global Solutions
- Symtech Solar Group
- Shanghai Sermatec Energy Technology Co., Ltd.
- Narada
- Hithium Energy Storage Technology Co., Ltd

+44 20 8123 2220
info@marketpublishers.com

Chengdu Tecloman Energy Storage Technology Co., Ltd.

ZTT New Energy

Beijing HyperStrong Technology Co., LTD.

Contemporary Amperex Technology Co.

Fluence

Trinasolar

Xi'An JD Energy Co., Ltd.

Companies not part of the pool have been well represented across different sections of the report (wherever applicable).

+44 20 8123 2220
info@marketpublishers.com

Contents

+44 20 8123 2220
info@marketpublishers.com

2 APPLICATION

+44 20 8123 2220
info@marketpublishers.com

3 PRODUCTS

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

List Of Figures

LIST OF FIGURES

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

List Of Tables

LIST OF TABLES

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

+44 20 8123 2220
info@marketpublishers.com

I would like to order

Product name: Liquid Cooling Market for Stationary Battery Energy Storage System (BESS) - A Global and Regional Analysis: Focus on Application, Product, and Country Level Analysis - Analysis and Forecast, 2024-2033

Product link: https://marketpublishers.com/r/LF13370587AEEN.html

Price: US$ 5,500.00 (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 https://marketpublishers.com/r/LF13370587AEEN.html