# COMMITTEE ON SCIENCE
# U.S. HOUSE OF REPRESENTATIVES

## HEARING CHARTER

### *An Overview of the Federal R&D Budget for Fiscal Year 2005*

**Wednesday, February 11, 2004**
**11:00 a.m. - 1:00 p.m.**
**2318 Rayburn House Office Building**

**1. Purpose**

On Wednesday, February 11, 2004, the House Science Committee will hold a hearing to consider President Bush's fiscal year 2005 (FY05) budget request for research and development (R&D). Five Administration witnesses will review the proposed budget in the context of the President's overall priorities in science and technology. The Science Committee will hold a separate hearing on February 12th to examine the budget request for the National Aeronautics and Space Administration (NASA). Later this year, the Environment, Technology, and Standards Subcommittee will hold a hearing to review the R&D budget of the Environmental Protection Agency (EPA).

**2. Witnesses**

**Dr. John H. Marburger III** is the Director of the Office of Science and Technology Policy (OSTP), the White House science office. Prior to joining OSTP, Dr. Marburger served as President of the State University of New York at Stony Brook and as Director of the Brookhaven National Laboratory.

**Dr. Rita R. Colwell** is the Director of the National Science Foundation (NSF). Before joining the Foundation, Dr. Colwell served as President of the University of Maryland Biotechnology Institute and Professor of Microbiology at the University of Maryland. She was also a member of the National Science Board from 1984 to 1990.

**Dr. Charles E. McQueary** is the Under Secretary for Science and Technology (S&T) at the Department of Homeland Security (DHS). Prior to joining the Department, Dr. McQueary served as President of General Dynamics Advanced Technology systems, and as President and Vice President of business units for AT&T, Lucent Technologies, and as a Director for AT&T Bell Laboratories.

**Mr. Phillip J. Bond** is the Under Secretary for Technology in the Department of Commerce. Before joining the Department, Mr. Bond served as Director of Federal Public Policy for the Hewlett-Packard Company, and previously served as Senior Vice President for Government Affairs and Treasurer of the Information Technology Industry Council.

**Dr. Raymond L. Orbach** is the Director of the Office of Science at the Department of Energy (DOE). Prior to joining the Department, Dr. Orbach was Chancellor of the University of California at Riverside.

## 3. Background

*Overall Budget*

On February 2, 2004, President Bush delivered his FY05 federal budget submission to Congress. The budget proposes $2.4 trillion in outlays (versus an estimated $2.0 trillion in receipts), a 3.4 percent increase over FY04, and an estimated 19.9 percent of the $12 trillion U.S. gross domestic product. The overall budget request focuses heavily on Department of Defense (DOD) and Department of Homeland Security (DHS) activities, which receive 7 and 10 percent increases, respectively. All other discretionary spending is held to 0.5 percent growth.

*Research and Development Budget*

The President's R&D budget proposes to spend $132 billion, an increase of $5.9 billion, or 5 percent, over FY04.[1] Consistent with the overall federal budget, the largest percentage R&D increases will go to DOD and DHS (7 and 15 percent, respectively), while all other agencies receive an average increase of 2.3 percent (table 9). The R&D budget increases are almost entirely for development (8 percent), while basic and applied research are almost flat-funded (0.6 and 0.5 percent increases, respectively).

*Research Budget*

The Federal Science and Technology (FS&T) budget—which differs from the R&D budget in that it excludes funding for defense development, testing, and evaluation—often provides a more useful overall perspective on funding for agencies under the Science Committee's jurisdiction. Funding for FS&T in the FY05 budget declines by 0.4 percent, to $60.4 billion. The FS&T budgets of the Department of Commerce (DOC) and EPA are particularly affected, receiving 12 and 14 percent cuts, respectively.

*Administration Highlights and Perspective*

The Administration points out that, under the proposed budget, R&D overall and the research budgets of some key agencies, such as the National Science Foundation (NSF) would increase at a rate significantly greater than overall domestic discretionary spending. But basic and applied research as a whole would grow at about the same rate as the rest of the discretionary budget.

The Administration also argues that the proposed R&D budget should be compared not just to the figures for FY 04, but to previous years to get a true picture of how R&D is faring. For example, the budget notes that in FY05, 13.5 percent of all discretionary outlays will go to R&D, the highest share in 37 years. The budget also emphasizes that non-defense R&D outlays are at their third highest level in 25 years. Similarly, the budget underscores that funding for total R&D and civilian R&D have increased 44 and 26 percent since FY01, respectively.

In evaluating the budget using FY01 as a baseline, it should be noted that the overall R&D increases are often not representative of trends for individual agencies and scientific disciplines (and that the figures include development funding). For example, R&D at the National Institutes of Health (NIH) and DHS accounts for over two-thirds of the civilian R&D increases over the last four years, while trends at other agencies range from modest increases to significant cuts.

[1] A complete federal R&D spending table is provided at the end of the charter.

The Administration also emphasizes that evaluations of how well agencies and programs are managed is helping to determine the proposed budgets. Agencies are evaluated by the Executive Branch Management Scorecard, which grades agencies with green, yellow and red lights. Agencies under Science Committee jurisdiction generally scored well on these evaluations, in particular NASA and NSF, which were the only agencies among the 26 evaluated to receive more than one green light. The Office of Management Budget selects a number of specific programs to review each year using the Program Assessment Rating Tool (PART). Some R&D programs at both the Department of Energy (DOE) and the EPA receive cuts in the FY 05 proposal because of poor PART scores. NSF programs have scored well.

The budget also emphasizes the Administration's growing concern over Congressional earmarks within R&D accounts. The budget notes that academic earmarks have increased from just $296 million in 1996 to over $2 billion in 2003, and that they now account for 8 percent of all federal funding to colleges and universities.

**4. Primary Issues**

The following highlights flag those areas of greatest interest to the Science Committee:

**Overall Funding Levels and Balance:** The research community (often backed by the Science Committee and the federal agencies themselves) has been calling for substantial increases in R&D. For example, the Congress passed, and the President signed, the NSF Authorization Act, which calls for doubling NSF's budget over five years. The proposed budget falls significantly short over those goals because overall domestic discretionary spending is so tight. The increase for non-defense, non-homeland security R&D in the proposed budget is 2.3 percent. Further, research (basic and applied) is essentially flat-funded while support for development is increased 8 percent (table 9). Also, while the Committee will review the NASA budget request at a later date, the proposed increase for NASA (5.6 percent) may have an impact on the availability of R&D funds for other agencies—especially NSF and EPA, which are both included in the same appropriations bill as NASA (VA-HUD-Independent Agencies Appropriations).

**Physical Science Research:** The FY05 budget request would continue the decade-long trend of flat-funding physical science research. For example, the budget requests $3.42 billion for the Department of Energy's (DOE) Office of Science—the largest single source of funds for civilian physical science research—a decrease of $68 million (2 percent). Even if Congressional earmarks were excluded from the FY04 baseline (as the Administration suggests is appropriate), the requested increase for the Office of Science would only amount to 2 percent. In constant dollars, physical science research is funded at about the same level as in 1993, while biological research has more than doubled.

**NSF Math and Science Partnership Program:** The budget would eliminate the Math and Science Partnership (MSP) program at NSF ($140 million enacted in FY04). MSP, which funds partnerships between local school districts and institutions of higher education to improve K-12 math and science education, was established in the *National Science Foundation Act of 2002* (P.L. 107-368), following the recommendation of the President. After highlighting MSP in the FY03 and FY04 budget requests for NSF, the Administration has proposed moving the program and its funds to the Department of Education. Opponents of the move believe NSF is better suited to run a competitive program that pairs universities with school districts. If moved, the NSF program would be merged with a Department of Education program that focuses exclusively on mathematics for secondary school students, particularly those who are at risk of dropping out of high school because they lack basic skills. Also, by law, the Department of Education program is

distributed to states by formula. As part of its proposal, the Administration wants Congress to amend the law so that the Department could award funds competitively – as NSF already does.

**National Institute of Standards and Technology (NIST):** Overall, NIST receives a 14.5 percent decrease in the FY05 budget request, primarily due to elimination of the Advanced Technology Program (ATP). ATP has long been a contentious program because it assists industrial research. The budget requests a 22 percent increase over the FY04 for NIST's core laboratories, but some of that money is needed to restore funding cut by Congress in FY 04. NIST has not yet provided a final assessment of the impact of those cuts, but it has estimated that 50 to 100 scientists and technical staff may be laid off during the current fiscal year, and work at all labs will be reduced.

**NIST Manufacturing Extension Partnership (MEP):** The FY05 budget requests no increase for the Manufacturing Extension Partnership (MEP), which was cut 67 percent in the FY04 enacted budget. The dramatic reduction in MEP funding for the current fiscal year likely will result the closure of a significant number of MEP centers and satellite offices that provide assistance to small manufacturers to improve their competitive position.

**5. Interagency Research Activities**

**National Nanotechnology Initiative (NNI):** NNI, which involves 10 federal agencies, continues to be a high priority of both the Administration and the Science Committee. The budget requests an estimated[2] $982 million for NNI in FY05, an increase of $21 million, or 2 percent, over the estimated FY04 level. Funding for the five agencies[3] authorized in the *21st Century Nanotechnology Research and Development Act* (P.L. 108-153) is up 8 percent to $609 million, but remains significantly below the $809 million authorized for FY05 in the Act.

**Networking and Information Technology R&D Initiative (NITRD):** NITRD, which has been in existence for many more years than NNI, did not receive an increase. The budget requests $2.0 billion for NITRD in FY05, a 1 percent decrease from the FY04 enacted level.

**Climate Change Research:** The budget requests $2 billion for the interagency Climate Change Science Program (CCSP), approximately the same as enacted in FY04. A strategic plan for CCSP was released in July 2003, but it is unclear to what extent the budget request was guided by that strategic plan. The request for CCSP includes $240 million for the interagency Climate Change Research Initiative (CCRI), a 42 percent increase above the FY04 enacted level. CCRI is intended to target critical scientific uncertainties and deliver results in three to five years. It is unclear, however, how much of the increase for CCRI reflects reprogramming from ongoing research activities in other programs.

**Cybersecurity R&D:** Some increases are proposed for cybersecurity R&D programs in FY05. The budget requests $76 million for cybersecurity R&D and education and training programs at NSF and $18.5 million for cybersecurity R&D at NIST (up 48 percent). These are both significant increases but still well below the levels authorized in the *Cyber Security Research and*

[2] OMB and OSTP estimate agency funding levels for NNI activities, but the data are not entirely consistent from year to year and there are discrepancies arising from the fact that some nanotechnology research may be difficult to identify or classify.

[3] The National Science Foundation, the Department of Energy, the National Institute of Standards and Technology, the National Aeronautics and Space Administration, and the Environmental Protection Agency.

*Development Act* (P.L. 107-305).[4] Within the DHS Science and Technology (S&T) Directorate, the FY05 budget requests $18 million for cybersecurity R&D, the same level as in FY04.

**The National Earthquake Hazards Reduction Program (NEHRP):** NEHRP is a multi-agency program administered by the Federal Emergency Management Agency (FEMA), U.S. Geological Survey (USGS), NIST, and NSF. The President's overall FY05 request for NEHRP is $114.5 million, including $45.7, $46.5, $20.5, and $1.8 million, respectively, for NSF, USGS, FEMA, and NIST. These amounts are roughly flat compared to FY04 levels. The House passed a reauthorization bill for NEHRP last year, which is pending in the Senate.

Budget tables for NNI, NITRD, and CCSP are provided in Appendix I.

## 6. Agency R&D Highlights

### National Science Foundation (NSF)

The National Science Foundation is the primary source of federal funding for non-medical basic research conducted at colleges and universities and serves as a catalyst for science, technology, engineering, and mathematics education reform at all levels.

The FY05 budget request for NSF is $5.75 billion, an increase of 3.0 percent, or $167 million over the FY04 level. This is $1.6 billion below the funding level in the *National Science Foundation Authorization Act of 2002* (P.L. 107-368). In the budget proposal, the largest percentage increases are for personnel and administrative initiatives, as well as construction of major research facilities. The Research and Related Activities (RRA) account, which contains the funds for most of NSF research grants programs, receives a 4.7 percent increase. However, actual spending on research programs would increase by only 2.8 percent because the Administration transfers into the research account funds that would be used to close out a discontinued education program.

NSF continues to receive high marks from the Office of Management and Budget for the quality of its management and for the excellence of its programs. As in the FY04 budget request, NSF was awarded two green lights on the Executive Branch Management Scorecard. Also, in the past year, four NSF programs were examined using the Program Assessment Rating Tool (PART): Nanoscale Science and Engineering, Information Technology Research, Facilities, and Individuals (programs directed toward math, science, and engineering education and training of students at the K-12, undergraduate, and graduate levels). All received ratings of Effective (the highest rating), and the three continuing programs received substantial budget increases.[5]

*Issues/Questions Raised by the FY05 Request for NSF*

**Education and Human Resources (EHR):** In addition to eliminating the MSP program as discussed above, the FY05 budget request would cut other NSF education programs at the K-12 and undergraduate levels. For example, the Science, Mathematics, Engineering, and Technology

[4] For FY05, NSF cybersecurity programs are authorized to be $128 million and NIST cybersecurity programs are authorized to be $61 million.

[5] Nanoscale Science and Engineering is up 22 percent, Facilities is up 12 percent, and the "Individuals" category (programs focused on education and training) is up 11 percent. (All percentages compare the FY05 request with the FY04 enacted level.) The Information Technology Research program will be terminated in FY04, as scheduled.

Talent Expansion Program (known as STEP or the Tech Talent program) established in the *National Science Foundation Authorization Act of 2002* (P.L. 107-368) would receive $15 million in FY05, a decrease of $9.85 million (40 percent) from the FY04 enacted level of $24.85 million. Tech Talent funds innovative programs at colleges and universities designed to increase the number of American undergraduates completing degrees in math, science, and engineering. The Robert Noyce Scholarship Program, which was reauthorized in the 2002 Act, would receive $4 million in FY05, a decrease of $3.95 million (50 percent) from the FY04 enacted level of $7.95 million. The program offers scholarships to math and science majors at the junior and senior undergraduate level, and stipends to math and science professionals, who are seeking to become K-12 math and science teachers.

**Major Research Equipment and Facilities Construction (MREFC):** The FY05 budget request proposes $213.27 million for this account, 37 percent above the FY04 level. The request includes three continuing projects and three new starts: National Ecological Observatory Network (NEON), Scientific Ocean Drilling Vessel (SODV), and Rare Symmetry Violating Processes (RSVP). The budget does not provide the rationale for starting these three projects from among those in the queue.

**Organization and Management:** Nearly half of the $167 million increase requested for NSF in FY05 is slated for the Salaries and Expenses (S&E) account. The FY05 budget requests $294 million for S&E, an increase of $75 million (34 percent) over the FY04 enacted level of $219 million. Most of the proposed increase for S&E—$47.1 million—would be used to buy or lease new computer and networking equipment and services. The budget does not explain the reason for the large increase. The budget does not request significant new funds for personnel, although staffing has not kept up with the increases in the number of grants being awarded, and the Inspector General has raised concerns about NSF's ability to manage grants with its existing staff.

**Table 1. National Science Foundation**

FY05 Budget Request (dollars in millions)

(Source: Agency Budget Justification)

| Account | FY03 Actual | FY04 Enacted | FY05 Request | Amount Change | Percent Change |
|---|---|---|---|---|---|
| RRA | 4054.4 | 4251.4 | **4452.3** | 201.0 | 4.7% |
| BIO | 570.5 | 586.9 | 599.9 | 13.0 | 2.2% |
| CISE | 589.3 | 604.7 | 618.1 | 13.4 | 2.2% |
| ENG | 541.7 | 565.1 | 575.9 | 10.8 | 1.9% |
| GEO | 691.8 | 713.1 | 728.5 | 15.4 | 2.2% |
| MPS | 1040.7 | 1091.5 | 1115.5 | 24.0 | 2.2% |
| SBE | 158.6 | 175.7 | 190.7 | 15.0 | 8.5% |
| OISE | 40.0 | 28.1 | 34.0 | 5.9 | 21.1% |
| OPP | 324.0 | 342.2 | 349.7 | 7.6 | 2.2% |
| IA* | 97.9 | 144.1 | 240.0 | 95.9 | 66.5% |
| EHR | 903.2 | 939.0 | **771.4** | -167.6 | -17.9% |
| MRE | 148.5 | 155.0 | **213.3** | 58.3 | 37.6% |
| S&E | 189.1 | 218.7 | **294.0** | 75.3 | 34.4% |
| OIG | 9.2 | 9.9 | **10.1** | 0.17 | 1.7% |
| NSB | 3.5 | 3.9 | **4.0** | 0.07 | 1.8% |
| **Total** | **5308** | **5578** | **5745** | **167.2** | **3.0%** |

Acronyms:

RRA = Research and Related Activities

EHR = Education and Human Resources

MREFC = Major Research Equipment and Facilities Construction

S&E = Salaries & Expenses

OIG = Office of Inspector General

NSB = National Science Board

BIO = Biological Sciences

CISE = Computer & Information Science & Engineering

ENG = Engineering

GEO = Geosciences

MPS = Mathematical and Physical Sciences

SBE = Social, Behavioral, and Economic Sciences

OISE = Office of International Science & Engineering

OPP = Office of Polar Programs

*IA = Integrative Activities (increase due to redirection of Math and Science Partnership program from EHR)

**Homeland Security R&D**

*Homeland Security R&D at the Department of Homeland Security (DHS)*

The budget requests $1.2 billion for R&D in DHS, a 15 percent increase over the FY04 enacted level. The primary focus of the DHS effort would continue to be on development ($750 million, or 62 percent of the total DHS R&D FY05 request), but the budget does propose a significant increase in funding devoted to basic research ($153 million, up $106 million from FY04).

Although R&D is also funded in other directorates, the bulk of the department's proposed R&D expenditures, about $1 billion, is requested for the DHS Science and Technology (S&T) Directorate, an increase of $126 million (14 percent) over the FY04 enacted level. Most of this increase is directed toward biological countermeasures activities, including an expansion of BioWatch[6] coverage in high-threat cities, piloting an integrated warning and assessment system for bioattacks, and safety/compliance and security upgrades to the infrastructure of the Plum Island Animal Disease Center.

The FY05 budget request proposes to commence consolidation of the department's R&D programs into the S&T Directorate by transferring of $24 million worth of R&D activities from the U. S. Coast Guard and from the Federal Air Marshal Service. Significant R&D programs would remain outside of the S&T Directorate, mainly the $154 million R&D program in the Transportation Security Administration.[7]

S&T Directorate funding is split among various technical portfolio areas, such as biological countermeasures, nuclear and radiological countermeasures, support of conventional DHS missions (such as the Secret Service), and threat and vulnerability testing and assessment (TVTA); a complete list of portfolios and their funding is provided in table 2. Cybersecurity R&D, an element of TVTA, would receive $18 million (the same level as in FY04).[8]

*Homeland Security R&D at Other Agencies*

Approximately $2.4 billion is proposed for homeland security R&D programs in departments and agencies outside of DHS. The bulk of this funding, $1.7 billion (up 7.5 percent from FY04), is for biodefense programs at the NIH, such as basic research on infectious microbial agents, applied research on diagnostics, vaccines, and therapies, and construction of bio-safety facilities. The remaining funds (approximately $700 million) go to a number of other agencies, such as: EPA for research on detection of chemical and biological agents in the water supply (other homeland security R&D activities at EPA are cut, so this item may be controversial); the U.S. Department of Agriculture (USDA) for expanding the nation's laboratory capabilities for animal disease diagnosis and research; DOD for detection systems, protective gear, and vaccines for biological and chemical agents; and DOE's National Nuclear Security Administration for research on detection and attribution of radiological and nuclear materials.

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[6] BioWatch is a system of sensors in various cities that is designed to rapidly detect trace amounts of biological materials in the air so as to provide early warning of the release of a bioagent.

[7] *The Homeland Security Act of 2002*, which created DHS, requires the Transportation Security Administration to be maintained as a distinct entity through November 25, 2004.

[8] At DHS, operational cybersecurity programs, such as national alerts about existing computer and network vulnerabilities and technical support for other federal agencies' implementation of cybersecurity activities, are located in the National Cyber Security Division of the Information Analysis and Infrastructure Protection Directorate, for which roughly $79 million (level funding) has been requested for FY05.

In its first year of existence, the DHS S&T Directorate has begun to build relationships with other agencies and some successful coordination of projects has occurred. For example, DHS and NSF provided joint funding for a cybersecurity test bed, and DHS and NIST worked together on issuing standards for first responders' equipment.

*Issues/Questions Raised by the FY05 Request for DHS*

**Balance Between Internal and External Programs within the S&T Directorate:** The Science Committee is interested in the balance between R&D conducted within the Department and at national laboratories,[9] and extramural R&D funded through a competitive, merit-reviewed grant process. The balance is not discernible in the FY05 budget request. The request for DHS S&T presents proposed funding levels by technical topic, not by organizational unit or research performer. No information is provided about how these funds will be expended—whether through programs at the national laboratories, grants to industry and others through Homeland Security Advanced Research Projects Agency (HSARPA), or through contracts for prototype development.

**Transitioning Technology from Development to Operations:** The DHS S&T Directorate has responsibility for the full range of R&D, from basic research through prototype demonstrations. In order for the directorate to devote resources to all elements of the R&D process, successful technologies will have to be passed off to operational units within DHS or elsewhere. It is not clear, however, that the Directorate has a process in place to effect such transitions.

[9] National laboratories available for use by the DHS S&T Directorate include the DOE laboratories, the National Biodefense Analysis and Countermeasures Center, and the Plum Island Animal Disease Center.

**Table 2. DHS Science and Technology Directorate**

FY 2005 Budget Request (dollars in millions)
(Source: Agency Budget Justification)

| Account | FY03 Actual | FY04 Enacted | FY05 Request | Amount Change | Percent Change |
|---|---|---|---|---|---|
| Biological Countermeasures (including NBACC, BioWatch, and Plum Island)# | NA | 285.0 | 407.0 | 122.0 | 42.8% |
| Nuclear and Radiological Countermeasures | NA | 126.3 | 129.3 | 3.0 | 2.4% |
| Chemical Countermeasures | NA | 52.0 | 53.0 | 1.0 | 1.9% |
| High Explosives Countermeasures | NA | 9.5 | 9.7 | 0.2 | 2.1% |
| TVTA (including CIP and Cybersecurity*) | NA | 100.1 | 101.9 | 1.8 | 1.8% |
| ManPADS | NA | 60.0 | 61.0 | 1.0 | 1.7% |
| Support of DHS Conventional Missions | NA | 34.0 | 34.0 | 0.0 | 0.0% |
| Rapid Prototyping Program/TSWG | NA | 73.0 | 76.0 | 3.0 | 4.1% |
| Standards/State and Local Programs | NA | 39.0 | 39.7 | 0.7 | 1.8% |
| Emerging Threats | NA | 21.0 | 21.0 | 0.0 | 0.0% |
| University Centers and Fellowship Programs | NA | 68.8 | 30.0 | -38.8 | -56.4% |
| Transferred R&D Programs** | | 0.0 | 24.2 | 24.2 | NA |
| Administration/Salaries | NA | 44.2 | 52.6 | 8.3 | 18.9% |
| **Total** | **561.0** | **912.9** | **1039.3** | **126.4** | **13.8%** |

Acronyms:
NBACC = National Biodefense Analysis and Countermeasures Center
TVTA = Threat and Vulnerability, Testing and Assessment
TSWG = Technical Support Working Group
CIP = Critical infrastructure protection
RDT&E = Research, Development, Test, and Evaluation

# Increase to Biological Countermeasures (~$120M) is mainly due to increases in Bio-Surveillance activities (+$65M) and Plum Island Animal Disease Center (+$12.9M).

* Cybersecurity is at $18.0 M in both FY04 and FY05.

** Programs transferred into DHS S&T from elsewhere in DHS include:
Coast Guard RDT&E Activities ($13.5 M)
U.S. Fire Administration RDT&E Activities ($0.65 M)
Federal Air Marshal Service RDT&E Activities ($10 M)

**National Institute of Standards and Technology (NIST)**

*NIST's Laboratory Programs*

The FY05 budget requests $422 million for a wide range of research conducted at NIST laboratories in Gaithersburg, Maryland and Boulder, Colorado. The request is $85 million (22 percent) above the FY04 enacted level of $337 million. This request is less of a jump than it initially appears. Congress cut the NIST laboratory programs by $22 million in FY04, so some of the increase is needed simply to restore NIST to its former level. Another $25.7 million of the increase is for one-time expenses at the new Advanced Measurement Laboratory (see below). Another NIST has not provided a final assessment of the impacts of the FY04 appropriation, but it has estimated that 50 to 100 scientists and technical staff may be laid off, and work at all labs will be reduced.

*Cybersecurity*

The FY05 budget requests $18.5 million for cybersecurity R&D at NIST, an increase of $6 million (48 percent) over the FY04 enacted level. With the additional funding, NIST would work with industry and government agencies to accelerate the development of more secure computer and communications infrastructure, and expand and develop stronger cryptographic standards for hand-held wireless technology.

*Advanced Measurement Laboratory Equipment*

The Advanced Measurement Laboratory in Gaithersburg, Maryland is scheduled for completion this year. The requested increase for NIST's laboratory programs includes $25.5 million (non-recurring) to outfit the Advanced Measurement Laboratory with state-of-the-art metrology equipment required to maximize the usefulness of this facility. The ability of NIST to perform other research proposed for FY05, including that which would be funded by the President's requested $12 million increase for nanomanufacturing and nanometrology, will depend on the timely outfitting of this laboratory.

*Advanced Technology Program (ATP) and Manufacturing Extension Partnership (MEP)*

Both ATP and MEP are largely extramural (outside of the laboratories) grant programs administered by NIST. The goal of ATP is to provide grants in to "bridge the gap between the research laboratory and the marketplace" through grants to the private sector. ATP seeks to fund development of pre-competitive, emerging, and high-risk technologies that promise significant benefit. MEP funds state and regional centers that help small U.S. manufacturers adopt advanced manufacturing technologies, techniques, and best business practices.

The President's FY05 budget proposes to eliminate ATP. (The FY04 enacted level for ATP is $179 million.) Unlike previous proposals to eliminate ATP, this budget provides no money for close-out costs, which include funds for completing multi-year awards made in previous years and continuing funding for internal NIST laboratory work related to ATP proposals.

The request for MEP is $39 million, equal to the FY04 enacted level, which represents a 67 percent cut from the FY03 enacted level of $106 million. The dramatic reduction in MEP funding enacted for FY04 is expected to lead to the closure of a significant number of regional MEP centers. There are currently 60 MEP centers and 300 satellite offices.

*Issues/Questions Raised by the FY05 Request for NIST*

**Impact of FY04 Enacted Budget on NIST's Core Laboratory Programs:** NIST has not resolved how to implement the significant funding reductions for its core laboratory programs that were included in the FY04 enacted budget, including possible lay-offs and program reductions. It is not clear how these reductions will affect NIST's ability to undertake the new initiatives proposed in the FY05 budget request.

**Impact of Proposed Elimination of ATP:** The FY05 budget request proposes to eliminate ATP, but provides no funds to close out obligations incurred through multi-year ATP awards granted during the current fiscal year. These costs could be as high as $30 million. Moreover, ATP is expected to fund an estimated $13 million worth of R&D conducted at the NIST laboratories in FY04.

**Impact of Scaling Back MEP:** It is unclear how the MEP program would function at the levels proposed by the Administration. The Administration has already proposed to re-compete all centers, but it is unclear what criteria will be used, how many centers will be continued or created, or how they will be organized.

## Table 3. National Institute of Standards and Technology

FY 2005 Budget Request (dollars in millions)
(Source: Agency Budget Justification)

| Account | FY 03 Enacted | FY 04 Enacted | FY 05 Request | Amount Change | Percent Change |
|---|---|---|---|---|---|
| **STRS** | **357.1** | **344.4** | **422.9** | **78.5** | **22.8%** |
| EEE | 45.4 | 44.7 | 55.8 | 11.1 | 24.8% |
| ME | 21.0 | 21.8 | 29.6 | 7.8 | 35.7% |
| CST | 40.1 | 42.3 | 50.1 | 7.8 | 18.5% |
| Physics | 35.3 | 37.7 | 42.2 | 4.6 | 12.1% |
| MSE | 56.2 | 53.0 | 62.7 | 9.7 | 18.3% |
| BFR | 21.4 | 21.5 | 23.6 | 2.1 | 9.5% |
| CSAM | 52.7 | 49.5 | 57.9 | 8.4 | 16.9% |
| TA | 17.6 | 15.0 | 17.4 | 2.4 | 16.3% |
| NQP | 5.2 | 5.7 | 5.4 | -0.3 | -4.5% |
| RS | 62.3 | 53.2 | 78.1 | 24.9 | 46.8% |
| **ITS** | **284.8** | **218.8** | **39.2** | **-179.6** | **-82.1%** |
| ATP | 178.8 | 179.2 | 0.0 | -179.2 | -100.0% |
| MEP | 105.9 | 39.6 | 39.2 | -0.4 | -1.1% |
| **Construction** | **65.7** | **65.0** | **59.4** | **-5.5** | **-8.5%** |
| **TOTAL** | **423.1** | **628.1** | **521.5** | **-106.6** | **-17.0%** |

Acronyms:
STRS = Scientific and Technical Research Services
EEE = Electronics and Electrical Engineering
ME = Manufacturing Engineering
CST = Chemical Science and Technology
Phys = Physics
MSE = Materials Science and Engineering
BFR = Building and Fire Research
CSAM = Computer Science and Applied Mathematics
TA = Technology Assistance
NQP = National Quality Program
RS = Research Support
ITS = Industrial Technology Service
ATP = Advanced Technology Program
MEP = Manufacturing Extension Partnership

**National Oceanic and Atmospheric Administration (NOAA)**

The FY05 budget requests $3.4 billion for NOAA, a decrease of $308 million (8.3 percent) compared to the FY04 enacted level of $3.7 billion. NOAA's FY04 budget includes approximately $540 million worth of Congressional earmarks. If earmarks are removed from the FY04 baseline, then the President's budget could be construed as proposing an additional $230 million for NOAA in FY05.

*National Weather Service*

The FY05 budget requests $837 million for the National Weather Service (NWS), an increase of $12 million (1.5 percent). The request reflects the transfer of two programs from the Office of Oceanic and Atmospheric Research (OAR) to NWS—the Space Environment Center ($7.5 million request) and the U.S. Weather Research Program ($6.6 million request). NOAA's request for the Space Environment Center is an increase of $2.2 million over the FY04 enacted level of $5.3 million. The Subcommittee on Environment, Technology, and Standards held a hearing last year on the activities of the Center (which predicts the effects of solar storms) that helped establish the value of the Center to the nation.

*Climate Change Research*

The FY05 budget request includes a $13.5 million increase in climate change research and observations at NOAA. Most of the increase is to support the President's Climate Change Research Initiative (CCRI), which focuses on priority areas, such as ocean observations ($11 million), aerosol research ($7 million), and carbon cycle research ($6.5 million).

## *Satellite Acquisition*

The FY05 budget requests $898 million for satellite programs at NOAA. This request is a $71 million (8.6 percent) increase over the FY04 enacted level of $827 million. The increase is for procurement, acquisition, and construction of the next generation of weather satellites, and is in line with the long-term budget plans for these satellite systems. Polar weather satellites are vital for three- to seven-day weather forecasts, tracking of severe weather such as hurricanes, and for climate observations. In September 2003, the last of the current generation of polar satellites was severely damaged in an accident during construction. Unless this satellite can be repaired or replaced, there will be gap in polar weather satellite coverage of at least 21-months (the time until the next generation polar satellite is scheduled to be launched). A report assessing whether the satellite can be repaired and the costs associated with that repair is scheduled to be released in April.

*Issues/Questions Raised by the FY05 Request for NOAA*

**Weather Satellite Coverage Gap:** The Committee is concerned that the costs of repairing or replacing the satellite that was damaged during construction last year is not included in the FY05 request. If the satellite cannot be repaired and funding levels for the next generation is not increased significantly, there will be a gap in polar satellite coverage at the end of this decade. The current projection for the cost of the next generation polar satellite system has risen from $6.5 billion to $7.4 billion, without taking into account the recent accident. The Committee has asked the General Accounting Office (GAO) to examine the costs and risks associated with NOAA's satellite program.

**Organization of Research at NOAA**: In the legislative reports accompanying the FY04 Commerce, State, Justice appropriations bills in the House and Senate, NOAA was asked to examine its research enterprise and deliver a report on (1) the costs and benefits of dissolving Office of Oceanic and Atmospheric Research (OAR) and distributing its activities among the other program offices, and (2) a plan for consolidating its laboratories. NOAA quickly assembled a subcommittee of its Science Advisory Board to examine the issue. The subcommittee provided its observations and recommendations to NOAA in January 2004. It appears that based on this review process, NOAA moved programs from OAR to NWS in the FY05 request. The Committee is concerned that NOAA is beginning to implement major structural changes to its research enterprise without fully examining the ramifications or consulting with the authorizing committees.

## Table 4. National Oceanic & Atmospheric Administration

FY 2005 Budget Request (dollars in millions)
(Source: Departmental Budget Justification)

| Account | FY03 Actual | FY04 Enacted | FY05 Request | Amount Change | Percent Change |
|---|---|---|---|---|---|
| NOS | 485 | 606 | **394** | -212 | -35.0% |
| ORF | 415 | 506 | 379 | -127 | -25.1% |
| PAC | 70 | 100 | 15 | -85 | -85.0% |
| OAR | 389 | 414 | **361** | -53 | -12.8% |
| ORF | 372 | 393 | 350 | -43 | -10.9% |
| PAC | 17 | 21 | 11 | -10 | -47.6% |
| NWS | 746 | 825 | **837** | 12 | 1.5% |
| ORF | 702 | 722 | 749 | 27 | 3.7% |
| PAC | 44 | 103 | 88 | -15 | -14.6% |
| NESDIS | 640 | 827 | **898** | 71 | 8.6% |
| ORF | 149 | 152 | 149 | -3 | -2.0% |
| PAC | 491 | 675 | 749 | 74 | 11.0% |
| Program Support[1] | 253 | 363 | **277** | -86 | -23.7% |
| ORF | 169 | 323 | 240 | -83 | -25.7% |
| PAC | 84 | 40 | 37 | -3 | -7.5% |
| NMFS | 603 | 760 | **735** | -25 | -3.3% |
| Transfers | 14 | -106 | **-121** | -15 | N/A |
| **Total** | **3,130** | **3,689** | **3,381** | **-308** | **-8.3%** |

NOS = National Ocean Service, which manages the nation's coastal and ocean ecosystems.

OAR = Office of Oceanic and Atmospheric Research, which conducts research, in weather, climate, coastal, ocean and Great Lakes, and living marine resources topics.

NWS = National Weather Service

NESDIS = National Environmental Satellite Data Information Service, which acquires and manages the Nation's operational weather satellites and satellite data.

[1]Program Support includes Fleet and Aircraft Maintenance and NOAA headquarters accounts.

NMFS = National Marine Fisheries Service, which is budgeted under NOAA, but is under jurisdiction of the Resources Committee.

ORF = Operations, Research and Facilities

PAC = procurement, Acquisition and Construction

**Department of Energy (DOE)**

The FY05 request for civilian R&D at DOE—$5.0 billion—represents a decrease of 4 percent from FY04 enacted levels.[11] The Administration's top funding priorities for energy and science programs are hydrogen R&D, fusion, nanotechnology, and the programs of the Office of Electric Transmission and Distribution.

*Office of Science*

The FY05 budget requests $3.43 billion for the Office of Science, a decrease of $68 million (2 percent) from the FY04 enacted level. The Administration describes this as a 2 percent increase, if one excludes Congressional earmarks from the FY04 baseline. The budget is far below the $.1 billion level authorized in H.R. 6, *The Energy Policy Act of 2003*, which the House passed last year.

The budget request includes funds to begin planning and construction of several major new facilities, such as the Linac Coherent Light Source, a Protein Production and Tags Facility, and the U. S. share of the International Thermonuclear Experimental Reactor (ITER).

The budget requests $264 million for fusion research, an increase of $1.6 million (0.6 percent) from the FY04 enacted level of $263 million, but that increase is not large enough to accommodate U.S. participation in ITER in FY05 without cutting other existing parts of the fusion program.

The FY05 budget request proposes significant decreases in funding for Biological and Environmental Research (BER)—$502 million requested, a decrease of $140 million (22 percent) from the FY04 enacted level of $641 million. Much of the reduction in BER reflects elimination of earmarks or projects that have been completed. The budget also cuts the Science Laboratories Infrastructure account nearly in half—$29 million requested, a decrease of $25 million (46 percent) from the FY04 enacted level of $54 million.

*Applied Energy Programs*

The budget continues the trend of cutting most energy efficiency and renewable programs to fund hydrogen research and weatherization. Excluding the hydrogen/FreedomCar activities, efficiency and renewable R&D for FY05 is $656 million, a cut of 10 percent ($72 million) from the FY04 enacted level of $727 million.

In fossil energy, the budget increases coal programs by $108 million (60 percent), primarily to fund the FutureGen project, which would build a new coal plant to experiment with the sequestration of carbon dioxide. These increases come at the expense of the stationary fuel cell program (Distributed Generation), cut by $49 million (68 percent), to $23 million; as well as other coal programs. The budget proposes to rescind the funds for several Clean Coal projects that never got off the ground and to close the Clean Coal Technology account, moving most of the money to the base Fossil R&D program. This follows what the appropriators have been doing piecemeal for several years.

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[11] Unlike the Administration's Federal Science and Technology Funding Table 5-3 on page 61 of *Analytical Perspectives*, these figures include the $140 million rescission from the Clean Coal Technology Account.

Oil and gas programs are also cut: oil technology by 57 percent (-$20 million, to $15 million) and gas technology by 39 percent (-$17 million, to $26 million). These two programs were among the few rated ineffective by OMB using its Program Assessment and Rating Tool (PART).

The new Office of Electric Transmission and Distribution receives a $10 million increase (13 percent, to $91 million), half of which is for R&D programs, and half of which is for program direction for personnel increases. Despite the increased resources, some elements of the Office were cut. Electricity storage R&D, vital to emerging technologies such as wind, fuel cells, and solar-generated electricity, is cut by $5 million (56 percent, to $4 million). (The sister program in EERE—Distributed Energy—cited by witnesses at a September 2003 Energy Subcommittee briefing as being crucial for reliability—is cut by 13 percent (to $53 million)).

In the nuclear area, large increases for Idaho facilities management (up $33 million, 43 percent) come at the expense of nuclear energy R&D, which receives a 26 percent cut (-$34 million, to $96 million) in the budget.

*Issues/Questions Raised by the FY05 Request for DOE*

**Physical Science Research:** Funding for the physical sciences has remained essentially flat for at least a decade. The proposed cuts to the Office of Science—the single largest source of federal funds for civilian physical science R&D—continue the pattern even though the Administration had signaled that physical science and engineering research activities would be given additional consideration during the FY05 budget cycle.

**Twenty-year Facilities Plan:** The Office of Science recently released a 20-year plan for the acquisition and construction of experimental facilities for the physical sciences. That plan was based on the budget numbers contained in H.R. 6, *The Energy Policy Act of 2003.* While the budget proposes to move forward with several of these facilities, including ITER, the Protein Production and Tag Facility and Linac Coherent Light Facility, the budget request for DOE's Office of Science declines in the face of these increasing future facility commitments, raising questions about the ability to meet these long-term goals without reducing existing programs.

**Third-Party Financing for Science Infrastructure:** The cuts to DOE's Science infrastructure funding run counter to complaints from the scientific community about deteriorating facilities throughout DOE's complex of laboratories. The Administration says that its current plan is to have new facilities built and owned by private entities, with DOE as the tenant. This approach can increase the cost to the government over the life of the building (even though it reduces up-front costs). Third party financing can also create incentives that can distort the activities of government programs to meet the needs of building owners.

**Hydrogen R&D:** The budget requests a significant increase for R&D on infrastructure for hydrogen as a fuel for transportation, to be offset by cuts in energy efficiency R&D, the area of research that likely has the most rapid payoff in terms of reducing our dependence on imported energy. The recently released National Academies of Science (NAS) study, *The Hydrogen Economy: Opportunities, Costs, Barriers, and R&D Needs*, emphasizes that hydrogen R&D efforts need to be approached in a systems analysis framework to "integrate them with other DOE energy efforts." The report also notes that fuel cell technology necessary for transportation is at least a decade away, and the budget sends conflicting signals, cutting funding for stationary fuel cells and increasing funding for transportation fuel cells and basic research. This report raises additional questions regarding the coordination and execution of this long-term effort.

**FutureGen**: The budget makes a $237 million commitment to the controversial FutureGen project, which would build a new coal power plant to demonstrate the sequestration of carbon dioxide in geological formations. The Department's plans for the project include cutting-edge equipment throughout the facility, which will both raise the cost and increase the chances of failure. Further, the Administration's proposed legislative language would remove taxpayer protections, such as cost sharing, from the project requirements.

**Table 5. Department of Energy Civilian R&D**

FY 2005 Budget Request (dollars in millions)
(Sources: President's FY05 Budget Request and Departmental Budget Justification)

| Account | FY03 Actual | FY04 Enacted | FY05 Request | Amount Change | Percent Change |
|---|---|---|---|---|---|
| Science | 3322 | 3500 | 3432 | -68 | -2.0% |
| HEP | 702 | 734 | 737 | 4 | 0.5% |
| NP | 371 | 390 | 401 | 11 | 2.9% |
| BER | 494 | 641 | 502 | -140 | -21.8% |
| BES | 1002 | 1011 | 1064 | 53 | 5.2% |
| ASCR | 163 | 202 | 204 | 2 | 1.0% |
| FES | 241 | 263 | 264 | 2 | 0.6% |
| O(1) | 349 | 260 | 260 | 0 | -0.1% |
| FE (2) | 564 | 575 | 496 | -79 | -13.7% |
| FERD | 611 | 673 | 636 | -37 | -5.5% |
| CCT | -47 | -98 | -140 | -42 | -42.9% |
| EERE | 934 | 964 | 919 | -45 | -4.7% |
| RE | 322 | 357 | 375 | 18 | 5.0% |
| EE | 612 | 607 | 544 | -63 | -10.4% |
| NE (2,3) | 130 | 130 | 96 | -34 | -26.2% |
| ETD | 88 | 81 | 91 | 10 | 12.5% |
| **Total (4)** | **5039** | **5250** | **5033** | **-216** | **-4.1%** |

(1) Includes Safeguards and Security (less reimbursable work), Workforce Development for Scientists and Teachers and small business set-asides.
(2) R&D programs only
(3) Does not include non-civilian nuclear activities
(4) Reflects adjustments made in PL 108-199 as reflected in H Rept. 108-401

**Key to Abbreviations**

**Science**

| | |
|---|---|
| HEP | High Energy Physics |
| NP | Nuclear Physics |
| BER | Biological and Environmental Research |
| BES | Basic Energy Sciences |
| ASCR | Advanced Scientific Computing Research |
| FES | Fusion Energy Science |
| O | Other Science Programs |
| **FE** | Office of Fossil Energy |
| FERD | Fossil Energy Research and Development Account |
| CCT | Clean Coal Technology Account |
| **EERE** | Office of Fossil Energy |
| RE | Renewable Energy (in Energy Supply account) |
| EE | Energy Efficiency in Energy Conservation account |
| **NE** | Nuclear Energy Science and Technology (in Energy Supply account) |
| **ETD** | Electric Transmission and Distribution |

**7. Witnesses Questions**

Witnesses have been asked to:

1. Review the R&D budget request in the context of the Administration's overall priorities in science and technology.

2. Describe the mechanisms that the Administration uses to determine priorities across scientific disciplines.

3. Describe the mechanisms the Administration uses to coordinate its scientific research and technical development activities with other Federal agencies.

## APPENDIX I: Budget Charts for Selected Interagency Programs

(Source for all interagency program charts: President's FY05 Budget Request)

### Table 6. National Nanotechnology Initiative

(dollars in millions)

| | FY03 Actual | FY04 Estimate | **FY05 Request** | Change FY04-05 | |
|---|---|---|---|---|---|
| | | | | Amount | Percent |
| **NSF** | 221 | 254 | **305** | 51 | 20.08% |
| **Defense** | 322 | 315 | **276** | -39 | -12.38% |
| **Energy** | 134 | 203 | **211** | 8 | 3.94% |
| **NASA** | 36 | 37 | **35** | -2 | -5.41% |
| **Commerce** | 64 | 63 | **53** | -10 | -15.87% |
| **NIH** | 78 | 80 | **89** | 9 | 11.25% |
| **Other** | 7 | 9 | **13** | 4 | 44.44% |
| **Total** | 862 | 961 | 982 | 21 | 2.19% |

(This nanotechnology table includes corrections to Defense levels as provided by OMB.)

### Table 7. Networking and Information Technology (NITRD)

(dollars in millions)

| | FY03 Actual | FY04 Enacted | **FY05 Request** | Change FY04-05 | |
|---|---|---|---|---|---|
| | | | | Amount | Percent |
| **Commerce** | 26 | 26 | **33** | 7 | 26.92% |
| **Defense** | 296 | 252 | **226** | -26 | -10.32% |
| **Energy** | 308 | 344 | **354** | 10 | 2.91% |
| **EPA** | 2 | 4 | **4** | 0 | 0.00% |
| **HHS** | 376 | 368 | **371** | 3 | 0.82% |
| **NASA** | 213 | 275 | **259** | -16 | -5.82% |
| **NSF** | 743 | 754 | **761** | 7 | 0.93% |
| **Total** | **1,964** | **2,023** | **2,008** | **-15** | **-0.74%** |

### Table 8. Climate Change Science Program

(dollars in millions)

| | FY03 Actual | FY04 Enacted | **FY05 Request** | Change FY04-05 | |
|---|---|---|---|---|---|
| | | | | Amount | Percent |
| **NSF** | 202 | 213 | **210** | -3 | -1.41% |
| **Energy** | 120 | 133 | **134** | 1 | 0.75% |
| **Commerce** | 117 | 130 | **142** | 12 | 9.23% |
| **Ag** | 68 | 67 | **74** | 7 | 10.45% |
| **Interior** | 26 | 28 | **29** | 1 | 3.57% |
| **EPA** | 19 | 22 | **21** | -1 | -4.55% |
| **NIH** | 59 | 61 | **61** | 0 | 0.00% |
| **NASA** | 1146 | 1334 | **1271** | -63 | -4.72% |
| **All Other** | 12 | 13 | **16** | 3 | 23.08% |
| **Total** | **1769** | **2001** | **1958** | **-43** | **-2.15%** |

# APPENDIX II:

**Table 9. Federal R&D Spending (adapted from FY05 Budget Request)[1]**

| By Agency | 2003 Actual | 2004 Estimate | 2005 Proposed | $ Change 04-05 | % Change 04-05 |
|---|---|---|---|---|---|
| Defense | 58838 | 65484 | 69856 | 4372 | 7 |
| Health and Human Services | 27411 | 28275 | 29381 | 1106 | 4 |
| NASA | 10681 | 10893 | 11308 | 415 | 4 |
| Energy | 8312 | 8835 | 8893 | 58 | 1 |
| National Science Foundation | 3972 | 4115 | 4252 | 137 | 3 |
| Agriculture | 2334 | 2308 | 2105 | -203 | -9 |
| Homeland Security | 737 | 1053 | 1216 | 163 | 15 |
| Commerce | 1200 | 1126 | 1075 | -51 | -5 |
| Veterans Affairs | 819 | 824 | 772 | -52 | -6 |
| Transportation | 701 | 701 | 749 | 48 | 7 |
| Interior | 643 | 675 | 648 | -27 | -4 |
| Environmental Protection Agency | 568 | 575 | 577 | 2 | 0 |
| Other | 1223 | 1092 | 1034 | -58 | -5 |
| **Total** | **117439** | **125956** | **131866** | **5910** | **4.7** |
| **Basic Research** | | | | | |
| Defense | 1369 | 1404 | 1341 | -63 | -4 |
| Health and Human Services | 14120 | 14732 | 15198 | 466 | 3 |
| NASA | 2213 | 2584 | 2324 | -260 | -10 |
| Energy | 2556 | 2750 | 2664 | -86 | -3 |
| National Science Foundation | 3422 | 3551 | 3642 | 91 | 3 |
| Agriculture | 867 | 914 | 783 | -131 | -14 |
| Homeland Security | 47 | 47 | 153 | 106 | 226 |
| Commerce | 54 | 57 | 83 | 26 | 46 |
| Veterans Affairs | 327 | 332 | 308 | -24 | -7 |
| Transportation | 23 | 20 | 40 | 20 | 100 |
| Interior | 41 | 40 | 38 | -2 | -5 |
| Environmental Protection Agency | 97 | 79 | 91 | 12 | 15 |
| Other | 170 | 165 | 182 | 17 | 10 |
| **Subtotal** | **25306** | **26675** | **26847** | **172** | **0.6** |
| **Applied Research** | | | | | |
| Defense | 4252 | 4425 | 3828 | -597 | -13 |
| Health and Human Services | 11982 | 13174 | 13522 | 348 | 3 |
| NASA | 3192 | 3052 | 3122 | 70 | 2 |
| Energy | 2656 | 3020 | 3395 | 375 | 12 |
| National Science Foundation | 218 | 211 | 220 | 9 | 4 |
| Agriculture | 974 | 1049 | 888 | -161 | -15 |
| Homeland Security | 92 | 124 | 278 | 154 | 124 |
| Commerce | 910 | 891 | 838 | -53 | -6 |
| Veterans Affairs | 451 | 450 | 425 | -25 | -6 |
| Transportation | 405 | 398 | 455 | 57 | 14 |
| Interior | 547 | 584 | 560 | -24 | -4 |
| Environmental Protection Agency | 366 | 361 | 346 | -15 | -4 |
| Other | 579 | 609 | 617 | 8 | 1 |
| **Subtotal** | **26624** | **28348** | **28494** | **146** | **0.5** |
| **Development** | | | | | |
| Defense | 53172 | 59603 | 64622 | 5019 | 8.4 |
| Health and Human Services | 160 | 140 | 386 | 246 | 175.7 |
| NASA | 2963 | 2994 | 3247 | 253 | 8.5 |
| Energy | 1946 | 1956 | 1840 | -116 | -5.9 |
| National Science Foundation | N/A | N/A | N/A | N/A | N/A |
| Agriculture | 145 | 152 | 142 | -10 | -6.6 |
| Homeland Security | 549 | 794 | 750 | -44 | -5.5 |
| Commerce | 135 | 128 | 53 | -75 | -58.6 |
| Veterans Affairs | 41 | 42 | 39 | -3 | -7.1 |
| Transportation | 254 | 270 | 235 | -35 | -13.0 |
| Interior | 53 | 48 | 47 | -1 | -2.1 |
| Environmental Protection Agency | 105 | 135 | 140 | 5 | 3.7 |
| **Subtotal** | **59983** | **66573** | **71729** | **5156** | **7.7** |

[1] Columns do not add up due to omission of additional R&D activities at other agencies