Hydrogen funding and programs

Most federal research on hydrogen fuel and fuel cell vehicles is overseen by two offices within the DOE Office of Energy Efficiency and Renewable Energy (EERE).

The **Office of FreedomCAR and Vehicle Technologies (FCVT)** coordinates research on automotive fuel cells and other advanced vehicle technologies, including electric propulsion systems, vehicle systems, materials technology, and other areas.

The **Office of Hydrogen, Fuel Cells and Infrastructure Technologies (HFCIT)** coordinates research on fuel cell technologies (for all applications, not solely transportation), as well as research on hydrogen fuel production, delivery and storage systems.

The FreedomCAR and the Hydrogen Fuel Initiatives have each set four goals for 2015, and share one additional goal between them. The shared goal is to produce hydrogen-fueled engine systems that achieve double to triple the efficiency of today's conventional engines at a cost competitive with conventional engines.

FreedomCAR's individual goals mainly focus on reducing system costs for various technologies. The FreedomCAR goals are to develop:

- Electric drive systems with a 15-year life and significantly reduced hardware costs;
- Advanced internal combustion engine systems with double to triple the efficiency of current systems at no more cost and no higher emissions than conventional engine systems;
- Electrical energy storage with improved life and lower cost than current systems; and
- Materials and manufacturing technologies that achieve a 50% weight reduction in vehicle structure, while maintaining affordability and increasing the use of recyclable/recycled materials.

The four goals for the Hydrogen Fuel Initiative focus on improvements in fuel cell technology and improvements in the storage and delivery of hydrogen fuel. The Initiative's goals are to develop:

- Hydrogen fuel cell power systems that are durable, and deliver higher efficiency at lower cost than today's systems;
- Transportation fuel cell systems that deliver greater efficiency and lower cost, and meet or exceed emissions standards;
- Hydrogen refueling systems that are highly efficient and deliver fuel at the market price of gasoline; and
- On-board hydrogen storage systems with improved energy density and cost over existing systems.

Fuel cell R&D areas include transportation systems, stationary systems, fuel processing, fuel cell components, and technology validation. Hydrogen fuel R&D areas include hydrogen production and delivery, fuel storage, hydrogen infrastructure, safety, codes and standards, and training and education.

As part of its FY2006 budget request for the Hydrogen Fuel Initiative, DOE added ongoing research funded through three additional DOE offices [the Office of Fossil Energy (FE), the Office of Nuclear Energy (NE), and the Office of Science (SC)], as well as a small amount of research at the Department of Transportation.

FreedomCAR- and Hydrogen Fuel-Related R&D Funding

($ millions)

DOE Office	Program	FY03	FY04	FY05	FY06	FY07 Request	House FY07	Senate FY07
EERE-FCVT	FreedomCAR	87.6	86.7	83.4	99	109.8	109.8	109.7
EERE-HFCIT	Fuel Cell Technologies	57.0	63.8	0[d]	0[d]	0[d]	0[d]	0[d]
EERE-HFCIT	Hydrogen Technology	40.0	80.4	166.8	155.6	195.8	195.8	189.9
Subtotal		184.6	230.9	250.2	254.6	305.6	305.6	299.6
NE	Nuclear Hydrogen Initiative	n.a.	6.2	8.9	24.8	18.7	18.7	31.7
FE	President's Coal Research Initiative – Fuels	n.a.	21.3	16.5	21.6	23.6	23.6	23.6
SC	Basic Energy Research	n.a.	7.7	29.2	32.5	50	50	50
	Department of Transportation	n.a.	n.a.	0.5	1.4	1.4	1.4	1.4
Total		184.6	266.1	305.3	334.9	399.3	399.3	406.3

d. For the FY2007 budget request, DOE combined funding for the Fuel Cell Technology program within the funding for Hydrogen Technology. The comparable appropriations levels for previous years were similarly combined.