

Solid Oxide Fuel Cells - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

Market Report | 2025-04-28 | 135 pages | Mordor Intelligence

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Report description:

The Solid Oxide Fuel Cells Market is expected to register a CAGR of greater than 49% during the forecast period.

COVID-19 negatively impacted the market in 2020. Presently the market is likely to reach pre-pandemic levels.

Key Highlights

- Over the long term, the SOFC market is likely to grow in the future due to the energy conversion efficiency of the cells compared to other power generation sources and long-term stability.
- However, the market can be constrained due to the high cost of the technology compared to alkaline fuel cells.
- Non- Vehicular segment is expected to dominate the market in the coming years due to the demand for stationary high-temperature applications.
- Nevertheless, the technological milestones create ample opportunities for the market. For instance, Phillips 66 Company received a USD 3 million grant from the US Department of Energy (DOE) to develop high-performance reversible solid oxide fuel cells. The company will collaborate with the Georgia Institute of Technology to demonstrate the feasibility of this system for hydrogen and electricity generation.
- The Asia-Pacific region is likely to have the major share in this evolving scenario due to the favorable government policies for cleaner power supply sources.

Solid Oxide Fuel Cells (SOFC) Market Trends

Non-Vehicular segment expected to Dominate the Market

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- Stationary power sources are designed to provide power, not to move. It primarily includes main power units, uninterruptible power systems (UPS), and heat and power (CHP) co-generation systems. SOFC's used in CHP systems generate electricity and heat from a single fuel source. SOFC's are used in both large stationary combined heat and power (CHP) and small stationary micro-CHP.
- Due to the advantages such as high-quality heat supply, high electrical efficiency, flexibility of fuel use, use of inexpensive materials, and small installation footprints, SOFC's are used in CHP applications. Using SOFC, the CHP system generates electricity with almost zero pollutant emissions at 60% efficiency even in low power ranges.
- Solid oxide fuel cells are best suited for stationary power generation systems for homes and businesses. However, their high-temperature efficiency distinguishes them from other fuel cells used for such purposes, making them best suited for cogeneration systems or combined heat and power systems.
- The United States and Europe witnessed a constant acceleration in the installed micro-CHP systems, which reduced carbon-dioxide emissions to a great level. In the United Kingdom, the CO2 emissions were recorded at around nine metric ton in 2010, which were reduced to around four metric ton with the qualifying CHP systems.
- The technology is gaining momentum in the residential sector and the Commercial segment. In November 2020, Cummins Inc. announced that it received two federal grants of a total of USD 4.6 million to advance the commercialization of solid oxide fuel cell (SOFC) technology in the United States to help commercial and industrial customers minimize their carbon impact while providing energy resiliency and cutting costs in their businesses by installing fuel cell-based CHP systems.
- Furthermore, Bloom Energy Solutions has introduced an advanced distributed electric power generation solution based on solid oxide fuel cell technology. This offers customers a reliable, and cost-effective clean alternative to the electric grid.
- Similarly, companies such as Microsoft consider SOFCs to be a quick and viable alternative to the electric grid and can still provide some environmental advantages over combustion. Microsoft estimates that carbon dioxide emissions could be reduced by up to 49%, nitrogen oxide by 91%, carbon monoxide by 68%, and volatile organic compounds by 93%. Microsoft says less than 35% of the energy provided by a power plant is delivered to the data center due to generation, transmission and distribution losses. When energy consumption associated with lighting, cooling, and energy storage on the site is considered, only 17.5% of the energy supplied by a power plant reaches the servers.
- It is expected that SOFC systems designed for in-rack power generation in data centers are likely to produce more electricity and less heat and that such will be cooled with excess air and air ventilation systems already present in the data center
- Such developments are expected to boost the demand for Stationary SOFC systems in the future.

Asia-Pacific to Dominate the Market

- Asia-Pacific is expected to have the highest growth in the deployment of fuel cells due to the government's support for sustainable sources in the domestic energy mix. China and Japan are leading in the region with vast applications of fuel cells, ranging from backup services for data centers and combined heat and power systems for homes.
- China has great potential in the solid oxide fuel cell market as the government is increasingly focusing on ways to utilize clean energy technology in order to switch to a low-carbon economy.
- Moreover, the SOFC market with hydrogen as fuel in the country has been gaining traction on the back of favorable national and provincial government subsidies and incentive programs from local authorities to encourage the uptake of hydrogen vehicles to cut pollution.
- China has also witnessed a rise in its hyper-scale platforms, owing to which providing data center services for Chinese hyper-scale platforms has become necessary. China has 50 internet users per 100 population, indicating scope for a lot of development and the connectivity ecosystem. The data centers can become a major consumer for the SOFCs in the country.
- In 2022, Elcogen completed the incorporation of Solid Oxide Fuel Cell (SOFC) and stack technology into the Convion C60 power

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unit to generate both heat and electricity at high-efficiency levels. The project provides a template for future projects of this kind, also at scale, which is expected to enable companies to generate both heat and electricity at high-efficiency levels, all whilst reducing carbon emissions.

- Such developments are likely to elevate the growth of the solid oxide fuel cells market in the region.

Solid Oxide Fuel Cells (SOFC) Industry Overview

The solid oxide fuel cells market is fragmented. Some of the key players in the market (in no particular order) include Mitsubishi Hitachi Power Systems Ltd, DuPont de Nemours Inc., Bloom Energy Corp., Sunfire GmbH, Convion Ltd, and Elcogen AS.

Additional Benefits:

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

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