



A Renewed Commitment to Science and Technology *Federal R&D, Technology, and STEM Education in the 2010 Budget*

In the past, Federal funding for scientific research, technology, and education have yielded innovations that have transformed American life—technologies like the Internet, digital photography, bar codes, Global Positioning System technology, laser surgery, and chemotherapy. Today, the United States faces a new set of challenges, and science and technology can be a powerful ally in addressing them. The 2010 Budget builds on early accomplishments of the Obama Administration to make strategic Federal investments in research and development (R&D), 21st century technology, and science, technology, engineering, and mathematics (STEM) education.

Already in this Administration, the President has signed into law the 2009 Omnibus Appropriations Act (Public Law 111-8) and the American Recovery and Reinvestment Act (Public Law 111-5). Both boosted the budgets of key programs not only for their potential contributions to economic recovery but also because science and technology can help reorient the U.S. economy through strategic investments in clean energy, broadband, health care information technology, and education. These laws are critical down payments toward doubling Federal investments in key science agencies over a decade, meeting a Presidential commitment to invest \$150 billion during the next 10 years in a clean energy future, and enhancing America's capacity to understand the dimensions of climate change and respond to them effectively. The 2010 Budget builds on these early accomplishments with continued investments in R&D, technology, and STEM education.

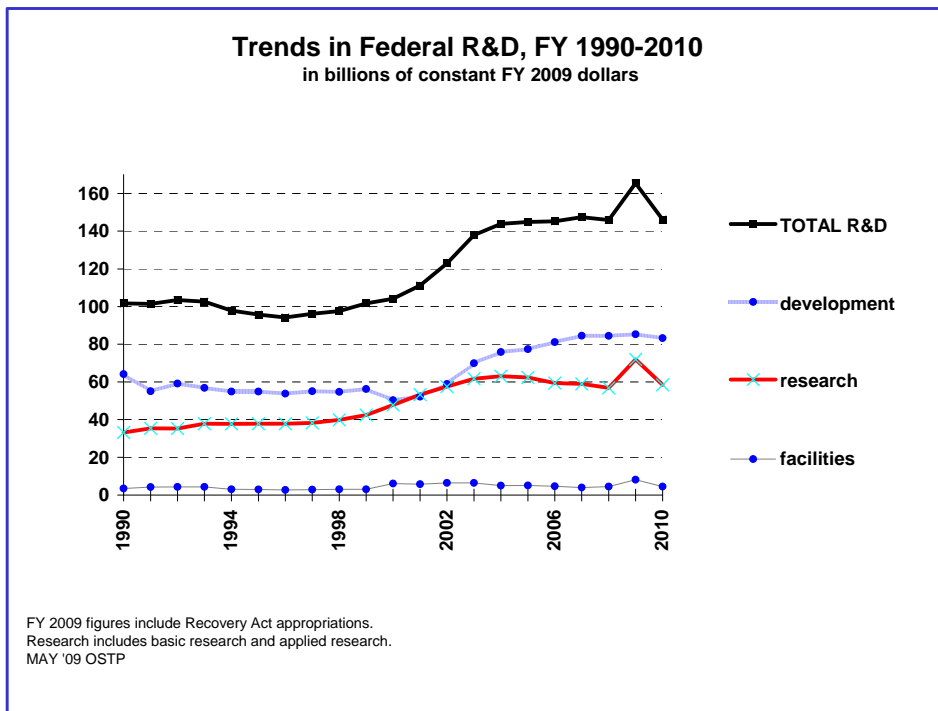


Figure 1.

Priorities for Federal Research and Development in the 2010 Budget

The President's Fiscal Year (FY) 2010 Budget proposes \$147.6 billion for the Federal investment in research and development (R&D). That is \$555 million or 0.4 percent more than the 2009 enacted level (see Table 1). In 2009, 2009 enacted appropriations and preliminary allocations of Recovery Act funding increase the Federal R&D investment to a record \$165.4 billion; Recovery Act funds will be spent in 2009 and 2010 (see text box: R&D

Funding in the American Recovery and Reinvestment Act of 2009). In real terms, the 2009 enacted level and 2010 Budget are among the two largest R&D investments in history (see Figure 1). These investments, spread across two dozen Federal departments and independent agencies, reflect the Administration's recognition that science, technology, and innovation are critical tools for making progress toward the national goals of a prosperous economy, a clean energy future, a healthy American people, and a strong and secure America. The Federal R&D investment also recognizes that the urge to probe more deeply into the unknown and expand the frontiers of human knowledge is at the core of the American experience.

R&D Funding in the American Recovery and Reinvestment Act of 2009

The American Recovery and Reinvestment Act of 2009 (Public Law 111-5), enacted on February 17, provided Federal R&D funding to spur new discoveries in energy, medicine, climate, and technologies for the future.

Within the Department of Health and Human Services (HHS), the National Institutes of Health (NIH) received \$10 billion for biomedical research and laboratory renovation and construction. In addition, \$1 billion was included for comparative effectiveness research at NIH and the Agency for Healthcare Research and Quality.

The Recovery Act included a \$5.2 billion investment in key science agencies, including: \$3.0 billion at NSF for basic research, education and human resources, research facilities construction, and research instrumentation; \$1.6 billion at DOE's Office of Science for energy frontier research collaborations, and infrastructure investments at the national laboratories; and \$580 million at the Department of Commerce's National Institute of Standards and Technology (NIST) for standards research, advanced measurement equipment, and construction of NIST research facilities. This investment by itself is an almost 50-percent increase for these programs over the 2008 enacted level and represents a significant down payment toward the President's plan to double the funding for these agencies over a decade.

The National Aeronautics and Space Administration (NASA) received \$1 billion for activities such as an acceleration of earth science climate research missions, and development of the next generation air transportation system. The National Oceanic and Atmospheric Administration (NOAA) received \$170 million for climate modeling, and \$660 million that includes support for maintenance and construction of research vessels and facilities. The U.S. Geological Survey received \$140 million for facility renovation and construction and for seismic and volcanic monitoring systems.

The 2010 Budget includes a special emphasis on **basic and applied research** to fundamentally improve our understanding of nature, revolutionize key fields of science, and foster radically new technologies. The Federal research portfolio (comprising basic and applied research) totals \$59.0 billion in the 2010 Budget (see Table 3), up \$376 million or 0.6 percent compared to the 2009 enacted level (excluding Recovery Act funding). After four years of decline in real terms (see Figure 2) from 2004 to 2008, the 2009 enacted level and 2010 Budget represent a real-dollar turnaround in Federal research investments across the spectrum of the sciences and engineering. (Preliminary allocations of Recovery Act investments are listed in separate columns in Tables 1 and 3; dollar and percentage changes are from 2009 enacted appropriations (excluding Recovery Act funds) to the 2010 Budget.)

The 2010 Budget provides \$84.1 billion in development funding. The Recovery Act and 2009 enacted appropriations provide unprecedented Federal support for R&D facilities and capital equipment totaling \$8.2 billion (see Table 1), including support for the construction and renovation of laboratory facilities at government laboratories, contractor-operated national laboratories, and academic institutions as well as competitively awarded funding for the purchase of major research instrumentation. In the 2010 Budget, R&D facilities and capital equipment funding totals \$4.5 billion, including substantial support from the National Aeronautics and Space Administration (NASA; \$2.4 billion) for scientific facilities including the International Space Station and the Department of Energy (DOE; \$1.2 billion) for a suite of scientific user facilities at DOE laboratories.

The 2010 Budget invests in four key R&D priorities:

Investing in the Sciences for a Prosperous America. Federally supported basic research, aimed at understanding many features of nature—from the size of the universe to the nature of subatomic particles, from the chemical reactions that support a living cell to interactions that sustain ecosystems—has been an essential feature of American life and helped drive our economic success for over 50 years. While the outcomes of specific projects are never predictable, basic research has been a reliable source of new knowledge that has fueled important developments in fields ranging from telecommunications to medicine, yielding positive rates of economic return and creating entirely new industries with high-tech, high wage jobs.

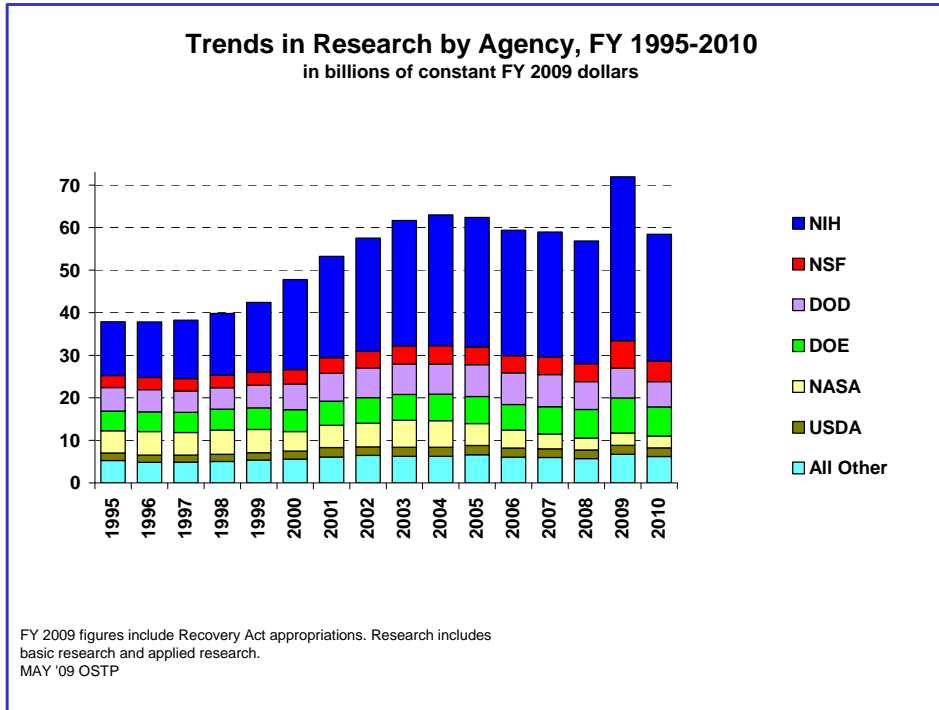


Figure 2.

The President plans to double Federal investments in three key basic research agencies, the National Science Foundation, Department of Energy’s (DOE’s) Office of Science, and the laboratories of the Department of Commerce’s National Institute of Standards and Technology, over a decade by 2016, building on down payments in the Recovery Act (see text box: The President’s Plan for Science and Innovation). These increases in research funding will help the United States to remain prosperous.

To increase the impacts of these investments, the 2010 Budget also emphasizes support for researchers at the beginning of their careers to sustain and expand the Nation’s scientific and technical workforce, including a plan to triple the number of NSF’s Graduate Research Fellowships by 2013.

A Clean Energy Future. The Administration envisions a United States that can lead the world in the research, development, demonstration and deployment of clean energy technology. Investments in clean energy R&D will drive a new energy economy that reduces dependence on oil, creates green jobs, and reduces the impact of climate change.

The 2010 Budget builds upon substantial clean energy R&D investments in the Recovery Act to forge a comprehensive approach to transforming our energy supply and slowing global climate change through cutting-edge science and technology. R&D funding will support renewable energy and energy efficiency technologies such as advanced batteries, solid-state lighting, solar, biomass, geothermal, and wind power. The 2010 Budget also supports the development and testing of carbon capture and storage technologies that will reduce carbon emissions from our use of fossil fuels and basic research to support transformational discoveries and accelerate solutions in the development of clean energy.

**The President's Plan for Science and Innovation:
Doubling Funding for Key Basic Research Agencies in the 2010 Budget**

The 2010 Budget sustains the President's commitment to double the budgets for three key basic-research agencies over a decade. Building on investments in the Recovery Act and the 2009 Omnibus Appropriations Act, the 2010 Budget provides substantial increases in funding for the National Science Foundation (NSF), the Department of Energy's Office of Science (DOE SC), and the National Institute of Standards and Technology (NIST) laboratories and establishes a clear path to completing the doubling effort in 2016.

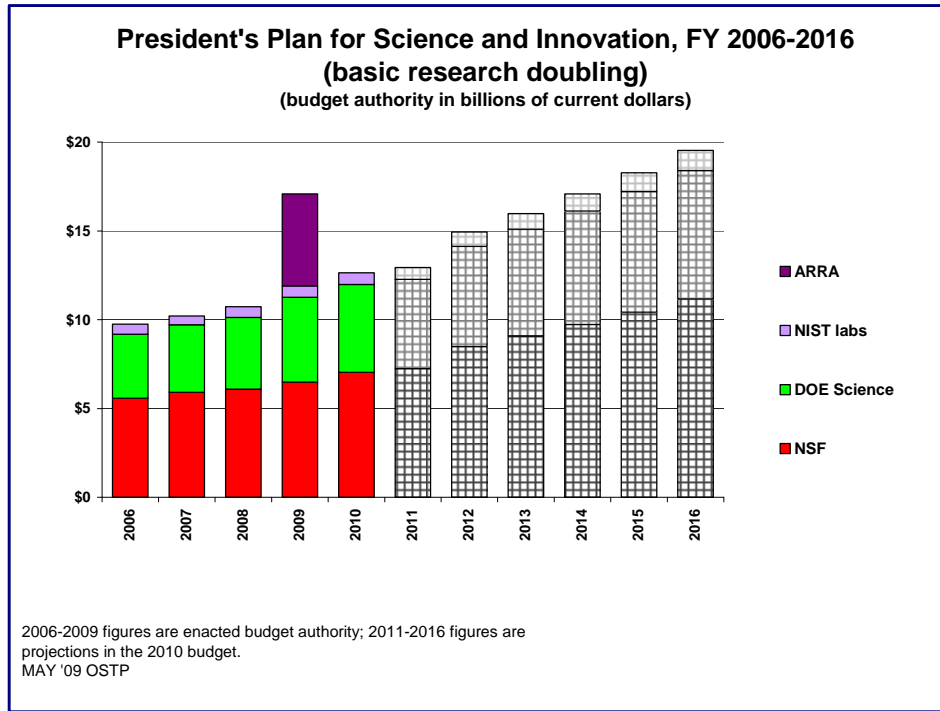


Figure 3.

Federally supported basic research has been a reliable source of new knowledge and new products. It has fueled important developments in fields ranging from telecommunications to transportation to medicine, and has yielded positive rates of economic return by creating entirely new industries with highly skilled, high-wage jobs. The President's Plan for Science and Innovation and the America COMPETES Act have identified NSF, DOE SC, and NIST as key to our nation's prosperity and to preserving America's place as the world leader in science and technology. Although the previous Administration voiced support for efforts to double these agencies' budgets between 2006 and 2016, these efforts fell short in 2007 and 2008. In 2009, the American Recovery and Reinvestment Act and the 2009 Omnibus Appropriations Act signed by President Obama finally put these agencies back on a doubling trajectory. **The 2010 Budget builds on these early Administration accomplishments with a requested \$12.6 billion total for NSF, DOE SC, and the NIST labs, an increase of \$731 million or 6.1 percent above the 2009 enacted total** (excluding Recovery Act funds of \$5.2 billion for the three agencies). These substantial increases keep the agencies on track for the fourth year of a ten-year doubling trajectory. In addition, the 2010 Budget establishes projections laying out a clear path to completing the doubling effort in 2016 with \$19.5 billion for the three agencies, double the \$9.7 billion they received in 2006. Between 2009 and 2016, the Obama Administration's enacted and proposed budgets would add \$42.6 billion to the 2008 budgets for these basic research agencies, with a special emphasis on encouraging high-risk, high-return research and supporting researchers at the beginning of their careers.

Healthy Lives for All Americans. Federal R&D investments in health result in knowledge and technologies that are vital for promoting longer, healthier lives for all Americans. The Administration is committed to funding biomedical and health research and to policies that increase the impact of these investments on health outcomes. The 2010 Budget emphasizes research to promote healthy living and disease prevention.

A Safe and Secure America. New developments in science and technology offer hope of predicting and preventing destabilizing or paralyzing natural and manmade threats, as well as minimizing their impacts and recovering from them as quickly as possible. The Budget accelerates the development of new medicines, vaccines, and production capabilities for biodefense by investing in countermeasures development. The Budget also invests in the technological capabilities necessary to monitor nuclear nonproliferation compliance and to prevent weapons of mass destruction from entering the country.

Highlights of Key R&D Funding Agencies in the 2010 Budget

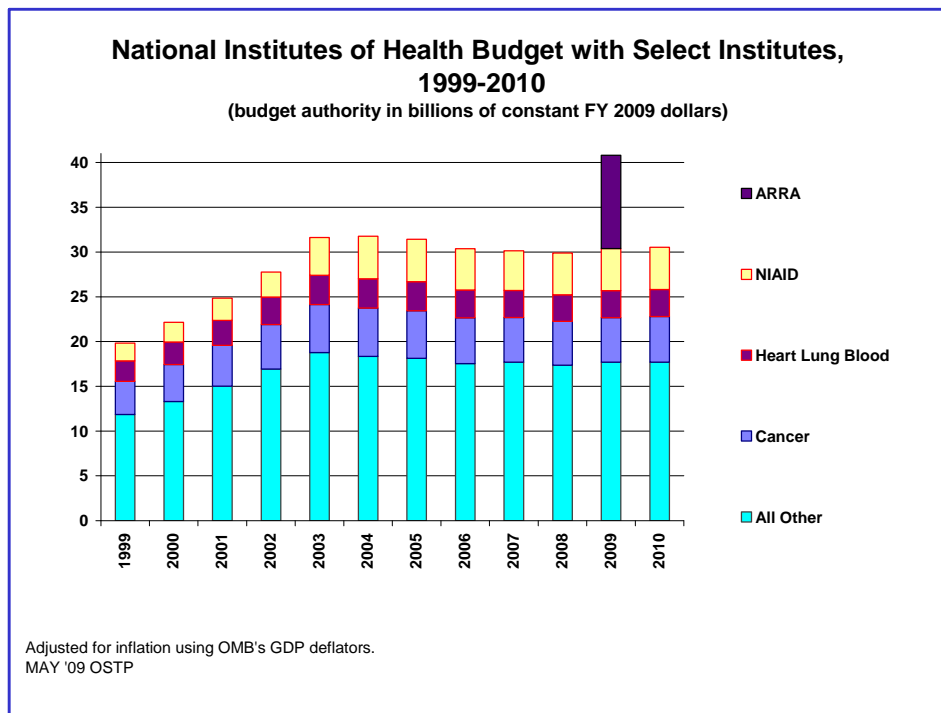


Figure 4.

- The **National Institutes of Health (NIH)** has at its mission the discovery of knowledge and therapies that will lead to better health outcomes for all Americans. The 2010 Budget proposes \$30.8 billion in appropriations for NIH, an increase of \$443 million or 1.5 percent above the 2009 enacted level. In addition, NIH received \$10.4 billion in Recovery Act funding, which will be spent in 2009 and 2010. After relatively sustained funding between 2004 and 2008, the Recovery Act provides an unprecedented increase for NIH. The 2010 Budget continues the Administration's support for biomedical research (see Figure 4). The 2010 Budget includes over \$6 billion to support cancer research as part of the President's sustained commitment to double NIH-wide funding for cancer research over the next 8 years, while also maintaining growth for non-cancer research. In 2010, the NIH Common Fund (CF) will invest \$549 million, an increase of \$8 million over 2009, to support cross-cutting, trans-NIH programs that require participation by at least two NIH Institutes or Centers (ICs) or that would otherwise benefit from strategic planning and coordination. Elsewhere within the Department of Health and Human Services (HHS), the 2010 Budget accelerates the development of new medicines, vaccines, and diagnostics for biodefense by investing \$305 million in Advanced Research and Development, \$30 million more than the 2009 enacted level.

- The **National Science Foundation (NSF)** is the primary source of support for academic research for most non-biomedical disciplines, funding basic research across the entire spectrum of the sciences and engineering. It is well

regarded for funding nearly all of its research through a competitive, peer-reviewed process. The increase in NSF funding to \$7.0 billion in the 2010 Budget, 8.5 percent more than the 2009 enacted level, will support many more researchers, students, post-doctoral fellows and technicians contributing to the innovation enterprise (see text box: The President's Plan for Science and Innovation). The 2010 Budget also fulfills the President's commitment to triple the number of NSF's Graduate Research Fellowships to 3,000 by 2013.

- The 2010 Budget sustains the **Department of Defense's (DOD's)** critical role in supporting technological advances with \$3.2 billion for the Defense Advanced Research Projects Agency (DARPA) for its support of longer-term breakthrough research, 4 percent more than the 2009 enacted level. The Budget maintains scientific and technological preeminence for our armed forces with a total R&D investment of \$79.7 billion, a decrease of \$1.9 billion from the 2009 enacted level due to proposed cuts in lower-priority weapons development programs and congressional projects. The 2010 Budget sustains DOD's commitment to increasing its support for basic research with a \$1.8 billion investment, a substantial increase over the 2009 enacted level after adjusting for approximately \$150 million in 2009 congressional projects that would not be renewed in 2010. Within the basic research portfolio, funding for the National Defense Education Program (NDEP) increases to \$90 million in 2010 from \$69 million.

- The **National Aeronautics and Space Administration (NASA)** 2010 Budget provides \$18.7 billion for space-based research that supports the Administration's commitment to deploy a global climate change research and monitoring system, a robust program of space exploration involving humans and robots, the safe flight of the Space Shuttle, continued use of the International Space Station, and a renewed commitment to aeronautics research. NASA's R&D portfolio totals \$11.4 billion in the 2010 Budget, an increase of \$1.0 billion or 10 percent over the 2009 enacted level (see Table 1).

- The **Department of Energy (DOE)** R&D portfolio totals \$10.7 billion in the 2010 Budget, an increase of \$119 million or 1.1 percent over the 2009 enacted level (excluding \$2.4 billion in preliminary allocations of Recovery Act funds for R&D activities; see Table 1). DOE's Office of Science (DOE SC) supports grants and infrastructure for a wide range of basic research impacting economically significant areas such as nanotechnology, high-end computing, energy, and climate change. The 2010 Budget of \$4.9 billion, 3.5 percent more than the 2009 enacted level, increases funding for both research and cutting-edge facilities, as part of the President's commitment to double funding over a decade (see text box: The President's Plan for Science and Innovation). The 2010 DOE SC Budget improves our understanding of climate science, continues the U.S. commitment to international science and energy experiments, and expands Federal support at the frontiers of energy research. The 2010 Budget invests in DOE's clean energy R&D programs to reduce dependence on foreign oil and to accelerate the transition to a low-carbon economy. The 2010 Budget provides \$320 million for solar energy R&D, nearly double the 2009 enacted level of \$175 million, and \$238 million for energy conservation building technologies, also nearly double the 2009 enacted level of \$140 million. DOE also proposes to fund an initial eight multi-disciplinary Energy Innovation Hubs at a total of \$280 million to support cross-disciplinary R&D focused on the barriers to transforming energy technologies into commercially deployable materials, devices and systems.

- **Department of Homeland Security (DHS)** R&D increases to \$1.1 billion in the 2010 Budget, up \$29 million or 3 percent from the 2009 enacted level.

- R&D in the **U.S. Department of Agriculture (USDA)** appears to fall to \$2.3 billion in the 2010 Budget from higher 2008 and 2009 enacted levels but after adjusting for 2008 and 2009 congressional projects that would not be renewed in 2010, USDA R&D funding increases in 2010. The 2010 Budget invests in the science and technology needed to combat natural and manmade threats to our nation's food supply, including \$132 million in USDA for research associated with the safety of the U.S. food supply. The 2010 Budget provides \$37 million in new intramural research funding for bioenergy, nutrition, climate, and world hunger research, and a \$70 million extramural initiative of research and extension funds for rural revitalization. The 2010 Budget sustains the Agriculture and Food Research Initiative (AFRI) of competitively awarded research grants at \$202 million.

- The Department of Commerce's **National Institute of Standards and Technology (NIST)** invests in technological innovation through research, advanced measurement, and standards development. The 2010 Budget of \$652 million for NIST's intramural laboratories will improve NIST's research capabilities by providing high

performance laboratory research and facilities for a diverse portfolio of basic research in areas such as health information technology, the digital smart grid, and carbon measurements. NIST's 2010 Budget is part of the President's commitment to double funding over a decade (see text box: The President's Plan for Science and Innovation). Commerce's **National Oceanic and Atmospheric Administration (NOAA)** is a leading sponsor of oceanic and atmospheric research and is one of the key sponsors of climate science capabilities in the Federal government. The 2010 Budget allocates \$644 million for NOAA R&D programs within a total NOAA Budget of \$4.5 billion.

- The **Department of Veterans Affairs (VA)** 2010 Budget provides \$1.2 billion for R&D programs, an increase of \$140 million or 14 percent over the 2009 enacted level. VA research focuses on biomedical research topics of special relevance to the wounded warrior, and supports a robust program of clinical and translational research.

- The 2010 Budget provides \$730 million for R&D in the **Department of the Interior**. The 2010 Budget provides \$649 million for R&D in Interior's lead science agency, the **U.S. Geological Survey (USGS)**, a 6 percent increase. The total USGS Budget of \$1.1 billion is a \$54 million increase over the 2009 enacted level.

- The **Environmental Protection Agency (EPA)** R&D portfolio of \$619 million in the 2010 Budget is a \$39 million or 7 percent increase over the 2009 enacted level.

- The 2010 Budget provides \$939 million for **Department of Transportation (DOT)** R&D, an increase of \$26 million or 3 percent over the 2009 enacted level. The 2010 Budget sustains aviation R&D investments in the Federal Aviation Administration (FAA) and highway R&D investments in the Federal Highway Administration (FHWA).

Multi-agency initiatives

A number of research investments are being addressed through multi-agency research activities coordinated through the National Science and Technology Council (NSTC) and other interagency forums. Many of the challenges simply cannot be addressed by a single agency. Moreover, innovation often arises from combining the tools, techniques, and insights from multiple agencies. Table 2 shows details of three such interagency efforts: networking and information technology R&D, nanotechnology R&D, and climate change R&D. (Preliminary allocations of Recovery Act investments are listed in a separate column in Table 2; dollar and percentage changes are from 2009 enacted appropriations (excluding Recovery Act funds) to the 2010 Budget.)

Networking and Information Technology R&D: The 2010 Budget provides \$3.9 billion for the multi-agency Networking and Information Technology Research and Development (NITRD) Program, an increase of \$44 million or 1.1 percent over the 2009 enacted level (excluding Recovery Act funds). NITRD programs also receive \$706 million in Recovery Act funding based on preliminary agency allocations. NITRD plans and coordinates agency research efforts in cyber security, high-end computing systems, advanced networking, software development, high-confidence systems, information management, and other information technologies. In 2008, the NITRD agencies addressed the recommendations contained in the President's Council of Advisors on Science and Technology (PCAST) NITRD Program Review by establishing a robust strategic planning activity scheduled to conclude in 2009. The NITRD Subcommittee also published the Federal Plan for Advanced Networking R&D in 2008, and has continued to address cyber security research under the R&D-related components of the Comprehensive National Cybersecurity Initiative.

The 2010 Budget retains the important focus on investment in high-end computing research for both national security and large-scale scientific applications, particularly in advanced scalable simulations. The 2010 Budget also emphasizes foundations for assured computing and secure hardware, software and network design and engineering to address the goal of making Internet communications more secure and reliable. Reports and general information about NITRD are available at www.nitrd.gov/.

Nanotechnology R&D: The 2010 Budget provides \$1.6 billion for the multi-agency National Nanotechnology Initiative (NNI), a slight cut of \$17 million or 1.0 percent from the 2009 enacted level (excluding Recovery Act funds) from the proposed elimination of 2009 Department of Defense congressional projects in 2010. NNI programs

also receive \$140 million in Recovery Act funding based on preliminary agency allocations. 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 nanoscale (roughly 1 to 100 nanometers). The results of NNI-supported R&D enable breakthroughs in biomedical detection and treatment, manufacturing at or near the nanoscale, environmental monitoring and protection, energy conversion and storage, and novel more powerful electronic devices, among many others.

Guided by the NNI Strategic Plan, participating agencies will continue to support nanoscience and nanotechnology development through investigator-led research; multidisciplinary centers of excellence; education and training; and infrastructure and standards development, including user facilities and networks that are broadly available to support research and innovation. In addition, consistent with the NNI Strategy for Nanotechnology-Related Environmental Health, and Safety (EHS) Research, 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. Participating agencies provide \$88 million for nano EHS research in the 2010 Budget, 23 percent more than the enacted 2009 level. Reports and general information about the NNI are available at www.nano.gov/.

Climate Change R&D: The U.S. Climate Change Science Program (CCSP) coordinates climate research among the 13 departments and agencies that participate in the CCSP. The 2010 Budget provides \$2.0 billion for CCSP programs, an increase of \$46 million or 2.3 percent over the 2009 enacted level (excluding Recovery Act funds). CCSP programs also receive \$461 million in Recovery Act funding based on preliminary agency allocations, including \$237 million for NASA climate activities. The 2010 Budget supports research activities including the development of an integrated earth system analysis capability; a focus toward creating a high-quality record of the state of the atmosphere and ocean since 1979; development of an end-to-end hydrologic projection and application capability; enhanced carbon cycle research on high latitude systems; quantification of climate forcing and feedbacks by aerosols, non-carbon dioxide greenhouse gases, water vapor, and clouds; assessment of abrupt change in a warming climate; examination of the feasibility of development an abrupt change early warning system; understanding climate change impacts on ecosystem functions; and refining ecological forecasting. Among agencies the U.S. Geological Survey (USGS) continues to expand its Global Change program and other related activities, to \$63 million (up 40 percent), while the National Science Foundation (NSF) provides \$300 million for CCSP activities in the 2010 Budget, an increase of \$80 million or 36 percent over the 2009 enacted level. Reports and general information about the CCSP are available on the program's website: www.climate-science.gov/.

Science, Technology, Engineering, and Mathematics (STEM) Education in the 2010 Budget

The 2010 Budget makes a renewed commitment to education in science, technology, engineering, and mathematics (STEM) fields because the progress and prosperity of future generations will depend on what we do now to educate our students. The 2010 Budget invests \$3.7 billion in STEM education programs throughout the federal government in over 100 programs identified by the Academic Competitiveness Council (ACC; see Table 4), an increase of \$98 million or 2.7 percent over the 2009 enacted level for these programs. In addition, the Recovery Act provides a preliminary \$276 million for these programs, which will be spent over 2009 and 2010. (Preliminary allocations of Recovery Act investments are listed in a separate column in Table 4; dollar and percentage changes are from 2009 enacted appropriations (excluding Recovery Act funds) to the 2010 Budget.)

For STEM programs, 2010 Budget highlights include:

- The President's commitment to triple the number of **Graduate Research Fellowships (GRF)** at the National Science Foundation (NSF) to 3,000 by 2013. The 2010 budget provides \$122 million for the NSF GRF program.
- Funding for the **Math and Science Partnerships (MSPs)** are sustained at \$179 million for the Department of Education component in the 2010 Budget, and \$58 million for the NSF component. Both components facilitate partnerships between local school districts and higher education institutions to improve math and science education.
- A new Department of Energy (DOE) Energy Efficiency and Renewable Energy (EERE) **RE-ENERGYSE (REgaining our ENERGY Science and Engineering Edge)** program will form the core of DOE's participation in

a joint DOE-NSF initiative to inspire tens of thousands of American students to pursue STEM careers, particularly in clean energy. The 2010 Budget provides \$115 million for DOE to launch this program.

- \$64 million, an increase of \$12 million, for NSF's **Advanced Technological Education (ATE)** program to promote partnerships between higher education institutions and employers to educate technicians for the high-technology fields that drive our nation's economy. ATE focuses on two-year colleges.

- \$798 million in the 2010 Budget, an increase of \$8 million, for the **Ruth L. Kirschstein National Research Service Award (NRSA)** program at the National Institutes of Health (NIH). The NRSA program provides training for the next generation of biomedical researchers.

- An expansion of the Department of Defense's (DOD) **Science, Mathematics and Research for Transformation (SMART) program** of physical sciences and engineering graduate scholarships with a government service component, to \$37 million in the 2010 Budget, up from the \$28 million 2009 enacted level.

Technology Programs in the 2010 Budget

In the face of unprecedented challenges, technological advances can provide a powerful engine for advancing economic growth and new opportunity. Harnessing the full power and potential of new technologies can improve the lives of all Americans. (Recovery Act investments are listed in a separate column in Table 5; dollar and percentage changes are from 2009 enacted appropriations (excluding Recovery Act funds) to the 2010 Budget.) The 2010 Budget invests in key technologies, including:

Broadband technology – The Administration is investing heavily in broadband infrastructure by implementing the \$7.2 billion provided for this purpose in the Recovery Act to the Departments of Agriculture and Commerce (see Table). These investments will continue to be implemented in 2010. The 2010 Budget provides \$82 million for continuing USDA support of rural broadband, distance learning, and telemedicine services, an increase of \$23 million or 39 percent over the 2009 enacted level.

Health information technology (IT) – Building on the historic \$19 billion investment in the Recovery Act, the Administration will continue efforts to further the adoption and implementation of health IT as an essential tool to modernize the health care system. \$2 billion in Recovery Act investments will continue to be implemented in 2010, while the remaining \$17 billion will be available as temporary incentive payments starting in 2011 to physicians and hospitals participating in Medicare for using certified electronic health records.

Education technology – Supporting cutting-edge educational technology, modernizing science laboratories, and forging partnerships to improve the use of science and technology in classrooms are key priorities throughout federal investments in education. \$650 million in Recovery Act investments for Education Technology State Grants (ED-TECH) will continue to be implemented through the 2010-2011 school year, and the 2010 Budget provides an additional \$100 million. Other Department of Education programs, including Title I Grants and Teacher Quality State Grants, also provide support for education technology.

Clean energy technology – In no area will innovation be more important than in the development of new technologies to produce, use, and save energy. The 2010 Budget sustains the Administration's commitment to developing a 21st century clean energy economy. In addition to energy research and development (R&D) investments, the 2010 Budget provides \$3.1 billion for clean energy technologies, including deployment, demonstration, and commercialization assistance activities, to build on \$31 billion in Recovery Act funding.

Federal information technology (IT) – Greater transparency, accountability, and public participation are central to the President's Open Government agenda. New technology has the potential to drive innovation in government. The 2010 Budget reflects the growing responsibilities for federal IT management with \$75.8 billion for total federal IT spending, \$5.1 billion or 7.2 percent more than the 2009 enacted level. New directions for federal IT in 2009, as well as allocations of Recovery Act investments, mean that federal IT spending estimates for 2009 and 2010 will likely change as plans are made to address the Administration's goal of greater openness in government, wider participation by citizens in government, and a more collaborative, cost-effective federal IT enterprise.

Next-Generation Manufacturing Technologies – The 2010 Budget provides significant funding for programs at the National Institute of Standards and Technology (NIST) that will foster innovation in manufacturing, including \$125 million for the Hollings Manufacturing Extension Partnership (MEP), an increase of \$15 million over the 2009 enacted level as part of the President’s plan to double MEP funding between 2008 and 2015. The 2010 budget also provides \$70 million for the Technology Innovation Program (TIP). While its initiatives are not solely directed at the manufacturing sector, the Economic Development Administration (EDA) will be spending at least \$50 million to promote regional innovation clusters and \$50 million to support business incubator networks. The 2010 Budget also funds research that benefits manufacturing in the NIST laboratories, and the Recovery Act provides \$2 billion for grants to support manufacturing of advanced batteries.

Table 1. R&D in the 2010 Budget

Table 1. R&D in the FY 2010 Budget by Agency

(budget authority in millions of dollars)

	FY 2008 Actual	FY 2009 Estimate	FY 2009 ARRA 1/	FY 2010 Budget	Change FY 09-10 2/ Amount	Percent
Total R&D						
Defense (military)	80,278	81,616	300	79,687	-1,929	-2.4%
Health and Human Services	29,265	30,415	11,103	30,936	521	1.7%
<i>Nat'l Institutes of Health</i>	<i>28,547</i>	<i>29,748</i>	<i>10,400</i>	<i>30,184</i>	436	1.5%
<i>All Other HHS R&D</i>	<i>718</i>	<i>667</i>	<i>703</i>	<i>752</i>	85	12.7%
NASA	11,182	10,401	925	11,439	1,038	10.0%
Energy	9,807	10,621	2,446	10,740	119	1.1%
Nat'l Science Foundation	4,580	4,857	2,900	5,312	455	9.4%
Agriculture	2,336	2,421	176	2,272	-149	-6.2%
Commerce	1,160	1,292	411	1,330	38	2.9%
NOAA	625	700	1	644	-56	-8.0%
NIST	498	550	410	637	87	15.8%
Interior	683	692	74	730	38	5.5%
<i>U.S. Geological Survey</i>	<i>586</i>	<i>611</i>	<i>74</i>	<i>649</i>	38	6.2%
Transportation	875	913	0	939	26	2.8%
Environ. Protection Agency	551	580	0	619	39	6.7%
Veterans Affairs	960	1,020	0	1,160	140	13.7%
Education	313	323	0	384	61	18.9%
Homeland Security	995	1,096	0	1,125	29	2.6%
All Other	761	818	0	947	129	15.8%
Total R&D	143,746	147,065	18,335	147,620	555	0.4%
Defense R&D	84,337	85,426	300	83,760	-1,666	-2.0%
Nondefense R&D	59,409	61,639	18,035	63,860	2,221	3.6%
Basic Research	28,613	29,881	11,365	30,884	1,003	3.4%
Applied Research	27,413	28,766	1,920	28,139	-627	-2.2%
Total Research	56,026	58,647	13,285	59,023	376	0.6%
Development	83,254	83,887	1,408	84,054	167	0.2%
R&D Facilities and Equipment	4,466	4,531	3,642	4,543	12	0.3%

1/ Based on preliminary allocations of Recovery Act (P.L. 111-5) appropriations. These figures may change.

2/ Excludes Recovery Act appropriations. Change is regular FY 2009 appropriations to FY 2010 request.

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Table 2. Interagency Science and Technology Investments

Table 2. Interagency Science and Technology Initiatives

(budget authority in millions)

	FY 2008 Actual	FY 2009 Estimate	FY 2009 ARRA 1/ ^{1/}	FY 2010 Budget	Change FY 09-10 2/ Amount	Percent
National Nanotechnology Initiative (NNI)						
National Science Foundation	409	397	108	423	26	6.5%
Defense	460	464	0	379	-85	-18.3%
Energy	240	332	25	347	15	4.4%
NASA	17	17	0	17	0	0.0%
Commerce (NIST)	86	88	7	92	3	3.9%
HHS - National Institutes of Health / CDC	311	319	0	338	19	6.1%
Agriculture	10	9	0	9	0	0.0%
EPA	12	16	0	18	1	7.9%
DHS	3	9	0	12	3	28.6%
Justice	0	0	0	0	0	33.3%
DOT - FHWA	1	3	0	3	0	0.0%
Total Nanotechnology	1,549	1,654	140	1,637	-17	-1.0%
Networking and Information Technology R&D (NITRD)						
Commerce	84	94	197	111	17	17.6%
Defense	1,096	1,281	0	1,141	-140	-10.9%
Energy	409	438	157	485	48	10.9%
Environ. Protection Agency	6	6	0	6	0	0.0%
Health and Human Services	956	981	0	995	14	1.4%
NASA	69	74	13	73	-1	-1.1%
National Science Foundation	947	1,004	340	1,111	107	10.6%
All Other	5	5	0	5	44	1.1%
Total IT R&D	3,572	3,882	706	3,927	44	1.1%
Climate Change Science Program (CCSP)						
National Science Foundation	207	220	95	300	80	36.4%
Energy	128	157	76	165	8	5.1%
Commerce (NOAA)	272	369	53	297	-72	-19.5%
Agriculture	65	56	0	59	3	5.4%
Interior (USGS)	34	45	0	63	18	40.0%
Environ. Protection Agency	17	18	0	21	3	16.7%
National Institutes of Health	4	4	0	4	0	0.0%
NASA	1,084	1,086	237	1,071	-15	-1.4%
All Other (Smith., AID, DOT, State)	21	25	0	46	21	84.0%
Total CCSP	1,832	1,980	461	2,026	46	2.3%

1/ Based on preliminary allocations of Recovery Act (P.L. 111-5) appropriations. These figures may change.

2/ Excludes Recovery Act appropriations. Change is regular FY 2009 appropriations to FY 2010 request.

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Table 3. Research in the 2010 Budget

Table 3. Research in the FY 2010 Budget

(budget authority in millions of dollars)

	FY 2008 Actual	FY 2009 Estimate	FY 2009 ARRA 1/	FY 2010 Budget	Change FY 09-10 2/ Amount	Percent
RESEARCH (basic + applied)						
Defense (military)	6,454	6,914	85	6,032	-882	-12.8%
<i>Basic Research ("6.1")</i>	1,599	1,822	3	1,796	-26	-1.4%
Health and Human Services	29,088	30,245	9,603	30,766	521	1.7%
<i>Nat'l Institutes of Health</i>	28,412	29,615	8,900	30,051	436	1.5%
NASA	2,743	2,617	271	2,828	211	8.1%
Energy	6,641	7,093	1,142	6,906	-187	-2.6%
Nat'l Science Foundation	4,124	4,445	2,000	4,900	455	10.2%
Agriculture	2,025	2,109	0	2,033	-76	-3.6%
Commerce	933	1,023	110	1,020	-3	-0.3%
NOAA	544	603	0	540	-63	-10.4%
NIST	373	402	110	461	59	14.7%
Interior	597	617	74	658	41	6.6%
<i>U.S. Geological Survey</i>	524	544	74	579	35	6.4%
Transportation	667	672	0	694	22	3.3%
Environ. Protection Agency	472	495	0	534	39	7.9%
Veterans Affairs	904	960	0	1,092	132	13.8%
Education	198	204	0	221	17	8.3%
Homeland Security	629	681	0	698	17	2.5%
All Other	551	572	0	641	69	12.1%
Total Research	56,026	58,647	13,285	59,023	376	0.6%

1/ Based on preliminary allocations of Recovery Act (P.L. 111-5) appropriations. These figures may change.

2/ Excludes Recovery Act appropriations. Change is regular FY 2009 appropriations to FY 2010 request.

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Table 4. Federal STEM Education Program Funding

Table 4. Federal STEM Education Program Funding by Agency
(budget authority in millions)

	FY 2008 Enacted	FY 2009 Enacted	FY 2009 ARRA 1/	FY 2010 Budget	Change FY 09-10 2/ Amount	Percent
Corporation for Nat'l & Community Service	3	7	0	7	0	0.0%
Agriculture	44	47	0	88	41	87.2%
Commerce	47	50	43	36	-14	-28.0%
Defense	209	218	0	229	11	5.0%
Education	708	850	0	763	-87	-10.2%
Energy	20	24	13	148	124	516.7%
Health and Human Services	837	845	0	853	8	0.9%
Homeland Security	93	99	0	106	7	7.1%
Labor	0	10	0	0	-10	-100.0%
Interior	23	24	0	26	2	8.3%
Transportation	158	159	0	174	15	9.4%
Environmental Protection Agency	10	10	0	11	1	10.0%
NASA	147	169	0	126	-43	-25.4%
National Science Foundation	1,013	1,066	220	1,109	43	4.0%
Total STEM Education	3,312	3,578	276	3,676	98	2.7%

1/ Based on preliminary allocations of Recovery Act (P.L. 111-5) appropriations. These figures may change.

2/ Excludes Recovery Act appropriations. Change is regular FY 2009 appropriations to FY 2010 request.

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Table 5. FY 2010 Budget Technology Programs

Table 5. 2010 Budget for Selected Technology Programs

(budget authority in millions of dollars)

Technology Area	FY 2009		FY 2009		Change '09 to '10**	
Department/ Agency - Program	FY 2008	FY 2009	ARRA*	FY 2010	Amount	Percent
Broadband Technology:						
Dept. of Commerce Nat'l Telecomm. and Info. Admin.						
- Broadband Technology Opportunities Program	0	0	4,700	0	0	--
U.S. Dept. of Agriculture Rural Utilities Service						
- Distance Learning, Telemedicine, and Broadband	53	59	2,500	82	23	39.0%
TOTAL Broadband	53	59	7,200	82	23	39.0%
Health Information Technology:						
Dept. of HHS Office of the Secretary						
- Office of National Coordinator for Health IT	61	61	2,000	61	0	0.2%
TOTAL Health IT 1/	61	61	2,000	61	0	0.2%
Education Technology:						
Dept. of Education School Improvement Programs						
- Enhancing Edu. Through Tech. State Prog. (ED-TECH)	267	270	650	100	-170	-62.9%
TOTAL Education Technology	267	270	650	100	-170	-62.9%
Clean Energy Technology:						
Dept. of Defense						
- Near Term Energy Efficiency Tech. Demos. And Res.	0	0	300	0	0	--
Dept. of Energy						
- Energy Efficiency & Renewable Energy 2/	1,704	2,179	14,800	2,319	140	6.4%
- Advanced Battery Manufacturing Grants	0	0	2,000	0	0	--
- Fossil Energy R&D 2/	727	876	3,400	618	-259	-29.5%
- Elec. Delivery and Energy Reliability 2/	136	137	4,500	208	71	51.8%
- Innovative Tech. Loan Guarantee Program 3/	4	0	5,990	0	0	--
TOTAL Clean Energy Technology	2,572	3,192	30,990	3,145	-48	-1.5%
Federal Information Technology Spending (Gov't Wide)	66,405	70,716	4/	75,829	5,113	7.2%
Next-Generation Manufacturing Technologies:						
Dept. of Commerce						
- Manufacturing Extension Partnership (NIST)	90	110	0	125	15	13.4%
- Technology Innovation Program (NIST) 2/	46	60	0	70	10	16.5%
- Regional Innovation Cluster and Business Incubator 5/	0	0	0	100	100	--
TOTAL Manufacturing Technologies 6/	136	170	0	295	125	73.3%

* American Recovery and Reinvestment Act (Public Law 111-5); funds will be spent over multiple years.

** Excludes Recovery Act appropriations. Change is regular FY 2009 appropriations to FY 2010 request.

1/ Health IT ARRA funding excludes an estimated \$17 billion in incentives and investments through mandatory programs (Medicare and Medicaid) beginning in 2011.

2/ Includes some R&D funding. EERE includes Federal Energy Assistance spending.

3/ Appropriated funds only. The program leverages appropriated funds by up to 10 times in loans.

4/ Recovery Act allocations are not available at this time.

5/ Allocation within Commerce EDA programs, roughly half for innovation clusters and half for business incubators.

For the past several years, EDA support of incubators has been approximately \$10-\$25 million a year.

6/ R&D spending in the NIST laboratories and other R&D agencies also contribute to manufacturing technologies.