Distributed Energy Generation Market Assessment, By Technology (Diesel and Oil Gensets, Natural Gas Gensets, Mini Hydropower Grids, Gas & Steam Turbines, Fuel Cells, Solar Photovoltaic, Wind Turbines, and Biomass Generators), By End-user (Residential, Commercial, and Industrial), By Region, Opportunities, and Forecast, 2016-2030F

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Report description:

The Global Distributed Energy Generation Market has seen substantial expansion in recent years and is projected to continue growing at a remarkable rate in the future. At present, the market's worth is estimated to be USD 92.65 billion in 2022, and it is anticipated to reach USD 233.36 billion in 2030, exhibiting a CAGR of 12.24% during the forecast period spanning from 2023 to 2030. The market growth is driven by adoption of small-scale renewable energy at off-grid locations. Small-scale renewable energy systems allow for the generation of power at or near the point of consumption. This decentralization reduces the need for long-distance transmission lines and decreases energy losses associated with transmitting electricity over long distances. It also enhances the reliability and resilience of the energy grid by reducing the vulnerability to disruptions in a centralized power system.

Solar photovoltaic (PV) panels are an excellent example of small-scale renewable energy systems for distributed energy generation. Moreover, small-scale solar PV (Photovoltaic) systems offer numerous benefits. Firstly, they enable individual homes and businesses to generate their own clean energy, reducing reliance on traditional fossil fuel-based electricity sources. This leads to lower carbon emissions and helps combat climate change. Secondly, solar PV systems contribute to energy self-sufficiency and resilience by diversifying the energy sources and reducing dependency on centralized power plants and transmission infrastructure. Hence, governments worldwide are focusing on increasing solar power capacities.

For example, in 2021, solar power generation across the globe achieved a remarkable milestone worldwide by increasing by a record-breaking 179 terawatt-hours (TWh), marking a 22% rise and surpassing a total of 1,000 TWh. Furthermore, solar PV is

becoming the most cost-effective option for new electricity generation across many regions globally, leading to anticipated increased investments in the sector. Likewise, adoption of other renewable energy generation at source is further driving overall market growth and facilitating the transition to sustainable energy sources.

Continuous Rise in the Hydropower Capacity Worldwide

Governments across the globe are focusing on expanding hydropower capacity for distributed energy generation purposes. Hydropower facilities are being built at various scales, ranging from medium size dams to smaller run-of-river installations. This flexibility allows for distributed energy generation, where power is generated closer to the point of consumption. Additionally, distributed hydropower systems offer advantages such as reduced transmission losses and improved grid stability, making them an attractive option for governments seeking to enhance energy security and resilience. Moreover, installing such plants allows governments to reduce electrical power tariffs.

For instance, in 2023, as part of its ongoing initiative to lower power prices, the State-run Electricity Generating Authority of Thailand (Egat) has commenced operations at its 10th mini-hydropower plant in Uttaradit . The new facility brings the total generation capacity of mini-hydropower plants to 102MW in Thailand. Hence, governments worldwide are focusing on the installation of hydropower plants for the distribution of energy to local areas across the world. Thus, it can be clearly elucidated that continuous development in hydropower capacity worldwide is augmenting market growth.

Development of Technologically Advanced Wind Turbines

The adoption rate of technologically advanced wind turbines for distributed energy generation has been increasing worldwide. Advanced wind turbine technologies have led to significant improvements in efficiency and performance. Modern wind turbines utilize sophisticated design features such as larger rotor diameters, taller towers, and aerodynamic enhancements, resulting in increased power output and higher capacity factors. These improvements make wind energy more productive and reliable for distributed generation. Moreover, the onshore wind turbine is more commonly used for windpower distribution worldwide compared to the offshore wind turbines. For example, GE Renewable Energy's 3 Megawatt (MW) onshore wind turbine platform is built upon the advancements of its predecessors and offers adaptability across a wide range of adverse wind conditions. The turbines within this platform have power outputs ranging from 3.2 to 4.2 MW. These 3 MW turbines have technologically advanced drivetrain and electrical system architecture, which delivers improved performance and increased energy production compared to earlier models . Therefore, development and adoption of such technologically advanced wind turbines is expected to amplify distributed energy production.

Asia-Pacific to Dominate

The Asia-Pacific region is leading the demand for distributed energy generation and is expected to maintain its position for a long period of time in the future. The market growth in the Asia-Pacific region can be attributed to factors such as a growing population, rapid urbanization, and an increasing demand & capacity for renewable energy. Countries like India, China, Indonesia, and Malaysia are experiencing significant urban development and a rising need for energy, thereby driving the market expansion in the region. For instance, according to National Energy Administration (NEA) and the National Bureau of Statistics (NBS), renewables accounted for the majority of newly installed power capacity in China, with incremental renewable capacity comprising 76.2% of the overall new installations. Moreover, China's total renewable energy capacity reached 1,213 GW in 2022, representing 47.3% of the country's total generation capacity. Therefore, due to the increasing demand for distributed energy generation in the Asia-Pacific region is anticipated to offer favorable prospects for market expansion in the foreseeable future.

Government Initiatives

Government initiatives and policies play a crucial role in supporting the growth of distributed energy generation from renewable sources. These initiatives aim to promote renewable energy adoption, incentivize investment, and create an enabling environment for distributed generation. Additionally, in some regions governments often enter into Purchase Power Agreements (PPAs) with developers of distributed energy systems, promising the purchase of electricity generated from these systems. PPAs provide stability and financial security for project developers, enabling the growth of distributed energy projects. Apart from this, there are regulations to measure distributed energy. For example - Net Metering -The Indian government has given approval for net metering to be implemented for rooftop solar systems in June 2021, with a capacity of up to 500 kilowatts (kW). The net metering facility utilizes a single bidirectional energy meter located at the point of supply. This meter calculates the energy imported from the grid and the energy exported from the grid-interactive rooftop solar system of a prosumer (a consumer who is also a producer

of electricity) at separate tariff rates . This facilitates adoption of renewable energy as it helps in saving cost, thereby enhancing the growth rate of renewable energy distribution.

Impact of COVID-19

Lockdown measures and economic slowdowns have led to fluctuations in energy demand patterns. Commercial and industrial sectors, which are significant consumers of distributed energy generation, experienced varying levels of disruption, impacting the deployment of new renewable energy projects. Most of the regions across the world was adversely impacted due to this pandemic, but in the Asia-Pacific region, China had a huge positive impact on the market as compared to the other countries like India, Malaysia, Japan, etc. The pandemic highlighted the importance of energy resilience and reliable power supply. As a result, there has been an increased interest in distributed energy systems such as microgrids, which can provide localized power generation and improve resilience during disruptions. For instance- In the first half of 2021, China witnessed a notable growth in electricity consumption and production, with an increase of 13.7% and 16.2% respectively. Additionally, there was an increase in investment in power generation projects by USD 8.9 billion, and investment in power grid projects rose by USD 4.7 billion. Compared to the same period in the previous year, there was an installation of 14.92 GW of new renewable energy capacity. As a result of lockdown measures, residential power usage in Chinese households experienced a rise of 6.6% and 4.5% during the first two quarters of 2020 and 2021, respectively. Furthermore, to minimize COVID-19's impact on renewable energy development and assist in building offshore wind power plants, economic and financial measures in China had been introduced by the government to reduce the pandemic's effect on solar PV systems. Therefore, it can be elucidated that China's market expanded extensively during the pandemic as compared to the other countries across the globe.

Key Players Landscape and Outlook

The global distributed energy generation market is experiencing significant growth, prompting multinational companies to dedicate more resources to research and development, marketing efforts, and the expansion of distribution networks. Companies are actively engaged in market expansion and trying to grab market share with less penetrated regions regarding distributed energy generation.

On May 25th, 2023, Vestas, a leading wind energy company, has been awarded a 37 MW contract for a wind project located in Turkey. The contract involves the transportation and setup of six V162-6.2 MW wind turbines, along with a 10-year service agreement. This order further strengthens Vestas' presence in Turkey, with a total of over 130 MW of EnVentus projects secured. The utilization of the V162-6.2 MW turbines will not only enhance the annual energy production but also optimize the customer projects' financial viability, contributing to the overall expansion of distributed energy generation

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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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