U.S. DEPARTMENT OF ENERGY

Education

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2009 DOE Hydrogen Program & Vehicle Technologies Program Annual Merit Review and Peer Evaluation Meeting

May 21, 2009

Accomplishment Highlights

Hydrogen and Fuel Cell Knowledge and Opinion Survey

- Finalized follow-up survey with the addition of safety and code officials survey, analysis and report to be published at the end of FY09

Safety and Code Officials

- Launched advanced-level first responder training that includes hands-on prop
- Launched Introduction to Hydrogen for Code Officials web course

Schools and Universities

- Trained 7,000 middle school teachers through full-day workshops and conference sessions (cumulative, since 2004)
- More than 600 high school students and 100 high school teachers introduced to hydrogen and fuel cell course materials
- 22 university courses and curriculum modules under development at 5 universities for general science and engineering programs and specialized hydrogen and fuel cell concentrations

End Users

- Conducted monthly educational seminars targeted to lift truck users, including demonstration of fuel cell lift trucks with potential early adopters

State and Local Governments

- Conducted more than 19 workshops and seminars across the country to help decision-makers identify and assess opportunities for fuel cell deployment

Automotive X-Prize/Fuel Our Future Now

- In partnership with Discovery Education, launched “Fuel Our Future Now” site, a portal to curricula materials for grades K-12 – focus is alternative fuel and advanced vehicle technologies

Goal and Objectives

GOAL: Educate key audiences about hydrogen and fuel cell technologies to facilitate near-term demonstration, commercialization, and long-term market acceptance

Objectives

- By 2009, increase knowledge of hydrogen and fuel cell technologies among key target populations (compared to a 2004 baseline)
  - State and local government officials, students – by 10%
  - Public, potential end-users – by 15%

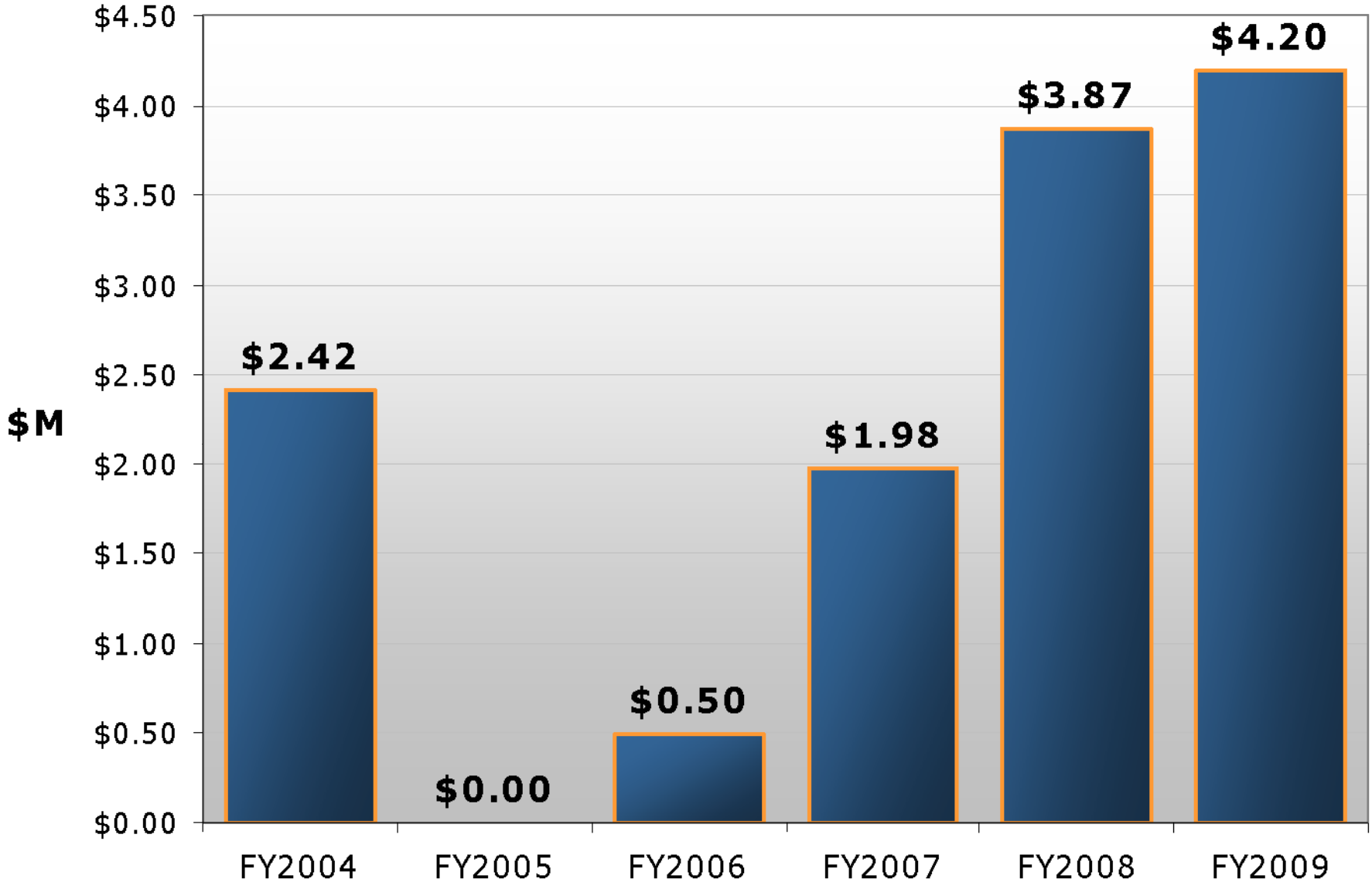
- By 2012, increase knowledge of hydrogen and fuel cell technologies among key target populations (compared to a 2004 baseline)
  - State and local government officials, students – by 20%
  - Public, potential end-users – by 30%

Target audience definitions:
State and local government officials: *State agency representatives (energy office, DOT, DEP), mayors and county supervisors or their designees*
Students: *Middle and high school students*
Public: *Adults ages 18+*
Potential end users: *Three categories – transportation, businesses needing uninterruptible power, and large power users*

Target Audiences

Audience	Rationale
First Responders	Must know how to handle potential incidents; their understanding can also facilitate local project approval
Code Officials	Must be familiar with hydrogen to facilitate permit process and local project approval
Local Communities/ General Public	Will be more likely to welcome local demonstration projects when they are familiar with hydrogen
State and Local Government Representatives	A broad understanding of hydrogen supports decision-making on current opportunities and laying the foundation for long-term change
Potential End Users	Potential early adopters need information about near-term opportunities
University Faculty and Students	Current interest is high; graduates needed for research in government, industry, and academia
Other Teachers and Students	Current interest is high; teachers looking for technically accurate information and usable classroom activities

Budget History



Challenges

- Resistance to change
- Lack of readily-available, objective, technically-accurate and "easily digestible" information
- Conflicting messages
- Lack of hydrogen/fuel cell information available through existing training and education networks
- Lack of educated trainers and training opportunities

Opportunities

- Energy is part of today's daily public conversation
- Demonstration and deployment is ramping up, particularly in early markets, providing opportunities for education and outreach

Hydrogen Knowledge and Opinion Survey

- Four populations (general public, students, state and local officials, and potential end users) surveyed in late 2008
- Safety and code officials survey to be administered spring/summer 2009
- Findings will be analyzed and compared with 2004 baseline survey results
- Final report planned for release by September 30, 2009
- Lead: ORNL, with Opinion Research Corporation

Sample knowledge question:

To which of the following can fuel cells provide power?

a. Your home

b. Your car

c. Your laptop computer

d. All of these

e. Or, none of these

f. Don't know/No opinion

Sample opinion question:

How would you feel if a school, hospital, or other building in your neighborhood was powered by a fuel cell located on its property? Would you say ...

a. Frightened

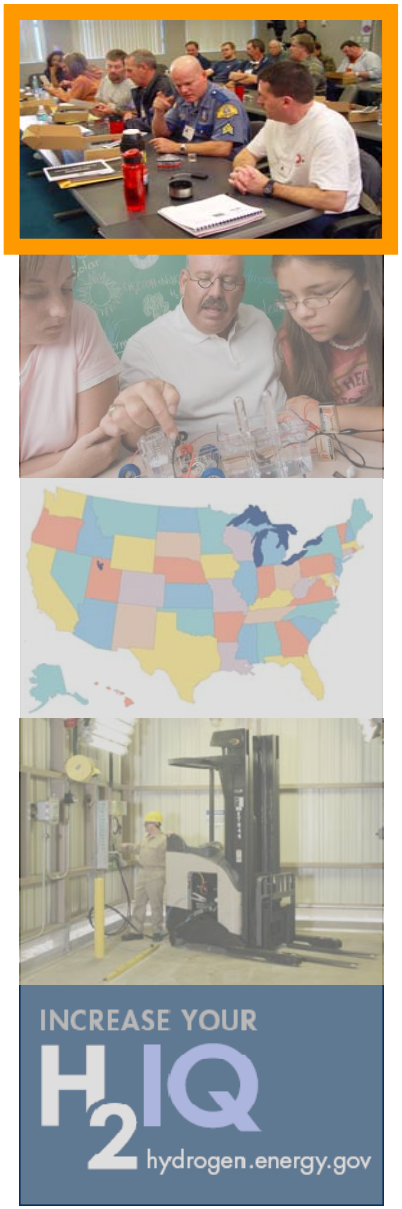
b. Uneasy

c. At ease

d. Or, pleased

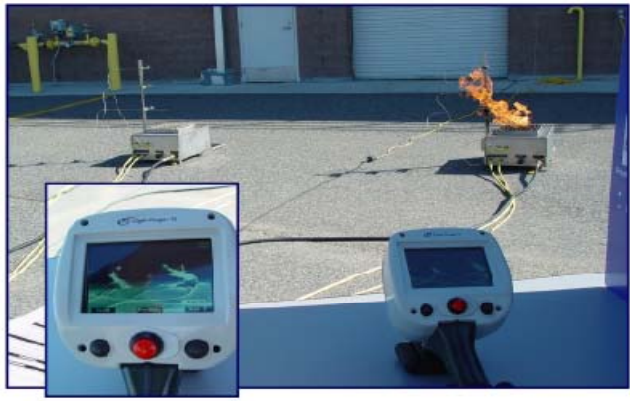
e. Don't know/No opinion

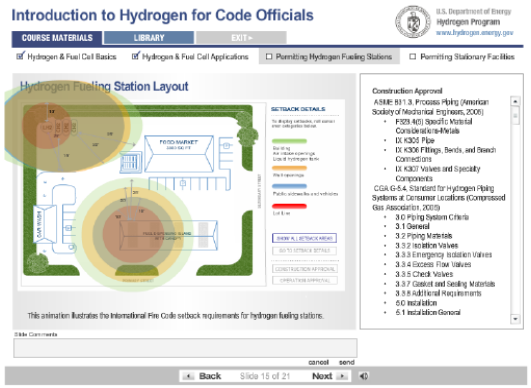
Safety and Code Officials



First Responder Education

- Completed upgrade of web-based *Introduction to Hydrogen Safety for First Responders – averaging 300-500 unique visits/month*
- Completed development and conducted inaugural advanced-level training course that includes hands-on prop
- Lead: PNNL, with HAMMER Training and Education Center





Code Official Education

- Completed Introduction to Hydrogen for Code Officials course website
- Launch planned for May 2009
- Lead: NREL

Schools and Universities

Middle School & High School Education

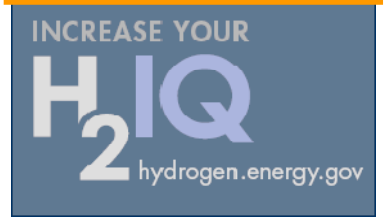
- Trained 7,000 middle school teachers through full day workshops and conference sessions (cumulative since 2004)
- More than 600 high school students and 100 high school teachers introduced to hydrogen and fuel cell course materials
- Leads: The NEED Project (middle school), Lawrence Hall of Science at UC-Berkeley (high school)

University Education Projects (5 projects)

- 22 courses and curriculum modules under development at 5 universities for general science and engineering programs and specialized hydrogen and fuel cell concentrations
- Targeting broad student audience in general courses and specialized science and engineering programs
- Includes lab kits and textbook modules for general use, teaching assistantships and internships
- Leads: Cal State-LA, Humboldt State, Michigan Tech, University of Central Florida, University of North Dakota

Student Competitions/Events

- Hydrogen Student Design Contest



End Users/Early Market Outreach & Demonstration Project (1 project)

- Conducted monthly educational seminars targeted to lift truck users
- Deployed first 2 lift trucks supporting early market commercialization
- Lead: Carolina Tractor & Equipment Company

State and Local Government Outreach (7 projects)

- Conducted more than 19 workshops and seminars across the country for state and local government officials
- Developing technology basics, case studies, best practices, and technical assistance resources to help decision-makers identify and assess opportunities for fuel cell deployment
- Disseminating information through workshops, webinars, websites, video, and publications
- Leads: CT Center for Advanced Technology; Houston Advanced Research Center; Ohio Fuel Cell Corridor; SC Hydrogen and Fuel Cell Alliance; VA Department of Mines, Minerals, and Energy; Clean Energy States Alliance; Technology Transition Corporation

Fuel Our Future Now

- **Partnered with Clean Cities Activity, the Automotive X Prize and Discovery Education**
- **Launched at the Washington DC Auto Show in February**
- **Curriculum available for K-12**
  - Grades K-2: Vroom! Vroom! What Makes Cars Go?
  - Grades 3-5: Designed for Efficiency
  - Grades 6-8: Designing a Vehicle for the Year 2020
  - Grades 9-12: Transport to the Future: Making a Plan for Positive Change

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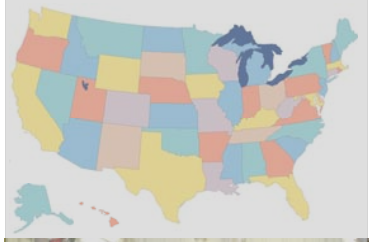
For More Information



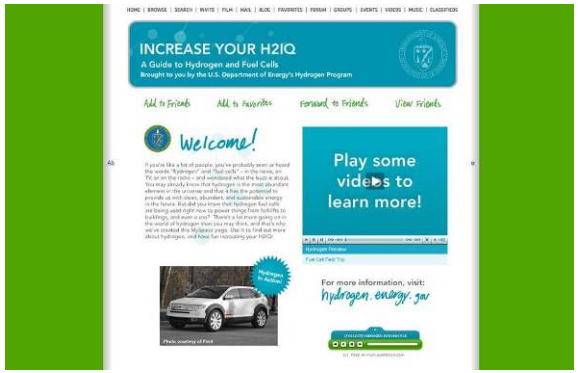
General Educational Resources

Fact sheets

Radio spots and podcasts

MySpace page

hydrogen.energy.gov



www.myspace.com/h2iq

eere.energy.gov/vehiclesandfuels/

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