
INDUSTRY OVERVIEW

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SOURCE OF INFORMATION

We commissioned Frost & Sullivan to conduct market research on global energy storage system (ESS) solution, and global full-lifecycle solutions for energy storage assets 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 RMB750,000 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.

The Frost & Sullivan Report is compiled based on the following assumptions: (i) the social, economic and political environment of the world and Chinese mainland is likely to remain stable in the forecast period; and (ii) related industry key drivers are likely to drive the market in the forecast period.

OVERVIEW OF GLOBAL ESS SOLUTIONS INDUSTRY

Driven by rapid electrification and renewable energy integration, the global power sector is transitioning toward a decarbonized market. However, the inherent intermittency of renewable energy strains traditional grid stability and real-time load balancing. To address this, ESS solutions have emerged as critical flexible assets. By providing peak shaving, and ancillary services like frequency regulation, ESS ensures grid resilience and maximizes renewable utilization, creating a fully integrated generation-grid-load-storage ecosystem.

Leveraging capabilities such as energy time-shifting, rapid response, and flexible regulation, energy storage demonstrates its core value across all links of the power system. On the generation side, it smooths renewable energy output, reduces wind and solar curtailment, and provides ancillary services such as frequency regulation. On the grid side, it maintains frequency and voltage stability, enhancing system resilience and transmission & distribution efficiency. On the user side, it enables peak-valley arbitrage, reduces energy costs, and improves power supply reliability. Characterized by flexibility, intelligence, and multi-scenario synergy, energy storage establishes a core technical architecture that

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supports the transition of the energy structure and the stable operation of the power system. Specifically, ESSs act as the critical apparatus for the conversion and storage of electrical energy between different forms. It integrates key hardware and software modules, including energy storage battery cells, PCS, EMS, and BMS.

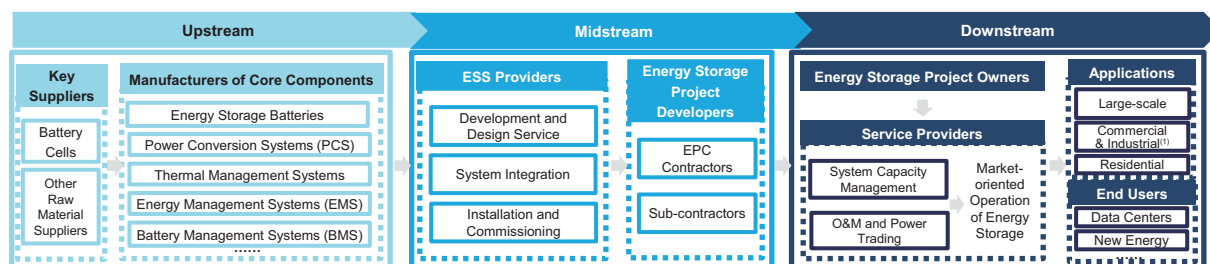
Value Chain Analysis of the ESS Solutions Industry

The upstream of the energy storage industry value chain primarily includes key suppliers and manufacturers of core components, which primarily include energy storage battery cells, PCS, and thermal management systems, and software suppliers of EMS and BMS. The midstream is dominated by energy storage project developers and ESS providers who are responsible for system design, integration, installation, and commissioning. The downstream sector mainly consists of service providers for the O&M of ESS across various application scenarios, undertaking duties related to system O&M and energy management.

As the scale of energy storage expands and application scenarios diversify, the industry is transitioning from competition based purely on technical products to competition centered on the full-lifecycle value of investable assets. This allows them to construct an integrated business model covering “investment & construction — management — operation — revenue,” thereby enhancing the long-term value and risk resilience of energy storage assets.

Our Company is a comprehensive ESS solution provider, and engages in the supply of core ESS components, the design, development, system integration and deployment for ESS product solutions, as well as O&M and power trading services across the value chain of the energy storage industry.

Value Chain Analysis of the Energy Storage Industry



Source: Frost & Sullivan

Note:

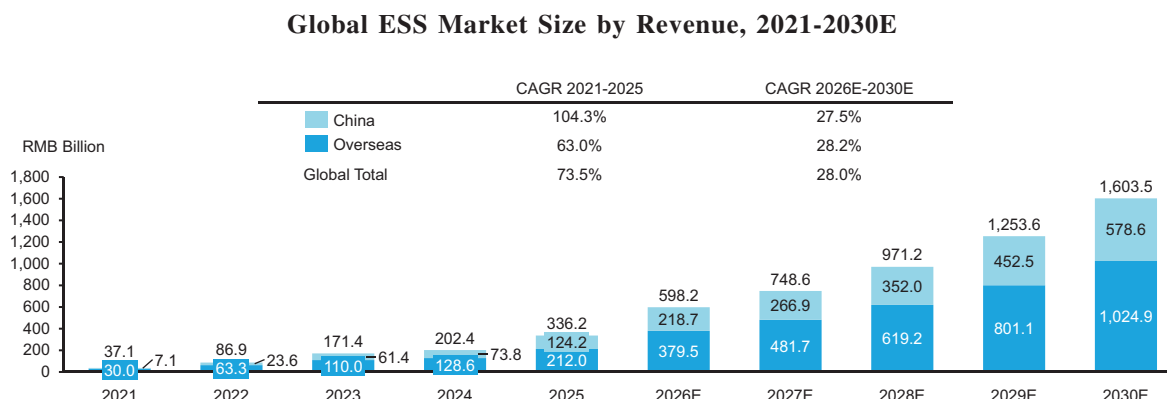
(1) The C&I and residential categories include off-grid side lithium-ion ESS.

Market Size Analysis of the Global ESS Solutions Industry

The global ESS market expanded from RMB37.1 billion in 2021 to RMB336.2 billion in 2025, representing a CAGR of 73.5%, and is expected to reach RMB1,603.5 billion by 2030, with a CAGR of approximately 28.0% from 2026 onwards, supported by continued policy incentives, declining system costs, and increasing deployment. In parallel, China has emerged as one of the fastest-growing ESS markets worldwide, underpinned by strong policy support, large-scale renewable energy installations, and accelerating commercialization of ESS solutions. China’s ESS market size by revenue surged from RMB7.1 billion in 2021 to RMB124.2 billion in 2025, corresponding to a CAGR of 104.3%, and is projected to further expand to RMB578.6 billion by 2030, with a CAGR of 27.5% from 2026 to 2030.

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The market size of global and China’s ESS markets is shown as below:



Sources: International Energy Agency “IEA”, China Energy Storage Alliance “CNESA”, Frost & Sullivan

Note: The above market size includes only the sales of ESS products and does not include O&M services or entrusted power trading services.

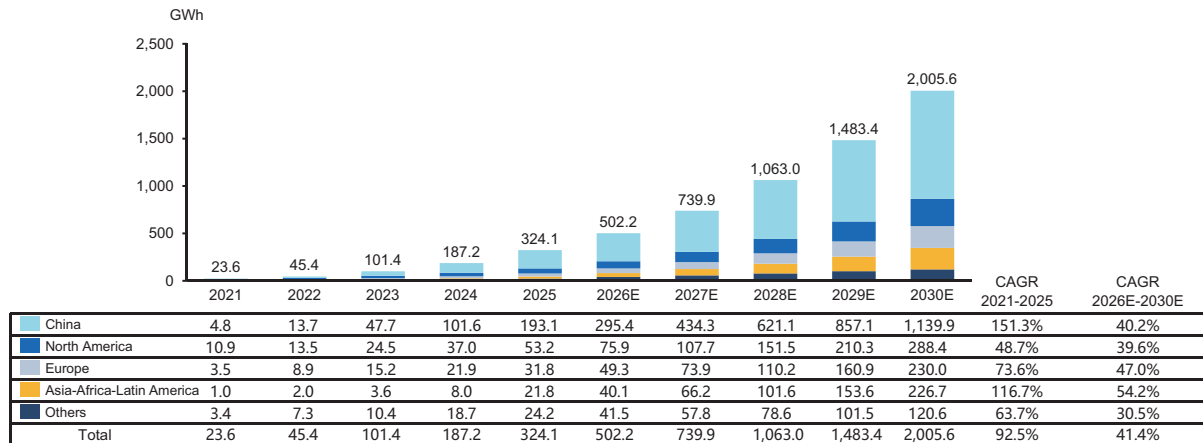
Global ESS newly installed capacity grew from 23.6 GWh in 2021 to 324.1 GWh in 2025, achieving a CAGR of 92.5%. With sustained policy support and rising market demand, global ESS newly installed capacity is projected to reach 2,005.6 GWh by 2030, with a CAGR of 41.4% from 2026 to 2030. China holds a pivotal position in the global market, with its lithium-ion ESS newly installed capacity expanding from 4.8 GWh in 2021 to 193.1 GWh in 2025, reflecting a CAGR of 151.3%. Looking ahead, continued policy refinement, technological innovation, and industrial breakthroughs are expected to drive China’s lithium-ion ESS newly installed capacity to 1,139.9 GWh by 2030, with a CAGR of 40.2% from 2026 to 2030.

Over the past five years, the European ESS market has been centered on residential side. However, large-scale ESS is poised to gradually supersede residential ESS as the core driver of future growth. The ESS newly installed capacity in Europe is projected to rise from 49.3 GWh in 2026 to 230.0 GWh by 2030, representing a CAGR of 47.0%. Driven by the surging energy consumption of AI data centers, the North American energy storage market is also experiencing a phase of rapid growth, characterized notably by the dominance of large-scale ESS. The ESS newly installed capacity in North America is expected to grow from 75.9 GWh in 2026 to 288.4 GWh by 2030, reflecting a CAGR of 39.6%. The region with the strongest growth potential in the ESS market is Asia-Africa-Latin America region. These areas commonly face challenges with underdeveloped grid infrastructure, prompting countries to actively promote renewable energy development and implement mandatory storage allocation policies to refine power market systems. The ESS newly installed capacity in Asia-Africa-Latin America region is expected to grow from 40.1 GWh in 2026 to 226.7 GWh by 2030, reflecting a CAGR of 54.2% from 2026 to 2030.

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The global ESS newly installed capacity by major countries and regions is shown as below:

Global ESS Newly Installed Capacity by Major Countries and Regions, 2021–2030E⁽¹⁾



Sources: IEA, CNESA, American Clean Power Association, European Association for Storage of Energy, Frost & Sullivan

Notes:

- (1) This section only calculates data related to lithium-ion ESS, which accounts for over 95% of the overall ESS solution market. Lithium-ion 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.
- (2) Asia excludes East Asia (consisting of China, Japan and South Korea) and the Middle East.

ESS can be segmented by application into large-scale ESS, C&I ESS, and residential ESS. Among these, large-scale ESS plays a critical role in enhancing grid flexibility and promoting renewable energy consumption, maintaining a dominant market position. The Group's large-scale ESS solutions refer to energy storage projects deployed in large-scale applications, primarily serving power generation and grid-side operations.

Comparison Analysis of ESS Applications

Feature	Large-scale ESS	Commercial and Industrial ESS	Residential ESS
Primary Goal	Grid stability & renewable integration	Cost management & power reliability	Self-consumption & emergency backup
Location	Integrated with power plants or substations	Factories, data centers, hospitals, malls	Individual homes and small apartments
Key Applications	<ul style="list-style-type: none"> Frequency & voltage regulation Spinning reserves Black start capabilities Renewable energy peak shaving 	<ul style="list-style-type: none"> Peak Shaving Load Shifting Backup for critical machinery 	<ul style="list-style-type: none"> Solar self-consumption optimization Backup for essential loads Off-grid living support

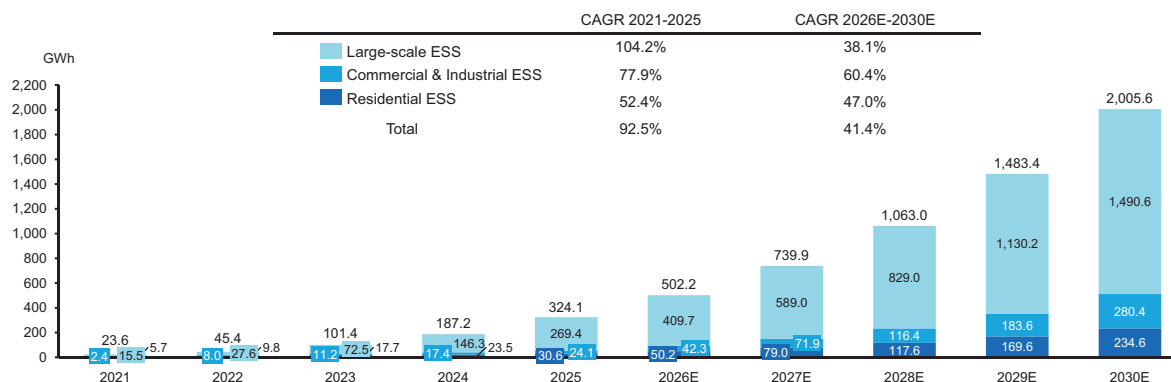
Source: Frost & Sullivan

From 2021 to 2025, the large-scale ESS newly installed capacity in China grew from 3.8 GWh to 169.9 GWh, representing a CAGR of 158.4%. Looking ahead, the total newly installed capacity is forecasted to reach 880.6 GWh by 2030, corresponding to a CAGR of 36.3% from 2026 to 2030.

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Meanwhile, the C&I ESS segment has also experienced significant expansion, with newly installed capacity increasing from 0.7 GWh in 2021 to 16.2 GWh in 2025. This segment is expected to accelerate further, reaching 199.5 GWh by 2030, representing a CAGR of 62.2% from 2026 to 2030, reflecting growing adoption of energy storage solutions in manufacturing, commercial building, and industrial applications. Similarly, the residential ESS segment expanded from 0.3 GWh in 2021 to 7.0 GWh in 2025 and is projected to grow to 59.8 GWh by 2030, representing a CAGR of 50.4% from 2026 to 2030, highlighting the increasing role of distributed storage in household energy management and peak-shaving strategies.

Global ESS Newly Installed Capacity by Application, 2021–2030E



Sources: IEA, CNESA, Frost & Sullivan

Note:

(1) C&I and residential categories include off-grid side lithium-ion ESS.

While residential ESS supports grid modernization by alleviating local distribution constraints and enhancing distributed solar self-consumption, large-scale ESS plays a critical role at the macro level in ensuring system reliability and balancing power supply and demand. Given their broader application scope and larger project scale, large-scale ESS is expected to account for a greater share of installed capacity. Nevertheless, both segments are fundamentally complementary and are anticipated to develop in parallel, collectively supporting the modernization and resilience of the global power system.

Market Drivers and Trends Analysis of the Global ESS Solutions Industry

Deepening Electrification Improves the Efficiency of Renewable Energy Consumption

The intermittency and volatility of renewable energy create load imbalance and frequency regulation pressure for power systems, driving rapid growth in energy storage demand. ESS, with their capability of energy shifting and power regulation, can shave peaks and fill valleys, smooth the output of renewable energy, reduce the pressure of grid expansion, and enhance system safety. In the future, energy storage will no longer serve merely as a supplementary facility for power systems but will become a fundamental configuration for large-scale renewable energy development and stable consumption. System integration, EMS, and dispatch optimization capabilities around energy storage systems will also become key supports for energy companies to build core competitiveness and scalable profitability models.

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Global Policy Support under Carbon Neutrality Drives the Development of the Energy Storage Industry

According to NetZeroTracker data, as of 2025, over 130 countries and regions globally have established carbon neutrality targets, covering 74% of global greenhouse gas emissions. Policies across various nations are accelerating power market reforms and the renewable energy substitution process. In China, the release of “Document No. 136” (“Notice on Deepening Market-Based Reform of Feed-in Tariffs for New Energy 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》) in 2025 and the “Notice on Comprehensively Accelerating the Construction of the Electricity Spot Market” (《關於全面加快電力現貨市場建設工作的通知》) (the “Notice”) have promoted the deep integration of products and operations and clarified the path for power market reform. “Document No. 136” actively encourages ESS to participate in market-oriented electricity trading, facilities must now adapt to dynamic pricing and complex grid demands. By exposing energy assets to the volatile, high-frequency pricing of the spot market, the “Notice” compels companies to deeply fuse their physical hardware products with intelligent, algorithm-driven operational systems to autonomously execute real-time, profit-maximizing trading strategies. Consequently, these transitions impose far more rigorous requirements on operations, demanding a highly intelligent and seamless integration of robust hardware infrastructure and advanced software management systems. In September 2025, the NDRC and NEA released the “Special Action Plan for Scaling Up New Energy Storage (2025-2027)” (《新型儲能規模化建設專項行動方案(2025-2027年)》) (the “Action Plan”), setting a target of new energy storage capacity nationwide by 2027, which is expected at least 180 GW to drive approximately RMB250 billion in direct project investment. With projected annual demand now exceeding 180 GW, this high-growth period necessitates a market-wide shift towards higher product quality, performance, reliability, and safety. The EU is driving renewable energy penetration through the “Renewable Energy Directive (RED III)”, further stimulating growth in demand for energy storage. In the United States, more than half of the states have established Renewable Portfolio Standards or Clean Energy Standards. Africa is achieving energy self-sufficiency in mining areas, commercial parks, and remote regions through a model combining energy storage with microgrids.

Application Scenarios of ESS are Becoming Diversified and Asset-oriented

As the construction of modern power systems accelerates, energy storage application scenarios are extending from the single generation side to the grid side, user side, and off-grid applications, forming a full-chain, multi-scenario synergistic industrial pattern. On the generation side, energy storage mitigates the volatility and intermittency of wind and solar power generation through peak regulation, frequency regulation, and peak shaving/valley filling, ensuring the grid integration of a high proportion of renewable energy. On the grid side, energy storage closely participates in grid-wide dispatch and local voltage regulation, enhancing system resilience and ensuring power supply security at critical nodes. Meanwhile, the user side achieves reduced energy costs, lower carbon emissions, and improved power supply reliability through peak-valley arbitrage, backup power, and green charging. In off-grid scenarios, PV/Wind-Solar-Storage microgrids provide stable and autonomous power for remote areas, islanded operations, and emergency disaster relief. Accompanying the expansion of application scenarios, energy storage is transforming from single equipment configuration toward asset-based operation and diversified business models. Enterprises and users not only gain revenue through equipment sales but also realize long-term value returns through multiple dimensions such as operational dispatch, power trading, spot power markets, ancillary services, and carbon asset management.

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Competitive Landscape of the China’s ESS Solutions Industry

The China’s ESS solutions market is highly competitive. In 2025, the China’s ESS shipment volume reached 252.5 GWh. The top 10 companies accounted for over 59% of total ESS shipment volume. Our company ranked 10th, with a shipment volume of 5.4 GWh in 2025, highlighting our strong market presence and the value of the advanced technologies and high-quality.

Top 10 Providers of ESS Solutions in China, by Shipment Volume, 2025

Ranking	Company	Shipment Volume (GWh)	Market Share	Core Application Scenarios	Operating Temperature Range	Adoption of Full-Immersion Liquid Cooling Technology	Electricity Price Forecasting Accuracy	End-to-End Electricity Trading Capabilities
1	Company A	~30	~11.9%	Large-scale, C & I	-40°C~+55°C	x	x	x
2	Company B	~25	~9.9%	Large-scale, C & I, Residential	-20°C~+55°C	x	x	x
3	Company C	~23	~9.1%	Large-scale, C & I	-30°C~+55°C	x	-	x
4	Company D	~20	~7.9%	Large-scale, C & I	-40°C~+55°C	x	≥85%	✓
5	Company E	~15	~5.9%	Large-scale	-30°C~+55°C	x	x	x
6	Company F	~11	~4.4%	Large-scale	-40°C~+60°C	x	x	x
7	Company G	~7	~2.8%	Large-scale, C & I, Residential	-40°C~+55°C	x	≥85%	x
8	Company H	~7	~2.8%	Large-scale, C & I	-30°C~+55°C	x	x	x
9	Company I	~6	~2.4%	Large-scale	-30°C~+50°C	x	≥85%	x
10	Our Company	5.4	2.1%	Large-scale, C & I	-30°C~+55°C	✓	≥85%	✓
Subtotal		~149.4	~59.2%					

Sources: Annual reports of listed companies, expert interviews, Frost & Sullivan

Notes:

- Company A was established in 1959 and is headquartered in China. It has full-chain R&D and production capabilities for lithium battery ESS, covering components from battery packs, BMS, PCS and EMS to system integration. The company’s core business covers multiple fields such as rail transit, energy storage, and new materials.
- Company B was established in 1995 and is headquartered in China. It is listed on the Shenzhen Stock Exchange and the Hong Kong Stock Exchange. The company mainly engaged in energy storage business, focusing on lithium-ion phosphate batteries and system-level ESS solutions for grid-scale, commercial and industrial, and residential application.
- Company C was established in 2011 and is headquartered in China. It is listed on the Shanghai Stock Exchange. The company primarily focuses on the research, development, production, sales, and service of energy storage systems. Its independent energy storage solutions encompass liquid-cooled energy storage, integrated charging and storage, integrated photovoltaic and energy storage, and power-side energy storage solutions.
- Company D was established in 2007 and is headquartered in China. It is a privately held company focused on renewable energy system solutions. Its principal businesses cover smart wind turbines, energy storage, and green hydrogen solutions. Its independent energy storage deployments include AI-powered supercharging and storage networks, smart energy storage systems, and intelligent energy storage system solutions.
- Company E was established in 2024 and is headquartered in China. It focuses on the entire energy storage industry chain, providing full-scenario solutions, covering energy storage technical services, battery manufacturing and sales, charging pile sales, power equipment and materials sales.
- Company F was established in 2000 and is headquartered in China. It is listed on both the Shenzhen Stock Exchange and the Hong Kong Stock Exchange. The company is mainly engaged in the energy storage business covering lithium-ion battery materials, energy storage batteries, and integrated ESS solutions. Its independent energy storage business covers large-scale energy storage systems, industrial and commercial energy storage systems, and clean energy storage solutions.
- Company G was established in 1997 and is headquartered in China. It is listed on the Shenzhen Stock Exchange. The company focuses on the R&D and production of new energy equipment including PV inverters, energy storage systems, wind power converters, etc. Its energy storage business specializes in ESS solutions for grid connection, frequency regulation, peak shaving, demand response, microgrids, and residential use.
- Company H was established in 2011 and is headquartered in China. It is listed on the Shenzhen Stock Exchange and the Hong Kong Stock Exchange. The company focuses on R&D and production of new energy equipment including power battery systems and energy storage battery systems, and covers lithium battery material development and recycling.
- Company I was established in 2019 and is headquartered in China. The company focuses on the R&D and production of large-scale energy storage system integration products, commercial and industrial energy storage products, and green transportation onboard energy products for electric vehicles.
- The size of the ESS solution industry is typically measured in GWh, as this metric most accurately reflects the shipment volume of ESS units. Evaluating market leadership and establishing competitive rankings based on GWh has become the industry-standard approach, widely recognized as the definitive measure for assessing market position.
- The ranking methodology based on shipment volume and newly installed capacity is consistent with industry-accepted practice. This view is based on the primary and secondary research conducted by Frost & Sullivan, including review of annual reports of industry participants, relevant market publications, and expert interviews with industry practitioners, which widely adopt GWh volume as a definitive measure for detailing business performance and market position ranking.

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12. The parameters of other market players are primarily based on their core products.
13. End-to-End Power Trading Capabilities refer to products and services covering the entire power trading workflow, including pre-trade forecasting, in-trade optimization, and post-trade analytics.

Our Company’s proprietary software platforms cover key functions across the ESS value chain, including energy management, power trading, data analytics, operation and maintenance, and AI-driven optimization. Compared with industry participants whose software offerings are primarily focused on ESS monitoring and energy management, our Company has developed an integrated software architecture that supports both operational optimization and market participation.

In particular, our Company’s software platforms incorporate power trading decision support based on proprietary economic models, as well as post-trade performance analysis capabilities, enabling customers to optimize trading strategies and evaluate realized returns. The combination of trading decision support and post-trade analytics remains relatively uncommon among ESS solution providers. Together with our Company’s ESS hardware solutions, these software capabilities enhance system performance and support improved project economics for customers.

OVERVIEW OF GLOBAL STANDALONE ENERGY STORAGE INDUSTRY

Introduction to Standalone Energy Storage and Revenue Models

Standalone energy storage, according to the “Notice of the General Office of the National Development and Reform Commission and the Comprehensive Department of the National Energy Administration on Further Promoting the Participation of New Energy Storage in the Power Market and Dispatch Operations” (《國家發展改革委辦公廳國家能源局綜合司關於進一步推動新型儲能參與電力市場和調度運用的通知》) issued by the National Development and Reform Commission in 2022, refers to new energy storage power stations that possess independent legal entity status, which connect to the grid and subject to dispatch, comply with technical standards and market rules, and can participate directly in electricity trading as independent entities. Their independence and characteristic of direct market participation make them standardized assets capable of valuation and trading, generating stable cash flows through diversified services such as capacity leasing, peak shaving and frequency regulation, and spot electricity trading. ESS solution refers to a comprehensive solution offered by ESS providers, integrating ESS hardware, software platforms and related services to support the deployment, operation and optimization of energy storage projects. Standalone energy storage is a system-level configuration mode within the broader ESS solution framework. The key distinction between standalone energy storage and other energy storage projects lies in whether the ESS is developed to serve a specific host project. For ESS co-developed with a specific host project, such as a wind power project, PV power project or industrial facility, the operation and dispatch arrangements are generally designed around the requirements of such host project, with defined operating objectives and relatively fixed usage scenarios. In contrast, standalone energy storage is not established for any particular host project. Instead, it operates as an independent energy asset and its charging and discharging activities are generally adjusted based on broader system requirements, including grid conditions, electricity market signals and power balancing needs. Accordingly, standalone energy storage provides greater operational flexibility and can participate in multiple applications such as peak shaving, frequency regulation and electricity trading. In 2025, the global ESS solution market reached RMB378.2 billion and is expected to grow to RMB1,963.3 billion by 2030, representing a CAGR of 30.1% from 2026 to 2030. Within the ESS solution market, the standalone energy storage solution market reached RMB128.6 billion in 2025, accounting for approximately 34% of the global ESS solution market, and is expected to further increase its share to approximately 50% by 2030.

The revenue models for standalone energy storage power stations primarily include capacity leasing, peak-valley arbitrage, ancillary services, and capacity payments, with profitability increasingly shifting toward a diversified and sustainable structure supported by electricity spot markets. As power market reforms deepen, energy storage is transitioning from an auxiliary facility to an independent,

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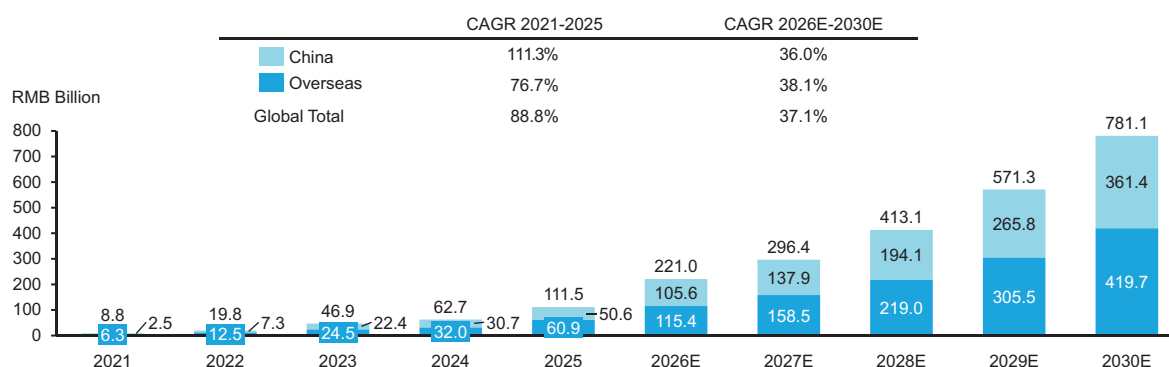
market-oriented asset. Leading ESS solution providers are correspondingly evolving from equipment suppliers into integrated solution providers and asset operators, leveraging capabilities in R&D, system integration, engineering, and intelligent O&M.

Market Size Analysis of the Global and China Standalone Energy Storage Industry

Standalone energy storage represents a narrowly defined subset of the broader ESS solution market. In 2025, it accounted for approximately 33.2% of the global ESS solution market by revenue and 49.8% by newly installed capacity, with these shares expected to increase to 48.7% and 63.8%, respectively, by 2030.

The market size of global standalone energy storage industry by revenue increased from RMB8.8 billion in 2021 to RMB111.5 billion in 2025, representing a CAGR of 88.8% over the period. Growth is expected to remain robust through 2030, with the total market size by revenue reaching RMB781.1 billion, with a CAGR of 37.1% from 2026 to 2030. The market size of China market expanded from RMB2.5 billion in 2021 to RMB50.6 billion in 2025, with a CAGR of 111.3%, and is expected to reach RMB361.4 billion by 2030, representing a CAGR of 36.0% from 2026 onwards.

Global Standalone Energy Storage Market Size by Revenue, 2021–2030E



Sources: IEA, CNESA, Frost & Sullivan

Note: The above market size includes only the sales of standalone ESS O&M services or entrusted power trading services.

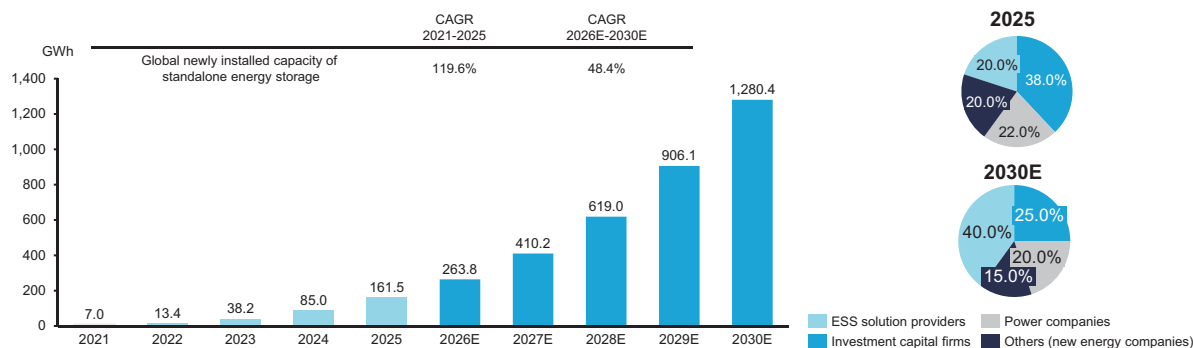
Currently, O&M services and entrusted power trading services provided by ESS solution providers account for a relatively small share of the overall market. However, driven by the rapid expansion of energy storage installations, the ongoing liberalization of electricity markets, and the increasing integration of renewable energy, demand for professional lifecycle services is expected to grow significantly, thereby expanding the role of ESS solution providers. Assuming that all installed standalone energy storage are equipped with corresponding O&M services and power trading services, and are capable of generating revenue, by 2030, the global and China O&M service markets are projected to reach RMB665.0 billion and RMB374.4 billion, respectively. Over the same period, the global and China entrusted power trading service markets are expected to reach RMB415.5 billion and RMB124.7 billion, respectively, highlighting substantial growth potential.

Global standalone energy storage industry has maintained rapid growth in recent years, projected to reach 1,280.4 GWh by 2030, representing a CAGR of approximately 48.4% from 2026 onwards. The market is primarily concentrated in three major regions: China, North America, and Europe. Industry participants in standalone energy storage projects mainly include ESS solutions providers, power companies, investment capital firms, and new energy companies. Among them, ESS solutions providers, with their technological and experiential advantages in battery cells, PCS, EMS, and full-lifecycle operation management, occupy the core links of project development, delivery, O&M, and transactions.

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Compared with traditional power companies and new energy companies, ESS solutions providers have stronger project integration capabilities, intelligent dispatch capabilities, and multi-market revenue optimization capabilities, and can provide full-lifecycle solutions.

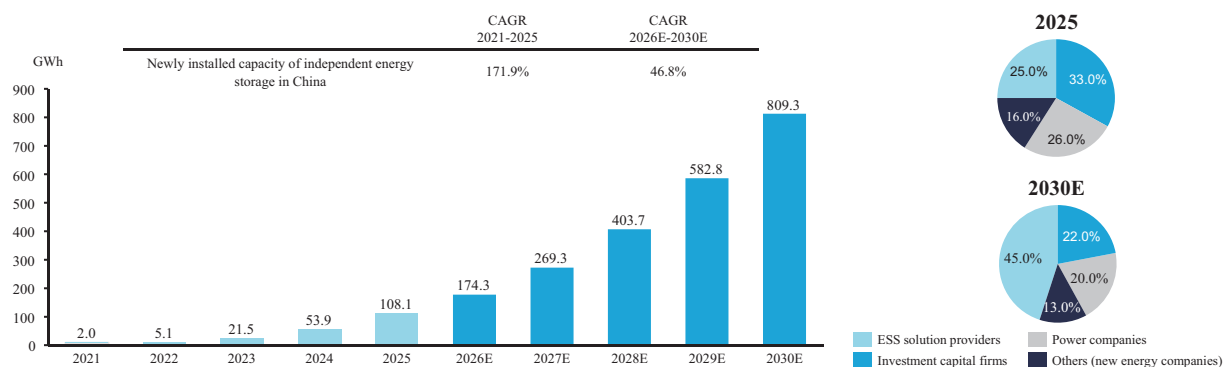
Global Newly Installed Capacity of the Standalone Energy Storage, 2021–2030E



Sources: BNEF, Frost & Sullivan

ESS solutions providers in China possess a significant advantage in the full-lifecycle solutions for global energy storage assets industry, thanks to their complete industry chain layout and extensive experience accumulated over multiple years in large-scale domestic projects. They can provide diversified business models covering system design, integration, O&M optimization, and trading of energy storage assets, thereby enhancing the economics, reliability, and long-term value of energy storage projects. The newly installed capacity of standalone energy storage in China is shown as below:

Newly Installed Capacity of Standalone Energy Storage in China, 2021–2030E



Sources: CNESA, Frost & Sullivan

Market Drivers and Trends Analysis of Global Standalone Energy Storage Industry

Strengthening Policy Support

Driven by carbon neutrality targets set by major economies and the rapid expansion of renewable energy, the increasing penetration of wind and solar power has significantly heightened the need for grid flexibility, positioning standalone energy storage as a critical solution for peak shaving, frequency regulation, and overall system stability. This trend is further supported by electricity market reforms, which are progressively recognizing standalone energy storage as an independent market participant and establishing transparent pricing mechanisms. A well-structured market system, encompassing energy,

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ancillary services, and capacity markets, is creating more monetization opportunities for energy storage. In China, the National Energy Administration has introduced the “Notice on Improving the Generation-side Capacity Pricing Mechanism” in January 2026, which for the first time included grid-side standalone energy storage in the generation-side capacity pricing mechanism. Other policy guidance, such as “Document No. 136” and “Notice on Comprehensively Accelerating the Construction of the Electricity Spot Market” issued in April 2025 and the “Suggestions of the CPC Central Committee on Formulating the 15th Five-Year Plan for National Economic and Social Development” emphasized the importance of improving capacity pricing for standalone energy storage and creating a more comprehensive market system. In particular, “Document No. 136” increases system-wide demand for flexible resources by exposing renewable projects more directly to market-based prices and balancing responsibilities. Standalone energy storage is well positioned to benefit, as it can be independently dispatched, serve multiple market participants and access diversified revenues from power trading, ancillary services and capacity mechanisms. As storage investment becomes more economics-driven, customers are also placing greater emphasis on system quality, lifecycle cost and integrated solutions covering project assessment, system configuration, trading optimization and long-term O&M.

Internationally, standalone energy storage is recognized as a critical enabler of decarbonization and energy system flexibility. In March 2023, the European Commission released a draft electricity market reform plan, which was formally approved by the European Parliament in July, strengthening the role and investment predictability of standalone energy storage. The U.S. government offered tax incentives for ESS paired with solar installations, stimulating further investment. Japan released its “Seventh Energy Strategy Plan” in February 2025, identifying energy storage as a cornerstone of energy transition.

Demand-driven Technological Innovation and Digital Transformation

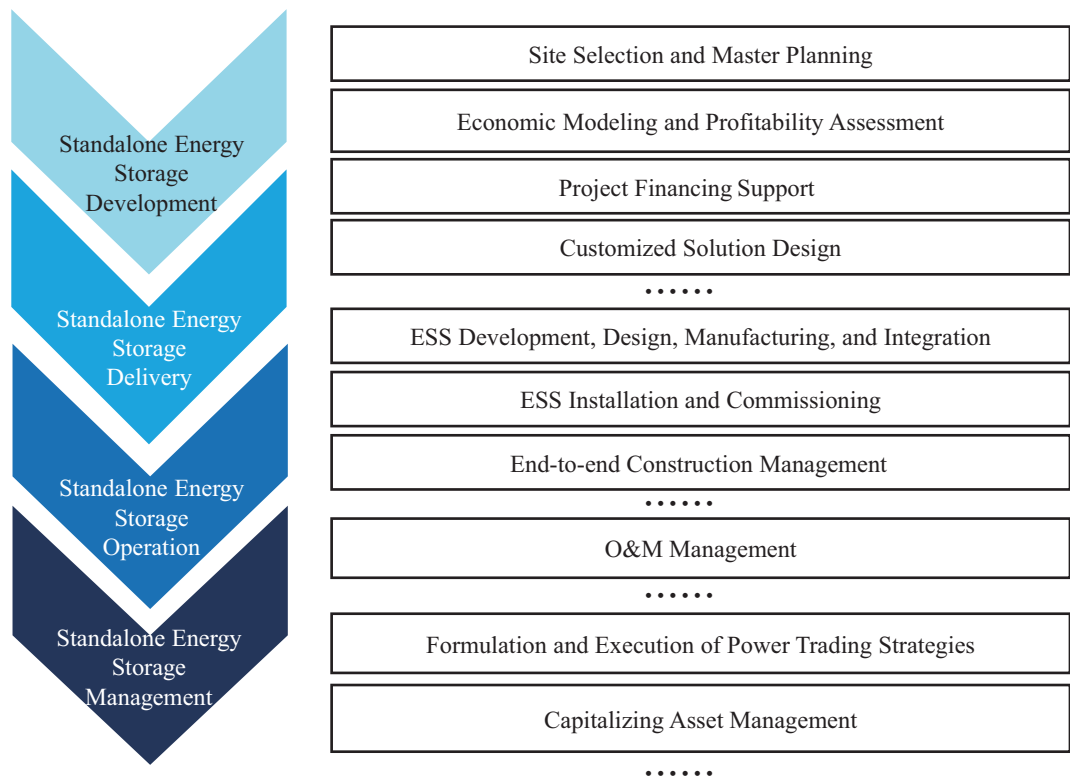
The growing demand for reliable, stable, and efficient standalone energy storage is shifting the industry focus toward operational performance, making digitalization and intelligent technologies increasingly critical. Key technical challenges — such as battery degradation, thermal management, energy efficiency, and safety — are driving continuous innovation. Advanced algorithms and data-driven models are being adopted to enable precise monitoring, early fault detection, and proactive maintenance, improving system reliability and efficiency. At the same time, the industry is accelerating the adoption of digital management tools, including AI-based dispatching and cloud monitoring platforms, to optimize system performance and enhance operational efficiency. These technologies support more stable operations, lower costs, and improved overall performance of standalone energy storage systems.

Diversification of Market Demand and Expansion of Business Value in Standalone Energy Storage

As standalone energy storage becomes a key infrastructure in power systems, the industry is shifting from a focus on equipment manufacturing to value-driven operations. With renewable power becoming more deeply integrated into electricity markets and storage deployment increasingly driven by project economics rather than administrative requirements, standalone energy storage projects are placing greater emphasis on actual operating performance, system quality and lifecycle cost efficiency. Standalone energy storage providers are therefore increasingly extending their capabilities beyond system delivery to offer full-lifecycle services, including preliminary project assessment, project development, system integration and delivery, intelligent O&M, and project management. In this context, the industry’s value is transitioning from installed capacity to service-based returns, supported by diversified revenue streams such as power trading, ancillary services, and capacity markets. At the same time, standalone energy storage is evolving into a more operationally driven and service-oriented business. Providers are leveraging digital tools and full-lifecycle management capabilities to improve performance and unlock additional value. This shift is driving the emergence of integrated service

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models, positioning standalone energy storage as a core enabler of flexible, efficient, and commercially sustainable energy systems. The graph below illustrates the business expansion of standalone energy storage providers, highlighting their extension toward full-lifecycle and value-added services.



Source: Frost & Sullivan

Entry Barrier Analysis of the Global Standalone Energy Storage Industry

The standalone energy storage industry presents significant entry barriers across technology, regulation, products, and market access. From a technological perspective, companies are required to build strong capabilities in key segments such as system integration, energy management, and operational optimization, with continuous accumulation in hardware and software. Regulatory barriers are also high, as participation in project development, grid connection, and electricity market trading requires multiple qualifications, permits, and compliance with stringent power industry regulations, often involving lengthy approval processes. On the product side, robust system integration capabilities and standardized, modular solutions are essential to ensure safety, reliability, and operational efficiency across diverse scenarios. In addition, market barriers are significant, as companies must build long-term trust with grid operators, governments, and customers through proven project experience, operational performance, and trading capabilities, making it difficult for new entrants to scale quickly in the market.

Competitive Landscape of Standalone Energy Storage Industry in China

In 2025, the total newly installed capacity of the standalone energy storage by the providers of ESS solution in China reached approximately 27.0 GWh. We ranked fourth in the industry with approximately 3.4 GWh of newly installed capacity in 2025. Market leaders in the standalone energy storage market typically provide value-added services such as O&M and entrusted power trading. The

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provision of such services enhances customer engagement and satisfaction by improving standalone energy storage performance and enabling more effective participation in power markets, thereby strengthening customer recognition and supporting long-term business relationships.

Top 5 Providers of Standalone Energy Storage Among ESS Solution Providers by Newly Installed Capacity in China, 2025

Ranking	Company	Newly Installed Capacity (GWh)	Market Share	Core Application Scenarios	Market Positioning
1	Company D	~6.6	~24.4%	Large-scale, C & I	New energy technologies and products provider
2	Company C	~6.0	~22.2%	Large-scale, C & I	ESS solutions and technical services provider
3	Company F	~5.1	~18.9%	Large-scale	Diversified lithium-ion battery and ESS solutions provider
4	Our Company	3.4	12.5%	Large-scale, C&I	Full-lifecycle ESS solutions provider
5	Company J	~2.0	~7.4%	Large-scale, C & I	New energy digital solutions provider
Subtotal		~23.1	~85.4%		

Sources: Annual reports of listed companies, Frost & Sullivan

Notes:

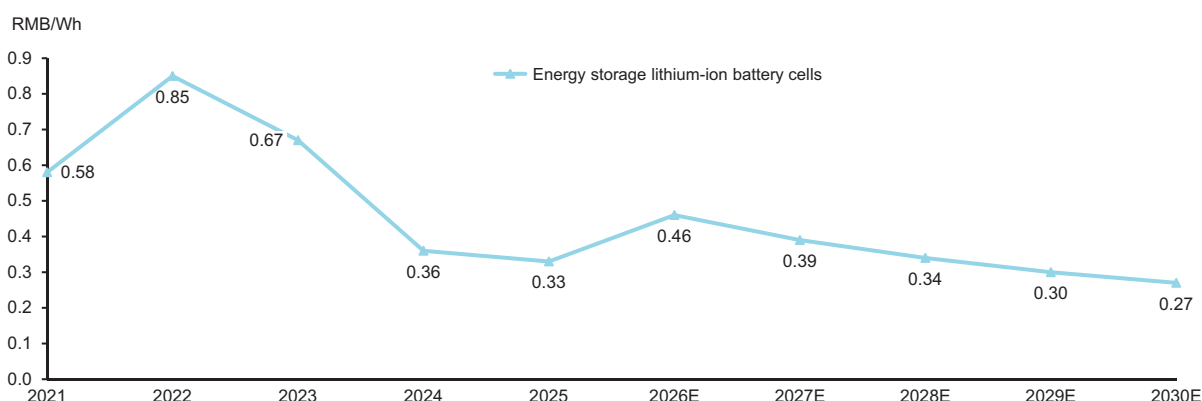
- Company J was established in 2014 and headquartered in China. It primarily focuses on electric vehicle charging infrastructure, microgrid technology, and digital energy solutions. Its independent energy storage business covers commercial and industrial energy storage, residential energy storage, integrated photovoltaic energy storage charging and discharging solutions, and the supply of large-scale energy storage systems on both the grid and power supply sides.
- The ranking methodology based on shipment volume and newly installed capacity is consistent with industry-accepted practice. This view is based on the primary and secondary research conducted by Frost & Sullivan, including review of annual reports of industry participants, relevant market publications, and expert interviews with industry practitioners, which widely adopt GWh volume as a definitive measure for detailing business performance and market position ranking.

Raw Material Analysis

After 2021, driven by an explosion in demand from the new energy vehicle and energy storage markets, compounded by supply chain tensions and rapid increases in lithium carbonate prices, battery cell prices climbed significantly to RMB0.85 per Wh in 2022. With the gradual improvement in lithium resource supply, continuous expansion of battery production capacity, and the advancement of technological iterations, prices entered a downward trend starting in 2023. Since October 2025, driven by the rapid price increase of lithium carbonate, the key raw material, which was supported by tightening supply expectations, stronger downstream demand and inventory restocking, as well as the approaching year-end deadline for ESS grid connections in China, prices of lithium-ion energy storage battery cell began to rise. In 2026, influenced by a tight supply-demand balance and the rapid expansion of the ESS market, the average price of lithium carbonate experienced a rapid surge and remained stable at a high level. From October 2025 to May 2026, the monthly average price of lithium carbonate surged by over 150%. Consequently, during the same period, the monthly average price of lithium-ion energy storage battery cells rose rapidly from RMB0.34 per Wh to RMB0.45 per Wh, representing a cumulative increase of 32.4%. It is projected that the annual average price of lithium-ion energy storage battery cells in 2026 will rise to RMB0.46 per Wh, marking a significant rebound compared to 2025. Looking ahead, as the supply-demand balance gradually stabilizes and advancements in battery cell manufacturing technologies continue to drive cost optimization, the price of lithium-ion energy storage battery cells is expected to remain relatively stable and decrease to the range from RMB0.25 per Wh to RMB0.30 per Wh in 2030, with moderate fluctuations within a certain range.

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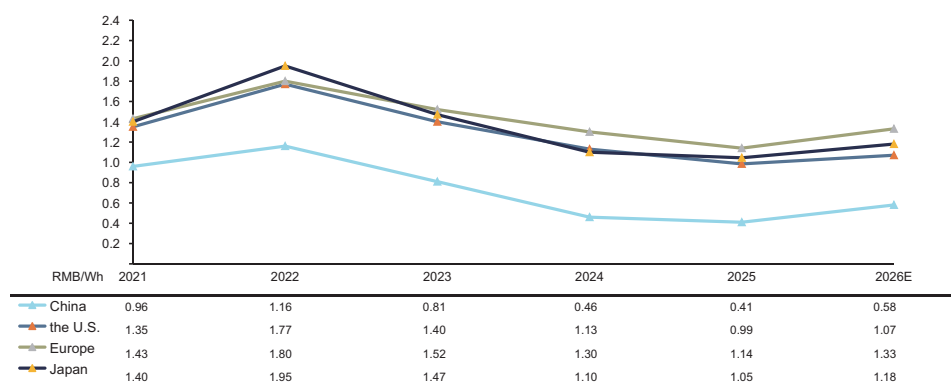
Average Prices of Lithium-ion Energy Storage Battery Cells in China, 2021–2030E



Sources: Shanghai Metal Market “SMM”, Frost & Sullivan

The average prices of energy storage systems in major global markets are closely related to upstream raw material costs and supply chain tightness since lithium-ion energy storage battery cells represent over 50% of the battery’s total manufacturing cost in 2025. Thus, any price fluctuations are inevitably and directly passed onto the final price of the ESS. In addition, intensifying market competition, technological advancements, and economies of scale have accelerated the decline in ESS prices, exerting sustained downward pressure on system pricing. Entering 2026, driven by accelerated global energy transition, continued strong demand for energy storage installations, and higher requirements for safety and intelligence, energy storage prices have gradually stabilized after the previous period of rapid decline. Consistent with the declining trend of lithium-ion energy storage battery cells and primarily driven by ongoing cost reductions, intensified competition and efficiency improvements, the average selling price of ESS solutions in China is expected to remain relatively stable over the next five years, primarily due to the already competitive pricing environment, mature supply chain and high level of market competition. In contrast, prices in the United States, Europe and Japan are expected to decline by approximately 30% to 50% in aggregate between 2025 and 2030, driven by ongoing cost localization, increasing market competition and gradual supply chain maturation in these regions. In light of the stabilization in ESS prices and the corresponding changes in the prices of key raw materials, particularly lithium-ion battery cells, gross margins of ESS solution providers are expected to gradually stabilize following the previous period of pressure. As system prices and raw material costs become more aligned, further margin compression is expected to ease.

Average Prices of ESS⁽¹⁾ (China⁽²⁾, United States, Europe, Japan), 2021–2026E



Source: Frost & Sullivan

Notes:

- (1) The average price of ESS refers to the average price of 4-hour lithium-ion energy storage system.
- (2) The price in China is net of tax.