

Microgrid Control Systems - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029

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Report description:

The Microgrid Control Systems Market size is estimated at USD 4.27 billion in 2024, and is expected to reach USD 7.79 billion by 2029, growing at a CAGR of 12.77% during the forecast period (2024-2029).

Continued control and energy management improvements are expected to impact market growth positively. Declining prices for distributed renewable energy and battery technology and technological advances in energy management systems have led to more efficient renewable energy grids and advanced smart grid technologies.

Key Highlights

- As per an article by the World Economic Forum published in May 2022, many homes, businesses, and critical services could be affected if a region's primary power grid were to go down due to storms or power outages, as conventional power grids can cover entire continents or countries. Microgrids can switch off from the primary grid and continue to supply power during such emergencies. This process is known as "islanding."
- As microgrids are used in many fields and integrated with new technologies, including fuel cells, efficient and reliable control systems are needed to handle the new systems' complexity. Therefore, there is a growing need for effective and centralized microgrid controllers. Traditional networks are considered very inefficient due to long lines.
- November 2022, Advanced Power and Energy Program (APEP) collaborated with Southern California Edison (SCE), the Department of Energy (DOE), KB Home, SunPower, and Schneider Electric on the development, deployment, and testing of two microgrid communities in the Shadow Mountain master plan in Menifee. Overall, APEP will guarantee that the microgrid controller meets the (IEEE 2030.7) national standards that advanced from prior research achieved by APEP for the DOE utilizing the UCI Microgrid as a platform for both demonstration and development.
- However, high implementation costs may hinder market growth. These systems require constant maintenance and need skilled

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workers to troubleshoot technical issues. These factors impede market growth.

-The COVID-19 outbreak had mixed impacts on the microgrid control systems market. The outbreak caused supply chain disruptions and project delays in the early stages. Subsequently, increased focus on resilient energy infrastructure and remote energy management has accelerated adopting and investing in microgrid control systems.

Microgrid Control Systems Market Trends

Utilities Segment Accounts for a Significant Share in the Market

- Microgrids allow an efficient and dynamic electricity grid by adapting to the growing use of renewable energy sources, such as photovoltaic equipment and electric vehicles. Additionally, reducing energy loss in transmission and distribution further increases the electricity delivery system's efficiency by using Local Energy Resources to serve households' needs.
- As per the U.S. Department of Energy, microgrids will be essential building blocks for a new electricity delivery system by 2035 to ensure resilience, decarbonization, and affordability.
- In March 2023, Volvo Penta partnered with Utility Innovation Group, a decentralized microgrid systems leader in the battery energy storage sector. Both companies cooperate to improve power grid reliability and resilience through battery storage and integration, maximizing renewable energy sources use, including solar and wind.
- Moreover, in January 2023, California utility PG&E created an energy storage microgrid, which has a long duration by combining green hydrogen and batteries, in collaboration with Energy Vault, the firm known for its gravity-based solution. The two firms are partnering to operate and deploy utility-scale battery and green hydrogen energy storage systems.
- As demand for electricity increases, electric power companies are looking at alternative energy sources and have integrated a more decentralized energy source. In managing such complex and decentralized energy networks, optimizing electrical flows to help integrate renewable energies seamlessly and microgrid control systems are essential. According to the EIA, in 2022, electricity generation from electrical utilities in the U.S. increased slightly compared with the preceding year by about 2,537 terawatt hours.

North America Accounts for a Significant Share in the Market

- The increase in renewable energy and distributed generation systems is anticipated to drive the market during the forecast period. The traditional grid market is under increasing pressure. At the same time, its aging infrastructure requires significant overhauls. The US EPA (Environmental Policy Agency) has imposed unprecedented greenhouse gas regulations, further driving the integrated renewable energy microgrid control systems market.
- Moreover, developments by market players in the region are expected to drive the market. For instance, in May 2023, Schneider Electric, a leader in the automation and energy management digital transformation, announced that EcoStruxure Microgrid Flex is an industry-first designed to significantly reduce project cycle times and achieve higher returns throughout the project lifecycle, announced an innovative standardized microgrid solution about investing in in-house systems. Distributed energy resources are estimated to account for 40% of U.S. electricity generation by 2050, increasing the microgrids demand to meet that need. Microgrid systems need significant engineering time and focused attention to configure, plan, and deploy the system.
- In October 2022, ENGIE North America (ENGIE) announced that it had expanded its microgrid offering with state-of-the-art equipment for the Santa Barbara Unified School District. Power and safety outages have become the new normal in California, putting communities under tremendous pressure to mitigate and adapt their immediate impact.
- The rising governmental support in the form of funding and state-level resiliency programs has increased the demand from institutions or campus applications, making it a key driver for U.S. market growth. For instance, in May 2023, the U.S. Department

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of Energy (DOE) announced USD 34 million in funding to advance clean energy technologies in 18 Native American and Indigenous communities in Alaska. The funds will empower tribal communities by increasing access to microgrids and solar power, powering non-electrified tribal buildings, and increasing energy security and resilience.

- The drop in energy storage prices is expected to lower the cost of integrating renewable energy. This factor is also expected to drive the adoption rate of Microgrids in larger communities and commercial and industrial sectors.

Microgrid Control Systems Industry Overview

The Microgrid Control Systems Market is moderately fragmented due to the large initial investments required to start a firm in the market. Some of the major companies in the market include ABB Group, Siemens AG, Hitachi Ltd, Eaton Corporation PLC, Princeton Power Systems, General Electric Corporation, Pareto Energy Ltd, Honeywell International Inc., Northern Power Systems Corporation, and Exelon Corporation, among others. Some key recent developments in the market include:

In March 2023, Siemens Canada partnered with Humber College to develop a Renewable Technology and Sustainable Microgrid Lab (SMART Lab) at its North Campus. Humber's investments in the SMART Lab are based upon sustainable digital technology, supported by the Province of Ontario. To generate and distribute energy locally and to allow for more efficient and sustainable use and consumption of electricity, devices such as electric vehicle charging stations, solar Smartflower, and battery energy storage systems will be used in the microgrid control system.

In March 2023, ABB invested in Direct Current microgrid start-up Direct Energy Partners to accelerate energy transformation. Direct Current (DC) energy networks will be crucial to the evolution of the energy industry, and this partnership enhances ABB's technological leadership in a significant future growth market. Direct Energy Partners' software platform automates the design and sourcing processes for DC Microgrids.

In August 2022, Engineering and management consulting firm Tetra Tech was implementing a 300kW future Microgrid for Oldham Council in Greater Manchester. ABB announced the delivery of electrical distribution and control systems for it. The project's initial phase, scheduled to be finished by the spring of 2023, was to incorporate solar photovoltaic panels, a 500kVA grid connection, EV charging stations, and the energy needs of an office building as heating provided by an air source heat pump.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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