



U.S. DEPARTMENT OF  
**ENERGY**

# **Technology Validation**

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**2007 DOE Hydrogen Program**

**Merit Review and Peer Evaluation Meeting**

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# Outline

- Goal and Objectives
- Budget
- Challenges
- Progress
  - Accomplishments/Status
- Future Plans



# Goals and Objectives

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

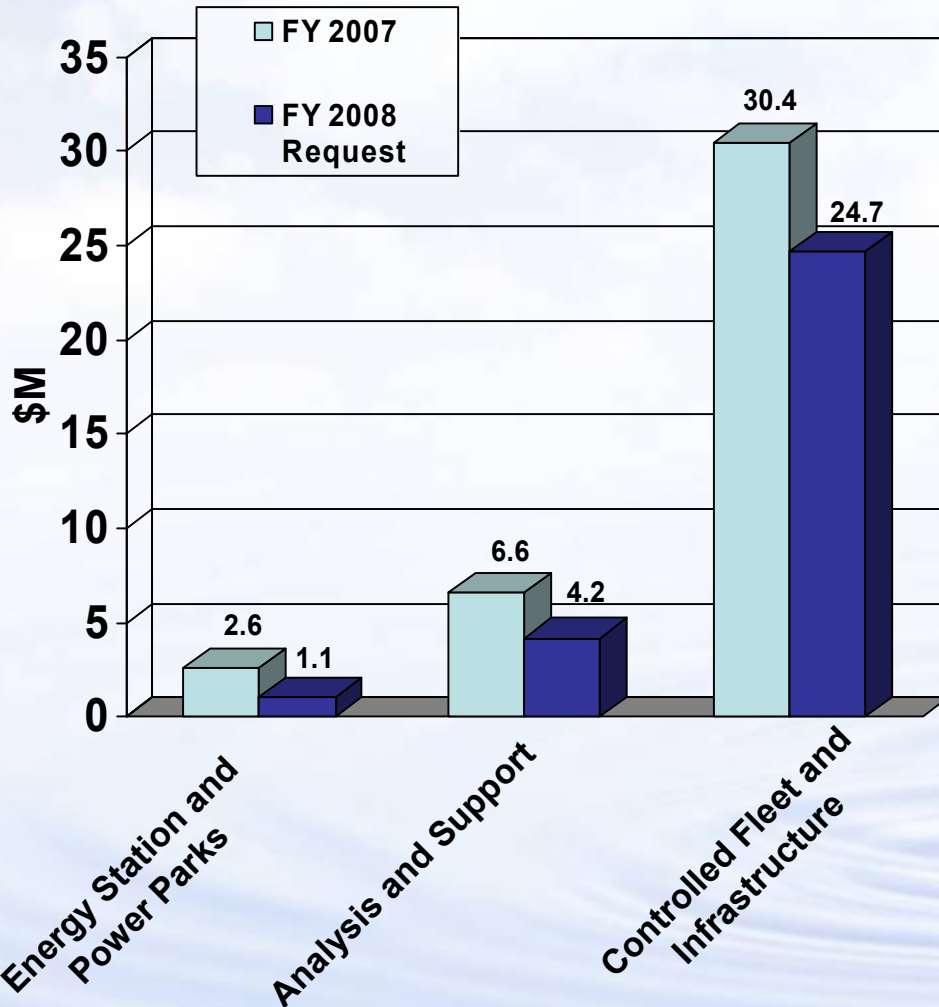
- Validate H<sub>2</sub> FC Vehicles and Infrastructure in Parallel
- Identify Current Status of the Technology
  - Assess Progress Toward Technology Readiness
  - Provide Feedback to H<sub>2</sub> Research and Development



# Technology Validation

**FY 2008 Budget Request = \$30.0M**

**FY 2007 Appropriation = \$39.6M**



## FY 2008 Emphasis:

- All Gen 2 vehicles and fueling stations in operation using advanced technology hardware to meet program objectives.
- Continue analysis to verify 2,000 hour fuel cell durability target by 2009
- Install equipment and collect data to meet \$3.00/gge by 2009
- Collect vehicle operational and maintenance data and conduct dynamometer testing to evaluate fuel cell performance and range

## FY 2008 Budget Plan:

Demo – Infrastructure	\$10.2M
Demo - Vehicle	\$14.5M
Other Industry/Lab	\$ 5.3M
<b>Total</b>	<b>\$30.0M</b>



# Challenges

- 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
- Determine fuel cell vehicle and infrastructure interface issues that need to be addressed



# Generation 2 Vehicles Being Delivered in 2007





# Progress

## DOE Vehicle/Infrastructure Demonstration:

- **Four teams in 50/50 cost-shared projects:**
  - General Motors/Shell
  - Ford/BP; Ballard
  - Hyundai/Chevron; UTC Power
  - DaimlerChrysler/BP; Ballard

### Current Status/Data

Fuel Cell Vehicles	77
Hydrogen Stations	12
Fuel Cell Efficiency	53 - 58%
Range	103 -190 miles
Durability	1200 hrs (max) (~36,000 miles)

**DOT is demonstrating fuel cell buses and providing data to DOE for analysis.**

- Eight buses in California, Massachusetts, New York, South Carolina, and Washington, DC





# Future Plans

- Continue testing and operating generation 1 and generation 2 fuel cell vehicles
- Verify
  - 2,000 hour fuel cell durability
  - 250 mile range
  - \$3.00/gasoline gallon equivalent
- Build and operate a biomass energy station
- Build and operate a power park in Hawaii





# For More Information

## Technology Validation Team

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The screenshot displays the homepage of the U.S. Department of Energy's Hydrogen Program website. The header includes the department name and the URL 'hydrogen.energy.gov'. A navigation menu lists 'Home', 'About', 'DOE Participants', 'International', 'Library', and 'News/Events'. A search bar is located in the top right. The main content area features a 'Hydrogen Program' banner with a 'H<sub>2</sub>IQ' logo and an announcement about a peer evaluation report. Below this, a 'News' section highlights 'Independent Review Panels Assess Progress Towards Technical Targets' and 'DOE Announces Hydrogen Funding Opportunity for Small Businesses'. A sidebar on the left provides a detailed navigation menu with categories such as 'Hydrogen Production', 'Hydrogen Delivery', 'Hydrogen Storage', 'Hydrogen Manufacturing', 'Conversion/Fuel Cells', 'Applications/Technology Validation', 'Safety', 'Codes & Standards', 'Education', 'Basic Research', 'Systems Analysis', and 'Systems Integration'. The bottom right corner contains a 'Features' section with links to the 'President's Hydrogen Fuel Initiative', 'ADVANCED ENERGY INITIATIVE', 'Hydrogen.gov', and 'FreedomCAR Fuel Partnership'. An 'Information on' section is also visible at the bottom right.