



2005 Annual DOE Hydrogen Program Review

Hydrogen Education

Christy Cooper

Hydrogen, Fuel Cells, and Infrastructure Technologies Program

Project ID#
ED1



Outline



- **Goal and Objectives**
- **Challenge and Barriers**
- **Program Status**
- **Accomplishments**
- **Future Approach/Strategy**
- **Future Plans**



Goal and Objectives



Goal –

Educate key audiences about the concept of a hydrogen economy and hydrogen fuel cell technologies to facilitate near-term demonstration and long-term commercialization and market acceptance of these technologies

Objectives –

By 2010:

- ✓ Achieve a fourfold increase in the number of *state and local government representatives* who understand the concept of a hydrogen economy and how it may affect them*
- ✓ Achieve a fourfold increase in the number of *students and teachers* who understand the concept of a hydrogen economy and how it may affect them*
- ✓ Achieve a twofold increase in the number of *large-scale end-users* who understand the concept of a hydrogen economy and how it may affect them*
- ✓ Launch a comprehensive and coordinated public education campaign about the hydrogen economy and fuel cell technology

*according to a 2004 baseline



Challenge and Barriers



Challenge –

That the hydrogen economy is a revolutionary change from the world we know today is the fundamental challenge to hydrogen education. Resistance to change is compounded by misunderstandings about the safe use of hydrogen as an energy carrier.

Barriers –

- A. Lack of awareness
- B. Lack of demonstrations or examples of real-world use
- C. Institutional barriers and access to audiences
- D. Regional differences



Program Status



FY05 Budget = \$ 0

- Sustained limited communications efforts
- FY04 projects extended to FY06

FY06 Budget Request = \$1.881M



Accomplishments



Completed Baseline Survey

About the Survey

- ✓ National, statistically-valid survey, required OMB approval
- ✓ Key players – ORNL and Opinion Research Corporation
- ✓ Four target audiences surveyed – public, state and local governments, large-scale energy end-users, students
- ✓ Included technical knowledge questions and opinion questions about the hydrogen economy and hydrogen fuel cell technologies

Sample Findings:

- The public and large-scale end-users each responded “don’t know” to more than 40% of the knowledge questions
- In every population, people who know the least about hydrogen have the most fear about hydrogen safety
- 37% of the public surveyed think hydrogen gas is toxic; 41% think hydrogen is too dangerous for everyday consumer use
- Nearly 60% of the students surveyed are not familiar with the term “hydrogen economy”

Final, peer-reviewed report expected in late May/early June



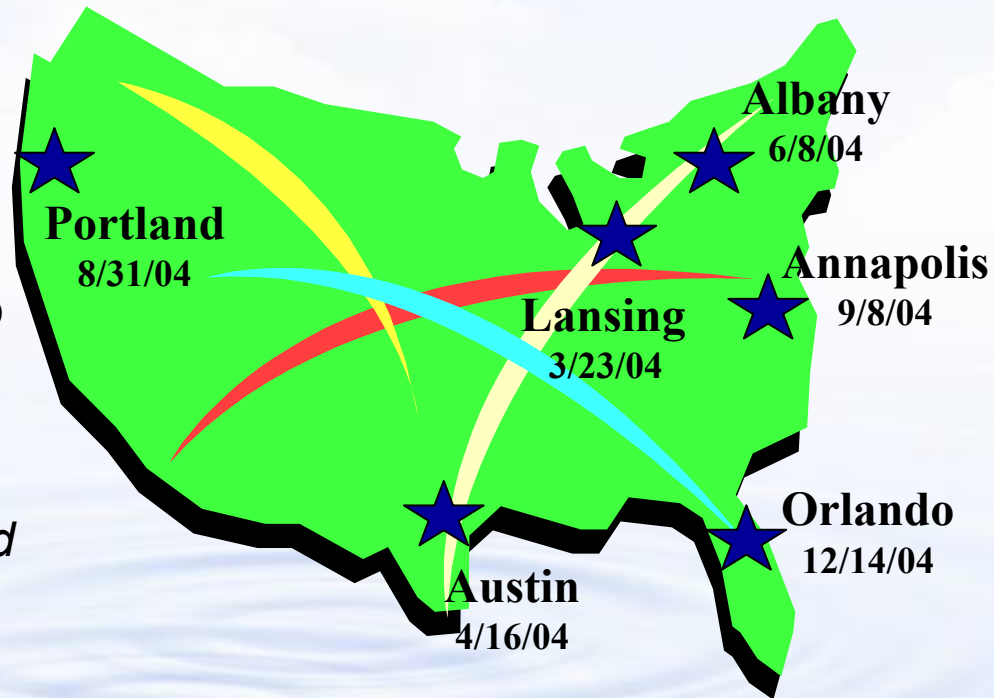
Accomplishments



Completed First Hydrogen 101 Series

Hydrogen Learning Workshops

- ✓ Target audience = State and local government officials (state agencies, state legislators, city and county employees)
- ✓ Partners included DOE Regional Offices, state energy offices, national lab and university experts
- ✓ Workshops included “Hydrogen 101” and afternoon state initiative roundtable
- ✓ Completed 6 pilot workshops; *received requests for up workshops in 15 additional cities*





Accomplishments



Launched Hydrogen Education Development Projects

Public Information Products –

- ✓ Hydrogen Information Kit: lead = Andersen Creative Group
- ✓ Hydrogen Technology Overview Book: lead = Energy and Environmental Analysis, Inc.

Target Audience → Interested public, media, state and local government officials, potential large-scale end-users, safety and code officials, and others with little technical background

Final materials will be available through the EERE Information Center (877-EERE-INF(O)) and on-line catalog - www.eere.energy.gov/hydrogenandfuelcells/resources.html.

Curriculum and Teacher Professional Development –

- ✓ High School: lead = Lawrence Hall of Science, University of California at Berkeley
- ✓ Middle School: lead = National Energy Education Development Project



Accomplishments



Launched University Projects

STAC

State Technologies Advancement Collaborative

Hydrogen Learning Centers at Universities –

- ✓ H2USA (regional centers in FL, NY, CA):
 - Lead = University of Central Florida - Florida Solar Energy Center
- ✓ Virginia-Maryland Hydrogen Technology Education Center:
 - Lead = Virginia Tech
- ✓ Regional Hydrogen Technology Education Consortium:
 - Lead = North Carolina A&T



- Curriculum development
- Training
- Community outreach



The University of Montana – Missoula

- Curriculum development
- Safety training center

The National Hydrogen Association's
2005 H2U Student Design Competition



Future Approach/Strategy



FY06 Budget Request = \$1.881M

→ Focus activities on target audiences critical to NEAR-TERM hydrogen activities

- State and local government representatives
- Safety and code officials
- Local communities

→ Identify and develop partnerships to leverage scarce resources and extend reach of education activities

- IPHE Education Task Force
- State and regional initiatives/DOE Regional Offices
- Other – trade associations, industry partners



Future Plans



State and local governments:

State initiatives database, Hydrogen 101 Workshops, "Energy Institutes"

Baseline Survey Statistic:

Nearly 90% of the State and local government officials surveyed feel a Hydrogen 101 workshop would be helpful

Local communities:

Targeted outreach where hydrogen fueling stations are planned – PSAs, Hydrogen 101 seminars

Baseline Survey Statistic:

When asked how they'd feel if their local gas station also sold hydrogen, more than 50% of the public surveyed said they'd feel frightened, uneasy, or "don't know"

Safety and code officials:

Training modules – developed and implemented in coordination with Safety, Codes & Standards key activity



Mid-Atlantic Hydrogen 101 Workshop



Washington, DC
Hydrogen Fueling Station



Future Plans



Continue Deferred Projects from FY04

Universities:

Hydrogen Learning Centers, H2U Competition

High schools/Middle schools:

Curriculum and teacher professional development projects

Baseline Survey Statistic:

Students answered 32% of the knowledge questions correctly and 36% of the knowledge questions incorrectly; 32% of the responses were "Don't Know"

Maintain education groundwork:

Education materials, web, clearinghouse



2005 H2U Contest Winners



For More Information



New DOE Hydrogen Program Web Site:
www.hydrogen.energy.gov

Hydrogen, Fuel Cells, and Infrastructure Technologies:
www.eere.energy.gov/hydrogenandfuelcells

EERE Information Center:
[877-EERE-INF\(O\)](tel:877-EERE-INF(O))

Christy Cooper
202-586-1885
christy.cooper@ee.doe.gov

Urvi Parekh
202-586-4470
urvi.parekh@ee.doe.gov



Looking to the Future...



“When hydrogen is used in [a] fuel cell it has the potential to power anything from a cell phone to a computer to an automobile...[and emit] pure water, instead of exhaust fumes.

I want the children here in America...to be able to take [their] driver's test in a completely pollution-free car that will make us less dependent on foreign sources of energy.”

**President George W. Bush
April 27, 2005**