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Global ESS Solution Industry Report

Executive Summary

This report provides an overview of the global ESS solution industry, outlining market size, regional performance, growth drivers, technological trends, multi-use ESS development, competitive landscape, and future outlook.

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1. Market Overview

1.1 Market Definition

The global energy structure is transforming, with electricity set to dominate future energy use driven by industrial expansion, surging data center power consumption fueled by AI progress, and the accelerated adoption of new energy vehicles, all of which support carbon reduction and the optimization of the global energy structure.

Against this backdrop, the global Energy Storage System (ESS) solution industry comprises systems that convert energy from diverse power generation sources into storable forms and discharge electricity on demand, addressing intermittency, volatility and spatial mismatch of renewable energy amid rising electrification to balance power supply and demand and enhance grid stability, security, flexibility and profitability.

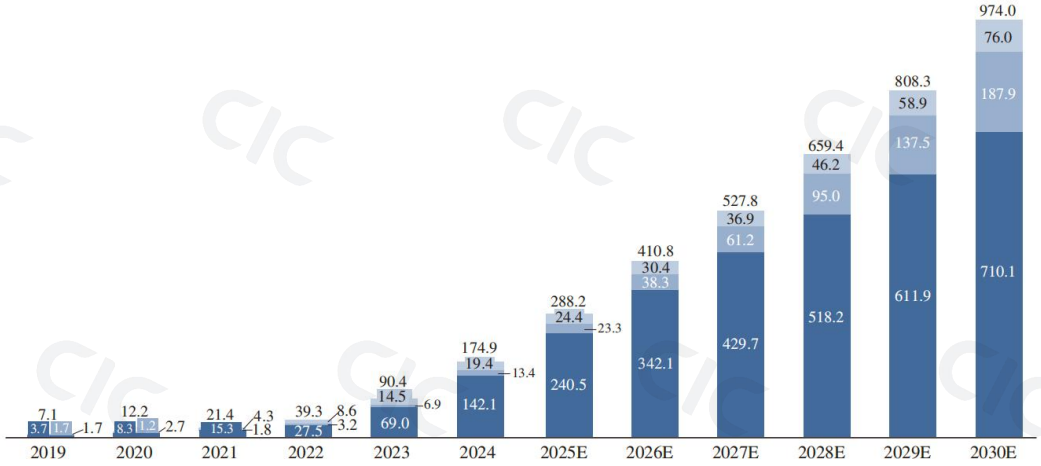
1.2 Market Size and Growth

From 2019 to 2024, the global newly installed capacity of ESS grew rapidly from 7.1 GWh to 174.9 GWh, with a CAGR of 89.8%. It is expected to increase to 974.0 GWh in 2030, with a CAGR of 33.1%. Large-scale ESS product dominates, accounting for 81.2% of total capacity in 2024. C&I ESS product accounts for 7.7% of the total market and residential

ESS accounted for 11.1% of the total market in 2024.

Global newly installed ESS capacity, 2019-2030E

GWh	CAGR (2019-2024)	CAGR (2024-2030E)
Total	89.8%	33.1%
Large-scale	107.4%	30.8%
C&I	51.1%	55.3%
Residential	62.7%	25.6%

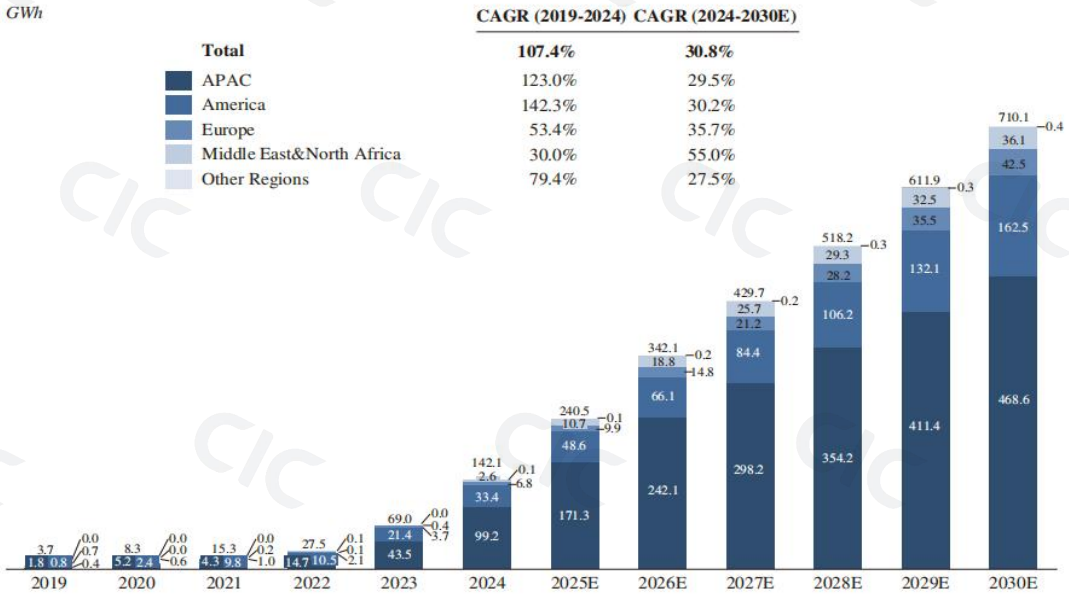


Note: Non-electrochemical storage technologies, such as pumped hydro, flywheel, and compressed air energy storage are not included.

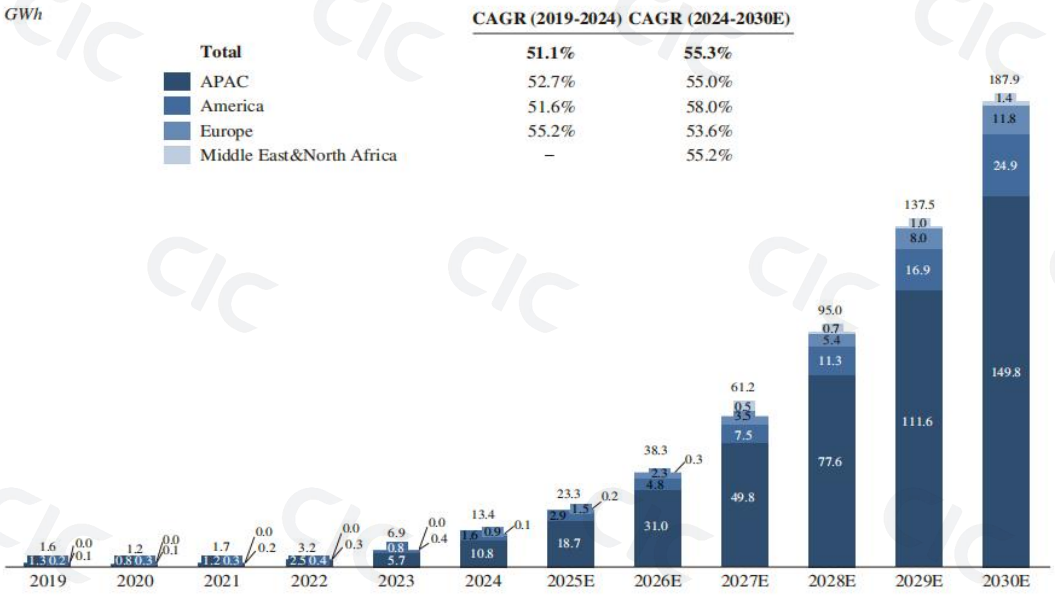
Source: BNEF, CIC Reports

APAC dominants both large-scale ESS and C&I ESS market. In other regions, large-scale ESS is the primary segment, with newly installed C&I and residential ESS capacity being almost negligible. In the future, the Middle East&North Africa is expected to be the fastest-growing large-scale ESS market, while the Americas is expected to be the most fast-growing C&I ESS market.

Global newly installed large-scale ESS capacity, 2019-2030E, by region



Global newly installed C&I ESS capacity, 2019-2030E, by region

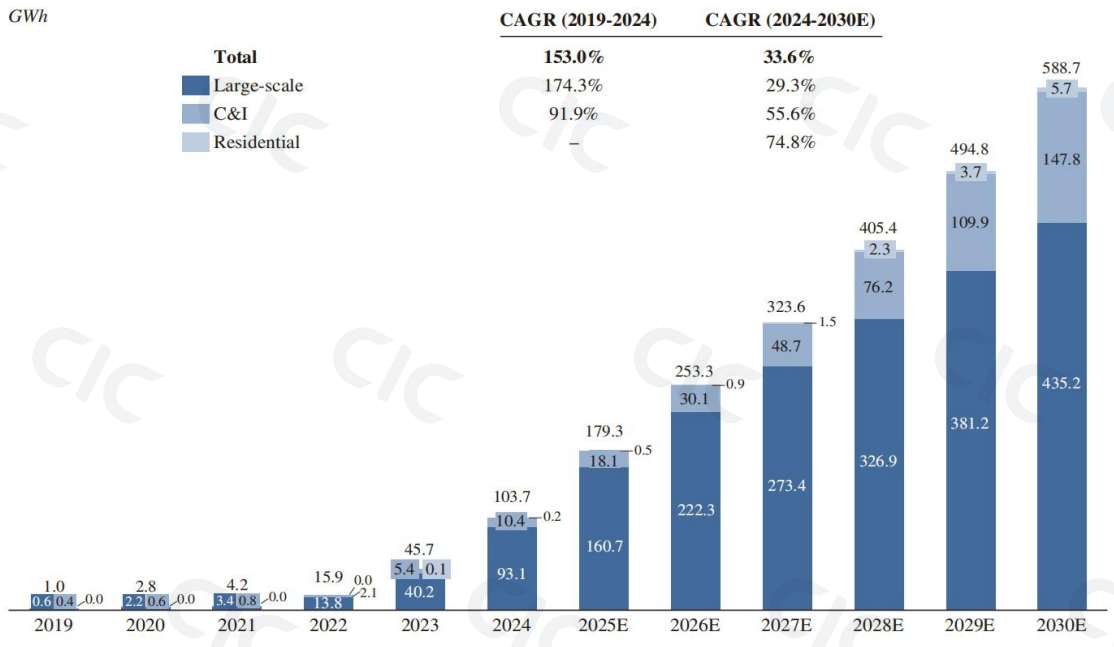


Note: Non-electrochemical storage technologies, such as pumped hydro, flywheel, and compressed air energy storage are not included.

Source: BNEF, CIC Reports

China is the world's largest newly installed ESS market, accounting for 59.3% of the global newly installed ESS market in 2024. From 2019 to 2024, China's newly installed ESS capacity grew from 1.0 GWh to 103.7 GWh, with a CAGR of 153.0%. It is expected to grow at a CAGR of 33.6%, reaching 588.7 GWh by 2030. Large-scale ESS is the major application in China. C&I ESS has been experiencing rapid growth since 2022. The C&I segment is expected to be a key driver of future market expansion in China. Residential section has seen minimal activity since 2023 and remain at a comparatively early stage of development.

China's newly installed ESS capacity, 2019-2030E



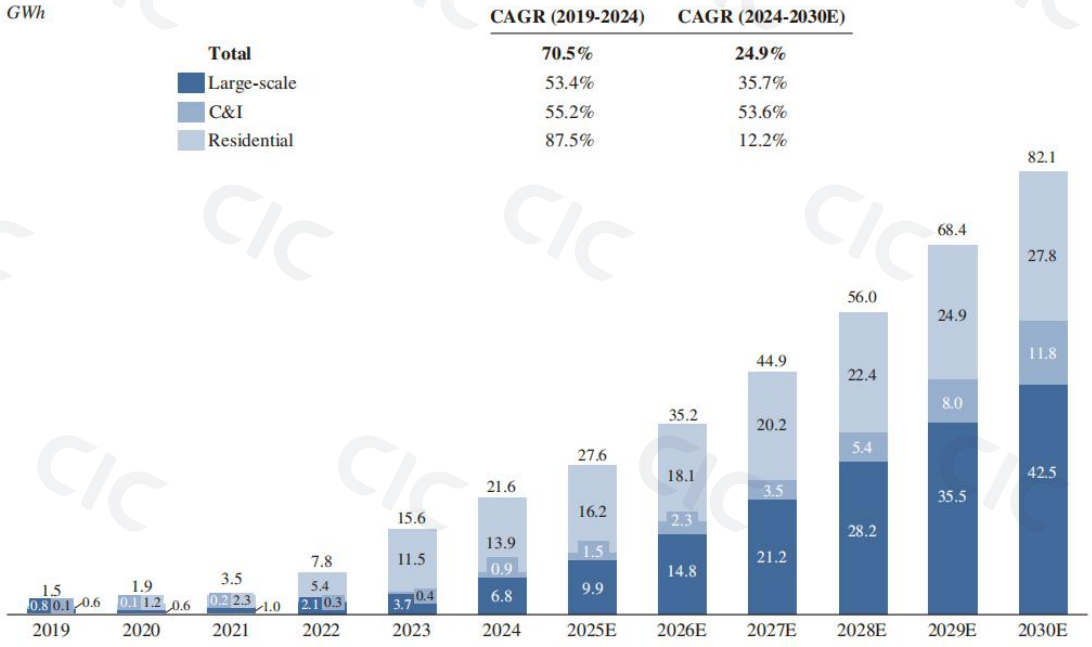
Note: Non-electrochemical storage technologies, such as pumped hydro,

flywheel, and compressed air energy storage are not included.

Source: BNEF, CIC Reports

From 2019 to 2024, Europe's newly installed ESS capacity surged from 1.5 GWh to 21.6 GWh with a 70.5% CAGR. It is forecast to reach 82.1 GWh by 2030 at a 24.9% CAGR. Europe has the world's most mature residential ESS sector, making up 71.6% of global newly installed residential ESS capacity in 2024. Its large-scale and C&I ESS segments will follow the growth of the residential market in the future.

Europe's newly installed ESS capacity, 2019-2030E



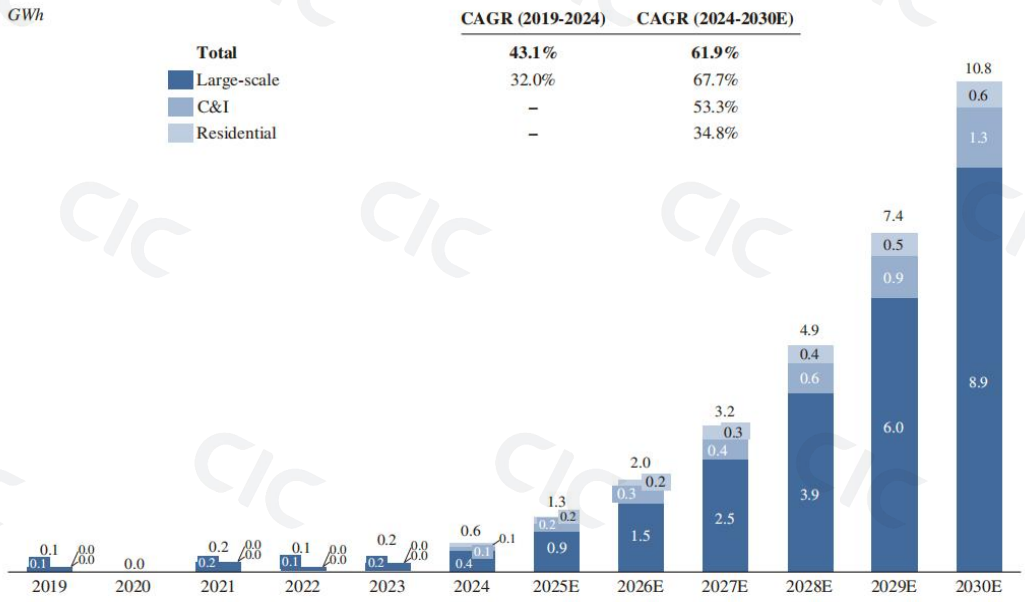
Note: Non-electrochemical storage technologies, such as pumped hydro, flywheel, and compressed air energy storage are not included.

Europe denotes the geographic region rather than the political entity of the European Union.

Source: BNEF, CIC Reports

Africa represents a small proportion of the global ESS market. However, the region boasts abundant wind and solar resources, making it a potential emerging market. It is expected that by 2030, Africa's share of the global newly installed ESS capacity will increase from 0.3% in 2024 to 1.1%, with the newly installed capacity growing from 0.6 GWh in 2024 to 10.8 GWh in 2030, representing a CAGR of 61.9%. Africa primarily focused on large-scale ESS to address fundamental power supply challenges. Residential and C&I ESS have only started to gain traction around 2024, remaining in the early stage of development.

Africa's newly installed ESS capacity, 2019-2030E



Note: Non-electrochemical storage technologies, such as pumped hydro, flywheel, and compressed air energy storage are not included.

Source: BNEF, CIC Reports

2. Key Growth Drivers and Trends

2.1 Key Drivers

Large-scale renewable integration

Growing net-zero targets drive rapid expansion of solar and wind, increasing variability and intermittency in power generation. This poses challenges to grid stability and reliability, making energy storage essential for balancing supply-demand, smoothing fluctuations, and ensuring power quality, thereby boosting global ESS demand.

Policy support and regulatory frameworks

Governments worldwide are driving the green energy transition through supportive policies. As solar and wind power suffer from intermittency, volatility and uneven distribution, policy support and application needs have accelerated energy storage adoption. Energy storage enhances grid performance and serves as a cornerstone of low-carbon, resilient energy infrastructure, boosting the global ESS solutions industry.

Technological advancements

Innovations in battery chemistry, especially lithium iron phosphate

(LFP), have markedly improved system safety, lifecycle durability, and thermal stability. These enhancements, combined with declining costs, have made energy storage more economically viable and accessible, encouraging widespread commercial deployment.

Market-driven electricity pricing and grid services

The shift toward deregulated and dynamic electricity markets allows ESS to capitalize on peak shaving, load shifting, and ancillary services such as frequency regulation. This market environment creates multiple revenue streams, making energy storage investments more attractive and accelerating industry growth.

2.2 Key Trends

Accelerating digitalization and AI integration

The adoption of digital technologies and AI technologies, such as cloud platforms and machine learning, is enhancing ESS efficiency, thereby improving reliability and integration with modern energy grids. This growth is driven by performance and predictive maintenance demands.

Emerging innovative business models

New business models, such as Virtual Power Plants (VPP), and

Multi-use ESS, are reshaping the energy storage industry, improving financial payback periods and diversifying revenue streams.

Cross-value chain collaboration

Increasing partnerships across industry segments, particularly with upstream and downstream partners, is providing a better understanding of downstream needs. This knowledge results in improved product offerings and more effective technology implementation.

Global expansion

The energy storage industry is expanding globally as companies seek growth opportunities. International partnerships and cross-border projects are accelerating deployment and creating a more interconnected energy landscape.

2.3 Future Outlook

The global ESS solution industry will maintain robust long-term growth driven by the deepening global energy transition, large-scale renewable energy integration, and favorable policy frameworks worldwide. Global newly installed capacity is expected to expand steadily, with large-scale ESS remaining the dominant segment, C&I

ESS growing rapidly as a key growth driver, and residential ESS seeing mature development led by Europe. Digitalization, AI integration, innovative business models like Virtual Power Plants (VPP), and cross-value chain collaboration will become core industry trends, continuously enhancing system efficiency and economic viability.

The market will stay highly concentrated with the top 30 enterprises holding over 90% of the new installed capacity share; Chinese companies will continue to dominate the global market relying on their strong supply chain and technological advantages, while the overall average selling price of ESS will keep a downward trend due to fierce competition, making technological innovation and cost control the core competitive edges for market players. Regional development will present differentiated features, with the Middle East & North Africa leading the growth of large-scale ESS and the Americas taking the lead in C&I ESS growth, and Africa gradually emerging as a potential emerging market, ultimately positioning ESS as a critical cornerstone of the global low-carbon, flexible and secure energy system.

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CIC is a professional consulting firm offering tailored end-to-end support across the full investment and financing lifecycle. The firm boasts a world-leading track record in guiding landmark first-in-sector IPOs across global markets, alongside unrivaled reach and in-depth coverage capabilities across specialized niche market segments.

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CIC Reports & Industry Overview

At CIC, we employ a rigorous, multi-method research framework, combining primary and secondary sources to underpin our analysis. Primary research involves in-depth engagements with industry thought leaders and practitioners, particularly in supply chain finance. Secondary research synthesizes publicly available datasets from authoritative bodies, including the National Bureau of Statistics of the People's Republic of China, the State Administration of Financial Regulation (SAFR, formerly the China Banking and Insurance Regulatory Commission), the China Securities Regulatory Commission (CSRC), and public company filings. We apply proprietary data analytics frameworks to process collected information, validating findings through cross-referencing data from multiple research streams to ensure analytical rigor and reliability.

All statistical data presented is verifiable and grounded in information available as of the date of this report.

Extracts are refined summaries of in-depth CIC industry research reports, highlighting supply and demand trends, key growth drivers, R&D trends and future outlook, etc. of various segmented fields, integrating multi-dimensional insights such as expert interviews, market surveys and industry data analysis.

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