U.S. DEPARTMENT OF ENERGY

Technology Validation

John Garbak

2009 DOE Hydrogen Program & Vehicle Technologies Program

Merit Review and Peer Evaluation Meeting

May 20, 2009

Goal and Objectives

Goal: Validate complete systems of integrated hydrogen and fuel cell technologies for transportation, infrastructure and electricity generation applications under real-world operating conditions

Objectives:

- Validate hydrogen and fuel cell technologies under real world conditions
- Identify current status of the technology
  - Assess progress toward technology readiness
  - Provide feedback to H_2 Research and Development

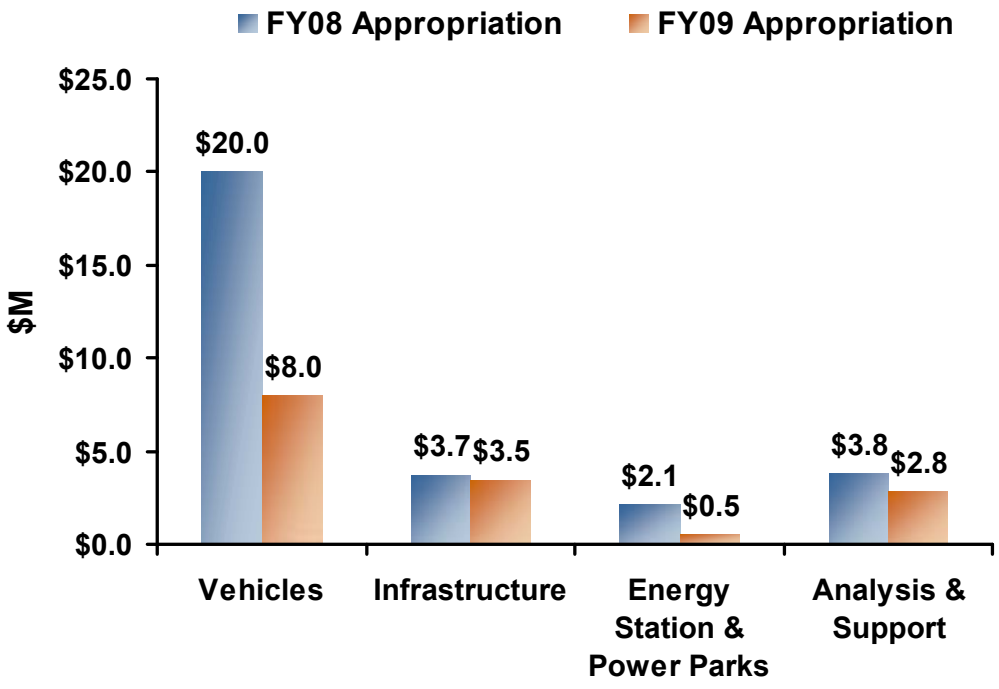
Key Targets

Performance Measure	2009	2015
Fuel Cell Stack Durability	2000 hours	5000 hours
Vehicle Range	250+ miles	300+ miles
Hydrogen Cost at Station	$3/gge	$2-3/gge

Budget

FY 2009 Appropriation = $14.8M

FY 2008 Appropriation = $ 29.6M



EMPHASIS

- All Gen 2 vehicles and fueling stations in operation using advanced technology hardware to meet program objectives.
- Verify 2,000 hour fuel cell durability target by 2010.
- Collect vehicle operational and maintenance data and conduct dynamometer testing to evaluate fuel cell performance and range.

Challenges

The lack of data on vehicles and infrastructure has been addressed in Phase 1 of the Learning Demonstration

- Lack of fuel cell vehicle performance and durability data
- Lack of refueling infrastructure performance and availability data
- Need to assess
  - fuel cell start-up and operation in 3 different climatic conditions
  - ability to start fuel cells in cold climates
- Evaluation of filling vehicles at 700 bar
- Need to address fuel cell vehicle and infrastructure interface issues

2009 Progress & Accomplishments

Fuel Cell Vehicles and hydrogen infrastructure continue to operate without major problems

- 140 fuel cell vehicles and 20 hydrogen fueling stations in operation
- All Gen 2 vehicles in operation now
- Fuel cell durability
  - 1,977 hours projected (nearly 60K miles)
- Over 1.9 million miles traveled
- Over 85K total vehicle hours driven
- Fuel cell efficiency 53-58%
- Over 88,000 kg of hydrogen produced or dispensed
- 6 hydrogen stations at 700 bar

Summary

FUTURE PLANS

- Continue testing and operation of generation 1 and 2 fuel cell vehicles
- Verify
  - 2,000 hour fuel cell durability
  - $3.00/gasoline gallon equivalent
- Complete the construction of refueling station for buses at Volcanoes National Park in Hawaii
- Continue data collection of fuel cell buses, stationary fuel cell and fork lifts

Session Schedule

- Analysis of the data from the Learning Demonstration Project – NREL
- Learning Demonstration Projects
  - Chevron and Hyundai-Kia
  - Ford and BP
  - Chrysler, Daimler and BP
  - GM and Shell
- Hydrogen Energy Station – APCI
- California Hydrogen Infrastructure Project – APCI
- Fuel Cell Bus Evaluations
- Hawaii Hydrogen Center – Hawaii Natural Energy Institute

For More Information

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