

## VII.0 Education Sub-Program Overview

### Introduction

The President's National Energy Policy includes a recommendation to the Secretary of Energy to "develop a public education campaign that communicates the benefits of alternative forms of energy, including hydrogen." Near-term demonstration projects and long-term hydrogen technology commercialization require educated state and local government officials, trained safety and code officials, an educated workforce that includes engineers and hydrogen fuel cell technicians, and local community/public understanding of hydrogen fuel cell technology. The Hydrogen Education activity develops and implements activities to meet the needs of these key target audiences. It also considers a balanced message to ensure an understanding of the benefits of a hydrogen economy, the facts about hydrogen safety, and the technical challenges related to hydrogen production, delivery, storage, and fuel cells that affect the timeline for commercialization.

### Status

In 2003 and 2004, hydrogen education activities focused on building the foundation for a long-term education campaign, including a baseline knowledge assessment, expansion of the program's web site and creation of an information clearinghouse, and development activities to educate specific key target audiences.

In 2003, the Hydrogen Education activity issued two solicitations through established programs involving coordination with state energy offices. The hydrogen topic of the State Energy Program Special Projects solicitation sought projects to demonstrate fuel cell technology at universities that could be used to educate the local community. Funds were awarded for projects at Central Washington University, North Carolina State University, and the University of North Dakota. Through the State Technology Advancement Collaborative (STAC), a partnership involving DOE, the National Association of State Energy Officials (NASEO), and Association of State Energy Research and Technology Transfer Institutions (ASERTTI), the Hydrogen Education activity issued another solicitation for the development of Hydrogen Technology Learning Centers at universities. Project awards were announced in March 2004 and involve three partnerships among ten schools in nine states. Schools and partner organizations include the following: (1) *H<sub>2</sub> USA Learning Center*: Florida Solar Energy Center, Rochester Institute of Technology, University of California at Davis, and San Diego Miramar College; (2) *Mid-Atlantic H<sub>2</sub> Learning Center*: Virginia Polytechnic and State University, University of Maryland at College Park, Breakthrough Technologies Institute, and Hampton Roads Clean Cities Coalition; (3) *Regional H<sub>2</sub> Technology Education Consortium*: North Carolina A&T, University of South Carolina, University of Georgia, and University of Florida. The schools will develop and expand undergraduate and graduate curricula, as well as conduct other activities to educate the local community.

In late 2003, the program issued the Hydrogen Education Development solicitation, seeking the development of general education materials, as well as middle school and high school hydrogen technology curricula and teacher professional development projects. Awards were announced in 2004. Hydrogen technology overview and program informational materials will be developed by teams led by Energy and Environmental Analysis, Inc., and Anderson Creative Group. High school hydrogen technology curricula and teacher professional development activities will be developed and implemented by a team led by the Lawrence Hall of Science at the University of California at Berkeley; a similar effort focused on middle schools will be implemented by a team led by the National Energy Education Development (NEED) Project.

Also in 2004, the Hydrogen Education activity launched the Hydrogen Learning Workshop series for state and local governments. The project was officially announced by Energy Secretary Abraham in February 2004, and continued with trainings in Lansing, MI, in March; Austin, TX, in April; Albany, NY, in June; Portland, OR, in August; and Annapolis, MD, in September. The initial series is scheduled to finish in Orlando, FL, in

early October. The purpose of the Hydrogen Learning Workshops is to provide “Hydrogen 101” to state and local government officials who are interested in learning about the hydrogen economy but do not have a technical background. Experts explained the benefits and vision of a hydrogen economy; how hydrogen is produced, delivered, and stored; the facts about hydrogen safety; how fuel cells work in fuel cell applications; and the technical challenges to achieving the hydrogen vision. The series brought together program staff from DOE headquarters with staff in DOE regional offices, as well as state and local partners.

## **FY 2004 Accomplishments**

Baseline knowledge assessment:

- Completed literature review, October 2003
- Developed and tested survey questions for all target audiences (public, students and teachers, state and local governments, and large-scale end-users) by March 2004
- Received Office of Management and Budget approval of public survey, March 2004; student survey, May 2004; state and local government survey, July 2004; large-scale end-user survey, September 2004

Hydrogen/fuel cell information “groundwork”:

- Launched new hotline as part of EE Information Center – 877-EERE-INF(O); EE Information Center went “live” January 2004; HFCIT official launch announced at National Hydrogen Association Annual Conference, April 2004
- Awarded Hydrogen Education Development solicitation to develop general educational materials and to co-sponsor conferences and events, April 2004

K-12 teachers and students:

- Identified and reviewed existing K-12 hydrogen education materials; developed report, May 2004
- Awarded Hydrogen Education Development solicitation to develop long-term, comprehensive curricula for middle schools and high schools; develop and implement teacher training and professional development; and assess curricula, usage, and overall effectiveness of program, April 2004
- Published middle school activity guide to serve immediate education needs, April 2004
- Drafted high school activity guide to serve immediate education needs, September 2004

Universities:

- Published database of university programs and hydrogen fuel cell textbook catalog, July 2004
- Initiated Hydrogen Technology Learning Centers involving 10 schools in 9 states through State Technology Advancement Collaborative, March 2004
- In partnership with the National Hydrogen Association, held first annual hydrogen design contest for university students, April 2004

State and local governments:

- Held Hydrogen Learning Workshop Series for state and local government officials; announced by Secretary Abraham in February 2004; trainings held in Lansing, MI, March 2004; Austin, TX, April 2004; Albany, NY, June 2004; Portland, OR, August 2004; and Annapolis, MD, September 2004 (Orlando, FL, scheduled for October 2004)

### FY 2005 Plans

Subject to Congressional appropriations, the FY 2005 plans are to fund “phase 2” efforts of projects awarded under the STAC Hydrogen Technology Learning Center and Hydrogen Education Development solicitations. The results of this investment will be expanded curricula at the university level and materials to educate multiple target audiences about hydrogen technology, as well as pilot-tested hydrogen curricula for middle schools and high schools.

Plans also include funding to develop and implement education activities in conjunction with specific projects awarded under the Technology Validation activity’s “Controlled Hydrogen Fleet and Infrastructure Learning Demonstration” solicitation. In addition to efforts at universities that are partners in the learning demonstrations, the focus of this activity will be to educate the public and others in local communities where demonstration projects will be implemented, with an emphasis on understanding hydrogen safety.

An expanded Hydrogen Learning Workshop series is planned (pending Congressional appropriations), as is a 2005 university design competition in cooperation with the National Hydrogen Association. The concept for the 2005 competition, now named “H2U,” is the development and design of a hydrogen power park. Other FY 2005 activities will include the creation of a Hydrogen Education Review Panel and a coordination plan with the Safety, Codes and Standards activity.

The FY 2005 Hydrogen Education budget request and FY 2004 appropriation are shown in the figure below.



