



AAAS R&D Funding Update July 21, 2003 -

## **Senate Boosts DOE R&D 6.6 Percent. But Keeps Office of Science Budget Flat**

### **Highlights**

- **The House would provide \$8.6 billion for R&D in the Department of Energy in FY 2004, an increase of \$381 million or 4.6 percent** (see Table).
- **DOE's Office of Science would receive \$3.1 billion for R&D in the Senate plan, a boost of just \$36 million or 1.2 percent, though a slight improvement over a requested cut.** The House, by contrast, would add funds for high-performance computing research, for domestic fusion research, and for increased extramural user time at DOE's large-scale scientific facilities for a 4.3 percent increase.
- The Senate would be generous with DOE's energy-related R&D, providing \$1.4 billion for a 9.0 percent increase, and with defense-related R&D, providing \$4.3 billion for a 10.1 percent increase.

On July 17, the Senate Appropriations Committee approved its version of the FY 2004 Energy/Water appropriations bill (S 1424), which provides funding for the majority of Department of Energy (DOE) programs; earlier on July 10, the Committee approved its FY 2004 Interior appropriations bill (S 1391), which funds the remainder of DOE. Together, the two bills would provide \$8.8 billion for DOE's R&D programs in FY 2004, \$540 million or 6.6 percent more than FY 2003 (see Table). On the House side, the full House has approved its version of these bills that would provide \$8.6 billion, a 4.6 percent increase. In the Senate plan, DOE's defense-related R&D and energy-related R&D would both climb substantially above both the request and this year's funding level, but funding for DOE's Office of Science would just barely increase. (For details of R&D in the FY 2004 request, please see Chapter 9 of *AAAS Report XXVIII: R&D FY 2004*. Details of House appropriations for DOE R&D are available in a July 18 AAAS R&D Funding Update on the AAAS R&D web site.)

Funding for R&D in DOE's Office of Science would remain essentially flat in the Senate bill, in contrast to a modest increase in the House bill. Although the Administration proposed slightly declining funding at \$3.1 billion for the third year in a row, the Senate would add \$44 million to the request for a 1.2 percent increase over this year's funding level, an increase well below the expected rate of inflation. The Senate report accompanying the Energy/Water bill laments stagnant to declining federal funding for the physical sciences, of which the Office of Science is a major sponsor, and worries that declining funding will have adverse impacts on DOE's missions and future workforce, as well as the nation as a whole through decreasing numbers of science and engineering PhDs going to U.S. students. The report also laments the research opportunities lost due to DOE user facilities not operating at capacity due to insufficient funds, and worries that lost opportunities could mean the loss of U.S. scientific and technological leadership. **But despite the laments, the Senate would not add funds to increase operating time and user support at scientific user facilities and would not significantly alter the long-term funding trends in the Office of Science** (see Figure 1). The House, by contrast, would provide an increase to the Office of Science and would specifically allocate additional funds to all six major Science programs to increase operating time and user support at scientific user 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 have squeezed operating time at these facilities.

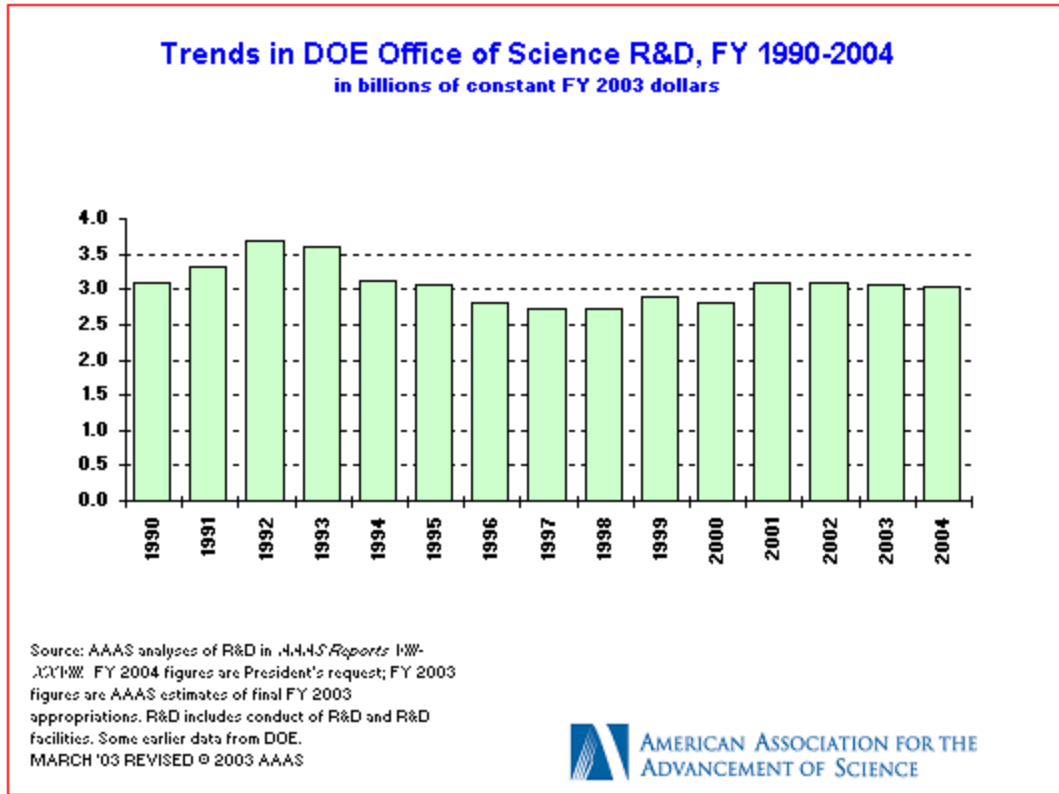


Figure 1. (click on the image to view or download a full-page color PDF version of the chart)

**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 \$3 billion since FY 2001, and even the House increase would enable the Office to just barely stay ahead of inflation, while the Senate proposal and the DOE request would leave the Office with less money in constant dollars than any of the last three years.

For four of the six major Science programs (High Energy Physics, Nuclear Physics, Fusion Energy Sciences, and Basic Energy Sciences), the Senate would just provide the requested amounts, resulting in modest increases over the FY 2003 funding level except for Basic Energy Sciences. The Basic Energy Sciences account would decline \$15 million to \$1.0 billion, but only because construction costs of the Spallation Neutron Source, a new large-scale facility in Tennessee, would decline as planned in FY 2004. BES support of research grants and user time would increase in FY 2004. The Biological and Environmental Research (BER) program would receive \$35 million more than the request for a total of \$534 million (up 1.4 percent), with the additional funds allocated to the Genomes to Life program, some congressional earmarks, and a research and demonstration program to study energy-related issues related to water resources. The Senate would add \$10 million to the request for the Advanced Scientific Computing Research (ASCR) program for a total of \$183 million, a 7.0 percent increase over FY 2003.

**The Senate would join the House and Administration in boosting funding for R&D on hydrogen and nuclear energy, but would cut spending in other renewable energy areas.** In February, the Bush Administration proposed a major expansion of hydrogen-related R&D as a long-term step toward using hydrogen fuel cells to power automobiles. Within the Energy Supply account, the Bush Administration proposed to boost hydrogen research from \$40 million to \$88 million, offset by cuts in other energy programs. The Senate would agree to the request, but would also agree to the proposed cuts to biomass, geothermal, solar, and wind energy research. The overall Solar and Renewables R&D program would increase 7.8 percent to \$258 million because of the large hydrogen increase and also because of funding boosts for electric energy distribution and storage R&D. Nuclear energy R&D would also receive a

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substantial boost of 119.1 percent to \$152 million, mostly on R&D to keep the existing generation of nuclear power plants operating safely, but also for additional R&D investments oriented toward advanced reactors and advanced fuel cycle technologies to better dispose of nuclear waste. Total Energy Supply R&D would increase \$82 million to \$410 million because of the sharp increases in nuclear energy, electricity, and hydrogen.

While the Administration requested a sharp 15 percent cut in **Fossil Energy** R&D, the Senate would add back some funds for a total of \$471 million, still 2.4 percent below FY 2003 and the same as the House appropriation. Although the House and Senate would stick to the Administration's \$130 million request for its Clean Coal Power Initiative to develop and demonstrate new coal-fired electricity generation technologies, both chambers mostly reverse the Administration's proposed cuts to R&D related to other fossil fuels such as petroleum, natural gas, and other fuels. The Senate would increase **Energy Conservation** R&D by 6.8 percent over FY 2004 to \$456 million in FY 2004, \$14 million above the request. The Senate would trim the \$78 million request for fuel cell technologies R&D, part of the Administration's hydrogen fuel cell initiative, down to \$69 million, but this would still represent a large increase over FY 2003 funding levels.

On the defense side, most of DOE's R&D is funded by the **National Nuclear Security Administration (NNSA)**, which was created in 2000 as a semi-autonomous agency within DOE. Although the House expressed skepticism at the large increases that NNSA has received in recent years, especially its core Weapons Activities account which funds maintenance of the nation's nuclear weapons stockpile through science-based research, the Senate would continue its tradition of generosity toward these activities. The R&D in Weapons Activities has grown from \$2.4 billion in FY 2001 to \$2.9 billion this year, and would grow to \$3.3 billion in the request. The Senate would up the ante to \$3.3 billion, a 13.1 percent increase compared to this year. Within the overall portfolio, the Senate would slightly raise funding for **Advanced Simulation and Computing**, an effort to develop the next generation of computer processing technologies to better model nuclear explosions, to \$726 million (up 3.0 percent).

### Next Steps

The House has approved both the Energy/Water and Interior bills, so action now moves to the Senate. The Senate has drafted its versions of both bills, and hopes to approve them the week of July 21. House-Senate conferences on the bills will not be complete until September at the earliest. (The AAAS analysis of DOE R&D in the House appropriations bills is available on the AAAS R&D web site).

(This analysis is one of a series of AAAS R&D Funding Updates on the FY 2004 appropriations process. This analysis includes information on R&D in Senate appropriations for the Department of Energy. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D by agency in FY 2004 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/rd>) in the "FY 2004 R&D" or the "What's New" sections.)

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**Table. Department of Energy  
Senate Appropriations Committee Action on R&D in the FY 2004 Budget  
(budget authority in millions of dollars)**

	FY 2003 Estimate	FY 2004 Request	FY 2004 House	Action by Senate				
				FY 2004 Senate	Chg. from Request Amount	Chg. from Request Percent	Chg. from FY 2003 Amount	Chg. from FY 2003 Percent
DOE Appropriations Containing R&D:								
1. Energy Supply R&D	309	376	351	<b>410</b>	34	8.9%	101	32.7%
2. Fossil Energy R&D	483	411	471	<b>471</b>	60	14.5%	-12	-2.5%
3. Energy Conservation	427	442	472	<b>456</b>	14	3.2%	29	6.8%
4. Science	3,075	3,066	3,208	<b>3,111</b>	44	1.5%	36	1.2%
5. Atomic Energy Defense Activities	3,869	4,180	4,045	<b>4,258</b>	79	1.9%	389	10.1%
6. Clean Coal Technology <sup>1</sup>	0	0	0	<b>0</b>	0	--	0	--
7. Radioactive Waste Management	62	59	59	<b>59</b>	0	0.0%	-3	-5.4%
<b>Total DOE R&amp;D</b>	<b>8,225</b>	<b>8,535</b>	<b>8,606</b>	<b>8,765</b>	<b>230</b>	<b>2.7%</b>	<b>540</b>	<b>6.6%</b>
Detail of selected appropriations:								
1. Energy Supply R&D								
Solar and Renewables	240	250	233	<b>258</b>	9	3.4%	19	7.8%
Nuclear Energy	69	127	118	<b>152</b>	25	19.8%	82	119.0%
<b>TOTAL Energy Supply</b>	<b>309</b>	<b>376</b>	<b>351</b>	<b>410</b>	<b>34</b>	<b>8.9%</b>	<b>101</b>	<b>32.7%</b>
4. Science <sup>2</sup>								
High Energy Physics	722	738	748	<b>738</b>	0	0.0%	16	2.2%
Nuclear Physics	382	389	399	<b>389</b>	0	0.0%	8	2.0%
Fusion Energy Sciences	248	257	268	<b>257</b>	0	0.0%	9	3.6%
Basic Energy Sciences	1,023	1,009	1,017	<b>1,009</b>	0	0.0%	-15	-1.4%
(Spallation Neutron Source)	225	143	143	<b>143</b>	0	0.0%	-82	-36.5%
Adv. Scientific Computing Res.	172	173	213	<b>183</b>	10	5.8%	12	7.0%
Biological and Environmental Res.	527	500	562	<b>534</b>	35	6.9%	7	1.4%
Energy Research Analyses	1	0	0	<b>0</b>	0	--	-1	-100.0%
<b>TOTAL Science <sup>2</sup></b>	<b>3,075</b>	<b>3,066</b>	<b>3,208</b>	<b>3,111</b>	<b>45</b>	<b>1.5%</b>	<b>36</b>	<b>1.2%</b>
5. Atomic Energy Defense Activities								
<b>National Nuclear Security Administration (NNSA)</b>								
Naval Reactors	617	632	631	<b>632</b>	0	0.0%	15	2.4%
Weapons Activities	2,922	3,256	3,123	<b>3,305</b>	49	1.5%	383	13.1%
(Stockpile R&D)	467	433	404	<b>433</b>	0	0.0%	-34	-7.3%
(Science Campaigns)	255	270	237	<b>273</b>	3	1.1%	17	6.7%
(Adv. Simulation and Computing)	704	751	716	<b>726</b>	-25	-3.3%	21	3.0%
(Inertial Confinement Fusion)	504	467	512	<b>433</b>	-34	-7.3%	-72	-14.2%
-- (Nat'l Ignition Facility Const.)	214	150	150	<b>150</b>	0	0.0%	-64	-29.9%
(All Other Weapons Acts. R&D)	777	1,186	1,105	<b>1,291</b>	105	8.8%	514	66.2%
Nonproliferation & Verification R&D	212	196	196	<b>225</b>	30	15.2%	13	6.1%
<b>Total NNSA R&amp;D</b>	<b>3,752</b>	<b>4,084</b>	<b>3,949</b>	<b>4,162</b>	<b>79</b>	<b>1.9%</b>	<b>411</b>	<b>10.9%</b>
Environmental Management	91	68	68	<b>68</b>	0	0.0%	-23	-25.3%
Other AEDA R&D	27	28	28	<b>28</b>	0	0.0%	1	5.1%
<b>TOTAL Atomic Defense R&amp;D</b>	<b>3,869</b>	<b>4,180</b>	<b>4,045</b>	<b>4,258</b>	<b>79</b>	<b>1.9%</b>	<b>389</b>	<b>10.1%</b>

(continued)

AAAS R&D Funding Update - DOE R&D in FY 2004 Senate Appropriations

DOE R&D by Budget Function:

Defense	3,869	4,180	4,045	<b>4,258</b>	79	1.9%	389	10.1%
General Science	3,075	3,066	3,208	<b>3,111</b>	44	1.5%	36	1.2%
Energy	1,281	1,289	1,353	<b>1,396</b>	107	8.3%	115	9.0%

AAAS estimates based on FY 2003 and FY 2004 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2003 and FY 2004 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.

FY 2003 figures adjusted to reflect rescissions and supplementals enacted in Public Laws 108-7 and 108-11.

<sup>1</sup> Funded from advance appropriations in previous years. Does not include deferrals of previously appropriated funds.

<sup>2</sup> Does not include program direction, waste management, and other non-R&D costs.

**July 21, 2003 - Senate Appropriations Committee-approved funding levels.**

**These funding levels may be amended or rejected on the Senate floor.**

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

	FY 2003 Estimate	FY 2004 Request	FY 2004 House	Action by Senate				
				FY 2004 Senate	Chg. from Request Amount	Percent	Chg. from FY 2003 Amount	Percent
Weapons Activities (NNSA)	5,983	6,378	6,118	<b>6,474</b>	96	1.5%	491	8.2%
Other NNSA Activities	2,285	2,457	2,391	<b>2,447</b>	-10	-0.4%	161	7.1%
<b>Total NNSA</b>	<b>8,268</b>	<b>8,835</b>	<b>8,508</b>	<b>8,920</b>	<b>86</b>	<b>1.0%</b>	<b>653</b>	<b>7.9%</b>
Defense Environmental Activities	6,757	6,810	6,748	<b>6,758</b>	-51	-0.8%	1	0.0%
Nuclear Waste and Other Defense	832	953	1,022	<b>777</b>	-175	-18.4%	-54	-6.5%
<b>Total DOE defense</b>	<b>15,857</b>	<b>16,597</b>	<b>16,278</b>	<b>16,456</b>	<b>-141</b>	<b>-0.9%</b>	<b>599</b>	<b>3.8%</b>
Science	3,295	3,311	3,480	<b>3,360</b>	50	1.5%	65	2.0%
Energy Supply	697	862	692	<b>920</b>	59	6.8%	223	32.1%
Fossil Energy	621	519	609	<b>594</b>	74	14.3%	-27	-4.4%
Energy Conservation	892	876	879	<b>862</b>	-14	-1.6%	-30	-3.4%
Other Energy Programs	383	497	640	<b>432</b>	-65	-13.0%	49	12.7%
Nondefense Environmental Mngmt.	214	292	320	<b>302</b>	10	3.4%	88	41.4%
Power Marketing Administrations	202	207	207	<b>214</b>	7	3.4%	12	6.0%
Departmental Administration	124	219	141	<b>202</b>	-17	-7.6%	78	62.8%
<b>Total DOE Budget</b>	<b>22,285</b>	<b>23,380</b>	<b>23,247</b>	<b>23,343</b>	<b>-37</b>	<b>-0.2%</b>	<b>1,058</b>	<b>4.7%</b>

Source: Department of Energy budget justification and FY 2004 appropriations bills.

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

**July 21, 2003 - Senate Appropriations Committee-approved funding levels.**

**These funding levels may be amended or rejected on the Senate floor.**