California Hydrogen Infrastructure Project

Edward C. Heydorn
Air Products and Chemicals, Inc.
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Project ID
#TV007

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Overview

Timeline
• Start – Aug. 2005
• End – Dec. 2010
• 85% Complete

Barriers
• Cost of delivered hydrogen

Budget
• Total project funding
  – DOE $5.5 million share
  – Contractor $5.4 million share
• Funding received in FY09: $0
• Funding for FY10: $0

Partners
Various collaborators and funding groups including:
– South Coast AQMD
– OEM’s
– UC Irvine
– Energy Companies
Objectives - Relevance

• Demonstrate a cost effective infrastructure model in California for possible nationwide implementation
  – Design, construct and operate five hydrogen fueling stations
  – Collect and Report Infrastructure Data
  – Document permitting requirements and experiences
  – Validate expected performance, cost, reliability, maintenance, and environmental impacts

• Implement a variety of new technologies with the objective of lowering costs of delivered hydrogen
Approach

• Work with OEM’s to determine vehicle usage needs and general station equipment requirements
• Work with OEM’s and others to determine preferred locations/areas for fueling station deployment
• Select potential Station Operators and work to locate suitable sites
• Initiate and complete required agreements, determine and address specific site issues including liability, billing, etc.
• Complete detailed Station Design, permits, installation, operation, and maintenance of stations
• Collect and report Infrastructure Data to the DOE once stations put online
• Monitor and collect feedback which can be incorporated to improve station user’s fueling experience
Project Tasks

• Station Installation
  – UCI Fueling Station
  – Torrance Pipeline Fueling Station
  – Northern California Mobile Fueler (HF-150)
  – Fountain Valley Renewable Station
  – Long Beach Mobile Fueler (HF-150)

• New Delivery Concept (NDC)

• Infrastructure Data Acquisition, Analysis and Delivery (includes eRAM)

• Hydrogen Infrastructure Study (UC Irvine)
UCI 350/700 Bar Station

- 25 kg/day capacity, liquid hydrogen supply
- Actual demand higher, regularly approaching 50 kg/day
- 350 and 700 bar fueling capability
- Excellent operating performance
- Station usage doubled over past year
- UCI recently applied for local funding to expand 700 bar fueling system (storage, cooling)
Torrance Pipeline Station

- 48 kg/day capacity, pipeline hydrogen supply
- 350 and 700 bar fueling capability
- Greenfield station, retail-like design
- Station construction began February 2010
- Anticipated onstream mid-2010
- Expandable with additional compression to 96 kg/day
- Funding support by Shell Hydrogen and South Coast Air Quality Management District
Northern California HF-150

Placerville Station

- Gaseous hydrogen supply
- 350 bar fueling capability
- Host site: U.S. Forest Service, Eldorado National Forest
- Installed March 2010
- Planned 6 month deployment
- Seeking second 6 month operation in South Lake Tahoe area
- Funding support by Nissan
Fountain Valley Renewable Hydrogen

Fountain Valley Station

- 100 kg/day capacity
- 350 and 700 bar fueling capability
- Host site: Orange County Sanitation District
- Co-located with existing CNG dispenser
- Renewable hydrogen production using Hydrogen Energy Station
- Scope includes design/procurement of ADG fuel treatment system
Technology developed under second DOE Cooperative Agreement (No. DE-FC36-01GO11087)

Overall project selected for funding by California Air Resources Board and South Coast Air Quality Management District

Anticipated onstream Summer 2010
Orange County Sanitation District Site

I-405 South Ramp

Hydrogen Fueling Station

~1,100 feet

Ellis Avenue

Hydrogen Energy Station
Collaboration

- University of California, Irvine
  - Host site and operator, UCI Fueling Station
  - Operations support and data analysis, Fountain Valley Renewable Station

- Develop a methodology to analyze the integration of technologies in a hydrogen infrastructure with respect to criteria pollutant emissions, GHG emissions, energy consumption, and water consumption.
- Develop hydrogen infrastructure scenarios with a high level of geographic detail and utilize the capabilities of the Computational Environmental Sciences Laboratory at the University of California, Irvine to simulate the air quality impacts.
Future Work

• UCI Fueling Station – Continue operation
• Torrance Pipeline Fueling Station – Commission both 350 and 700 bar systems
• Fountain Valley Renewable Station – Install and commission both 350 and 700 bar systems
• Hydrogen Fuelers (HF-150) – Continue operation in Northern California
• Infrastructure Data Acquisition, Analysis and Delivery – Continue to report data to DOE
Summary

• Demonstrate a variety of options for delivery of low-cost hydrogen in the deployment of hydrogen Infrastructure
  – First permanent CHIP station (350 and 700 bar gaseous hydrogen) in operation at UCI
  – Two mobile CHIP stations (HF-150) (Long Beach, Placerville)
  – New Delivery Concept (NDC) trailer deployed
  – Infrastructure Data Reporting at each station

• Near Term Activities
  – First pipeline supplied hydrogen station in commissioning phase
  – Renewable-supplied hydrogen station in construction phase
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