Fuel cell technologies market report 2019

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Fuel cell market analysis.

Similar records in OSTI.GOV collections: The global fuel cell market size was USD 2.62 billion in 2020. The global impact of COVID-19 has been unprecedented and staggering, with fuel cell equipment witnessing a positive demand shock across all regions amid the pandemic. Based on our analysis, the global market exhibited a significant growth of about 14% in 2020. The market is projected to grow from USD 3.36 billion in 2021 to USD 28.95 billion in 2028 at a CAGR of 36.0% during the 2021-2028 period. The rise in CAGR is attributable to this market’s demand and growth, returning to pre-pandemic levels once the pandemic is over. A fuel cell is a type of device consisting of a cathode and an anode submerged in an electrolyte medium to effectively conduct and generate electricity. These units operate like a battery providing the necessary power to the system but use hydrogen-based fuel rather than charging at various time intervals. The system works on the basic electromechanical mechanism to convert chemical energy into electrical energy. Hydrogen is provided as the fuel is fragmented on the anode into protons and electrons while the oxygen is available at the cathode. These electrons complete a circuit between the electrodes, whereas the protons travel through the electrolyte medium. After completing this chemical reaction, all the negative and positive ions and oxygen combine at the cathode to generate electricity as the final product, coupled with water and heat as byproducts. Trade Restrictions amid COVID-19 to Dampen Demand for Product The abrupt rise of the global health emergency caused by novel coronavirus or COVID-19 pandemic has negatively affected the financial conditions of different sectors and countries. Various nations across the globe have observed investment deficits owing to the halt in revenue-generating industrial operations. Additionally, several small and medium organizations have also been significantly impacted by the pandemic resulting in various problems such as no cash flows and unavailability of skilled professionals. However, various governments have introduced economic booster packages for many verticals to enable various organizations to bear the revenue gap. Besides, the companies have also shifted their focus towards serving the essential industries to maintain their operational performances. For instance, in April 2020, Bloom Energy declared to complete a couple of rapid-deployment FC projects to support the infected population in California, U.S. The company’s FC systems focus on delivering clean energy with diminished particulate matter and smog-generating pollutants to ease respiratory problems for COVID-19 patients through clean air. LATEST TRENDS Request a Free sample to learn more about this report. Introduction of Innovative Products to Enhance Hydrogen Infrastructure to Boost Demand FC systems are widely installed to power hydrogen vehicles due to their quick start and high power densities. Additionally, several companies operating across different stages of the value chain have demonstrated substantial efforts to join forces and expand the reach of their functional areas. For instance, in January 2021, Navistar Inc., OneH2, and General Motors announced to initiate a partnership to deliver complete solutions for long-haul transportation systems with negligible emissions. The collaborative efforts of the organizations are set to boost the ecosystem for hydrogen-powered trucks. They will include the U.S.-based J.B. Hunt Transport Services, Inc. to pilot the innovative system in its offerings. Surging Deployment of Zero-emission Vehicles to Aid Market Growth These devices are designed and developed to provide uninterrupted electricity to a system by burning oxygen and fuel. This continuous power supply and negligible damaging effluent production ensure the technology's adoption in a wide array of vehicles such as passenger cars, forklifts, buses, trucks, UAVs, and submarines. Furthermore, the overall performance, efficiency, and durability of the systems are some of the major attributes encouraging the adoption of the technology that will boost the growth of the global fuel cell industry during the forecast period. DRIVING FACTORS Favorable Regulatory Policies to Support Product Deployment FC systems are increasingly installed to produce combined heat and power (CHP) for powering and heating small households and commercial spaces like hotels, hospitals, educational centers, public buildings, and various others. Consequently, various state and federal authorities have introduced favorable legislative frameworks and subsidy schemes to propel the integration of the devices in numerous applications. For instance, the government of the state of New Jersey has updated its financial benefits for FC CHP installations on or after October 1st, 2020. Its CHP-FC Program structure is designed to propel more manufacturers with a monetary aid of up to USD 3 million per project to the producers. Increasing Focus on Reducing Greenhouse Gas Emissions to Favor Growth The rising need to curb global greenhouse gas (GHG) emissions from numerous sources and significant measures to achieve a carbon-free society is likely to bode well for the global fuel cell market growth. Additionally, the increasing demand for cars with hydrogen fuel cells to abide by the stringent government objectives to boost clean energy deployment is likely to augment the adoption of battery cell systems across various regions. For example, in January 2019, the South Korean government announced its targets to boost FCEVs and ply around 81,000 FCEVs by 2022 on the national roads while increasing the number to around 1.8 million by 2030. RESTRAINING FACTORS High Initial Costs and Limited Hydrogen Infrastructure May Inhibit Industry Pace The manufacturing of FC systems requires various components such as bipolar plates, catalysts, membrane electrode assemblies (MEAs), gaskets, and many others. Consequently, these products are significantly expensive, and producing a constrained number of FC systems may generate unbearable high costs for the manufacturing companies. Furthermore, the limited availability of necessary highly technological hydrogen infrastructure in several nations could also hamper the industry outlook. However, the government divisions such as the U.S. Department of Energy (DOE)are continuously taking steps to introduce financial support & benefit to bridge the gap and enable manufacturers and customers with zero-emission technologies. SEGMENTATION By Type Analysis To know how our report can help streamline your business, Speak to Analyst Proton Exchange Membrane Fuel Cell (PEMFC) Segment to Dominate the Market Based on type, the industry can be divided into Proton Exchange Membrane Fuel Cell (PEMFC), Phosphoric Acid Fuel Cell (PAFC), Solid Oxide Fuel Cell (SOFC), and others. PEMFC is the most established technology, and this segment is set to hold the lion’s share in terms of volume and value during the forecast period. The PAFC type segment is anticipated to showcase considerable growth. They offer high efficiency and can operate over the range of fuels without much problem. PAFC was one of the maiden technologies commercialized by various regional governments and initially received substantial investments due to their high tolerance for carbon dioxide and carbon monoxide coupled with large capacity installations. SOFC offers a wide variety of advantages over other alternatives, including high CHP efficiency, fuel flexibility, and high power generated during processes ranging up to several megawatts (MWs). Therefore, their growing adoption is expected to bode well for the segmental growth. Other types of fuels that are present across the industry are AFC, DMFC, and MCFC. By Application Analysis Transport Application to Lead Backed by Shift towards Clean Fuel Vehicles Based on application, this industry can be majorly trifurcated into portable, stationary, and transport. The transport segment is projected to hold the major share for fuel cell market owing to immense government investment and bulk FCEV fleet targets. The rising inclination of customers to switch to clean fuel vehicles from the conventional fleet, coupled with a government subsidy to support this transition, will further propel the segment outlook. The stationary application segment is likely to witness significant growth during the forecast period. The rising demand for fixed backup power generators for remote locations and the growing setup of cogeneration facilities across various countries promotes technology implementation. The portable segment is set to witness positive growth due to substantial demand from military uses, consumer electronics, and rising off-grid or grid backup needs. REGIONAL INSIGHTS Asia Pacific Fuel Cell Market Size, 2020 (USD Billion) To get more information on the regional analysis of this market, Request a Free sample The market has been analyzed geographically across four major regions such as Asia Pacific, North America, Europe, and the rest of the world. Asia Pacific stood at USD 1.41 billion in 2020 and is projected to remain dominant in the global market during the forecast period. This is due to the increasing demand for FC cars, along with rapidly developing hydrogen infrastructure. Besides, different countries have set favorable goals to transform the existing energy infrastructure and fossil fuel dependence to carbon-free power generation. Key nations that are actively operating in the region are South Korea, China, and Japan. Substantial investments in the research & development of advanced FC systems coupled with the long-standing technology adoption will boost the market in North America. Countries such as the U.S. and Canada have substantially invested in expanding the hydrogen refueling infrastructure and delivered various tax credits to promote technology adoption. For instance, in December 2020, the California Air Resources Board (CARB) updated that as of August 2020, it has issued over 7,530 rebates to FCEVs under its Clean Vehicle Rebate Project (CVRP). CARB also stated that this funding's cumulative value exceeded USD 38.49 million in the same period to deploy clean vehicles on the state’s roads. The market in Europe is anticipated to exhibit significant growth due to the increasing need for compact and bulk cogeneration plants and positive targets to encourage fuel-cell energy. The European Union has also introduced various stringent policies and goals to promote sustainable energy generation and diminish the overall carbon discharge. These directives have positively propelled the member states to opt for zero-emission vehicles (ZEVs) to abide by the regional ambitions. Various nations across the rest of the world have unveiled their plans to boost renewable energy fuel by H2 gas. The administrations and industry players have further introduced plans to boost the hydrogen infrastructure to support the transition. For instance, in June 2019, Saudi Arabia inaugurated its maiden hydrogen fueling station constructed by Air Products and Saudi Aramco. KEY INDUSTRY PLAYERS Acquisition Strategy Deployed by Mitsubishi Heavy Industries to Strengthen its Geographical Footprint Various players are currently operating with local, regional, and international footholds across the market. Different companies emphasize producing products with even higher power density and efficiency to enhance their position across the globe. Additionally, numerous participants are also producing FC stacks at the regional or local level. Mitsubishi Heavy Industries, a Japan-based FC energy company, is significantly concentrating on acquiring new projects and adopting organic and inorganic expansions to fortify its product reach worldwide. For instance, in October 2020, the company declared to receive a contract to supply its SOFC system, MHI’s maiden in Europe. The hybrid-SOFC system is set to be integrated at the Gas- und Wärme-Institut Essen e.V. (GWI) in Germany as a part of the KWK.NRW 4.0 research project. The advanced system is designed to provide heat & power to large facilities such as hospitals, commercial buildings, residential localities, and operations with various fuels, including hydrogen, biogas, and natural gas. LIST OF KEY COMPANIES PROFILED: Horizon Fuel Cell Technologies (Singapore) ElringKlinger (Germany) Hydrogenics (Canada) SOLIDpower Italia (Italy) Ceres Power (UK) Ballard Power Systems (Canada) AVL (Austria) Bosch (Germany) Pragma Industries (France) Mitsubishi Heavy Industries (Japan) W. L. Gore & Associates (U.S.) Nedstack Fuel Cell Technology (Netherlands) Proton Motor Fuel Cell GmbH (Germany) Bloom Energy (U.S.) AISIN (Japan) Convion (Finland) ITM Power (UK) Plug Power (U.S.) Nuvera Fuel Cells, LLC (U.S.) KEY INDUSTRY DEVELOPMENTS: In July 2021, Ballard Power Systems confirmed to obtain an order for the 15 units of the company’s 70-kilowatt (kW) FCmoveTM-HD fuel cell systems to power zero-emission Fuel Cell Electric Buses (FCEBs) owned by India based Tata Motors. Ballard aims to complete the order by 2022 to abide by Tata Motor’s plans to analyze the potential of utilizing FCEBs in Faridabad, a city under the country’s National Capital Region. In July 2021, Bloom Energy announced to deploy a 4.2 MW solid oxide fuel cell system for the utility-scale combined heat and power (CHP) initiative with the collaboration of SK ecoplant in Donghae City, South Korea. The next-generation plant is set to generate about 35,000 MWh of clean electricity per annum along with the thermal energy capturing capacity of 4 million mega calories through SK ecoplant and Power Tower’s heat recovery system. In May 2021, Switzerland-based EH Group Engineering declared to expand its fuel cell production capabilities and shift its operations to a new unit in Nyon, Switzerland. The state-of-the-art facility is designed to have dedicated laboratory space, different FC testing stations to assess units with up to 250 kW ratings, optimized hydrogen supply, fast-paced prototyping, and manufacturing capabilities, among other advantages. The company also confirmed its plans to further boost the dedicated production facility with an area of 4,000 m2 by 2022. In April 2021, Plug Power and BAE Systems announced a partnership agreement to develop and provide low carbon powertrains for heavy-duty transit bus applications primarily across North America. The new solution under the collaboration will integrate BAE System’s smart electric drive systems with Plug Power’s ProGen fuel cell engines to boost the deployment of hydrogen-powered FCEBs in the region. REPORT COVERAGE An Infographic Representation of Fuel Cell Market View Full Infographic To get information on various segments, share your queries with us The global fuel cell market research report offers an elaborative analysis of numerous factors affecting the market. These include opportunities, growth drivers, threats, key developments, and restraints. It further analyzes and defines the market based on different segments such as type and application. It strategically analyzes several strategies such as product innovations, alliances, mergers, acquisitions, and joint ventures adopted by key players present in the industry. Report Scope & Segmentation ATTRIBUTE DETAILS Study Period 2017-2028 Base Year 2020 Forecast Period 2021-2028 Historical Period 2017-2019 Unit Volume (MW) and Value (USD Billion) Segmentation Type; Application; and Region By Type Proton Exchange Membrane Fuel Cell (PEMFC) Phosphoric Acid Fuel Cell (PAFC) Solid Oxide Fuel Cell (SOFC) Others By Application Portable Stationary Transport By Geography North America By Type By Application By Country U.S (By Application). Canada (By Application) Europe By Type By Application By Country UK (By Application) Germany (By Application) France (By Application) Italy (By Application) Sweden (By Application) Rest of Europe (By Application) Asia Pacific By Type By Application By Country China (By Application) South Korea (By Application) Japan (By Application) Rest of Asia Pacific (By Application) Rest of the World

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