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Japan Clean Energy Market Assessment, By Type [Hydropower and Tidal Power, Wind Power, Solar Power, Geothermal Power, Biomass and Waste, Nuclear Power, Green Hydrogen], By End-user [Residential, Commercial, Industrial, Others], By Region [North, Central, South], Opportunities and Forecast, 2016-2030F

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Abstracts

The adoption of clean energy has been driven by declining costs, technological advancements, supportive policies, and increasing public awareness. Individuals, businesses, and governments are adopting clean energy solutions to reduce carbon emissions and improve air quality. Total renewable energy capacity additions in 2022 were 8.99 GW.

Japan heavily depends on imported fossil fuels, such as liquefied natural gas (LNG), coal, and oil, to satisfy its energy needs. In the fiscal year 2022, Japan spent USD 54.9 billion to import Crude Petroleum, making it the fifth largest importer of this resource worldwide. Fossil fuels constituted 72.4% of the total electricity generated in the fiscal year 2023, while Renewable Energy accounted for 20.3% and nuclear power contributed 6.9% to Japan's electricity generation. Consequently, the market is experiencing significant growth due to the country's strong push towards cleaner energy sources, aiming to reduce its reliance on oil imports and improve energy security.

Net Zero Commitment Boosting the Demand for Clean Energy

The Paris Agreement, under the United Nations Framework Convention on Climate Change (UNFCCC), sets the goal of restraining global warming to less than a 2-degree

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Celsius increase above pre-industrial levels, with additional efforts to limit the rise to 1.5 degrees Celsius. Hence, Japan is one of the 136 nations that has committed to reach net zero emission target by 2050 to limit this rise in temperature by switching to cleaner energy. The 6th Strategic Energy Plan launched in FY 2022 aims to achieve 46% reduction in GHG emissions and a share of renewables and nuclear in the power mix of approximately 36-38% and 20-22%, respectively by FY3031. Hence, strategic shift in clean energy transition is propelling demand for clean energy generation and thereby boosting the market growth.

Technological Enhancements Improving Solar Panels Efficiency

Japan is making technological advancements to boost investments in large-scale renewable energy projects like rooftop solar installations, laying a strong foundation for reducing its reliance on fossil fuels. As available land for large-scale photovoltaic (PV) systems becomes limited, Japan's PV policy is shifting its focus towards rooftop and commercial PV models. Therefore, leading domestic companies like Trina Solar and JinkoSolar are transitioning from conventional PERC (Passivated Emitter and Rear Cell) solar cells to the more advanced Tunnel Oxide Passivated Contact (TOPCon) technology. This technological upgrade enhances module efficiency and enables improved power density from a given area, positioning it as the next-generation solution. DAS Solar, currently operating 30 GW of TOPCon cell capacity, has plans to expand its operations to 40 GW by the fiscal year 2024, further driving these advancements in the solar panel efficiency domain.

Government Supporting Investments in Clean Energy

Government expenditure has played a pivotal role in driving the rapid expansion of clean energy investments. Recognizing this, the Japanese Cabinet embraced the green growth strategy in December of the fiscal year 2022. This industrial policy aims to foster a mutually beneficial cycle of economic growth and environmental protection, with the active involvement of the business community. As part of this strategy, a fund amounting to USD 16.87 billion has been established to promote ecological businesses and foster innovation in order to achieve the net-zero targets. Additionally, the implementation of a carbon tax is currently being deliberated.

Moreover, Japan's Ministry of Energy (MoE) has made USD 151 billion in funding available for a range of renewable energy, energy storage, and decarbonization projects until 2030. In a further move, the Japanese Ministry of Economy, Trade, and Industry (METI) has replaced feed-in tariffs (FiTs) for large solar PV projects (>250 kW) with a

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tendering program, which relieves consumers of surcharge burdens and attracts both foreign and domestic players. Consequently, the government's support through investments and regulatory relaxations is facilitating the establishment of clean energy generation hubs, thereby positively impacting market growth.

Impact of COVID-19

Despite being one of the world’s third largest economy Japan was heavily impacted by COVID-19. Some of the short-term impacts were severe and there was a slowdown in projects reaching commercial operation due to a combination of physical problems, delivery constraints and financial barriers. To mitigate and revamp the economic slowdown.

However, in April 2020, the Japanese government incorporated renewable energy as part of its USD 992 billion economic stimulus package. This initiative falls within the Development of Resilient Economic Structures category, with an allocation of nearly USD 1 billion to encourage corporate power purchase agreements (PPAs) and promote the installation of onsite renewable energy sources. This is complemented by renewable and clean energy capacity addition to increase the share of renewables and nuclear energy in the power mix of 36-38% and 20-22%, respectively by FY2031. Hence, COVID-19 pandemic resulted in influencing the government to invest heavily in clean energy space to enhance energy security and cut dependency on fossil fuels.

Impact of Russia-Ukraine War

The global surge in energy prices due to Russia Ukraine war has dealt a particularly serious blow to Japan, which is reliant on imports for most of its energy resources. Japan imported 13.879 million mt of thermal coal from Russia in FY2022, the second highest after Australia, which sent 81.669 million mt of volumes last year. To alleviate the financial burden on households and businesses caused by high electricity bills, the Japanese government has put emphasis on Demand Response (DR) to incentivize energy conservation. Furthermore, the surge in price of crude oil led the government to pursue investment in renewables and clean energy generation to reduce dependency to meet energy demand. Hence, this geo-political conflict helped in driving the market growth.

Key Players Landscape and Outlook

The Japanese government is investing in the establishment of offshore wind turbines to

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lead Japan's energy transition and address multiple challenges faced by the country like limited land availability. Japan has limited land availability due to its geographical constraints. The country's mountainous terrain and densely populated coastal areas make it challenging to find suitable sites for large-scale renewable energy projects, including onshore wind farms. By turning to offshore wind, Japan can tap into its abundant offshore resources, utilizing the vast expanses of sea surrounding the archipelago. Hence, companies operating in Japan Clean Energy market are working alongside the government to help establish offshore wind farms.

For instance, in 2023, a collaborative effort involving several Japanese companies, such as Electric Power Development, Tokyo Electric Power, Chubu Electric, Kawasaki Kisen Kaisha, and Albatross Technology, has been established to undertake the development of a demonstration project for the next-generation floating axis offshore wind turbine. These companies aim to develop a small 20kW experimental floating axis turbine with the objective of reducing cost and enhance the production of energy.

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