

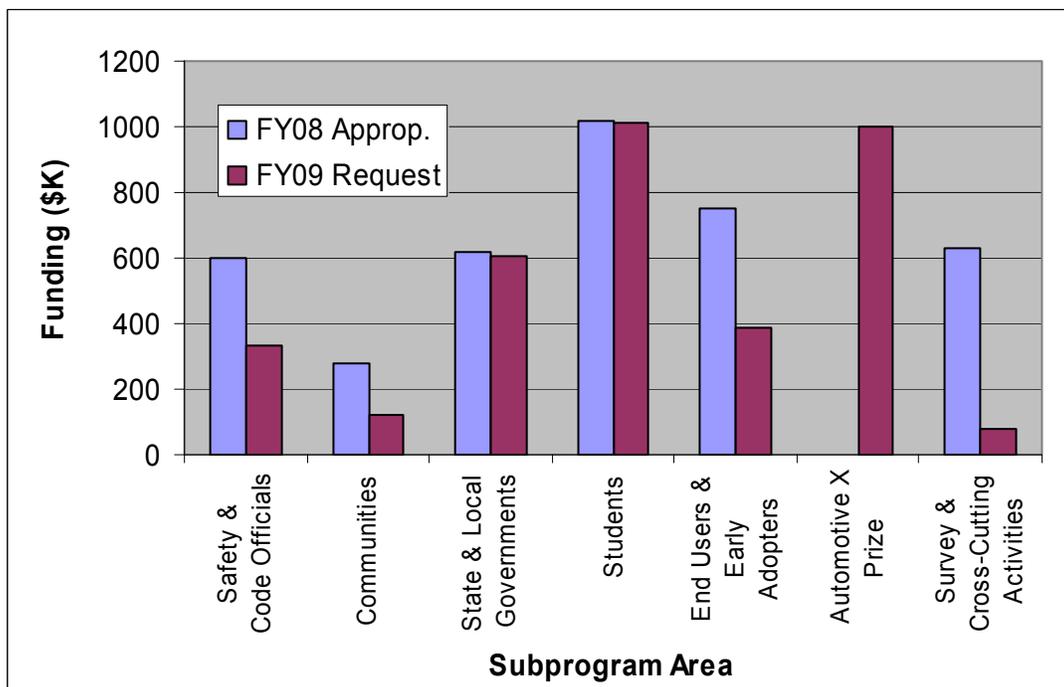
## 2008 Education Summary of Annual Merit Review Education Subprogram

### Summary of Reviewer Comments on Education Subprogram:

Reviewers expressed the importance of education, raising awareness of hydrogen and fuel cell technology, and correcting false perceptions or misinformation. The education subprogram structure and focus were considered well-defined and appropriate, with projects well-aligned with DOE targets. Reviewer comments underscored the importance of metrics across all projects, collaboration with partners, and using new media to reach a “tech-savvy” audience that may be among the first to adopt hydrogen fuel cell technology. Reviewers also noted the daunting challenge of educating a largely uninformed public that is often confronted with mixed messages. Reviewers specifically commended the strong partnerships and efforts to collect input and feedback from industry partners and other experts to ensure technical accuracy and maximum usability of materials.

### Hydrogen Education Funding:

The Education subprogram efforts are prioritized to focus on the target audiences involved in facilitating the near-term use of hydrogen and fuel cell technology. With funding at the request level, the FY 2008 budget allowed for support of projects across the education portfolio, including new competitively-awarded projects focused on outreach to state and local government officials and potential end users, as well as projects to develop and expand university hydrogen and fuel cell education programs. FY 2008 funds also support ongoing efforts to educate first responders and code officials, local communities, and teachers and students at the middle and high school levels. In FY 2009, the hydrogen education subprogram will move to the Vehicle Technologies Program to build on synergy with related education efforts in other alternative transportation fuels and energy-efficient vehicle technologies, including plug-in hybrids.



**Majority of Reviewer Comments and Recommendations:**

Reviewer scores for the education projects reviewed were average, with scores of 3.9, 3.4, and 2.8 for the highest, average, and lowest scores, respectively. Scores reflect progress made over the last year and reported plans for future activity. Key comments and recommendations are summarized below. DOE will act on reviewer recommendations as appropriate to the overall scope, direction, and coherency of the education effort.

**Knowledge and Opinions Assessment:** Reviewers noted the importance of the Knowledge and Opinions Assessment for helping to frame messaging and measuring progress. They felt the survey's statistical analysis is proficient and well thought-out, although for the public survey, many viewed the selected methodology of computer assisted telephone interviewing as being limited to a certain segment of the population. To remain statistically valid and adequately compare results over time, the follow-up survey methodology and survey instruments must remain the same as what was used for the baseline survey. Reviewers suggested coordinating the survey to align with other outreach projects.

**First responders:** This target audience is critical to successful market transformation. Reviewers credited efforts to pilot test, review, and validate the introductory course material prior to officially launching it, and noted successful usage. They also recognized the effective collaboration with first responder trainers at the Volpentest Hazardous Materials Management and Emergency Response (HAMMER) training facility and the importance of the steering committee, which includes representatives of both the hydrogen and first responder communities, to ensuring the appropriateness and usability of the new advanced-level, hands-on "prop course." For both the introductory course and the prop course, reviewers recommended a greater focus on near-term hydrogen applications such as forklifts.

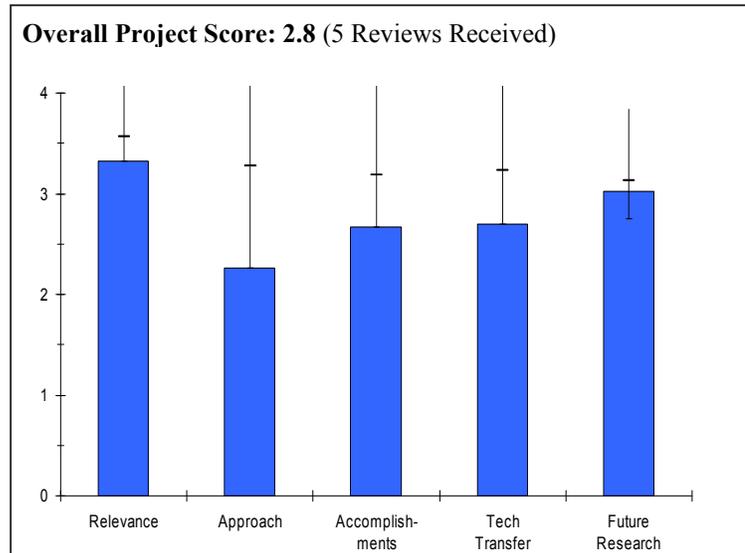
**Code officials:** Reviewers felt that educating code and permitting officials is essential and highly relevant to the DOE Hydrogen Program. They felt that the project presented includes the right collaborations to ensure usability, and that as an interactive learning program, the e-learning modules should be effective. Reviewers suggested developing a more robust course deployment plan.

**Local communities:** Reviewers felt that public education activities are well-aligned with DOE objectives and reiterated the importance of ensuring that messages communicate realistic expectations for technology availability and the expected commercialization timeline. Both the "Increase Your H2IQ" and "H2 and You" public education efforts seek to engage the public through new media using simple and objective messaging, but cover different "space" using different tactics. Reviewers felt that both approaches are well-defined, yet recognized the need for partnerships as well as clear metrics to evaluate project success.

**Middle and high schools:** Reviewers felt that the middle school project is an aggressive, well thought-out effort to educate an important target audience. They also noted that the project team developed an excellent, collaborative approach that involves hands-on learning and addresses teaching standards. Reviewers noted the project makes great use of resources and partners; they suggested reviewing and possibly enhancing metrics. Note: The project focused on high schools was not reviewed because the principal investigator was unable to present due to illness.

**Project # ED-01: Hydrogen Knowledge and Opinions Assessment***Rick Schmoyer; ORNL***Brief Summary of Project**

The objectives of this project are to 1) measure the current level of awareness and understanding of hydrogen and fuel cell technologies in five target populations (general public, students, state and local government agencies, potential end users, safety and code officials); 2) compare the current level of awareness and understanding to results of the 2004 baseline; and 3) analyze and summarize results for use in developing strategies and tactics for the hydrogen education subprogram. A compendium of related surveys conducted since the 2003 literature review has been completed as well as the 2008 general public survey. The 2008 state and local government officials survey was underway during the week of the DOE Hydrogen Program Annual Merit Review.

**Question 1: Relevance to overall DOE objectives**

This project earned a score of **3.3** for its relevance to DOE objectives.

- Understanding the public's understanding and acceptance of hydrogen is important to future commercialization.
- Target populations for surveys are highly consistent with DOE H<sub>2</sub> Education Subprogram goals.
- Data gathered is very helpful for framing DOE's message and publications in education.
- The project is very relevant because it measures progress. Metrics are important to report success to Congress, the general public, and other stakeholders.
- Literature review to assess public hydrogen attitudes is important.
- Conducting controlled surveys of different public sectors is of interest.

**Question 2: Approach to performing the research and development**

This project was rated **2.3** on its approach.

- Approach is sound but with some flaws based on "known" survey tools of cold-calling.
- Statistical analysis is very proficient and well thought out.
- Survey questions were well thought out and appropriate.
- The 4-year window between surveys may be longer than necessary to obtain statistically relevant results. A 2-3 year window may provide more timely input to the Principal Investigator.
- It is difficult to ascertain whether any increased target audience knowledge on hydrogen is attributable to efforts made by the DOE H<sub>2</sub> Program, or by general information penetration via other sources.
- Telephone interviews are hard because a lot of people only have cell phones (no land lines).
- [Many people] use Caller ID to screen calls.
- Hard to get large response or keep people on phone for entire survey.
- [The survey is possibly omitting] youth and tech-savvy people.
- Survey may not be the best approach, many (and, no doubt) specific demographics are not willing to spend time on surveys. Awareness, especially with the "general public" audience, is difficult to measure. It is not clear if the findings did more than validate expected outcomes.
- Literature review approach is good.

## EDUCATION

- Phone survey approach to assess hydrogen awareness in focus groups is good, but methodology based on land-line phones alone is somewhat flawed.

### **Question 3: Technical accomplishments and progress toward project and DOE goals**

This project was rated **2.7** based on accomplishments.

- Surveys were conducted and compared in 2004 and 2008.
- Statistical analysis was performed at a high level.
- Unsure of the validity of data based on people surveyed (cold-calling responders).
- When opinionated, the general public DOES appear to understand the connection between hydrogen technology and petroleum displacement.
- There is a need to work on increasing target audience response rates.
- Not quite finished but good data so far.
- The project is on-track to meet stated goals, such as numbers contacted, analysis, comparisons and reporting. It is not clear if the survey approach can help DOE overcome barriers. It is not clear if the survey findings have been used to help DOE develop strategies.
- Well defined tasks within the project and well-articulated progress in the given tasks.
- Results of survey possibly flawed due to limits of survey methodology.

### **Question 4: Technology transfer/collaborations with industry, universities and other laboratories**

This project was rated **2.7** for technology transfer and collaboration.

- Use of outside company for surveys is well thought out and high collaboration is apparent.
- Collaborations are presented to exist with market research entities, however the Principal Investigator didn't provide much information on other collaborations.
- Review didn't speak much about collaborations.
- The project is not designed/intended to expand collaborations. Measuring awareness of state & local government officials does increase their awareness of hydrogen and fuel cells and DOE level of interest.
- No specific collaborations or technology-transfer activities were made clear.

### **Question 5: Approach to and relevance of proposed future research**

This project was rated **3.0** for proposed future work.

- Future plans are good however they do not take into consideration the expansion of survey pool to more technically savvy people.
- Planned work does not differ from pattern/scope of past work, so there is no reason to believe volume or trends of survey results will improve.
- Survey still underway.
- The project addresses additional audiences and expands survey questions for other audiences. Additional analysis will be conducted that may assist in guiding future projects.
- Plan forward is clearly articulated with relation to the defined tasks.
- Should re-investigate limits of survey methodology to enhance quality of information.
- The survey tasks should be better coordinated to meet needs of providing metrics for the outreach projects.

### **Strengths and weaknesses**

#### Strengths

- Partner Opinion Research Corporation.
- Statistical analysis.
- Although survey results aren't strong, this project appears to have been successful at analyzing the data received by the Principal Investigator.

- The project also helps DOE measure progress and the data can be used to modify education and outreach approaches.
- Survey approach to assess hydrogen awareness in focus groups is good.
- Well-defined tasks and metrics.

#### Weaknesses

- Survey pool.
- The response rates are poor.
- Telephone surveys might be outdated. Think about other ways to interact – email, mail?
- Surveys are not the best way to measure awareness.
- Survey methodology based on land-line phones alone is somewhat flawed and should be re-investigated for better representation of focus group attitudes and awareness.

#### Specific recommendations and additions or deletions to the work scope

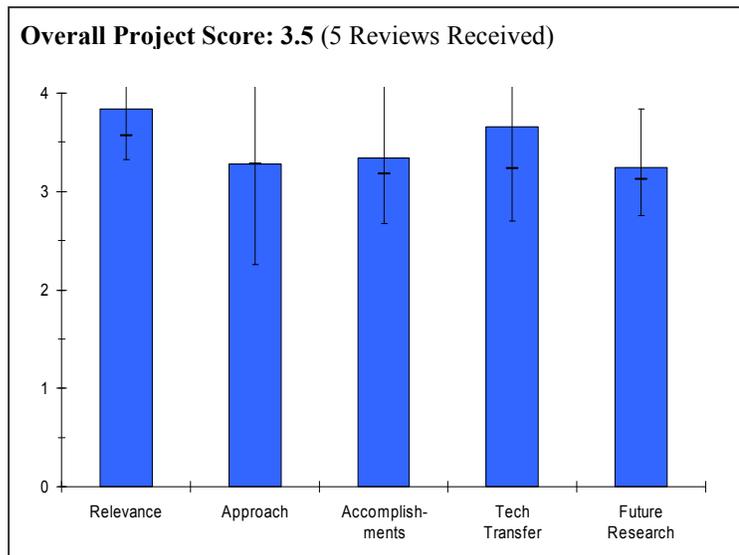
- Investigate and attempt to expand survey pool to people with technology savvy.
- The project should be better aligned with other H<sub>2</sub> "marketing"/outreach projects.
- Re-investigate survey methodology limited to land-line phone calls to improve results.
- The survey tasks should be better coordinated to meet needs of providing metrics for the outreach projects.

**Project # ED-02: Hydrogen Safety: First Responder Education**

*Marylynn Placet; PNNL*

**Brief Summary of Project**

The long-term objective of this project is to support the successful implementation of hydrogen and fuel cell demonstration projects and market transformation by providing technically accurate and objective information about hydrogen to first responders. The objective for fiscal year 2008 is to develop and disseminate first responder hydrogen safety educational materials, including an update of the awareness level course (first launched in fiscal year 2007) and a more in-depth, one day course. The more advanced course will include hands-on experience with a mobile hydrogen fuel cell vehicle prop developed in a companion project funded under the hydrogen safety, codes and standards subprogram.



**Question 1: Relevance to overall DOE objectives**

This project earned a score of **3.8** for its relevance to DOE objectives.

- Explaining and training first-responders on fuel cell technology is extremely important for the commercialization and safety of fuel cells.
- Awareness of first responders is the first step in making hydrogen accessible in communities – over 6000 unique visitors, 4000 in past year, 1700 in year one.
- Project objectives are highly consistent with Hydrogen Fuel Initiative and DOE Hydrogen Program objectives.
- Relevant to the Hydrogen Fuel Initiative in all aspects of project.
- Informs first responders on hydrogen.
- Development of first responders procedures for hydrogen-related emergencies is important to the hydrogen economy.
- Education of first responders in this area is critical.

**Question 2: Approach to performing the research and development**

This project was rated **3.3** on its approach.

- Approach is sound and has shown success thus far.
- Props are useful for training.
- Prop based course gives [first] responders a better framework for learning. Large numbers of reviewers of the course showed outstanding level of thoroughness. Online course helps get information dispersed to large numbers of responders – quiz is important for understanding accomplishment levels. Hearing voiceover added is helpful for some [first] responders.
- All tasks are well designed education dissemination strategies for the first responder audience.
- Great approach – especially the prop-based course for a "hands-on" learning experience.
- Well-defined approach for education and outreach using awareness-level course of clear benefit.
- Approach for prop-based course is also of clear benefit, but could be modified to include additional near-term fuel cell vehicles such as buses, tractors, forklifts, etc.

**Question 3: Technical accomplishments and progress toward project and DOE goals**

This project was rated **3.3** based on accomplishments.

- Involvement/responsiveness has been very high.
- Have trained many first responders successfully.
- Have metrics: Good unique visitors, 4000 this year. Well-received by fire training/protection community. Steering [committee] is well rounded, lots of input from industry/responders.
- Task progress appears to be (mostly) timely and on schedule.
- Awareness-level course is highly developed, and includes a lot of interactive features to engage target audience.
- Tasks appear to be either strongly received or show strong interest from first responder community.
- Good progress. Tasks at various levels of completion with some key milestones/deliveries overrun.
- Good progress has been demonstrated.
- Awareness-level course use with feedback was a useful metric of progress.
- Formation of the Steering Committee is a critical positive step in this process.
- Prop-based course is good, but should also consider covering events associated with nearer-term vehicle applications, such as fuel-cell buses/ tractors/fork-lifts.

**Question 4: Technology transfer/collaborations with industry, universities and other laboratories**

This project was rated **3.7** for technology transfer and collaboration.

- Collaboration with HAMMER is successful.
- Clear, close work to achieve goals.
- Large number of reviewers from industry and emerging communities. Steering [committee for] prop based course showed strong effort to collaborate with stakeholders.
- The project has strong collaborations with highly relevant partners.
- Steering committee formation and input to prop-based course is a good coordination strategy.
- Excellent collaboration with relevant organizations (HAMMER, 100 representatives, etc.).
- Collaboration could be extended in the future.
- There is a limited list of collaborators cited.
- Participants involved in the Steering Committee should be included as active partners.

**Question 5: Approach to and relevance of proposed future research**

This project was rated **3.2** for proposed future work.

- Future plans are good and are in-line with further expansion of training.
- Conducting courses and refining.
- The PI did not discuss a target number of future trainings, web-hits, CD's disseminated, etc.
- Could expand future work, but there are solid plans to use completed work to continue progress.
- Clear definition of plans to maintain and promote awareness-level course and to complete prop-based course.

**Strengths and weaknesses****Strengths**

- Partner.
- Website.
- On-site training.
- Appears to be a very well thought out initiative with phased approach.
- Very strong collaboration of industry.
- Modules for stationary and vehicles.
- Includes certificate of completion and train the trainer.
- Project deliverables are robust and close to on-time.

## EDUCATION

- Great educational tools – especially the prop. This makes material easy to understand and remember.
- Well-developed plan with well-defined tasks.
- Clear progress on each of the tasks.
- Steering committee formation including energy industry and firefighter representatives is a clear positive step.

### Weaknesses

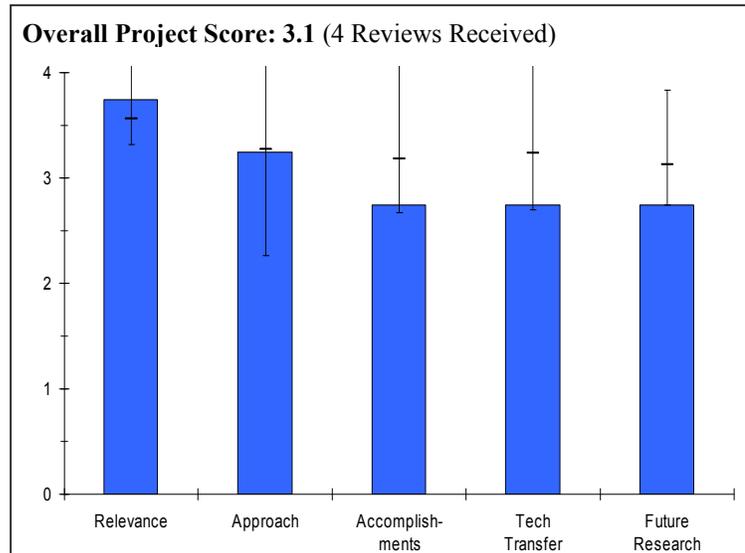
- Not following up to understand first responder's opinion of hydrogen after training.
- Plans/costs associated with deploying training in future years were not discussed by Principal Investigator.
- Application of first responder education to hazards associated with stationary power and nearer-term larger-scale vehicles such as buses, tractors and forklifts should be more clearly addressed.

### Specific recommendations and additions or deletions to the work scope

- Follow up to understand first responder's opinion of hydrogen after training.
- Application of first responder education to hazards associated with stationary power and nearer-term larger-scale vehicles such as buses, tractors and forklifts should be more clearly addressed.

**Project # ED-03: Hydrogen Education for Code Officials***Melanie Caton; NREL***Brief Summary of Project**

The objective of this project is to facilitate demonstration and deployment of hydrogen and fuel cell technologies by educating code officials on relevant safety, codes, and standards issues. Collaboration with codes and standards experts and consultation with code officials will help formulate appropriate content and ensure accuracy. Objectives for FY2008 include the development and deployment of this introductory information package for code officials.

**Question 1: Relevance to overall DOE objectives**

This project earned a score of **3.8** for its relevance to DOE objectives.

- Education of codes and standards officials is essential.
- Cannot get to implementation steps without educating code and permitting officials.
- The project aims to increase codes and standards knowledge of a critical target audience of the Hydrogen Fuel Initiative and DOE Hydrogen Program.
- The strategy and the goals of the project appear necessary and reasonable, but there may be a lack of understanding of what the code officials need.
- Highly relevant to the Program.

**Question 2: Approach to performing the research and development**

This project was rated **3.3** on its approach.

- E-learning for code officials and testing provides good instant feedback for code officials. Makes it simple to get information.
- The e-learning modules each address key hydrogen codes and standards topics.
- Beyond designing the modules, the project does not include a strategy for delivering modules to the right audience or channeling the codes and standards community to the online modules.
- The project appears generally effective, but could be improved by a discussion on the extent that collected real world data can be provided through the education tool.
- Approach identifies effective methods to train; investigates current methods. The user may get engaged more than usual. Suggest adding audio/visual to grab the viewer.

**Question 3: Technical accomplishments and progress toward project and DOE goals**

This project was rated **2.8** based on accomplishments.

- Good progress on milestones also developing permitting links.
- Has a link with industry codes and standards database.
- Both vehicle stations, vehicles, and stationary.
- Can be used to educate other audiences.
- The Principal Investigator did not provide significant depth on the content and status of modules 2-5.

## EDUCATION

- The work on this project appears consistent with DOE goals, and while it doesn't appear to fall short, the project has room to [grow].
- Good progress and plan to complete work.

### **Question 4: Technology transfer/collaborations with industry, universities and other laboratories**

This project was rated **2.8** for technology transfer and collaboration.

- Appears that the right people are being included.
- The project incorporates adequate collaboration to accomplish key milestones.
- The presentation appears to offer little in the way of collaboration beyond coordination with partners.
- Working with appropriate organizations.

### **Question 5: Approach to and relevance of proposed future research**

This project was rated **2.8** for proposed future work.

- Planning to consolidate websites.
- Reviewing materials to make sure it is updated.
- Adding audio.
- All should boost usability and accuracy.
- Module dissemination needs to be emphasized in future work.
- As with earlier comments, project could be improved through a greater discussion of supporting goals. The fear is that the project outcome will not support code officials.
- Solid plans to use experience/lessons learned for future work.

### **Strengths and weaknesses**

#### Strengths

- Very focused toward regulator community that will be implementing laws is very important.
- Creates an interactive platform for codes and standards official education.
- The e-learning modules should be effective.

#### Weaknesses

- Does not include a deployment plan for the platform.

### **Specific recommendations and additions or deletions to the work scope**

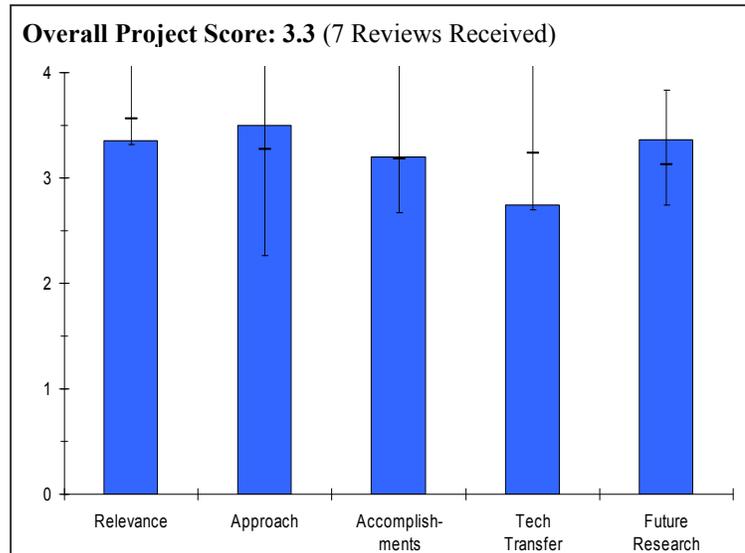
- The Principal Investigator should add a platform roll-out plan to ensure that the target audience actually uses to e-modules.

## Project # ED-04: Increasing “H2IQ”: A Public Information Program

Henry Gentenaar; The Media Network

### Brief Summary of Project

The objectives of this project are to 1) develop and disseminate resonant messaging that communicates to the general public basic facts about hydrogen as a fuel and fuel cells as an alternative to traditional power technologies; 2) transmit our message via communications channels audiences use; 3) generate interest, increase public requests for more information; 4) help raise knowledge levels to show progress toward education targets; 5) give the Hydrogen Program a communications mechanism with a flexible framework for reasons of timing and budget; and 6) make the most of Department of Energy resources and provide a gauge of success.



### Question 1: Relevance to overall DOE objectives

This project earned a score of **3.4** for its relevance to DOE objectives.

- Educating/informing the public about fuel cells/hydrogen is aligned with the Hydrogen Initiative of the DOE.
- Not sure how important it is right now to engage general public because of spotty implementation with regard to achieving goals in the near term. Potential is much longer term but will be important in the future.
- The project engages a critical target audience (general public) of the Hydrogen Fuel Initiative/DOE Hydrogen Program.
- Supports overall education objectives to raise awareness.
- This well-prepared project expertly lays out a possible foundation for public education.
- Beyond advising the "how" of the project, the project also discusses the "why" of ideas presented.
- Project directly supports the Program on getting information to target audience on hydrogen – especially to the younger audience.
- The project is relevant and meets DOE's goal to reach 12-35 years olds. Unless fuel cell vehicles become available in a short period of time, it will be difficult to keep people interested.

### Question 2: Approach to performing the research and development

This project was rated **3.5** on its approach.

- Approach while using a lot of communication buzz words seems well thought out and viable.
- Website, podcasts, radio ads reach a wide technically savvy audience.
- Importantly promotes source of objective information.
- Consistent information.
- What's in it for me is a good message – simple message.
- Using new media: podcasts, MySpace, etc.
- Podcasts and radio broadcasts have good simple messages.
- Contemporary multi-media marketing strategies are central to the Principal Investigator's approach.
- MySpace is a great channel to youth market (and critical target audience).
- Very knowledgeable about changing/evolving way people receive information.
- Good message.
- As presented, the project makes sense while sharply focusing on requirements and tasks, as well as reasoning.

## EDUCATION

- Great look into what works and doesn't on getting information out to the public.
- It would be good to know the "attention grabber".
- MySpace page is a great tool and has significant potential to hit a wide audience.
- The project approach will be/is effective in planting hydrogen and fuel cell technology in the minds of the general [public] using the latest communications techniques for this target audiences is appropriate.

### **Question 3: Technical accomplishments and progress toward project and DOE goals**

This project was rated **3.2** based on accomplishments.

- Many different media tools have been used to reach public, websites, podcasts, radio, etc.
- Lack of measurable metrics makes it difficult to judge success.
- Finished ads and promos but have not followed up with metrics.
- Developed media campaigns (podcasts and radio spots) are high quality.
- It is difficult for the Principal Investigator to measure campaign progress/penetration.
- Great tie-in with NBA team.
- Frankly and clearly, this project advises marketing opportunities, how to penetrate, and why.
- Great progress – will have to visit the MySpace page.
- This project will inform the target audience about hydrogen and fuel cells.

### **Question 4: Technology transfer/collaborations with industry, universities and other laboratories**

This project was rated **2.8** for technology transfer and collaboration.

- Looking for future collaborations with other agencies at both the state and federal level.
- Working with partners, who are potential partners?
- Collaboration efforts (outside of Orlando, FL) are still not developed.
- Great tie in with Orlando Magic – high visibility partners are important to entice and draw public in.
- There has been some collaboration (Florida) but presentation advises partnering is not yet complete. \*I really wanted to give a "4" here, but could not.
- Could use more collaboration. Find what else is effective.
- What makes a good radio spot? Good MySpace page (what grabs people).
- It is not clear if partners are a factor in this project.

### **Question 5: Approach to and relevance of proposed future research**

This project was rated **3.4** for proposed future work.

- Future plans are good and in-line with further expansion of education.
- Introduction and measuring of metrics will be useful to gauge success.
- Continue radio and MySpace.
- More markets.
- Measure response.
- Need to gauge results/response better – how many downloads, views, MySpace, friends, etc?
- This organization prepared a well-thought presentation and if they are involved in the implementation of these strategies, it is possible that DOE will be pleased with the results of its hydrogen education subprogram.
- Great plan moving ahead, progress on MySpace, more radio spots, building partnerships.
- Good to keep an eye on more social networks.

### **Strengths and weaknesses**

#### Strengths

- Principal Investigator is expert in the field of marketing; specifically to the key demographic.
- Using new media.

- Innovative marketing outreach methods are employed by the project.
- Think outside the box.
- The presentation was noteworthy for its clear, well-presented thought.
- Should hit wide audience with accurate information.

#### Weaknesses

- Lack of measurable metrics to gauge success.
- Should have some metrics by now – difficult to gauge without.
- Have not done a lot with fleets; should tap outreach to them in addition to this.
- Expanding program could be costly.
- No project weaknesses noted; there is a partnering requirement but the degree to which this project was completed and the quality of the work provided indicates that little partnering was required.
- Target audience could be expanded.

#### Specific recommendations and additions or deletions to the work scope

- Develop and use measurable metrics to gauge success.
- Expand media vehicles to include web banners and TV spots. For banners, if major sites are too expensive, even getting web banners placed on less-traveled sites and non-profit websites would help draw in people.
- This project should be coordinated with ED-01 (survey project).
- The Principal Investigator should weigh the cost/benefits between producing high-end podcasts that will be heard by a limited audience, with deploying strategically placed web banners that will draw in much greater numbers of people to DOE education web resources.
- Reviewing this project was enjoyable, no further recommendations provided.

**Project # ED-05: H2 and You: A Public Education Initiative by the Hydrogen Education Foundation**

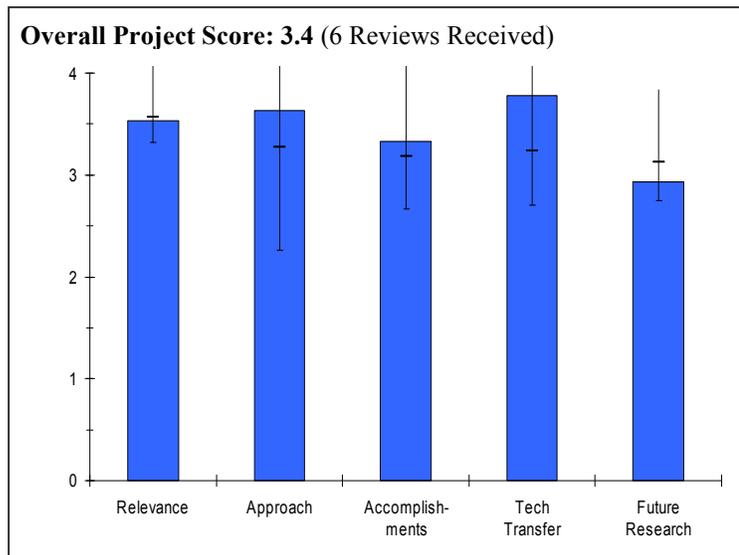
*Patrick Rooney; Hydrogen Education Foundation*

**Brief Summary of Project**

The overall goal is to increase understanding about hydrogen and hydrogen-fueled technologies. The objectives of this project are to 1) increase awareness and understanding of hydrogen and hydrogen-fueled technologies among the general public; 2) educate leading hydrogen influencers to validate hydrogen’s impact and potential; and 3) capitalize on related initiatives and resources from program steering committee partners. The program is guided and shaped by a steering committee of private and public sector organizations.

**Question 1: Relevance to overall DOE objectives**

This project earned a score of **3.5** for its relevance to DOE objectives.



- Does not achieve much in short term, in terms of behavior.
- The project's objectives are highly consistent with Hydrogen Fuel Initiative and DOE Hydrogen Program objectives.
- Highlighting what is going on today is very important.
- Directly supports the Program in providing the public with information on hydrogen.
- The project works to dispel misinformation and promote the benefits of hydrogen.
- Use of up-to-date methods in internet and media and eminent interaction for promotion of hydrogen education is very important.
- The content of hydrogen education should be better coordinated with DOE Multi-Year Research, Development and Demonstration Plan goals.

**Question 2: Approach to performing the research and development**

This project was rated **3.6** on its approach.

- Industry eminent – key influences are brought in to collaborate.
- Have a general public influence.
- Easy to understand/strategy to communicate issues.
- Dividing approach across four issues platforms is a smart outreach strategy.
- The project targets very relevant websites and blogs where key target audiences convene.
- The project targets industry eminent that are critical to DOE Hydrogen Program communication goals.
- Blog monitoring – great idea, very practical.
- Approach lists a large audience and considers an effective means of getting information to the public.
- The project is designed well, includes metrics, and addresses DOE's target audiences.
- The partners are an excellent approach.
- Steering committee of public and private sector entities is a good approach for promoting hydrogen messages.
- The project's steering committee hydrogen messages need better coordination with the DOE's hydrogen messages.
- Use of internet and media resources is clearly a good and necessary approach.

**Question 3: Technical accomplishments and progress toward project and DOE goals**

This project was rated **3.3** based on accomplishments.

- Metrics show positive responses to efforts.
- Measuring progress of effort through number of internet conversations is a shaky metric.

- Conversation "tones" have only been measured for 2 months, so the statistical relevance of these results is not strong.
- Obtain hard metrics that are very useful (online conversations/tour, etc).
- Can see improvement and growth in hydrogen conversation, making tune more positive.
- Great visibility. Accomplishing objectives.
- Number of conversations online is used as a metric, but it is not clear if the project has a direct influence on the changes. Media interviews and press are impressive.
- The approach of monitoring internet and blogs, and interacting with the media has great value, however project tasks, metrics, targets and progress against targets have not been clearly articulated.

#### **Question 4: Technology transfer/collaborations with industry, universities and other laboratories**

This project was rated **3.8** for technology transfer and collaboration.

- Varied partners with different backgrounds in steering committee.
- Eminent are included.
- Working on more collaborations.
- The Principal Investigator has demonstrated outstanding collaboration on the project.
- Using NHA members to full advantage.
- Steering committee and other partners make sense. Includes government, OEMs and other relevant organizations.
- The project brings together an impressive array of private and private partners. The significant cost share shows the partners commitment to accomplishing the project.
- Impressive list of collaborators on the project steering committee.
- Better collaboration of steering committee with DOE is needed to coordinate the hydrogen message.
- Better technology transfer to the DOE of the developed internet and media resources would be useful.

#### **Question 5: Approach to and relevance of proposed future research**

This project was rated **2.9** for proposed future work.

- Media and consumer support loops.
- Future work should focus on building consensus messaging with steering committee members.
- Future work activities are good.
- Not detailed – "deepen and broaden" and "build a groundswell" doesn't really state what will be done.
- Plan forward is not clearly articulated with specific goals and metrics for success.
- Basic plan for future work is to continue work and hope to expand outreach.

#### **Strengths and weaknesses**

##### Strengths

- Has metrics on conversations.
- Lots of hang to the bucket.
- DOE budget is leveraged well.
- Getting good traffic on website and spending lots of time.
- Working well with media.
- Strong partnerships.
- Project is effective at reaching audience.
- Use of up-to-date methods in internet and media and eminent interaction for promotion of hydrogen education.
- Interesting progress in media and eminent outreach.

##### Weaknesses

- Affiliation with hydrogen industry could be viewed as biased.
- Poorly defined project milestones and metrics for tracking success.
- Good steering committee list, but their hydrogen outreach message not clearly linked to official DOE message.

#### **Specific recommendations and additions or deletions to the work scope**

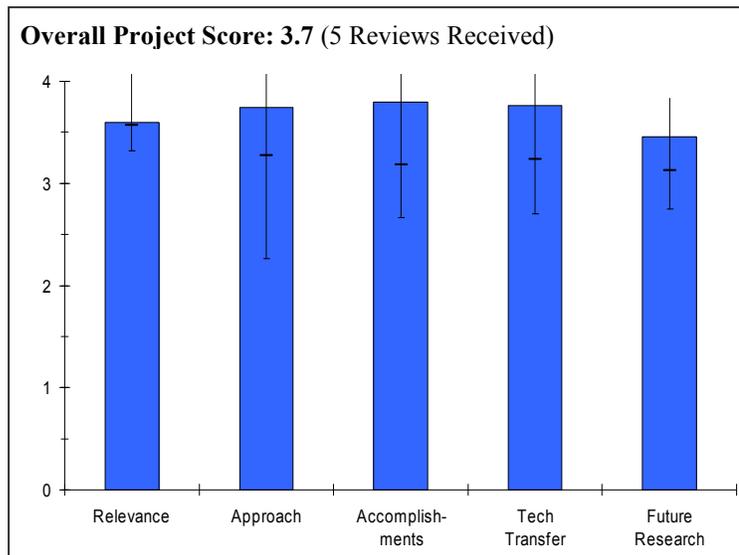
- Better coordination between DOE and project steering committee would be useful for promoting a more consistent outreach.

**Project # ED-07: H2 Educate! Hydrogen Education for Middle Schools**

Mary Spruill; NEED

**Brief Summary of Project**

The objectives of this project are to 1) develop, design and deliver a first class, comprehensive middle school hydrogen education program including: training, classroom materials, technical and best practices exchange, and evaluation; 2) design a program to link science and technology to the study of hydrogen and fuel cells; 3) deploy materials via teacher training and other professional development outreach opportunities; 4) provide technical support for schools that entered the program in year one and two; 5) collect data and evaluate for year two revisions; 6) work to expand the reach of the program with new partners able to support training workshops at the local level; 7) expand program for new localities and workshops; 8) continue to evaluate effectiveness and usability of materials; and 9) expand financial resources for workshops.



**Question 1: Relevance to overall DOE objectives**

This project earned a score of **3.6** for its relevance to DOE objectives.

- Project is critical to train teachers what they teach children who will be using fuel cells, studying in college, entering workforce, etc.
- Relevant to the DOE Hydrogen Program and will educate "future leaders" on what hydrogen is.
- Although the program is certainly worthwhile an effort of this scope will reach only a small fraction of teachers and students.
- An aggressive, well thought out program that reaches one of DOE's primary target audiences.
- Education of middle school children is critical now to the future of the hydrogen economy.
- The exact message at the appropriate level for this age group is still in the process of evolving.

**Question 2: Approach to performing the research and development**

This project was rated **3.7** on its approach.

- Complying with standards – excellent.
- Community outreach – excellent.
- Upgrading labs and materials.
- Got information that could relate to audience (students).
- Good sequence with objectives.
- Generally good but probably there should be more emphasis on feedstocks, production, and energy, and less on molecular structure and periodic tables.
- Excellent approach that overcame finding and materials challenges. The approach is exceptional because it ensures that the program continues after the close of the grant.
- Working with the schools and teachers at this level is a great approach.
- The hands-on aspect is wonderful for the students.
- Alignment with national and state standards is very important and commendable.

**Question 3: Technical accomplishments and progress toward project and DOE goals**

This project was rated **3.8** based on accomplishments.

- Reached a considerable amount of teachers per state even with zero funding for two years from DOE.
- Great progress with students and partners.
- Project complete – no major barriers preventing work to be accomplished.
- Project seemed ahead of schedule.
- Pre-/post-date indicates great success.
- On an absolute scale the accomplishments have been modest but relative to resources, they have been outstanding.
- Exceeded expectations in spite of funding challenges.
- NEED has deployed creative strategies and is one of the best projects.
- Good progress has been demonstrated.
- Somewhat less clear was the amount of progress since the last review.
- Survey metrics were a useful, though somewhat limited, indication of progress.

**Question 4: Technology transfer/collaborations with industry, universities and other laboratories**

This project was rated **3.8** for technology transfer and collaboration.

- Partnerships with utilities – excellent opportunity.
- Collaborations with state governments.
- More than a dozen partners including government, energy, national labs, industry, etc. This is great.
- The only way they could have accomplished what they have is through really good interactions with their partners.
- Brought many partners to the table to help reduce cost per unit and expand their reach.
- There is an impressive list of collaborators.
- The role of these collaborators and the extent of the collaborations was not made clear.

**Question 5: Approach to and relevance of proposed future research**

This project was rated **3.5** for proposed future work.

- Need to expand but needs partners to do so.
- Expanding into technology education – YES!!
- Continued work to prove up-to-date information.
- Planned workshop (up to 10).
- Move beyond pilot project to training workshops.
- Continued alignment to national and state standards.
- Proposed work is appropriate for goals but apparently there are no plans for incorporation of lessons learned or for revisions to the student/teacher distribution materials.
- The grant closes in 2009, yet the program will continue because of the efforts of NEED to bring together additional partners and the high quality of the end product.
- Plans to continue with the regional workshops are good.
- Not clear if funding will be adequate to the future plans.
- Contingencies for reduced funding should be addressed.

**Strengths and weaknesses****Strengths**

- Making great use of resources and finding and integrating hydrogen into other curriculum (solar, wind).
- There are many willing participants for a technical area rapidly gaining national interest.
- Excellent project that exceeded expectations.

## EDUCATION

- Demand has exceeded the supply.
- Working in schools with teachers and students to develop hydrogen awareness is of clear benefit, and appears to be working well in the pilot schools.
- Hands-on projects for the students are a powerful tool for hydrogen education.

### Weaknesses

- Great success hinges on funding.
- Their main interfaces with the public are their distribution materials which are not particularly well done.
- Survey metrics for student and teacher development should be enhanced.
- Better integration into school programs to match the science education level of the students would be beneficial.
- The role of the collaborators should be more clearly defined and enhanced.

### Specific recommendations and additions or deletions to the work scope

- Put some time and effort into determining optimum messages to get to students and teachers and update the distribution materials accordingly. Also, put some effort into looking for additional innovative approaches for reaching target groups.