DOE Hydrogen Program

CODES & STANDARDS FOR THE HYDROGEN ECONOMY

2009 DOE Hydrogen Program Review

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regulatory logic LLC
supporting innovative regulation toward a sustainable world

Project ID: scsp_01_nakarado

Overview

Timeline

Start: December 5, 2007

End: September 30, 2011

48% Complete

Barriers

Current Economic Climate in General, Auto Industry in Particular

Prime Contract Cost – Share

Budget

Total Project: $7.2 M

DOE Share: $6.0 M

Cost Share: $1.2 M

Partners

- To Date: 12 Leading Code & Standard Developers, Experts
- See Slide 13

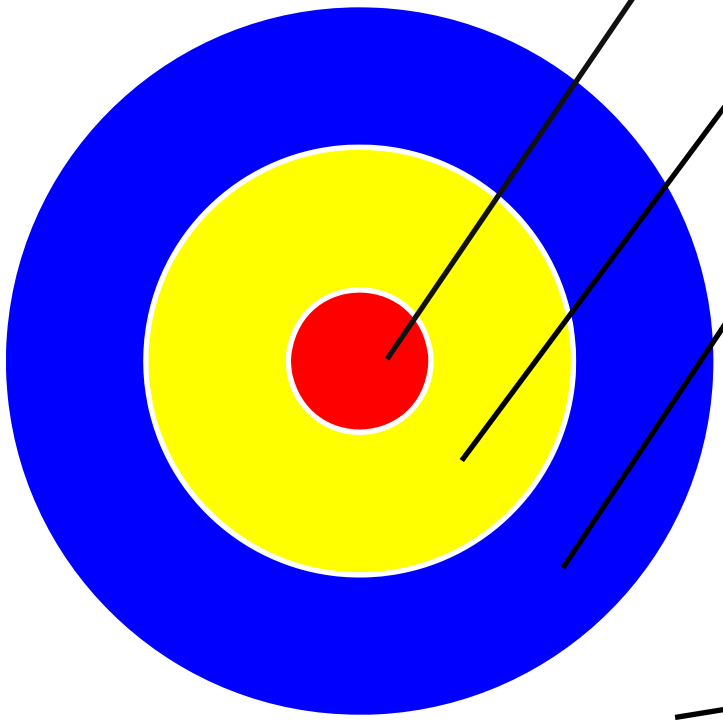
General Objectives of DOE Codes & Standards Project

- To accelerate the availability of appropriate codes and standards to ensure consistency and, if possible, uniformity of requirements and to facilitate deployment.
- To enable certification to applicable standards in order to facilitate approval by local code officials and safety inspectors.
- To promote uniform standards because manufacturers cannot cost-effectively manufacture multiple products that would be required to meet different and inconsistent standards

Objectives (continued)

- The overarching objective for Codes & Standards for The Hydrogen Economy (DE-FC36-07GO 17004*)* is to facilitate timely completion of the necessary codes and standards for hydrogen and fuel cell technologies and infrastructure. Specific project objectives include:
  - Coordinate and facilitate the accelerated development of codes and standards in close collaboration with DOE, National Laboratories and other relevant agencies;
  - Establish strong partnerships with industry, SDOs and CDOs;
  - Facilitate information dissemination to technology developers, implementers and local code officials.

2009 Objectives



All Contracts in place with Zero Downtime, Minimizaion of Subcontractor Transaction Costs Toward inimization of Overhead Expense for SubAwardees for Contract Administration

Updated Review of SubContracts & Performance Toward Optimizing Contribution In Meeting National Template Objectives

Through Streamlined Electronic Payment Systems- Reduce SubAwardee Payment Time to Less than 1 Week after DOE Reimbursement

The Barriers

- **Limited Government Influence on Model Codes.** The code development process is a consensus-based, voluntary process. Government support can affect its progression, but ultimately consensus from participants is required by standard development and code publishing groups.
- **Competition between SDOs and CDOs.** Competition between various organizations can hinder the creation of consistent hydrogen codes and standards.
- **Limited State Funds for New Codes.** Budgetary shortfalls in many states and local jurisdictions impact the adoption of codes and standards, since funds are not consistently available for purchasing new codes or for training building and fire safety officials.

The Barriers (cont.)

- **Large Number of Local Government Jurisdictions (there are approximately 44,000).** The large number of jurisdictions hinders universal adoption of codes and standards.
- **Lack of Consistency in Training of Officials**. The training of code officials is not mandated. There are a large number of jurisdictions and significant variation in training facilities, requirements.
- **Limited DOE Role in the Development of International Standards.** Governments can participate and influence the development of codes and standards, but cannot direct the development of international standards.

The Barriers (cont.)

- **Need for Representation at International Forums.** Participation in international forums and meetings is voluntary and has previously been ad hoc rather than planned and coordinated in advance. Our national interest requires representation.
- **International Competitiveness.** International economic competition complicates development of international standards.
- **Conflicts between Domestic and International Standards.** National positions can complicate the harmonization of domestic and international standards.
- **Lack of National Consensus on Codes and Standards.** "Intra" national Competitive issues can also hinder consensus.

The Barriers (cont.)

- **Need for Technical Data to Revise Standards.** Research activities are underway to develop and verify the technical data needed to support codes and standards development, such as requirements for retrofitting existing infrastructure and universal parking certification.

  Ex: Sandia distance requirements to NFPA
- **Affordable Insurance is Not Available.** New technologies not yet recognized in codes and standards will have difficulty in obtaining reasonably priced insurance.

The Barriers (cont.)

- **Large Footprint Requirements for Hydrogen Fueling Stations.** The existing set-back and other safety requirements can result in large footprints
- **Parking and Other Access Restrictions.** Complete access to parking, tunnels and other travel areas has not yet been secured

Codes & Standards Partners with DOE Hydrogen Program

	Sub Awards 2007
1	ANSI Contract #RL-2007-002
2	ASME Contract #RL-2007-011 *(in process)*
3	CGA Contract #RL-2007-010
4	CSA America Contract #RL-2007-004
5	GWS Solutions Contract #RL-2007-003
6	ICC Contract Contract#RL-2007-006
7	Kelvin Hecht Contract #RL-2007-001
8	NFPA Contract #RL-2007-005
9	NHA Contract #RL-2007-008
10	SAE Contract #RL-2007-009
11	USFCC Contract #RL-2007-007
12	Jim Ohi Contract #RL-2009-012

National Fire Protection Association
The authority on fire, electrical, and building safety

US Fuel Cell Council
www.usfcc.com

Approach

- **In close collaboration with DOE Hydrogen Program and Technical Advisors, develop streamlined contracting procedures.**
- **Consistent with DOE requirements, advocate Subawardee Improvement suggestions**
- **Utilizing modern electronic funds transfers, reduce invoice to payment time to less than 1 week after receipt of DOE funds.**
- **Deliver low overhead services to the Hydrogen Codes & Standards Program, with experienced energy and business professionals**

Project Tasks Overview

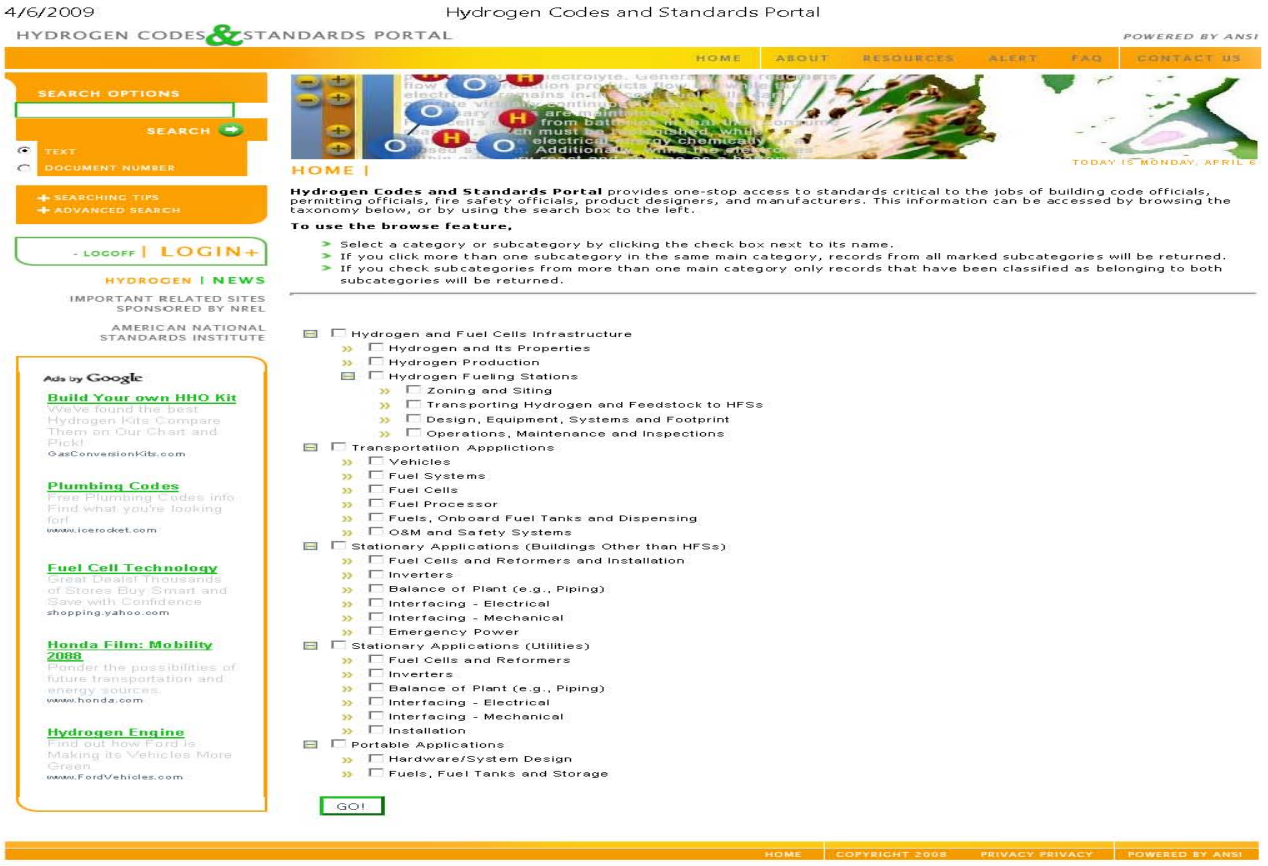
Task Number	TASK DESCRIPTION	Progress Notes
1	Coordinate with DOE, National Laboratory Representatives and Other Relevant Agencies	INITIALLY COMPLETE ONGOING
2	Manage Subcontract Awards	ONGOING
3	Facilitate Development of Codes and Standards	ONGOING
4	Support Dissemination of Information to Technology Developers, Implementers and Local Code Officials	ONGOING
5	Project Management and Reporting	ONGOING

Task Schedule

Task Number	Project Milestones	Task Completion Date				Progress Notes
		Original Planned	Revised Planned	Actual	Percent Complete	
1	**Task 1.0 Coordinate with DOE, National Laboratory Representatives and Other Relevant Agencies**	10/30/06	11/31/06	11/31/06	100%	Complete.
2	**Subtask 1.1 Define Criteria for the Selection of Industry, CDO and SDO Participants**	10/30/06	12/31/06	12/31/06	100%	Complete
3	**Subtask 1.2 Selection of CDOs, SDOs and Industry Organizations**	11/31/06	12/31/06	12/31/06	100%	Complete
4	**Subtask 1.3 Negotiate with Selected CDOs and SDOs for Contracts**	11/31/06	12/31/06	01/30/07	100%	Complete
5	**Subtask 2.1 Manage Subcontract Performance**	10/01/06	10/01/06	10/01/06	Ongoing	Ongoing
6	**Subtask 2.2 Coordinate Collaboration Between CDOs, SDOs and Industry Organizations**	10/01/06	10/01/06	10/01/06	Ongoing	Ongoing
7	**Task 5.0 Project Management and Reporting**	10/01/06	10/01/06	10/01/06	Ongoing	Ongoing

ANSI WEB PORTAL

http://hcsp.ansi.org



CODES & STANDARD MATRIX

KELVIN HECHT

http://www.fuelcellstandards.com/Matrix.htm

This website tracks the world-wide development of over 200 hydrogen and fuel cell standards, and its matrix can be searched, using the TABS above, by the following applications or geographic areas:

- **Stationary Fuel Cells International**
- **Hydrogen & Fuel Cell Vehicles North America**
- **Portable & Micro Fuel Cells Europe**
- **Hydrogen Infrastructure Pacific Rim**

This website also features:

- **CALENDAR** ***includes relevant meetings, conferences and symposia***
- **BULLETIN BOARD** ***for posting questions***
- **PDF FILES** ***for downloading hard copies of the TABS above***
- **RECENT UPDATES** ***identifies updates during the previous month***

Comments can be addressed to:
editor@fuelcellstandards.com

Hydrogen Safety, Codes and Standards

Contractor: Jim Ohi

- Coordinate activities of U.S. participants in developing hydrogen fuel quality specifications under the International Organization for Standardization (ISO), involving key stakeholders from industry, national laboratories, and academia
- Assist DOE in achieving consistency and harmonization of requirements incorporated in domestic and international hydrogen related regulation, codes, and standards
- Support DOE in addressing critical issues in research and development and other activities related to safety, regulations, codes, and standards for hydrogen and other alternative transportation fuels
- Closely coordinate work under this agreement with and support on-going and planned work by DOE national laboratories and other DOE subcontractors.

CSA America's Coordination of Hydrogen Standards

Fittings – Published December 2008

- Hydrogen Fittings, (CSA America HGV 4.10)

Pressure Relief Devices

- Pressure Relief Devices for Compressed Hydrogen Vehicle Fuel Containers (CSA America HPRD1)
  - 1st Review and comment 2008. Comments reviewed, removed coverage for series type HPRD devices.
  - 2nd Review and comment- April 2009
  - **Anticipated publication- September 2009**

Fuel System Components

- Fuel System Components for Hydrogen Vehicles (CSA America HGV 3.1)
  - TAG updated CNG document and harmonized coverage with ISO 15500
  - HGV 3.1 **Review and Comment anticipated October 2009**

On-board Compressed Container

- Container for Compressed Hydrogen Vehicles (CSA America HGV 2)
  - Revised draft to coordinate coverage with SAE J2579

CSA America's Coordination of Hydrogen Standards

Tentative Interim Requirements Publish - April, 2009

- Compressed Hydrogen Dispensers (CSA America HGV 4.1)
- Hoses and Hose Assemblies for Compressed Hydrogen Dispensing Systems (CSA America HGV 4.2)
- Breakaway Devices for Hoses for Compressed Hydrogen Dispensing Systems (CSA America HGV 4.4)
- Priority and Sequencing Equipment for Compressed Hydrogen Dispensing Systems (CSA America HGV 4.5)
- Manually Operated Valves for Compressed Hydrogen Dispensing Systems (CSA America HGV 4.6)
- Standard for Automatic Pressure Operated Valves for Compressed Hydrogen Dispensing Systems (CSA America HGV 4.7)

CSA America's Coordination of Hydrogen Standards

Fueling Station Compressor

- Hydrogen Gas Vehicle Fueling Station Compressor (CSA America HGV 4.8) *[May 2009]*

Fuel System/Station

- Compressed Hydrogen Dispenser System/Station (CSA America HGV 4.9)
  Review and Comment April 2009

Fueling verification

- Compressed Hydrogen Dispensing Systems Fueling (CSA America HGV 4.3)
- **December 2009 Publication**

Future Work

- **Completion of All Remaining SubAwards, with annual funding renewals, for 2009-2011**
- **Continue Streamlining Through Electronic Payment Systems**
- **Reduce SubAwardee Transaction Time & Expense Requirements for Annual Contract Extensions for 2009 and Beyond**

Project Summary

- **Approximately 1/3 through Third contract year for Regulatory Logic LLC Award Placement**
- **Start Up requirements of new cost-share with Codes & Standards partners hurdles have been overcome**
- **Subcontractor progress includes completion of DRAFT of NFPA 2**

Questions?

- *Contact: Gary Nakarado at 303-526-5505 Gary@RegLogic.Org*
- *or Christine Manchester at 303-526-5505 Chris@RegLogic.Org*

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