



Innovation, Education, and Infrastructure

Science, Technology, STEM Education, and 21st Century Infrastructure in the 2012 Budget

February 14, 2011

“We know what it takes to compete for the jobs and industries of our time. We need to out-innovate, out-educate, and out-build the rest of the world.”

- President Barack Obama
January 2011

The world is fundamentally different today than it was just a generation ago. Technological innovations in communications, manufacturing, healthcare, and energy have transformed Americans’ personal and professional lives, opening new opportunities at home and abroad but also raising daunting competitive stakes. In this new, hyperconnected and hypercompetitive environment, the nations that invest in innovation, elevate education, and improve their infrastructure to keep people, goods, and information moving are the nations where the jobs and businesses of tomorrow will thrive.

Accomplishing this requires more than a piecemeal approach to patching up problems and trimming waste. It requires the creation of an all-encompassing environment—an economic and technological ecosystem—in which invention, innovation, and industry can flourish. That is the philosophy behind the President’s 2012 Budget. It starts with continuing investment in the basic research, science, engineering, and technology that can turn ideas into realities. And it ends with the creation of new products, businesses, and industries that, despite barely having been imagined a few years earlier, prove to be essential and even iconic.

The 2012 Budget recognizes today’s difficult economic circumstances and makes a number of tough choices, limiting spending in many areas that in other times would be deemed worthy of greater support. But through this process it also focuses on the future, helping to build and fuel the engines of discovery that will expand the frontiers of human knowledge and produce novel applications that promote sustainable growth, cultivate a clean-energy future, improve the health of the population at lower costs, address the challenges of global climate change, manage competing demands on the environment, and ensure our national security.

There is no doubt that America can win the future. The President’s Fiscal Year 2012 Budget proposes \$147.9 billion for Federal research and development (R&D) to do just that—to ensure that the Nation out-innovates, out-educates, and out-builds the rest of the world.

- **Jumpstarting Innovation.** To strengthen U.S. leadership in the 21st century’s high-tech knowledge-based economy, the 2012 Budget proposes a substantial increase in non-defense R&D to \$66.8 billion, an increase of \$4.1 billion or 6.5 percent over the 2010 enacted level. The Budget also invests \$81.2 billion for defense R&D. (Because 2011

appropriations have not been enacted, all comparisons are between the 2012 Budget and 2010 appropriations. All comparisons are in current, not-adjusted-for-inflation dollars.)

- **Pushing the Frontiers of Scientific Discovery.** To meet America's challenges, including those related to the economy, health, energy, climate, environment, and national security, the 2012 Budget calls for a Federal research portfolio (comprising basic and applied research) totaling \$66.1 billion, up \$6.9 billion or 11.6 percent compared to the 2010 enacted level.
- **Maintaining Our Commitment to Three Key Science Agencies.** Reflecting several legislative and executive branch conclusions that the activities of three key science agencies—the National Science Foundation (NSF), the Department of Energy (DOE) Office of Science, and the National Institute of Standards and Technology (NIST) laboratories—are critical to preserving America's place as the world leader in innovation, the 2012 Budget maintains the commitment to double these agencies' budgets by providing a total of \$13.9 billion, an increase of \$1.5 billion or 12.2 percent above 2010.
- **Advancing a Clean Energy Future.** To develop the revolutionary technologies that will reduce U.S. dependence on foreign oil and nourish the domestic energy industries and jobs of the future, the 2012 Budget proposes \$550 million in appropriations for DOE's Advanced Research Projects Agency-Energy (ARPA-E). The Budget also proposes to double the number of Energy Innovation Hubs from three to six, to further catalyze synergies between industry and academia; provides for long-term, paradigm-shifting energy research in DOE's Office of Science; and ramps up support for renewable energy research, development, and deployment activities.
- **Educating Our Children in Science, Math, and Engineering.** To prepare American children for a future in which they can out-pace the competition anywhere in the world, the 2012 Budget proposes \$3.4 billion for the Federal investment in science, technology, engineering, and mathematics (STEM) education, including a \$100 million down payment on an initiative to prepare 100,000 new and highly effective STEM teachers over the next decade.
- **Investing in 21st Century Infrastructure to Keep People, Goods, and Information on the Move.** To spur innovation in the public and private sectors and to provide the foundational capacities that facilitate the growth of new jobs and industries, the 2012 Budget proposes investments in high-speed wireless Internet for all Americans, enhanced use of spectrum, and high-speed rail. As part of this commitment, the Budget proposes an investment of \$3 billion from expected spectrum auction proceeds for a Wireless Innovation Fund to accelerate the research and development of cutting-edge wireless technologies and applications.
- **Ensuring Longer, Healthier Lives for All Americans.** To maintain American leadership in biomedical research and to improve the health of Americans and the American economy, the 2012 Budget proposes nearly \$32 billion in discretionary appropriations for the National Institutes of Health (NIH), an increase of \$745 million above 2010.

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- **Expanding Private Sector Investment.** To provide incentives for U.S. industries to keep investing in American innovation, the 2012 Budget proposes an expanded, simplified, and permanent Research and Experimentation (R&E) Tax Credit, which will provide companies the certainty they need that the credit will be available for the duration of their R&D investments.
 - **Making Tough Choices.** The Obama Administration’s investments in innovation, education, and infrastructure fit within an overall non-security discretionary budget that would be frozen at 2010 levels for the second year in a row and would stay frozen through 2015. The Budget reflects strategic decisions to focus resources on those areas where the payoff for the American people is likely to be highest, while imposing hard-nosed fiscal discipline on areas lacking that kind of promise. For example, the 2012 Budget proposes \$79.4 billion for development within the Federal R&D portfolio—a decline compared to the 2010 funding level in part because of reductions in development funding in the Department of Defense.

Priorities for Federal Research and Development in the 2012 Budget

“This is our generation’s Sputnik moment. ... We’ll invest in biomedical research, information technology, and especially clean energy technology – an investment that will strengthen our security, protect our planet, and create countless new jobs for our people.”

- President Barack Obama
January 2011

The President’s 2012 Budget proposes \$147.9 billion for the Federal investment in research and development (see Table 1). Within a fiscally responsible budget that reduces projected deficits and freezes overall non-security discretionary spending at 2010 levels for five years, Federal R&D increases \$772 million or 0.5 percent over the 2010 enacted level. The 2012 Budget sets priorities and makes tough choices within tight fiscal constraints to make room for high-priority investments in education, innovation, and infrastructure. In that spirit, the 2012 Budget proposes a decline in defense-related development but **proposes non-defense R&D of \$66.8 billion, an increase of \$4.1 billion or 6.5 percent over the 2010 enacted level.** (Again, all comparisons are between the 2012 Budget and 2010 appropriations and are in current, not-adjusted-for-inflation dollars.)

The 2012 Budget recognizes the role of government in fostering groundbreaking scientific and technological breakthroughs with a special emphasis on **basic and applied research** to fundamentally improve our understanding of nature, revolutionize key fields of science, and boost long-term economic growth and quality of life through new technologies. **The Federal research portfolio (comprising basic and applied research) totals \$66.1 billion in the 2012 Budget (see Figure 1 and Table 3), up \$6.9 billion or 11.6 percent compared to the 2010 enacted level.**

The 2012 Budget provides \$79.4 billion for development, a decline compared to the 2010 level because of decreased funding needs in the Department of Defense (DOD) for weapons and supporting systems. R&D facilities and capital equipment funding totals \$2.4 billion, a reduction of 48 percent compared to the 2010 level, primarily because of the planned transition of NASA's International Space Station from laboratory construction to research operations as a National Laboratory.

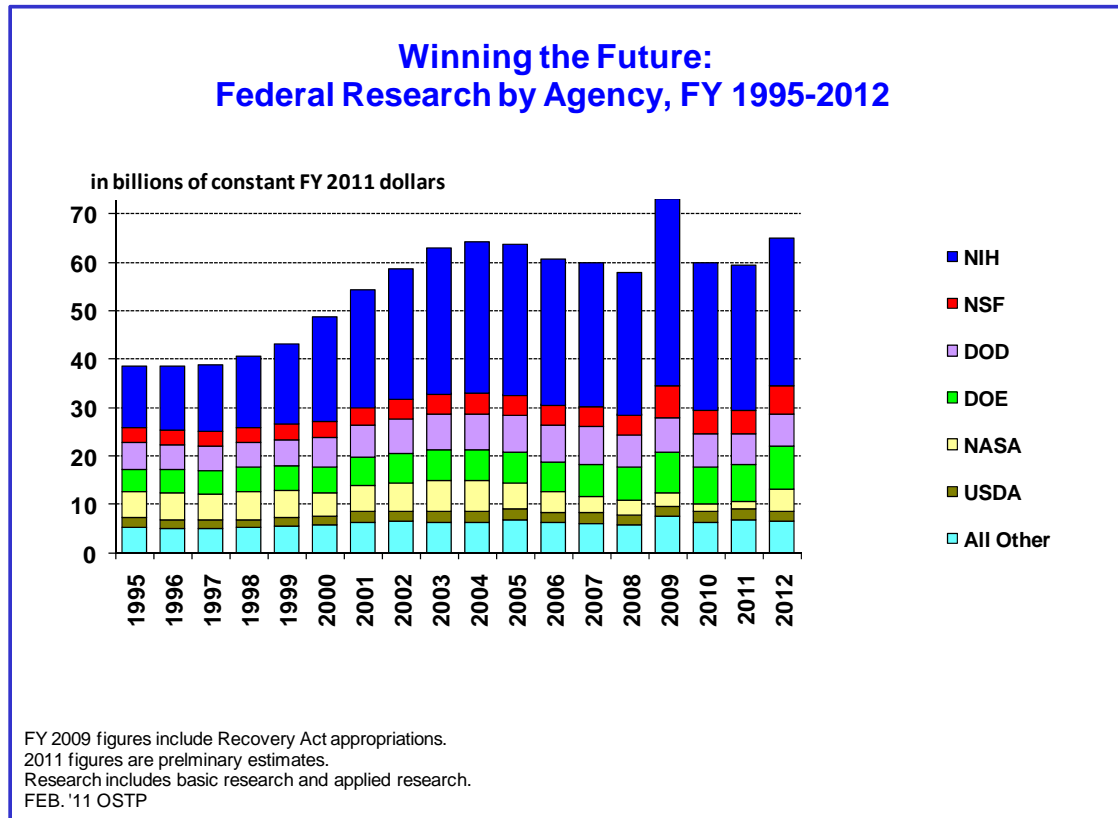


Figure 1.

Highlights of Key R&D Funding Agencies in the 2012 Budget

The **National Institutes of Health (NIH)** supports the development of knowledge and therapies that will lead to longer and healthier lives for all Americans. NIH accomplishes this goal through a robust program of intramural and extramural research, education, and training conducted or sponsored by its Institutes and Centers. **The 2012 Budget provides \$31.8 billion in discretionary appropriations for NIH, an increase of \$745 million or 2.4 percent above the 2010 enacted level.** The 2012 Budget continues to support basic and applied biomedical research across a broad range of scientific and health opportunities both on campus and at academic and independent research institutions across the country. NIH will continue its focus on supporting new and early-stage investigators to maintain the pipeline of talented scientists in biomedical research; NIH research training stipends will increase an average of 4 percent under the 2012 Budget. NIH will increase its focus on bridging the translational divide between basic science and therapeutic applications by fostering novel collaborations among government entities, academia, and industry, accelerating the development of treatments for diseases and disorders

that affect millions of Americans. Additionally, the NIH Common Fund will invest \$557 million, an increase of \$13 million over 2010, to support cross-cutting, trans-NIH programs that require participation by at least two NIH Institutes or Centers or that would benefit from coordinated strategic planning.

The **National Science Foundation (NSF)** is the primary source of support for academic research for most non-biomedical disciplines, integrating fundamental research and education across the entire spectrum of the sciences and engineering. The **increase in NSF funding to \$7.8 billion in 2012, or 13.0 percent more than the 2010 enacted level**, will catalyze the development of fundamental ideas in science and engineering and support the people who generate them. The 2012 Budget expands NSF's efforts in clean-energy research, advanced manufacturing, and other emerging technologies. NSF proposes to increase research funding to promote discoveries that can spark innovations for tomorrow's clean-energy technologies with a cross-disciplinary approach to sustainability science. The Science, Engineering, and Education for Sustainability (SEES) portfolio will increase to \$998 million in the 2012 Budget for integrated activities involving energy, climate, and environment. NSF is also committed to enhancing U.S. economic competitiveness with Science and Engineering Beyond Moore's law, a multidisciplinary research program that aims to surpass the physical and conceptual limits on computer processing development, with an investment of \$96 million in the 2012 Budget. NSF is also investing \$76 million in a multi-directorate initiative on research at the interface of the Biological, Mathematical, and Physical Sciences (BioMaPS) that aims for an accelerated understanding of biological systems. And the Administration proposes \$15 million in the 2012 Budget for the NSF's contribution to a new interagency initiative called Enhanced Access to the Radio Spectrum, or EARS, to support research into new and innovative ways to use the radio spectrum more efficiently so that more applications and services used by individuals and businesses can occupy the limited amount of available spectrum. (Additional NSF highlights can be found in OSTP's STEM Education fact sheet.)

The 2012 Budget invests in the **Department of Defense's (DOD)** long-term scientific and technological innovation to ensure that the Nation has access to the best defense systems in the world. The Budget **proposes \$76.6 billion for DOD R&D, a \$4.0 billion decrease from the 2010 funding level, including \$12.3 billion for early-stage science and technology programs (S&T)**. The Budget proposes \$3.0 billion for the Defense Advanced Research Projects Agency (DARPA) for its support of longer-term breakthrough research. The 2012 Budget sustains DOD's basic research ("6.1") with a record commitment of \$2.1 billion, an increase of 14.5 percent over the 2010 funding level, and provides increases for research in high-priority areas such as cybersecurity, advanced learning, information access, systems engineering, power distribution, and energy storage. DOD-funded research provides future affordable options for new defense systems and helps the Nation avoid technological surprise by potential adversaries. The Budget also prepares for emerging threats and sustains the U.S. nuclear deterrent.

The **National Aeronautics and Space Administration (NASA)** 2012 Budget **provides \$18.7 billion, the same as the 2010 enacted funding level**. The 2012 Budget maintains the Nation's commitment to humanity's first foothold in space through continuing support for the International Space Station; initiates development of a heavy-lift rocket and crew capsule; embraces an innovation-based partnership with the U.S. commercial space industry; supports

groundbreaking exploration of the universe through robotic missions and new astronomical observatories; reinvigorates a fleet of Earth observation spacecraft to strengthen U.S. leadership in understanding our planet; invests in the new technologies that will expand the nation's ability to utilize space and enrich our technical capabilities; and sharpens the focus of aeronautics research to enhance aviation safety and airspace efficiency while reducing the environmental impact of aviation. The Budget provides \$375 million to place the James Webb Space Telescope on a stable funding path that allows for completion of the project while maintaining a balanced astrophysics program. NASA's R&D portfolio totals \$9.8 billion in the 2012 Budget, an increase of \$559 million or 6.0 percent over the 2010 enacted level (see Table 1).

The **Department of Energy (DOE)** 2012 Budget positions the United States to lead in the clean-energy economy of the future with an **R&D portfolio that totals \$13.0 billion, an increase of \$2.2 billion or 19.9 percent over the 2010 enacted level** (see Table 1). DOE's Office of Science (DOE SC) delivers discoveries and scientific tools that transform our understanding of energy and nature. The 2012 DOE SC Budget of \$5.4 billion, or 10.7 percent more than the 2010 enacted level, increases funding for both research and cutting-edge facilities as part of the President's commitment to double funding for this Office and for two other key science agencies. The 2012 Budget invests in DOE's clean-energy R&D programs to reduce dependence on oil and to move toward a clean-energy future, including \$2.5 billion for R&D in Energy Efficiency and Renewable Energy. DOE will double the number of Energy Innovation Hubs from three to six, creating three new hubs on Batteries and Energy Storage, Smart Grid Technology and Systems, and Critical Materials. The 2012 Budget provides \$550 million in appropriations for the Advanced Research Projects Agency – Energy (ARPA-E) within DOE to support transformational discoveries and to accelerate solutions in the development of clean energy. In DOE's defense-related portfolio, the Budget includes \$7.6 billion for Weapons Activities to maintain a safe, secure, and effective nuclear arsenal and \$418 million for Nonproliferation and Verification R&D to monitor nuclear nonproliferation compliance and to prevent the proliferation of nuclear weapons.

Department of Homeland Security (DHS) R&D totals **\$1.1 billion in the 2012 Budget, up \$167 million or 18.8 percent from the 2010 enacted level**. The 2012 Budget proposes \$150 million to begin construction of the national Bio and Agro-defense Facility (NBAF), which will serve as a new, state-of-the-art biosafety level 3&4 facility for the development of vaccines and anti-virals and enhanced diagnostic capabilities for protecting the United States against emerging agricultural diseases. The Budget also proposes an \$18 million increase for research to support the Comprehensive National Cybersecurity Initiative (CNCI).

R&D in the **U.S. Department of Agriculture (USDA)** falls to **\$2.2 billion** in the 2012 Budget because of proposed reductions and terminations in lower-priority programs. The Budget provides increases for selected USDA research in human nutrition and obesity reduction, food safety, sustainable bioenergy, global food security, and climate change. The Budget increases funding to \$325 million for the National Institute of Food and Agriculture's (NIFA) key competitive research program, the Agriculture Food and Research Initiative (AFRI), 24 percent more than the \$262 million enacted 2010 level. The Budget proposes \$120 million for USDA bioenergy research to develop next-generation cellulosic and algae-based biofuels that displace

oil consumption and reduce greenhouse-gas emissions. The Budget also proposes \$151.5 million for USDA research associated with the safety of the U.S. food supply.

The Department of Commerce's **National Institute of Standards and Technology (NIST)** invests in technological innovation through research, advanced measurement, and standards development. The 2012 Budget of **\$764 million for NIST's intramural laboratories, a 15.1 percent increase over the 2010 enacted level**, will improve NIST's research capabilities by supporting high-performance laboratory research and facilities in areas such as advanced manufacturing, cybersecurity, interoperable Smart Grid devices, and nanotechnology. NIST's 2012 Budget maintains the President's commitment to double funding for three key science agencies. The Budget also includes \$12 million for the Advanced Manufacturing Technology Consortia program, a new public-private partnership that will develop road maps for research that will benefit the Nation's industrial base, and \$143 million for the Hollings Manufacturing Extension Partnership. The **National Oceanic and Atmospheric Administration (NOAA)**, also part of the Department of Commerce, plays a vital role supporting research on the Earth's oceans, atmosphere, and marine habitats. The NOAA budget of **\$5.5 billion is an increase of \$749 million over the 2010 enacted level**. This will allow NOAA to strengthen the scientific basis for environmental decision-making, improve critical weather and climate services that protect life and property, invest more heavily in restoring our oceans and coasts, take advantage of high-performance computing to manage weather and climate data, and ensure satellite continuity. The 2012 Budget proposes a restructuring of NOAA, including the creation of a Climate Service line office in NOAA that will focus on the delivery of climate services while sustaining research on oceans, atmosphere, and climate and supporting NOAA's contribution to the National Climate Assessment.

The **Department of Education** R&D portfolio of **\$480 million in the 2012 Budget is a \$127 million or 36.0 percent increase over the 2010 enacted level**. The Budget proposes \$90 million for the creation of an Advanced Research Projects Agency–Education (ARPA-ED). ARPA-ED will catalyze the development and deployment of new tools and technologies to significantly improve student learning. ARPA-ED will push the education research, development and demonstration field forward by: sponsoring the synthesis and vetting of public and private R&D efforts; identifying breakthrough development opportunities; shaping the next wave of R&D; investing in the development of new education technologies, learning systems, and digital learning materials; and identifying and transitioning the best and most relevant R&D from other federal agencies. (Additional Education highlights can be found in OSTP's STEM Education fact sheet.)

The **Department of Veterans Affairs (VA)** 2012 Budget provides \$509 million for medical and prosthetic research and \$509 million in medical care support for a total of \$1.0 billion for R&D programs across VA, a decrease of \$144 million or 12.4 percent below the 2010 enacted level. In addition, VA's research program will receive approximately \$710 million from Federal and non-Federal grants. VA research focuses on biomedical topics of special relevance to wounded warriors and supports a robust program of clinical and translational research. VA's research program benefits from clinical care and research occurring together, allowing discoveries to be directly coordinated to the care of veterans.

The 2012 Budget for the **Department of the Interior** provides \$727 million for R&D. The total budget of the **United States Geological Survey (USGS)**, Interior's lead science agency, is **\$1.1 billion or a \$6 million increase from the 2010 enacted level**. The Budget includes a total of \$126 million in program increases, offsetting a total of \$120 million in program reductions and savings, reflecting USGS' shifting priorities towards climate variability research and ecosystem restoration and away from traditional geological disciplines. These targeted increases include \$11 million to complete the network of climate science centers that will develop research-based decision support tools for use by Federal land managers. The 2012 Budget also proposes \$48 million for USGS to take charge of the Landsat satellite program, which collects remote sensing data that are invaluable for many purposes, including climate change research.

Environmental Protection Agency (EPA) R&D funding totals \$579 million in the 2012 Budget, \$11 million or 1.9 percent less than the 2010 funding level. EPA's Science and Technology (S&T) account is \$826 million in the 2012 budget. With this investment, EPA will focus on enhancing and strengthening the planning and delivery of science by restructuring its research and science programs to be more integrated and cross-disciplinary. The 2012 Budget supports high-priority research of national importance in such areas as endocrine disrupting chemicals, green chemistry, e-waste and e-design, green infrastructure, computational toxicology, air monitoring, drinking water, and STEM fellowships. In addition, by way of strategic redirections, EPA will significantly increase—by \$25 million—its outreach to the broader scientific community through its Science to Achieve Results (STAR) program. This investment will bring innovative and sustainable solutions to 21st century environmental science challenges by engaging the academic research community.

The 2012 Budget provides **\$1.2 billion for Department of Transportation (DOT) R&D**, an increase compared to the 2010 funding level. One significant part of DOT's R&D activities is the Federal Aviation Administration's (FAA) Research, Engineering, and Development program. The Budget request includes funding for several R&D activities in FAA's Next Generation Air Transportation System, known as NextGen. The Joint Planning and Development Office coordinates this important effort with NASA and other participating agencies. The Federal Highway Administration (FHWA) also manages a comprehensive, nationally coordinated highway research and technology program, engaging and cooperating with other highway research stakeholders. FHWA performs research activities associated with safety, infrastructure preservation and improvements, and environmental mitigation and streamlining.

The 2012 Budget **provides \$212 million for R&D programs in the Smithsonian Institution, down \$1 million or 0.5 percent from the 2010 funding level.** The Smithsonian continues to enhance its research efforts in science and the humanities in line with its new strategic plan. Specific investments include research on global change, DNA bar-coding, and Encyclopedia of Life, and strengthening the maintenance, digitization, and research uses of scientific collections, as well as renovation of critical research infrastructure.

Multi-agency initiatives

A number of R&D investments are being addressed through multi-agency activities coordinated through the National Science and Technology Council (NSTC) and other interagency forums. Table 2 shows details of three such efforts: global change research, networking and information technology R&D, and nanotechnology R&D.

U.S. Global Change Research Program: The 2012 Budget includes an expanded commitment to global change research as part of a government-wide effort to mitigate U.S. greenhouse-gas emissions and move toward a clean-energy economy. Investments in climate science over the past several decades have contributed to an improved understanding of global climate. To continue to assist the government and society to understand, predict, project, mitigate, and adapt to climate change, the 2012 Budget provides \$2.6 billion for the multi-agency U.S. Global Change Research Program (USGCRP), an increase of 20.3 percent or \$446 million over the 2010 enacted level (see Table 2). In 2011, USGCRP is undertaking a comprehensive strategic planning process that will result in an updated strategic plan, which will be submitted to Congress later this year. Within USGCRP's coordinated interagency investments, the 2012 Budget supports an integrated and continuing National Climate Assessment of climate change science, impacts, vulnerabilities, and response strategies. The Budget also prioritizes research for measuring, reporting, and verifying greenhouse-gas emissions. Reports and general information about USGCRP are available at www.globalchange.gov/.

Networking and Information Technology R&D: The 2012 Budget proposes \$3.9 billion for the multi-agency Networking and Information Technology Research and Development (NITRD) Program, an increase of 2.0 percent or \$74 million over the 2010 enacted level. Networking and computing capabilities are more critical than ever for national and homeland security, reforming the health care system, understanding and responding to environmental stresses, increasing energy efficiencies and developing renewable energy sources, strengthening the security of our critical infrastructures including cyberspace, and revitalizing our educational system for the jobs of tomorrow. The 2012 Budget includes a focus on research to improve our ability to derive value and scientific inferences from enormous quantities of data, and continues to emphasize 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/.

National Nanotechnology Initiative: The 2012 Budget proposes \$2.1 billion for the multi-agency National Nanotechnology Initiative (NNI)—a \$201 million increase from the 2010 enacted level. The NNI focuses on R&D that creates materials, devices, and systems that exploit the fundamentally distinct properties of matter at the nanoscale (roughly 1 to 100 nanometers). Participating agencies have developed three signature initiatives in areas ready for advances through close and targeted program-level interagency collaboration: Nanoelectronics for 2020 and Beyond; Sustainable Manufacturing: Creating the Industries of the Future; and Nanotechnology for Solar Energy Collection and Conversion.

Guided by the NNI strategies developed by the Nanoscale Science, Engineering, and Technology Subcommittee of the NSTC, 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, agencies continue to maintain a focus on the responsible development of nanotechnology, with attention to potential 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/.

Table 1. R&D in the 2012 Budget

Table 1. R&D in the FY 2012 Budget by Agency

(budget authority in millions of dollars)

	FY 2010	FY 2012	Change FY 10-12	
	Actual	Budget	Amount	Percent
Total R&D				
Defense (military)	80,602	76,633	-3,969	-4.9%
<i>S&T (6.1-6.3)</i>	13,306	12,347	-959	-7.2%
<i>All Other DOD R&D</i>	67,296	64,286	-3,010	-4.5%
Health and Human Services	31,424	32,343	919	2.9%
<i>Nat'l Institutes of Health</i>	30,155	31,174	1,019	3.4%
<i>All Other HHS R&D</i>	1,269	1,169	-100	-7.9%
NASA 1/	9,262	9,821	559	6.0%
Energy	10,836	12,989	2,153	19.9%
<i>Atomic Energy Defense R&D</i>	3,854	4,522	668	17.3%
<i>Office of Science</i>	4,528	4,940	412	9.1%
<i>Energy R&D</i>	2,454	3,527	1,073	43.7%
National Science Foundation	5,445	6,320	875	16.1%
Agriculture	2,611	2,150	-461	-17.7%
Commerce	1,344	1,720	376	28.0%
NOAA	692	728	36	5.2%
NIST	588	872	284	48.3%
Interior	776	727	-49	-6.3%
<i>U.S. Geological Survey</i>	661	607	-54	-8.2%
Transportation	1,069	1,215	146	13.7%
Environmental Protection Agency	590	579	-11	-1.9%
Veterans Affairs	1,162	1,018	-144	-12.4%
Education	353	480	127	36.0%
Homeland Security	887	1,054	167	18.8%
Smithsonian	213	212	-1	-0.5%
All Other	565	650	85	15.0%
Total R&D	147,139	147,911	772	0.5%
Defense R&D	84,456	81,155	-3,301	-3.9%
Nondefense R&D	62,683	66,756	4,073	6.5%
Basic Research 1/	29,397	32,895	3,498	11.9%
Applied Research 1/	29,799	33,182	3,383	11.4%
Total Research 1/	59,196	66,077	6,881	11.6%
Development	83,305	79,414	-3,891	-4.7%
R&D Facilities and Equipment 1/	4,638	2,420	-2,218	-47.8%

Note: Because 2011 appropriations have not been enacted, year-to-year changes are **2010** to 2012.

1/ NASA construction of the International Space Station will be complete in FY 2011.

Resources to operate this National Laboratory will be considered "research" instead of "R&D facilities" beginning in FY 2012.

Table 2. Interagency Science and Technology Initiatives

Table 2. Interagency Science and Technology Initiatives
(budget authority in millions)

	FY 2010	FY 2012	Change FY 10-12	
	Actual	Budget	Amount	Percent
National Nanotechnology Initiative (NNI)				
National Science Foundation	447	458	11	2.5%
Defense	440	368	-71	-16.2%
Energy	374	611	237	63.3%
NASA	20	32	13	64.0%
Commerce (NIST)	115	116	1	0.9%
HHS - NIH / CDC / FDA	473	496	24	5.0%
Agriculture	20	17	-4	-18.2%
Environmental Protection Agency	18	20	2	11.9%
Homeland Security	22	10	-12	-53.4%
DOT - FHWA	3	2	-1	-37.5%
All Other	1	2	1	185.7%
Total Nanotechnology	1,931	2,132	201	10.4%
Networking and Information Technology R&D (NITRD)				
Commerce	107	160	53	49.3%
Defense	1,313	1,052	-261	-19.9%
Energy	448	556	108	24.1%
Homeland Security	50	85	35	69.7%
Health and Human Services 1/	674	653	-21	-3.1%
NASA	85	95	9	11.0%
National Science Foundation	1,106	1,259	153	13.8%
All Other	11	8	-2	-22.2%
Total NITRD	3,794	3,868	74	2.0%
U.S. Global Change Research Program (USGCRP)				
National Science Foundation	320	425	106	33.0%
Energy	171	224	54	31.5%
Commerce (NOAA, NIST)	363	419	56	15.4%
Agriculture	113	117	4	3.9%
Interior (USGS)	63	73	10	15.9%
Environmental Protection Agency	21	21	0	0.0%
National Institutes of Health	4	4	0	0.0%
NASA	1,123	1,338	215	19.1%
Smithsonian	7	8	1	18.6%
DOT	3	3	0	0.0%
Total USGCRP	2,187	2,633	446	20.4%

1/ Includes funds from offsetting collections for Agency for Healthcare Research and Quality (AHRQ).

Note: Because 2011 appropriations have not been enacted, year-to-year changes are **2010** to 2012.

Table 3. Research in the 2012 Budget

Table 3. Research in the FY 2012 Budget

(budget authority in millions of dollars)

	FY 2010	FY 2012	Change FY 10-12	
	Actual	Budget	Amount	Percent
RESEARCH (basic + applied)				
Defense (military)	6,799	6,865	66	1.0%
<i>Basic Research ("6.1")</i>	1,815	2,078	263	14.5%
Health and Human Services	31,259	32,173	914	2.9%
<i>Nat'l Institutes of Health</i>	30,047	31,041	994	3.3%
NASA 1/	1,488	4,573	3,085	207.3%
Energy	7,378	9,030	1,652	22.4%
<i>Office of Science</i>	3,908	4,142	234	6.0%
National Science Foundation	4,963	5,877	914	18.4%
Agriculture	2,235	2,114	-121	-5.4%
Commerce	937	1,232	295	31.5%
NOAA	467	506	39	8.4%
NIST	448	649	201	44.9%
Interior	692	658	-34	-4.9%
<i>U.S. Geological Survey</i>	587	548	-39	-6.6%
Transportation	727	846	119	16.4%
Environmental Protection Agency	502	493	-9	-1.8%
Veterans Affairs	1,082	938	-144	-13.3%
Education	218	242	24	11.0%
Homeland Security	361	382	21	5.8%
Smithsonian	167	171	4	2.4%
All Other	388	483	95	24.5%
Total Research	59,196	66,077	6,881	11.6%

Note: Because 2011 appropriations have not been enacted, year-to-year changes are **2010** to 2012.

1/ NASA construction of the International Space Station will be complete in FY 2011.

Resources to operate this National Laboratory will be considered "research" instead of "R&D facilities" beginning in FY 2012.