

Solid-State Transformer Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 84 pages | Mordor Intelligence

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Report description:

The potential market size of the solid-state transformer was estimated at USD 4.97 million in 2021. It is expected to reach USD 7.12 million by 2027, at a CAGR of 5.38% during the forecast period (2022-2027). In 2020 and Q1 2021, the solid-state transformer market in the United States and Canada was impacted by the COVID-19 pandemic. During the pandemic, several transmission and renewable projects were delayed, causing a decrease in the demand for transformers. For instance, in 2020, Greek industrial group Mytilineos' turnover from its renewables and storage development decreased by 40% due to contracting and construction delays caused by the pandemic. Increasing integration of renewable energy in the power generation mix and increasing investment in smart grid technologies are expected to drive the market during the forecast period. The technical advantages of solid-state transformers over conventional transformers are likely to drive the market. However, performance constraints, such as high cost and reliability, are expected to restrain the market's growth during the forecast period.

Key Highlights

In recent years, the smart grid investments remained focused on hardware, such as digital substations and smart meters. The smart grid application segment is expected to dominate the solid-state transformer market during the forecast period. Reduced prices due to mass production, investments in R&D by manufacturers, and technological advancements are expected to create immense opportunities for the solid-state transformer market in the coming years. Asia-Pacific is expected to be the largest and fastest-growing market during the forecast period, with most of the demand coming from countries like China, India, and Japan.

Solid-State Transformer Market Trends

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Smart Grid Application is Expected to Dominate the Market

A smart grid is an electricity network/grid enabling a two-way flow of electricity and data. The concept of the smart grid accelerated in the last two decades. It has now become an essential part of the digital transformation of the electricity sector. Due to their modular construction flexibility, enabling bi-directional power flow, and deployment in AC and DC grids, solid-state transformers are preferred more than conventional transformers in smart grids.

The three-stage solid-state transformers are typically designed for smart grid applications in which they have bi-directional power flow to transfer power from low voltage to high voltage.

Recently, the modernization of the grid to accommodate power flows, serve reliability needs, and meet future projected usage led to the incorporation of electronic intelligence capabilities for power control purposes and operations monitoring, which is driving the demand for smart grid technologies such as solid-state transformers.

For instance, in December 2020, GridWise Alliance in the United States launched its comprehensive Policy Framework for Grid Investments in Economic Recovery, which outlines the need for USD 50 billion in federal spending for grid modernization. Several such grid modernization plans are expected to increase the demand for solid-state transformers in smart grids during the forecast period.

Major companies and countries are becoming more involved in the technological advancement and development of new and more efficient solid-state transformers used for grid applications. For instance, in March 2021, Hitachi ABB Power Grids and Nanyang Technological University, under the Singapore government's flagship Energy Grid 2.0 initiative to shape the next-generation grid system, collaborated to work together on the advancement of solid-state transformer (SST) technology.

Therefore, based on the factors mentioned above, the smart grid application segment is expected to dominate the solid-state transformer market during the forecast period.

Asia-Pacific to Dominate the Market

Asia-Pacific is expected to be the largest and fastest-growing market due to the increasing investment in smart grid technology and the increasing demand for electricity, leading to increased investment in power infrastructure across the region.

China is the world's largest market for power transmission and distribution (T&D). It is projected to become a significant consumer of smart grid technology, supported by its policy to reduce carbon emissions and commitment to green development. <In 2021, the total electricity generation from the various sources in the Chinese power sector was 8.11 trillion kilowatt-hours (KWh). Energy sources contributing to the country's energy generation include coal, natural gas, the nuclear, wind, hydro, biofuels, and solar energy. Since China has the largest industrial sector, the country's energy demand has been rising continuously owing to rapidly growing industrial demands.

With the growing investment in distribution networks, companies are now focusing on smart grids, which is likely to drive the demand for SST in China during the forecast period.

As of February 2021, India's total thermal installed capacity stood at 233.17 GW. The installed capacity of renewable, hydro, and nuclear energies totaled 91.15 GW, 46.20 GW, and 6.78 GW, respectively. The government plans to double the share of installed electricity generation capacity of renewable energy to 40% by 2030. India also raised the solar power generation capacity target by five-fold, to 114 GW, by 2022. The government is preparing a 'rent a roof' policy for supporting its target of generating 40 GW of power through solar rooftop projects by 2022. The peak power demand in the country stood at 170.83 GW in FY 2020.

Furthermore, the Government of India has set a target to install 227 GW of renewable energy capacity by the end of 2022. As of June 2019, the Government launched USD 5 billion of transmission-line tenders. The investment in the low and medium voltage transmission lines is likely to provide opportunity for SST deployment during the forecast period.

Therefore, based on the factors mentioned above, Asia-Pacific is expected to be the largest and fastest-growing market during the forecast period.

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Solid-State Transformer Market Competitor Analysis

The solid-state transformer market is consolidated with very few companies and research institutes operating in the market, including Delta Electronics Inc. and Hitachi Energy Ltd.

Additional Benefits:

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

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