

Long Duration Energy Storage Market by Technology (Mechanical Storage, Thermal Storage, Electrochemical Storage), Duration (8 to 24, >24 to 36, >36), Capacity (Upto 50 MW, 50-100 MW, More Than 100 MW), Application, End User, Region - Global Forecast to 2030

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# **Abstracts**

The long duration energy storage market is forecasted to reach USD 8.61 Billion by 2030 from an estimated USD 3.64 billion in 2024, at a CAGR of 15.4% during the forecast period. With an increasingly aggressive push toward renewable energy sources worldwide solar and wind to other kinds-long-duration energy storage has become necessary to overcome some of the challenges of intermittency. It bridges that gap between when energy is produced and demanded by the grid, ensuring a stable grid and improving reliability in clean energy sources. Investments from governments and utilities into renewable projects create demand in energy storage systems for the storage of power for a duration. In contrast, older power grids increase electrical demands and contribute to the decentralized integration of renewable sources into distribution. LDES finds versatile storage solutions for solving the swing swings in the direction of modernizing pre-existing infrastructure and upgrading existing distribution infrastructures. Grid modernization catapults further LDES adoption by a developed economy through quite much efficiency, better resilience, and smooth penetration of renewable sources.

"50-100 MW segment, by capacity is expected to grow at the highest CAGR during the forecast period."

As large-scale renewable energy projects, such as solar and wind farms, grow, a strong



energy storage system becomes necessary to stabilize the otherwise intermittent power generation. The 50-100 MW capacity range is ideal for such projects as it makes it seamless to integrate renewable energy by storing excess energy when generation is high and then releasing it during times of high demand. Power grids are also exposed to the volatility of renewable resources and the growing demand for electricity. Therefore, storage systems with capacities of 50-100 MW play a crucial role in the stabilization of the grid, reducing congestion, maintaining the stability of frequency and voltage, and thus guaranteeing reliable operation of the grid. As such, this capacity range is key in guaranteeing the reliable operation of the grid while supporting global modernization of grids in developed and developing energy systems.

"Grid management segment is expected to emerge as the fastest segment by application."

The increasing penetration of intermittent renewable sources such as wind and solar presents challenges to grid stability. LDES systems balance supply and demand by storing excess energy during periods of high generation and releasing it when generation is low. This would make it easier to add more renewables to the system and maintain a stable, reliable power supply while supporting further decarbonization. This output can further destabilize grid frequency and voltage when fluctuations occur. LDES technologies maintain stability by offering extended-duration energy discharge. In doing so, utilities respond to the load changes and imbalances that will ensure the power delivered is reliable and efficiently executed in a renewable-rich system.

"Europe to grow at the highest CAGR in the long duration energy storage market."

Europe is expanding renewable energy capacity, especially in solar and wind, fast to reach decarbonization targets. The LDES technologies play an important role in overcoming the intermittency of renewables by providing excess power at high generation and discharging when the renewables output is low to enhance the stability of the grid while supporting the uptake of clean energy. These are the ambitious energy transition targets set by the European Union, including the European Green Deal, which fuels the demand for sustainable storage solutions. The LDES systems have already proven to provide flexibility for grids, stabilize renewable energy sources, and support efforts towards decarbonization, and the whole of Europe keeps marching towards its climate goals.

In-depth interviews have been conducted with various key industry participants, subjectmatter experts, C-level executives of key market players, and industry consultants,



among other experts, to obtain and verify critical qualitative and quantitative information, as well as to assess future market prospects. The distribution of primary interviews is as follows:

By Company Type: Tier 1- 65%, Tier 2- 24%, and Tier 3- 11%

By Designation: C-Level- 30%, Managers- 25%, and Others- 45%

By Region: North Americas- 30%, Europe- 20%, Asia Pacific- 25%, and the Middle East & Africa- 15% and South America- 10%

Note: Others include product engineers, product specialists, and engineering leads.

Note: The tiers of the companies are defined based on their total revenues as of 2023. Tier 1: > USD 1 billion, Tier 2: From USD 500 million to USD 1 billion, and Tier 3: Sumitomo Electric Industries, Ltd. (Japan), ESS Tech, Inc. (US), Energy Vault, Inc. (US), Eos Energy Enterprises (US), Invinity Energy Systems (England), MAN Energy Solutions (Germany), Highview Power (UK), Primus Power (US), CMBlu Energy AG (Germany), and Malta Inc. (US) are some of the key players in the long duration energy storage market. The study includes an in-depth competitive analysis of these key players in the long duration energy storage market, with their company profiles, recent developments, and key market strategies.

#### Research Coverage:

The report defines, describes, and forecasts the long duration energy storage market by technology (Mechanical Storage, Thermal Storage, Electrochemical Storage, and Chemical Storage), by duration (8 to 24, >24 to 36, and >36) by Application (Grid Management, Power Backup, Renewable Energy Integration and Off grid and Microgrid Systems), by capacity (Upto 50 MW, 50-100 and more than 100 MW) End User (Utilities, Industrial, Residential & Commercial, and Transportation & Mobilitysss) and by region (North America, Europe, Asia Pacific, Middle East & Africa, and South America). The scope of the report covers detailed information regarding the major factors, such as drivers, restraints, challenges, and opportunities, influencing the growth of the long duration energy storage market. A detailed analysis of the key industry players has been done to provide insights into their business overview, solutions, and services; key strategies; Contracts, partnerships, agreements. new product & service launches, mergers and acquisitions, and recent developments associated with the long duration energy storage market. Competitive analysis of upcoming startups in the long duration



energy storage market ecosystem is covered in this report.

Key Benefits of Buying the Report

Analysis of key drivers (Growing renewable Energy Integration, Pressing need to enhance grid reliability and resilience to mitigate power outage risks), restraints (High installation costs of DERMS, Limited adoption of DERMS due to uncertainties and varying regulations across different jurisdictions), opportunities (Limited adoption of DERMS due to uncertainties and varying regulations across different jurisdictions, Expansion of electric vehicle infrastructure) and challenges (Interoperability issues among different energy systems and technologies, Cybersecurity risks associated with DERMS) influences the growth of the long duration energy storage market.

Product Development/ Innovation: The battery chemistries, such as flow batteries, and solid-state batteries, further improve storage efficiency and extend length. Advances in the mechanical storage of CAES, pumped hydro, and more storages which facilitate dischargeability for several days also continue with their development. Old power grids are now also getting upgraded into LDES systems, particularly for ensuring balancing renewable energy integration and peak loads, and the security of supply during an outage situation. In addition, with growing potential for developing green hydrogen as an energy storage medium over long periods, it offers flexibility along with the de-carbonisation benefit.

Market Development: in March 2023, Sumitomo Electric Industries, Ltd. (Japan) developed sEMSA the next-generation energy management solution for grid storage batteries. Charging and discharging plans for a cloud-based server are optimized and profit maximized through applications, including supply-demand balancing and participation in the power trading market. On site, the sEMSA terminal controls the battery operations, maintaining power grid stability and the capability of Virtual Power Plant functionalities for renewable energy integration. Compatible with many battery systems, sEMSA improves grid stability and opens up new sources of revenue for operators that drive efficient energy management solutions.

Market Diversification: In May 2024, ESS Tech, Inc. (US) and Burbank Water and Power (US) commemorate the energizing of BWP's first LDES system in the United States - a 75 kW/500 kWh ESS Energy Warehouse iron flow battery



installed at Burbank Water and Power's EcoCampus, interfaced with a 265 kW solar array that will generate enough power to fuel 300 homes-an exemplification of iron flow technology supporting a decarbonized grid. This project supports California's 2045 zero-emission electricity goal and demonstrates the importance of LDES for integrating renewable energy.

Competitive Assessment: In-depth assessment of market shares, growth strategies, and service offerings of leading players like The Sumitomo Electric Industries, Ltd. (Japan), ESS Tech, Inc. (US), Energy Vault, Inc. (US), Eos Energy Enterprises (US), Invinity Energy Systems (England), MAN Energy Solutions (Germany), Highview Power (UK), Primus Power (US), CMBlu Energy AG (Germany), and Malta Inc. (US) among others in the long duration energy storage market.





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