



U.S. DEPARTMENT OF
ENERGY

Program Overview

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Acting Program Manager

2007 DOE Hydrogen Program Merit Review and Peer Evaluation Meeting

May 15, 2007



Mission Statement

The Hydrogen Program mission is to research, develop, and validate hydrogen production, storage, and fuel cell technologies to reduce dependence on oil in the transportation sector, and to enable clean, reliable energy for stationary and portable power generation.



Hydrogen Fuel Initiative

Total Budget

- President Bush committed \$1.2 billion over 5 years (FY04 – FY08) to accelerate R&D to enable technology readiness in 2015.

Hydrogen Fuel Initiative Funding ¹ (\$ in millions)				
FY2004 Approp.	FY2005 Approp.	FY2006 Approp.	FY2007 Approp.	FY 2008 Request
157	222	232	274	309

- President's cumulative request has been consistent with the commitment: \$1.2 B (FY04 – FY08).

¹ Includes EERE, FE, NE, SC and Department of Transportation



Hydrogen Fuel Initiative

Budget by Participant Organization

Activity	Funding (\$ in thousands)			
	FY2005 Approp	FY2006 Approp	FY2007 Actual	FY2008 Request
Hydrogen Fuel Initiative				
EERE Hydrogen (HFCIT)	166,772	153,451	193,551	213,000
Fossil Energy (FE)	16,518	21,036	23,611	12,450
Nuclear Energy (NE)	8,682	24,057	18,665	22,600
Science (SC)	29,183	32,500	36,500	59,500
DOE Hydrogen TOTAL	221,155	231,044	272,327	307,550
Department of Transportation	549	1,411	1,420	1,425
Hydrogen Fuel Initiative TOTAL	221,704	232,455	273,747	308,975

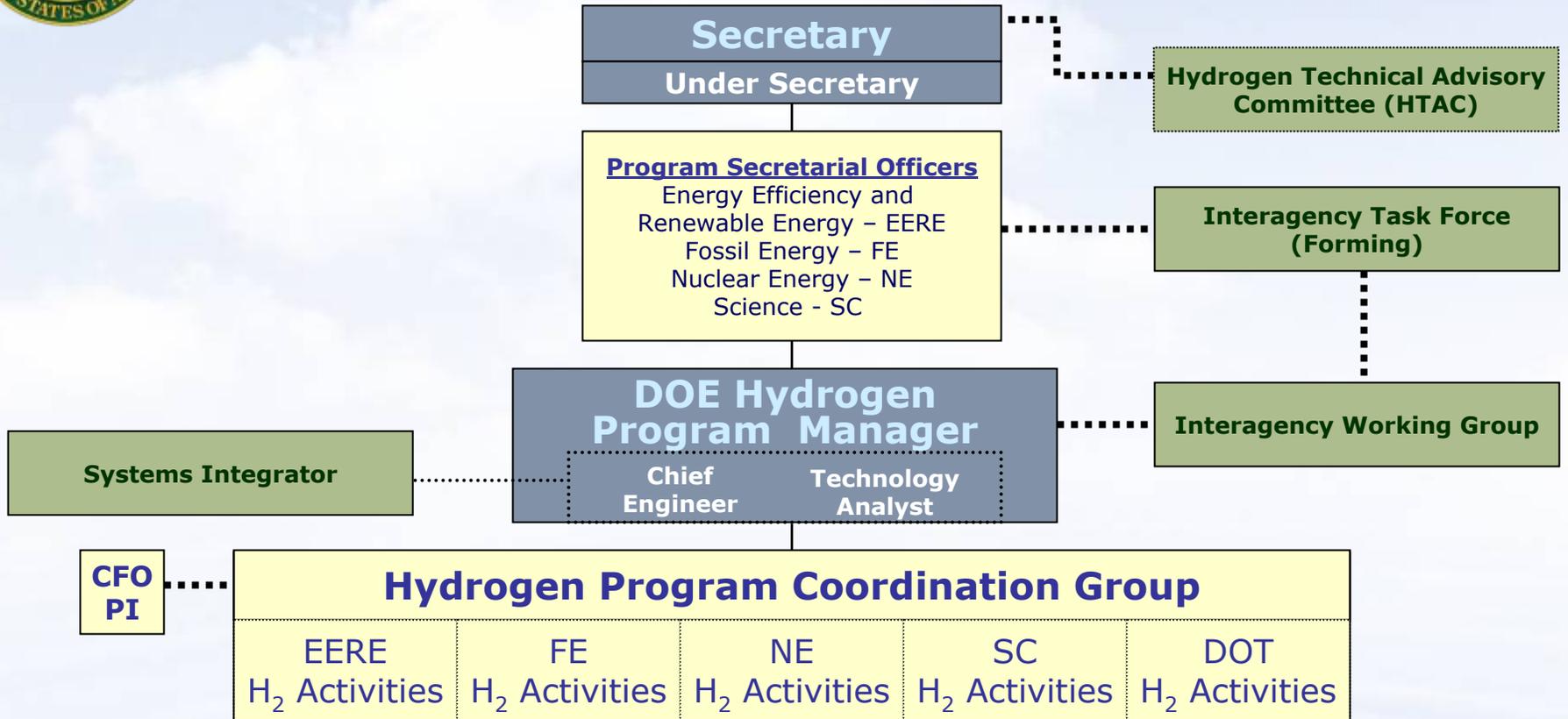


EERE Hydrogen Budget

Activity	Funding (\$ in thousands)			
	FY 2005 Approp	FY 2006 Approp	FY 2007 Actual	FY 2008 Request
Hydrogen Production & Delivery	13,303	8,391	34,594	40,000
Hydrogen Storage R&D	22,418	26,040	34,620	43,900
Fuel Cell Stack Component R&D	31,702	30,710	38,082	44,000
Technology Validation	26,098	33,301	39,566	30,000
Transportation Fuel Cell Systems	7,300	1,050	7,518	8,000
Distributed Energy Fuel Cell Sys.	6,753	939	7,419	7,700
Fuel Processor R&D	9,469	637	4,056	3,000
Safety, Codes & Standards	5,801	4,595	13,848	16,000
Education	0	481	1,978	3,900
Systems Analysis	3,157	4,787	9,892	11,500
Manufacturing R&D	0	0	1,978	5,000
Technical/Program Mgt. Support	535	0	0	0
Congressionally Directed Activities	40,236	42,520	0	0
TOTAL	166,772	153,451	193,551	213,000



DOE Hydrogen Program

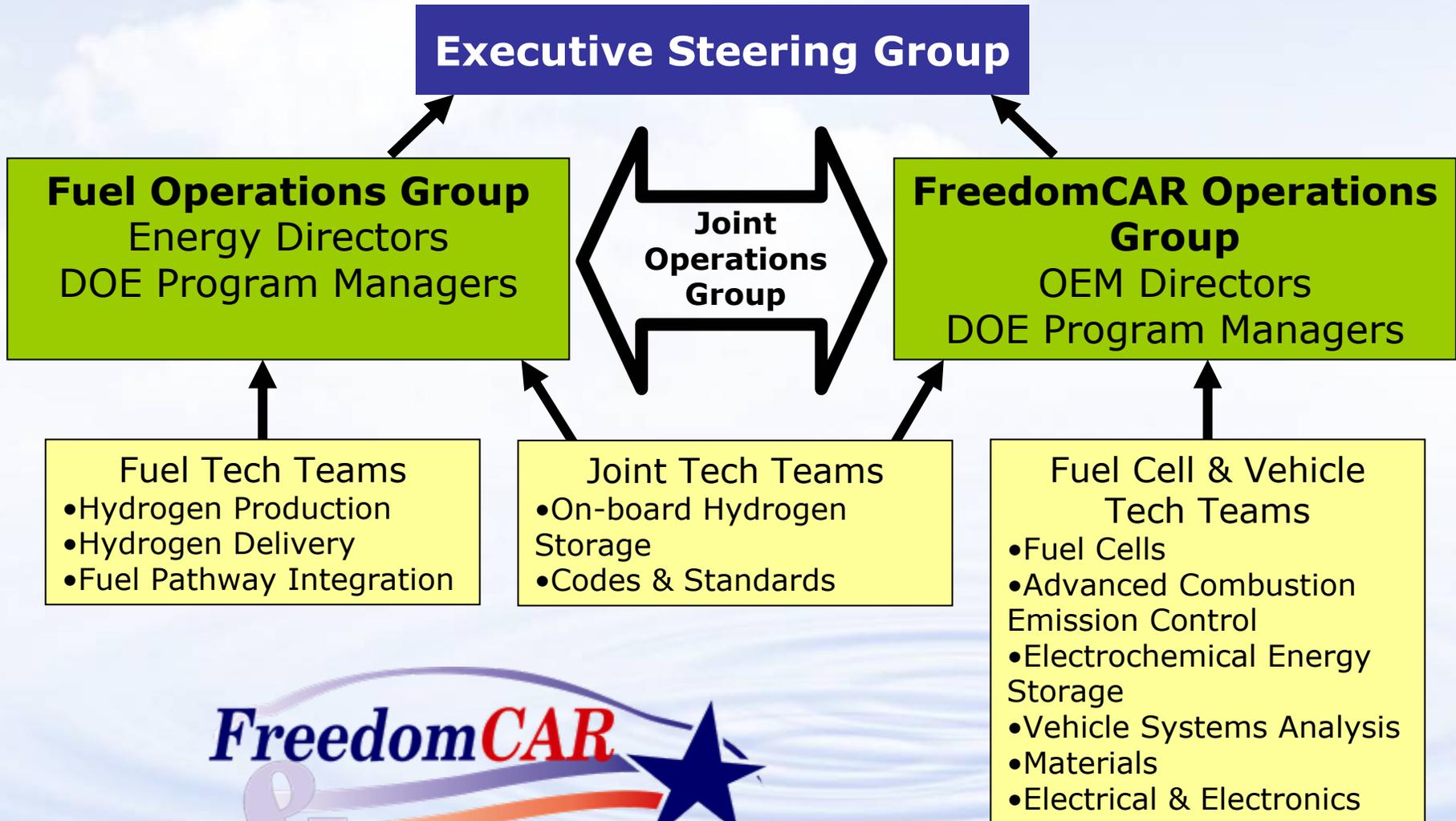


Program Management (Headquarters)





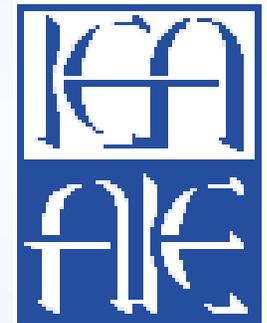
FreedomCAR and Fuel Partnership





Other Partnerships

- Hydrogen Utility Group (e.g. Xcel Energy, Sempra)
- Interagency Hydrogen and Fuel Task Force (with OSTP)
- Interagency Working Group on Manufacturing R&D
- State/Local Governments, e.g. California Fuel Cell Partnership, Upper Midwest Hydrogen Initiative
- International Partnership for the Hydrogen Economy
- International Energy Agency



The Program maintains strong partnerships with industry and government, and coordinates extensively with other stakeholder groups.





Program Evaluations

- National Academy of Sciences (NAS) Reviews
 - 2 completed, 2 ongoing
 - Biannual review of the Hydrogen Program and the FreedomCar and Fuel Partnership currently underway
- Government Accountability Office (GAO)
- Hydrogen Technical Advisory Committee (HTAC)
 - Advisory committee comprised of stakeholders from federal government, industry, and the research community
- Annual Merit Review (AMR)
 - Annual review of research projects funded in the past year (proceedings and progress report published)
- FreedomCAR Tech Team project reviews

The Program undergoes regular reviews to evaluate progress and inform planning activities.



New Activities

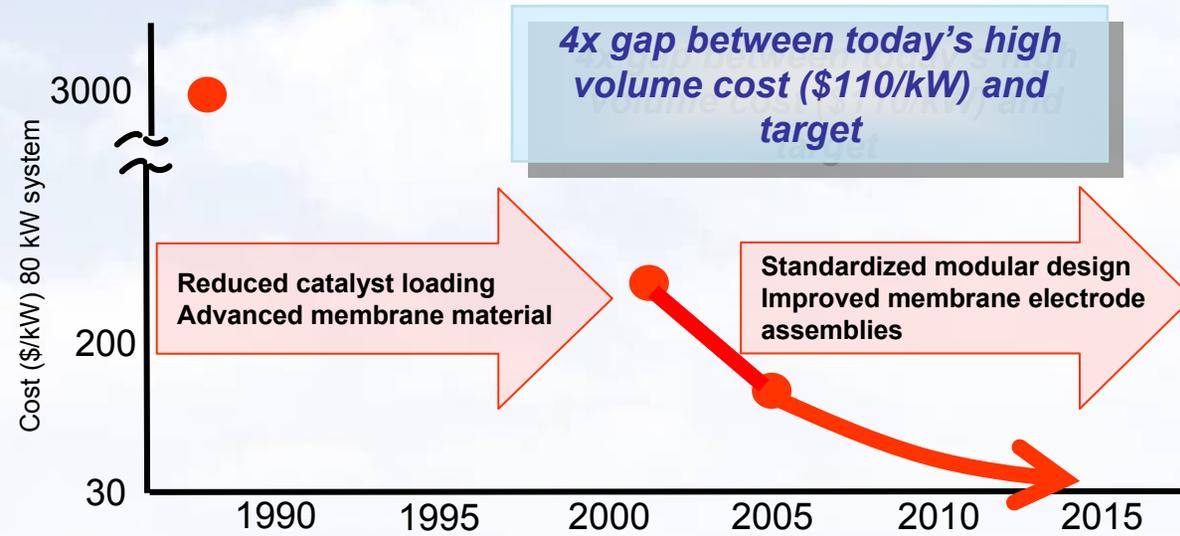
- Early Markets
- Manufacturing
- Integrated Renewable Hydrogen
 - HUG
 - NREL/Xcel
 - DTE
 - Hawaii



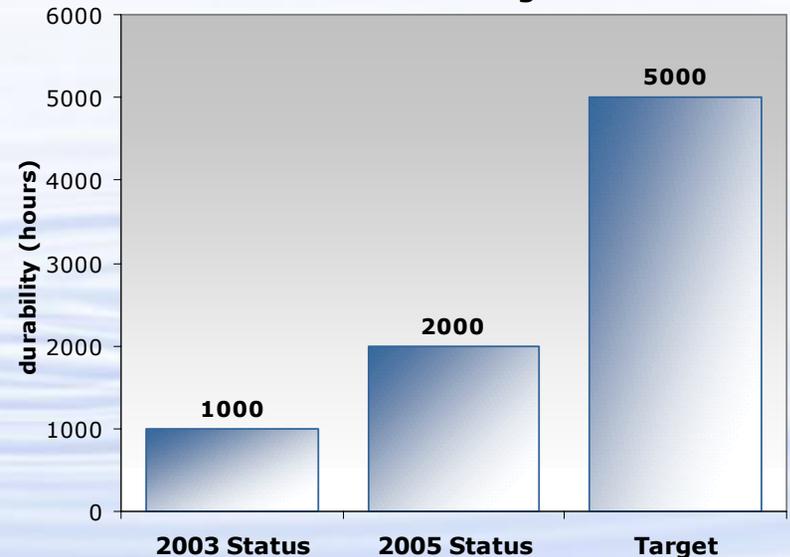
Supplementing focus on R&D to foster movement of hydrogen and fuel cells into early markets.



Progress Fuel Cells



Fuel Cell System Stack (only) Durability Status vs Targets

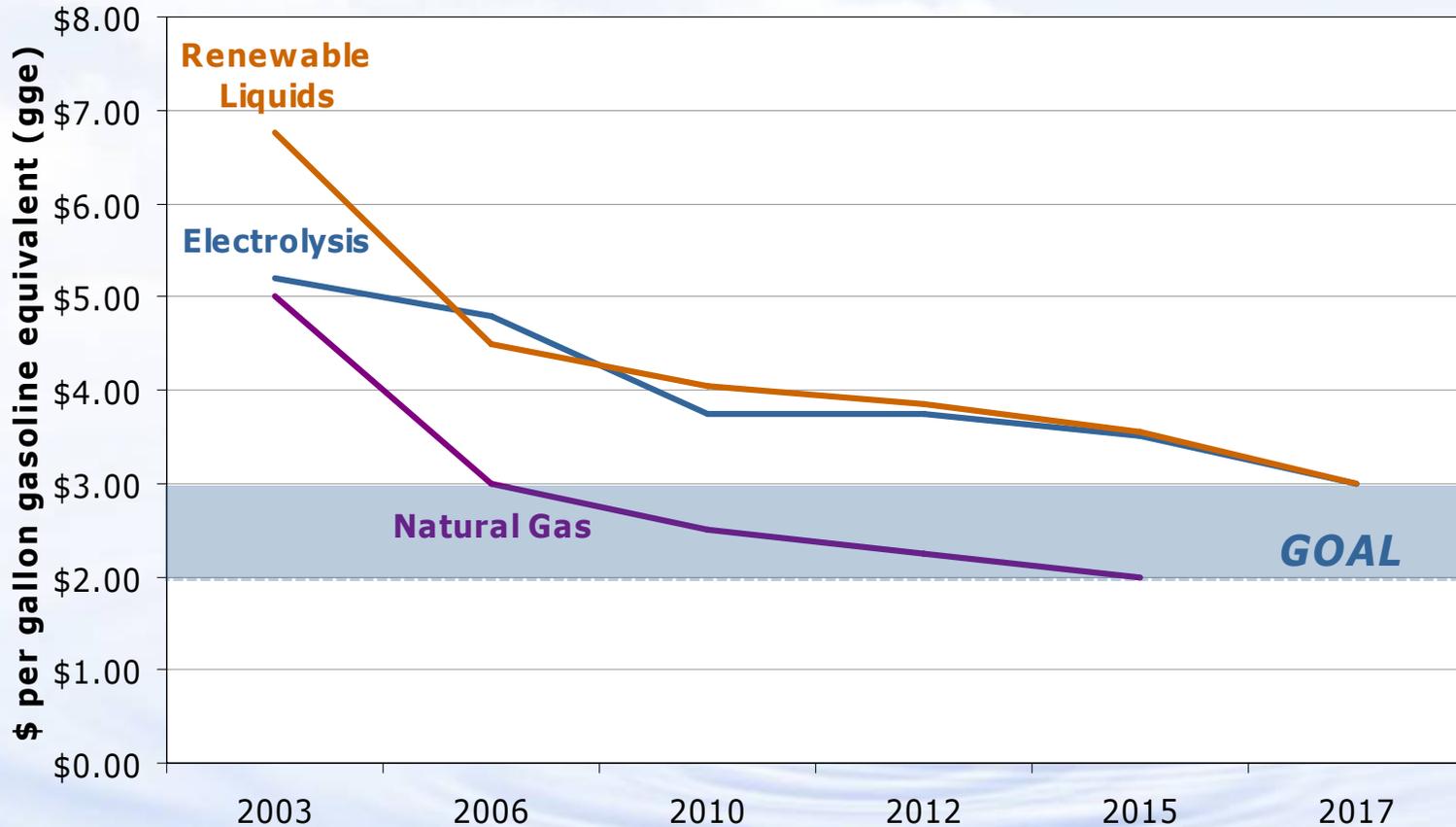


The Program has reduced the cost of fuel cells and improved durability.



Progress *Hydrogen Production*

**Distributed Hydrogen Production Cost
Status and Targets (Goal: \$2.00-\$3.00/gge)**

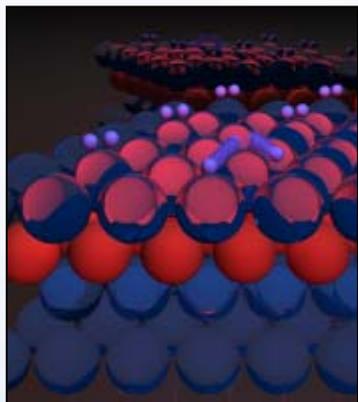
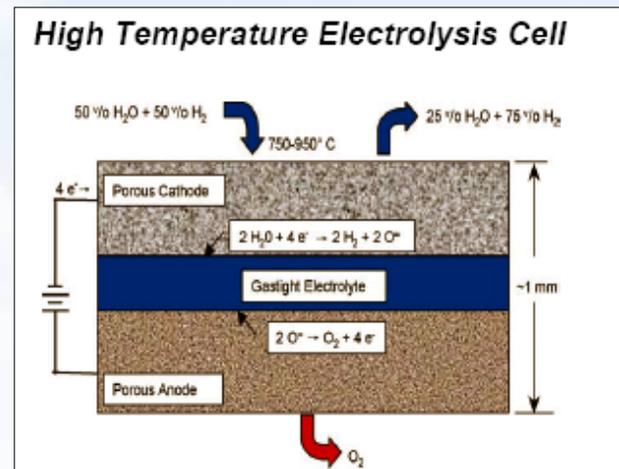


The Program has reduced the cost of hydrogen production



Progress

- The Office of Nuclear Energy completed bench-scale testing of its baseline hydrogen production technologies, and will begin operation of integrated laboratory-scale experiments of both thermochemical and high temperature electrolysis production methods in September 2007.



- Basic Energy Sciences: New alloys with novel architectures and compositions have been identified and await experimental validation. This is a rare instance in which theoretical catalysis precedes experiments.

- The Office of Fossil Energy has completed Initial bench-scale success in H₂ separation membranes achieving their 2008 flux goal early





Progress Technology Validation

DOE Vehicle/Infrastructure Demonstration

Four teams in 50/50 cost-shared projects:

- General Motors/Shell, Ford/BP, Hyundai/Chevron, DaimlerChrysler/BP
- Current Status/Data:

Fuel Cell Vehicles	77
Hydrogen Stations	10
Fuel Cell Efficiency	53 - 58%
Range	103 -190 miles
Durability	1200 hrs (~36,000 miles)

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

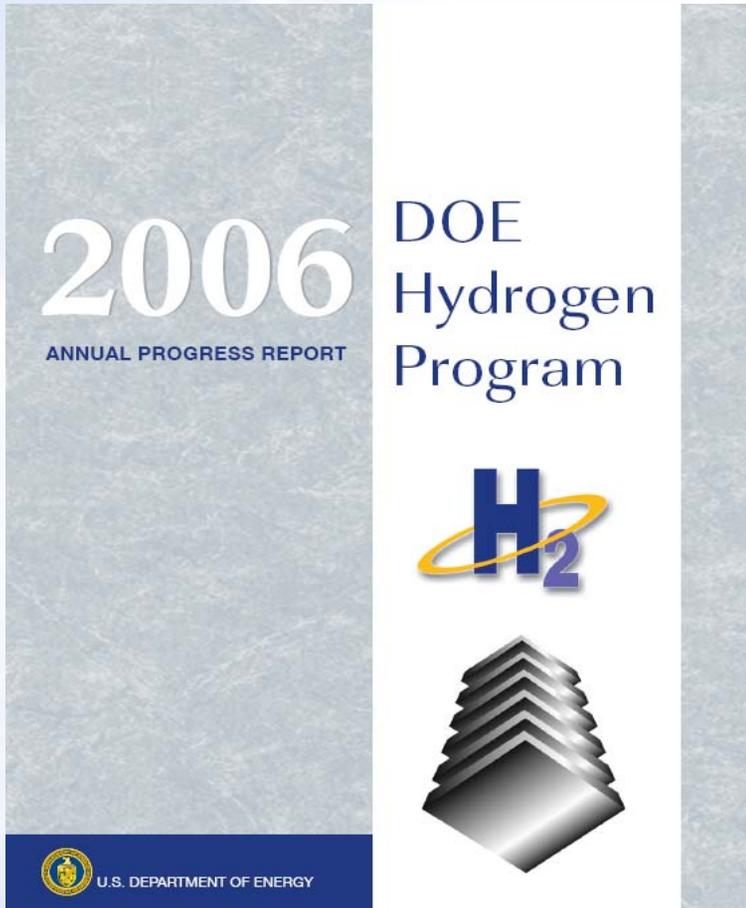
- Eight buses in California, Massachusetts, New York, South Carolina, and Washington, DC

Technologies are validated and progress evaluated through learning demonstrations.





For more information...



DOE Hydrogen Program Annual Progress Report

www.hydrogen.energy.gov