

WINTERGREEN RESEARCH, INC.

**Worldwide Micro Fuel Cell Market Shares, Strategies, and  
Forecasts, 2009-2015**

**Micro Fuel Cells Provide Increased Energy Density**



*Picture by Susie Eustis*

**MOUNTAINS OF OPPORTUNITY**

**WinterGreen Research, Inc.  
Lexington, Massachusetts**

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## **CHECK OUT THESE KEY TOPICS**

**MOBILE LIFE FUEL CELL POWER**  
**PERSISTENT COMPUTING EXTENDED POWER**  
**FIRST RESPONDER**  
**Portable Medical Equipment**  
**Laptop Computer Power**  
**CONSUMER ELECTRONICS PORTABLE POWER**  
**INSTANT RECHARGE FOR CONTINUOUS COMPUTING**  
**FUEL CELL REFERENCE MODEL**  
**HYBRID TECHNOLOGIES**  
**FUEL CELL CARTRIDGES APPROVED FOR COMMERCIAL AIRCRAFT**  
**MICRO FUEL CELL TECHNOLOGY DECREASES THE WEIGHT SOLDIERS CARRY**  
**Global Warming Drives Micro Fuel Cell Energy Adoption**

**Fuel Cell Efficiency**  
**Fuel Cell Electrochemical Converter**  
**Clean Energy**  
**DMFC Fuel Cells**  
**Micro Fuel Cell Hours Of Operation**  
**Power Degradation**  
**Cathode Catalysts**

***OPPORTUNITY ABOUNDS***

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## Micro Fuel Cell: Market Shares, Strategies, and Forecasts, 2009-2015

Micro fuel cells address demand for higher energy density and longer lasting portable power devices. Micro fuel cells provide longer lasting energy sources for digital electronics. Micro fuel cells provide a hybrid storage technology that supports long term reliable portable electronics power. Renewable energy is base source for charging batteries, but micro fuel cell alternative charging is needed to provide power continuity. Batteries are a chemical process, but current devices do not last long enough. Fuel cells are one of several evolving technologies that promise to provide more reliable, longer portable power.

Micro fuel cell component costs continue to be an issue. Micro fuel cells are expected to be an expensive alternative to thin film batteries, providing hybrid technology that is needed for power continuity, but not basic power sources in most cases throughout the forecast period.

Economies of scale do not entirely solve the inherent high costs of high grade metallic catalysts used in micro fuel cells. More catalyst price reductions are needed to make micro fuel cells competitive with thin film batteries. Micro fuel cells are useful in many particular situations.

The direct methanol fuel cell (DMFC) portable power market for notebook computers, mobile phones, and other portable electronic devices is expected to grow significantly. Leading electronics manufacturers and innovative start-up companies are introducing products. Micro fuel cells are anticipated to work in combination with thin film batteries, creating hybrid power systems. Hybrid markets are expected to achieve market growth as the batteries are less expensive than the micro fuel cells. The micro fuel cells are useful for charging thin film batteries.

Micro fuel cell markets are at \$75 million at the end of 2008. By 2015, micro fuel cell markets reach \$5.59 billion. Another related segment, portable fuel cells used in bicycles and similar large portable devices represent a similar market opportunity. The micro fuel cells represent power for devices that include a range of PC, handset, PDA, and digital device segments in a variety of industry, military, and health care segments.

## Companies Profiled

### Market Leaders

Toshiba  
Mechanical Technology Incorporated (MTI)  
Medis Technologies  
Smart Fuel Cells (SFC)  
PolyFuel  
BASF

### Market Participants

Altair Nanomaterials  
Angstrom Power  
Asahi Glass  
Ballard  
BASF / E-TEK  
BASF Direct Methanol Fuel Cells  
Ceramic Fuel Cells  
Gore  
GrafTech International  
Heliocentris Fuel Cells AG  
Horizon  
ICM Plastics  
JMC / Tekion  
Johnson Matthey  
Manhattan Scientifics  
Masterflex AG  
Microcell  
Millennium Cell Liquidation Plan  
System Design Program  
Sanyo / Hoku Scientific  
SGL Technologies  
Electric Automotive Vehicle Smart Fuel Cell Battery Charger  
Solvay

**Tatung System Technologies  
UltraCell  
BASF Venture Capital / UltraCell**

## **Micro Fuel Cell Market Shares, Strategies, and Forecasts 2009-2015**

### **REPORT METHODOLOGY**

THIS IS THE 396TH REPORT IN A SERIES OF MARKET RESEARCH REPORTS THAT PROVIDE FORECASTS IN COMMUNICATIONS, TELECOMMUNICATIONS, THE INTERNET, COMPUTER, SOFTWARE, TELEPHONE EQUIPMENT, HEALTH EQUIPMENT, AND ENERGY. THE PROJECT LEADERS TAKE DIRECT RESPONSIBILITY FOR WRITING AND PREPARING EACH REPORT. THEY HAVE SIGNIFICANT EXPERIENCE PREPARING INDUSTRY STUDIES. FORECASTS ARE BASED ON PRIMARY RESEARCH AND PROPRIETARY DATA BASES. FORECASTS REFLECT ANALYSIS OF THE MARKET TRENDS IN THE SEGMENT AND RELATED SEGMENTS. UNIT AND DOLLAR SHIPMENTS ARE ANALYZED THROUGH CONSIDERATION OF DOLLAR VOLUME OF EACH MARKET PARTICIPATION IN THE SEGMENT. INSTALLED BASE ANALYSIS AND UNIT ANALYSIS IS BASED ON INTERVIEWS AND AN INFORMATION SEARCH. MARKET SHARE ANALYSIS INCLUDES CONVERSATIONS WITH KEY CUSTOMERS OF PRODUCTS, INDUSTRY SEGMENT LEADERS, MARKETING DIRECTORS, DISTRIBUTORS, LEADING MARKET PARTICIPANTS, OPINION LEADERS, AND COMPANIES SEEKING TO DEVELOP MEASURABLE MARKET SHARE. OVER 200 IN DEPTH INTERVIEWS ARE CONDUCTED FOR EACH REPORT WITH A BROAD RANGE OF KEY PARTICIPANTS AND INDUSTRY LEADERS IN THE MARKET SEGMENT. WE ESTABLISH ACCURATE MARKET FORECASTS BASED ON ECONOMIC AND MARKET CONDITIONS AS A BASE. USE INPUT/OUTPUT RATIOS, FLOW CHARTS, AND OTHER ECONOMIC METHODS TO QUANTIFY DATA. USE IN-HOUSE ANALYSTS WHO MEET STRINGENT QUALITY STANDARDS. INTERVIEWING KEY INDUSTRY PARTICIPANTS, EXPERTS AND END-USERS. OUR RESEARCH INCLUDES ACCESS TO LARGE PROPRIETARY DATABASES. LITERATURE SEARCH INCLUDES ANALYSIS OF TRADE PUBLICATIONS, GOVERNMENT REPORTS, AND CORPORATE LITERATURE.

**YOU MUST HAVE THIS STUDY**

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# Micro Fuel Cell Technology Market Shares, Strategies, and Forecasts, 2009 to 2015

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### MICRO FUEL CELL MARKET DESCRIPTION AND MARKET DYNAMICS

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