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Development of Hydrogen Education Programs for Government Officials

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Project ID # ED010

SC HYDROGEN & FUEL CELL ALLIANCE
www.SCHydrogen.org

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POWERFUL EXPERTS

Project Overview

- **Timeline**
  - August 1, 2008 thru January 31, 2013
- **Budget**
  - DOE Share: $841,611
  - Recipient Share: $607,000
  - Funding for FY 11: $0
  - Funding for FY 12: $0
- **Barriers**
  - Mixed Messages can create potential for conflicting public messages
  - Disconnects between hydrogen information and dissemination networks
  - Difficulties of measuring success
- **Partners**
  - South Carolina Hydrogen and Fuel Cell Alliance (SCHFCA); Greenway Energy LLC; Municipal Association of South Carolina (MASC); South Carolina Energy Office (SCEO); Office of the South Carolina State Fire Marshal; SC Chapter of the American Planners Association (SCAPA); BMW, ATI, Ameresco

Relevance

Hydrogen 101: State and Local Government Education

- To accelerate the on-going construction of the hydrogen and fuel cell economy in South Carolina and the Southeast by providing accurate and reliable information to state and local decision-makers.

- Challenges to overcome:
  - Lack of adequate educational materials
  - Mixed messages about hydrogen and alternative energy technologies
  - Inefficient dissemination of hydrogen educational materials
  - Lack of educated trainers

Hydrogen 101: State and Local Government Education

Aug. 2008 – Jan. 2013

- Goals
  - Identify evolving key messages for decision makers, industry leaders and stakeholders
  - Develop varying presentation tools and formats
    - Available time
    - Audience interest & technical level
  - Develop and host webinars for state and local government officials and stakeholders
  - Give H_2 101 presentations to a variety of decision makers and stakeholders
  - Collect feedback and improve presentations
  - Launch H101 educational web browsing tool

Approach

Hydrogen 101: State and Local Government Education

- Assess the needs of the program and the team
- Design the decision-maker targeted program
- Develop the training materials
- Deploy materials to the audience to be educated
- Evaluate the educational program

Approach

Hydrogen 101: State and Local Government Education

2011: Quarter 1-4:

- Specific Metrics
  - In-person presentations & meetings
  - national conference(s)
  - webinars
  - published article(s)
  - H101 webpage launch via SCHFCA website
  - MVP of Fuel Cell Forklift brochure distribution

= **21,339** stakeholders reached in 2011

(does not incorporate a multiplier effect created by website postings and dissemination of MVP brochures)

Accomplishments
Activities

March 2011 – March 2012 Activities:

- H_2 101 Webpage Launch (http://schydrogen.org/html/H101.html)
- Slideshare site access (www.slideshare.net/greenwayenergy)
- Educational YouTube channel access
    - www.youtube.com/greenwayenergy
    - www.youtube.com/user/schydrogenfuelcells)
- H_2 101 Webinars - 3
  - featured presenter in a DOE webinar: Where the Jobs Are: Hydrogen and Fuel Cells in South Carolina
- Meeting with Dr. Arun Majumdar, Director of the Advanced Research Projects Agency - Energy (ARPA-E), and alternative energy leaders in Charleston, SC
- Attended "Securing Our Energy Future" conference in Charleston, SC with keynote speakers, Congressman James Clyburn and Senator Lindsey Graham

Activities Continued

March 2011 – March 2012 Activities:

- Phone presentation for the California Hydrogen Business Council
- Published an educational article in the *Columbia Regional Business Report* about the South Carolina Hydrogen Fuel Cell Cluster
- Featured presenter at the ACEC-SC/SCSPE Winter Meeting (South Carolina Society of Professional Engineers)
- 2011 Fuel Cell Seminar & Exposition Early Markets Course Presenter & End-User Educational Course Leader
  - "Fuel Cell Lift Trucks: Key Considerations for Fleet Conversion"
- Co-Hosted the 2011 SC Renewable Energy Forum
- Exhibited at the 2011 Green is Good for Business Conference
- 2011 Green Tie Event
  - with 40+ SC Senators and Representatives in attendance

Accomplishments

Presentations and Meetings

SC Political Representatives:

- Senator Lindsey Graham and/or staff
- Congressman Tim Scott and/or staff (SC-1st District)
- Congressman Joe Wilson and/or staff (SC-2nd District)
- Congressman Jeff Duncan and/or staff (SC-3rd District)
- Congressman Trey Gowdy and/or staff (SC-4th District)
- Congressman Mick Mulvaney and/or staff (SC-5th District)
- Representative James Smith (SC-District 72)
- Senator Paul G. Campbell, Jr. (SC-District 44)
- Senator Nikki G. Setzler (SC-District 26)
- Representative Shannon Erikson (SC House – District 124)
- Mayor Steve Benjamin of Columbia
- Through working with the Solar Business Alliance, we expanded our connections in the SC House and Senate

Companies in South Carolina:

- Bosch
- BMW
- Proterra Inc.
- Trulite, Inc.
- Plug Power
- TAM Energy

Other:

- Former Congressman, JC Watts
- Mr. John Hazzard (Chief of Staff and Counsel for President Pro Tempore and Senate Judiciary Committee)
- SC Dept. of Commerce's Secretary and Deputy Secretary and additional agency leadership members
- UK Minister of Climate & Energy and SC alternative energy leaders
- SC Dept. of Transportation (SCDOT)
- SC Coastal Conservation League
- SC Clean Energy Business Alliance
- SC Department of Agriculture
- Worked with various Charleston, Aiken and Richland County officials

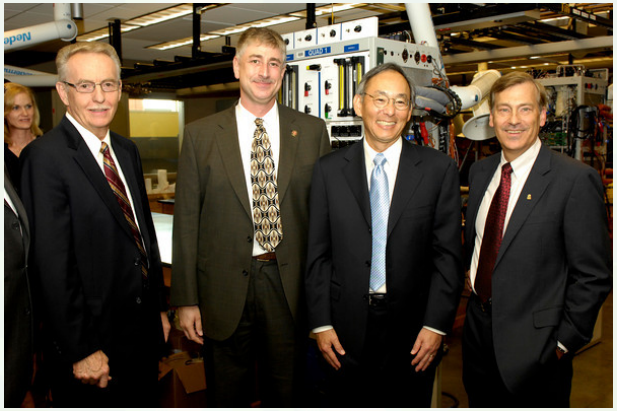
Accomplishments

Presenter at the Hydrogen and Fuel Cell Technical Advisory Program Committee (HTAC) meeting in Washington, D.C.

- **5 Keys Points Made about advancing the commercialization of hydrogen fuel cells:**
  1.) decrease the cost of hydrogen
  2.) support a clear national public policy for hydrogen and fuel cell technologies
  3.) keep aiding innovative companies and organizations
  4.) support state hydrogen infrastructure – recommended US EPA give credit to automakers for placing fuel cell vehicles in non-ZEV states
  5.) include grants in lieu of tax credits

Accomplishments

Hosted the US DOE Secretary Chu in South Carolina



Left to Right: Dr. Ken Reifsnider, Dr. Jochen Lauterbach, DOE Secretary Steven Chu and Dr. Brian Benicewicz

Left to Right: Congressman James Clyburn, Dr. Shannon Baxter-Clemmons, DOE Secretary Steven Chu and Mr. Sam Logan

South Carolina Hydrogen and Fuel Cell Cluster leaders briefed Congressman James Clyburn (6th – SC) and US DOE Secretary Steven Chu about South Carolina's hydrogen and fuel cell initiatives.

"There (are) some people who felt that I was trying to get rid of fuel cells, totally altogether. That is absolutely not true. We still want to fund the research and development of these fuel cells."

-Sept. 2011 edition of The Hydrogen & Fuel Cell Letter

National press pickup of the successful visit:

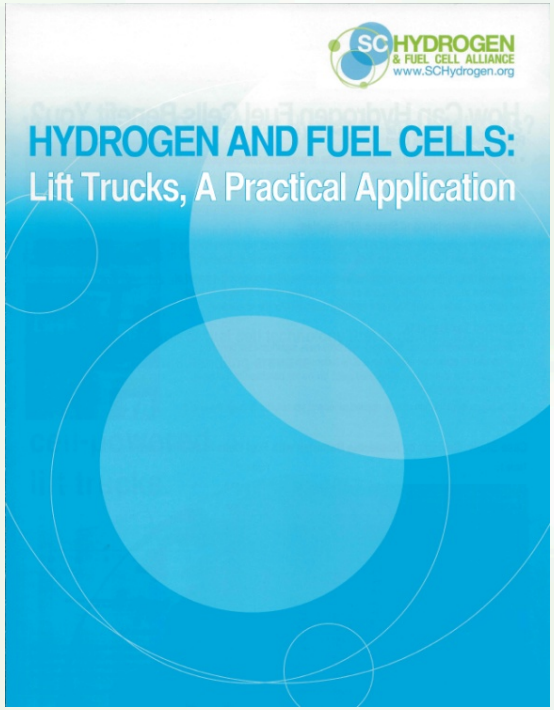
- White House blog
- US Dept. of Energy blog
- Fuel Cell & Hydrogen Energy Association (FCHEA)
- most major alternative energy news websites

Accomplishments & Progress

Market Value Proposition of Fuel Cell Forklifts - brochure

H_2 501– Development of Early Market Hydrogen Technology Case Studies:

- **H_2 Lift Truck Case Study**
- **Telecom Backup Case Study**
- **Combined, Heat, and Power (CHP) Study**



-Completed and distributed the "Hydrogen and Fuel Cells: Lift Trucks, A Practical Application" market value proposition brochure to policy makers and regional industry leaders

-Companies that helped contribute to the brochure:

- Plug Power
- Nuvera
- ARC: Hydrogen
- Raymond
- Lift One
- Ballard
- Bridgestone/Firestone
- Genco/Kimberly-Clark
- BMW

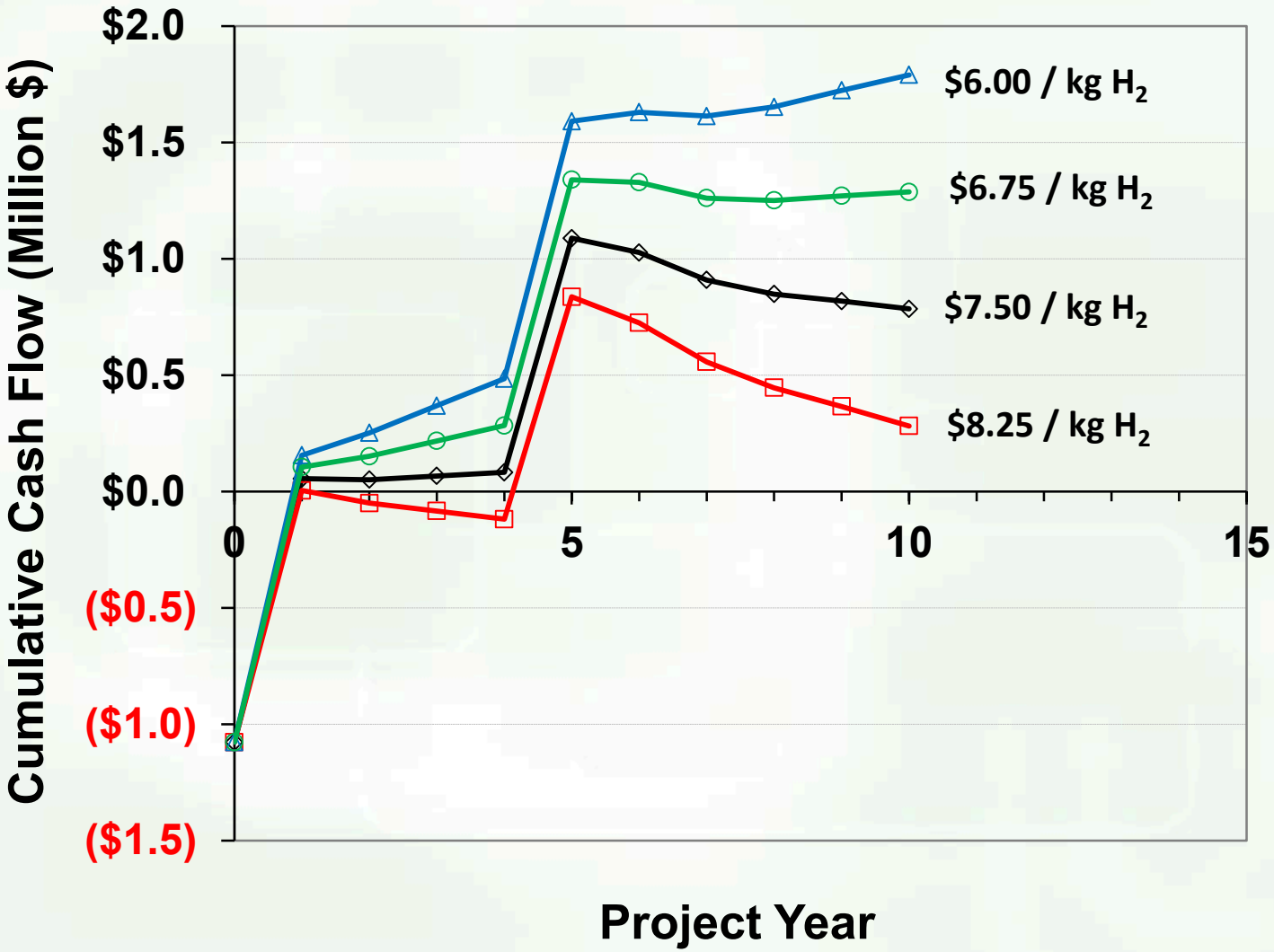
-Working on whitepapers for publication to document findings

Hydrogen 101: State and Local Government Education

March 2011 –March 2012

- Development discussions of how to grow regional infrastructure to lower hydrogen cost are needed
- Case studies assist in technology evaluation
  - High H_2 cost is a major negative decision factor for lift trucks
  - Presentation of back-up power with lift trucks generates interest in terms of shared infrastructure

H_2 Price Analysis for a 60 Lift Truck Fleet



Progress

Hydrogen 101: State and Local Government Education

Task Schedule:

Milestone Number	Project Milestones	Task Completion Date				Progress Notes
		Original Planned	Revised Planned	Actual	Percent Complete	
1	Strategy & Curriculum	3/2/2009	5/31/2009	5/31/2009	100%	Completed
2	NHA Presentation	4/1/2009	4/1/2009	4/1/2009	100%	Completed
3	Y1 Annual Report	9/30/2009	9/30/2009	9/30/2009	100%	Completed
4	Y2 Annual Report	9/30/2010	9/30/2010	9/30/2010	100%	Completed
5	Y3 Annual Report	9/30/2011	9/30/2011	9/30/2011	100%	Completed
6	Project Management	12/31/2010	1/31/2013		52%	Ongoing

Future Work

Hydrogen 101: State and Local Government Education

- Continue updating presentation and handout materials
  - with a focus on the case studies of the value proposition for fuel cell forklift truck fleets
- Continue to update the educational H101 webpage
- Continue to engage and educate key SC decision makers about hydrogen and fuel cell technologies
- Continue to engage and educate SC industry leaders about the benefits of hydrogen fuel cells
- Continue working on whitepapers for publication to document findings on the Early Market H_2 Technology Case Studies

Southeastern States Education and Outreach

Goals:

- Establish cooperative efforts among stakeholders
- Promote interstate cooperation
- Broaden the understanding of hydrogen and fuel cells
- Encourage stakeholder growth in the industry

Target states to investigate:

- Florida
- Tennessee
- North Carolina

Southeastern States Education and Outreach

Deliverables:

- "Best Practices" document
- "State Resources" document
- "Stakeholder Survey" report
- "Key Contacts" database
- "Final Report"

Collaborations

The South Carolina Hydrogen and Fuel Cell Alliance

- A non-profit partnership of academic, government and businesses coordinating resources in South Carolina to advance the commercialization of hydrogen and fuel cells.
- Areas of focus:
  (currently discussing the evolution of our mission)
  - Education and Outreach
  - Infrastructure Development
  - Policy Development and Implementation
  - Research and Technology Transfer

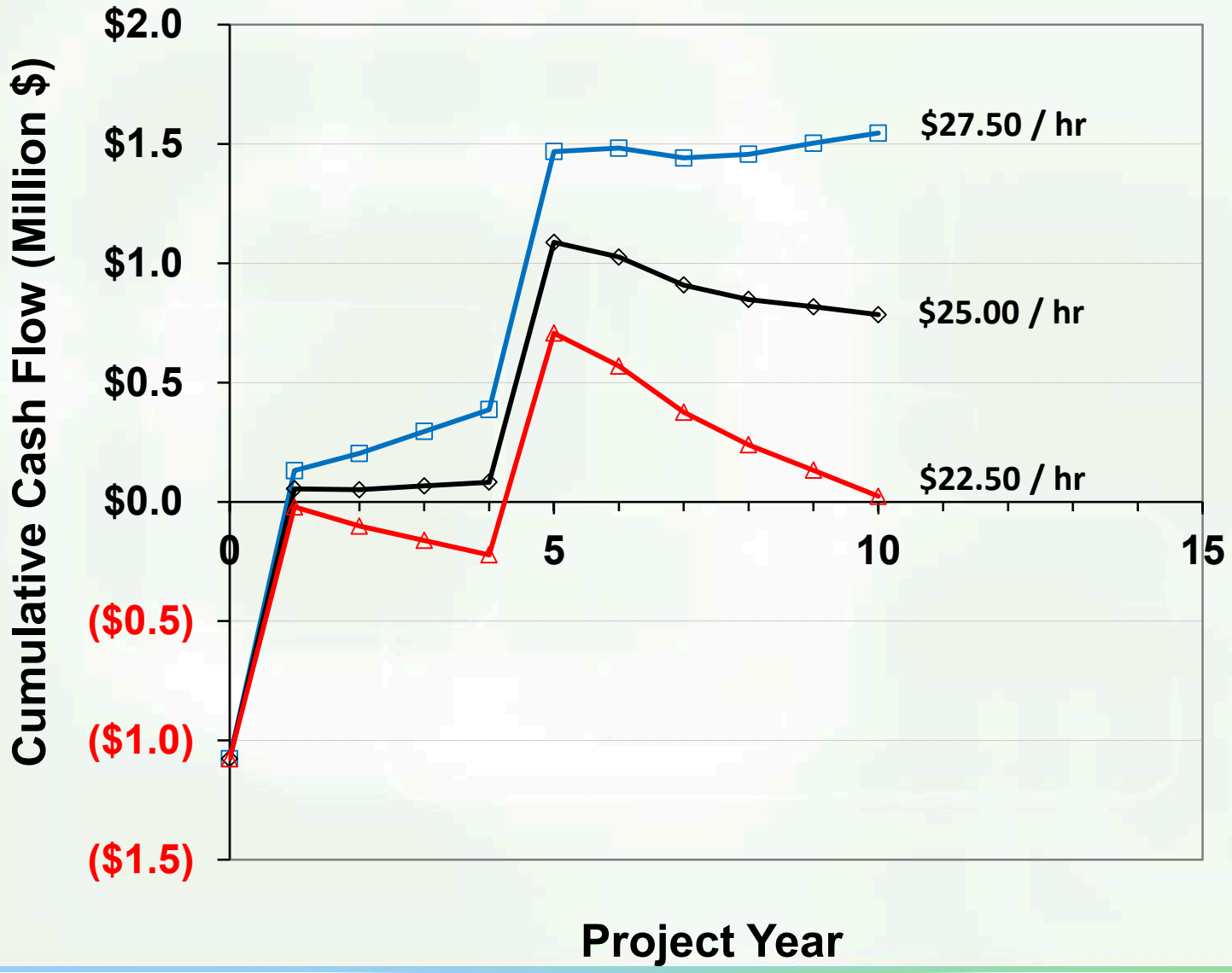
I/U Cooperative Research Center for Fuel Cells

Collaborations – Working Partners

- South Carolina Hydrogen and Fuel Cell Alliance
- Greenway Energy LLC
- Municipal Association of South Carolina
- South Carolina (State) Energy Office
- Office of the South Carolina State Fire Marshal
- SC Chapter of the American Planners Association
- BMW
- ATI
- Ameresco

Project Summary

- Relevance: Approached audiences are engaged in presentations and want to learn more about hydrogen and fuel cell technologies
- Approach: Presentations have focused mostly on a basic understanding of hydrogen and fuel cells and their market value propositions
- Accomplishments/Progress: educated various key SC industry and decision makers about the importance of hydrogen and fuel cells
- Collaborations: South Carolina Hydrogen and Fuel Cell Alliance, Greenway Energy LLC, Municipal Association of South Carolina, South Carolina (State) Energy Office, Office of the South Carolina State Fire Marshal, SC Chapter of the American Planners Association, BMW, ATI, Ameresco
- Future Work: Updates to presentation and web materials with a focus on the case studies of the value proposition for fuel cell forklift truck fleets; Continue to engage and educate key SC decision makers and industry leaders

Technical Back-up Slides

Labor Cost Analysis for a 60 Lift Truck Fleet