

House Boosts DOE Office of Science Funding

AAAS R&D Funding Update on R&D in House FY 2006 DOE Appropriations

Highlights

- The House would appropriate \$8.6 billion for **R&D in the Department of Energy (DOE) next year, a 0.4 percent cut from FY 2005 in contrast to a requested cut of nearly 2.6 percent** (see Table).

- **The House would add funds to the request for DOE's Office of Science (OS). Science R&D would gain 1.5 percent to \$3.4 billion**, a dramatic improvement over a requested cut of 4.5 percent. The House would add funds to all Science accounts to allow fusion, computing, and energy sciences programs to receive substantial increases in FY 2006. In fusion, the House would shift funds away from the international ITER project in order to boost domestic fusion programs.

- **Energy-related R&D would also be a winner** with a 5.6 percent gain to \$1.2 billion in the House plan because of increases for Administration priorities in hydrogen, nuclear energy, fuel cells, and coal R&D.

- **DOE's defense R&D investments would fall 3.7 percent to \$4.0 billion**, including steep cuts to advanced scientific computing. The House would once again eliminate the controversial Robust Nuclear Earth Penetrator program in 2006, in contrast to a DOE request for \$4 million, but would add funds for the Reliable Replacement Warhead program.

DOE R&D in FY 2006 House Appropriations

On May 24, the House of Representatives continued work on FY 2006 appropriations by debating and approving its version of the FY 2006 Energy and Water appropriations bill. For the first time, the bill funds all of the Department of Energy (DOE), while in previous years some DOE programs had been funded in the Interior bill. **The House Energy and Water bill would provide \$8.6 billion for DOE R&D in FY 2006**, a slight cut of \$38 million or 0.4 percent below FY 2005 but an improvement over a cut of 2.6 percent contained in the President's request (see Table).

The FY 2006 House plan would provide \$24.3 billion for DOE's total budget, a cut of \$101 million or 0.4 percent from this year's funding level. More than two-thirds of DOE's budget goes to defense programs to maintain the nuclear weapons stockpile and to clean up past weapons sites. Most DOE program areas would see cuts in this era of tight budgets, and DOE's R&D programs would be no exception. DOE's R&D, split roughly in half between defense and nondefense missions, would total \$8.6 billion, also 0.4 percent below this year's budget (see Table). (For details of the President's request for DOE R&D, please see Chapter 9 of *AAAS Report XXX: R&D FY 2006* or the March 1 DOE R&D Funding Update).

R&D in the DOE Office of Science (OS)

The House showed its support for DOE's Office of Science (OS) by adding \$201 million to the request to bring OS R&D to \$3.4 billion, an increase of 1.5 percent. While this increase would just barely keep pace with inflation, it would be a big improvement over a requested cut of 4.5 percent (see Table and Figure 1). The language accompanying the bill makes no attempt to hide the House's disappointment at DOE's requested cuts to these programs, and states clearly that the additional OS funds should address the priorities of high performance computing, additional operating time at OS user facilities, and domestic fusion research.

In high performance computing, the House would reverse proposed cuts to the **Advanced Scientific Computing Research (ASCR) program** and instead provide a boost of 5.8 percent to \$246 million, while expressing disappointment at DOE's perennial proposals to cut ASCR funding after congressional funding boosts. The extra House funds would go especially to shore up investments in computing hardware and competitive university research grants.

The House would strongly support domestic fusion research. Total Fusion funding would jump 8.1 percent to \$296 million, but the House would dramatically rearrange fusion priorities. In its budget request, DOE proposed \$56 million for the International Thermonuclear Experimental Reactor (ITER) project, up from just \$5 million this year. The \$5 billion international project has been delayed because the international partners have been unable to agree on a site in either Japan or France; more than a year after a deadline to pick a site has come and gone, the six partners are still deadlocked, but the budget request assumed that the project will proceed in time to require an increased U.S. contribution. But the House would shift \$30 million of the proposed ITER funds and the \$5 million House boost over the total Fusion request to shore up domestic fusion programs, which would have suffered dramatic cuts in the DOE request. The House plan would allow domestic fusion programs to operate at close to this year's levels. As an extra measure, during floor debate the full House approved an amendment to the bill that would prohibit DOE from entering into any agreement on further U.S. contributions to ITER until at least March 1, 2006, which should further help domestic fusion programs.

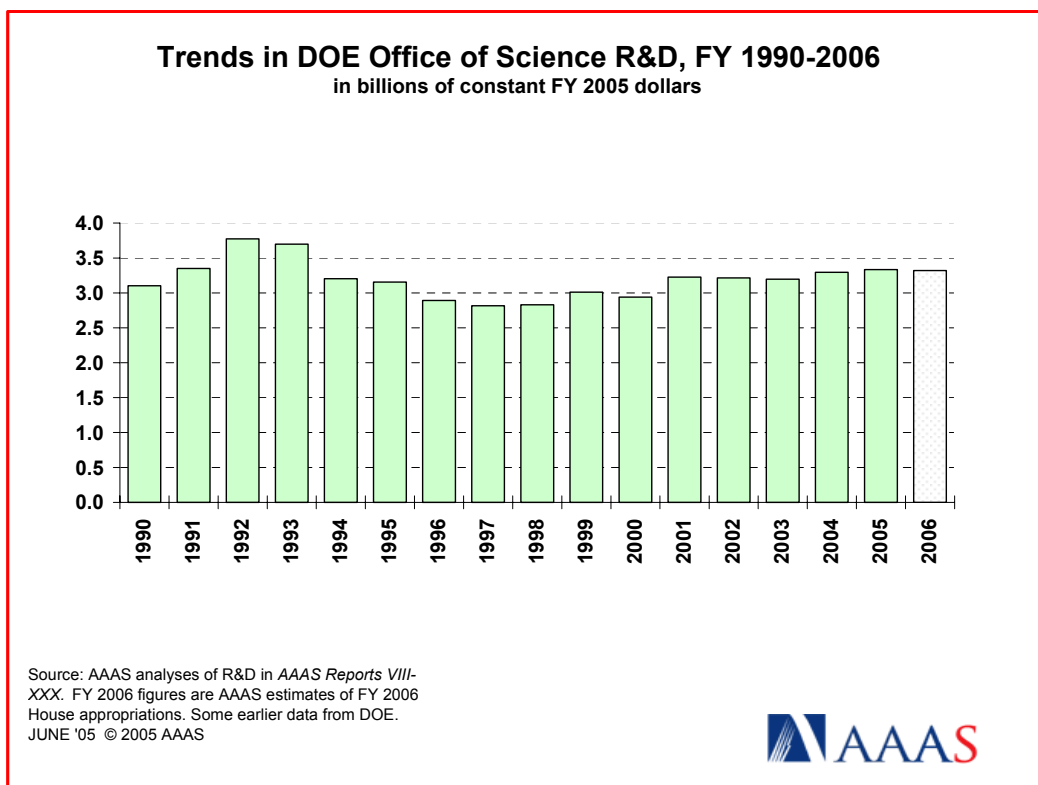


Figure 1. (click on the image for PDF)

The House appropriation should also allow OS programs to stabilize operating times at its user facilities, and the bill specifically instructs DOE to give high priority to maintaining user access to facilities. The Office of Science operates unique, large-scale research facilities at DOE's national laboratories around the country, which external researchers can use for their own experiments through a competitive proposal process. In recent years, tight budgets (see Figure 1) have squeezed operating time at these facilities, and the FY 2006 request would squeeze even tighter, with operating times reduced by as much as 61 percent at some OS facilities. In Basic Energy Sciences (BES), for example, which would rise

6.2 percent to \$1.2 billion in the House plan, two-thirds of the \$27 million boost over the request would go to sustaining BES user facilities. Elsewhere in BES, funding for the Spallation Neutron Source (SNS) in Tennessee would surge \$36 million to \$149 million as the facility transitions from construction to operations.

While most of the major OS accounts would see increases in FY 2006 thanks to the House appropriation, High Energy Physics (HEP) and Biological and Environmental Research (BER) funding would decline (see Table). The House would add \$22 million to the HEP request to bring funding to \$736 million, just slightly below this year's funding level but sufficient to moderate the proposed cuts in HEP user facilities. BER funding would total \$526 million in FY 2006, \$70 million more than the request but still \$56 million below this year's funding level. \$35 million of the add-on would go to fund 53 congressionally earmarked projects, while the other \$35 million would boost funding for medically related biological research.

After more than a decade of steep cuts and stagnant budgets, the DOE Office of Science has less money now for its R&D programs than it did in the early 1990s (see Figure 1). In today's dollars, the Science program has been stuck at roughly \$3.2 billion since FY 2001, and the House appropriation would enable Science to just stay ahead of expected inflation.

DOE Energy and Defense R&D Programs

The House would agree to boost funding for energy R&D programs overall and to shuffle dollars among energy areas to boost Administration priorities in coal, hydrogen, and nuclear energy. The overall DOE energy R&D portfolio would climb 5.6 percent to \$1.2 billion (see Table).

The top DOE priority in the energy request is \$257 million in R&D for a newly organized **Hydrogen Fuel Initiative**, up from \$224 million this year. The nascent multi-agency initiative builds on existing DOE programs, but also enlists the Department of Transportation (DOT) for \$2 million to make it a \$260 million initiative, up 16 percent from 2005. The initiative would tie together DOE efforts in hydrogen production, fuel cells, nuclear hydrogen, hydrogen from coal, and basic science to develop practical technologies for hydrogen-powered cars of the future. Funding would come from the Energy Conservation, Fossil Energy, Nuclear Energy, and Energy Efficiency and Renewable Energy programs, and the Office of Science. The House appropriations for these accounts would allow DOE to fully fund the initiative request.

Fossil Energy R&D funding would fall 9.2 percent to \$407 million after a similar cut in 2005. But within the total, coal-related R&D would gain substantially at the expense of other fossil fuels. Having been rebuffed by Congress in last year's proposals to boost funding for the FutureGen program to \$237 million, the FY 2006 request would keep funding for this initiative to build a near-emission-free, coal-fired electricity and hydrogen production plant at \$18 million; this year, the House would along with this reduced request. But the House would reverse proposed DOE eliminations of funding for oil and gas R&D and keep funding closer to this year's levels. Energy conservation R&D would also decline, by 5.8 percent down to \$346 million after a similar cut in 2005. Fuel cells R&D and biomass R&D in this account would increase dramatically, but the House would go along with DOE proposals to make steep cuts to R&D on conservation in buildings and industry.

In Energy Supply, Administration and House priorities for hydrogen and nuclear energy would reshape the portfolio. Nuclear energy R&D would increase 9.1 percent to \$93 million. Renewable Energy R&D funding would fall 3.3 percent to \$239 million, with increases for hydrogen R&D offset by cuts in solar, geothermal, hydropower, and biomass R&D.

On the defense side, most of DOE's R&D is funded by the **National Nuclear Security Administration (NNSA)**, which funds maintenance of the nation's nuclear weapons stockpile through science-based research, mostly in its core Weapons Activities account. R&D in Weapons Activities grew substantially in recent years in lockstep with rapid growth in overall defense spending, from \$2.4 billion in FY 2001 to \$3.2 billion in 2003 and 2004, but now these investments are in decline with a cut in 2005 and a proposed

4.7 percent reduction to \$2.9 billion in FY 2006. The House would reduce this account even further down to \$2.8 billion, 8.6 percent below FY 2005. Although the House would reverse a proposed cut to Inertial Confinement Fusion R&D by providing \$541 million (up 1.0 percent), the House would dramatically cut DOE's considerable investments in research computing on the defense side of the budget to \$501 million, 28 percent below this year's funding level.

The House would once again eliminate the controversial Robust Nuclear Earth Penetrator program in 2006. Last year, DOE requested funds but Congress provided no money. DOE tried again in FY 2006 with a request of \$4 million, but once again the House would provide no funding. This Administration proposal to initiate research on a new generation of nuclear weapons, including the RNEP and other tactical or 'low-yield' nuclear weapons (also called 'bunker buster' bombs), has been opposed by Congress so far because building these weapons would require the repeal of a U.S. ban on developing new nuclear weapons. Chastened by congressional rejection, the FY 2006 request plans for RNEP research only in 2006 and 2007, no funding for 'advanced concepts' R&D on similar weapons, and no current plans for development funding. But the FY 2006 budget does contain \$9 million for R&D on the Reliable Replacement Warhead, a 5-year, \$98 million project initiated by Congress in the final FY 2005 budget that would explore the possibility of new warhead designs to use with existing rather than new nuclear weapons. The House would support this program as the best way to keep U.S. nuclear weapons reliable in the absence of nuclear testing, and would boost funding to \$25 million in FY 2006.

Next Steps

Now that the full House has approved the Energy-Water bill, the Senate Appropriations Committee is expected to draft its version in June.

- June 3, 2005

(This analysis is one of a series of AAAS R&D Funding Updates on FY 2006 congressional appropriations. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D in FY 2006 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/rd>) in the "FY 2006 R&D" or the "What's New" sections.)

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Table. DOE R&D in FY 2006 House Appropriations

**Table. Department of Energy
House Action on R&D in the FY 2006 Budget
(budget authority in millions of dollars)**

	FY 2005 Estimate	FY 2006 Request	FY 2006 House	House Action			
				Chg. from Request Amount	Percent	Chg. from FY 2005 Amount	Percent
DOE Appropriations Containing R&D:							
1. Energy Supply R&D	423	397	409	12	3.0%	-15	-3.5%
2. Science	3,334	3,184	3,385	201	6.3%	51	1.5%
3. Fossil Energy R&D	448	382	407	25	6.5%	-41	-9.2%
4. Energy Conservation	367	356	346	-10	-2.9%	-21	-5.8%
5. Atomic Energy Defense Activities	4,138	4,031	3,986	-45	-1.1%	-153	-3.7%
6. Clean Coal Technology ¹	-160	0	0	0	--	160	-100.0%
7. Radioactive Waste Management	63	44	44	0	0.0%	-19	-30.2%
Total DOE R&D	8,614	8,393	8,576	183	2.2%	-38	-0.4%
Detail of selected appropriations:							
1. Energy Supply R&D							
Solar and Renewables	247	230	239	9	3.9%	-8	-3.3%
Electricity Transmission & Distrib.	91	72	77	5	7.3%	-14	-15.8%
Nuclear Energy	85	95	93	-2	-2.4%	8	9.1%
TOTAL Energy Supply	423	397	409	12	3.0%	-15	-3.5%
2. Science ²							
High Energy Physics	736	714	736	22	3.1%	-1	-0.1%
Nuclear Physics	405	371	408	38	10.1%	4	0.9%
Fusion Energy Sciences	274	291	296	6	1.9%	22	8.1%
Basic Energy Sciences	1,105	1,146	1,173	27	2.4%	69	6.2%
<i>(Spallation Neutron Source)</i>	113	149	149	0	0.0%	36	31.5%
Adv. Scientific Computing Res.	232	207	246	39	18.8%	14	5.8%
Biological and Environmental Res.	582	456	526	70	15.4%	-56	-9.7%
TOTAL Science ²	3,334	3,184	3,385	201	6.3%	51	1.5%
5. Atomic Energy Defense Activities							
National Nuclear Security Administration (NNSA)							
Naval Reactors	772	756	769	14	1.8%	-3	-0.4%
Weapons Activities	3,084	2,940	2,818	-122	-4.1%	-266	-8.6%
<i>(Science Campaigns)</i>	276	262	217	-45	-17.2%	-59	-21.4%
<i>(Adv. Simulation and Computing)</i>	697	661	501	-160	-24.2%	-196	-28.1%
<i>(Inertial Confinement Fusion)</i>	536	460	541	81	17.6%	6	1.0%
<i>(All Other Weapons Acts. R&D)</i>	1,575	1,557	1,559	2	0.1%	-16	-1.0%
Nonproliferation & Verification R&D	224	272	335	63	23.2%	111	49.7%
Total NNSA R&D	4,080	3,968	3,923	-45	-1.1%	-158	-3.9%
Environmental Management	56	61	61	0	0.0%	5	8.9%
Other AEDA R&D	2	2	2	0	0.0%	0	0.0%
TOTAL Atomic Defense R&D	4,138	4,031	3,986	-45	-1.1%	-153	-3.7%

(continued)

Table. DOE R&D in FY 2006 House Appropriations

DOE R&D by Budget Function:

Defense	4,138	4,031	3,986	-45	-1.1%	-153	-3.7%
General Science	3,334	3,184	3,385	201	6.3%	51	1.5%
Energy	1,141	1,179	1,205	26	2.2%	63	5.6%

AAAS estimates based on FY 2005 and FY 2006 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2005 and FY 2006 request figures based on OMB R&D data and supplemental agency budget data.

Figures are rounded to the nearest million. Changes calculated from unrounded figures.

1/ Negative budget authority because of rescissions and deferrals of previously appropriated funds. Coal research is now funded in the Fossil Energy program.

2/ Does not include non-R&D management and other costs.

June 3, 2005 - AAAS estimates of House-approved appropriations bill.

Department of Energy Budget (budget authority in millions of dollars)

	FY 2005 Estimate	FY 2006 Request	FY 2006 House	House Action		Chg. from FY 2005 Amount	Chg. from FY 2005 Percent
				Chg. from Request Amount	Chg. from Request Percent		
Weapons Activities (NNSA)	6,632	6,630	6,181	-449	-6.8%	-450	-6.8%
Other NNSA Activities	2,348	2,767	2,667	-100	-3.6%	320	13.6%
Total NNSA	8,979	9,397	8,848	-549	-5.8%	-131	-1.5%
Defense Environmental Activities	6,808	6,015	6,468	453	7.5%	-340	-5.0%
Nuclear Waste and Other Defense	916	987	1,054	67	6.7%	138	15.0%
Total DOE defense	16,704	16,400	16,371	-29	-0.2%	-333	-2.0%
Science	3,600	3,463	3,666	203	5.9%	67	1.8%
Energy Supply and Conservation 1/	1,807	1,749	1,763	13	0.8%	-44	-2.4%
Fossil Energy	572	491	502	11	2.2%	-69	-12.1%
Other Energy Programs	929	1,246	1,256	11	0.8%	327	35.2%
Nondefense Environmental Mngmt.	440	350	320	-30	-8.6%	-120	-27.2%
Power Marketing Administrations	209	57	265	208	364.7%	57	27.1%
Departmental Administration	159	200	174	-26	-13.0%	15	9.6%
Total DOE Budget	24,419	23,956	24,318	362	1.5%	-101	-0.4%

Source: Department of Energy budget justification and FY 2006 appropriations bills.

DOE appropriations only (does not include offsets and other mandatory).

1/ Combines Energy Supply and Energy Conservation accounts.

June 3, 2005 - AAAS estimates of House-approved appropriations bill.