Welcome to the Brooklyn, New York Technology & Market Assessment Forum October 6-8, 2010 • New York Marriott® at the Brooklyn Bridge

Market Outlook for Fuel Cell Products: MC Fuel Cells
Market Outlook

DFC© Stationary Fuel Cell Technology

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reliable, efficient, ultra-clean
• Production and delivery capabilities meet current demand
• State-of-the-art manufacturing in Torrington, CT
• Continuous flow production line with selective use of automation
• R&D in Danbury, CT
• 70 MW of production capacity currently
• Expansion plan to achieve 150 MW capacity at Torrington facility
• Strong supply chain in place
Overview

Global demand for electric power expected to grow to 28.9 trillion kWh by 2025 from 18.0 trillion kWh in 2006¹

- 68% of the world’s electricity was generated from fossil fuels in 2006²
- Wind and solar are providing less than 3% of global electricity generation due to intermittent nature²
- Environmental needs driving ultra-clean power generation solutions
- Ability to reduce energy costs and greenhouse gas emissions is dependent on increasing energy efficiency

FuelCell Energy

Building Block Approach to Product Line

**DFC300 - 300 kW**
- Average Grocery Store
- 300 Bed Hotel

**DFC1500 - 1,400 kW**
- 1,000 Bed Hotel
- Convention Center
- Wastewater Treatment

**DFC3000 - 2,800 kW**
- Average Hospital
- Manufacturing Facility
- Universities

**Multi-MW Installations**
- 5 to 50 MW
- State RPS Programs
- Grid Support Applications
Direct Fuel Cell (DFC) power plants offer the highest efficiency which is key to customer value.

- DFC-ERG DFC/Turbine 58 – 70%
- Direct Fuel Cell (DFC)* 47%
- Natural Gas Engines 30 – 42%
- Small Gas Turbines 25 – 35%
- Micro-turbines 25 – 30%

* Fuel cells configured for Combined Heat & Power (CHP) can achieve up to 90% efficiency, depending on application.
Emissions Lbs. per MWh

FCE power plants have 47-70% electrical efficiency compared to 35% or less for other power generators their size.

Source for combustion generator data: “Model Regulations For The Output Of Specified Air Emissions From Smaller scale Electric Generation Resources Model Rule and Supporting Documentation”, October 15, 2002; The Regulatory Assistance Project report to NREL.
### Comparison to Alternate Solutions

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<tr>
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<th>Capacity Factor</th>
<th>24/7 Power</th>
<th>Peaking Power</th>
<th>Central Generation</th>
<th>DG or On-Site Power</th>
<th>SOX, NOX Particulate Matter</th>
<th>CO2 Reduction</th>
<th>Avoid Siting, NIMBY Issues</th>
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<td>Conventional Combustion</td>
<td>Up to 95%</td>
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<td>Wind</td>
<td>20-35%</td>
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<td>15-25%</td>
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<td>Fuel Cells</td>
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*Fuel cells offer an economically compelling balance of attributes*
Benefits of Fuel Cells

DFC Products are positioned to capture the commercial, industrial and utilities clean power generation market

- Higher electrical efficiency than competing technologies
- Near-zero NOX, SOX and low CO2 emissions
- Allows siting in polluted urban areas
- Reliable, secure, 24/7 uninterrupted power
- Competitive economics
- Cleaner & quieter operation
- Distributed generation puts power where needed
- Enables smart grid
- Connects to existing electric and fuel infrastructure
- More control over power costs, emissions, and reliability

DFC 3000 fuel cell power plant
Inchon, South Korea
**INTEGRATED SYSTEMS**

**IMPROVE EFFICIENCY**

- DFC – (47%)
- DFC – CHP (60-80%)
- DFC – ERG (55-70%)
- DFC/T – (60-65%)
- DFC H2 (50-60%)

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**FUEL RESOURCES**

- NATURAL GAS
- METHANOL
- ETHANOL
- PROCESS METHANE
- BIOGAS
- COAL GAS

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**Application Diversity**

**Diversity of Fuels plus High Efficiency - High Sustainability**
Sheraton Hotel and Marina   San Diego, California

Traditional CHP Applications
DFC1500 Santa Rita Corrections Facility, California

Combining DFC 1500 with Solar PV to further reduce Carbon Footprint
Power Magazine  Plants of the Year Award
Sierra Nevada Brewery, Chico, California

Bio-solid waste to Power and Heat for Reduced Environmental Emissions
Gas Pipeline

Market

• DFC-ERG designed for pipeline letdown operations
  – Byproduct heat warms gas to prevent freezing
  – Energy from pressure letdown fed to turbine
  – Excess electricity sold to the grid
• 62.5% average electrical efficiency & 70% peak efficiency
• Improved economics and lower CO2 emissions
• First site commissioned in Toronto
• 4 sites pending under Connecticut RPS program
• Market estimated at 250-350 MW in Toronto, California and Northeast USA - Global opportunity
• Development agreement with Enbridge, largest pipeline company in Canada (NYSE: ENB)

Application for Gas Delivery and Reduced Environmental Emissions
Ford Paint Shop Fumes for DFC® 300 Fuel

- Unit to start up in early 2008 at the Ford; Oakville, Ontario (Canada) Auto Plant
- VOC’s from the basecoat and clear coat paint lines for the Ford Edge and Lincoln MKX to fuel DFC 300 fuel cell power plant
- System will turn 200 lb/hr VOC’s into the 300kW of Electricity
- Eliminates NOx, SOx, and greatly reduces CO2 Emissions
- At Part VOC load the unit will blend Natural Gas to maintain full electrical output
- Ten year cost is estimated to be half the cost to incinerate traditionally
- Funded by Ontario Government, Ford, and FuelCell Energy

VOC Emissions into Power and Heat reducing CO2, NOx and Sox … the Future?
Core Products

Product Characteristics

- High temperature, high efficiency, carbonate fuel cell power plants for base load commercial and industrial applications
- High value waste heat by-product for cogeneration
- Internally generated hydrogen from readily available fuels such as natural gas – *operating at customer sites today*
- Certifications for product safety, interconnection, performance and installation

DFC300MA

DFC1500

DFC3000
Markets

- 100 MW installed/backlog
  - Korea/Asia: 70 MW
  - California/West Coast: 22 MW
  - Northeast/Canada: 6 MW
  - Europe: 2 MW

- Targeted applications
  - Grid Support: 69 MW
  - Renewable/Wastewater: 11 MW
  - Manufacturing: 5 MW
  - Hotels: 3 MW
  - University & Hospitals: 5 MW
  - Government: 5 MW
  - Pipeline: 2 MW
Our product costs are declining while grid power costs are increasing.
Be Clean. Be Green. Be Safe.

Fuel cell energy is ultra-clean. That means we give off negligible NOx and SOx emissions, and fit neatly and quietly in a variety of locations.

Fuel cells are also green. They run on biofuels – gases from wastewater treatment, food processing, and landfills – in addition to natural gas. Plus they’re efficient. They generate more electricity per unit of fuel than any other energy source, and make efficient use of residual heat.

Most important, stationary fuel cells are the only 24/7 ultra-clean distributed power source available. That’s because fuel cells do not depend on wind or sunshine, and reduce your reliance on the power grid. You can build one, literally, anywhere and depend on it around the clock.

Protect your facility from power interruptions, and deal a serious blow to carbon emissions.

Fuel cells exceed all 2007 California Air Resources Board (CARB) requirements.

Thank You

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