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Japan Hydropower Market Assessment, By Type [Impoundment, Diversion, and Pumped Storage], By Size [Large Hydropower (Above 30 MW), Small Hydropower (100 kW to 10 MW), Micro Hydropower (up to 100 kW)], By Components [Electromechanical Equipment's, Electric Infrastructure, Civil Works], By Sector [Public and Private], By End-user [Residential, Commercial, Industrial], By Region, Opportunities, and Forecast, FY2017-2031F

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Abstracts

Japan has been experiencing significant advancements in its hydropower sector. In FY2023, the Japan hydropower market will witness a net addition of 6 MW. This will increase to a net addition of 6.3 MW in FY2031, growing at a CAGR of 0.7%.

Japan has a long history of hydropower development, with large-scale projects constructed in the past. However, due to land constraints, further large-scale development is limited. In recent years, there has been a shift towards small-scale hydropower projects that utilize smaller rivers and streams. These projects aim to generate clean energy locally. Environmental conditions are considered, and the government promotes renewable energy, including hydropower.

The Shin-Takasegawa Pumped Storage Station in Nagano Prefecture, Japan, is a notable example of hydropower projects contributing to Japan's market growth. This hydroelectric facility utilizes the Takase River, a tributary of the Shinano River, to operate a pumped storage hydroelectric scheme with an installed capacity of 1,280 megawatts. The station's upper reservoir, formed by the Takase Dam, serves as the

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water storage for power generation. Standing at a height of 176 meters, the Takase Dam is the tallest in Japan and the second tallest in the country, following the Kurobe Dam. This project exemplifies Japan's commitment to harnessing water resources for clean energy production, providing a reliable source of renewable electricity while minimizing environmental impact through a run-of-river design. Such hydropower initiatives are instrumental in accelerating Japan's overall market growth in the renewable energy sector.

Carbon-Free Solution Driving Green Energy and Emission Reductions

Hydropower plants in Japan generate electricity without burning fossil fuels, resulting in zero direct emissions of carbon and other greenhouse gases (GHGs) during the generation process. This carbon-free attribute significantly contributes to reducing overall GHG emissions in the country's energy sector. Hydropower serves as a reliable and renewable energy source, displacing the need for power generation from fossil fuel sources like coal, oil, and natural gas. By replacing these carbon-intensive fuels, hydropower helps avoid substantial CO2 emissions that would have occurred if fossil fuel power plants were utilized instead.

Hydropower generation in Japan accounts for around 10% of the nation's total electricity production, playing a vital role in reducing carbon dioxide (CO2) emissions. With hydropower generation being emission-free, it contributes to an annual reduction of approximately 70 million tons of CO2 compared to power generation from sources like oil-fired thermal power, equivalent to about 6% of Japan's total carbon emissions. Consequently, the significant reduction of greenhouse gas (GHG) emissions through hydropower is driving the rapid growth of Japan's hydropower market.

Hydropower Capacity Soars with Government Support and Technological Advancements

Japan's hydropower capacity has risen steadily due to government policies, technological advancements, and a commitment to renewable energy. Upgraded turbine and generator technologies have boosted plant efficiency and power output. Innovations in equipment and control systems have enabled higher capacity installations, improving overall performance. Developing small-scale projects utilizing local water bodies in rural areas has also contributed to capacity growth, providing decentralized power generation and benefiting local communities.

Japan aims to achieve 9.6% of its electricity generation from hydropower sources by

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2030. The government offers feed-in tariffs to encourage the development of small-scale hydropower projects. These tariffs provide a guaranteed payment of USD 0.26 per kilowatt-hour for capacities below 200 kW over 20 years. For capacities between 200 kW and 1 MW, the tariff is USD 0.22 per kilowatt-hour, and for capacities between 1 MW and 3 MW, it is USD 0.18 per kilowatt-hour. The continuous growth in Japan's hydropower capacity is a significant market expansion driver.

Government Regulations

The Japanese government has enacted a comprehensive set of regulations and policies to govern the hydropower market within the country, prioritizing sustainable development, efficient operation, and environmental protection of hydropower projects. One notable regulation is the Environmental Impact Assessment (EIA), which mandates that hydropower projects undergo thorough assessments to identify and mitigate potential environmental and social impacts. The EIA process evaluates the project's effects on water resources, aquatic ecosystems, biodiversity, and local communities and imposes strict adherence to environmental standards.

Under the national Environmental Impact Assessment Law (EIA Law), Type I power plants, which include hydroelectric power plants with an installed capacity of 30,000 kW or higher, or 22,500 kW or higher if significant construction or renovation work is involved, require comprehensive environmental impact assessments (EIAs) before their construction. This stringent regulatory framework ensures that hydropower projects in Japan are developed and operated in an environmentally responsible manner, safeguarding the country's natural resources and ecological balance. Implementing the EIA and other regulatory measures has significantly influenced the hydropower market in Japan.

Impact of COVID-19

The COVID-19 pandemic caused fluctuations in electricity prices due to reduced energy demand, impacting hydropower operators' revenue streams. Construction activities and project timelines were disrupted, leading to delays and financing challenges. However, with the gradual resumption of economic activities, electricity demand and prices stabilized. The pandemic had a mixed impact on Japan's hydropower market, presenting temporary challenges in project development and revenue generation. Nevertheless, the sector's stability and policy support helped mitigate some adverse effects. As the economy recovers and energy demand rebounds, the hydropower market is expected to regain momentum, contributing to Japan's renewable energy

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goals.

Key Players Landscape and Outlook

As Japan's hydropower market experiences ongoing growth, international companies are keenly aware of preserving their market share and expanding globally. To achieve these objectives, they are placing a strong emphasis on maintaining quality and strategic brand positioning. Additionally, these companies are making substantial investments in research and development, marketing efforts, and expanding their distribution networks.

In April 2023, Toshiba Corporation and its energy business arm, Toshiba Energy Systems & Solutions Corporation, signed a Virtual Power Purchase Agreement (VPPA) for the Smart Community Center in Kawasaki, Japan. The agreement and FIT non-fossil certificates will ensure the Center's energy requirements are met from renewable sources, including hydropower, starting April 2023. This aligns with Toshiba Group's 'Environmental Future Vision 2050,' which aims to address climate change and advance the circular economy.

In July 2021, Veolia and Metawater Co., Ltd. and eight local partners signed a concession contract to oversee water services in Miyagi Prefecture, Japan. This collaboration enables Veolia to expand its global water services and adds a significant project portfolio in Japan. The Miyagi concession covers drinking water, industrial water, and sewage treatment.

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