World Fuel Cells

Industry Study with Forecasts for 2017 & 2022

Study #3140 | April 2014 | $6300 | 501 pages
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Skyrocketing demand for fuel cells worldwide will be driven by technological advances, improved manufacturing efficiencies, and government mandates and subsidies.

World fuel cell demand to nearly triple by 2017

The global appetite for commercial fuel cell products will advance in dramatic fashion over the next decade with demand almost tripling to $4 billion in 2017 and then tripling again through 2022 to $12 billion. Increases will be stimulated by technological advances that will help reduce costs to competitive levels in a growing number of applications, and improved manufacturing efficiencies will support these gains as output levels climb. For the last few decades, fuel cell cars have been only promised. Now they really are here, and nearly half of fuel cell revenues in 2022 will derive from motor vehicle applications. Just as automotive fuel cell demand will be spurred by efficiency and emissions regulations, success in other markets will be greatest where factors other than price play a significant role in purchase decisions. These factors include government mandates concerning the use of alternative energy sources and pollution abatement and government subsidies, which increase fuel cell cost competitiveness.

Motor vehicles to be fastest growing market

Strong commercial demand for fuel cells is projected across the board in all applications. However, it will be most pronounced in motor vehicles, where it is forecast to expand sixtyfold from current levels to reach nearly $5.5 billion in 2022. In early 2014, Hyundai became the first automobile producer to begin leasing fuel cell vehicles, and a number of other major automakers are expected to offer a limited number of additional vehicle models by 2017. In addition to fuel cell powered automobiles, revenues will derive from buses, as well as fuel cell-powered range extenders for electric vehicles.

Electric power generation to remain largest market

Electric power generation is the most successfully commercialized fuel cell application to date, accounting for three-quarters of all commercial revenues in 2012. Electric power generation-related fuel cell demand will continue to grow at a brisk pace through 2022, bolstered by comparatively low hurdles to overcome in order to achieve cost competitiveness and much greater fuel efficiency than conventional power generation methods.

Fuel cell systems used by portable electronics suppliers will benefit from their products’ ability to generate power over a longer period than comparably sized batteries and from further cost reductions. Although fuel cell systems used in these applications will account for 85 percent of all unit demand in 2022, portable electronics will remain a modest-sized market in value terms because sales will be dominated by high volume, low price products.
Asia/Pacific

South Korea: Fuel Cell Outlook & Suppliers

South Korea will continue to be the third largest national market in the world behind Japan and the US. Demand proliferation in the South Korean market will be more than quadruple to $540 million in 2017 and then to triple to $1.7 billion in 2022. Total fuel cell spending in the country will expand substantially, increasing from $785 million in 2017 to $2 billion in 2022, when South Korea will rank fourth globally behind Japan, the US, and Germany in aggregate spending.

South Korean demand for fuel cells will be driven principally by motor vehicle applications. The nation will account for 22 percent of all sales in that market worldwide in 2022, benefiting from the local manufacturing operations of Hyundai, the first automaker to commercially launch an FCV. Hyundai began to lease its TUCSON (marketed under the name IX35 in Europe) to commercial customers in Europe in early 2014 and plans to begin leasing the vehicle to customers in select parts of California later in the year. South Korean motor vehicle manufacturers will also benefit from rising demand for fuel cell buses and fuel cell range extenders in electric vehicles.

Sales of fuel cell-based electric power generation products, while substantial, will be only one-third the size of demand for fuel cells used in motor vehicle applications in 2022. The market for electric power generation products will be balanced between MW projects for centralized power grid applications and micro-CHP units designed to meet the needs of individual homes or businesses. Electric power generation demand will grow more slowly in South Korea than in some other parts of the world because it already represents a sizable market, and fuel cell technology is more prevalent in South Korea than in other nations.

South Korea: Fuel Cell Outlook & Suppliers

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<td>49</td>
<td>128</td>
<td>285</td>
<td>785</td>
<td>2000</td>
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</tbody>
</table>

Sample Text, Table & Chart
Research and Development Expenditures: US$8 million (FY 2013)

Employment: 140 (FY 2013)

Key Products: solid oxide fuel cell generators and modules

Ceramic Fuel Cells Limited (CFCL) develops and produces flat plate solid oxide fuel cell (SOFC) generators and modules using proprietary technology. The Company has operations in Australia, the United Kingdom (UK), the Netherlands, and Germany.

Fuel cell products accounted for US$3 million of CFCL’s FY 2013 revenues. The Company’s SOFC generators are engineered primarily for use in small scale onsite micro-combined heat and power (CHP) and distributed generation applications in which heat and electricity are cogenerated for residential and commercial use. CFCL reports that its SOFC generators, which are available under the BLUEGEN brand name, can achieve up to 60 percent electrical efficiency using natural gas and can reduce carbon dioxide emissions by more than two-thirds compared to coal fired electrical generation. BLUEGEN generators, which can be used in residential and commercial applications, convert natural gas to electricity and heat through ceramic fuel cells and have an output of up to 1.5 kilowatts of electricity. The Company also makes GENNEX SOFC modules, which are sold to other manufacturers for

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### TABLE VII-5

**SOUTH KOREA: MARKET ENVIRONMENT FOR FUEL CELLS**

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<td>% of GDP</td>
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<td>kWh/$ GDP</td>
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<td>Electric Power Generation (bil kWh)</td>
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<tr>
<td>vehicles/mil $ GDP</td>
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<td>000$ electronics/capita</td>
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<td>Electronic Product Shipments (bil $)</td>
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This Freedonia study, *World Fuel Cells*, offers historical data (2002, 2007 and 2012) plus forecasts for 2017 and 2022 for global supply and demand, as well as demand by product and market, in six regions and 16 major countries. The study also details key market environment factors, evaluates company market share and profiles 41 competitors in the fledging world fuel cells industry.
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- [ ] Credit Card 
- [ ] Company
- [ ] Division
- [ ] Street __________________________ (No PO Box please)
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- [ ] Country __________________________
- [ ] Phone __________________________ Fax __________________________
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About The Freedonia Group

The Freedonia Group, Inc., is a leading international industry market research company that provides its clients with information and analysis needed to make informed strategic decisions for their businesses. Studies help clients identify business opportunities, develop strategies, make investment decisions and evaluate opportunities and threats. Freedonia research is designed to deliver unbiased views and reliable outlooks to assist clients in making the right decisions. Freedonia capitalizes on the resources of its proprietary in-house research team of experienced economists, professional analysts, industry researchers and editorial groups. Freedonia covers a diverse group of industries throughout the United States, the emerging China market, and other world markets. Industries analyzed by Freedonia include:

- Chemicals
- Plastics
- Life Sciences
- Packaging
- Building Materials
- Security & Electronics
- Industrial Components & Equipment
- Automotive & Transportation Equipment
- Household Goods
- Energy/Power Equipment

Freedonia Custom Research

Freedonia Custom Research delivers the same high quality, thorough and unbiased assessment of an industry or market as an industry study. Since the research initiative is based upon a company’s specific needs, companies harness Freedonia’s research capabilities and resources to answer unique questions. When you leverage the results of a Freedonia Custom Research engagement, you are able to obtain important answers to specific questions and issues associated with: mergers and acquisitions, new product launches/development, geographic expansion, entry into new markets, strategic business planning, and investment and funding decisions.

Freedonia Custom Research is ideal for companies seeking to make a strategic difference in the status quo and focus on future business growth. Working side by side with clients, Freedonia’s team is able to define a research project that is custom-tailored to answer specific questions and provide the basis from which a company can make informed business decisions.

Other Studies

World Batteries
Global battery demand is forecast to rise 7.8 percent per year to $120 billion in 2019. China will remain the largest national market as well as one of the fastest growing. Secondary batteries will outpace primary types. Rechargeable lithium-ion batteries will be the fastest growing products. This study analyzes the $3 billion world battery industry, with forecasts for 2019 and 2024 by type and market for six world regions and 16 countries. The study also reviews battery technology, evaluates company market share and profiles industry participants.

#3309 .......................... July 2015 .......................... $6700

Electric Motors
US electric motor demand will rise 5.4 percent per year through 2018 to $16.2 billion. Growth in the dominant AC motors segment will outpace DC types. The motor vehicle market will grow the fastest and remain the largest category, followed by the heating/cooling and machinery markets. IHP electric motors will outpace FHP types in both value and volume terms. This study analyzes the $12.5 billion US electric motor industry, with forecasts for 2018 and 2023 by type, power rating, and market. The study also evaluates company market share and profiles industry players.

#3238 .......................... December 2014 .......................... $5200

Wind Turbine Systems
US demand for wind turbine systems is forecast to reach $18.9 billion in 2018, a nearly ninefold increase over severely depressed 2013 levels. The market for wind turbines tends to be highly volatile due to its reliance on government incentives. Feed-in tariff payments and various grants from the Department of Energy will drive gains going forward. This study analyzes the $2.1 billion US wind turbine system industry, with forecasts for 2018 and 2023 by type, component, application and US region. The study also evaluates company market share and profiles industry players.

#3139 .......................... March 2014 .......................... $5100

Battery & Fuel Cell Materials
US demand for battery and fuel cell materials is expected to grow 4.3 percent annually through 2017 to $6.1 billion. Polymers, metals and other materials will lead gains. Material usage in secondary batteries will outpace primary batteries, while fuel cells will be the fastest growing application overall from a small base. This study analyzes the $4.9 billion US battery and fuel cell material industry, with forecasts for 2017 and 2022 by type, function and application. The study also evaluates company market share and profiles industry players.

#3115 .......................... January 2014 .......................... $5100

World Turbines
The world market for turbines and related products (turbine-based engines, generators, and generator sets) is forecast to rise 6.4 percent annually to $162 billion in 2016. Wind turbines will remain the largest and fastest growing segment (albeit at a more moderate rate), while demand for gas combustion turbines will accelerate. This study analyzes the $119 billion world turbine industry, with forecasts for 2016 and 2021 by application, product, world region and for 22 countries. The study also evaluates company market share and profiles industry competitors.

#3009 .......................... March 2013 .......................... $6100