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Japan Smart Grid Market Assessment, By Network Area [Home Area Network (HAN), Neighbourhood Area Network (NAN), Wide Area Network (WAN), and Long Range Wide Area Network (LoRaWAN)], By Components [Hardware, and Software], By Applications[Distribution Automation, Conservation Voltage Reduction (CVR), Substation Automation, and Advanced Metering Infrastructure (AMI)], By End-user [Residential, Commercial, Industrial, and Transportation], By Region, Opportunities, and Forecast, FY2017-FY2031

https://marketpublishers.com/r/J4A10CDC2FE6EN.html
Date: February 2025
Pages: 133
Price: US$ 3,300.00 (Single User License)
ID: J4A10CDC2FE6EN

Abstracts

The smart grid sector in Japan has witnessed remarkable progress, paving the way for substantial developments. By FY2031, the Japan Smart Grid market is anticipated to achieve a noteworthy milestone, with an estimated value of USD 10.49 billion in FY2031, marking a substantial increase from USD 8.12 billion in FY2023 with a CAGR of 3.25% during the forecast period.

The country’s strong commitment to transitioning to a sustainable energy system is propelling the adoption of smart grid technologies. Japan's increasing reliance on renewable energy sources, such as solar and wind, necessitates a modern grid infrastructure to effectively manage and integrate these sources into the existing power system. Additionally, the need to improve grid reliability, installation of smart meters, reduction of transmission and distribution losses, and enhance energy efficiency is fuelling the demand for smart grid solutions. Furthermore, government initiatives,

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regulatory support, and investments in research and development are providing impetus to the development and deployment of smart grids in Japan.

Smart meters play a vital role in Japan's energy landscape. They enable real-time monitoring of electricity consumption, facilitating efficient energy management thereby aiding in adequate customer services. Smart meters also support the integration of renewable energy sources, enhance grid stability, and enable demand response programs. Their implementation aligns with Japan's commitment to building a sustainable energy system, improving grid efficiency, and reducing carbon emissions. Hence, the Japanese government is strongly focusing on increasing the number of smart meter installations and making it mandatory for all the regions of the country. For example, in June 2020, Chubu Electric Power Grid Co., Inc. successfully deployed seven million smart meters using Oracle Meter Data Management (MDM). This accomplishment is a significant milestone within the company's broader initiative to connect 10 million residential and commercial properties by 2023. In response to Japan's Ministry of Economy, Trade and Industry's (METI) mandate in 2014 to liberalize the electricity market, Chubu Electric Power Grid Co. made the strategic decision to implement a smart meter system. Their goal is to eventually provide all customers with smart meters by 2023, aligning with METI's objective to ensure a stable energy supply, reduce energy costs, and create a competitive retail market offering customers greater choice.

Advent of Highly Upgraded Technologies for Smart Grid Systems

Japan has embraced highly advanced technologies for its smart grid systems. These innovations have bolstered energy security, facilitated the integration of renewable energy sources, promoted energy efficiency, and enabled grid flexibility. Supported by proactive government initiatives and policies, these upgraded technologies have paved the way for a more resilient and sustainable energy infrastructure in Japan. The Advanced Distribution Management System (ADMS) is an advanced smart grid technology that is gaining significant traction in the smart grid market. It is recognized as one of the most cutting-edge solutions in the industry, offering advanced functionalities for efficient management and optimization of electricity distribution in smart grids. For example, ETAP ADMS - it provides a smart and resilient decision support platform that utilizes a unified Digital Twin of the electrical network. It combines geospatial-based distribution network applications with critical operational solutions to efficiently manage, control, visualize, and optimize distribution networks and smart grids, regardless of their size.

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Introduction of Smart Microgrid Projects Nationwide

The introduction of smart microgrid projects nationwide marks a significant advancement in the field of sustainable energy management. These projects aim to revolutionize the traditional centralized power grid system by incorporating cutting-edge technologies and advanced monitoring systems. Smart microgrids are localized energy networks that integrate various sources such as solar, wind, and storage systems, providing efficient and reliable power supply to communities. Moreover, with their advanced control and communication systems, smart microgrids enhance energy resilience, promote energy independence, optimize energy usage, and foster a greener future by reducing carbon emissions and increasing energy efficiency.

In 2021, the United States Air Force declared the initiation of a microgrid project at Yokota Air Base in Japan. This project involves an energy savings performance contract (ESPC) and incorporates a combined heat and power plant with microgrid controls. Its primary objectives are to enhance energy resilience and bolster mission readiness. The implemented system has the capacity to generate over 10 MW of power, catering to the critical structures within the base. Additionally, it aims to improve the efficiency of more than 450 buildings, optimizing energy demand. Overall, the introduction of smart microgrid projects in Japan is a significant milestone in the nation's journey towards a smarter and more sustainable energy future.

Government Regulations

In Japan, the government has implemented comprehensive regulations to support the development and deployment of smart grid technologies. These regulations focus on promoting renewable energy integration, demand response programs, and energy efficiency. Moreover, the Japanese government also encourages collaboration between utility companies, technology providers, and consumers to foster innovation in the smart grid sector. Additionally, the Japanese government has laid out lots of schemes, and regulations with the aim to drive the adoption of smart grid technologies and pave the way for a more sustainable and resilient energy infrastructure in Japan.

For example, Electricity regulation in Japan -- The Partial Amendment of the Electricity Business Act and other acts for establishing resilient and sustainable electricity supply systems has led to the revision of the Renewable Energy Act, which was enacted on June 5th, 2020, and became effective on June 12th, 2020. This revised act, called the Act on Special Measures for the Promotion of the Use of Renewable Energy, introduces several key changes. This includes the implementation of a feed-in premium (FIP)

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mechanism, the establishment of a new surcharge system for grid development, the requirement for mandatory external reserves to cover decommissioning costs, and the automatic cancellation of FIT/FIP approval in cases of significant delays. These amendments aim to promote the utilization of renewable energy and ensure a more resilient and sustainable electricity supply system.

Impact of COVID-19

The COVID-19 pandemic had a notable impact on the Japan Smart Grid Market. The lockdown measures and disruptions in supply chains have caused delays in the implementation of smart grid projects. The economic downturn and uncertainty have also resulted in reduced investments in the sector. However, the pandemic has also highlighted the importance of resilient and reliable energy systems, leading to an increased focus on smart grid solutions. The shift towards remote working and increased energy consumption in residential areas has driven the need for smart grid technologies to optimize energy distribution and manage peak loads. Furthermore, the government's stimulus packages and initiatives promoting renewable energy and digitalization have provided opportunities for the smart grid market. Despite the challenges posed by the pandemic, the Japan Smart Grid Market is expected to rebound and grow as the country strives towards a sustainable and efficient energy future.

Key Players Landscape and Outlook

The Smart Grid industry in Japan is experiencing significant growth due to the recognition of grid storage batteries and advanced inverters as they are crucial for maintaining grid stability. Japanese organizations are strategically positioning themselves to preserve their market presence and are actively exploring opportunities for expansion in the Japan market. Moreover, they are increasing their investments in smart meter installations, enhancing energy resilience, implementing technological advancements, conducting research and development, etc. However, few of the notable companies operating in this market are particularly focused on introducing smart grid energy management solutions.

> On March 13th, 2023, Sumitomo Electric Industries, Ltd. introduced a new energy management solution powered by SEMSA technology. This innovation enables versatile applications for grid storage batteries. By employing distinctive architecture, Sumitomo Electric's energy management systems have successfully achieved diverse solutions for efficiently controlling dispersed

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power sources. These solutions include virtual power plants (VPPs) that necessitate integration with power trading markets (such as balancing markets and capacity markets). Additionally, the systems facilitate regional decarbonization initiatives by incorporating renewable energy sources and storage batteries.

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*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work

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