

## U.S. Fuel Cell Vehicle Learning Demonstration: Status Update and Early Second-Generation Vehicle Results

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### Project Overview and Partners

#### Objectives

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

#### Industry Partners

##### Four Automaker/Energy-Supplier Teams



Gen 1 Chrysler / BP



Gen 1 Ford / BP



Gen 2 GM / Shell



Gen 1 and 2 Chevron / Hyundai-Kia / UTC Power

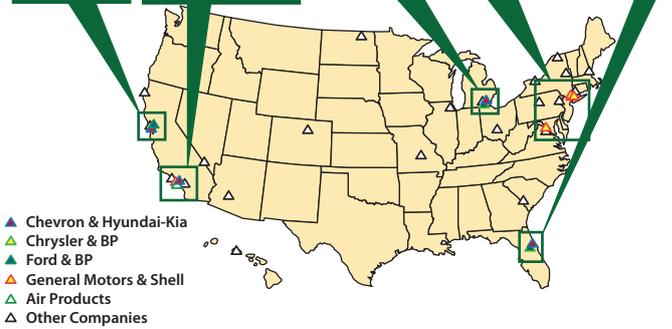
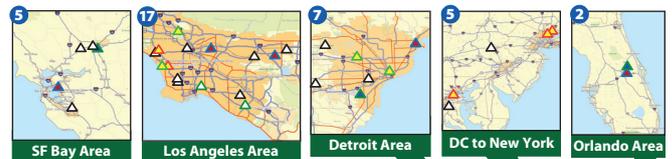
#### Key Targets

Performance Measure	2009	2015
Fuel Cell Stack Durability	2,000 hours	5,000 hours
Vehicle Range	250+ miles	300+ miles
Hydrogen Cost at Station	\$3/gge	\$2-3/gge

#### Project Refueling Stations

58 STATIONS

Refueling stations test performance in various climates; Learning Demo stations comprise approximately 1/3 of the 58 U.S. stations in five key regions.



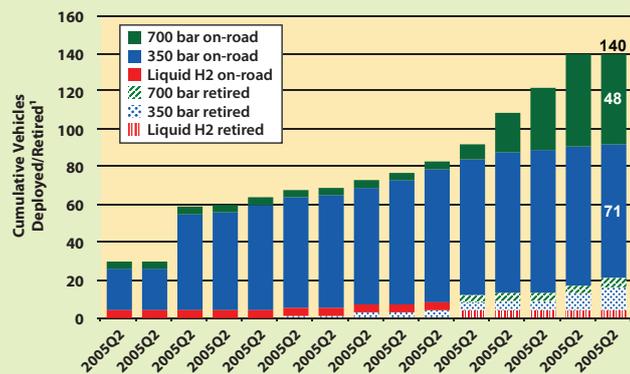
20 STATIONS

The majority of the project's fixed infrastructure to refuel vehicles has been installed, with a total of 90,000 kg H<sub>2</sub> produced or dispensed.



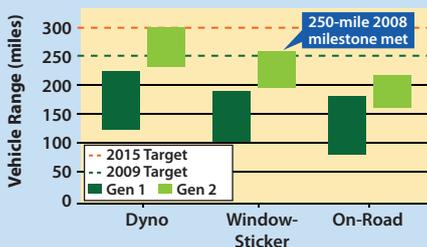
\* One station has been retired.

#### Vehicle Deployment by On-Board Hydrogen Storage Type

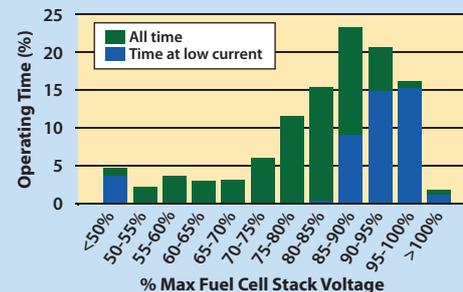


## Vehicle Project Status

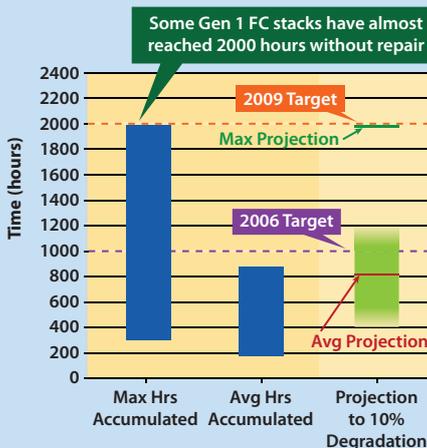
### Vehicle Range



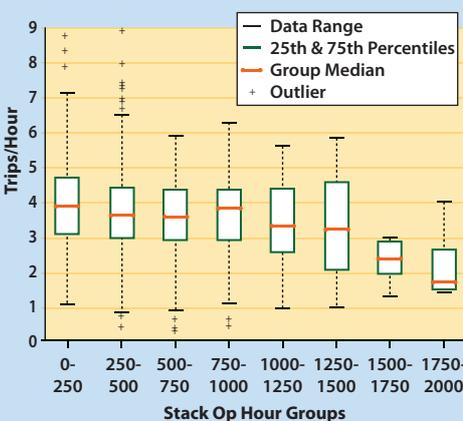
### Operating Time at Fuel Cell Stack Voltage Levels: DOE Fleet



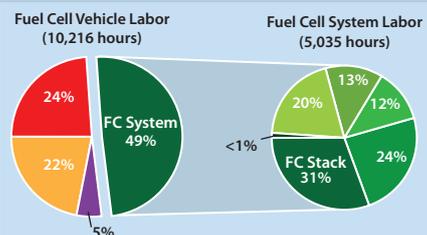
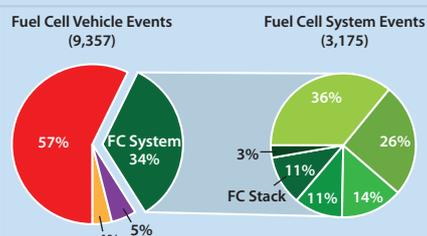
### Fuel Cell Stack Durability



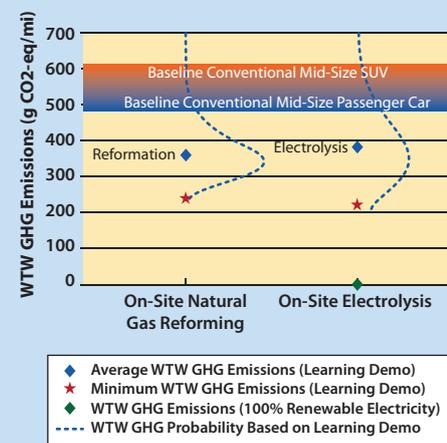
### Average Fuel Cell Trips Per Hour



### Vehicle Maintenance

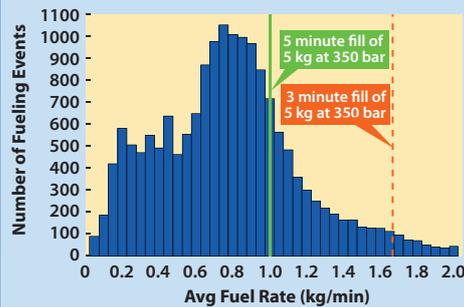


### Well-to-Wheels Green House Gas Emissions

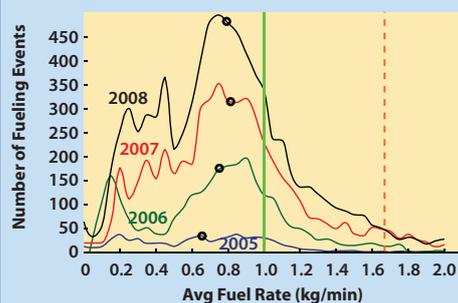


## Refueling Rates

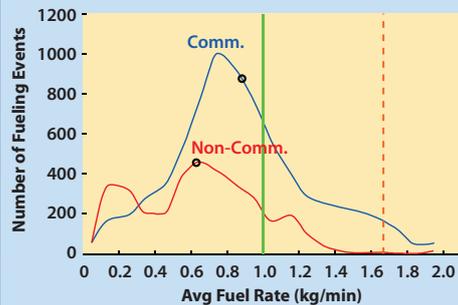
### Refueling Rates: All



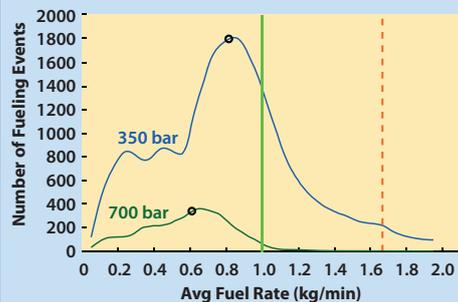
### Refueling Rates: By Year



### Refueling Rates: Communication vs. Non-Communication



### Refueling Rates: 350 bar vs. 700 bar



## Summary

### Learning Demo evaluation is ~80% complete

- 140 vehicles and 20 stations deployed
- 1.9 million miles traveled, 90,000 kg H<sub>2</sub> produced or dispensed
- 346,000 individual vehicle trips analyzed
- Project to continue through 2010

### Emphasis from project has been on providing maximum value from the data collected during project

- 60 results have been published
- Updates every 6 months
- Current results are always available on our web page:

[www.nrel.gov/hydrogen/cdp\\_topic.html](http://www.nrel.gov/hydrogen/cdp_topic.html)

### Vehicle/Station Status

- Roll-out of 2nd generation vehicles is now complete
- Station deployment nearing completion
- Rate of data delivery to NREL is now at its highest level during project