

**FY 2004 Budget
Proposals
for Fuel Cells and Hydrogen**

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FreedomCAR and Freedom Fuel

- Goal:
 - “Enable automotive manufacturers and the energy industry to make a commercialization decision in 2015 regarding fuel cell vehicles and hydrogen infrastructure”
- 2004 Funding = \$273M

FreedomCAR + Freedom Fuel: “New Math”

- 2003:

- FreedomCAR Fuel Cell + Hydrogen (part) + Selected Vehicle Programs = \$150M

- 2004:

- FreedomCAR = Fuel Cell + Hydrogen (all) + Selected Vehicle Programs = \$273M
- Freedom Fuel = Fuel Cell + Hydrogen Programs = \$182M

Vehicle Related R&D

Program	FY 2003 Request	FY 2004 Request
Fuel Cells	\$49.9	\$77.5
Hydrogen (part/all)	\$25.0	\$104.2
Freedom Car Vehicle	\$74.5	\$91.1
Totals	\$150	\$272.8
21 st C. Truck	\$70.1	\$57.5
“Other”	\$8.9	\$9.0
Grand Totals	\$229	\$337.3

Freedom Fuel Program

- 2004 Initiative
- Fuel Cells + Hydrogen Research
- Prepare U.S. economy for transition to hydrogen
- R&D in production, delivery, storage and distribution
- “Accelerate” demonstrations
- \$1.2B/5 years; \$182M in FY 2004

Hydrogen: Major Programs

- Expand hydrogen production and delivery research (higher efficiency, lower cost)
 - Hydrogen from renewables
- Vehicle hydrogen storage
- Infrastructure technologies and validation
 - Power Parks to co-produce H₂
- Education
- Codes, standards, recommended practices

Hydrogen Programs

Sub-Program	FY 2003	FY 2004
Production/Delivery	\$11.8	\$23.0
Storage	\$11.3	\$30.0
Infrastructure	\$10.0	\$13.2
Safety/Codes	\$4.8	\$16.0
Education	\$3.0	\$5.8
Nuclear H2 Initiative	\$0.0	\$4.0
Coal/Gas Extraction	\$3.0	\$11.5
Totals	\$43.9	\$104.2*

*Includes a small amount from other agencies.

Hydrogen Funding in DOE Fossil Energy Office

Sub-Program	FY 2003	FY 2004
Coal-to-Hydrogen	\$ 0.0	\$ 5.0
Gas-to-Hydrogen	\$ 0.0	\$ 6.5
Totals	\$ 0.0	\$11.5

Fuel Cell Vehicles: Major Programs

- Cost reduction
 - Stack + System components
- Distributed Systems
 - PEM for power generation
- Fuel Processor R&D
 - On-board = Off-board
- Outreach and Education

Fuel Cell Vehicles

Sub-Program	FY 2003	FY 2004
Transport. Systems	\$ 7.6	\$ 7.6
Distributed Energy	\$ 7.5	\$ 7.5
Stack Components	\$14.9	\$28.0
Fuel Processor	\$25.3	\$19.0
Tech. Validation	\$ 1.8	\$15.0
Other	\$ 0.4	\$ 0.4
Totals	\$57.7	\$77.5

FreedomCAR and Other Vehicle Programs

- 10-year research program
- Launched in 2003 by changing name of PNGV dropping hardware delivery goal and adding technology milestones
- Many programs continue to focus on conventional systems
- \$273M in FY 2004 + additional \$57.5M for 21st Century Trucks and \$9M “other”

Vehicle Programs

Sub-Program	FY 2003	FY 2004
Vehicle Systems	\$14.4	\$14.5
Innovative Concepts	\$ 1.6	\$ 0.5
Hybrid/Elec. Propulsion	\$42.0	\$49.6
Adv. Combustion Engine	\$40.2	\$37.1
Materials	\$29.4	\$39.6
Fuels Technology	\$18.0	\$ 6.8
Tech. Introduction	\$ 5.9	\$ 5.9
Mgt./Peer Review	\$ 2.1	\$ 3.6
Totals	\$153.4	\$157.6

F.C. Power Generation

- Increased focus on Advanced research (primarily small SOFC Systems)

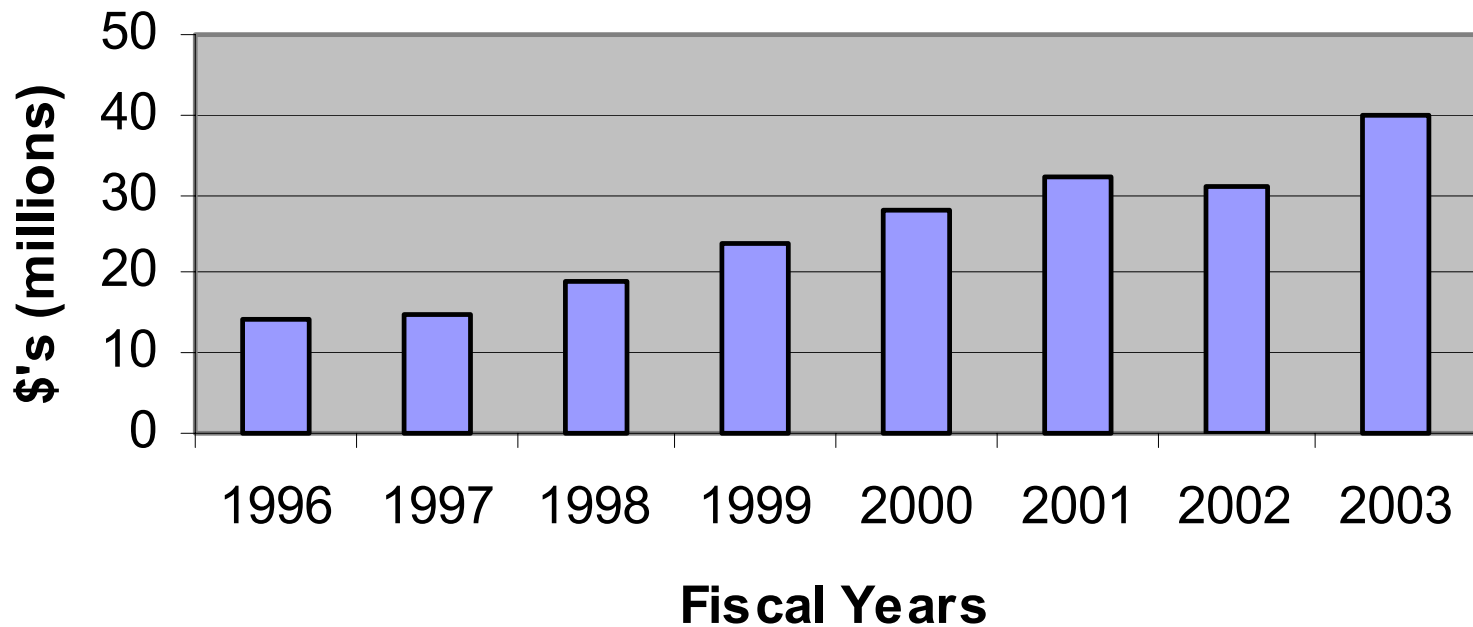
Sub Program	FY '04	Change from '03 Request
Advanced Research		+ \$ 7.0
Systems		- \$ 4.0
Vision 21 Hybrids		- \$ 6.5
Innovative Concepts		+ \$ 1.0
Total	\$47.0	- \$ 2.5

Proposed Cuts (DOE)

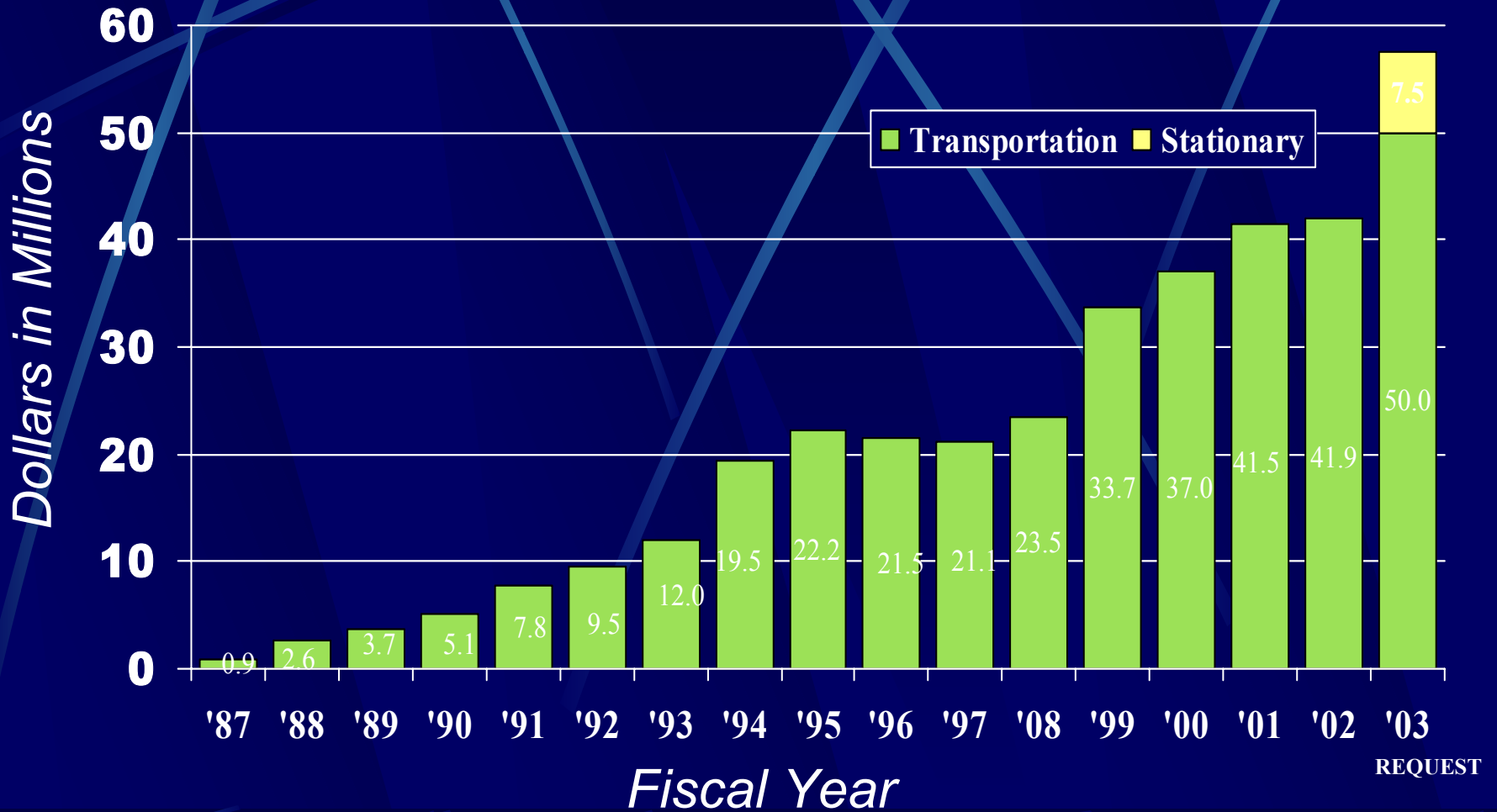
- Biomass (-\$31.4, 28.5%)
- Zero Energy Buildings (-\$4)
- Wind (-\$2.4)
- Industrial technologies -29.6%
(\$64.4M)
- Industry of the Future -61% (\$24M)
- State Energy Programs -14%
- Efficiency overall - - 3.9%

DOE Hydrogen Funding History

DOE's Funding of Hydrogen



Fuel Cells for Transportation Program Funding History



DOE's Investment in Fuel Cells

