

Controlled Hydrogen Fleet & Infrastructure Analysis: Keith Wipke, National Renewable Energy Laboratory (NREL)

Reviewer Sample Size

This project had a total of 5 reviewers.

Question 1: What is your assessment of the relevance to overall DOE objectives – the degree to which the project supports the goals and objectives of the Multi-Year RD&D plan?

One reviewer feels that the collection of vehicle and fueling data under realistic, real-life operating conditions is vitally important to assess the of the technology validation effort. They pointed out that the collected data provides critical information to both the hydrogen program participants and to the general public. Another reviewer said that the project is very relevant to DOE's objectives prior to phasing out hydrogen funds. They also feel that the project needs better marketing or promotion to let public and government officials know about the program, progress, etc.

Other reviewers also said that the data is enormously valuable in determining technology readiness and provides important information to the overall program by providing data collection which includes analysis on real world experience. They point out that a partnership with vehicle manufacturers important to success of program.

Question 2: What is your assessment of the approach to performing the work? To what degree are technical barriers addressed? Is the project well-designed, feasible, and integrated with other efforts?

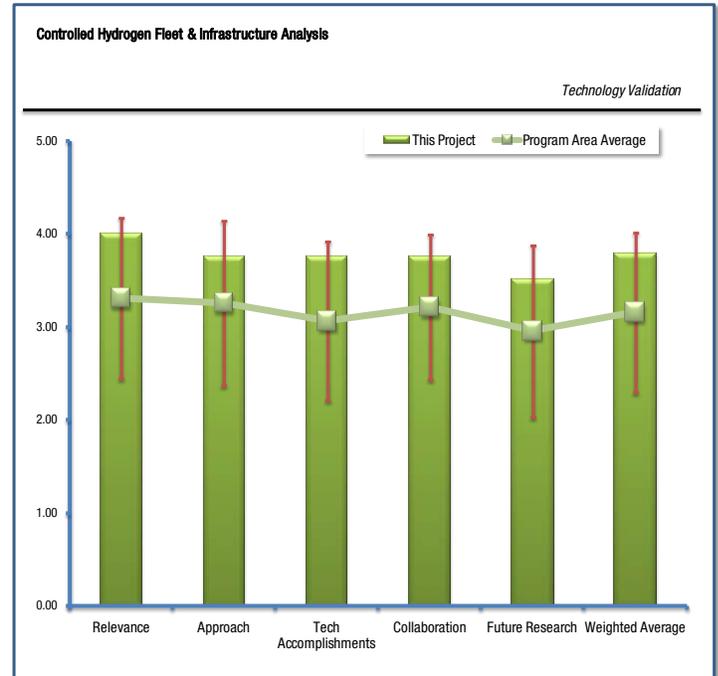
One reviewer feels that the approach taken is both comprehensive and complete. They also note that the project has been responsive to input from the program participants and the approach has been adjusted as the project progresses as appropriate. Another reviewer said that there is a very thorough analysis and progression from the beginning of this program (6 years ago) - addressing all issues - range, durability, maintenance, cold start, etc.

Yet another reviewer noted that the project has a very focused effort on collecting, analyzing and disseminating data, but at the same time industry sensitive information is protected (by using composite data). They recommend that dissemination of data could be improved by providing information (a) on how to obtain results, (b) updating results more often and (c) going beyond web site to disseminate the information.

Question 3: Characterize your understanding of the technical accomplishments and progress toward overall project and DOE goals – the degree to which progress has been made, measured against performance indicators and demonstrated progress towards DOE goals.

One of the reviewers noted that the excellent progress continues and the project manages to keep current as extensive data submission from the various participants has increased. This is a vital component of vehicle technical validation program. One reviewer would like to see key decision makers on how much progress is being made to show worth and value of program.

A different reviewer noted that there was software developed (Matlab) which has a great custom user interface and that is was very impressive comprehensive data collection and display of results.



A reviewer felt that the overall progress over the course of the program has been good; they point out specific accomplishments such as the good number of stations brought on line, the significant quantity of hydrogen produced and distributed, and the significant mileage accumulated on vehicles. They also say that new results appear to be limited to data analyses on fuel economy range and fuel cell performance characteristics. They feel it is not clear whether some of the other analyses presented were performed this year or were a continuation of previous studies.

Question 4: What is your assessment of the level of collaboration and coordination with other institutions: the degree to which the project interacts with industry partners, universities and laboratories?

Overall the reviewers noted that extensive collaboration has been ongoing and is absolutely essential to the success of this project. They commend the project for using different fuel cell vehicle manufacturers with different fuel providers, and point out that USFCC, CaFCP, and DLA connections are important partnerships. They also noted that there has been very good coordination and data sharing with other organizations involved in similar activities, some feedback from program areas has been used to supply specific analyses. One reviewer says the project could enhance collaborations with other program areas of hydrogen program.

Question 5: Has the project effectively planned its future work in a logical manner?

Reviewers feel the plans for future activities are reasonable and appropriate, but wonder how to ensure funding and focus.

What are the project's strengths?

The reviewers note that the project has excellent data collection, data tracking, data analysis and information mining methodologies. They also point out that the project is addressing major technical issues facing fuel cell vehicles and making enormous strides. Furthermore they feel the project is responsive to input from participants and DOE.

One reviewer points out that the project has a good relationship between participants with great communication that gives the project the ability to handle proprietary data very well.

What are the project's weaknesses?

One reviewer points out that there is not enough promotion or sharing of results - presenting results at fuel cell seminars and meetings is great, but need to do more to let public, media, policymakers and Congress know how much work is being done and the progress that is being made so people aren't so quick to write off fuel cells and hydrogen as a future technology with too many technical challenges - the challenges are being met yet not publicized very well so no one knows how much has been done. They say the project needs to present side by side with battery or plug-ins to show progress in vehicles but also quick hydrogen fills.

Do you have any recommendations for additions or deletions to the project scope?

One reviewer points out that vehicle and fuel cell system availability information would be useful. They also feel that inclusion of forklift, back-up power and stationary system operating data will be an important component of this project in the future as the program shifts emphasis to these areas.

Another reviewer feels that more education and publicity about data acquired in this project is needed and could help direct funding back to hydrogen if more people knew how much progress has been made in a few years. One reviewer feels that the project partners need to address the sulfur contamination in electrolysis. As mentioned in the project weakness comments above one reviewer feels that some of the results and analyses generated in this project should be disseminated in a format suitable for general-public consumption. They feel there has been much progress made in real world operating experience in terms of FC durability, vehicle range, miles driven, accident experience, etc. They think these results could go a long way toward getting public support and overcoming some misconceptions about the state of this technology.

9. Technology Validation

Introduction

In addition to the technical challenges being addressed through research, design, and development, there are obstacles to successful implementation of fuel cells and the corresponding hydrogen infrastructure that can be addressed only by integrating the components into complete systems. After a technology achieves its technical targets in the laboratory, the next step is to show that it can work as designed within complete systems (i.e., fuel cell vehicles and hydrogen refueling infrastructure).

Technology validation confirms that component technologies can be incorporated into a complete system solution and that system performance and operation are met under anticipated operating scenarios. DOE is developing and testing complete system solutions that address all elements of infrastructure and vehicle technology, validating integrated hydrogen and fuel cell technologies for transportation, infrastructure, and electric generation in a systems context under real-world operating conditions. Data will be collected to determine whether targets have been met under realistic operating conditions, to provide feedback on progress, and to efficiently manage the research elements of the program while providing redirection as needed.

In this merit review activity, each reviewer was asked to respond to a series of questions, involving multiple-choice responses, expository responses where text comments were requested, and numeric score responses. In the pages that follow, the reviewer responses to each question for each project will be summarized: the multiple choice and numeric score questions will be presented in graph form for each project, and the expository text responses will be summarized in paragraph form for each question. A table presenting the average numeric score for each question for each project is presented below.

Presentation Title	Principal Investigator and Organization	Page Number	Relevance	Approach	Technical Accomplishments	Collaborations	Future Research	Weighted Average
Controlled Hydrogen Fleet & Infrastructure Analysis	Keith Wipke, National Renewable Energy Laboratory (NREL)	9-6	4.00	3.75	3.75	3.75	3.50	3.78
Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	Dan Casey, Chevron	9-8	4.00	3.80	3.60	3.60	3.20	3.68
Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	Mike Veenstra, Ford Motor Company	9-10	3.67	3.67	3.33	3.17	3.17	3.43
Hydrogen to the Highways	Ronald Grasman, Daimler	9-12	4.00	3.60	3.60	3.40	3.20	3.62
Hydrogen Vehicle and Infrastructure Demonstration and Validation	Rosalind Sell, General Motors Corporation	9-14	3.83	3.83	3.67	3.33	3.00	3.63
Validation of an Integrated Hydrogen Energy Station	Edward Heydorn, Air Products	9-16	3.80	3.80	3.40	3.40	3.60	3.58
California Hydrogen Infrastructure Project	Edward Heydorn, Air Products	9-18	3.60	3.40	3.20	3.60	3.40	3.38
Technology Validation: Fuel Cell Bus Evaluations	Leslie Eudy, National Renewable Energy Laboratory (NREL)	9-20	3.40	3.60	3.40	3.60	3.20	3.44
Hawaii Hydrogen Energy Park	Richard Rocheleau, Hawaii Natural Energy Institute	9-22	3.75	3.75	3.00	4.00	3.75	3.48

Presentation Title	Principal Investigator and Organization	Page Number	Relevance	Approach	Technical Accomplishments	Collaborations	Future Research	Weighted Average
<i>Detroit Commuter Hydrogen Project</i>	<i>Jody Egelton, Southeast Michigan Council of Governments (SEMCOG)</i>	<i>9-24</i>	<i>2.80</i>	<i>3.00</i>	<i>2.40</i>	<i>3.20</i>	<i>2.40</i>	<i>2.68</i>
<i>Tanadgusix (TDX) Foundation Hydrogen Project</i>	<i>Katherine Keith, Tanadgusix Foundation</i>	<i>9-26</i>	<i>2.20</i>	<i>2.20</i>	<i>2.25</i>	<i>2.20</i>	<i>2.20</i>	<i>2.22</i>
<i>Texas Hydrogen Highway - Fuel Cell Hybrid Bus and Fueling Infrastructure Technology Showcase</i>	<i>David Hitchcock, Texas Hydrogen Highway</i>	<i>9-28</i>	<i>2.60</i>	<i>2.40</i>	<i>1.75</i>	<i>2.40</i>	<i>2.40</i>	<i>2.18</i>
<i>Florida Hydrogen Initiative</i>	<i>Pam Portwood, Florida Hydrogen Initiative</i>	<i>9-30</i>	<i>1.83</i>	<i>1.83</i>	<i>2.17</i>	<i>2.50</i>	<i>1.83</i>	<i>2.03</i>
OVERALL AVERAGE FOR TECHNOLOGY VALIDATION			3.31	3.26	3.06	3.21	2.96	3.16

NOTE: Italics denote poster presentations.