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Global Residential ESS Industry Report

Executive Summary

Residential ESS serves as a vital and fast-growing segment of the broader ESS solutions industry. The global residential ESS industry is experiencing a boom fueled by falling battery costs, a desire for energy independence, and the integration of AI-driven management systems.

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1. Market Overview

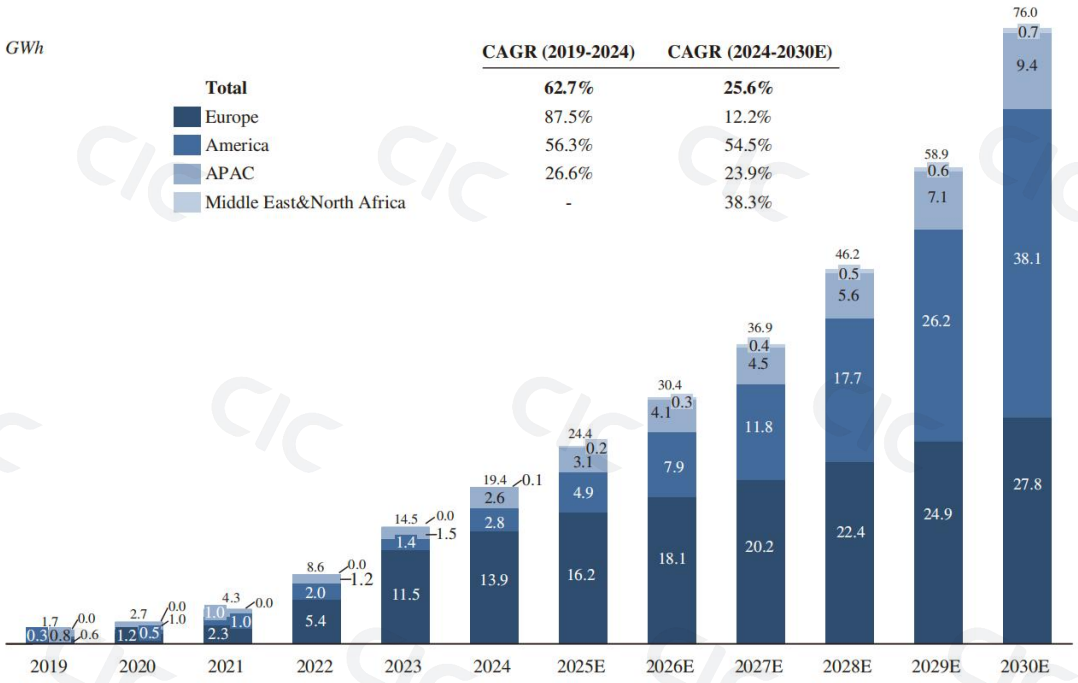
1.1 Market Definition

The global residential ESS (Energy Storage System) industry is a key downstream segment of the global energy storage solution industry, referring to the sector that develops, manufactures, sells and services electrochemical energy storage systems and supporting solutions exclusively for household/residential end-users.

1.2 Market Size and Growth

From 2019 to 2024, the global newly installed residential capacity of energy storage grew from 1.7 GWh to 19.4 GWh, with a CAGR of 62.7%. It is expected to reach 76.0 GWh in 2030, with a CAGR of 25.6%. Europe is the leading market that contributes to the global residential ESS industry; the newly installed residential ESS capacity in 2024 was 13.9 GWh, accounting for 71.6% of the global market. The current residential energy storage market in the UK is relatively small, with a newly installed ESS capacity of only 0.6 GWh in 2024. However, it is expected to grow rapidly at a CAGR of 42.4%, reaching a scale of 5.0 GWh by 2030.

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



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

2. Key Growth Drivers and Trends

2.1 Key Drivers and Trends

Rising energy costs and grid independence

The upward trend in electricity prices, combined with heightened concerns regarding power reliability, has led to a growing preference for ESS in residential settings, enabling peak shaving and backup power capabilities.

Technological advancements in battery storage

Ongoing advancements in battery technology, particularly in lithium-ion battery efficiency, cost reduction, and safety improvements, are significantly driving down the barriers to entry for residential ESS.

Solar-storage-charging all-in-one systems

The market is experiencing a shift towards integrated solar-storage-charging systems that enable seamless management of solar energy, storage, and electric vehicle (EV) charging. This trend is expected to drive greater consumer adoption and enhance the overall efficiency of residential energy solutions.

AI-optimized energy management

AI and smart technologies are becoming increasingly integrated into residential ESS. These innovations enable more efficient energy management, predictive maintenance, and intelligent load forecasting, optimizing overall system performance and reducing operational costs.

2.2 AI Application in the Residential ESS Industry

Smart solar-storage-charging integration

AI enables seamless coordination between solar generation, battery storage and EV charging, prioritizing energy usage based on availability and cost to maximize economic benefits.

Self-consumption optimization

AI analyzes residential electricity consumption, electricity generation forecasts, and real-time electricity prices to maximize self-consumption, reduce grid dependence and lower energy costs.

Intelligent Home Integration

AI seamlessly integrates with residential appliances, including heat pumps, EV chargers, and other smart home systems, to optimize energy consumption and energy storage, enhance efficiency and prevent peak demand overloads. By dynamically managing

electricity usage, AI enables a more autonomous and cost-effective home energy ecosystem.

Home Device Operation Safety Control

With the increasing adoption of AI in home environments, ESS can optimize device management through energy control, ensuring the safe operation of various residential smart devices including robots while enhancing overall efficiency.

2.3 Future Outlook

Residential ESS will maintain steady growth, with Europe leading and the UK emerging as a fast-growing hub. AI-powered intelligent management and solar-storage-charging integration will be mainstream trends. Continuous cost reduction and innovation will drive penetration, solidifying residential ESS as a critical pillar of the global distributed low-carbon energy system.

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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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