

**Science
Facilities Maintenance and Repair**

The Department's Facilities Maintenance and Repair activities are tied to its programmatic missions, goals, and objectives. The Facilities Maintenance and Repair activities funded by the budget and displayed below and are intended to ensure that the scientific community has the facilities required to conduct cutting edge scientific research now and in the future to meet Department of Energy goals and objectives.

Costs for Direct-Funded Maintenance and Repair (including Deferred Maintenance Reduction) (\$K)

	FY 2015 Planned Cost	FY 2015 Actual Cost	FY 2016 Planned Cost	FY 2017 Planned Cost
Brookhaven National Laboratory	6,254	5,271	5,228	5,432
Fermi National Accelerator Laboratory	147	1,042	0	0
Lawrence Berkeley National Laboratory	0	0	0	6,000
Notre Dame Radiation Laboratory	172	214	175	170
Oak Ridge National Laboratory	14,000	14,869	14,420	14,853
Oak Ridge Office	3,272	3,072	4,075	6,273
Office of Scientific and Technical Information	383	383	392	402
SLAC National Accelerator Laboratory	3,322	4,408	3,667	3,883
Thomas Jefferson National Accelerator Facility	69	114	71	73
Total, Direct-Funded Maintenance and Repair	27,619	29,373	28,028	37,086

General purpose infrastructure includes multiprogram research laboratories, administrative and support buildings, as well as cafeterias, power plants, fire stations, utilities, roads, and other structures. Together, the SC laboratories have over 1,400 operational buildings and real property trailers, with nearly 20 million gross square feet of space.

Generally, facilities maintenance and repair expenses are funded through an indirect overhead charge. In some cases, however, a laboratory may charge maintenance directly to a specific program. One example would be when maintenance is performed in a building used only by a single program. Such direct-funded charges are not directly budgeted.

Costs for Indirect-Funded Maintenance and Repair (including Deferred Maintenance Reduction) (\$K)

	FY 2015 Planned Cost	FY 2015 Actual Cost	FY 2016 Planned Cost	FY 2017 Planned Cost
Ames Laboratory	1,900	1,850	2,300	2,300
Argonne National Laboratory	46,600	57,426	48,100	49,200
Brookhaven National Laboratory	37,808	43,578	39,388	40,634
Fermi National Accelerator Laboratory	17,738	15,959	18,383	19,251
Lawrence Berkeley National Laboratory	18,400	20,814	27,450	24,700
Lawrence Livermore National Laboratory	2,813	2,813	2,869	2,926
Los Alamos National Laboratory	599	599	611	623
Oak Ridge Institute for Science and Education	443	657	443	487
Oak Ridge National Laboratory	56,993	69,116	58,703	60,464
Oak Ridge National Laboratory facilities at Y-12	761	244	400	412
Pacific Northwest National Laboratory	4,442	5,468	7,608	5,061
Princeton Plasma Physics Laboratory	6,800	7,124	7,000	7,200
Sandia National Laboratories	2,883	2,883	2,940	2,998
SLAC National Accelerator Laboratory	10,014	10,208	9,240	10,670
Thomas Jefferson National Accelerator Facility	5,800	5,963	5,900	6,500
Total, Indirect-Funded Maintenance and Repair	213,994	244,702	231,335	233,426

Facilities maintenance and repair activities funded indirectly through overhead charges at SC laboratories are displayed. Since this funding is allocated to all work done at each laboratory, the cost of these activities charged to funding from SC and other DOE organizations, as well as other Federal agencies and other entities doing work at SC laboratories.

Maintenance reported to SC for non-SC laboratories is also shown. The figures are total projected expenditures across all SC laboratories.

Report on FY 2015 Expenditures for Maintenance and Repair

This report responds to the requirements established in Conference Report (H.Rep. 108-10) accompanying Public Law 108-7 (pages 886-887), which requires the Department of Energy to provide an annual year-end report on maintenance expenditures to the Committees on Appropriations. This report compares the actual maintenance expenditures in FY 2015 to the amount planned for FY 2015, including Congressionally directed changes.

Science Total Costs for Maintenance and Repair (\$K)

	FY 2015 Planned Costs	FY 2015 Actual Costs
Ames Laboratory	1,900	1,850
Argonne National Laboratory	46,600	57,426
Brookhaven National Laboratory	44,062	48,849
Fermi National Accelerator Laboratory	17,885	17,001
Lawrence Berkeley National Laboratory	18,400	20,814
Lawrence Livermore National Laboratory	2,813	2,813
Los Alamos National Laboratory	599	599
Notre Dame Radiation Laboratory	172	214
Oak Ridge Institute for Science and Education	443	657
Oak Ridge National Laboratory	70,993	83,985
Oak Ridge National Laboratory facilities at Y-12	761	244
Oak Ridge Office	3,272	3,072
Office of Scientific and Technical Information	383	383
Pacific Northwest National Laboratory	4,442	5,468
Princeton Plasma Physics Laboratory	6,800	7,124
Sandia National Laboratories	2,883	2,883
SLAC National Accelerator Laboratory	13,336	14,616
Thomas Jefferson National Accelerator Facility	5,869	6,077
Total, Maintenance and Repair	241,613	274,075

**Science
Research and Development (\$K)**

	FY 2015 Enacted	FY 2015 Current^a	FY 2016 Enacted	FY 2017 Request	FY 2017 vs. FY 2016 Enacted
Basic	4,310,357	4,333,630	4,505,148	4,827,314	+322,166
Applied	0	65,075	0	0	0
Subtotal, R&D	4,310,357	4,398,705	4,505,148	4,827,314	+322,166
Equipment	182,472	161,849	178,476	161,839	-16,637
Construction	540,636	537,986	621,772	633,465	+11,693
Total, R&D	5,033,465	5,098,540	5,305,396	5,622,618	+317,222

^a Reflects the transfer of Small Business Innovation/Technology Transfer Research (SBIR/STTR) funds within and to the Office of Science.

Science
Small Business Innovative Research/Small Business Technology Transfer (SBIR/STTR) (\$K)

	FY 2015 Transferred	FY 2016 Projected	FY 2017 Request	FY 2017 vs. FY 2016
Office of Science				
Advanced Scientific Computing Research				
SBIR	15,457	18,450	21,062	+2,612
STTR	2,132	2,767	2,962	+195
Basic Energy Sciences				
SBIR	44,182	47,540	54,385	+6,845
STTR	6,094	7,132	7,649	+517
Biological and Environmental Research				
SBIR	17,033	18,135	21,038	+2,903
STTR	2,349	2,720	2,958	+238
Fusion Energy Sciences				
SBIR	8,906	9,333	8,436	-897
STTR	1,228	1,400	1,186	-214
High Energy Physics				
SBIR	18,251	18,171	19,796	+1,625
STTR	2,517	2,726	2,784	+58
Nuclear Physics				
SBIR	12,967	14,134	15,824	+1,690
STTR	1,789	2,120	2,225	+105
Total, Office of Science SBIR	116,796	125,763	140,541	+14,778
Total, Office of Science STTR	16,109	18,865	19,764	+899
Other DOE				
Nuclear Energy				
SBIR	11,992	TBD	TBD	TBD
STTR	1,654	TBD	TBD	TBD
Electricity Delivery & Energy Reliability				
SBIR	2,702	TBD	TBD	TBD
STTR	373	TBD	TBD	TBD
Energy Efficiency & Renewable Energy				
SBIR	25,765	TBD	TBD	TBD
STTR	3,333	TBD	TBD	TBD
Environmental Management				
SBIR	406	TBD	TBD	TBD
STTR	56	TBD	TBD	TBD

	FY 2015 Transferred	FY 2016 Projected	FY 2017 Request	FY 2017 vs. FY 2016
Defense Nuclear Nonproliferation				
SBIR	6,233	TBD	TBD	TBD
STTR	860	TBD	TBD	TBD
Fossil Energy				
SBIR	10,283	TBD	TBD	TBD
STTR	1,418	TBD	TBD	TBD
Total, Other DOE SBIR	57,381	TBD	TBD	TBD
Total, Other DOE STTR	7,694	TBD^a	TBD^a	TBD^a
Total, DOE SBIR	174,177	125,763	140,541	+14,778
Total, DOE STTR	23,803	18,865	19,764	+899

^a The DOE SBIR/STTR amounts are listed in the other DOE program budget volumes and will be reflected in the Science budget once transferred.

**Science
Safeguards and Security Crosscut (\$K)**

	FY 2015 Enacted	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	FY 2017 vs. FY 2016 Enacted
Protective Forces	38,095	37,767	38,805	39,638	+833
Physical Security Systems	12,601	11,314	12,019	10,357	-1,662
Information Security	4,252	4,268	4,416	4,467	+51
Cyber Security	24,118	25,781	33,156	33,236	+80
Personnel Security	5,267	5,335	5,412	6,086	+674
Material Control and Accountability	2,223	2,256	2,454	2,458	+4
Program Management	6,444	6,279	6,738	6,758	+20
Total, Safeguards and Security Crosscut	93,000	93,000	103,000	103,000	-

**Science
Centers (\$K)**

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
Energy Innovation Hubs: Batteries and Energy Storage							
Funded by SC, the Batteries and Energy Storage Hub focuses on discovery of new energy storage chemistries through the development of an atomic-level understanding of reaction pathways and development of universal design rules for electrolyte function. In response to a competitive Funding Opportunity Announcement in FY 2012, the Joint Center for Energy Storage Research (JCESR) received a five-year award starting 12/14/2012. The potential for a subsequent five-year renewal is contingent on progress in the first performance period, which is externally reviewed annually. The overarching goals of JCESR that drive the scientific and engineering research towards next-generation energy storage technologies are summarized as 5/5/5—five times the energy density of current systems at one-fifth the cost within five years.							
Science: Basic Energy Sciences							
Materials Sciences and Engineering	FY 2012	Reviewed Annually	\$67,884	\$24,175	\$24,137	\$24,088	\$140,284

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
Energy Innovation Hubs: Fuels from Sunlight							
Funded by SC, the Joint Center for Artificial Photosynthesis (JCAP) focuses on critical transformative advances in the development of artificial photosynthetic systems for converting sunlight, water, and carbon dioxide into a range of commercially useful fuels. In the initial award, JCAP primarily targeted the solar-driven production of hydrogen fuel and reached its five-year goal to design and develop a photocatalytic prototype capable of generating fuel, hydrogen, from sunlight. In December 2014, BES solicited a renewal proposal from JCAP for a final award term with a maximum duration of five years and directed JCAP to focus on the fundamental science of carbon dioxide reduction, a critical need for efficient solar-driven production of carbon-based liquid transportation fuels. Based on the outcome of external peer review, the Fuels from Sunlight Hub was renewed by BES for a second and final five-year award term starting on September 30, 2015, at an annual funding level of \$15M. In this second phase, JCAP will discover and develop new materials and catalysts for the reduction of carbon dioxide using both direct and high throughput approaches. These discoveries would be key components in the development of an artificial photosynthetic system capable of efficient solar-driven production of carbon-based fuels.							
Science: Basic Energy Sciences							
Chemical Sciences, Geosciences, and Biosciences	FY 2010	Reviewed Annually	\$94,737	\$15,000	\$15,000	\$15,000	\$139,737 ^a

^aTotal funding does not include \$22M appropriated to EERE for the first year of the Hub.

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
Energy Frontier Research Centers							
The Energy Frontier Research Centers (EFRCs) support multi-disciplinary teams of leading scientists to conduct fundamental research aimed at accelerating innovation toward meeting critical energy challenges. These integrated, multi-investigator Centers involve partnerships among universities, national laboratories, nonprofit organizations, and for-profit firms that will conduct fundamental research focusing on one or more “grand challenges” and use-inspired “basic research needs” identified in major strategic planning efforts by the scientific community. The EFRC program was initiated by BES in 2009 with 46 five-year awards, 16 of which were fully funded through \$277M in funds from the American Recovery and Reinvestment Act. The program was recompeted in FY 2014 with an open solicitation for both new and renewal proposals, resulting in 32 four-year awards (22 renewal and 10 new). During FY 2016 all 32 EFRCs will undergo a full mid-term progress review involving external peer reviewers. Funding for the final two years of these awards will be contingent upon a successful outcome of this review. The FY 2017 Request includes an additional \$33.8M to fully fund up to five new EFRCs in topical areas in support of the Subsurface crosscut.							
Science: Basic Energy Sciences							
Materials Sciences and Engineering	FY 2009	Mid-term Reviews, FY 2016 Q2	\$461,950	\$50,800	\$55,800	\$55,800	\$624,350
Chemical Sciences, Geosciences, and Biosciences	FY 2009	Mid-term Reviews, FY 2016 Q2	\$415,070	\$49,200	\$54,200	\$86,766	\$605,236

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
India Center							
The purpose of the Center is to facilitate joint research and development on clean energy by teams of scientists and engineers from India and the United States, and related joint activities, needed to deploy clean energy technologies rapidly with the greatest impact. For the Solar Energy Research Institute for India and the United States (SERIUS) of high priority are new concepts and architectures in solar electricity production, including organic and hybrid organic/inorganic conversion systems, innovative nanoscale designs of interfaces and cells, and novel materials, as well as advanced theory, modeling and simulation of such systems. The overall goal of SERIUS is to accelerate the development of solar-electric technologies by lowering the cost-per-watt of photovoltaics (PV) and concentrated solar power (CSP) through a binational consortium that is innovating, discovering, and readying emerging, disruptive, and revolutionary solar technologies that span the gap between fundamental science and applied research and development (R&D), leading to eventual deployment by sustainable industries. SERIUS addresses critical issues in fundamental and applied research, analysis and assessment, outreach, and workforce development. Throughout this joint effort, a key element is the engagement of a significant base of Indian and U.S. industry that is dedicated and committed to developing solar energy for both India and the United States.							
Science: Basic Energy Sciences							
Materials Sciences and Engineering	FY 2013	Mid-term Reviews, FY 2016	\$1,875	\$625	\$625	\$625	\$3,750
Chemical Sciences, Geosciences, and Biosciences	FY 2013	Mid-term Reviews, FY 2016	\$1,875	\$625	\$625	\$625	\$3,750

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
Bioenergy Research Center: Joint Bioenergy Institute							
Major multidisciplinary research center conducting research to achieve the breakthroughs in basic science needed to develop new methods of producing cellulosic biofuels sustainably and cost-effectively on a commercial scale.							
Science: Biological Environmental Research							
Biological Systems Science	9/27/2007	9/30/2017	\$189,012	\$25,000	\$25,000	\$29,850	\$268,862

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
Bioenergy Research Center: Bioenergy Science Institute							
Major multidisciplinary research center conducting research to achieve the breakthroughs in basic science needed to develop new methods of producing cellulosic biofuels sustainably and cost-effectively on a commercial scale.							
Science: Biological Environmental Research							
Biological Systems Science	9/27/2007	9/30/2017	\$190,335	\$25,000	\$25,000	\$29,850	\$270,185

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
Bioenergy Research Center: Great Lakes Bioenergy Research Centers							
Major multidisciplinary research center conducting research to achieve the breakthroughs in basic science needed to develop new methods of producing cellulosic biofuels sustainably and cost-effectively on a commercial scale.							
Science: Biological Environmental Research							
Biological Systems Science	9/27/2007	11/30/2017	\$189,073	\$25,000	\$25,000	\$29,850	\$268,923

Center/Appropriation/ Program	Date Established	Termination/ Review Date	Prior Year Funding	FY 2015 Current	FY 2016 Enacted	FY 2017 Request	Total Funding
U.S. - China Clean Energy Research Center (CERC)							
CERC focuses on research in areas where advances in technology can lead to major improvements in energy efficiency in buildings, development of vehicles with lower carbon emissions and deployment of clean coal technologies. The Center facilitates joint research and development on clean energy by teams of scientists and engineers from the U.S. and China, as well as serves as a clearinghouse to help researchers in each country with broad participation from universities, research institutions, and industry. U.S. funds will be used exclusively to support work conducted by U.S. institutions and individuals only, and Chinese funds will support work conducted by Chinese institutions and researchers.							
Science: Biological Environmental Research							
Climate and Environmental Sciences	2009	2019	\$0	\$299	\$299	\$299	\$897