



AAAS R&D Funding Update July 18, 2003 -

## **House Adds Funds for Office of Science, Boosts Total DOE R&D 4.6 Percent**

### **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 \$3.2 billion for R&D in the House plan, a boost of 4.3 percent or \$133 million in contrast to a requested cut.** The House 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.
- The House would trim the request for DOE's defense R&D activities, but would still provide a \$176 million or 4.6 percent increase for a total of \$4.0 billion.

On July 18, the House of Representatives approved its version of the FY 2004 Energy/Water appropriations bill (HR 2754), which provides funding for the majority of Department of Energy (DOE) programs; on July 17, the full House approved its FY 2004 Interior appropriations bill (HR 2691), which funds the remainder of DOE. Together, the two bills would provide **\$8.6 billion for DOE's R&D programs in FY 2004, \$381 million or 4.6 percent more than FY 2003** (see Table). Under the House plan, R&D in DOE's Office of Science and DOE's energy-related R&D would rise significantly above the request and this year's funding level, but DOE's defense-related R&D would be trimmed from a large requested 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 Senate appropriations for DOE R&D are now available on the AAAS R&D web site.)

The total FY 2004 DOE budget would be \$23.2 billion in the House bills, an increase of nearly \$1 billion above FY 2003 and slightly below the Administration request (see Table). More than two-thirds of the DOE budget goes to defense-related activities involving the U.S. nuclear weapons stockpile and related environmental clean-up costs.

R&D in DOE's **Science program would be a modest winner in the House bill.** Although the Administration proposed flat funding at \$3.1 billion for the third year in a row, the House would add \$141 million to the request for a total of \$3.2 billion in FY 2004, a 4.3 percent boost compared to this year. **All six of Science's major research programs would receive additional funds specifically 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. The Biological and Environmental Research (BER) program would receive \$63 million more than the request for a total of \$562 million (up 6.7 percent), with the additional funds dedicated to increasing operating time at user facilities but also to increase university research grants. BER's facilities have become especially popular in recent years as biomedical researchers have steadily increased their use of DOE facilities. The High Energy Physics, Nuclear Physics, and Basic Energy Sciences would also receive boosts to the request for more user time at facilities. The Basic Energy Sciences account would still decline \$7 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 House would provide additional funds to the Fusion Energy Sciences program to ensure that U.S. participation in an international fusion project will not crowd out domestic research.** The Fusion appropriation of \$268 million would be \$20 million more than this year and \$11 million more than the request. In January, DOE announced that the U.S. would rejoin the International Thermonuclear Experimental Reactor (ITER) project after leaving the \$5 billion international project in 1998, and proposed \$12 million in FY 2004 as the U.S. contribution to the project. In the budget request, the new ITER funding would have necessitated a small reduction in U.S.-based fusion research but the additional House funds would allow for both an ITER contribution and additional domestic fusion research.

**The House would reserve the largest Science increase for Advanced Scientific Computing Research,** whose funding would jump 24.5 percent to \$213 million in contrast to a flat request. Although part of the increase would go, like in the other Science accounts, to increasing user time at DOE supercomputing user facilities, much of the new funding would support the acquisition of additional advanced computing capabilities and additional R&D on next-generation computing and its applications.

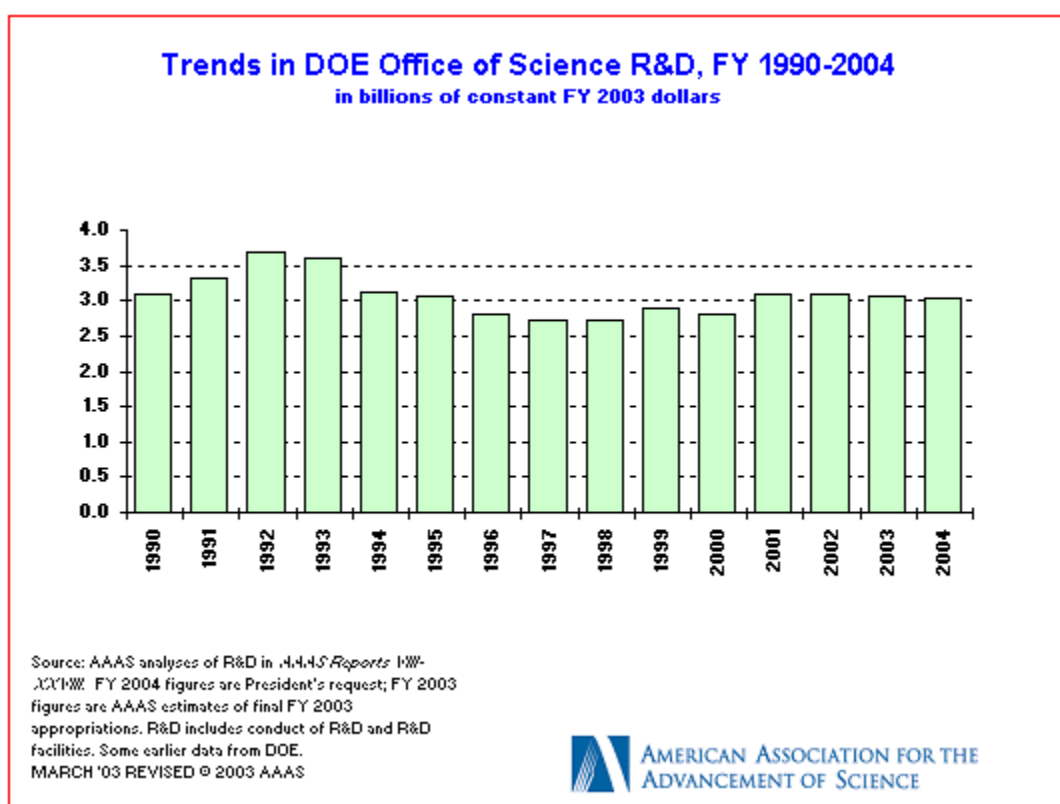


Figure 1. (click on the image to view or download a full-page color PDF version of the chart)

**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.

**The House would boost 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 House would trim the request down to \$68 million, still a sizeable increase over FY 2003, but would leave in place proposed cuts to biomass,

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geothermal, solar, and wind energy research. The overall Solar and Renewables R&D program would decline 2.9 percent to \$233 million. Nuclear energy R&D, however, would receive a substantial boost of 70.1 percent to \$118 million, mostly on R&D to keep the existing generation of nuclear power plants operating safely, with some efforts to develop a next generation of nuclear plants. Total Energy Supply R&D would increase \$42 million to \$351 million because of the increases in nuclear energy and hydrogen.

While the Administration requested a sharp 15 percent cut in **Fossil Energy** R&D, the House would add back some funds for a total of \$471 million, still 2.4 percent below FY 2003. Although the House 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, the House would mostly reverse the Administration's proposed cuts to R&D related to other fossil fuels such as petroleum, natural gas, and other fuels. The House would increase **Energy Conservation** R&D by 10.6 percent over FY 2004 to \$472 million in FY 2004, \$30 million above the request. Among activities that would receive additions to the request are building technologies, distributed energy resources, industrial technologies, and vehicle technology R&D. The House would trim the \$78 million request for fuel cell technologies R&D, part of the Administration's hydrogen fuel cell initiative, down to \$57 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. The House bill contains language expressing 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 House expresses concern that funding for Weapons Activities has been set by Department of Defense military requirements, without sufficient consideration of the impact of budget increases on the rest of the DOE budget. 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 House would trim the request down to \$3.1 billion in FY 2004, still a 6.9 percent increase compared to this year. Within the overall portfolio, the House 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 \$716 million (up 1.6 percent). Inertial Confinement Fusion R&D would rise 1.5 percent to \$512 million, including \$150 million for continued construction of the National Ignition Facility.

### Next Steps

Now that the House has approved both the Energy/Water and Interior bills, action 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 Senate appropriations bills is also 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 House 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  
House Appropriations Committee Action on R&D in the FY 2004 Budget  
(budget authority in millions of dollars)**

|  | FY 2003<br>Estimate | FY 2004<br>Request | Action by House  |                             |                              |                             |                              |
|--|---------------------|--------------------|------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|
|  |                     |                    | FY 2004<br>House | Chg. from Request<br>Amount | Chg. from Request<br>Percent | Chg. from FY 2003<br>Amount | Chg. from FY 2003<br>Percent |
| DOE Appropriations Containing R&D:                     |                     |                    |                  |                             |                              |                             |                              |
| 1. Energy Supply R&D                                   | 309                 | 376                | <b>351</b>       | -26                         | -6.9%                        | 42                          | 13.5%                        |
| 2. Fossil Energy R&D                                   | 483                 | 411                | <b>471</b>       | 60                          | 14.6%                        | -12                         | -2.4%                        |
| 3. Energy Conservation                                 | 427                 | 442                | <b>472</b>       | 30                          | 6.8%                         | 45                          | 10.6%                        |
| 4. Science   | 3,075               | 3,066              | <b>3,208</b>     | 141                         | 4.6%                         | 133                         | 4.3%                         |
| 5. Atomic Energy Defense Activities                    | 3,869               | 4,180              | <b>4,045</b>     | -134                        | -3.2%                        | 176                         | 4.6%                         |
| 6. Clean Coal Technology <sup>1</sup>                  | 0                   | 0                  | <b>0</b>         | 0                           | --                           | 0                           | --                           |
| 7. Radioactive Waste Management                        | 62                  | 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>72</b>                   | <b>0.8%</b>                  | <b>381</b>                  | <b>4.6%</b>                  |
| Detail of selected appropriations:                     |                     |                    |                  |                             |                              |                             |                              |
| 1. Energy Supply R&D                                   |                     |                    |                  |                             |                              |                             |                              |
| Solar and Renewables                                   | 240                 | 250                | <b>233</b>       | -17                         | -6.8%                        | -7                          | -2.9%                        |
| Nuclear Energy   | 69                  | 127                | <b>118</b>       | -9                          | -6.9%                        | 49                          | 70.1%                        |
| <b>TOTAL Energy Supply</b>                             | <b>309</b>          | <b>376</b>         | <b>351</b>       | <b>-26</b>                  | <b>-6.9%</b>                 | <b>42</b>                   | <b>13.5%</b>                 |
| 4. Science <sup>2</sup>                                |                     |                    |                  |                             |                              |                             |                              |
| High Energy Physics                                    | 722                 | 738                | <b>748</b>       | 10                          | 1.4%                         | 26                          | 3.6%                         |
| Nuclear Physics  | 382                 | 389                | <b>399</b>       | 10                          | 2.6%                         | 18                          | 4.6%                         |
| Fusion Energy Sciences                                 | 248                 | 257                | <b>268</b>       | 11                          | 4.2%                         | 20                          | 7.9%                         |
| Basic Energy Sciences                                  | 1,023               | 1,009              | <b>1,017</b>     | 8                           | 0.8%                         | -7                          | -0.7%                        |
| (Spallation Neutron Source)                            | 225                 | 143                | <b>143</b>       | 0                           | 0.0%                         | -82                         | -36.5%                       |
| Adv. Scientific Computing Res.                         | 172                 | 173                | <b>213</b>       | 40                          | 23.1%                        | 42                          | 24.5%                        |
| Biological and Environmental Res.                      | 527                 | 500                | <b>562</b>       | 63                          | 12.5%                        | 35                          | 6.7%                         |
| Energy Research Analyses                               | 1                   | 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>141</b>                  | <b>4.6%</b>                  | <b>133</b>                  | <b>4.3%</b>                  |
| 5. Atomic Energy Defense Activities                    |                     |                    |                  |                             |                              |                             |                              |
| <b>National Nuclear Security Administration (NNSA)</b> |                     |                    |                  |                             |                              |                             |                              |
| Naval Reactors   | 617                 | 632                | <b>631</b>       | -1                          | -0.2%                        | 13                          | 2.2%                         |
| Weapons Activities                                     | 2,922               | 3,256              | <b>3,123</b>     | -133                        | -4.1%                        | 201                         | 6.9%                         |
| (Stockpile R&D)  | 467                 | 433                | <b>404</b>       | -29                         | -6.7%                        | -63                         | -13.5%                       |
| (Science Campaigns)                                    | 255                 | 270                | <b>237</b>       | -33                         | -12.2%                       | -19                         | -7.4%                        |
| (Adv. Simulation and Computing)                        | 704                 | 751                | <b>716</b>       | -35                         | -4.7%                        | 11                          | 1.6%                         |
| (Inertial Confinement Fusion)                          | 504                 | 467                | <b>512</b>       | 45                          | 9.6%                         | 7                           | 1.5%                         |
| -- (Nat'l Ignition Facility Const.)                    | 214                 | 150                | <b>150</b>       | 0                           | 0.0%                         | -64                         | -29.9%                       |
| (All Other Weapons Acts. R&D)                          | 777                 | 1,186              | <b>1,105</b>     | -81                         | -6.8%                        | 328                         | 42.3%                        |
| Nonproliferation & Verification R&D                    | 212                 | 196                | <b>196</b>       | 0                           | 0.0%                         | -17                         | -7.9%                        |
| <b>Total NNSA R&amp;D</b>                              | <b>3,752</b>        | <b>4,084</b>       | <b>3,949</b>     | <b>-134</b>                 | <b>-3.3%</b>                 | <b>198</b>                  | <b>5.3%</b>                  |
| Environmental Management                               | 91                  | 68                 | <b>68</b>        | 0                           | 0.0%                         | -23                         | -25.3%                       |
| Other AEDA R&D   | 27                  | 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>-134</b>                 | <b>-3.2%</b>                 | <b>176</b>                  | <b>4.6%</b>                  |

(continued)

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

DOE R&D by Budget Function:

|                 |       |       |              |      |       |     |      |
|-----------------|-------|-------|--------------|------|-------|-----|------|
| Defense         | 3,869 | 4,180 | <b>4,045</b> | -134 | -3.2% | 176 | 4.6% |
| General Science | 3,075 | 3,066 | <b>3,208</b> | 141  | 4.6%  | 133 | 4.3% |
| Energy          | 1,281 | 1,289 | <b>1,353</b> | 64   | 5.0%  | 72  | 5.6% |

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 18, 2003 - House Appropriations Committee-approved funding levels.**

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

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

|                                  | FY 2003<br>Estimate | FY 2004<br>Request | FY 2004<br>House | Action by House             |                              |                             |                              |
|----------------------------------|---------------------|--------------------|------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|
|                                  |                     |                    |                  | Chg. from Request<br>Amount | Chg. from Request<br>Percent | Chg. from FY 2003<br>Amount | Chg. from FY 2003<br>Percent |
| Weapons Activities (NNSA)        | 5,983               | 6,378              | <b>6,118</b>     | -260                        | -4.1%                        | 135                         | 2.3%                         |
| Other NNSA Activities            | 2,285               | 2,457              | <b>2,391</b>     | -66                         | -2.7%                        | 105                         | 4.6%                         |
| <b>Total NNSA</b>                | <b>8,268</b>        | <b>8,835</b>       | <b>8,508</b>     | <b>-326</b>                 | <b>-3.7%</b>                 | <b>240</b>                  | <b>2.9%</b>                  |
| Defense Environmental Activities | 6,757               | 6,810              | <b>6,748</b>     | -61                         | -0.9%                        | -9                          | -0.1%                        |
| Nuclear Waste and Other Defense  | 832                 | 953                | <b>1,022</b>     | 69                          | 7.2%                         | 190                         | 22.8%                        |
| <b>Total DOE defense</b>         | <b>15,857</b>       | <b>16,597</b>      | <b>16,278</b>    | <b>-319</b>                 | <b>-1.9%</b>                 | <b>421</b>                  | <b>2.7%</b>                  |
| Science                          | 3,295               | 3,311              | <b>3,480</b>     | 169                         | 5.1%                         | 185                         | 5.6%                         |
| Energy Supply                    | 697                 | 862                | <b>692</b>       | -170                        | -19.8%                       | -5                          | -0.8%                        |
| Fossil Energy                    | 621                 | 519                | <b>609</b>       | 90                          | 17.3%                        | -12                         | -1.9%                        |
| Energy Conservation              | 892                 | 876                | <b>879</b>       | 4                           | 0.4%                         | -12                         | -1.4%                        |
| Other Energy Programs            | 383                 | 497                | <b>640</b>       | 143                         | 28.8%                        | 256                         | 66.8%                        |
| Nondefense Environmental Mngmt.  | 214                 | 292                | <b>320</b>       | 28                          | 9.7%                         | 107                         | 50.0%                        |
| Power Marketing Administrations  | 202                 | 207                | <b>207</b>       | 0                           | 0.0%                         | 5                           | 2.6%                         |
| Departmental Administration      | 124                 | 219                | <b>141</b>       | -78                         | -35.7%                       | 17                          | 13.3%                        |
| <b>Total DOE Budget</b>          | <b>22,285</b>       | <b>23,380</b>      | <b>23,247</b>    | <b>-133</b>                 | <b>-0.6%</b>                 | <b>962</b>                  | <b>4.3%</b>                  |

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

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

**July 18, 2003 - House Appropriations Committee-approved funding levels.**

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