

# 2005 DOE Hydrogen Technology Learning Centers

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State Technologies Advancement  
Collaborative (STAC)

April 19, 2005

This presentation does not contain any proprietary or confidential information

**Project ID#  
EDP5**

# Overview of STAC Program

## Benefits

- Expedited procurements: six months from solicitation to selection
- Multi-state projects
- Leverage

## STAC Project Funds

Total Value of Projects

-\$23,802,880

STAC/Federal Funds

-\$11,742,014

Participant Cost share

-\$12,060,866

## Barriers

- Limited funding
- Consistency of multi-year funding

## Partners

- ASERTTI, NASEO
- DOE-EERE & FE

# STAC Program

## Mission and Objectives

The overall goal is to provide a better way to plan a federal / state RDD&D agenda, and conduct joint RDD&D through multi-state, efficient, competitive and fair procurement and management practices.

STAC builds on existing, successful programs and is not intended to replace the State Energy Program (SEP), the Special Projects solicitation, or the other successful joint DOE / State initiatives.

# STAC H2 Project Funding

Project	Cost Share	Total Project Cost	Partial 1 <sup>st</sup> Year Funding	
			DOE	Participants Cost Share
CA, FL, NY	\$250,000	\$1,000,000	\$234,272	\$86,082
H2TEC	\$167,862	\$666,741	\$118,039	\$43,651
HyTEC	\$116,202	\$464,804	\$52,689	\$20,466

# Overview of Selected Projects

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*Three projects were selected as part of the STAC program's hydrogen solicitation:*

- Hydrogen Technology Learning Centers for California, Florida, and New York
- Virginia-Maryland Hydrogen Technology Education Center
- Development of a Regional Hydrogen Technology Education Consortium (North and South Carolina, Georgia, and Florida)

# Project Objectives

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To educate students; potential end-users, such as fleets or building developers; local officials; and the public about the vision of a hydrogen economy, hydrogen technologies and applications, the safe use of hydrogen as an energy carrier, and the challenges to achieving a hydrogen economy.

# Hydrogen Technology Learning Centers for California, Florida, and New York

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This 18-month effort will establish four learning centers in the three named states at the following locations:

- San Diego Miramar College
- University of California at Davis
- University of Central Florida Solar Energy Center
- Rochester Institute of Technology

The project participants will develop interactive displays and exhibits, set up a website, produce information publications, and conduct a national conference.

**Project Lead:** University of Central Florida Solar Energy Center

**Partners:** California Energy Commission (CEC)  
NY State Energy Research & Development Authority

# Hydrogen Technology Learning Centers for California, Florida, and New York

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Task #	Description	Deliverable(s)
1	Develop Education Media	<ul style="list-style-type: none"><li>• Inventory of Existing Hydrogen &amp; Fuel Cell Educational Materials Currently Available<ul style="list-style-type: none"><li>▪ Website</li></ul></li></ul>
2	Develop Education Programs	<ul style="list-style-type: none"><li>• Community College and University Hydrogen Course Survey<ul style="list-style-type: none"><li>▪ Survey Results Report</li></ul></li></ul>
3	Conduct Education Programs	<ul style="list-style-type: none"><li>• Curriculum Outline and Course Descriptions<ul style="list-style-type: none"><li>▪ National Conference</li></ul></li></ul>



# Virginia-Maryland Hydrogen Technology Education Center (H2TEC)

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This three-year project will establish a new undergraduate course in hydrogen technology in the two states, as well as graduate study in the hydrogen area. Short courses and seminars for professionals will be offered. In addition, presentations for non-technical audiences will be developed and K-12 outreach is also included.

**Project Lead:** Virginia Polytechnic Institute and State University (Alexandria Research Institute)

**Partners:** University of Maryland (UMCP)  
Breakthrough Technologies Institute  
Hampton Roads Clean Cities Coalition

# Virginia-Maryland Hydrogen Technology Education Center (H2TEC)

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Task #	Description	Deliverable(s)
1	Interactive Demonstrations & Activities	Reports describing demonstrations of H <sub>2</sub> vehicle refueling; renewable H <sub>2</sub> ; PEMFC lab; FC-CHP; SOFC lab.
2	Advanced Undergraduate Course	Course materials; course taught; course report
3	Graduate Course	Course materials; course taught; course report
4	One-day short Course	Course materials; course taught; course report
5	Bimonthly Hydro Tech Seminar Series	Seminars delivered; seminar report
6	H <sub>2</sub> Energy Advocate Program	Annual report from energy advocates indicating activities.
7	Learning Center Open House	Copies of educational materials; event reports
8	Government/Industry Briefings	Copies of briefing materials; briefing reports
9	Display/Educational Materials for Public Forums	Copies of education materials; event reports

# Development of a Regional Hydrogen Technology Education Consortium (HyTEC)

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This three-year effort led by a consortium of four universities from four states will provide education and training for students, professionals, and the public. The consortium will establish centers at each university, develop courses, workshops, establish a quarterly electronic newsletter, and develop and disseminate K –12 outreach materials.

**Project Lead:** North Carolina A&T University

**Partners:** University of South Carolina  
University of Florida  
University of Georgia

# Development of a Regional Hydrogen Technology Education Consortium (HyTEC)

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Task #	Description	Deliverable(s)
1	University Courses	Courses on: 1) Hydrogen Energy Technology; 2) Hydrogen Production, Storage, and Transportation; 3) Hydrogen Energy Conversion; and 4) Fuel Cells
2	K-12 Students and Science Teachers	Multi-media one-day short course
3	State & Local Government Officials	Multi-media, one day short course
4	End Users & Industry Groups	Multi-media presentation on safe production, storage, and transportation of hydrogen as well as safety codes and standards
5	General Public	Quarterly electronic newsletter
6	Hydrogen Technology Demonstration	Demonstrations of: 1) Fuel Cell Bus; 2) Solar Hydrogen Production; and 3) Biomass Hydrogen Production .

# Progress of Learning Centers for CA, FL, and NY

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## *University of California at Davis Progress*

- Developed a draft curriculum for the *Hydrogen Pathways Graduate Course*
- In the planning stages of:
  - creation of *Hydrogen and Fuel Cell Educational Modules* for students at the 6-12 grade levels, and
  - the *Fuel Cell Fundamentals and Fuel Cell Systems Laboratory Course* for university students.

# Learning Centers for CA, FL, and NY – Next Quarter

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## *University of California at Davis – Next Quarter*

- Develop content for courses, including:
  - lectures;
  - background reading materials;
  - practice problem and homework sets; and
  - a detailed description (and example) of the final hydrogen system design project

# Progress of H2TEC

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- Offered undergraduate senior design project course to design a hybrid electric vehicle
- Developed a three credit hour undergraduate course in hydrogen technology
- “Virginia Tech Future Truck,” display illustrating a hydrogen fuel storage system and a hydrogen IC engine was presented at the Roanoke Civic Center as part of the Association of Energy Conservation Professionals (AECP) Energy Fair

# H2TEC - Next Quarter

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- Continue teaching undergraduate and graduate courses in hydrogen technology;
- Complete first phase of laboratory renovations;
- Deliver two hydrogen seminars to be offered in the Virginia/DC/Maryland area;
- Develop educational materials for a one-day short course on hydrogen technology.



# Progress of HyTEC

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- A preliminary course outline was developed for a course on Fuel Cells.
- Several course modules for application of engineering principles of heat and mass transfer, fluid dynamics and thermodynamics to hydrogen Energy Systems are already completed and available.
- Tours of the Fuel Cell Laboratory and Fuel Cell bus tours were given.
- The Solar Hydrogen Production facility construction continues.

# HyTEC – Next Quarter

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- Improved fuel cell course material will be tested as part of a graduate level Energy Conversion class (EML 6451).
- The course outline will be further refined and improved.
- Production of a hydrogen newsletter for the general public will commence.
- Additional tours and demonstration will be performed.

# Overall

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- Projects were only recently funded.
- Work began late in the fourth quarter of 2004.
- Due to decreases in Congressional appropriations, FY'05 funding was not provided.
- STAC is working with the project managers and DOE to determine how best to proceed given the lack of complete funding.

# Questions?

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