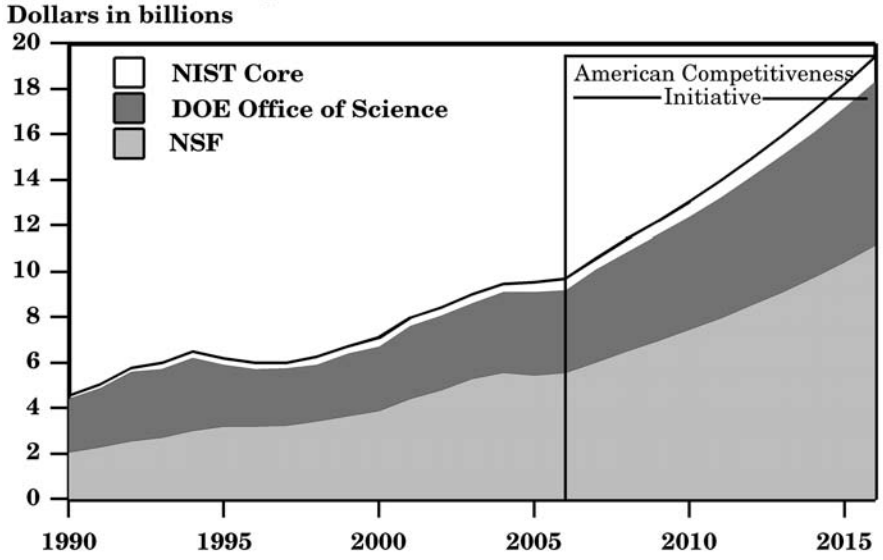
5. RESEARCH AND DEVELOPMENT

The U.S. economy is the largest in the world, and has been growing faster than any other G-7 industrialized nation. In large measure, the U.S. economy owes its strength to its willingness to build innovation capacity through the creation and growth of a world-class science and technology research enterprise and a high-quality scientific and technical education infrastructure. The relationship between support for science and economic growth is well documented. Investments in basic research lead to knowledge breakthroughs that fuel innovation, drive productivity, grow the economy, and improve our understanding of the world. Economists estimate that as much as half of post-World War II economic growth is directly due to technological progress fueled by research and development (R&D).

Economic payoffs from research come in the form of process and product innovations that reduce the costs of production, lower product prices, and result in new and better products and services. Consumers ultimately benefit from less expensive, higher quality and more useful products and services, and of course, from earnings accruing to innovative companies. Today's transforming technologies and most popular consumer items have deep roots in basic and applied research.

To sustain the Nation's economic competitiveness, the President, in last year's State of the Union address, called for a long-term vision to strengthen Federal support for the Nation's innovation enterprise in an integrated package of investments and policies called the American Competitiveness Initiative (ACI).

Chart 5-1. Research in the American Competitiveness Initiative



I. THE AMERICAN COMPETITIVENESS INITIATIVE

The President's 2008 Budget maintains a strong commitment, through the ACI, to invest in basic research areas that advance knowledge and technologies used by scientists in nearly every field. Through the ACI, the President plans to double, over 10 years, investment in innovation-enabling research at three Federal agencies—the National Science Foundation (NSF), the Department of Energy's (DOE's) Office of Science, and the Department of Commerce's National Institute of Science and Technology (NIST) laboratories.

In 2008, the second year of the American Competitiveness Initiative, President Bush proposes $11.4 billion total for NSF, DOE's Office of Science, and NIST laboratories, an overall funding increase of $764 million, or 7.2 percent, above his 2007 Budget of $10.7 billion. To reach doubling within ten years, overall annual increases will average roughly seven percent.

Research Agencies in the American Competitiveness Initiative

The National Science Foundation is the primary source of support for academic research in the physical sciences, funding basic research in areas such as nanotechnology, advanced networking and information technology, physics, chemistry, materials science, mathematics, and engineering. It also is well regarded for funding nearly all of its research through a competitive, peer-reviewed process. The increase in NSF funding will support many more researchers, students, post-doctoral fellows and technicians contributing to the innovation enterprise.

The Department of Energy's Office of Science supports grants and infrastructure for a wide range of basic research related to economically significant innovations including nanotechnology, biotechnology, high-end computing and advanced networking, and energy technologies. The 2008 Budget increases funding for both research and cutting edge facilities in these critical mission areas, such as an expansion in the number of bio-energy research centers, major growth in the United States' contribution to the international fusion energy project known as ITER, expanded supercomputing facilities and related research, and design or construction activities for world-leading next generation light sources.

The Department of Commerce's National Institute of Standards and Technology invests in technological innovation through research and standards development. These investments will improve nanotechnology manufacturing capabilities; expand NIST's neutron facility to aid in characterizing novel materials in high-growth research fields; construct new, high-performance laboratories at NIST's Boulder, Colorado facility; and improve our understanding of quantum information science that has the potential to dramatically improve computer processing speeds and enable more secure communications.

II. IMPROVING THE PERFORMANCE OF R&D PROGRAMS

R&D is critically important for keeping our Nation economically competitive, and it will help solve the challenges we face in health, defense, energy, and the environment. Therefore, every Federal R&D dollar must be invested as effectively as possible.

R&D Investment Criteria

The Administration continues to improve the effectiveness of the Federal Government's investments in R&D by applying transparent investment criteria in analyses that inform recommendations for program funding and management. R&D performance assessment must be done with care. Research often leads scientists and engineers down unpredictable pathways with unpredictable results. This outcome can require special consideration when measuring an R&D program's performance against its initial goals.

With this in mind, the Administration is improving methods for setting priorities based on expected results, and is asking agencies to apply specific criteria that programs or projects must meet to be started or continued and supply clear milestones for gauging progress and improved metrics for assessing results.

As directed by the President's Management Agenda, the R&D Investment Criteria accommodate the wide range of R&D activities, from basic research to development and demonstration programs, by addressing three fundamental aspects of R&D:

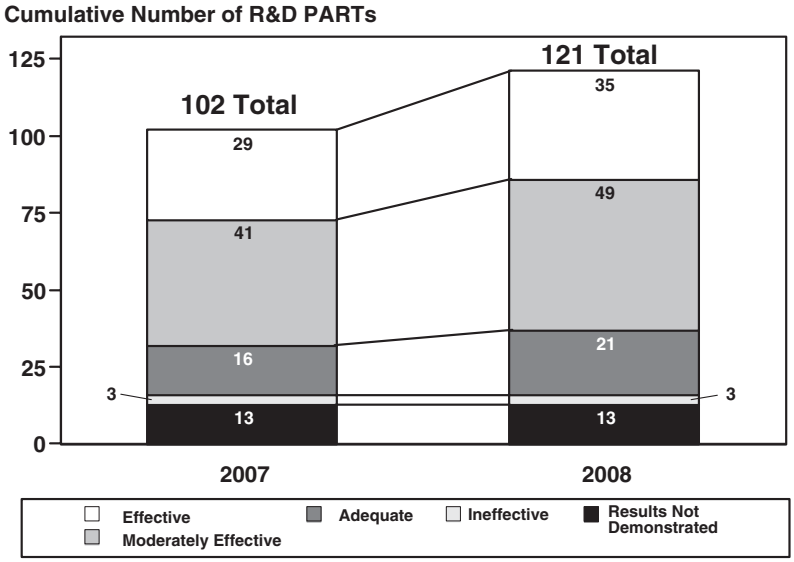
- *Relevance*—Programs must be able to articulate *why* they are important, relevant, and appropriate for Federal investment;
- *Quality*—Programs must justify *how* funds will be allocated to ensure quality; and
- *Performance*—Programs must be able to monitor and document *how well* the investments are performing.

In addition, R&D projects and programs relevant to industry are expected to apply criteria to determine the appropriateness of the public investment, enable comparisons of proposed and demonstrated benefits, and provide meaningful decision points for completing or transitioning the activity to the private sector.

As part of the President's Management Agenda's Budget and Performance Integration initiative, the Administration uses the Program Assessment Rating Tool (PART) to consistently assess the effectiveness of programs. A section of the PART specifically addresses the assessment of R&D program management and performance and is aligned with the R&D Investment criteria. In the last five years, agencies completed 977 PART assessments, of which 121 were for R&D programs. The results of these PART assessments may be found on the web at *www.expectmore.gov*.

Performance assessments help policy makers identify those programs that are the most effective and worthy of funding; however, the Administration does not allocate funding levels and initiate management reforms strictly by formula or based solely on PART results. While programs rated Effective are typically favored for additional funding over related programs that do not perform as well, PART ratings do not automatically relate to specific funding levels. For instance, a program rated Effective that has achieved what it set out to do may have its funding reduced. On the other hand, a program rated Ineffective might receive more money to correct a deficiency that would help it become more effective. The PART provides information that leads to more informed decisions.

Chart 5-2. Scores of R&D PART Assessments



Research Earmarks

President Bush has called on Congress to reform the earmark process, proposing a series of reforms that include full disclosure for each earmark and cutting the number and cost of all earmarks by at least half. Consistent with this effort, the Administration is continuing its strong support for awarding research funds based on merit review through a competitive process refereed by scientists themselves. Such a system has the best prospects for ensuring that the top research is supported. Research earmarks—in general the assignment of money during the legislative process for use by a specific organization or project—are counter to a merit-based competitive selection process. Earmarks signal to potential investigators that there is an acceptable alternative to creating quality research proposals for merit-based consideration. Such an alternative can be an ineffective use of taxpayer funds.

Unfortunately, the practice of earmarking funds to colleges, universities, and other entities for specific research projects has expanded dramatically in recent years. Some argue that earmarks help spread the research money to states or institutions that would receive less research funding through other means. *The Chronicle of Higher Education* has reported that this is not the main role earmarks play. Often only a minor portion of academic earmark funding goes to the states with the smallest shares of Federal research funds.

Some proponents of earmarking assert that earmarks provide a means of funding unique projects that would not be recognized by the conventional peer-review process. To address this concern, a number of research agencies have procedures and programs to reward "out-of-the-box" thinking. For example, the Defense Advanced Research Projects Agency, within the Department of Defense (DOD), seeks out high-risk, high-payoff scientific proposals, the National Institutes of Health has established a similarly focused "Pioneer Award," and program managers at the NSF set aside a share of funding for higher-risk projects in which they see high potential.

Earmarks that are outside of an agency's mission can detract from an efficient and effective Federal effort on behalf of taxpayers. For instance, the Congress directed DOD to fund research on a wide range of diseases including diabetes, neurofibromatosis (a genetic disorder of the nervous system), and childhood cancer. Congressional adds in DOD's budget for medical research projects totals about $500 million in 2007 alone.

While research on these diseases is very important, these diseases are generally not unique to the U.S. military and the research can be better selected, carried out and coordinated within civil medical research agencies, without disruption to the military mission. At the same time, intrusion of earmarks into the peer-review processes of civilian medical research agencies would have a significant detrimental impact on funding the most important and promising research.

Earmarks that divert funding from a merit-based process undermine America's research productivity. The Administration commends Congress for taking measures to protect NSF and the National Institutes of Health from this practice, which is an approach that should be followed throughout the R&D programs.

III. PRIORITIES FOR FEDERAL RESEARCH AND DEVELOPMENT

The 2008 Budget requests $143 billion for Federal R&D funding, and targets key research investments within agencies, in particular, the three ACI agencies: NSF, the DOE's Office of Science, and the NIST laboratories. (Table 5–1 provides details by agency).

Multi-Agency R&D Priorities

The 2008 Budget continues to target important research investments that must be coordinated across multiple agencies. The Administration will continue to analyze other areas of critical need that could benefit in the future from improved focus and coordination among agencies.

Combating Terrorism R&D: A robust R&D effort continues to be a key asset in advancing technologies in support of the President's national strategy for homeland security. Though there have been numerous achievements over the past four years, many challenges remain. A number of these challenges are being addressed through multi-agency research efforts that are coordinated through the National Science and Technology Council (NSTC) and other inter-agency forums.

In 2006, key multi-agency R&D efforts made significant progress towards improving the Nation's counterterrorism capability. Using the 2006 Administration R&D budget priorities memorandum as a guide, agencies, for example:

- improved radiation portal monitors with the ability to discern threatening sources of radiation from non-threatening sources;
- advanced technology to meet new international electronic passport standards that enables biometric screening of individuals entering the country;
- developed standards for technologies that enable the detection and interception of nuclear and radioactive material before it enters the U.S.;
- developed and established standard methodologies and practices for the sampling and detection of biological agents; and
- developed rapid diagnostics and next generation vaccines.

The 2008 Budget provides continued support for these and many other R&D related to combating terrorism, including: pursuing stand-off detection and imaging capabilities to locate and identify nuclear threat materials at a distance; advancing cargo screening capabilities to recognize and expedite safe cargo while securing the borders against other entries; improving the capabilities and implementation planning of biometric systems; initiating the 2008–2012 R&D plan for high-consequence foreign animal diseases; and focusing on critical medical countermeasures that do not have a pre-existing market to stimulate their development.

Networking and Information Technology R&D: The Budget provides $3 billion for the multi-agency Networking and Information Technology Research and Development (NITRD) Program, which plans and coordinates agency research efforts in high-end computing systems, cyber security, large-scale networking, software development, high-confidence systems, information management, and other information technologies. The agencies involved in this program coordinate efforts to accelerate research advancement in information technology, upon which every economic sector now depends.

In 2006, agencies participating in high-end computing R&D continued to make significant progress in implementing the recommendations contained in the Federal Plan for High-End Computing. The 2008 Budget continues the path toward the development of petascale systems for science by both DOE and NSF. Relevant agencies will continue to conduct research in highly scalable systems software and applications to ensure that Federal investments in high-end computing achieve maximal impact.

Participating agencies also completed and published the Federal Plan for Cyber Security and Information Assurance R&D in 2006, and are now undertaking the development of the roadmap for addressing any identified R&D gaps as recommended in the Plan.

In 2007, participating agencies will undertake the development of a Federal Plan for Advanced Networking R&D, analogous to the recent Plans for High-End Computing and for Cyber Security and Information Assurance R&D. The Federal Plan for Advanced Networking R&D will provide a strategy for addressing current and future networking needs of the Federal government in support of science and national security missions, and provide a process for developing a more detailed roadmap to guide future multi-agency investments in advancing networking R&D. Reports and general information about NITRD are available at *www.nitrd.gov/*.

Nanotechnology R&D: The Budget provides $1 billion for the multi-agency National Nanotechnology Initiative (NNI). The NNI focuses on R&D that creates materials, devices, and systems that exploit the fundamentally distinct properties of matter as it is manipulated at the atomic and molecular levels. The results of NNI-supported R&D are already leading to breakthroughs in disease detection and treatment, manufacturing at the nanoscale level, environmental monitoring and protection, energy production and storage, and creating electronic devices that have even greater capabilities than those available today. Research opportunities cover a similarly broad spectrum. Advances that will be foundational for all aspects of nanotechnology R&D in particular include: instrumentation for characterizing nanoscale materials in the laboratory, in the body, and in the environment; and computational research to model and predict properties at the nanoscale, for designing novel materials, and for determining their behavior under various conditions and environments.

Guided by the NNI, participating agencies will continue to support discovery, development and application of nanotechnology through investigator-led fundamental and applied research; multidisciplinary centers of excellence; education and training of nanotechnology researchers, teachers, workers, and the public; and infrastructure development, including user facilities and networks that are broadly available to support research and innovation. In addition, agencies continue to maintain a focus on the responsible development of nanotechnology, with attention to the human and environmental health impacts, as well as ethical, legal, and other societal issues. Reports and general information about the NNI are available at *www.nano.gov/*.

Climate Change R&D: The 2008 Budget for the Climate Change Science Program (CCSP) continues to support the implementation of the CCSP Strategic Plan, which was released in July 2003. The 13 departments and agencies that participate in the CCSP coordinate preparation of the budget and program implementation. During 2008, the CCSP will continue research into important scientific uncertainties and preparation of a series of *Synthesis and Assessment* reports. Working within the overarching priorities defined in the Strategic Plan, the CCSP's interagency coordination and integration efforts will give particular emphasis in 2008 to the following activities: abrupt climate change; integrated Earth system analysis; coping with drought through research and regional partnerships; integration of water cycle observations, research and modeling; carbon cycle research integration; aerosol forcing and interactions with clouds and non-carbon dioxide trace gases; impacts of climate variability and change on ecosystem productivity and biodiversity; and interactions on land use/land cover change and climate.

The program expects to receive input from the National Research Council under the terms of a continuing advisory agreement. This advice will include findings and recommendations on the process for evaluating progress toward the five goals in the CCSP Strategic Plan, and a preliminary assessment of progress made toward the program's goals. The CCSP will continue to track deliverables and milestones for each of its programs in order to assess overall performance. Additional detail on individual agency activities will be provided in the Administration's 2008 edition of *Our Changing Planet.* Reports and general information about the CCSP are available on the program's website: *www.climatescience.gov/*.

The Climate Change Technology Program (CCTP) continues to provide strategic direction, planning, and analysis to help coordinate and prioritize activities within the portfolio of Federally funded climate change technology R&D consistent with the President's National Climate Change Technology Initiative (NCCTI). In 2005, the CCTP published a Vision and Framework for Strategy and Planning and released a draft Strategic Plan for review by the scientific community and the public. In 2006, the CCTP addressed the nearly 300 comments received and published a final Strategic Plan. The CCTP has also identified within its portfolio a subset of NCCTI priority activities, defined as discrete R&D activities that address technological challenges, which, if solved, could advance technologies with the potential to dramatically reduce, avoid, or sequester greenhouse gas emissions. In 2008, CCTP's focus will be on implementing the Strategic Plan, which lays out a series of next steps. Reports and general information about the CCTP are available on the program's website: *www.climatetechnology.gov/*.

The CCSP and CCTP will continue to coordinate implementation of relevant climate change provisions in the 2005 Energy Policy Act as appropriate.

Ocean Research: The 2008 Budget supports ocean and coastal research as outlined in the recently released report *Charting the Course for Ocean Science in the United States for the Next Decade: An Ocean Research Priorities Plan and Implementation Strategy.* Developed by the National Science and Technology Council's Joint Subcommittee on Ocean Science and Technology, plan implementation will deploy key components of an ocean observing system that can better and more accurately describe actual conditions, enhance our understanding and capability to forecast ocean processes and phenomena, and provide scientific support for ecosystem-based management. These three overarching goals represent tremendous potential for ocean science, as well as for maintaining U.S. leadership in ocean technology and enhancing U.S. competitiveness. These goals are supported by 20 separate national ocean research priorities, established with extensive community input and oriented around the most compelling issues of interaction between society and the ocean. The Joint Subcommittee on Ocean Science and Technology will coordinate this multi-agency research into key aspects of the oceans, coasts and Great Lakes and work closely with the other coordinating bodies of the President's Ocean Action Plan.

Hydrogen R&D: In 2006, the Hydrogen R&D Interagency Task Force led coordination among nine agen-

cies in hydrogen-related manufacturing and innovation, safety, codes and standards, and fundamental research on fuel cells, hydrogen production, and hydrogen storage. The Task Force improved and updated its web portal (*www.hydrogen.gov*) for hydrogen and fuel cell information. Additionally, the Task Force works with the International Partnership for the Hydrogen Economy, which coordinates hydrogen research among 15 nations representing two thirds of global energy consumption.

DOE will continue to lead the President's Hydrogen Fuel Initiative to accelerate the worldwide availability and affordability of hydrogen-powered fuel cell vehicles and the infrastructure to support them. The initiative focuses on research to advance hydrogen production, storage, conversion, and infrastructure technologies. The 2008 Budget completes the President's five-year, $1.2 billion commitment announced in his 2003 State of the Union address, but work will continue on the many technical challenges that remain.

Biomass R&D: The Biomass R&D Act of 2000 established the Biomass R&D Board to guide interagency coordination and bring coherence to Federal strategic planning on biomass-related issues. Since 2002, the Departments of Agriculture and Energy have been preparing joint annual reports on a subset of coordinated biomass activities. In 2006, the Board began preparation of an interagency coordination and planning document that will be reviewed by the National Academy of Sciences. In addition to assessing the goals and plans for interagency biomass research, the Academy will be tasked with considering economic and other impacts of increased biomass utilization under various energy price and policy scenarios. Additional information on the Biomass R&D Board is available online at *www.biomass.govtools.us.*

Stimulating Private Investment

Along with direct spending on R&D, the Federal Government has sought to stimulate private R&D investment through incentives in the Internal Revenue Code. A long-standing credit, which had provided a 20-percent tax credit for private research and experimentation expenditures above a certain base amount, was extended for two years through the end of 2007 and enhanced through the Tax Relief and Health Care Act of 2006. The Administration proposes making the enhanced Research and Experimentation tax credit permanent starting in 2008. The proposed extension will cost $42 billion over the period from 2008 to 2012. In addition, a permanent tax provision lets companies deduct, up front, the costs of certain kinds of research and experimentation, rather than capitalize these costs. Also, equipment used for research benefits from relatively rapid tax depreciation allowance.

IV. FEDERAL R&D DATA

Federal R&D Funding

R&D is the collection of efforts directed towards gaining greater knowledge or understanding and applying knowledge toward the production of useful materials, devices, and methods. R&D investments can be characterized as basic research, applied research, development, R&D equipment, or R&D facilities, and the Office of Management and Budget has used those or similar categories in its collection of R&D data since 1949.

Basic research is systematic study directed toward a fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind. Basic research, however, may include activities with broad applications in mind.

Applied research is systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met.

Development is systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes to meet specific requirements.

Research and development equipment includes acquisition or design and production of movable equipment, such as spectrometers, research satellites, detectors, and other instruments. At a minimum, this category should include programs devoted to the purchase or construction of R&D equipment.

Research and development facilities include the acquisition, design, and construction of, or major repairs or alterations to, all physical facilities for use in R&D activities. Facilities include land, buildings, and fixed capital equipment, regardless of whether the facilities are to be used by the Government or by a private organization, and regardless of where title to the property may rest. This category includes such fixed facilities as reactors, wind tunnels, and particle accelerators.

There are over twenty Federal agencies that fund R&D in the U.S. The nature of the R&D that these agencies fund depends on the mission of each agency and on the role of R&D in accomplishing it. Table 5–1 shows agency-by-agency spending on basic and applied research, development, and R&D equipment and facilities.

The "Federal Science and Technology" (FS&T) budget (shown in Table 5–2) highlights the creation of new knowledge and technologies more consistently and accurately than the overall R&D data. The FS&T budget emphasizes research; does not count funding for defense development, testing, and evaluation; and totals less than half of Federal R&D spending. The 2008 Budget requests $61 billion for FS&T.

Table 5–1. FEDERAL RESEARCH AND DEVELOPMENT

(Budget authority, dollar amounts in millions)

	2006 Actual	2007 Estimate	2008 Proposed	Dollar Change: 2007 to 2008	Percent Change: 2007 to 2008
By Agency					
Defense	73,723	77,881	78,862	981	1%
Health and Human Services	28,531	28,743	29,027	284	1%
NASA	11,317	11,613	12,428	815	7%
Energy	8,596	8,389	9,224	835	10%
National Science Foundation	4,227	4,232	4,880	648	15%
Agriculture	2,438	2,316	2,010	–306	–13%
Commerce	1,090	920	1,088	168	18%
Homeland Security	1,455	1,079	1,068	–11	–1%
Veteran Affairs	824	818	822	4	0%
Transportation	820	752	812	60	8%
Interior	639	636	621	–15	–2%
Environmental Protection Agency	622	567	562	–5	–1%
Other	1,250	1,223	1,251	28	2%
Total	**135,532**	**139,169**	**142,655**	**3,486**	**3%**
Basic Research					
Defense	1,457	1,565	1,428	–137	–9%
Health and Human Services	15,546	15,545	15,615	70	0%
NASA	2,299	2,259	2,226	–33	–1%
Energy	2,930	2,957	3,409	452	15%
National Science Foundation	3,520	3,499	3,993	494	14%
Agriculture	853	799	771	–28	–4%
Commerce	118	118	164	46	39%
Homeland Security	85	105	132	27	26%
Veteran Affairs	343	328	330	2	1%
Transportation	.....	.....	.....	.....	N/A
Interior	42	42	39	–3	–7%
Environmental Protection Agency	105	94	94	.....	.....
Other	158	163	170	7	4%
Subtotal	**27,456**	**27,474**	**28,371**	**897**	**3%**
Applied Research					
Defense	4,948	5,330	4,357	–973	–18%
Health and Human Services	12,827	12,964	13,237	273	2%
NASA	1,680	1,010	1,127	117	12%
Energy	2,700	2,707	2,869	162	6%
National Science Foundation	286	281	380	99	35%
Agriculture	1,149	1,117	984	–133	–12%
Commerce	729	617	696	79	13%
Homeland Security	662	518	533	15	3%
Veteran Affairs	435	442	444	2	0%
Transportation	497	501	541	40	8%
Interior	546	534	525	–9	–2%
Environmental Protection Agency	400	369	364	–5	–1%
Other	590	549	581	32	6%
Subtotal	**27,449**	**26,939**	**26,638**	**–301**	**–1%**
Development					
Defense	67,154	70,926	72,873	1,947	3%
Health and Human Services	22	22	22	.....	.....
NASA	5,141	6,451	6,707	256	4%
Energy	1,939	1,843	1,891	48	3%
National Science Foundation	.....	.....	.....	.....	N/A
Agriculture	164	158	156	–2	–1%
Commerce	93	55	72	17	31%
Homeland Security	659	325	269	–56	–17%
Veteran Affairs	46	48	48	.....	.....
Transportation	305	232	252	20	9%
Interior	46	53	55	2	4%
Environmental Protection Agency	117	104	104	.....	.....
Other	464	455	454	–1	0%
Subtotal	**76,150**	**80,672**	**82,903**	**2,231**	**3%**
Facilities and Equipment					
Defense	164	60	204	144	240%
Health and Human Services	136	212	153	–59	–28%

Table 5–1. FEDERAL RESEARCH AND DEVELOPMENT—Continued

(Budget authority, dollar amounts in millions)

	2006 Actual	2007 Estimate	2008 Proposed	Dollar Change: 2007 to 2008	Percent Change: 2007 to 2008
NASA	2,197	1,893	2,368	475	25%
Energy	1,027	882	1,055	173	20%
National Science Foundation	421	452	507	55	12%
Agriculture	272	242	99	–143	–59%
Commerce	150	130	156	26	20%
Homeland Security	49	131	134	3	2%
Veteran Affairs	.....	.....	.....	.....	N/A
Transportation	18	19	19	.....	N/A
Interior	5	7	2	–5	–71%
Environmental Protection Agency	.....	.....	.....	.....	N/A
Other	38	56	46	–10	–18%
Subtotal	**4,477**	**4,084**	**4,743**	**659**	**16%**

Table 5–2. FEDERAL SCIENCE AND TECHNOLOGY BUDGET

(Budget authority, dollar amounts in millions)

	2006 Actual	2007 Estimate [1]	2008 Proposed	Dollar Change: 2007 to 2008	Percent Change: 2007 to 2008
By Agency					
National Institutes of Health [2]	**28,242**	**28,269**	**28,700**	**431**	**2%**
NASA [3]	**7,670**	**7,173**	**7,124**	**–49**	**–1%**
Science	5,110	5,330	5,516	186	3%
Aeronautics	893	724	554	–170	–23%
Exploration Systems [4]	1,452	921	856	–65	–7%
Innovative Partnerships	215	198	198	.....	.....
Energy [5]	**5,625**	**6,186**	**6,906**	**720**	**12%**
Science Programs	3,596	4,102	4,398	296	7%
Electricity Transmission & Distribution	136	96	86	–10	–10%
Nuclear Energy	416	560	811	251	45%
Energy Efficiency and Renewable Energy Resources [6]	896	963	1,047	84	9%
Fossil Energy R&D [7]	581	465	564	99	21%
National Science Foundation	**5,581**	**6,020**	**6,429**	**409**	**7%**
Defense	**6,405**	**6,895**	**5,785**	**–1,110**	**–16%**
Basic Research	1,457	1,565	1,428	–137	–9%
Applied Research	4,948	5,330	4,357	–973	–18%
Agriculture	**2,170**	**1,921**	**1,934**	**13**	**1%**
CSREES Research and Education [8]	675	569	566	–3	–1%
Economic Research Service	75	83	83	.....	.....
Agricultural Research Service [9]	1,141	1,001	1,022	21	2%
Forest Service: Forest and Rangeland Research	279	268	263	–5	–2%
Interior (USGS)	**965**	**945**	**975**	**30**	**3%**
Commerce	**939**	**869**	**944**	**75**	**9%**
NOAA: Oceanic & Atmospheric Research	369	338	358	20	6%
NIST Intramural Research and Facilities	570	531	586	55	10%
Veterans Affairs [10]	**769**	**765**	**822**	**57**	**7%**
Environmental Protection Agency [11]	**761**	**816**	**781**	**–35**	**–4%**
Transportation	**563**	**598**	**570**	**–28**	**–5%**
Highway research: Federal Highway Administration	426	468	430	–38	–8%
Federal Aviation Administration: Research, Engineering, and Development	137	130	140	10	8%
Education	**342**	**342**	**342**	.....	.....
Special Education Research and Innovation	72	72	72	.....	.....
National Institute on Disability and Rehabilitation Research	107	107	107	.....	.....
Research, Development, and Dissemination [12]	163	163	163	.....	.....
Total	**60,032**	**60,799**	**61,312**	**513**	**1%**

[1] The amounts included as 2007 Estimates in this table reflect the 2007 Budget levels, with the exception of the numbers for the Department of Defense, which are the enacted levels.

[2] In 2006, the Department of Health and Human Services allocated an additional $18 million to NIH for Pandemic Influenza research from the Department of Defense Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act, 2006.

[3] Due to recent changes in NASA's approach to budgeting overhead costs, 2008 funding levels are not comparable to 2006 and 2007 levels.

[4] Includes Exploration Technology Development, the Human Research Program, and the Lunar Precursor Robotic Program.

[5] Data do not reflect actual transfers to Science Programs from other Department of Energy R&D programs to support the Small Business Innovation Research and the Small Business Technology Transfer programs.

[6] In 2006, Congress merged the Energy Supply and Energy Conservation accounts. The amount reported under the new Energy Efficiency and Renewable Energy Resources line within this account reflects a combination of the former Energy Conservation line item (excluding Weatherization and State grants) and the Renewables line item.

[7] Excludes funding for the Alaska Natural Gas Pipeline project.

[8] Includes the appropriation of earnings from the Native American Endowment Fund, but not the appropriation to the Endowment's principal.

[9] Excludes building and facilities. Excludes $6 million transfer to the account in 2006.

[10] Includes the medical care and prosthetic research appropriation and VA medical care support transfer to research.

[11] Science and Technology, plus superfund transfer.

[12] Does not include funding for Regional Educational Labs.

Table 5–3. AGENCY DETAIL OF SELECTED INTERAGENCY R&D EFFORTS

(Budget authority, dollar amounts in millions)

	2006 Actual	2007 Estimate [1]	2008 Proposed	Dollar Change: 2007 to 2008	Percent Change: 2007 to 2008
Networking and Information Technology R&D [2]					
Defense	1,106	1,046	1,027	–19	–2%
National Science Foundation	812	904	994	90	10%
Health and Human Services [3]	486	541	463	–78	–14%
Energy	282	389	404	15	4%
National Aeronautics and Space Administration	78	82	85	3	4%
Commerce	64	73	73	.....	N/A
Environmental Protection Agency	6	6	6	.....	N/A
National Archives and Records Administration	4	4	5	1	25%
Total	**2,838**	**3,045**	**3,057**	**12**	**0%**
National Nanotechnology Initiative					
National Science Foundation	360	373	390	17	5%
Defense	424	417	375	–42	–10%
Energy	231	293	332	39	13%
Health and Human Services [4]	196	175	208	33	19%
Commerce (NIST)	78	89	97	8	9%
National Aeronautics and Space Administration	50	25	24	–1	–4%
Environmental Protection Agency	5	9	10	1	11%
Agriculture	6	7	8	1	14%
Transportation	1	1	1	.....	N/A
Justice	.....	1	1	.....	N/A
Homeland Security	2	1	1	.....	N/A
Total	**1,353**	**1,391**	**1,447**	**56**	**4%**
Climate Change Science Program					
National Aeronautics and Space Administration [5]	1,045	981	871	–110	–11%
National Science Foundation	197	205	208	3	1%
Commerce (NOAA)	157	173	174	1	1%
Energy	130	126	130	4	3%
Agriculture	61	60	59	–1	–2%
National Institutes of Health	50	57	50	–7	–12%
Interior (USGS)	27	26	27	1	4%
Environmental Protection Agency	19	18	18	.....	N/A
Smithsonian	6	6	6	.....	N/A
Transportation	1	1	1	.....	N/A
U.S. Agency for International Development [6]	13	14	.....	N/A	N/A
Total	**1,706**	**1,667**	**1,544**	**–123**	**–7%**

[1] The amounts included as 2007 Estimates in these tables reflect the 2007 Budget levels, with the exception of the numbers for the Department of Defense and the Department of Homeland Security, which are the enacted levels.
[2] DHS NITRD funding information is not yet available.
[3] Includes funds from offsetting collections for the Agency for Healthcare Research and Quality.
[4] Includes funds from both the National Institutes of Health and National Institute of Occupational Safety and Health.
[5] Beginning with the 2007 Estimate, NASA is no longer counting its Ground Network and Research Range within its CCSP totals.
[6] USAID CCSP funding information for 2008 is not yet available.