

Science

(discretionary dollars in thousands)

	FY 2012 Current	FY 2013 Annualized CR	FY 2014 Request	FY 2014 vs. FY 2012	
				\$	%
Advanced Scientific Computing Research	428,304	443,566	465,593	+37,289	+8.7%
Basic Energy Sciences	1,644,767	1,698,424	1,862,411	+217,644	+13.2%
Biological and Environmental Research	592,433	613,287	625,347	+32,914	+5.6%
Fusion Energy Sciences Program	392,957	403,450	458,324	+65,367	+16.6%
High Energy Physics	770,533	795,701	776,521	+5,988	+0.8%
Nuclear Physics	534,642	550,737	569,938	+35,296	+6.6%
Workforce Development for Teachers and Scientist	18,500	18,613	16,500	-2,000	-10.8%
Science Laboratories Infrastructure	111,800	112,485	97,818	-13,982	-12.5%
Safeguards and Security	80,573	81,066	87,000	+6,427	+8.0%
Science Program Direction	185,000	186,132	193,300	+8,300	+4.5%
Small Business Innovation Research (SBIR)	175,471	0	0	-175,471	-100.0%
Total, Science	4,934,980	4,903,461	5,152,752	+217,772	+4.4%

Office of Science (SC) programs contribute to the achievement of all DOE Strategic Plan goals and the investment in clean energy, innovation, and the future jobs theme of the FY 2014 Budget Request. SC is the largest federal sponsor of basic research in the physical sciences and supports programs in areas such as physics, chemistry, biology, environmental science, applied mathematics, and computational science. SC supports investigators at about 300 academic institutions and all of the DOE laboratories. Approximately 29,000 researchers from universities, national laboratories, industry, and international partners are expected to use SC facilities in FY 2014. Highlights for the SC research programs follow:

- Advanced Scientific Computing Research (\$465.6 million)**
Advanced Scientific Computing Research (ASCR) advances applied mathematics and computer science; delivers, in partnership with disciplinary science programs, advanced computational scientific applications; enhances computing and networking capabilities; and develops, in partnership with U.S. industry, future generations of computing hardware and tools for science. The FY 2014 Budget Request addresses technical challenges to delivering 1,000 fold increases in computing capability. Increased funding will support operations, lease payments, and user support for ASCR facilities.
- Basic Energy Sciences (\$1,862.4 million)**
Basic Energy Sciences (BES) supports fundamental research to understand, predict, and control matter and energy to provide the foundation for new energy technologies and to mitigate the environmental impacts of energy use. In FY 2014, BES will support ongoing core research, Energy Frontier Research Centers (EFRCs), and the Fuels from Sunlight and the Batteries and Energy Storage Energy Innovation Hubs. The EFRCs will undergo an open re-competition that will include selection of new EFRCs and consider renewal applications for existing EFRCs. In FY 2014, BES will support the National Synchrotron Light Source-II construction and early operations, Linac Coherent Light Source-II construction, the operations of the five synchrotron light source facilities, five Nanoscale Science Research Centers, and the three neutron scattering facilities. Major item of equipment projects for the Advanced Photon Source Upgrade and the National Synchrotron Light Source –II (NSLS-II) Experimental Tools continue.
- Biological and Environmental Research (\$625.3 million)**
Biological and Environmental Research (BER) supports the Department’s energy and environmental missions. Its research includes efforts to understand how genomic information is translated to functional capabilities, enabling more confident redesign of microbes and plants for sustainable biofuels production, improved carbon storage, and contaminant bioremediation. BER research advances our understanding of the role of atmospheric, terrestrial, ocean, and subsurface interactions in determining climate dynamics to

predict future climate change and plan for future energy and resource needs. In FY 2014, support of research and scientific user facilities in bioenergy, climate, and environmental science continues. Increased investments target the development of biosystems design tools and the development of integrative analysis of experimental datasets in support of bioenergy, climate, and environmental research. Research in foundational genomics, including the DOE Bioenergy Research Centers, will provide the fundamental biological system science to underpin advances in clean energy through bioenergy production and carbon cycling. Climate and Environmental Research activities will explore interaction between geography, clouds, aerosols, and sensitive ecosystems and the sensitivity and uncertainty of climate predictions and models.

- **Fusion Energy Sciences (\$458.3 million)**

Fusion Energy Sciences (FES) supports research to develop fusion as a future energy source. The FY 2014 Budget Request funds U.S. contributions to the ITER project for long-lead procurements required in construction of the facility; the majority of these contributions will be spent on in-kind hardware sourced from U.S. industries, national laboratories, and universities. Domestic research continues in most areas, while program balance is maintained consistent with National Academies recommendations to promote overall federal stewardship of plasma science.

- **High Energy Physics (\$776.5 million)**

High Energy Physics (HEP) supports research to understand how the universe works at its most fundamental level. Support for Large Hadron Collider (LHC) detector operations, maintenance, computing, and R&D for detector upgrades continue. Project engineering and design for the Muon to Electron Conversion Experiment (Mu2e) continues as well as research for the Long Baseline Neutrino Experiment. Exploration of the feasibility of neutrino and dark matter research continues. Collaborations on projects to pursue questions in dark matter, dark energy, and neutrino properties are pursued. Support for collaborative advanced accelerator and detector R&D including development of superconducting radio frequency technology applicable to accelerator projects continues as well. The FY 2014 Budget supports new accelerator science stewardship activities that can broadly benefit fields both within and outside of HEP.

- **Nuclear Physics (\$569.9 million)**

Nuclear Physics (NP) supports research to discover, explore, and understand all forms of nuclear matter. The FY 2014 Budget Request supports construction of the Facility for Rare Isotope Beam (FRIB) at Michigan State University to provide world-leading capability and new discovery potential for U.S. leadership in nuclear structure and nuclear astrophysics, and continued U.S. scientific competency in critical areas. The Relativistic Heavy Ion Collider (RHIC) and the Argonne Tandem Linac Accelerator System (ATLAS) are supported for world leading research on new states of matter and the origin of heavy nuclei. Construction continues for the 12 GeV Continuous Electron Beam Accelerator Facility (CEBAF) Upgrade, and beam development and commissioning activities are initiated.