

2008 DoE Hydrogen Program Review

Advanced Manufacturing Technologies for Renewable Energy Applications – a DoE/NCMS Partnership

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June 13, 2008

This presentation does not contain any proprietary or confidential information



Project ID # MF3

Overview

- **Timeline**
 - Project start date
October 2004
 - Project end date
September 2008
 - 90% Percent complete
- **Barriers**
 - Covered on next slide
- **Budget**
 - Total - \$6,179,040
((\$7,547,967 actual to date)
 - DOE - \$4,943,232
 - In-Kind –
 - \$1,235,808
(contract)
 - \$2,604,735 (actual
to 4/08)
 - Funding received in
 - FY04 - \$2,943,232
 - FY05 - \$2,000,000
- **Partners**
 - Total: 22 Partners
 - Covered in posters/oral
briefs

Technical Barriers and Targets from the HFCIT Program Multi-year Program Plan

- **Technical Barriers**

 - Fuel Cell Components

 - O. Stack Material and Manufacturing Cost

 - P. Durability

 - Fuel-Flexible Fuel Processors

 - N. Cost

 - Hydrogen Storage Systems

 - A. Cost

 - B. Weight and Volume

 - D. Durability

- **Technical Targets**

 - Costs:** Range from \$10/kWe for fuel-flexible systems to \$45/kWe for integrated systems operating on direct hydrogen; Storage system costs of \$2/kWh net.

 - Durability:** Targets are all 5000 hours or greater. Portable storage systems equivalent to 300,000 miles.

 - Weight and Volume:** Target is 3 kWh/Kg net useful energy/maximum system mass

Objectives

- ❁ Working with DoE and the private sector, identify and develop critical manufacturing technology assessments vital to the *affordable manufacturing* of hydrogen-powered systems.
- ❁ Leverage technologies from other industrial sectors and work with the extensive industrial membership base of NCMS to do feasibility projects on those manufacturing technologies identified as key to reducing the cost of the targeted hydrogen-powered systems.

Approach

- ✿ Identify manufacturing hurdles to hydrogen-powered and storage systems (completed 2005)
- ✿ Rank as to impact for producing affordable structures (completed 2005)
- ✿ Institute collaborative development projects that address the manufacturing technology issues deemed of highest impact (ongoing)

NCMS/DoE Collaborative Projects

1. Affordable High-Rate Manufacturing of Vehicle Scale Carbon Composite High-Pressure Hydrogen Storage Cylinders (MF-4)
2. Manufacturable Chemical Hydride Fuel System Storage for Fuel Cell Systems (MFP-3)
3. Novel Manufacturing Process for PEM Fuel Cell Stacks (MFP-2)
4. Non-Destructive Testing and Evaluation Methods (MFP-4)
5. Innovative Inkjetting and Spray Deposition for Low-Cost, High-Performance Fuel Cell Catalyst Coated Membrane Manufacturing (MFP-1)
6. Manufacture of Durable Seals for PEM Fuel Cells (MF-5) (suggested by FreedomCAR/USCAR)
7. Qualifying Low-Cost High-Volume Manufacturing Technologies for PEM Fuel Cell Power Systems (MF-5)
8. Develop Low Cost MEA3 Process (MF-6)

Fleeting Opportunity

- Solutions to Manufacturing R&D issues are *the* key for widespread usage of fuel cell systems
- Failure to address manufacturing R&D issues early in the process will delay the domestic commercialization of hydrogen-powered systems
- Delays in domestic commercialization will cede this industry to non-domestic manufacturers
- The US is in danger of losing leadership in the development and commercialization of hydrogen-powered systems
- This industry is vital to our national energy future