Making Sense of President Bush's New Advanced Energy Initiative

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Outline

- Introduction
- The announcement
- The actual budget numbers in charts
- Assessing the budget
- Conclusion

State of the Union 2006

Keeping America competitive requires affordable energy. And here we have a serious problem: America is addicted to oil, which is often imported from unstable parts of the world.

The best way to break this addiction is through technology. Since 2001, we have spent nearly $10 billion to develop cleaner, cheaper and more reliable alternative energy sources. And we are on the threshold of incredible advances.

So tonight I announce the Advanced Energy Initiative -- a 22 percent increase in clean-energy research at the Department of Energy to push for breakthroughs in two vital areas. To change how we power our homes and offices, we will invest more in zero-emission coal-fired plants; revolutionary solar and wind technologies; and clean, safe nuclear energy.

We must also change how we power our automobiles. We will increase our research in better batteries for hybrid and electric cars and in pollution-free cars that run on hydrogen. We will also fund additional research in cutting-edge methods of producing ethanol, not just from corn but from wood chips and stalks or switch grass. Our goal is to make this new kind of ethanol practical and competitive within six years.

Breakthroughs on this and other new technologies will help us reach another great goal: to replace more than 75 percent of our oil imports from the Middle East by 2025.

Notes About the Data

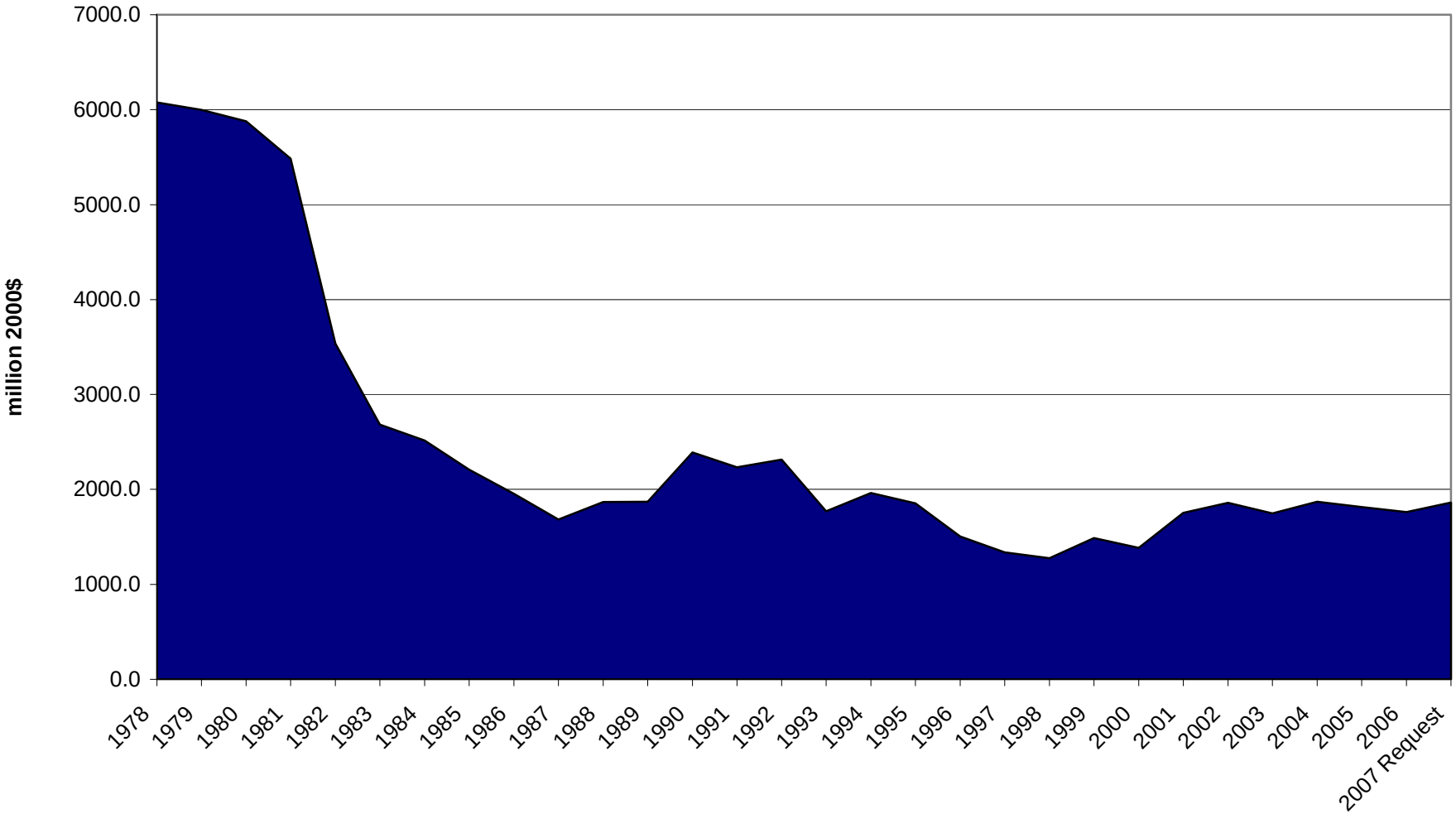
- What is measured: U.S. DOE energy RD&D
- What is not measured: deployment (fuzzy boundaries), non-energy fission and fusion nuclear, ERD&D in other government agencies
- All subsequent charts are in constant 2000 dollars
- Problems with program direction estimates
- Data source is fiscal year Statistical Table of Appropriations, two years after the fiscal year, where possible

The measurement of ETI

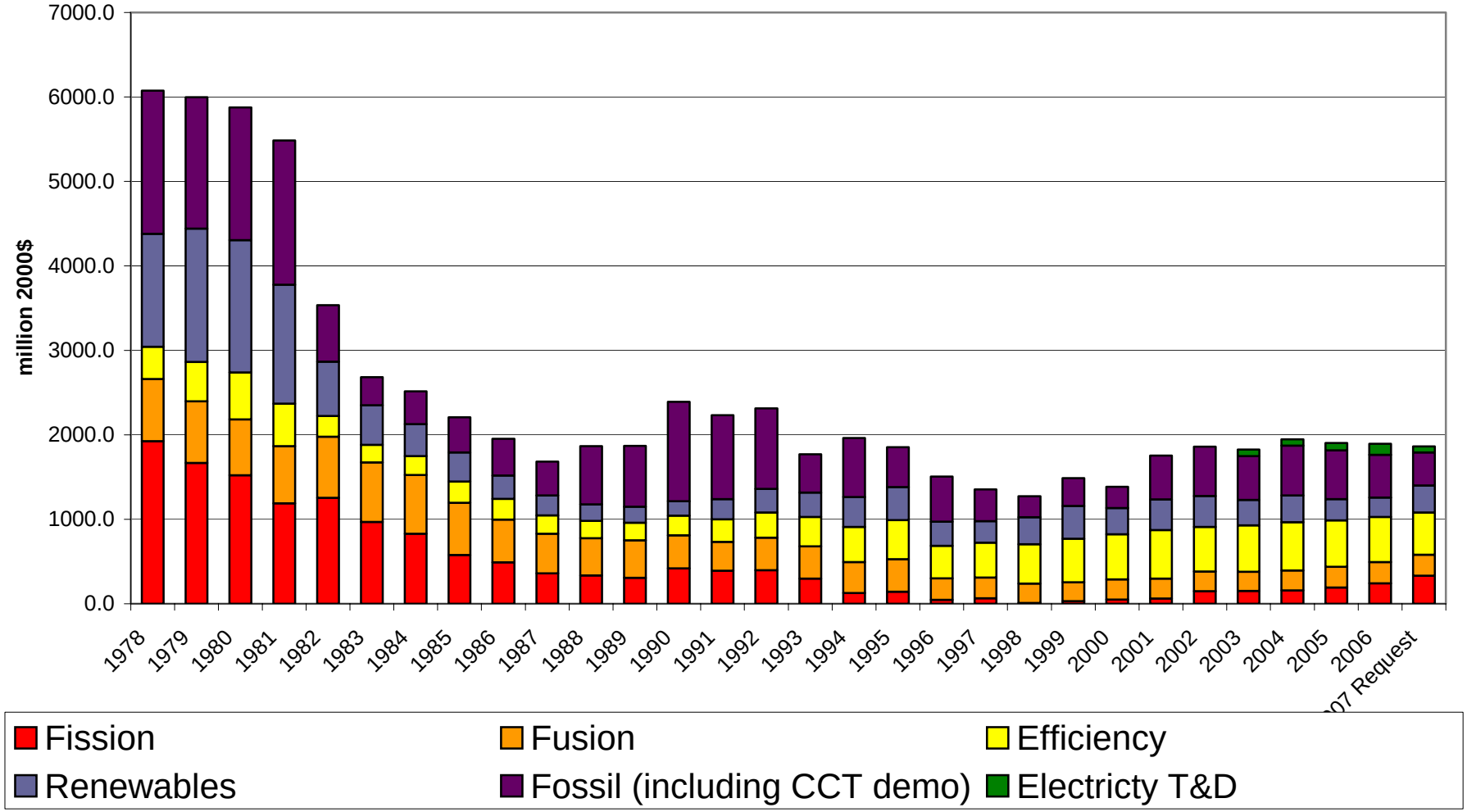
- What is an energy technology?
- Government investments in ETI are a commonly used metric
- Relatively poor understanding of U.S. private sector spending
- Other input metrics
- Output metrics
- Outcome metrics

Total DOE Energy RD&D Investments

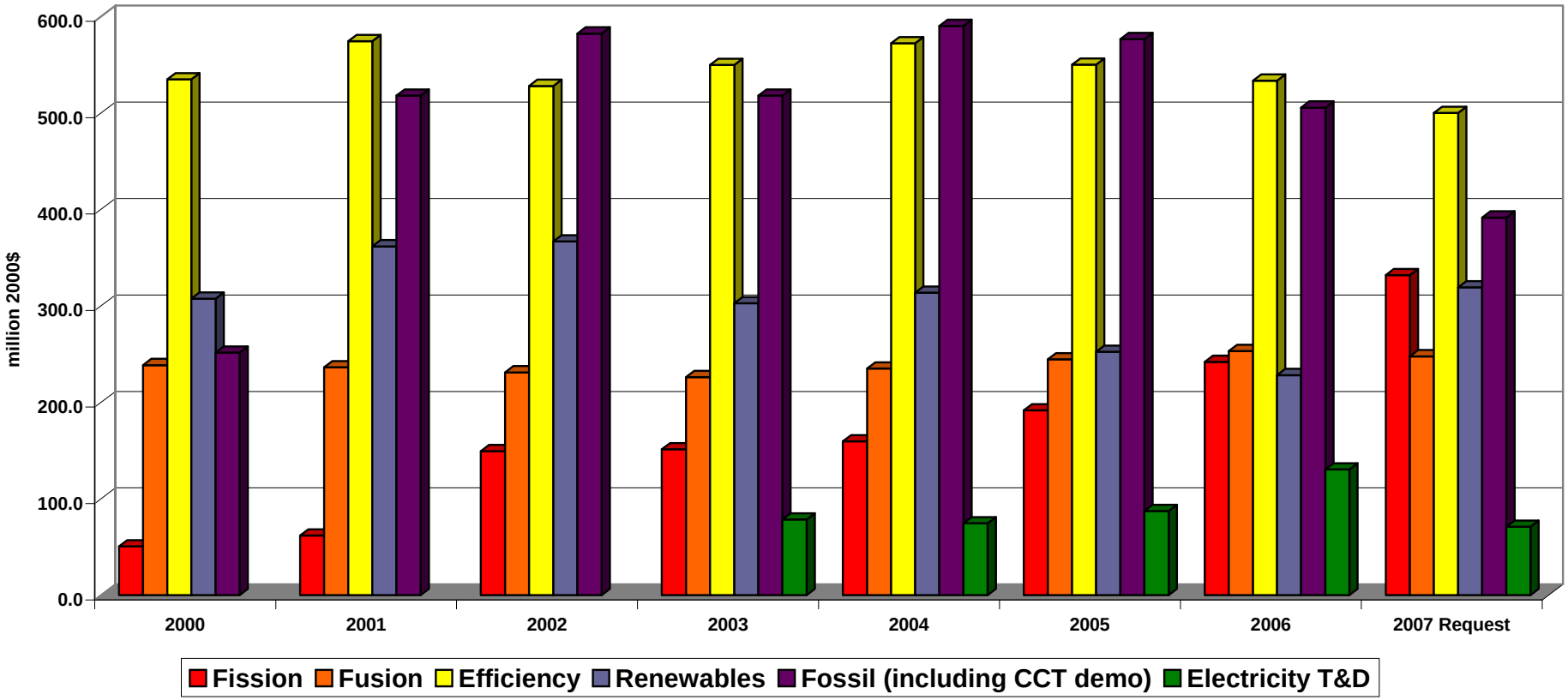
FY1978-FY07 Administration Request



U.S. DOE Energy RD&D Spending
FY1978-FY2007 Admin. Request

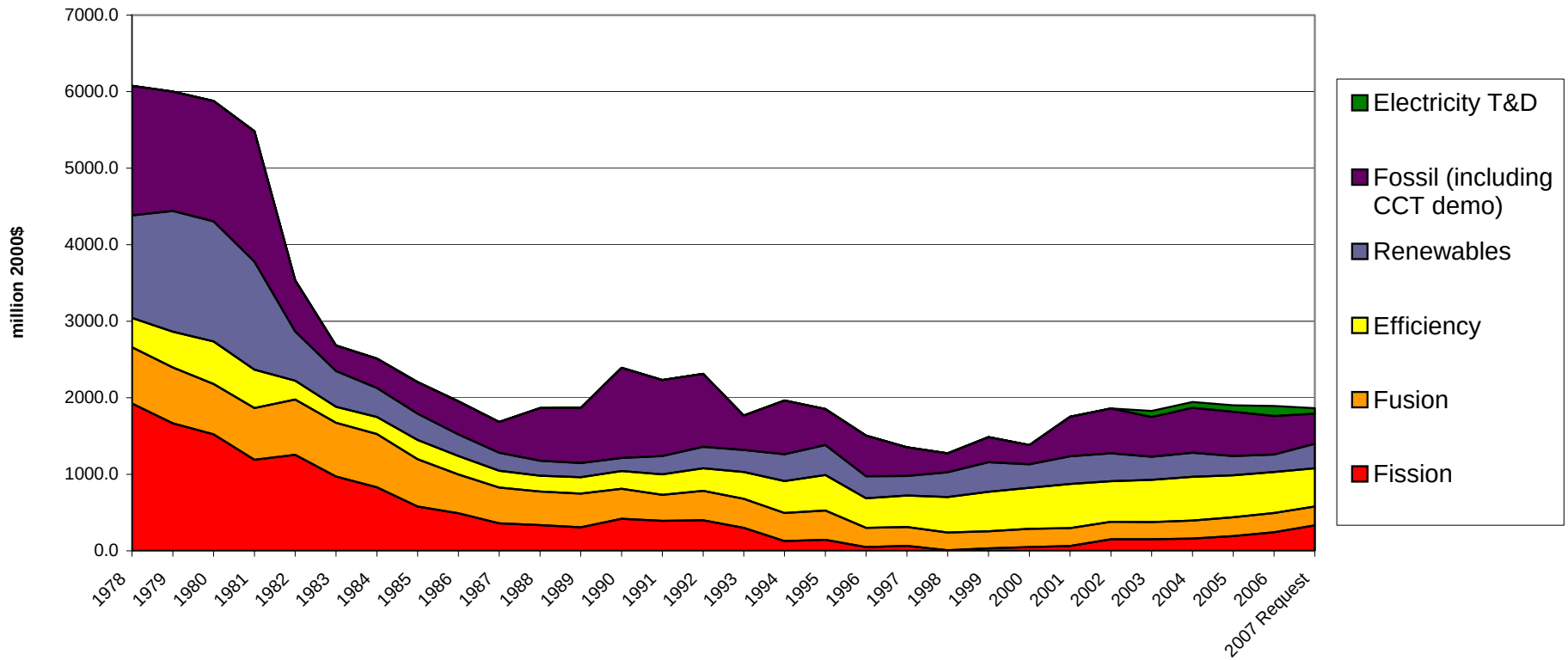


U.S. DOE Energy RD&D FY2000-FY2007 Request

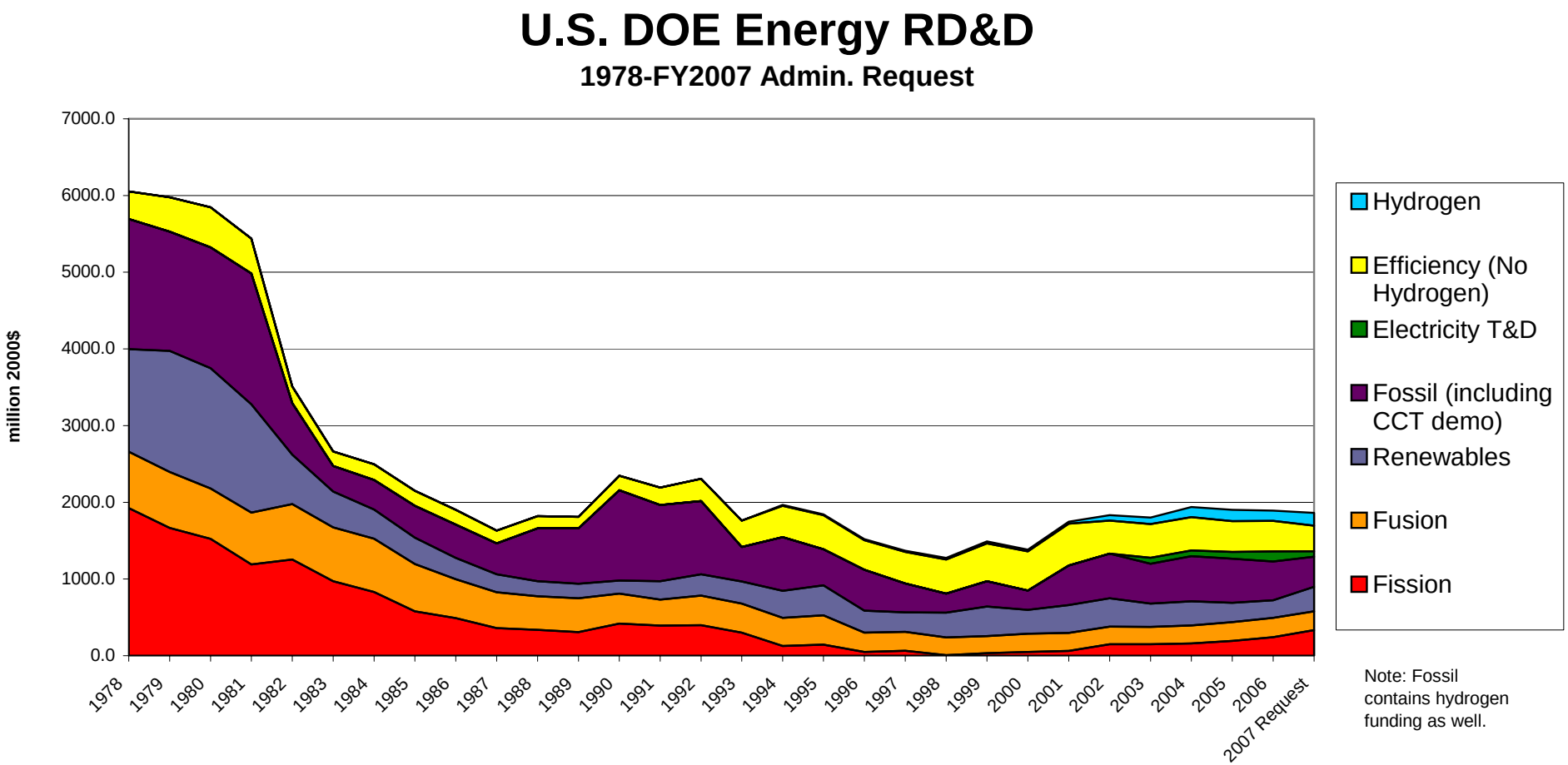


U.S. DOE Energy RD&D

1978-FY2007 Admin. Request

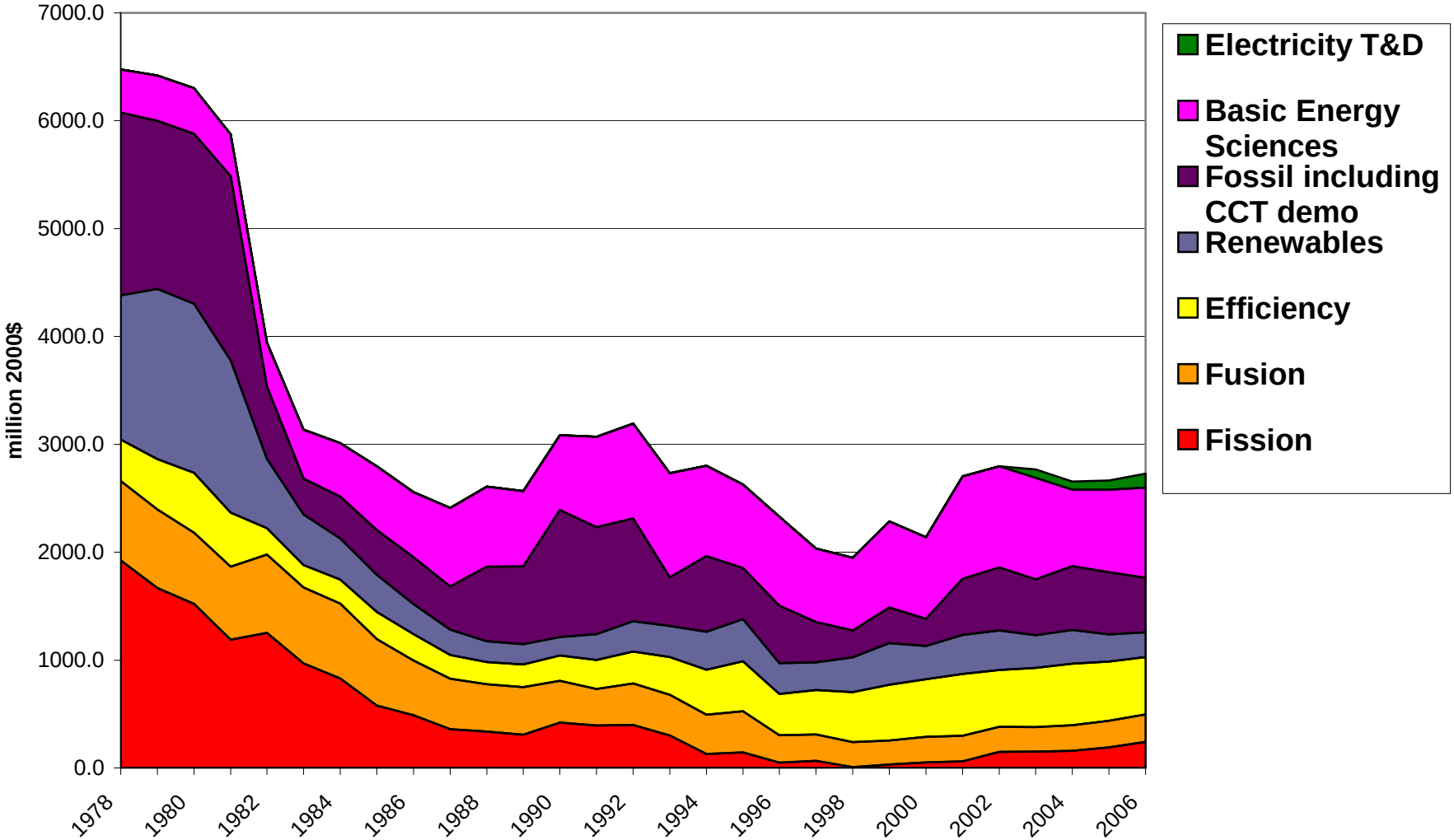


Separating out Hydrogen Reduces Efficiency

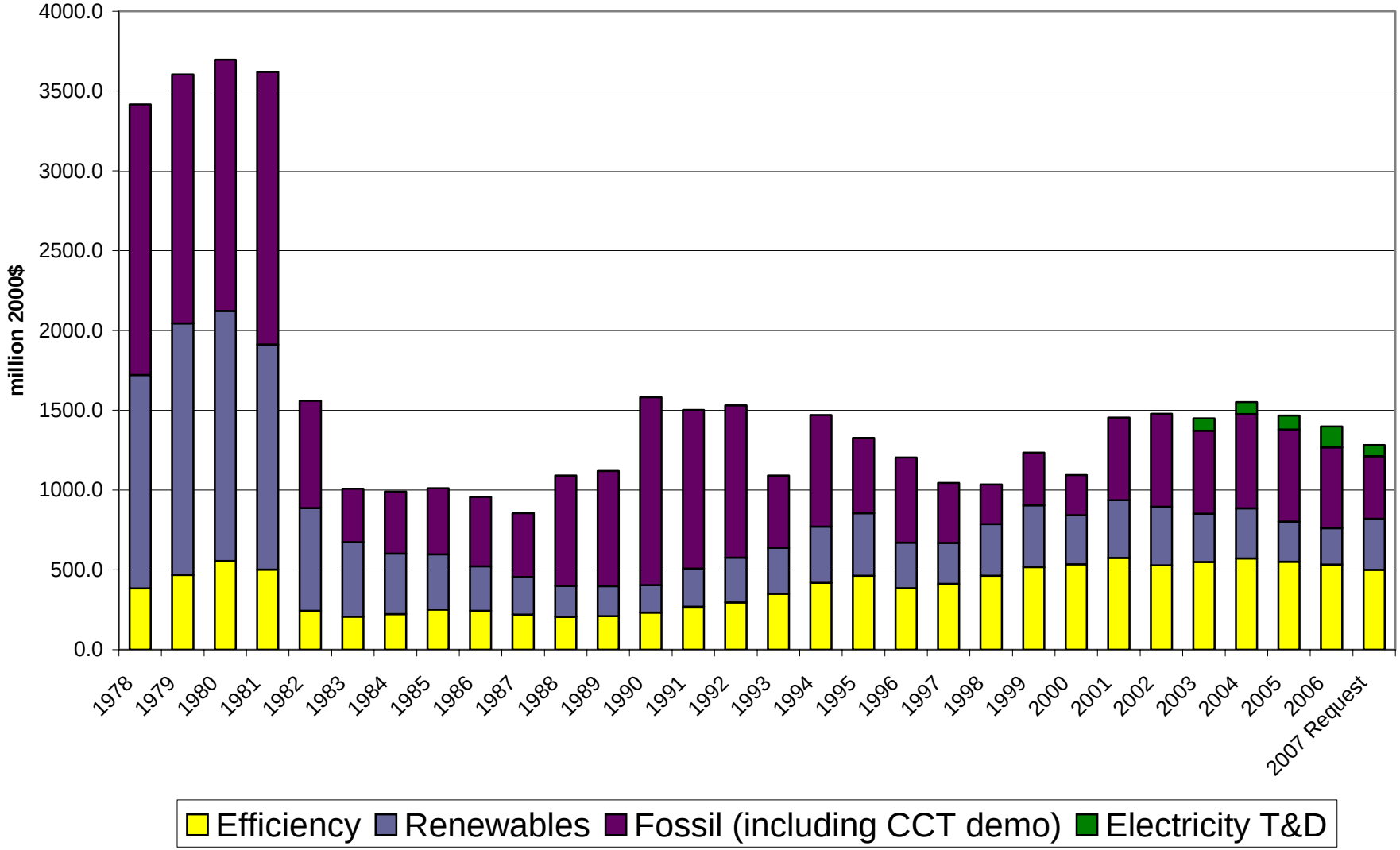


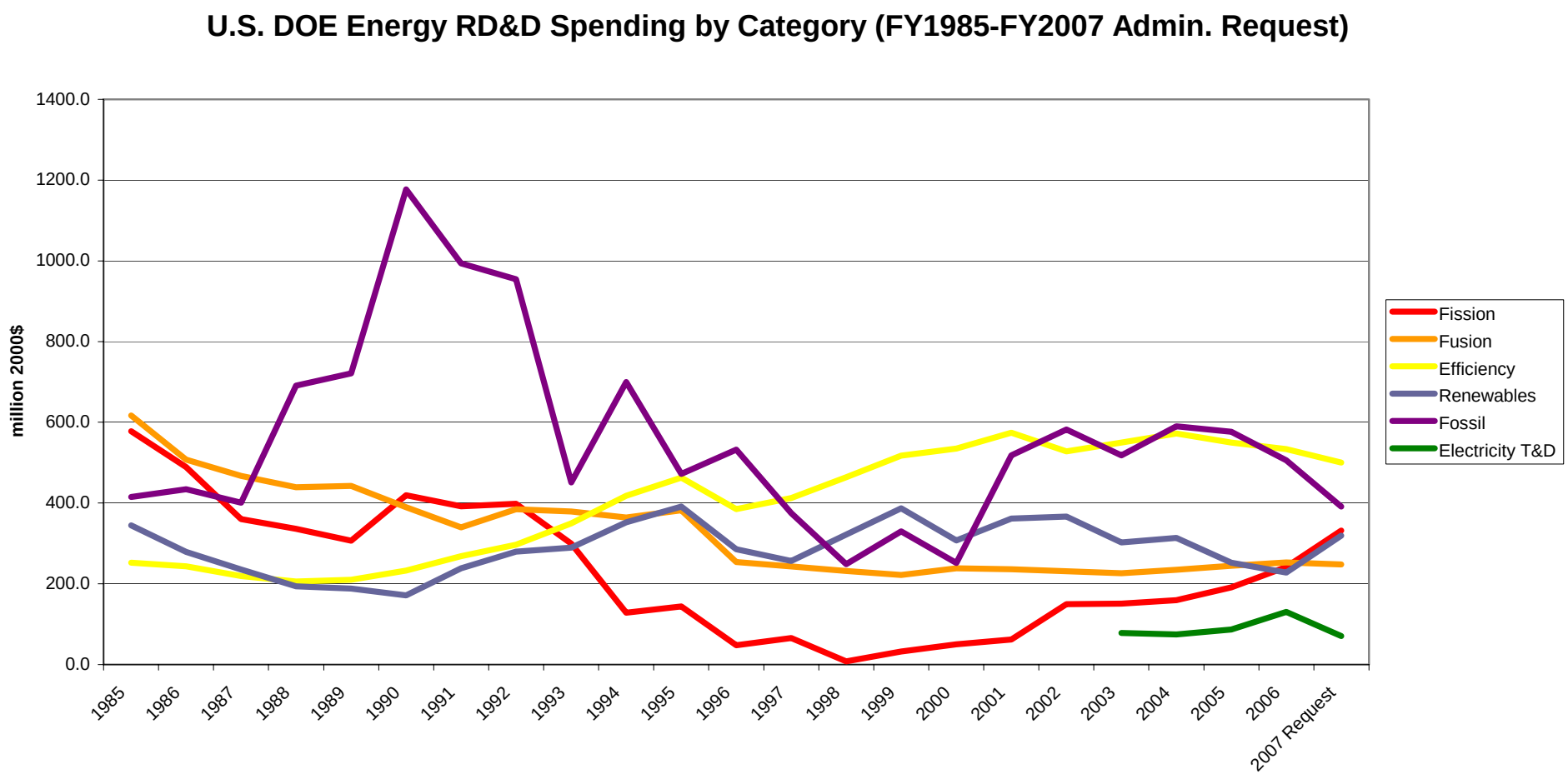
Note: Fossil contains hydrogen funding as well.

U.S. DOE Energy RD&D
FY1978-FY2006

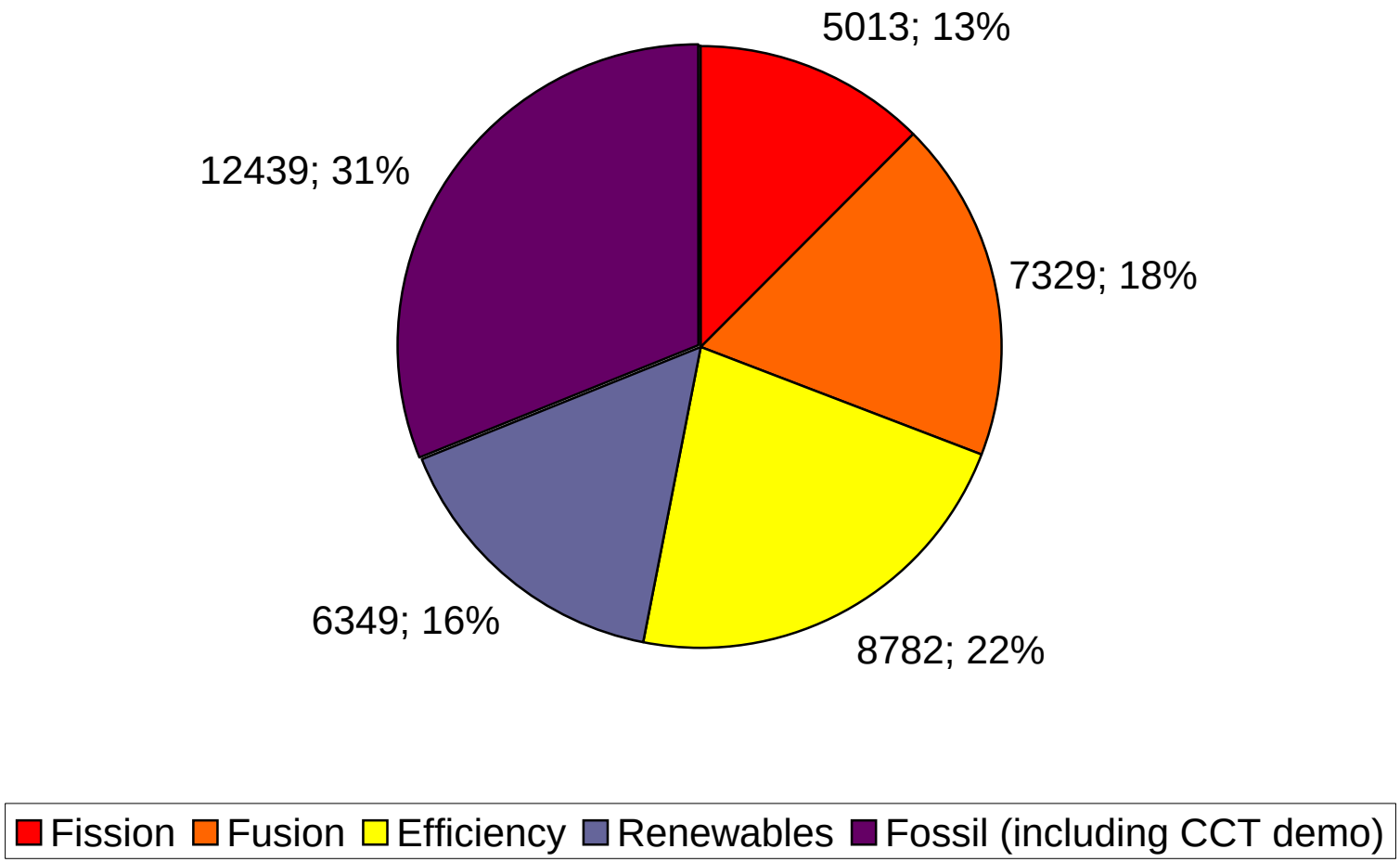


U.S. Non-Nuclear DOE Energy RD&D Spending

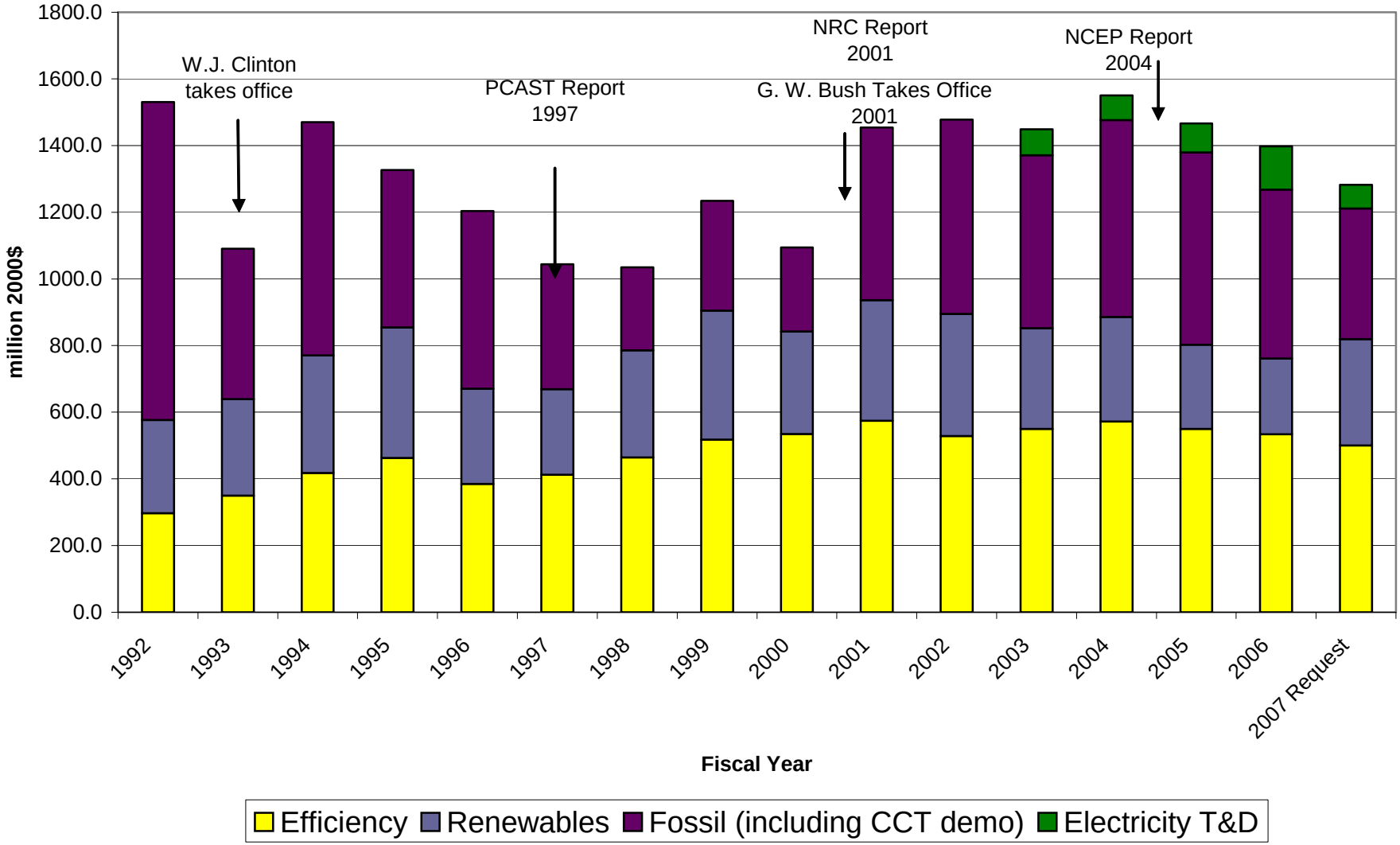



U.S. DOE Energy RD&D Spending by Category (FY1985-FY2007 Admin. Request)
million 2000$
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007 Request
Fission
Fusion
Efficiency
Renewables
Fossil
Electricity T&D

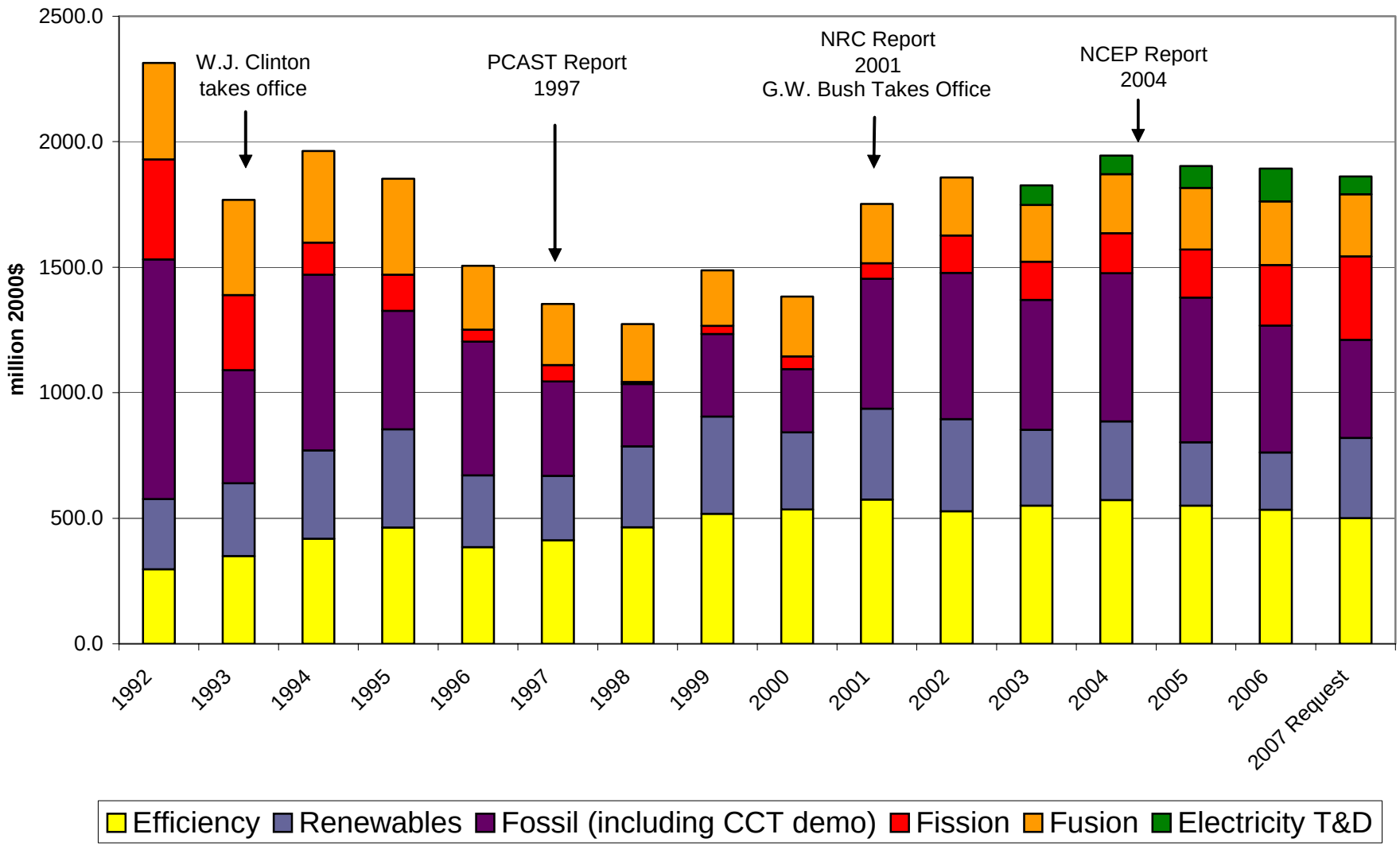
Cumulative Spending on U.S. DOE Energy RD&D (FY1985-FY2006) (million 2000$)



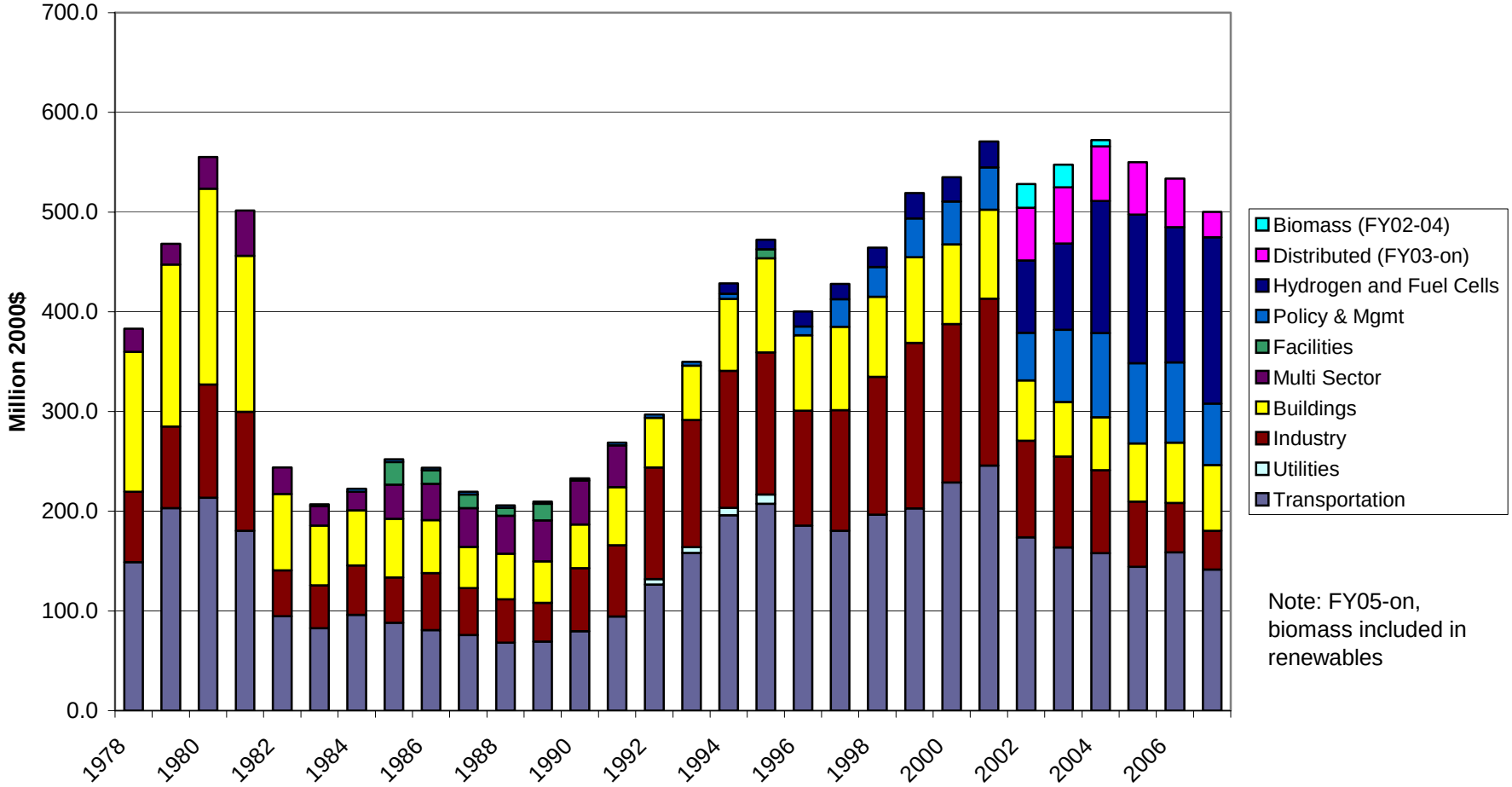
U.S. Non-Nuclear DOE Energy RD&D With Events



U.S. DOE Energy RD&D With Events

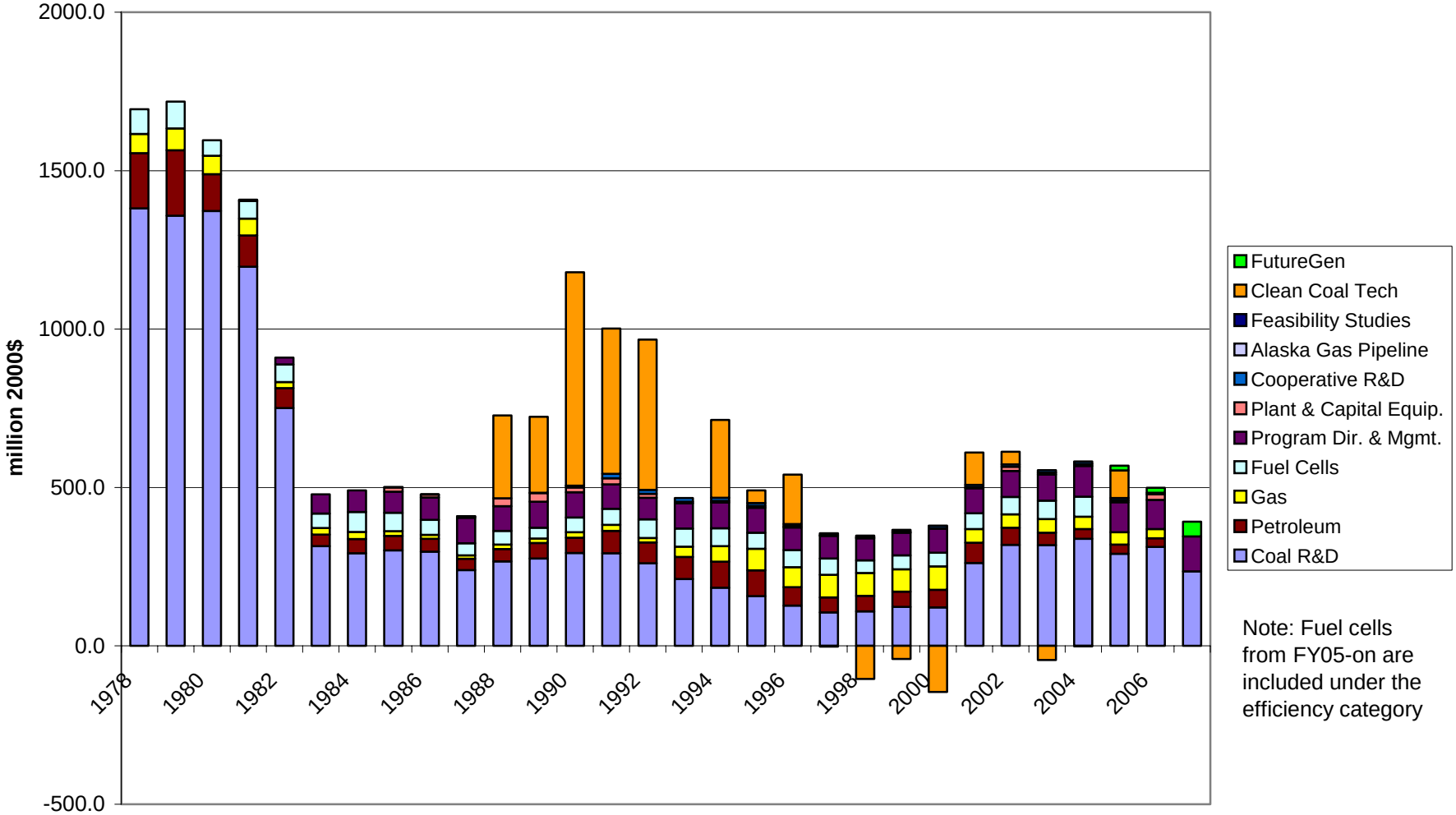


Composition of DOE Efficiency ERD&D (FY1978-FY2007 Admin. Request)



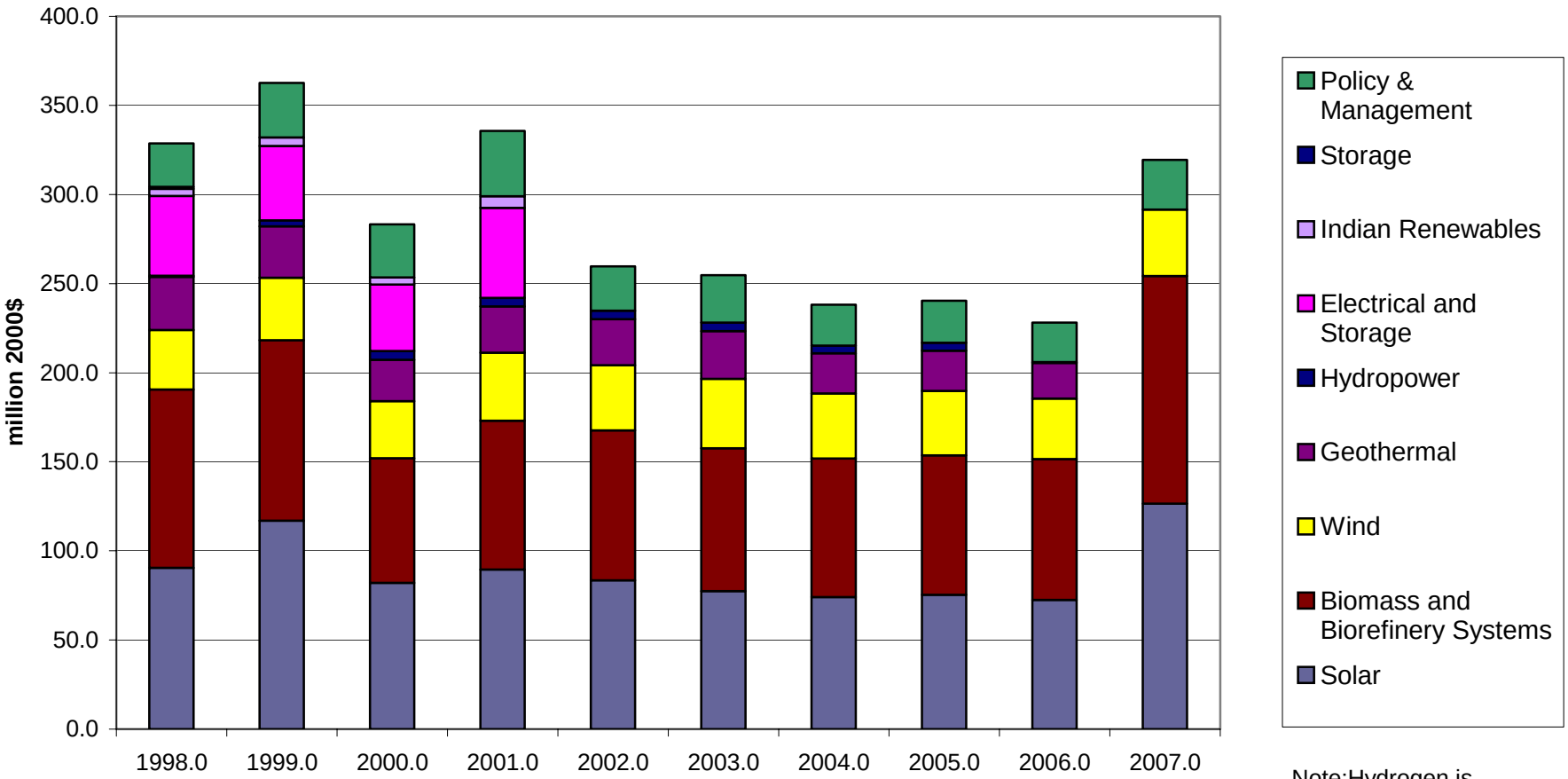
Note: FY05-on, biomass included in renewables

Composition of DOE Fossil Energy RD&D Spending (FY1978-FY2007 Admin. Request)



Note: Fuel cells from FY05-on are included under the efficiency category

Composition of Renewable Energy DOE ERD&D Spending (FY1998-FY2007 Admin. Request)



Note:Hydrogen is included in the Efficiency category

Overall. . .

- $99 million increase in total ERD&D in constant 2000 dollars (5.6% increase)
- President Bush claimed he was increasing funding by 22 percent for “clean-energy research at the Department of Energy” for “zero-emission coal-fired plants; revolutionary solar and wind technologies; and clean, safe nuclear energy” but. . .

Where Does the 22% Increase Come From?

	2006	2007 Request
Coal R&D	312.3	235.4
FutureGen	15.5	46.0
Coal Combined (R&D and FutureGen)	327.8	281.5
Solar	72.4	126.5
Wind	33.9	37.3
Fission	241.9	331.7
Total (using Coal Combined)	676.1	777.1
Percent Increase using Coal Combined		**14.9%**
Percent Increase using FutureGen only		48.9%

*Constant 2000$

Change from FY06 to FY07: Administration Request in Broad Categories (million 2000$)

Category	FY06	FY07 Request	% change
Renewable energy	228.2	319.4	+40%
Fission	241.9	331.7	+37%
Efficiency	533.6	500.2	-6%
Fusion	253.2	247.7	-2%
Non-hydrogen efficiency	398.0	333.2	-16%
Fossil	505.6	391.7	-23%
Electricity T&D	130.4	70.9	-46%

Change from FY06 to FY07: Administration Request for Specific Line-Items (million 2000$)

Category	**FY06**	**FY07 Request**	**% change**
Solar	72.4	126.5	+75%
Biomass and biorefinery systems	79.0	127.7	+62%
Hydrogen and fuel cells	135.6	167.0	+23%
Wind	33.9	37.3	+10%
Coal R&D and FutureGen (including sequestration)	327.8	281.4	-5%
Vehicle efficiency	158.7	141.6	-11%
Industrial efficiency	49.6	38.9	-22%

Will the Initiative Help End America's "Addiction to Oil?"

- The FY07 budget actually cuts vehicle efficiency funding overall. This category encompasses the FreedomCar and Fuel partnership and the 21st Century Truck partnership. In FY07, the Administration is increasing research by an unspecified amount for plug-in hybrids, however.
- The increase in funding for coal, solar, wind, and nuclear is unlikely to affect U.S. oil consumption any time soon because oil is not used in the U.S. electricity sector.

Other Important Notes

- Geothermal, hydropower, petroleum, and natural gas RD&D are all cancelled in the FY07 request
- Weatherization funding (deployment) is cut by $91 million current dollars. Weatherization activities help the poor install energy-efficient technologies

Relation to Energy Policy Act of 2005

DOE RD&D programs	**FY 2006 Level**	**EPACT Level for FY 2007**	**President's Request for FY 2007**
Renewable Energy	238.6	632	341.9
Hydrogen	155.7	560	195.8
Energy Efficiency	308.9	783	288.9
Nuclear Energy	496.4	590	568.1
Electricity T&D	161.9	240	124.9
Fossil Energy	454	911	330.1
Weatherization Program	242.6	600	164.2
(million current dollars)			

Conclusions: Specifics

- Carbon sequestration funding at $73 million is ridiculously low.
- Do we want to completely zero out petroleum and natural gas funding? Cancel geothermal?
- Although the percentage increases in solar, wind, and biomass investments seem impressive, their total budgets are relatively small.

Conclusions: Broader

- Overall amount of U.S. government investments in ERD&D seems rather small in relation to the looming energy-related challenges
- These government investments have had big payoffs in the past
- Congressional earmarking is a big problem
- Need for better understanding of ETI in general and deployment programs in particular

Acknowledgements

- Data from 1978-1996 from spreadsheet by Paul de Sa and John Holdren dated May 2, 1997
- Updated by Kelly Gallagher, Ambuj Sagar, and Diane Segal, July 2004
- Updated by Kelly Gallagher in February 2005 and February 2006
- Comments from Ambuj Sagar on the database
- Funding from U.S. Energy Foundation

Database is available at

http://bcsia.ksg.harvard.edu/energy