2017 OHIO FUEL CELL SYMPOSIUM:
DOE Hydrogen and Fuel Cell Supply Chain Development Session

FuelCell Energy Inc.
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This presentation contains forward-looking statements, including statements regarding the Company's plans and expectations regarding the development and commercialization of fuel cell technology. All forward-looking statements are subject to risks and uncertainties that could cause actual results to differ materially from those projected. The forward-looking statements speak only as of the date of this presentation. The Company expressly disclaims any obligation or undertaking to release publicly any updates or revisions to any such statements to reflect any change in the Company's expectations or any change in events, conditions or circumstances on which any such statements are based. The Company may refer to non-GAAP (generally accepted accounting principles) financial measures in this presentation. The Company believes that this information is useful to understanding its operating results and the ongoing performance of its underlying business.
Company Overview

- >50 sites operating on 3 continents
- > 5 billion kWh’s ultra-clean power generated
- Global manufacturing
- Robust intellectual property portfolio

Design & Manufacture
Project Development
Turn-key Project Delivery
Plant Operation

Energy Supply

Micro-grid CHP
Utility Grid Support
Distributed Hydrogen Tri-Gen

Energy Recovery

Coal
Gas
Carbon Capture
Gas Pipeline
H₂ Recovery (EHS)

Energy Storage

Long duration storage
Power-to-Gas

NASDAQ: FCEL
www.fuelcellenergy.com
Global Partners and Customers

North America

**nrge**

*Market Development / Project finance*
- Largest IPP in N. America
- $40 million project finance facility to FCE
- Owns 4% FCEL stock
- FCE-developed projects to yieldco

Asia

**POSCO ENERGY**

*Market Development Asian Manufacturing*
- Largest IPP in S. Korea
- POSCO 2015 sales: ~$48 billion
- Owns 7% FCEL stock
- License/royalty for Asia
- Asian manufacturing

Europe

**Fraunhofer**

*Market Access Leveraging R&D*
- Providing gov’t & industry introductions
- Multi-million Euro R&D projects
- Near-term opportunities in Germany, UK, and Italy

**Partners**

**Utility & IPP customers**

**On-site Power (behind the meter)**

**CO₂ capture & H₂**

**Corporate Partners**

- Dominion
- NRG YIELD
- Avangrid
- Enbridge
- Pacific Gas & Electric Company
- Southern California Edison
- MPC
- IHCN
- EIP
- BYUCKSAN POWER
- e-on
- EWZ

**Governmental Partners**

- Federal Ministry of Education and Research
- THE CROWN ESTATE
- FRIATEC Group PLC
- CANARY WHARF GROUP PLC

**Academic Partners**

- University of California, Irvine
- UCI Medical Center
- Eastern Municipal Water District
- Hartford Hospital
- Pepperidge Farm
- Pfizer
- Seoul City Hall
- LandSecurities
Global Operations

North America

Manufacturing
Torrington, CT
- Module Assembly & Stacking
- 65,000 ft² facility (pre-expansion)
- Opened 2001

Corporate
Danbury, CT
- Research labs
- Engineering design
- Global Service center

SOFC Research
Calgary, Canada
- Research labs
- Pilot manufacturing

Asia & Europe

Manufacturing
Pohang, South Korea
Capacity for Asian market via partner, POSCO Energy

Manufacturing
Taufkirchen, Germany
Capacity for European market
Scalable Solutions

Individual fuel cell & 350 kW fuel cell stack

Four-Stack Module 1.4 megawatts

Completed module 1.4 megawatts

1.4 MW DFC1500®
• Utilizes one module
• 47% Electrical Eff, up to 90% Total Eff.

2.8 MW DFC3000®
• Utilizes two modules
• 47% Electrical Eff, up to 90% Total Eff.

3.7 MW DFC4000®
• Utilizes three modules
• 60% Electrical Eff. Up to 80% total Eff

59 MW fuel cell park
What’s a high temperature fuel cell PFD look like?
Powerplant Subsystems

- Mechanical Balance of Plant (MBOP)
- Exhaust Stack
- Fuel Treatment - Desulfurizer
- Blower, Heater, Preconverter
- DFC Stack Module A
- DFC Stack Module B
- Water Treatment and Control Panel
- Inverter
- Switchgear
- Electrical Balance of Plant (EBOP)
Expanding Applications

DFC® carbonate fuel cells
- Distributed Generation
- Distributed Hydrogen
- Carbon Capture
- Industrial
- Transportation
- Compression
- Natural Gas
- Combined cycle plant
- Coal-fired
- Multi-MW grid support
- On-site CHP
- Supply and emissions reduction
- Supply, Recovery & Compression
- Emission reduction / Power & CO₂

Solid Oxide fuel cells
- Distributed Generation & Storage
- Power Generation
- Electrolysis & Storage
- Power & Energy Storage

Common Technology Platforms - Expanding Market Opportunities
• Needs and supply chain gaps for Stationary applications: customized balance of plants unit operations –
  – DC/AC inverters suitable for fuel cell systems
  – Inexpensive control hardware (e.g. Automotive based)
  – High temperature anode recycle Blower (200 C- 800 C)
  – Low cost Heat exchangers (high temperature/highly packaged)
  – Fuel Cleanup components

• Explore common ground for manufacturing and strengthening the BOP supply chain
  – The Problem: some of these items are “fixed at volume”-- this approach is problematic because it falls prey to the “valley of death” issue
    • Development costs are high, repeat costs are high until “volume” is reached
    • Most companies never reach “volume”
  – Some unit operations will remain “solid oxide-specific."
    • E.g., for SOFC - Anode recycle blower

• But others, need not be just a fuel cell problem– continue to seriously assess the feasibility of “enabling synergies.”
  – Cross-industry approach leveraging advances, and manufacturing volume- the intersection between the Fuel Cell industry and other industries.
  – Automotive (e.g., a water pump on a pickup costs $100 and will last at least 5 years in the worst environment)
  – Solar (grid-tie inverters; “Little Box Challenge”)
  – Batteries
  – Electronics
Thank You!