Japan High Voltage Direct Current (HVDC) Transmission Systems - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

Market Report | 2025-04-28 | 95 pages | Mordor Intelligence

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Report description:

The Japan High Voltage Direct Current Transmission Systems Market is expected to register a CAGR of 6.51% during the forecast period.

Key Highlights
- The underground and submarine HVDC transmission system segment is expected to account for the largest share in the Japanese HVDC transmission systems market in terms of transmission type. This is primarily due to the several projects for connecting different islands with HVDC transmission systems owing to several preferable properties, such as low power loss and safety from natural calamities.
- In terms of components, the converter stations segment held the largest share of the market studied. Factors such as increasing demand for bulk power transmission, increasing penetration of HVDC and connecting AC line to DC line for efficient transmission lead to the increased demand for converter stations.
- Japan is undergoing a significant energy transition and is shifting away from fossil fuels. The increasing penetration of renewable energy, especially offshore wind, and solar energy, is expected to drive the market's growth in Japan. In 2020, the government of Japan announced its plan to install 45 GW of offshore wind power in the country by 2040, which foreshadows the increase in demand for subsea transmission lines.

Japan HVDC Transmission Systems Market Trends

Increasing Demand for Underground and Submarine HVDC Transmission Systems

- The submarine transmission of electricity is gaining importance, on account of increasing focus on renewable energy, such as wind energy, and power trading with neighbouring countries.
- The submarine direct current transmission requires a converter station at each end to make the DC interact with the AC grid network. In an HVDC transmission system, the submarine power cables have a much more complicated structure, compared to the overhead transmission lines, which are only composed of conductors.
- To support its offshore wind energy plan, in June 2020, the government launched its first offshore wind energy auctions in the country, under its offshore wind promotion law of 2019. Further, in April 2021, construction began at the country's first large-scale offshore wind farm, called Akita Noshiro. Such developments in the country's offshore wind energy sector are expected to create demand for submarine HVDC transmission systems during the forecast period.
- Apart from wind energy, Japan's territory comprises the four large islands of Hokkaido, Honshu, Shikoku, Kyushu, and other smaller islands, which makes the submarine HVDC system a preferable and much-needed choice for the country's electricity connectivity.
- Therefore, owing to the above points, the installation and demand for underground and submarine HVDC systems are expected to increase during the forecast period, thus making is largest segment in the market.

Growing Renewable Energy Sector Expected to Drive the Market

- The Japanese power supply has been undergoing a significant transition, shifting away from fossil fuels and renewable energy sources. Moreover, wind and solar PV are on track to become the cheapest sources of electricity, thereby, providing new opportunities for decarbonization. Furthermore, as a more significant number of coal plants are decommissioned, renewable generation is expected to play a vital role in fulfilling the increasing energy demand.
- The cost of renewable power generation, mainly solar and wind power generation, has been continuously declining. The primary reasons are manufacturing innovations, improvement in wind turbine materials and designs, economies of scale.
- Renewable power generation facilities, such as offshore wind energy in Japan, are generally located far from the end-users. They require long-distance transmission lines to provide generated electricity to the consumers.
- The HVDC has become an integral part of many transmission grids. It can connect remote sources of electrical generation (renewable sources, like hydro or wind) to load centers where it is needed, hundreds or even thousands of kilometers away.
- As the HVDC lines are better suited for long-distance power transmission; hence, for power transmission companies HVDC transmission lines are more attractive option over HVAC for renewable power plants. They ensure high availability, minimal maintenance, and lower losses (by around 50% than HVAC).
- The country's offshore wind energy sector is expected to witness a gradual growth in total installed capacity. Thus, this is expected to create a significant demand for renewable energy, integrating with the grid in the coming years. Therefore, in addition to solar and onshore wind farms, the offshore wind energy sector is expected to create a considerable demand for HVDC transmission systems in Japan during the forecast period.
- Moreover, according to the New Energy and Industrial Technology Development (NEDO), offshore wind power potential in Japan based on wind development criteria is about 1,380 million kW, distributed along the Japan coastal trip and primarily located away from large load areas. Approximately 70% of them are expected to be situated along the coast of the Hokkaido, Tohoku, and Kyushu regions.
- Therefore, owing to the above points, increasing installations of renewable energy are expectd to drive Japan high voltage direct current (HVDC) transmission systems market dirng the forecast period.

Japan HVDC Transmission Systems Industry Overview

The market for high voltage direct current (HVDC) transmission systems in Japan is consolidated. Some of the major players in this market include Hitachi ABB Power Grids Ltd, Sumitomo Electric Industries Ltd, Toshiba Corporation, and Mitsubishi Electric Corporation.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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