Fuel Cells

US Industry Study with Forecasts for **2012 & 2017**

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Fuel Cells

US Industry Study with Forecasts for ***2012 & 2017***

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Fuel Cells

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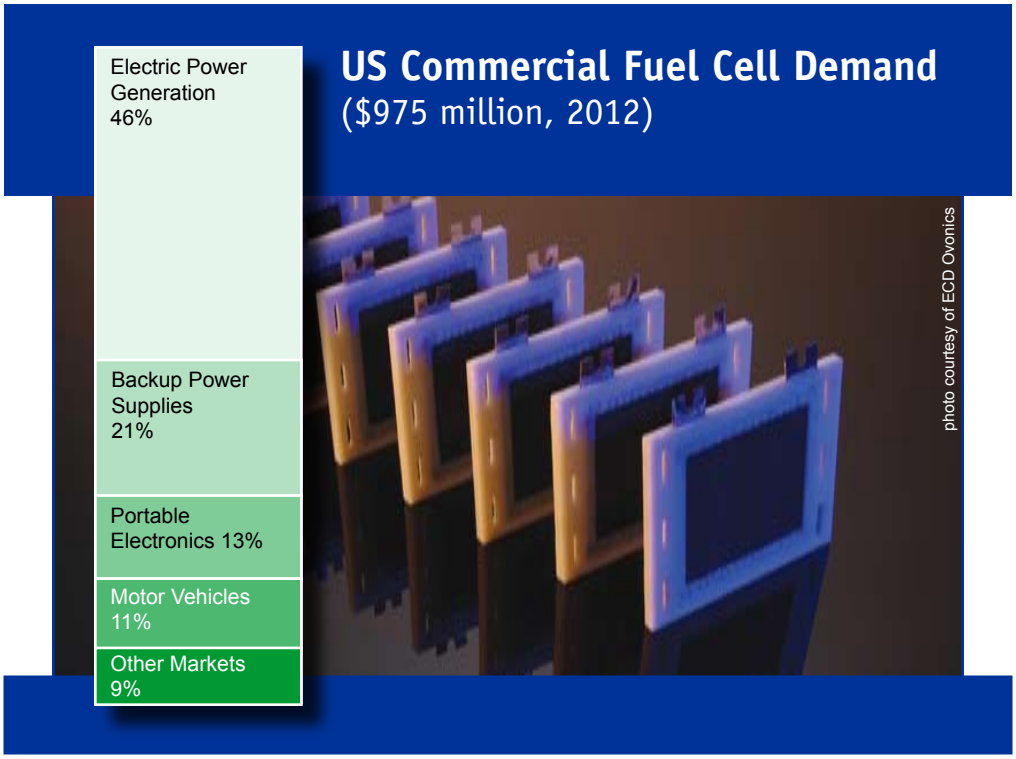
US commercial fuel cell demand is forecast to expand almost sixfold through 2012 to $975 million and reach $3.3 billion in 2017, when it will claim half of all fuel cell spending.

Total US fuel cell spending to reach $3.7 billion in 2012

Total US fuel cell spending -- consisting of research and development (R&D) funding, investment in fuel cell enterprises, revenues associated with prototyping and test marketing, and demand for fuel cell systems, products and services -- is expected to reach $3.7 billion in 2012. Commercial fuel cell demand, which accounted for less than ten percent of total spending in 2007, is forecast to expand almost sixfold through 2012 to $975 million and reach $3.3 billion in 2017, when it will claim half of all fuel cell spending. Prospects for fuel cells vary by market, with success dependent on how well fuel cells stack up to other energy sources.



Electric power generation to remain largest market

The largest market for fuel cells is electric power generation, which is expected to rise more than 40 percent annually to $450 million in 2012. Gains will be bolstered by ongoing environmental concerns that will spur interest in less polluting energy sources, as well as continued efforts to reduce US dependence on foreign oil. The electric power generation market will continue to comprise almost half of commercial demand in 2012, as molten carbonate fuel cells (MCFCs) and solid-oxide fuel cells (SOFCs), which have proven to be effective for electricity production, continue to become more cost efficient.

Portable electronics to be fastest growing market

The market for fuel cells used to power portable electronic devices is expected to advance at the most rapid pace through 2012, as technological advancements have enabled these fuel cells to outperform most types of batteries used for similar purposes. As portable wireless devices continue to advance in intelligence and functionality, fuel cells will be better able to meet their increased energy requirements by providing longer operational times, while eliminating the need for recharging.

The motor vehicle market for fuel cells -- currently consisting mostly of prototypes, demonstrations and test marketing -- is expected to rise at a below-average pace, as cost barriers continue to delay commercialization. The growing popularity of gasoline-electric hybrid vehicles will also restrain growth in the segment, as hybrids are viewed by many as a satisfactory alternative to conventional gasoline-powered vehicles in terms of environmental impact and gas mileage efficiency. In addition, fuel cell-powered vehicles are likely to face increasing competition from all-electric vehicles, which have also benefitted from sizeable R&D spending in recent years. By 2017, however, fuel cell-powered vehicles are expected to expand their market presence, as ongoing developmental work will ultimately drive down costs.

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Sample Text, Table & Chart

PRODUCTS

Hydrocarbon-Based

Demand for hydrocarbon and hydrocarbon-based fuel c
expected to advance more th $115
Gains will be supported by t at wi
the performance of hydroge igh c
handling problems associate hand
benefit from significant incr t met
molten carbonate and solid- whic
hydrocarbon fuels without a separate reformer. Growth will
what limited, on the other hand, by ongoing research and dev
which will facilitate the use of pure hydrogen as a fuel sourc

SAMPLE TEXT

As the name indicates, hydrocarbon compounds are composed of hydrogen and carbon. A variety of hydrocarbon-based materials have been used or investigated for possible use in fuel cells, including coal, diesel, ethanol, gasoline, kerosene, methanol, natural gas and propane. Natural gas and methanol have accounted for the largest share of fuel cell fuels demand to date, with methanol growing in popularity. Methanol is among the easiest fuels to process, and improvements in reformer design are making carbon monoxide formation (which can severely degrade fuel cell performance) less of an issue in methanol-fueled systems.

Current and potential suppliers of hydrocarbon-based fuels for fuel cells are largely the same firms that account for most pr
production, including chemical companies, industrial gas su
integrated petroleum producers and petroleum refiners. In a
US headquartered enterprises such as Archer-Daniels-Midla
ronTexaco and Exxon Mobil, these include foreign firms lik
Iwatani International (Japan), Methanex (Canada) and Statoi

TABLE IV-3

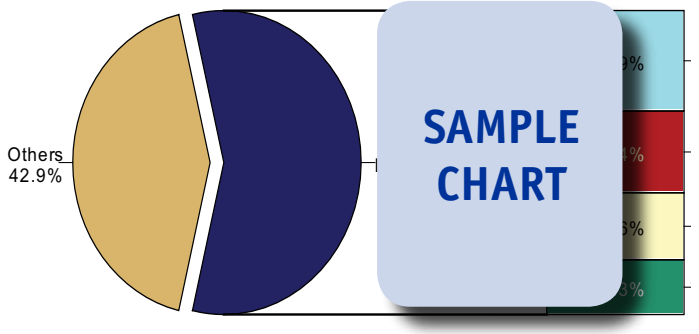
FUEL CELL STACK & SYSTEM DEMAND
(million dollars)

Item	1997	2002	2007	2012	2017
Durable Goods Shipments (bil $)	20				15
$ stacks & systems/mil $ durables					
Fuel Cell Stack & System Demand					
Proton-Exchange Membrane					
Phosphoric Acid					
Molten Carbonate					
Solid-Oxide					
Alkaline					
Direct Methanol					
Other					
% stacks & systems					
Total Commercial Fuel Cell Demand	42	85	175	975	3300

SAMPLE TABLE

CHART VI-1

US FUEL CELL MARKET SHARE BY COMPANY, 2007
($175 million)



SAMPLE CHART

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Sample Profile, Table & Forecast

TABLE V-4

ELECTRIC POWER GENERATION FUEL CELL DEMAND
(million dollars)

Item	1997	2002	2007	2012	2017
Electric Power Generation (bil kWh)	34				630
$ fuel cell/mil kWh					70
Electric Power Generation FC Demand					50
By Setting:					
Micropower					30
Large-Scale					20
By Fuel Cell Chemistry:					
PEM					25
PAFC					55
MCFC					50
SOFC					50
Alkaline					10
Direct Methanol					--
Other					60
% power generation	4				9
Total Fuel Cell Demand	42	85	175	975	3300

SAMPLE TABLE

COMPANY PROFILES

FuelCell Energy Incorporated
Three Great Pasture Road
Danbury, CT 06813
203-825-
http://ww

Revenue
US Reve
Employr

Key Proc ants and the development o

SAMPLE PROFILE

FuelCell Energy is a leading developer of molten carbonate fuel cell (MCFC) and solid-oxide fuel cell (SOFC) technology for stationary power generation applications. It collaborates with customers and partners to construct and demonstrate fuel cell products worldwide.

FuelCell Energy was the second largest US producer of fuel cell products and services in 2007, with a 15 percent market share. The Company participates in the US fuel cell industry primarily through the development and manufacture of MCFC electric power generators based on FuelCell Energy's proprietary DIRECT FUELCELL (DFC) technology. In FY 2007, fuel cell product sales and revenues were $33 million.

Through the use of DFC technology, the Company's MCFCs operate at a temperature of approximately 1,200 degrees Fahrenheit, thereby avoiding usage of precious metal electrodes required by lower-temperature fuel cells, and expensive metals and ceramic materials employed by higher-temperature fuel cells. As a result, FuelCell Energy

"**Micropower** -- Demand for fuel cells used in micropower applications is forecast to increase more than fivefold through 2012 to $380 million. Commercial sales will benefit from continual improvements in the efficiency and reliability of fuel cells used in this market, particularly in MCFCs and SOFCs, which have already proven in some cases to generate economic savings over the long-term ..."

--Section V, pg. 108

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Other Studies

World Turbines

The global turbine market is analyzed in this study. It presents historical demand data for the years 1997, 2002 and 2007 and forecasts for 2012 and 2017 by turbine type (e.g., gas combustion, steam and hydraulic, wind, microturbines, turbine engines, turbine generators); application (e.g., electric power generation, aircraft engines, marine); world regional market and for 22 major national markets. The study also considers market environment factors, evaluates company market share and profiles major players.

#2315 ..... 05/2008 ..... $5500

Battery & Fuel Cell Materials

US demand for battery and fuel cell materials will rise 4.4% per year through 2011. Growth will be driven by rising production of high-performance batteries (e.g., lithium, Ni-MH) and a nearly fivefold jump in fuel cell demand. Metals will stay the leading material while polymers and carbon/graphite lead gains. This study analyzes the US battery and fuel cell material industry, with forecasts for 2011 and 2016 by type, function and application. It also details company market share and profiles major players.

#2244 ..... 10/2007 ..... $4400

Electric Transmission & Distribution Equipment

US electrical transmission and distribution equipment demand will rise 3.6% yearly through 2011. Growth in nonutility generation and an improved regulatory outlook supporting investment in the electric grid will aid gains. Specialty transformers and metal-clad and -enclosed switchgear will lead gains. This study covers the $17.5 billion US electrical transmission and distribution equipment market, with forecasts for 2011 and 2016 by product and market. It also details market share and profiles major firms.

#2198 ..... 07/2007 ..... $4400

World Fuel Cells

Global fuel cell spending (R&D, investment, sales) will grow 15% yearly through 2011. Portable electronics will be the fastest growing commercial use while electric power generation will stay the largest. Proton-exchange membrane fuel cells will remain dominant over other chemistries. This study analyzes the $5.2 billion world fuel cell industry to 2011 and 2016 by product, chemistry, application, world region and for 14 countries. It also reviews technology, evaluates market share and profiles major players.

#2194 ..... 05/2007 ..... $5500

Batteries

US demand for primary and secondary batteries will grow 4.3% annually through 2011. Growth will be driven by strong demand for battery-powered products and motor vehicles, and by an ongoing shift toward more expensive, better-performing batteries. Primary batteries will outpace secondary/rechargeable types, led by primary lithium batteries. This study analyzes the $12.1 billion US batteries industry to 2011 and 2016 by product and market. It also evaluates market share and profiles major producers.

#2178 ..... 03/2007 ..... $4500

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