Congress Awards Large Increases to DOE R&D in Final Spending Bills

(This analysis is part of a series of AAAS R&D Funding Updates on the FY 2001 congressional appropriations process. This analysis includes information on R&D in final FY 2001 DOE appropriations. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D by agency in FY 2001 appropriations, is available on the AAAS R&D Web Site (http://www.aaas.org/spp/R&D) in the "FY 2001 R&D" or the "What's New" sections.)

In late September, Congress finalized two FY 2001 appropriations bills providing substantial increases for R&D in the Department of Energy (DOE). On September 27, a House-Senate conference committee released a conference report (final version) of the Energy-Water appropriations bill (HR 4733), which funds DOE's defense, science, and some energy programs. The House gave final approval on September 28, and the Senate approved it on October 2. The conference report of the Interior bill (HR 4578), which funds the remainder of DOE's energy programs, was released on September 29. President Clinton signed the Energy-Water bill into law on October 27, after vetoing an earlier version. The President signed the Interior bill on October 11. On December 21, as part of the final FY 2001 appropriations bill, he signed into law a provision containing a 0.22 percent across-the-board cut for most domestic programs, including DOE; all figures in this analysis are adjusted to reflect this cut. Together, the bills far exceed both the FY 2000 funding levels and the President's request for DOE R&D. Most DOE R&D programs receive substantial increases, despite earlier House and Senate proposals that would have cut funding for several key science programs.

DOE R&D in FY 2001 totals $8.0 billion, $355 million more than the President's request and $878 million or 12.3 percent more than FY 2000 (see Table). There are double-digit percentage increases for all three DOE missions areas: defense-related R&D (up 12.0 percent to $3.7 billion), science-related R&D in the Office of Science (up 13.8 percent to $3.0 billion), and energy-related R&D (up 10.0 percent to $1.3 billion). For all three missions, the final bills provide far more than either the earlier House or Senate proposals (for more information on House appropriations for DOE, please see the June 21 AAAS R&D Funding Update; for information on Senate appropriations, please see the July 25 Update).

In the **Science account, Congress provides $3.0 billion for R&D, a substantial 13.8 percent or $363 million increase over FY 2000**. President Clinton made DOE's science programs a centerpiece of his FY 2001 proposal to achieve a more balanced research portfolio by balancing past increases for the National Institutes of Health's biomedical research with large FY 2001 increases for key supporters of non-biomedical research such as DOE and the National Science Foundation (NSF). President Clinton requested a 12.6 percent increase for Science R&D as part of this balancing effort, and the final Energy-Water bill adds $31 million to his request for a 13.8 percent increase, far above the earlier House proposal of only 1.2 percent and the Senate proposal of 4.5 percent. (Science programs in the Table have been adjusted to reflect general reductions contained in the Energy-Water bill, and the December across-the-board reduction).

The big winner in Science is **Basic Energy Sciences**, which receives $1.0 billion for R&D in FY 2001, a 29.7 percent increase. Within the account, Congress grants $279 million to the **Spallation Neutron Source**, just shy of the request and more than double the FY 2000 funding level. Of the total funding for this large scientific user facility, to be built at Oak Ridge National Laboratory in Tennessee, $259.5 million will be used for construction, and the remaining $19.1 million for development work. Although the SNS accounts for most of the 29.7 percent increase, non-SNS R&D in Basic Energy Sciences increases by $68 million.

Other Science programs also receive large increases. R&D funding for **Advanced Scientific Computing Research**, recently renamed from Computing and Technology Research, increases from $128 million to $168 million, a 31.2 percent boost. Although this large increase falls short of the request, it will still allow DOE to expand substantially its participation in the multi-agency information technology (IT) R&D initiative. **Biological and Environmental Research** (BER) R&D jumps $61 million or 14.1 percent to $494 million. Much of the increase is due to 24 congressionally designated projects at colleges and universities totaling $44 million. Other Science programs increase modestly, including High Energy Physics (up 2.1 percent to $707 million), Nuclear Physics (up 3.3 percent to $359 million), and Fusion Energy Sciences (up 1.6 percent to $249 million). These funding levels are improvements over the earlier Senate proposals, which would have cut funding for these programs.

DOE's defense R&D programs receive large increases, consistent with the large increases for defense programs in the Department of Defense (DOD) signed into law in August. Total DOE defense R&D jumps $396 million or 12.0 percent to $3.7 billion, far above the request of $3.4 billion.

Most of DOE's defense R&D is funded within the new **National Nuclear Security Administration (NNSA),** created within DOE last year by Congress in response to national security concerns and allegations of espionage at DOE weapons laboratories. NNSA began operations on March 1, and is designed to be a semi-autonomous agency within DOE with its own command structure separate from the rest of DOE. In FY 2001, NNSA is responsible for $6.6 billion, or roughly a third, of the total DOE budget. The Weapons Activities program, the cornerstone of NNSA's mission to use science-based methods to ensure the safety and reliability of the nation's nuclear stockpile, receives $2.5 billion for its R&D activities, a boost of 13.7 percent. The Accelerated Strategic Computing Initiative (ASCI) receives the request of $477 million, a boost of $80 million over the FY 2000 level, to continue DOE's effort to develop the next generation of supercomputers to simulate nuclear explosions without nuclear testing. ASCI is a also a major part of the multi-agency IT R&D initiative. There are large increases for most of the other Weapons Activities programs.

Within Weapons Activities, construction of the **National Ignition Facility (NIF)** receives $199 million, less than the $247 million for FY 2000 but far more than the original $74 million request. After the February release of the budget, DOE requested more for the project because of a series of cost overruns and delays which have now pushed the total project cost to $3.5 billion from an original $2.0 billion estimate, and which have delayed the completion date to 2008 from 2004. Congress responded angrily to these developments, and although the final bill grudgingly allocates more funding to NIF the dollars come with several conditions. The bill allows for the immediate release of only $130 million of the FY 2001 funds, and withholds the remaining $69 million until March 31, 2001, by which time several requirements must be met, including: a new project plan, a new budget plan, a certification of satisfactory construction progress, and a study on whether the NIF in its currently proposed 192-laser form is necessary or whether there are alternatives. Elsewhere in the bill is a punitive $25 million reduction in the budget of Lawrence Livermore National Laboratory in California, the project manager and site of the NIF.

There are large increases for DOE's other defense R&D programs, including Nonproliferation and Verification R&D (up 13.0 percent to $207 million), and science and technology development for Environmental Management (up 30.7 percent to $218 million).

There are also increases for DOE's energy-related R&D programs, including $444 million for R&D in Energy Supply (up 21.9 percent) to fund solar and renewables R&D programs and R&D on nuclear energy. There are also substantial increases for R&D in the Energy Conservation program (up 6.3 percent to $458 million) and the Fossil Energy program (up 3.4 percent to $339 million). Although the House proposed to slash Fossil Energy R&D in its earlier version of the bill by nearly eliminating funding for the Partnership for the Next Generation of Vehicles (PNGV), a multi-agency collaboration with the "Big Three" automobile manufacturers to develop high-mileage passenger vehicles, the conference report restores funding and allows most Fossil Energy programs to receive increases.

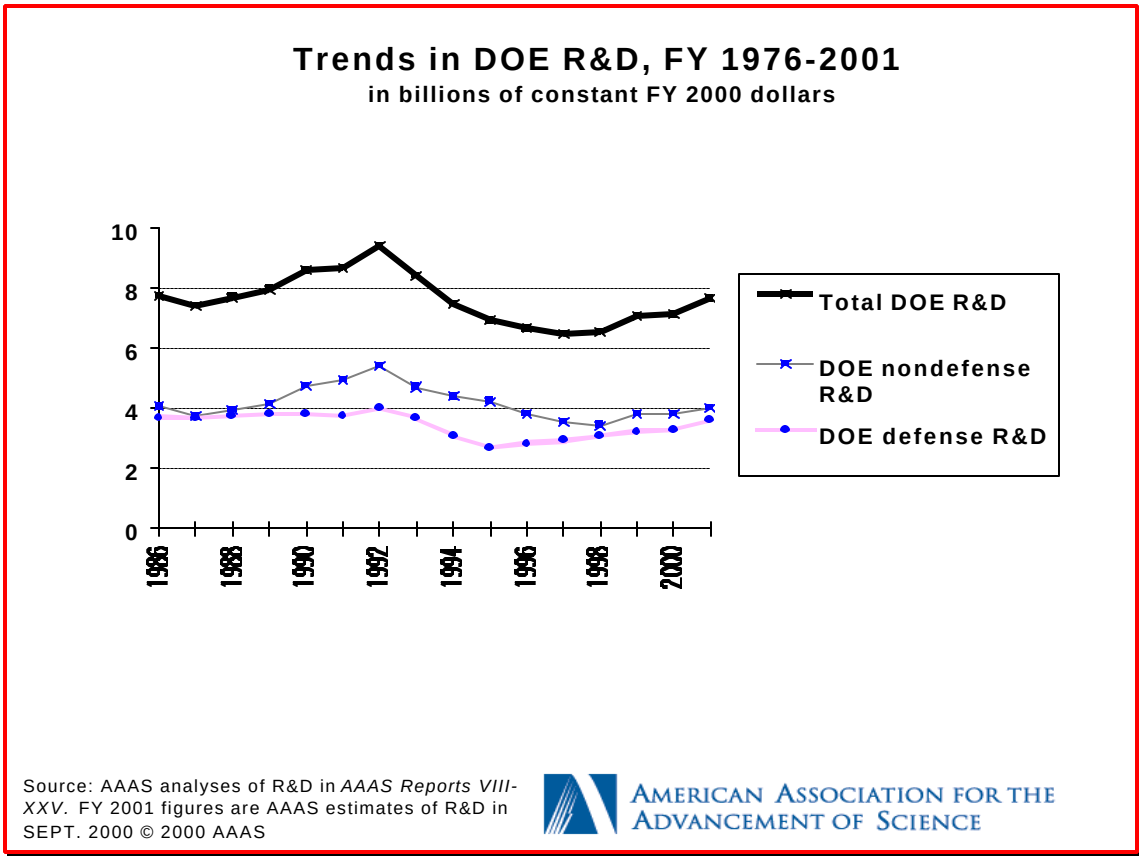

Figure 1.

DOE's R&D budget has had an up-and-down history over the past several years, as shown in Figure 1. Because of the end of the Cold War, DOE's defense R&D declined sharply from FY 1992 to FY 1995, but has increased since then as the Stockpile Stewardship (now Weapons Activities) program's budget has grown to reflect DOE's commitment to rely on science instead of nuclear testing to fulfill the department's mission of ensuring the safety and reliability of U.S. nuclear weapons. The large FY 2001 increase brings DOE defense R&D nearly back to its late Cold War funding levels. DOE's nondefense R&D also peaked in FY 1992 but then suffered a steeper and more prolonged decline that lasted until FY 1998. Initially, the cuts were driven by the cancellation of the Superconducting Super Collider in 1993. But after the Republican takeover of Congress in 1994, DOE nondefense R&D declined further because of tight restrictions on domestic discretionary spending aimed at achieving a balanced budget and because of Republican animosity toward DOE itself. With the federal budget reaching balance in FY 1998 and with waning Republican antipathy toward the department, in the last few years DOE nondefense R&D has begun to inch back toward previous funding levels. Taken together, total DOE R&D has been increasing for the past four years but remains well below the funding levels of the early 1990s.

DOE is a key funding source for research in many disciplines, as shown in Figure 2. Although DOE funds only about 10 percent of total federal support for research, it is by far the largest supporter of physics research, accounting for nearly two-thirds of total federal support. DOE is also an important supporter of research in chemistry, mathematics, and computer sciences, with a little less than 30 percent of total federal support in these fields. DOE is the third-largest supporter of engineering research behind DOD and NASA, with about 15 percent of the total, but in the sub-disciplines of chemical engineering and metallurgy / materials engineering DOE provides half and a third of total federal support, respectively.

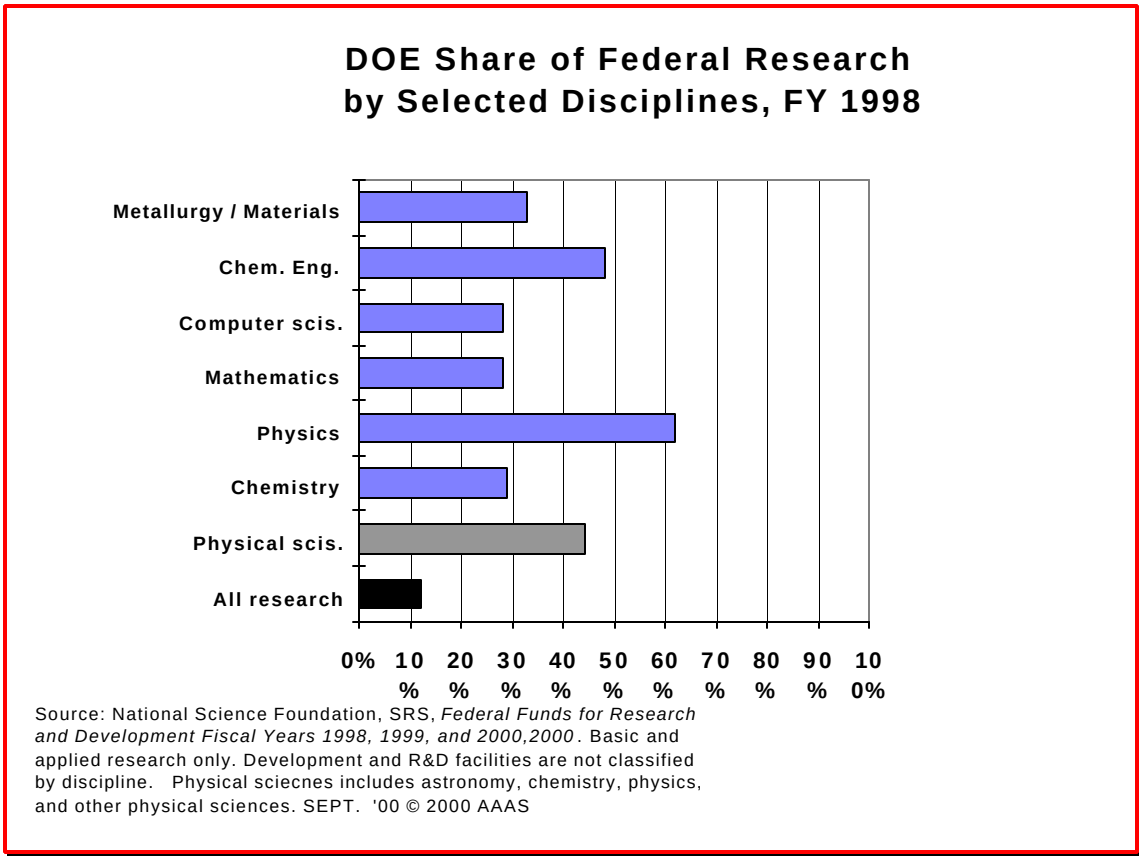

Figure 2.

In addition to its important funding role in federal research, DOE is the largest federal funding source for R&D facilities construction, including large capital equipment for research. In FY 2001, DOE will spend nearly $1 billion of its R&D budget on R&D facilities and capital equipment. In addition to construction, DOE is also responsible for the operation of dozens of scientific user facilities at its national laboratories, which allow scientists and engineers to use unique laboratory facilities and research equipment unavailable in their own laboratories.

On October 7, President Clinton vetoed the Energy-Water bill because of environment-related legislative provisions attached to the bills. Congress removed the legislative provisions, and sent the President a revised version making no changes to DOE appropriations. President Clinton signed the revised bill on October 27. The President signed the Interior bill into law on October 11. These funding levels were modified on December 21 when the President signed the Labor-HHS bill into law. The Labor-HHS bill contains a provision reducing all appropriations in the Energy-Water and Interior bills by 0.22 percent.

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Table. Department of Energy
R&D in the FY 2001 Budget (FINAL)
(budget authority in millions of dollars)

			Final FY 2001 Appropriations				
	FY 2000	FY 2001	**FY 2001**	Chg. from Request		Chg. from FY 2000	
	Estimate	Request	**FINAL**	Amount	Percent	Amount	Percent
DOE Appropriations Containing R&D:							
1. Energy Supply R&D	364	468	**444**	-24	-5.1%	80	21.9%
2. Fossil Energy R&D	328	293	**339**	46	15.7%	11	3.4%
3. Energy Conservation	431	465	**458**	-6	-1.3%	27	6.3%
4. Science	2,638	2,969	**3,001**	31	1.1%	363	13.8%
5. Atomic Energy Defense Activities	3,301	3,405	**3,697**	293	8.6%	396	12.0%
6. Clean Coal Technology [1]	0	0	**0**	0	- -	0	- -
7. Radioactive Waste Management	55	40	**55**	15	38.8%	0	0.0%
Total DOE R&D	7,117	7,639	**7,994**	355	4.7%	878	12.3%
Detail of selected appropriations:							
1. Energy Supply R&D							
Solar and Renewables	272	376	**344**	-32	-8.4%	72	26.3%
Nuclear Energy	92	92	**100**	8	8.4%	8	8.7%
TOTAL Energy Supply	364	468	**444**	-24	-5.1%	80	21.9%
4. Science *							
High Energy Physics *	693	704	**707**	3	0.4%	15	2.1%
(Large Hadron Collider)	*70*	*70*	***70***	*0*	*0.0%*	*0*	*0.0%*
Nuclear Physics *	348	364	**359**	-5	-1.3%	12	3.3%
Fusion Energy Sciences *	245	244	**249**	5	1.9%	4	1.6%
Basic Energy Sciences *	772	1,008	**1,000**	-7	-0.7%	229	29.7%
(Spallation Neutron Source)	*118*	*281*	***279***	*-2*	*-0.9%*	*161*	*136.3%*
Adv. Scientific Computing Res. *	128	182	**168**	-14	-7.8%	40	31.2%
Biological and Environmental Res. *	433	444	**494**	50	11.2%	61	14.1%
Energy Research Analyses *	1	1	**1**	0	-1.3%	0	-0.4%
Multiprogram Lab Support *	19	22	**22**	0	-0.2%	3	15.3%
TOTAL Science *	2,638	2,969	**3,001**	31	1.1%	363	13.8%
5. Atomic Energy Defense Activities							
National Nuclear Security Administration (NNSA) [4]							
Naval Reactors	655	656	**667**	11	1.7%	13	2.0%
Weapons Activities *	2,201	2,273	**2,502**	230	10.1%	301	13.7%
Stockpile R&D	*236*	*243*	***272***	*28*	*11.7%*	*36*	*15.1%*
ASCI [2]	*397*	*477*	***0***	*-477*	*-100.0%*	*-397*	*-100.0%*
Defense Appl. And Modeling [2]	*228*	*249*	***715***	*465*	*186.9%*	*487*	*213.8%*
ICF Ignition and High Yield [3]	*100*	*121*	***250***	*129*	*106.9%*	*150*	*150.6%*
Nat'l Ignition Facility Construction	*247*	*74*	***199***	*125*	*168.1%*	*-48*	*-19.6%*
All Other Weapons Acts. R&D	*993*	*1,108*	***1,067***	*-41*	*-3.7%*	*74*	*7.5%*
Nonproliferation & Verification R&D	183	191	**207**	16	8.3%	24	13.0%
Fissile Materials Disposition	63	71	**71**	0	0.0%	9	13.7%
Total NNSA R&D [4]	3,101	3,191	**3,448**	257	8.0%	347	11.2%

(continued)

Environmental Management	167	182	**218**	36	19.8%	51	30.7%
Nuclear Safeguards & Security	27	26	**26**	0	-0.2%	-2	-5.7%
Intelligence	5	5	**5**	0	0.0%	0	0.0%
TOTAL Atomic Defense R&D	3,301	3,405	**3,697**	293	8.6%	396	12.0%
DOE R&D by Budget Function:							
Defense	3,301	3,405	**3,697**	293	8.6%	396	12.0%
General Science	2,638	2,969	**3,001**	31	1.1%	363	13.8%
Energy	1,178	1,265	**1,296**	31	2.5%	118	10.0%

AAAS estimates based on FY 2001 appropriations bills. Includes conduct of R&D and R&D facilities.
FY 2000 and FY 2001 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 2001 Final figures adjusted to reflect general reductions.
[1] Budget authority is negative for some years because of enacted or proposed deferrals of previously appropriated funds. Table does not reflect enacted or proposed deferrals. FY 2001 deferral is $67 million.
[2] Accelerated Strategic Computing Initiative. Moved to Defense Applications and Modeling in FY 2001 Final.
[3] Inertial Confinement Fusion. FY 2001 Final figures reflect transfers from other Weapons Acts. accounts.
[4] New semi-autonomous agency within DOE. FY 2000 figures adjusted for comparability with new account structure.
FY 2001 FINAL figures adjusted to reflect 0.22 percent across-the-board cut.
December 20, 2000 - FINAL FY 2001 funding levels.

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

			FY 2001 Final Appropriations				
	FY 2000	FY 2001	**FY 2001**	Chg. from Request		Chg. from FY 2000	
	Estimate	Request	**FINAL**	Amount	Percent	Amount	Percent
Weapons Activities (NNSA)	4,321	4,594	**5,004**	410	8.9%	683	15.8%
Other NNSA Activities	1,375	1,584	**1,571**	-13	-0.8%	196	14.2%
Total NNSA	5,696	6,178	**6,575**	397	6.4%	879	15.4%
Defense Environmental Restoration	4,466	4,552	**4,964**	412	9.1%	498	11.2%
Nuclear Waste and Other Defense	1,827	2,196	**1,961**	-236	-10.7%	134	7.3%
Total DOE defense	11,988	12,926	**13,499**	574	4.4%	1,511	12.6%
Science	2,815	3,151	**3,180**	29	0.9%	366	13.0%
Energy Supply	643	765	**660**	-105	-13.7%	17	2.7%
Fossil Energy	404	376	**433**	57	15.2%	29	7.1%
Energy Conservation	759	851	**813**	-37	-4.4%	55	7.2%
Other Energy Programs	298	472	**439**	-33	-7.0%	141	47.4%
Nondefense Environmental Mngmt.	307	286	**277**	-9	-3.1%	-30	-9.8%
Power Marketing Administrations	230	200	**200**	0	0.2%	-30	-13.2%
Departmental Administration	110	118	**106**	-11	-9.5%	-3	-2.9%
Total DOE Budget	17,553	19,142	**19,608**	466	2.4%	2,055	11.7%

Source: Department of Energy budget justification and FY 2001 appropriations bills.
DOE appropriations only (does not include offsets and other mandatory).
Excludes deferrals of funds in Clean Coal Technology and other deferrals. FY 2001 CCT deferral is $67 million.
FY 2001 FINAL figures adjusted to reflect 0.22 percent across-the-board cut.
December 20, 2000 - FINAL FY 2001 funding levels.