INDUSTRY OVERVIEW

The information and statistical data contained in this section and other sections of this document are excerpted from the Frost & Sullivan report commissioned by us, as well as various official government publications and other publicly available sources. We have engaged Frost & Sullivan to prepare an independent industry report for the [REDACTED], the Frost & Sullivan Report. We believe that these materials are derived from appropriate sources and have exercised reasonable care in compiling and reproducing them. We have no reason to believe that these materials are false or misleading, or that any facts have been omitted that would render them false or misleading. The information provided by official government sources has not been independently verified by us, the sole sponsor, the [REDACTED], the [REDACTED], and the [REDACTED], or by any of their respective directors or advisors, or by any other persons or parties involved in the [REDACTED], and no representation is made as to its accuracy.

SOURCE OF INFORMATION

We commissioned Frost & Sullivan to conduct market research on global energy storage system (ESS), and distributed ESS industries and prepare the Frost & Sullivan Report. Frost & Sullivan is an independent global consulting firm founded in 1961 in New York that offers industry research and market strategies. We have contracted to pay RMB500,000 to Frost & Sullivan for compiling the Frost & Sullivan Report. In preparing the Frost & Sullivan Report, Frost & Sullivan conducted detailed primary research which involved discussing the status of the industry with certain leading industry participants and conducting interviews with relevant parties. Frost & Sullivan also conducted secondary research which involved reviewing company reports, independent research reports and data based on its own research database. Frost & Sullivan obtained the figures for the estimated total market size from historical data analysis plotted against macroeconomic data as well as considered the above-mentioned industry key drivers. Its market engineering forecasting methodology integrates several forecasting techniques with the market engineering measurement-based system and relies on the expertise of the analyst team in integrating the critical market elements investigated during the research phase of the project. These elements primarily include expert-opinion forecasting methodology, integration of market drivers and restraints, integration with the market challenges, integration of the market engineering measurement trends and integration of econometric variables.

OVERVIEW OF GLOBAL ESS INDUSTRY

Introduction to Energy Storage

Energy storage is a core component of modern power systems, enabling the capture of surplus energy and its release during peak demand. This enhances energy utilization efficiency and supports stable grid operation. Technologies include electrochemical, physical, thermal, and mechanical solutions. Among these, electrochemical energy storage currently dominates the market, and lithium-ion battery energy storage lead due to their high energy density and long cycle life, representing over 95% of electrochemical energy storage market. The global share of renewable energy is rising rapidly, with the global cumulative installed capacity of solar PV and wind power increasing from 238.3 GW in 2010 to 3,926.5 GW in 2025 and is projected to reach 9,431.2 GW by 2030, representing a CAGR of 19.2% from 2025 onwards. The penetration of solar PV power and wind power in terms of cumulative installed capacity of global power mix has increased from 4.4% in 2010 to 33.4% in 2025, and is expected to increase substantially to 54.3% by 2030. However, the intermittent and volatile nature of renewable energy generation increasingly constrains grid stability and renewable energy consumption as penetration levels continue to rise.

Energy storage addresses the challenge of energy consumption by enabling time-shifting of electricity and regulating power flows. It enables peak shaving, valley filling, and grid cost reduction while providing ancillary services such as frequency regulation and backup, thereby improving renewable energy utilization and ensuring reliable grid operation. With ongoing electricity market

reforms and improved peak-valley pricing mechanisms, energy storage can generate revenue through spot trading, capacity markets, and ancillary services. Consequently, the energy storage business model is becoming increasingly mature and economically viable.

Definition and Classification of ESS

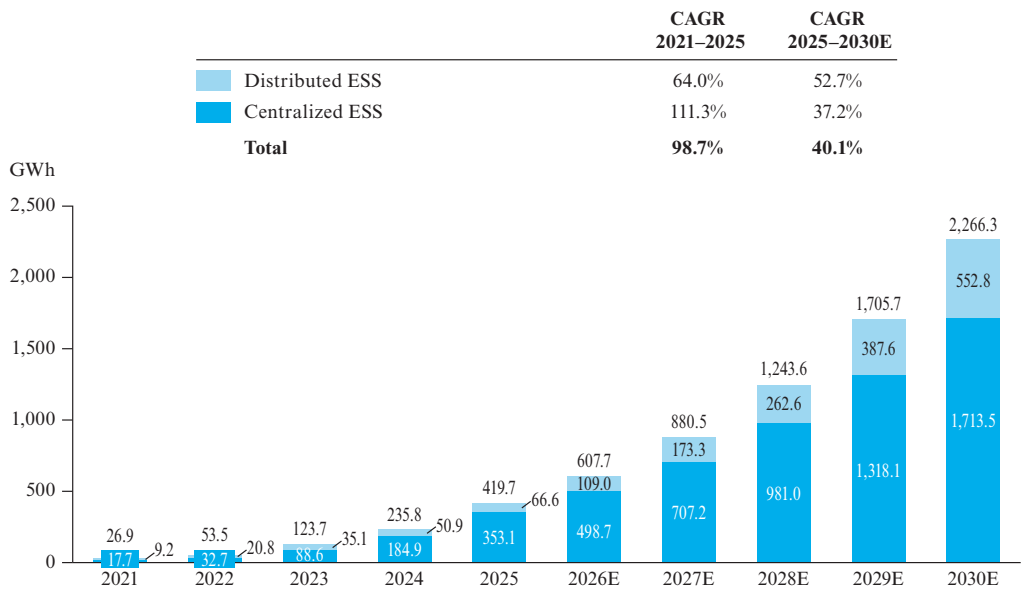
ESS is an integrated system that stores and releases electricity using electrochemical batteries, with key components including energy storage battery modules, power conversion systems (PCS), energy management systems (EMS), and power battery management systems (BMS). ESS enables controllable charging and discharging, bidirectional regulation, and rapid response, supporting coordinated operation of power generation, grids, and loads. By decoupling energy generation from consumption, ESS improves energy efficiency and facilitates the integration and utilization of renewable energy.

Lithium-ion battery ESS, the dominant technology, is widely applied across utility-scale, commercial, industrial, and residential energy storage. ESS can be further divided into centralized and distributed ESS: centralized ESS provide system-level support on the grid or generation side offering large-scale balancing and stability support, while distributed ESS are deployed near end-users for local consumption, flexible dispatch, and cost optimization. With market-oriented electricity pricing mechanisms and demand-side response programs, ESS business models continue to mature, enhancing energy system flexibility, economic efficiency, and renewable energy consumption.

Market Size of Global ESS Industry

Global ESS shipment volume has grown rapidly in recent years, driven by the expansion of renewable energy and increasing demand for energy management. Centralized ESS dominates the market, while distributed ESS is gaining traction in industrial, commercial and residential sectors. The global ESS shipment volume is expected to continue rising steadily through 2030, supported by deeper renewable energy penetration and improved electricity market mechanisms.

Global Shipment Volume of ESS by Application, 2021–2030E



Source: *IEA (International Energy Agency), CNESA (China National Energy Storage Alliance), Frost & Sullivan*

Note: This section only calculates data related to lithium-ion battery ESS, which accounts for over 95% of the overall ESS market. Lithium-ion battery ESS leads the industry due to its cost-effectiveness, high energy density, and versatility. Its economies of scale make it a mature, efficient, and rapid-response solution suitable for a wide range of applications.

INDUSTRY OVERVIEW

OVERVIEW OF GLOBAL DISTRIBUTED ESS INDUSTRY

Introduction to Distributed ESS

Distributed ESS are modular, decentralized systems deployed on the user side or at the end of the distribution network, operating close to load centers. Their primary objective is to optimize local energy consumption through intelligent coordination of power loads, generation, and storage. Compared with centralized ESS, distributed ESS emphasizes multi-point access, user-side revenue optimization, and refined operation and maintenance, enhancing energy reliability, reducing terminal energy costs, and strengthening distribution system resilience. Distributed ESS can be further categorized by application into:

1) **Residential ESS:** Designed for households with capacities typically between 5–20 kWh per unit. Residential ESS increases self-consumption, reduces electricity costs, and provides backup power during outages. With the development of peak-valley electricity pricing, residential ESS can perform price arbitrage, charging during off-peak periods and discharging during peak periods, thereby improving household energy cost efficiency and investment returns.

2) **Commercial &Industrial (C&I) ESS:** Deployed in industrial parks, commercial complexes, and data centers primarily. C&I ESS primarily exceeds 20 kWh per unit, addressing high power consumption needs. Its core value lies in peak shaving, valley filling, and demand-side management, reducing capacity-based charges and overall electricity costs while ensuring stable operation of critical equipment. As power markets mature, C&I ESS can also participate in ancillary services such as frequency regulation and demand response, creating additional revenue streams.

Value Chain Analysis of Distributed ESS Industry

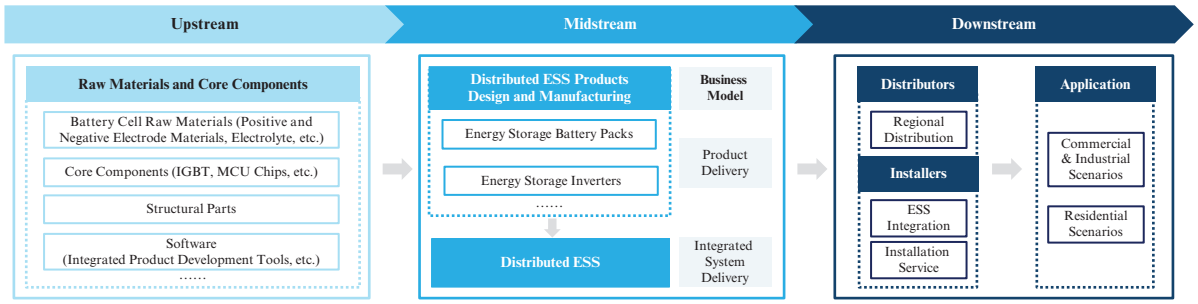
The upstream of the distributed ESS industry consists of suppliers of battery cell materials, core components, structural parts, and related software. The midstream focuses on product design, manufacturing, and system integration, with core products including but not limited to battery packs and energy storage inverters. Midstream providers deliver customized distributed ESS solutions and leverage intelligent O&M platforms to enhance system reliability, efficiency, and long-term performance. The downstream consists of residential and C&I ESS customers. In overseas markets, midstream distributed ESS providers usually collaborate with local distributors and installers to expand market coverage and meet regulatory requirements. Business models are mainly:

Product Distribution and Local Integration: Midstream providers supply core components, while local distributors and qualified installers configure and integrate systems for flexible, customized solutions.

Integrated System Delivery: Midstream providers deliver complete ESS products and solutions, with distributors and installers handling sales and project execution, suitable for high-demand scenarios requiring compatibility, security, and overall performance.

As a leading ESS provider, the Company emphasizes digitalization, platformization, and systematization as core competitiveness. Using an integrated product development ("**IPD**") system and intelligent O&M cloud platform, the Company achieves full-process digital management — from product design and manufacturing to system integration, channel empowerment, and lifecycle optimization — enhancing delivery efficiency, operational reliability, and long-term value.

Value Chain of the Distributed ESS Industry

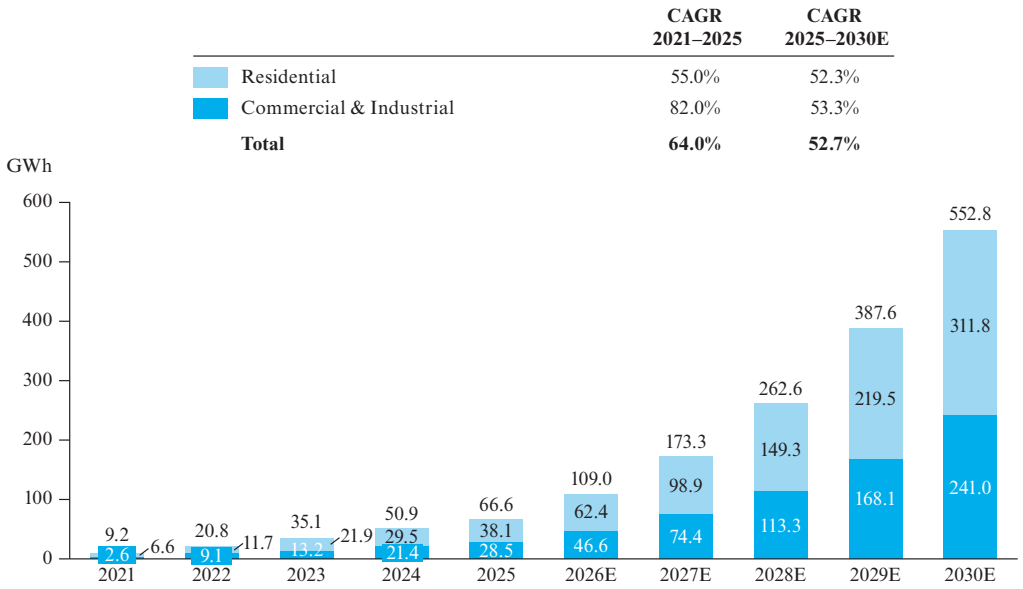


Source: IEA, CNESA, Frost & Sullivan

Market Size of Global Distributed ESS Industry

With the increase in the penetration rate of renewable energy, the intensification of electricity price volatility, and the growing demand for grid flexibility, the demand for distributed energy storage continues to rise. From 2021 to 2025, with ongoing electricity market reforms and the increasing demand for energy independence among residents, the growth of residential ESS has been significant. Meanwhile, policy support and rising electricity costs have enhanced the economic viability of energy storage in distributed solar PV applications. Looking ahead, the widening peak-to-valley electricity price gap, the continuous growth in installed PV capacity, and the decline in system costs will further drive the development of the residential ESS market. C&I ESS are also experiencing rapid growth, primarily driven by the declining costs of energy storage and the widening peak-to-valley electricity price gap. In addition, the increasing demand for highly reliable power supply from high-computing power infrastructure such as AIDC has provided a new driving force for C&I energy storage applications. It is expected that by 2030, as these demands intensify, the global distributed ESS market will continue to expand with a significant increase in shipment volumes.

Global Shipment Volume of Distributed ESS by Application, 2021–2030E



Source: IEA, CNESA, Frost & Sullivan

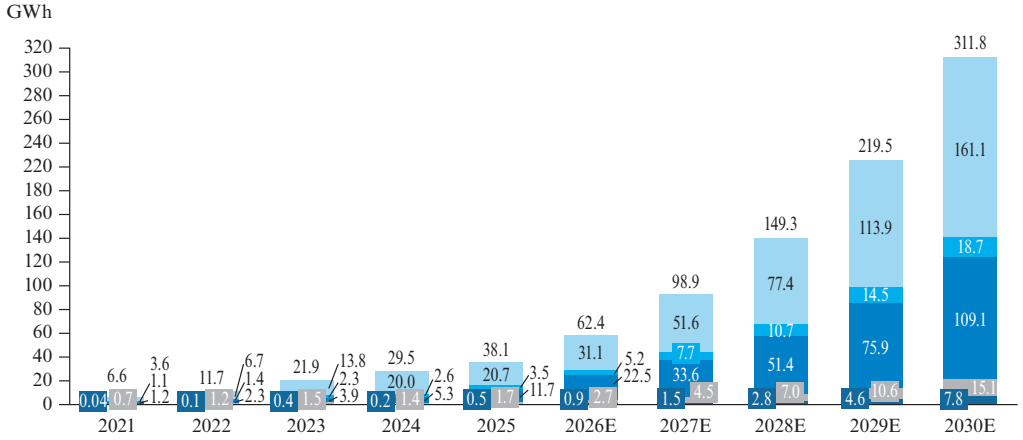
INDUSTRY OVERVIEW

Market Size of Global Residential ESS Industry

The global residential ESS market is experiencing rapid growth, driven by high electricity prices, widening peak-valley price gaps, and increasing renewable energy penetration. In Europe and the Americas, particularly in regions with high electricity costs, residential ESS demand continues to expand. Time-of-use electricity pricing and virtual power plant models enable consumers to reduce costs through peak-valley arbitrage and participate in demand response programs for additional revenue. By 2025, Europe and the Americas accounted for over 63% of global total residential ESS shipments. In emerging markets, demand is concentrated in areas with less stable grids, where households seek reliable power and emergency backup solutions.

Global Shipment Volume of Residential ESS by Major Regions, 2021–2030E

	CAGR 2021–2025	CAGR 2025–2030E
Europe	54.8%	50.7%
the Americas	32.5%	40.1%
Asia Pacific	78.1%	56.2%
Africa	27.5%	54.3%
ROW	82.9%	76.8%
Total	**55.0%**	**52.3%**



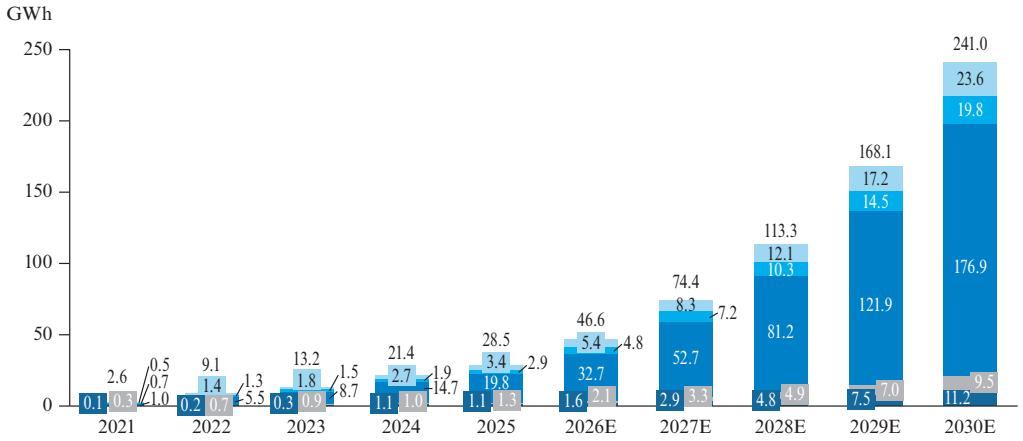
Sources: IEA, CNESA, SolarPower Europe, Frost & Sullivan

Market Size of Global C&I ESS Industry

The rapid growth of generative AI and large models has driven global data center expansion, with capital expenditures expected to reach USD3 trillion by 2030. High-power, concentrated electricity demand has increased the need for reliable, high-density power solutions, boosting demand for C&I ESS. The rise of new energy vehicles and large-scale commercial and industrial electricity demand has further expanded ESS applications for peak load management and energy optimization.

Global Shipment Volume of C&I ESS by Major Regions, 2021–2030E

	CAGR 2021–2025	CAGR 2025–2030E
Europe	65.9%	47.2%
Americas	42.9%	47.3%
Asia Pacific	109.2%	55.0%
Africa	40.7%	48.9%
ROW	83.2%	58.2%
Total	**82.0%**	**53.3%**



Sources: IEA, CNESA, SolarPower Europe, Frost & Sullivan

Market Drivers Analysis of Global ESS and Distributed ESS Industries

- **Energy Transition and Power Reliability Needs Drive Energy Storage Growth:** Against the backdrop of global decarbonization and energy transition, the rapid expansion of renewable energy installations, including wind and solar PV power, continues to increase demand for flexible grid resources. At the same time, aging grid infrastructure and insufficient investment in certain regions have constrained transmission capacity and grid flexibility, limiting the ability to accommodate growing electricity demand and higher renewable penetration. In this context, ESSs have become critical infrastructure for modern power systems due to their fast response, bidirectional regulation and energy shifting capabilities. Energy storage enhances grid stability and power reliability through peak shaving, frequency regulation and backup capacity services, while also improving renewable energy integration by mitigating intermittency and increasing grid flexibility. In weak-grid and remote areas, energy storage further strengthens local power resilience and emergency supply capabilities, driving sustained growth in global energy storage demand.

- **AI and Electric Vehicle Growth Drive Rising Energy Demand:** Rapid growth in AI computing and accelerating electric vehicle adoption are driving global electricity demand. Increasing demand for large-model training, cloud computing and high-performance computing has significantly raised power density requirements for AIDC, placing greater pressure on grid stability and flexibility. At the same time, the expansion of electric vehicles and fast-charging networks continues to increase charging-related power loads. As a result, distributed ESS is being deployed more broadly to support grid stability, power resilience and renewable energy integration through coordinated "generation-grid-load-storage" management.

- **Ongoing Demand for Lower Energy Costs and Higher Safety:** Growing global demand for low-cost and highly reliable clean energy continues to drive the evolution of the ESS industry toward higher energy density, improved safety and lower costs. Technological advancements, including large-capacity battery cells and next-generation power

electronics such as gallium nitride (GaN) devices, are improving system efficiency, integration and safety performance. Meanwhile, expanding industry scale, automated production and manufacturing optimization continue to reduce system costs. Driven by both technological progress and economies of scale, the ESS industry continues to advance toward higher performance, lower cost and enhanced safety.

- **Supportive Government Policies:** As global carbon neutrality targets advance, major economies including the U.S., the EU, and China are implementing policies to promote the deployment of renewable energy and energy storage. In the U.S., 13 states have established energy storage procurement mandates, deployment targets, and related incentive mechanisms, defining state-level deployment plans and the role of regulated utilities. Continued supportive policies, regulations, and fiscal incentives are expected to underpin orderly, large-scale growth of the energy storage industry worldwide.

Policies and Regulations for the ESS and Distributed ESS Industries in Major Economies

Country/Region	Policy & Regulation	Year	Key Contents
European Union	Renewable Energy Directive III	2023	• Distributed ESSs have the potential to provide flexibility and balancing services to the grid through aggregation. Regulatory frameworks should remove barriers to fully unlock their role in supporting renewable energy penetration and power system decarbonization.
United Kingdom	Warm Homes Plan	2026	• A subsidy programme with a total allocation of GBP 15 billion aimed at helping millions of households install rooftop solar PV systems, energy storage systems, heat pumps, and insulation facilities by 2030.
Australia	Cheaper Home Batteries Program	2025	• The Programme provides subsidies for residential ESS through the Small-scale Technology Certificates (STC) mechanism. Applications are processed by installers on behalf of users. The programme aims to support 2 million households in deploying ESS with a total capacity of 40GWh by 2030.
Netherlands	Wetsvoorstel beëindiging salderingsregeling per 2027	2024	• Beginning in 2027, the residential solar net metering scheme will be phased out and replaced with a feed-in compensation mechanism. Under dynamic and time-of-use electricity pricing, stronger incentives for self-consumption are expected to further drive demand for residential and C&I ESS.
Abu Dhabi	Solar PV and Battery Energy Storage Self-Consumption Policy	2026	• The Policy allows residents and enterprises to install distributed solar PV systems combined with ESS for self-consumption, promoting the adoption of distributed solar and ESS in residential and C&I applications.
South Africa	South African Renewable Energy Master Plan	2025	• The Plan proposes recognizing ESS as an independent asset class, improving time-of-use pricing mechanisms and electricity trading frameworks, and advancing programs to deploy solar PV and ESS across suitable public buildings.
China	Notice on Deepening Market-oriented Reform of New Energy Feed-in Tariffs and Promoting High-quality Development of New Energy (《關於深化新能源上網電價市場化改革，促進新能源高質量發展的通知》)	2025	• The Notice promotes further participation of renewable energy in market trading, optimises feed-in tariff formation mechanisms, reduces peak-period electricity procurement costs, enhances resilience to electricity price fluctuations, improves project profitability, and supports continued installed capacity growth.
China	Guiding Opinions on the High-quality Development of Distribution Networks under the New Situation (《關於新形勢下配電網高質量發展的指導意見》)	2024	• The Guide encourages distributed energy resources to reasonably deploy or share new ESS, strengthening the coordinated development of "generation-grid-load-storage" from the grid policy perspective.

- **Geopolitical Changes and Accelerating China's Renewable Energy Industry Globalized Expansion:** Against the backdrop of global energy security concerns, supply chain restructuring and accelerating energy transition, global demand for energy storage continues to grow. China has established a comprehensive ESS value chain covering battery materials, cell manufacturing, PCS, BMS and system integration, with strong advantages in technology, manufacturing, engineering expertise and China's talent resources. Supported by large-scale manufacturing and a mature supply chain, Chinese ESS companies continue to lead in cost efficiency, delivery capability and product performance, driving the industry toward higher safety, greater energy density and lower costs. Meanwhile, rapid growth in China's renewable energy and storage markets has enabled companies to accumulate extensive project experience and operational capabilities, further supporting their global expansion and competitiveness.

Development Trends Analysis of Global ESS and Distributed ESS Industries

- **Diversification of ESS Applications:** As renewable energy deployment and power system demand continue to grow, the applications of ESS are expanding across multiple scenarios. In the residential sector, balcony and home energy storage systems are increasingly adopted to improve self-consumption and electricity cost efficiency. In the C&I sector, ESS is widely used for peak shaving, demand management and backup power, with improving economic returns. Meanwhile, the growth of fast EV charging and AIDC

is driving demand for integrated storage-charging solutions and backup energy storage systems. Standardized containerized storage systems are also seeing broader adoption in grid-scale and overseas projects due to their deployment flexibility and scalability.

- **AI-Driven Intelligent Energy Management:** Driven by the integration of AI and intelligent energy management systems, distributed ESS is evolving from passive devices into intelligent energy units with predictive and adaptive capabilities. AI algorithms enable multidimensional forecasting of load fluctuations, power generation and electricity prices, optimizing charging, discharging and energy management strategies to improve efficiency and reduce operating costs. Combined with digital twin technology and big data analytics, AI supports real-time simulation, risk identification and performance optimization. Through cloud platforms, edge AI and remote OTA upgrades, ESS can achieve real-time monitoring, health prediction and continuous optimization, enabling increasingly intelligent and autonomous energy management.

- **Technology-Driven Efficiency Improvements and Scale-Driven Cost Reduction:** The future development of distributed ESS is expected to follow a dual-track trend of technology-driven efficiency improvement and scale-driven cost reduction. On the technology side, continuous advancements in AI algorithms, digital twins and advanced control strategies are enhancing energy dispatch efficiency and response speed, improving system utilization, optimizing operating economics and reducing lifecycle losses, thereby delivering greater value from the same resource input. On the industry side, expanding deployment scale and a maturing value chain are driving higher standardization and modularization of ESS, enabling economies of scale to gradually reduce unit construction and operating costs. Supported by coordinated industry and capital development, accelerating commercialization is further reinforcing the cycle of technological iteration and cost optimization, pushing distributed ESS toward higher cost-effectiveness and broader adoption.

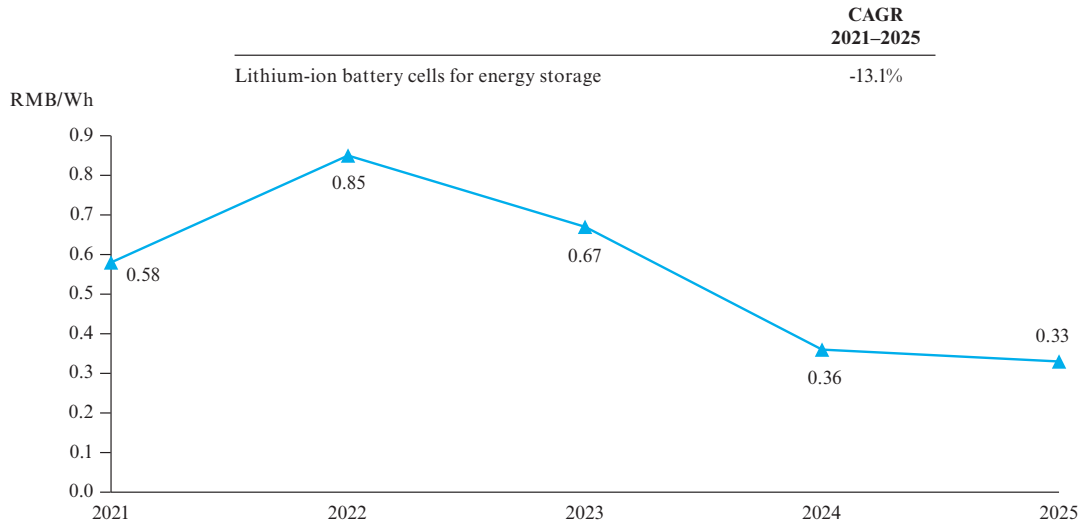
- **Quality and Safety Performance Enhancement:** In the development of distributed ESS, quality and safety performance have become core competitive factors. With the application of AI-based monitoring, predictive maintenance and intelligent diagnostics, system capabilities in detecting thermal runaway, capacity degradation and abnormal operating conditions continue to improve, enabling a shift from reactive response to proactive risk prevention. Although the shipment volume of lithium-ion battery ESS is growing rapidly, certain safety risks remain. Going forward, increasingly stringent global safety standards are expected to accelerate industry standardization and normalization, improving overall reliability, performance and lifespan, while also driving greater industry consolidation and an optimized competitive landscape. Supported by both technological advancement and regulatory alignment, distributed ESSs are expected to evolve toward full lifecycle safety management and higher-quality sustainable development.

- **Global Expansion of Chinese Energy Storage Companies:** Chinese companies continue to lead the global distributed ESS market, particularly in the residential segment, supported by strong manufacturing capabilities and cost advantages that enabled rapid overseas expansion through large-scale exports. The industry is now shifting from product export to localized operations, with closer collaboration with overseas distributors and installers to improve delivery efficiency, service responsiveness and brand trust. At the same time, Chinese companies are expanding into higher-value C&I ESS markets, which require stronger system integration, project management and O&M capabilities. This transition is driving their evolution from equipment suppliers to integrated energy solution providers, while further advancing the globalization of the industry chain and supply chain.

Raw Material Analysis of Global ESS Industry

Lithium-ion battery cell prices represent a major cost component of ESS. Between 2021 and 2022, rapid growth in demand for new energy vehicles and ESS outpaced lithium supply, pushing battery cell prices from approximately RMB0.58/Wh to approximately RMB0.85/Wh. Since 2023, increased upstream production and eased supply constraints have driven prices down to approximately RMB0.33/Wh by 2025. In 2026, driven by increasing global installation demand and temporary supply-demand imbalances in raw materials, lithium-ion battery cell prices are expected to gradually stabilize and experience a modest rebound. Looking ahead, technological advances, economies of scale, and efficient supply chains are expected to keep prices trending downward, stabilizing around RMB0.30–0.40/Wh through 2030.

Average Price of Energy Storage Lithium-ion Battery Cells in China, 2021 to 2025



Sources: Infolink, SolarPower Europe, GGII, Frost & Sullivan

Competitive Landscape Analysis of Global Distributed ESS Industry

In 2025, global shipment volume of residential ESS reached 38.1GWh. The shipment volume of the world's top 5 residential ESS providers was 16.9 GWh, with a combined market share of approximately 44.3%, representing a relatively concentrated market share. Among them, the Company's shipment volume of residential ESS in 2025 reached approximately 2.5 GWh, with a market share of 6.5%, ranking fifth globally and fourth among China-based enterprises. The Company also recorded the highest shipment volume growth rate from 2024 to 2025 among the global top 5 providers.

Top 5 Global Residential ESS Providers by Shipment Volume, 2025

Ranking	Company	Shipment Volume (GWh)	Market Share (%)	2024–2025 Shipment Volume Growth Rate (%)
1	Company A	4.0	10.5%	~185%
2	Company B	3.8	10.0%	~35%
3	Company C	3.6	9.4%	~20%
4	Company D	3.0	7.9%	~140%
5	**The Company**	**2.5**	**6.5%**	**~244%**
	Top 5	**16.9**	**44.3%**	

Sources: *Expert interviews, Annual reports of listed companies and public disclosures, Infolink, SolarPower Europe, GGII, Frost & Sullivan*

1. Company A was established in 2019 and is headquartered in China. It is primarily engaged in the research and development, production, and sale of PV inverters, energy storage inverters, and lithium battery products. Its products are widely applied in scenarios such as residential, C&I PV power generation, distributed energy storage, microgrids, and clean energy solutions.

2. Company B was established in 2003 and is headquartered in the United States. It is listed on the Nasdaq Stock Market and is primarily engaged in businesses such as new energy vehicles, ESS, and clean energy solutions. Its products are widely used in fields such as new energy vehicles, residential, C&I energy storage, power systems, and solar power generation.

3. Company C was established in 1987 and is headquartered in China. It is primarily engaged in businesses such as digital information and communications technology infrastructure, smart terminals, and digital energy. Its products are widely applied in fields including telecommunications operations, enterprise digital transformation, electric power and energy, data centers, and smart terminals.

4. Company D was established in 2000 and is headquartered in China. It is listed on the Shanghai Stock Exchange and is primarily engaged in the research and development, production, and sale of products such as photovoltaic inverters, ESS, and environmental appliances. Its products are widely applied in fields such as residential, C&I solar-storage systems, distributed energy, and intelligent power management.

Entry Barriers Analysis of Global Distributed ESS Industry

- **Technology-driven Product Definition Capability Barriers:** As application scenarios continue to expand, customer needs become increasingly segmented, and technical standards across countries grow more diverse, product definition capability has become an important barrier to entry in the distributed ESS industry. Industry participants are required not only to possess product development capabilities, but also to continuously identify user needs, application scenarios and technology trends, and effectively translate market demand into competitive products and system solutions through product definition and system architecture design. To achieve this, industry participants must continuously accumulate core technologies across key areas such as BMS, PCS, EMS, cloud platforms and system integration, while establishing systematic R&D capabilities covering market insight, product planning, product design, testing and validation, product iteration and lifecycle management. Such capabilities also require effective cross-functional collaboration among product, R&D, supply chain and commercial teams to continuously develop products that comply with varying regulatory requirements, technical standards and application needs across different markets. These capabilities typically require long-term R&D investment, continuous technology accumulation,

organizational capability building and extensive market experience, and are difficult to replicate within a short period of time, thereby constituting an important barrier to entry in the distributed ESS industry.

- **Manufacturing and Supply Chain Management Barriers:** Manufacturing and supply chain management capabilities constitute important barriers to entry in the distributed ESS industry. Distributed ESS serve a wide range of residential and C&I applications, involving diverse product models and configuration requirements across geographically dispersed markets, which place significant demands on flexible manufacturing, supply chain coordination and global delivery capabilities. At the same time, the supply stability and quality consistency of battery cells and key electronic components directly affect product safety, reliability and delivery performance. As a result, industry participants are required to establish mature supplier management systems, stable supply chain partnerships and global warehousing and logistics networks to support large-scale delivery. In addition, enterprises with scaled manufacturing capabilities can further enhance cost competitiveness and market responsiveness through improved capacity utilization and optimized procurement and production processes. As these capabilities require substantial long-term capital investment, supply chain resources, manufacturing system development and global operational experience, and involve significant complexity and coordination, they are difficult to establish in the short term and therefore constitute important barriers to entry in the distributed ESS industry.

- **Global Distribution Network and Localized Operational Capability Barriers:** Global distribution networks and localized operational capabilities constitute important barriers to entry in the distributed ESS industry. As global ESS markets continue to expand, significant differences exist across countries and regions in terms of energy policies, grid environments, electricity pricing mechanisms, regulatory standards and end-user requirements. Industry participants are therefore required to establish distribution networks covering major markets and possess localized product adaptation, technical support, after-sales service and compliance operation capabilities in order to continuously address local market needs. Meanwhile, the distributed ESS market is highly dependent on sales channels, and stable distributor relationships are typically built through long-term market investment, product validation and service support. Enterprises with global operational capabilities can improve delivery efficiency and customer responsiveness through overseas subsidiaries, localized service systems and warehousing networks, while continuously optimizing products and services based on market feedback, thereby creating a virtuous cycle among channel coverage, market insight and product-market fit. As global distribution networks and localized operating systems require sustained resource investment, channel relationship development and regional market experience, and exhibit strong network effects and path dependency, such capabilities are difficult to replicate within a short period of time and therefore constitute important barriers to entry in the distributed ESS industry.

- **Brand Trust and Long-term Service Capability Barriers:** Brand trust and long-term service capabilities constitute important barriers to entry in the distributed ESS industry. Unlike utility-scale ESS projects, which are primarily driven by professional investors and operators, distributed ESS systems are directly marketed to residential users, C&I customers, and distribution partners. In addition to product performance and pricing, customers place significant emphasis on system safety, operational reliability, service quality and responsiveness, as well as the long-term stability of the service providers. Given that distributed ESS typically have operating lifecycles exceeding ten years, industry participants are required to continuously invest in product quality management, technical support, after-sales services and lifecycle management systems. Through consistent product delivery, market validation and customer feedback, companies gradually accumulate brand reputation and customer trust. As these capabilities require

long-term product validation, sustained service investment and continuous brand building, and possess strong continuity and limited substitutability, they are difficult to replicate and therefore constitute important barriers to entry in the distributed ESS industry.