California Hydrogen Infrastructure Project

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Overview

Timeline
• Start – Aug. 2005
• End – Dec. 2010
• 70% Complete

Barriers
• Cost of delivered hydrogen

Budget
• Total project funding
  – DOE $5.5 million share
  – Contractor $5.4 million share
• No funding received in FY08 and FY09

Partners
Various collaborators and funding groups including:
• SCAQMD
• OEM’s
• UC Irvine
• Energy Companies
Objectives

• Demonstrate a cost effective infrastructure model in California for possible nationwide implementation
  – Design, construct and operate seven 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
  – Long Beach Mobile Fueler (HF-150)
  – Torrance Pipeline Fueling Station
  – Northern California Mobile Fueler (HF-150)
  – Fountain Valley Renewable Station

• New Delivery Concept (NDC)
• Infrastructure Data Acquisition, Analysis and Delivery (includes eRAM)
• Hydrogen Infrastructure Study (UC Irvine)
Operating Stations - UCI

UCI 350/700 Bar Station

- 25 kg/day capacity, liquid hydrogen supply
- 350 and 700 bar fueling capability
- Excellent operating performance
- Station usage tripled since early 2007
- Lessons Learned to date:
  - Component listing, especially 700 bar
  - Maintenance requirements for compression systems
Operating Stations – Long Beach

Long Beach Station

• Gaseous hydrogen supply
• 350 bar fueling capability
• Limited OEM usage in 2008
• Station removed in March 2009

• Lessons Learned:
  – Contractual requirements for access by equipment and users
  – Costs for hydrogen at low demand
Planned Stations – Torrance Pipeline

Torrance Pipeline Station

- 48 kg/day capacity, pipeline hydrogen supply
- 350 and 700 bar fueling capability
- Greenfield station, retail-like design
- Potential expansion:
  - 96 kg/day
  - Capability to perform simultaneous fuelings
- Currently in permitting phase
- Anticipated onstream early 2010
Planned Stations – Northern California

Placerville Station

- Gaseous hydrogen supply
- 350 bar fueling capability
- Host site: U.S. Forest Service, Eldorado National Forest
- Planned 6 month deployment
- Seeking second 6 month operation in South Lake Tahoe area
Planned Stations – Fountain Valley Renewable Hydrogen

Fountain Valley Station

- 100 kg/day capacity, renewable hydrogen supply
- 350 and 700 bar fueling capability
- Host site: Orange County Sanitation District
- Anaerobic digestion of municipal wastewater
- Hydrogen production using Hydrogen Energy Station
- Selected for funding by California Air Resources Board
- Anticipated onstream December 2009
Hydrogen Energy Station
(Developed under DOE Cooperative Agreement No. DE-FC36-01GO11087)

Renewable hydrogen – for onsite requirements or regional distribution
Future Work

• UCI Fueling Station – Continue operation
• Torrance Pipeline Fueling Station – Install and commission both 350 and 700 bar systems
• Fountain Valley Renewable Station – Install and commission both 350 and 700 bar systems
• Hydrogen Fuelers (HF-150) – Operations in Northern California
• Infrastructure Data Acquisition, Analysis and Delivery – Report Data to DOE
• Hydrogen Infrastructure Study by UCI – Complete scope of work
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
  – First mobile CHIP station (HF-150) in Long Beach
  – New Delivery Concept (NDC) trailer deployed
  – Infrastructure Data Data Reporting at each station

• Near Term Activities
  – First pipeline supplied hydrogen station in permit phase
  – Renewable-supplied hydrogen station under development
  – Mobile CHIP station (HF-150) in Northern California

• Completing Hydrogen Infrastructure Study at UCI
Thank you
tell me more

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**Acknowledgement & Disclaimers**

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