VIII.8 Hydrogen Analysis Resource Center

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Start Date: June 2005
Projected End Date: Project continuation and direction determined annually by DOE

Objectives

Develop a publicly-accessible, web-based hydrogen analysis resource center to provide ready access to a wide range of consistent and high-quality data and tools for use in hydrogen-related analyses.

Technical Barriers

This project addresses the following technical barriers from the Systems Analysis section (4.5) of the Hydrogen, Fuel Cells and Infrastructure Technologies Program Multi-Year Research, Development and Demonstration Plan:

(B) Lack of Consistent Data, Assumptions and Guidelines

(D) Stove-Piped/Siloed Analytical Capabilities

Technical Targets

This project is developing a data book and other resources to support a wide range of analytical activities within the Hydrogen Program. The project helps meet the following technical objective in the Hydrogen, Fuel Cells and Infrastructure Technologies (HFCIT) Program Multi-Year Research, Development and Demonstration Plan:

- Continuously support a spectrum of analyses, including financial and environmental assessments, across and within Program elements–from individual unit/subsystem elements to a fully integrated system and infrastructure.

Accomplishments

- Developed a prototype of the web-based Hydrogen Analysis Resource Center (HyARC), including a preliminary Hydrogen Data Book, calculator tools, and links to other analysis resources.
- Conducted an external review of the data book and website to ensure data accuracy and website functionality.
- Launched the website for public access (March 2006).

Introduction

Over the course of FY 2005 and FY 2006, PNNL developed an operational version of the Hydrogen Data Book and the Hydrogen Analysis Resource Center (HyARC) website (see Figure 1). The Data Book contains a wide range of factual information on hydrogen and fuel cells (e.g., hydrogen properties, hydrogen production and delivery data, and information on fuel cells and fuel cell vehicles), and other data that might be useful in analyses of hydrogen infrastructure in the United States (e.g., demographic data and data on energy supply and/or infrastructure). The HyARC website also contains:

- *Calculator tools* to perform conversions of hydrogen from weight to energy, calculate energy equivalency among hydrogen and other transportation fuels based on heating values, perform equation of state calculations, convert units for many parameters from metric to English and other units, make simple financial calculations, and more.
- *Links to external sites* such as EIA data, other data books, and the NIST website.
- *Links to analysis tools* (e.g., models) such as H2A, GREET, PSAT, MOVES, and other transportation and energy models.
- *Official assumptions* to be used in HFCIT analyses including financial assumptions for use in cost analyses and fuel and utility prices. The intent is to update the data and expand the content of data book and website each year.

The website allows user-defined searches of the data book, as well as all the other linked websites, and can be accessed through the DOE Hydrogen Program website.

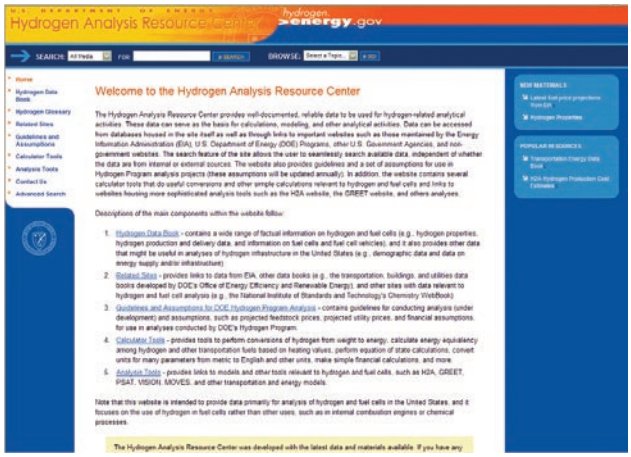

FIGURE 1. HyARC Website Home Page (http://hydrogen.pnl.gov/cocoon/morf/hydrogen)

Approach

The approach to developing the contents of the data book and website involved querying DOE staff members within HFCIT, Fossil Energy (FE) and Nuclear Energy (NE), national laboratories, and contractors to find data appropriate for this purpose, as well as ideas for links to many other sites that contain data useful for analysis relevant to hydrogen and fuel cells. Searches of the web and open-source literature also provided ideas for content.

PNNL was responsible for designing and implementing a website that was compatible and consistent with the official DOE website format and requirements. PNNL staff members had developed website software for other DOE/EERE projects, which was adapted for HFCIT use in this project.

A key component of the approach was to hold a workshop to review the contents and functionality of the website and solicit feedback from government and private-sector reviewers. As a result of this review, changes to both the data content and functionality of the site were made. Some of the recommendations from the reviewers will be implemented in FY 2007.

Results

Positive feedback has been received on the project, and in the first month after launch, the site has experienced over 25,000 hits. All of the project milestones were achieved on schedule, as follows:

08/05 First prototype completed (in FY 2005)

10/05 Website demonstration to HFCIT

12/05 First internal review completed

02/06 External technical review by industry (Chevron, Praxair); other agencies (NIST, DOT); DOE staff (HFCIT, Freedom Car, NE, FE, NETL and others); national lab experts (NREL, ANL)

03/06 Launch of publicly-available website

Conclusions and Future Directions

The website and data book serve a useful function as a central repository of information and data useful for hydrogen and fuel cell analysis efforts. A list of potential improvements to the site has been compiled and prioritized, based on external technical review, e.g., reviewers have recommended that the website include:

- Additional data, e.g., maps of energy resources, vehicle performance data, additional hydrogen production data, global hydrogen fueling stations, trends in energy delivery, etc.
- Additional guidelines and assumptions to be used in Hydrogen Program analysis.
- More explanation and text for people unfamiliar with hydrogen analysis.

The plan is to update the site on a continuous basis and to annually update links, guidelines & assumptions and any data that is regularly updated (e.g., EIA data and projections).

Special Recognitions & Awards/Patents Issued

1. This project received a 2006 DOE Hydrogen Program R&D Award in recognition of outstanding program support.