

Final DOE Bills Award Slight Increases for Science Programs; DOE Restructuring Becomes Law

(The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D by agency in FY 2000 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/R&D>) in the "FY 2000 R&D" or the "What's New" sections.)

Just before the October 1 start of fiscal year (FY) 2000, President Clinton signed into law the FY 2000 Energy-Water bill, which funds most of the Department of Energy (DOE). This week, Congress is scheduled to give final approval to the Interior bill, which funds the remainder of DOE's activities. **The two bills give slight increases to DOE's Science programs funding R&D in high-energy and nuclear physics and biological and environmental research. They also give substantial increases to DOE's support of magnetic fusion research, weapons-related R&D, and fossil-energy R&D programs (see Table). Total DOE R&D rises \$223 million or 3.2 percent to \$7.2 billion.** DOE's weapons-related activities, however, have been moved to a **new semi-autonomous agency within DOE called the National Nuclear Security Administration (NNSA)** as a result of the FY 2000 defense authorization bill, which President Clinton signed into law on October 5.

In the **Science** account, Congress provides \$2.7 billion for R&D, a slight increase of 0.1 percent after adjusting for general reductions (see Table). All but two accounts receive more than requested. Physics and fusion research are high priorities within Science. **Fusion Energy Sciences** receives \$247 million, an increase of 11.6 percent after several years of flat or declining budgets. This amount is well above the request of \$223 million. Both **High Energy Physics** (up 0.9 percent to \$695 million) and **Nuclear Physics** (up 4.3 percent to \$348 million) receive increases. In order to accommodate these increases, Congress cuts **Computational and Technology Research (CTR)** by 16.3 percent to \$131 million. The final Energy-Water bill denies funding for the proposed **Scientific Simulation Initiative**, part of the Administration's proposed Information Technology for the Twenty-First Century (IT²) initiative. Within the **Basic Energy Sciences** program, Congress reduces funding for **the Spallation Neutron Source (SNS)** to \$118 million, down from a requested \$214 million because of several critical internal and external reviews of the project's management. Most of the SNS funds are for construction of the facility in Tennessee.

DOE's investments in energy R&D are a mixed bag of increases and cuts. In the Energy Supply account, spending on **Solar and Renewable Energy** R&D falls 7.0 percent to \$276 million, \$76 million less than the request. The House version of the Energy-Water bill criticizes DOE for continuing to invest federal research funds on technologies that already receive private investment rather than more fundamental, peer-reviewed research. Both the House and Senate bills would have cut funding even further than the final funding level. **Nuclear Energy** R&D, however, is favored with a 19.8 percent increase to \$91 million because of congressional concern that nuclear energy has been neglected as a potential non-atmospheric polluting energy source. DOE's R&D on **Fossil Energy** receives \$322 million, an increase of 9.3 percent or \$27 million over the FY 1999 funding level. Although DOE and the House had proposed cuts, the conference funding level is close to the Senate-proposed level. This program funds R&D on more efficient coal, gas, and oil technologies. **Energy Conservation** R&D, however, declines by 3.0 percent to \$388 million. This program aims to develop new technologies for conserving energy in buildings, transportation, and industry, and new ways of energy management.

DOE's defense R&D programs receive large increases, consistent with increases for total defense spending in Republican budget plans. Total DOE defense R&D in FY 2000 is \$3.4 billion, an increase of 5.2 percent over FY 1999.

Despite the controversies over security at DOE weapons labs, the **Stockpile Stewardship** program, the cornerstone of DOE's effort to use science-based methods to ensure the safety and reliability of the nation's nuclear stockpile, receives \$2.3 billion, \$134 million or 6.4 percent more than FY 1999. The additional dollars fund an expansion of the **Accelerated Strategic Computing Initiative** (ASCI; \$316 million, up 5.0 percent), a program to develop the next generation of teraflop computers (capable of several trillions of operations a second) in order to simulate nuclear explosions without nuclear testing. There are large increases for the core stockpile stewardship program, which applies science to weapon stockpile issues through the development of new technologies and processes, and also funds design and engineering activities for weapons. There is also an increase for Inertial Confinement Fusion (\$228 million, up 3.8 percent), a different approach to fusion than the magnetic fusion research funded in the Science account. Construction funding for that program's major facility, the **National Ignition Facility**, declines from its peak funding of \$284 million to \$228 million, unaffected by recent news that the project is now behind schedule and over budget. The bill directs DOE to prepare a revised construction schedule and project budget by next June.

DOE's defense programs, despite increased funding, will be in for turmoil this coming year as they are reorganized into a new semi-autonomous agency within DOE. For much of the year, DOE has been the target of intense criticism over lax security and thefts of classified nuclear information at its three weapons laboratories. The labs (Los Alamos and Sandia in New Mexico, and Lawrence Livermore in California) are operated by contractors but are owned by DOE and report to DOE management. Over the past several months, DOE Secretary Bill Richardson and other top agency officials have been called before Congress several times to respond to a growing chorus of demands to radically reorganize the labs' management and to correct persistent problems in keeping nuclear information secret. A report issued by an advisory board appointed by the President called for the creation of either a semi-autonomous agency within DOE to oversee the labs and other nuclear programs or a separate agency to run DOE's nuclear weapons programs.

In response, after much discussion of possible options, Congress attached legislation to the FY 2000 defense authorization bill creating a new agency within DOE, the **National Nuclear Security Administration (NNSA)**. NNSA is now responsible for ensuring the security and reliability of the nation's nuclear weapons stockpile and promoting nuclear safety in a manner consistent with environmental protection and national security. Although DOE Secretary Bill Richardson had previously opposed the creation of NNSA because a new agency could undermine his authority, last month he reluctantly gave his consent to the provisions in the defense bill, removing the last possible obstacle to President Clinton signing the bill into law on October 5.

The legislation creating NNSA declares that it is responsible for "nuclear weapons development, naval nuclear propulsion, defense nuclear nonproliferation, and fissile material disposition." The agency is headed by a presidentially-appointed and Senate-confirmed Under Secretary for Nuclear Security who also serves as Administrator for Nuclear Security in NNSA. All NNSA employees and NNSA contractors report only to this new Administrator and no one in the non-NNSA parts of DOE, except that the Administrator reports to the Deputy Secretary of Energy and Secretary of Energy who retain ultimate control of NNSA and the rest of DOE. The DOE budget will be reorganized so that NNSA will have its own budget accounts within DOE. In practical terms, this means that all of DOE's defense R&D (in Atomic Energy Defense Activities in the Table) with the possible exception of Environmental Management will become part of NNSA in the next budget.

Despite the creation of the NNSA, President Clinton and Secretary Richardson appear determined to forge their own path in interpreting the law. The President angered Congress by immediately appointing Secretary Richardson as the Under Secretary head of NNSA and giving high-level DOE officials dual appointments to similar jobs in NNSA, thwarting Congress's intention of creating two separate structures staffed by different people. The President appears determined to seek adjustments to the law to allow the Secretary of DOE greater authority over the NNSA. It is unclear at this time whether his unusual appointments are a bargaining tactic, a temporary arrangement until regular appointments can be made, or an act of resistance against the law. Nor is it clear how Congress will act, though there have been threats to make NNSA a completely separate agency.

The Stockpile Stewardship program, at the core of the new NNSA's activities, funds most of the R&D at the three weapons labs which are responsible for the nation's nuclear weapons stockpile and which are at the heart of the DOE security controversy. The contract managers of the labs (the University of California for Los Alamos and Livermore, Lockheed Martin for Sandia) and all laboratory employees will report to NNSA.

The weapons labs, although they rely on the Stockpile Stewardship account to fund most of their R&D, also perform R&D funded through other nondefense accounts, and there is concern that this nondefense work could be negatively affected in NNSA because non-NNSA program managers in DOE who manage DOE nondefense R&D programs now have no direct authority over R&D activities or personnel in the labs. It is unclear at this time how nondefense R&D performed at the three labs will fit into the new organizational structure, and it is equally unclear whether NNSA will implement new restrictions on the flow of scientific personnel and information between the labs and other institutions. (Please see the special July 12 DOE Funding Update for information on R&D funding at the three weapons labs).

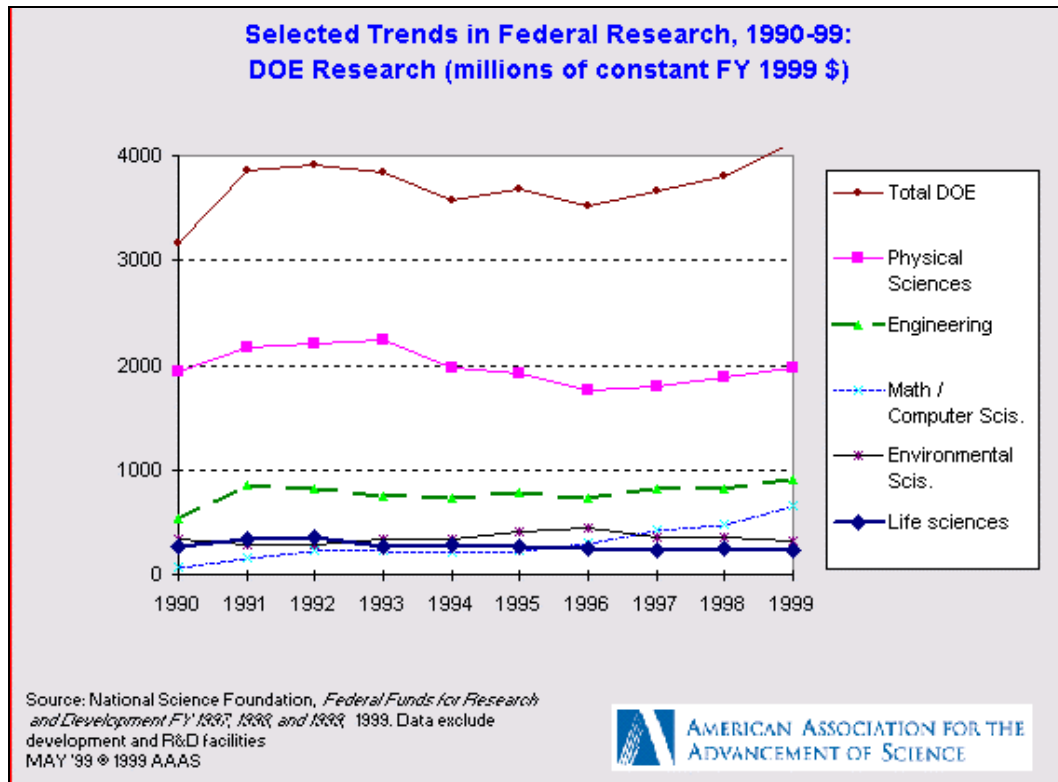


Figure 1.

DOE's R&D budget has had an up-and-down history over the past several years. Figure 1 shows the recent history of DOE's **research** support (excluding development and R&D facilities). Because of the end of the Cold War and tight restrictions on domestic discretionary spending, DOE's research support declined in the mid-1990s, and edged back to its previous funding level last year. The FY 2000 R&D increase should result in a small increase in the total DOE research portfolio. Several disciplines, however, face steep cuts from peak funding levels because of budget cuts in past years. DOE's support of physics research has declined from funding levels of the early 1990s, partially because of the cancellation of the Superconducting Super Collider but also because of recent cuts to high-energy and nuclear physics. In the past few years, increases have helped to recover some of the lost funding, but the FY 2000 increase is barely sufficient to keep pace with inflation. DOE support of research in the life sciences and the environmental sciences has stagnated in recent years because of cuts to the Biological and Environmental Research program and Basic Energy Sciences research support, a trend that is likely to continue in FY 2000 because of cuts in BES and a less-than-inflation increase for BER. DOE support of engineering research, however, has rebounded from cuts in the early 1990s because of an increasing emphasis on the Stockpile Stewardship program. Similarly, DOE support of computer sciences research has surged because of Stockpile Stewardship, especially ASCI, and past increases in the Computational and Technology Research program.

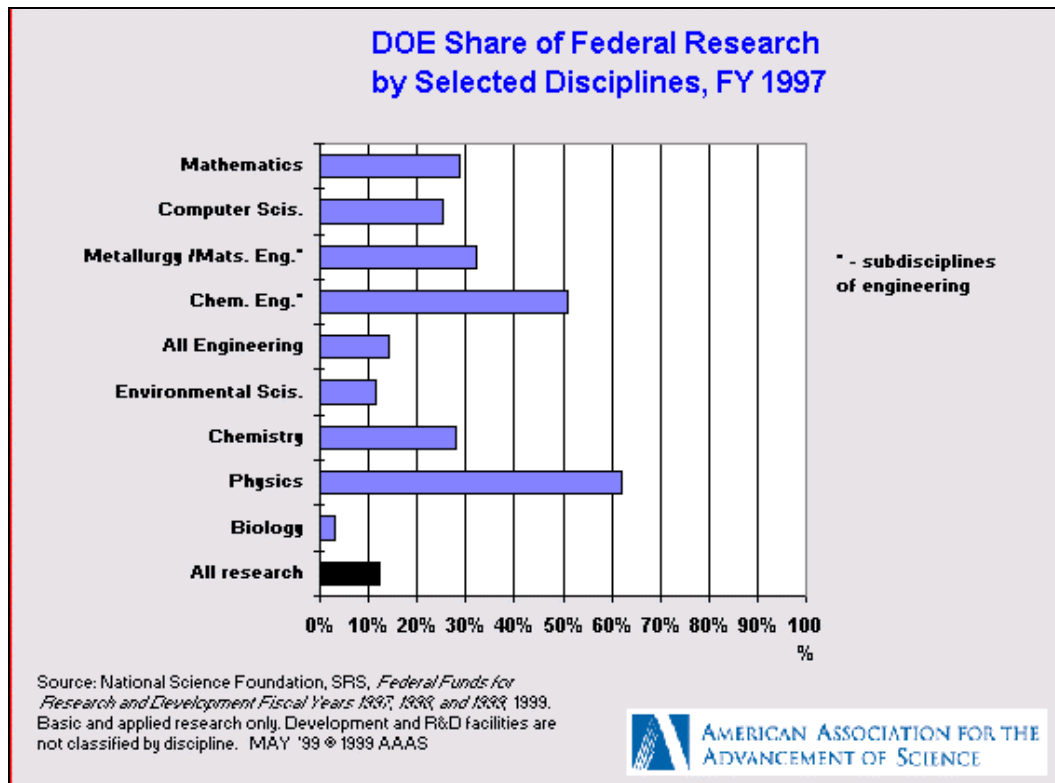


Figure 2.

DOE is a key funding source for research in many disciplines, as shown in Figure 2. Although DOE accounts for only a little more than 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. Among the physical sciences, DOE is also an important supporter of chemistry research, with a little less than 30 percent of total federal support. DOE is second behind only the Department of Defense in its support of mathematics and computer sciences research. 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 a half and a third of total federal support, respectively.

The President signed the Energy-Water bill on September 30, before the start of FY 2000, and signed the defense authorization bill creating NNSA on October 5. Although there will be a transition period to get NNSA organized, the new agency is required to start operations immediately, with a detailed organizational plan due to Congress by January 1. The Interior bill, which funds DOE programs in Fossil Energy and Energy Conservation, has emerged from House-Senate conference but it is uncertain whether the House and the Senate will give final approval. Even if it clears Congress, the President has threatened to veto the bill because of numerous environment-related legislative provisions attached to the bill. If it is vetoed, the bill becomes a likely candidate to be rolled into an omnibus appropriations bill, and it is highly uncertain whether funding levels for its programs will stay the same. Congress may reallocate funds within the bill to satisfy the President's demands, and in addition Congress is seriously considering enacting across-the-board cuts in discretionary spending to get all FY 2000 appropriations under budget targets, which could affect even the programs funded in the Energy-Water bill.

- October 21, 1999 (revised from an earlier version)

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**Table. Department of Energy
House-Senate Conference on R&D in the FY 2000 Budget
(budget authority in millions of dollars)**

	FY 1999 Est.	FY 2000 Request	House-Senate Conference				
			FY 2000 CONF.	Chg. from Request		Chg. from FY 1999	
				Amount	Percent	Amount	Percent
DOE Appropriations Containing R&D:							
1. Energy Supply R&D ¹	373	440	367	-72	-16.5%	-6	-1.5%
2. Fossil Energy R&D	295	289	322	33	11.4%	27	9.3%
3. Energy Conservation	400	477	388	-89	-18.6%	-12	-3.0%
4. Science ¹	2,651	2,778	2,654	-124	-4.5%	3	0.1%
5. Atomic Energy Defense Activities	3,234	3,417	3,400	-17	-0.5%	167	5.2%
6. Clean Coal Technology ²	-40	10	10	0	0.0%	50	-125.0%
7. Radioactive Waste Management	61	55	55	0	0.0%	-6	-10.5%
Total DOE R&D	6,974	7,467	7,197	-270	-3.6%	223	3.2%
Detail of selected appropriations:							
1. Energy Supply R&D ¹							
Solar and Renewables	297	353	276	-76	-21.7%	-21	-7.0%
Nuclear Energy	76	87	91	4	4.6%	15	19.8%
TOTAL Energy Supply ¹	373	440	367	-72	-16.5%	-6	-1.5%
4. Science ¹							
High Energy Physics	689	692	695	3	0.4%	6	0.9%
(Large Hadron Collider)	65	70	70	0	0.0%	5	7.7%
Nuclear Physics	334	343	348	5	1.5%	14	4.3%
Fusion Energy Sciences	222	223	247	25	11.0%	26	11.6%
Basic Energy Sciences	796	888	774	-114	-12.8%	-21	-2.7%
(Spallation Neutron Source)	130	214	118	-96	-44.9%	-12	-9.3%
Computational and Technology Res.	156	199	131	-68	-34.4%	-25	-16.3%
Biological and Environmental Res.	433	411	437	25	6.2%	4	0.8%
Energy Research Analyses	1	1	1	0	-1.1%	0	8.9%
Multiprogram Lab Support	21	21	21	0	-1.1%	0	-1.1%
TOTAL Science ¹	2,651	2,778	2,654	-124	-4.5%	3	0.1%
5. Atomic Energy Defense Activities							
Naval Reactors	650	644	657	13	2.0%	7	1.1%
Weapons Activities	2,180	2,390	2,350	-40	-1.7%	170	7.8%
(Stockpile Stewardship)	2,116	2,286	2,250	-36	-1.6%	134	6.4%
- ASCI ³	301	341	316	-25	-7.3%	15	5.0%
- Inertial Confinement Fusion	219	218	228	10	4.6%	8	3.8%
- National Ignition Facility	284	248	248	0	0.0%	-36	-12.7%
- All Other Stockpile Steward.	1,312	1,480	1,459	-21	-1.4%	147	11.2%
Nuclear Safeguards & Security	24	27	37	10	36.4%	14	58.6%
Intelligence	4	4	4	0	0.0%	0	0.0%
Nonproliferation & Verification R&D	187	191	191	0	0.0%	4	1.9%
Fissile Materials Disposition	54	53	53	0	0.0%	-1	-1.9%
Environmental Management	135	108	108	0	0.0%	-27	-20.0%
TOTAL Atomic Defense	3,234	3,417	3,400	-17	-0.5%	167	5.2%

(continued)

AAAS R&D Funding Update - DOE R&D in FY 2000 House-Senate Conference

DOE R&D by Budget Function:

Defense	3,234	3,417	3,400	-17	-0.5%	167	5.2%
General Science ¹	2,651	2,778	2,654	-124	-4.5%	3	0.1%
Energy ¹	1,089	1,271	1,143	-129	-10.1%	53	4.9%

AAAS estimates. Includes conduct of R&D and R&D facilities.

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

¹ DOE has changed its appropriation account structure. Programs in the General Science and Research account and selected programs in Energy Supply have been shifted to a new "Science" account. The table shows DOE programs under the new account structure.

The final Energy-Water bill applies general reductions to these accounts in order to reduce contractor travel and other overhead expenses. FY 2000 Conference figures distribute general reductions among programs.

² Negative for some years because of deferrals of previously appropriated funds. Table does not reflect FY 2000 deferral of \$156 million in previously appropriated funds.

³ Accelerated Strategic Computing Initiative.

House-Senate conference funding levels.

These figures are final unless additional changes are made in an omnibus appropriations bill.

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

	FY 1999 Estimate	FY 2000 Request	FY 2000 CONF.	House-Senate Conference			
				Chg. from Request		Chg. from FY 1999	
				Amount	Percent	Amount	Percent
Weapons Activities	4,400	4,531	4,444	-87	-1.9%	44	1.0%
Defense Environmental Restoration	4,321	4,506	4,484	-21	-0.5%	164	3.8%
Nuclear Waste and Other Defense	3,660	3,147	3,088	-60	-1.9%	-572	-15.6%
Total DOE defense	12,381	12,184	12,016	-168	-1.4%	-365	-2.9%
Science	2,698	2,835	2,800	-36	-1.3%	102	3.8%
Energy Supply	770	841	639	-202	-24.0%	-131	-17.0%
Fossil Energy	384	364	410	46	12.6%	26	6.8%
Energy Conservation	628	838	689	-148	-17.7%	62	9.8%
Other Energy Programs	187	352	313	-38	-10.9%	127	67.8%
Nondefense Environmental Mngmt.	431	331	334	3	0.8%	-98	-22.6%
Power Marketing Administrations	238	200	262	62	31.2%	25	10.4%
Departmental Administration	141	153	129	-25	-16.0%	-12	-8.2%
Total DOE Budget	17,856	18,098	17,593	-505	-2.8%	-264	-1.5%

Source: Department of Energy budget justification and FY 2000 appropriations bills.

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

Excludes FY 2000 deferral of \$156 million in previously appropriated funds in Clean Coal Technology and other deferrals.

House-Senate conference funding levels.

These figures are final unless additional changes are made in an omnibus appropriations bill.