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Global Smart Grid Market: Analysis By Component (Hardware, Software and Services), By Application (Transmission, Distribution, Consumption and Generation), By Technology (Advanced Metering Infrastructure, Distribution & Network Automation, Grid Optimization, Demand Response and Others), By End User (Utility, Residential, Commercial and Industrial), By Region Size and Trends with Impact Analysis of COVID-19 and Forecast up to 2030

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Abstracts

The global smart grid market was valued at US$55.54 billion in 2024. The market value is expected to reach US$145.42 billion by 2030. A smart grid is an advanced electrical system that uses digital communication, data analytics, and automation to improve the efficiency, reliability, and sustainability of power generation, transmission, and distribution. Unlike traditional grids, which rely on a one-way flow of electricity from the provider to the consumer, a smart grid enables two-way communication between utility companies and consumers, along with real-time monitoring of electricity usage.

In the forthcoming years, the smart grid market is expected to continue growing due to several converging trends. One key factor is the increasing demand for more efficient and reliable energy distribution systems as the world transitions toward renewable energy sources. Smart grids enable the integration of solar, wind, and other renewable energy technologies, helping to balance supply and demand more effectively. Additionally, the rise of electric vehicles (EVs) and the need for intelligent infrastructure to manage EV charging stations are contributing to the expansion of the market. Technological advancements, including the Internet of Things (IoT), big data analytics,

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and artificial intelligence, are further boosting the smart grid sector by providing utilities with enhanced tools to optimize energy usage and improve grid reliability. Furthermore, regulatory policies aimed at reducing carbon emissions and promoting energy sustainability are also fostering the adoption of smart grid solutions. Together, these factors position the global smart grid market for steady growth in the years ahead. The market is expected to grow at a CAGR of approx. 17% during the forecasted period of 2025-2030.

Market Segmentation Analysis:

By Component: The report provides the bifurcation of the smart grid market into three segments on the basis of component: Software, Hardware, and Services. The smart grid software segment held a significant share of the global market. As smart grids generate vast amounts of real-time data, software solutions are essential for analyzing this data to optimize power flow, improve system reliability, and integrate renewable energy sources like wind and solar. The increasing demand for energy efficiency and real-time monitoring of grid performance supports the growth of this segment, with innovations such as artificial intelligence and machine learning expected to further enhance the capabilities of smart grid software in the future.

By Application: The report provides the bifurcation of the smart grid market into four segments on the basis of application: Transmission, Distribution, Consumption and Generation. Distribution is the largest segment of the global smart grid market due to its critical role in optimizing the delivery of electricity to end-users, including residential, commercial, and industrial sectors. Smart grid technologies like advanced distribution management systems (ADMS), automated fault detection, and smart meters help reduce energy losses, improve reliability, and enable real-time grid management. With the growing integration of renewable energy sources and the need to upgrade aging infrastructure, the distribution segment is essential for managing bidirectional electricity flow and enhancing consumer engagement, driving its continued growth.

By Technology: The report provides the bifurcation of the smart grid market into five segments on the basis of technology: Advanced Metering Infrastructure (AMI), Distribution & Network Automation, Grid Optimization, Demand Response and Others. Among the technology, AMI segment dominated the market in 2024. This market's dominance is attributed to its ability to provide utilities with real-time data on energy consumption, enabling accurate billing, better demand management, and the implementation of dynamic pricing strategies. The growing need for efficient energy management, along with the modernization of infrastructure and the focus on reducing

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operational costs, has driven the widespread adoption of smart meters and AMI systems.

By End User: The report provides the split of global smart grid market into four segments in terms of end-user: Utility, Industrial, Residential and Commercial. The Utility segment holds the highest market share, as utilities are the primary entities responsible for the generation, distribution, and management of electricity. Smart grid technologies in this segment enable utilities to monitor and manage the grid efficiently, integrate renewable energy sources, and improve grid stability. Additionally, technologies such as Advanced Metering Infrastructure (AMI), distribution automation, and grid optimization solutions are increasingly being adopted by utilities to enhance operational efficiency, reduce outages, and better manage energy consumption. With the growing push for renewable energy integration, grid modernization, and more resilient energy systems, the utility segment is expected to maintain its dominant share in the market.

By Region: In the report, the global smart grid market is divided into four regions: North America (the US, Canada, and Mexico), Europe (Germany, UK, France, Italy, and Rest of Europe), Asia Pacific (China, Japan, India, South Korea, and rest of Asia Pacific), and Rest of the World. In 2024, the North America region led the smart grid market, propelled by strong government support, ongoing infrastructure modernization, and a high adoption rate of advanced technologies. The region’s commitment to sustainability, energy efficiency, and the integration of renewable energy sources, along with significant investments in smart grid solutions, has driven its market leadership.

During 2025-2030, the US is forecasted to maintain its lead within North America, due to its continued investment in smart grid infrastructure, government initiatives promoting clean energy adoption, and advancements in technology such as artificial intelligence and big data analytics. Additionally, the growing focus on renewable energy integration, electric vehicle charging infrastructure, and grid modernization efforts are likely to further solidify the US's dominance in the smart grid market.

Market Dynamics:

Growth Drivers: The global smart grid market growth is predicted to be supported by numerous growth drivers such as integration of renewable energy sources, increasing investment in smart infrastructure, rising demand for electric vehicles and charging infrastructures, growing energy demand and rapid urbanization, and many other factors. The surging need for grid modernization is a key growth driver of the global smart grid

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market, as aging grids, many built in the 1960s and 1970s, become inefficient and prone to outages. Rising energy demands, renewable energy integration, and extreme weather events further strain grid reliability. In the U.S., much of the grid is nearing the end of its life cycle, while smart grid technologies like sensors and real-time monitoring enhance performance and balance renewable energy. The global need for resilient grids is driving the growth of the smart grid market as utilities seek innovative solutions for future energy demands and grid stability.

Challenges: However, the market growth would be negatively impacted by various challenges such as high initial capital investment, cybersecurity risks, etc.

Trends: The market is projected to grow at a fast pace during the forecast period, due to various latest trends such as upsurge in investments in energy sector, emergence of virtual power plants, technological advancements in smart grid solutions, incorporation of blockchain technology, enhanced consumer engagement through smart technologies, etc. Blockchain technology is becoming a key trend in the smart grid market due to its ability to enhance security, transparency, and efficiency. By providing a decentralized and immutable ledger, it securely tracks energy production, consumption, and trading, enabling peer-to-peer energy trading. This reduces reliance on traditional utilities and ensures transparent, tamper-proof data access. Blockchain also strengthens cybersecurity by adding protection against cyberattacks in interconnected smart grids. Its role in optimizing grid management, integrating renewable energy, and facilitating demand-response programs makes it a vital enabler of the future smart grid ecosystem, driving growth and innovation in the market.

Impact Analysis of COVID-19 and Way Forward:

The COVID-19 pandemic significantly disrupted the global smart grid market due to supply chain challenges, project delays, and reduced investments in infrastructure. However, post-pandemic recovery, along with the growing focus on energy efficiency, renewable energy integration, and digitalization, is driving the market's resurgence. The increasing demand for resilient and sustainable energy systems, coupled with advancements in smart grid technologies such as IoT, AI, and blockchain, is fueling market growth. Additionally, the rising need for grid modernization, improved grid reliability, and enhanced consumer engagement in the post-COVID era is further boosting the adoption of smart grid solutions across the globe.

Competitive Landscape:

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The global smart grid market is highly competitive, with a mix of established players and emerging companies. The key players in the global smart grid market are:

ABB Group
Schneider Electric SE
Siemens AG
Cisco Systems, Inc.
GE Vernova Inc. (General Electric Co)
International Business Machines Corporation
Itron, Inc.
Eaton Corporation PLC
Honeywell International Inc.
Hitachi, Ltd.
Landis+Gyr Group AG
Oracle Corporation

The key players are constantly investing in strategic initiatives, such as new product launch, introducing their products to emerging markets and more, to maintain a competitive edge in this market. For instance, in October 2024, Schneider Electric unveiled new smart grid application developments that enhance flexibility, net zero demand management, and increase the resilience of the grid’s infrastructure at Enlit Europe 2024. On the other hand, in February 2024, Siemens announced the launch of its new offering Gridscale X, a modular software product intended for the autonomous management of utility grids and the digital transformation of a utility’s business processes. It allows for the rapid scaling of operators' capacity, better management of the increasing complexity of distributed energy resources (DERs) and increases the flexibility of the grid simultaneously.

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