

2006 DOE Hydrogen Program Review

Hydrogen Education and Outreach

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EDP 1

This presentation does not contain any proprietary or confidential information

Overview



Timeline

- Start date – Nov. 2004
- End date – Dec. 2006
- 75% Complete

Barriers

- Consumers, industry leaders, and public policy makers knowledge level of the benefits of Hydrogen
- Faculty and students limited knowledge of the future of Hydrogen and our economy

Budget

- Funding
 - DOE - \$981,077
 - LCC - \$1 Million +

Partners

- University of Michigan
- Lawrence Institute of Technology
- Wayne State University
- Kettering University
- General Motors Corporation

Objectives

- Increase number of technicians available to service and maintain hydrogen equipment
- Provide an open and accessible site to view and work with Hydrogen fuel cells and other advanced fuels in a lab setting
- Build links with business, industry and educational institutions
- Become an advanced energy resource center for educators, innovators, and policy makers

Approach

- Curriculum Development (DACUM)-100%
 - Alternative Energy Engineering Degree
- Faculty Development and Teacher Prep- 75%
 - Numerous conferences/educational opportunities
- Community Education & Outreach- 75%
 - Public Outreach Trailer and Activities
- Advanced Energy Labs- 60%
 - Fuel Cell & Engine development lab

Progress/Results

Curriculum Development



- Alternative Energy Engineering Degree
 - Curriculum Completed 2+2
 - Courses Being Offered
 - Students Being Employed

AEET 102 Principals of Alternative/Renewable Energies

AEET 110 Conventional Energy Sources/Use

AEET 115 Geothermal Technology

AEET 116 Solar Energy Technology

AEET 117 Biomass, Biogas and Micro Turbine Technology

AEET 118 Fuel Cell & Hydrogen Technology

AEET 119 Wind Energies

AEET 200 Energy Site Evaluation

AEET 220 Energy Efficiency & Management

AEET 250 Alternative Energy Inventory & Analysis

AEET 251 Planning & Design

AEET 252 Alternative Energy Implementation/Maintenance

AEET 260 Codes, Regulations & Standards

Progress/Results

Faculty Development



- Conferences/Workshops
 - Sustainable Business Industry Council
 - International Colloquium on Environmentally Preferred Advanced Power Generation
 - Great Lakes Renewable Energy Association
 - SEMA Conference
 - Fuel Cell Durability Conference
 - Reinvention 2005
 - 2006 Hybrid Vehicle Symposium
 - National Association of State Energy Officials
 - MHA Annual Hydrogen Conference
 - Hydrogen Expo USA
 - Globalcon Energy and Facilities Management Conference
 - International Conference on Hydrogen and Fuel Cells

Progress/Results

Community Education

- **Public Outreach**
 - **Public Outreach Trailer**
 - **Fuel Cell Golf Cart**
 - **SUNY Delhi – LCC Faculty Collaboration**
 - **Fuel Cell Conference for K-14 Partners**
 - **Michigan Legislature Expo**
 - **Statewide Science Teachers Conference Booth**
 - **Alternative Energy Website**
 - **Alternative Energy Brochures**
 - **Media Training**
 - **LCC/Clean Cities Legislators Informational Booth**
 - **3 Full Color Energy Banners for use at conferences and workshops**
 - **Kiwanis, Rotary, Governor's Conference on Technical Education Presentations**



Progress/Results

Advanced Energy Labs

- **Fuel Cell & Engine Labs**
 - Design Complete
 - Equipment Received
 - Installation Now
 - Expected Completion
 - July 2006
- **Fuel Cell Golf Cart**
- **Hybrid Vehicle**
- **Fuel Cell Kiosk**
- **Solar Bench**
- **Hydrogen ICE Engine**



Future Work



- **Completion of Fuel Cell Laboratory**
- **Completion of Engine Laboratory**
- **Completion of Faculty Development**
- **Completion of Fuel Cell Conference K-14**
- **Completion of Hydrogen Integration In Automotive Courses**
- **Complete Delivery of Curriculum**
- **Curriculum Revisions Based on Experience**

Future Work – Long Term



- **Hydrogen Refueling Station**
 - Needed to support education of technicians
 - Regional need to support R& D
 - Not able to be completed as part of this award
 - Seeking Funding Sources
- **Ongoing Public Outreach**

Project Summary



- **Focus on Technician Training**
- **Curriculum Being Delivered**
- **Students Being Employed**
- **Fuel Cell Labs Under Construction**
- **Faculty Training Ongoing**
- **Hydrogen Integration Automotive**
- **Public Outreach Continuing**
- **Hydrogen Refueling Station Needed**

Responses to Reviewers Comments



- **Stronger Linkage to Hydrogen Technologies**
 - DACUM process identified the tasks that students will need to be successful as stated by industry representatives
- **Demand for Students**
 - Students are being employed even before completion of their course of study
- **Hydrogen ICE**
 - All major manufacturers have prototyped these vehicles and some OEM's indicate they believe they will go to market well before fuel cell vehicles requiring technicians who can repair and maintain these vehicles

Publications and Presentations



- **Brochure – The Shift to alternative energy starts with educators**
- **Brochure – Leadership, partnership and bold vision will power the alternative energy economy**
- **Brochure – Get Ready-The power of alternative energy is here**
- **Numerous presentations on energy have been conducted**

Critical Assumptions and Issues



- **Educating local code officials on Hydrogen applications is essential**
 - Meeting with trained faculty to assist in educating the public officials was helpful
- **Completion of Hydrogen Safety Plan is critical prior to applications going online**
 - Draft submitted and revisions being made now