DOE/CF-0134

Department of Energy
FY 2018 Congressional Budget Request

Budget in Brief

May 2017 Office of Chief Financial Officer

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TABLE OF CONTENTS

OVERVIEW

The Department of Energy (DOE) requests $28.0 billion for FY 2018, a reduction of $1.6 billion from the FY 2016 Enacted level of $29.6 billion.

The FY 2018 Budget Request makes key investments in science and technology innovation to support four major mission areas:

- Nuclear security, including the stewardship of the nuclear weapons stockpile and modernization of the nuclear security enterprise; protecting America from nuclear threats around the world; and propelling the nuclear Navy;
- Basic scientific research;
- Energy innovation and security; and
- Environmental cleanup to meet the Nation's obligations from the Manhattan Project, Cold War, and nuclear energy research.

The Department of Energy's world-leading science and technology enterprise generates the innovations that fulfill DOE's missions ensuring the Nation's security and prosperity. Through 17 national laboratories, DOE engages in cutting-edge research that expands the frontiers of scientific knowledge and generates new technologies to address the country's greatest energy challenges and strengthen national security by maintaining and modernizing the nuclear stockpile.

DEPARTMENT OF ENERGY

DOE Programs	FY18 ($M)
• National Nuclear Security Administration	13,931
• Science	4,473
• Energy	2,214
• Environmental Management	6,508
• Other Defense Activities	816
• Power Marketing Administrations	82
• Administration and Oversight	178
• *Savings and Receipts*	*-159*
DOE Total	**28,042**

The FY 2018 Budget Request provides $13.9 billion for the National Nuclear Security Administration (NNSA), $1.4 billion above the FY 2016 Enacted level, to fulfill the President's vision of rebuilding and restoring the Nation's security through robust investments in the Department's nuclear security mission. The Budget Request includes $10.2 billion for Weapons Activities, $1.4 billion above the FY 2016 Enacted level, $1.8 billion for Defense Nuclear Nonproliferation, $147 million below the FY 2016 Enacted level, and $1.5 billion for Naval Reactors, an increase of $104 million from FY 2016 Enacted.

The FY 2018 Budget Request refocuses the Department's energy and science programs on early-stage research and development (R&D) at the national laboratories to advance American primacy in scientific and energy research in an efficient and cost effective manner. The Budget Request provides $6.4 billion for research and development programs, with a renewed focus on cutting-edge innovation and fostering the transition of those breakthroughs to the private sector for commercialization.

The FY 2018 Budget Request provides $4.5 billion, $874 million below the FY 2016 Enacted level, for the Office of Science to maintain American leadership in scientific research in priority areas. The Budget Request also includes $2.2 billion for energy programs, $2.4 billion below the FY 2016 Enacted level, to support energy research and development, the Petroleum Reserves, and the Energy Information Administration. The Budget Request eliminates the Advanced Research Projects Agency—Energy program, the Title XVII Innovative Technology loan guarantee program, and the Advanced Technology Vehicle Manufacturing loan program. The Budget Request also proposes the sale of approximately 270 million barrels of SPR crude oil by 2027, roughly half of the remaining SPR inventory after all sales currently authorized by law are completed, resulting in estimated receipts of $1 billion by FY 2019 and $17 billion through 2027.

The FY 2018 Budget Request includes $6.5 billion for Environmental Management, $290 million above FY 2016 Enacted, to address the Department's responsibilities for the cleanup of sites resulting from five decades of nuclear weapons development and production and Government-sponsored nuclear energy research. The Budget Request for Environmental Management includes $225 million for a targeted effort to accelerate deactivation and decommissioning of selected high-risk excess facilities not in the current program's inventory to achieve substantial risk reduction within four years.

The Budget Request includes $82 million for the Power Marketing Administrations, the same as FY 2016 Enacted. As part of the Administration's mandatory budget proposals, the Budget Request proposes to sell the transmission assets of the Western Area Power Administration (WAPA), the Bonneville Power Administration (BPA), and the Southwestern Power

Administration (SWPA). The proposal also would repeal the $3.25 billion emergency borrowing authority for WAPA authorized by the American Recovery and Reinvestment Act of 2009.

ACCELERATING PROGRESS ON NATIONAL PRIORITIES

The FY 2018 Budget Request advances the Department of Energy's mission in key areas through significant investments to advance the nation's nuclear waste management program, achieve exascale computing, protect the national electric grid from cyberattack, and modernize the nuclear security enterprise.

The Budget Request includes $120 million, including $30 million in defense funds and $90 million from the Nuclear Waste Fund, to resume licensing activities for the Yucca Mountain nuclear waste repository and to initiate a robust interim storage program. This investment will accelerate fulfillment of the Federal Government's obligations to address nuclear waste, enhance national security, and reduce future burdens on American taxpayers.

The Budget Request for Yucca Mountain and Interim Storage includes $90.4 million to restart DOE support for Nuclear Regulatory Commission licensing activities for the Yucca Mountain nuclear waste repository, and $6.6 million to initiate a robust interim storage program that complements the Nation's nuclear waste management program by developing a capability for earlier acceptance of spent nuclear fuel. The Budget Request also provides $23 million in funding for Federal staff and contractor support both in Washington D.C. and the Nevada Field Office.

The FY 2018 Budget Request invests $508 million to reduce the timeline to achieve an exascale computing system, including $347 million in the Office of Science and $161 million in the NNSA. With the $286 million increase over the FY 2016 Enacted level, the Department intends to accelerate delivery of an exascale machine to 2021 to be closely followed by a second machine with a different architecture. This Science/NNSA partnership will focus on hardware and software technologies needed to produce an exascale system, and will bolster America's national security by supporting the nuclear stockpile while supporting the next generation of science breakthroughs not possible with today's fastest computing systems.

The FY 2018 Budget Request includes investments to make significant progress addressing cyber threats both to the Nation's electric power grid and infrastructure across the DOE enterprise. To ensure robust cybersecurity programs across the energy sector, the Budget Request provides funding in multiple programs, including $42 million in Electricity Delivery with a renewed focus on early stage activities that improve cybersecurity and resilience of the grid to harden and evolve critical grid infrastructure. These activities include early stage R&D at national laboratories to develop the next generation of control systems; components, devices and systems with engineered-in cybersecurity features; and a continuous monitoring capability that will significantly increase awareness of cyberattacks across the Nation's power grid. The Budget Request also provides $8 million in Fossil Energy research on advanced power plant sensors and controls that can enhance cybersecurity.

The FY 2018 Budget Request also provides robust funding to secure DOE networks, including $91 million for the Chief Information Officer, $18 million over FY 2016 Enacted, to modernize infrastructure and improve cybersecurity across the enterprise. The Budget Request includes $150 million for cybersecurity in NNSA, $18 million above FY 2016, to enhance security in the nuclear security networks, and $43 million for cybersecurity in Environmental Management to ensure the security at DOE cleanup sites.

Finally, the Budget Request provides a $1.4 billion increase to the NNSA to modernize the nuclear security enterprise, including the ongoing refurbishment of the nuclear weapon stockpile and the replacement of aging and degrading facilities that support nuclear stockpile operations.

NATIONAL NUCLEAR SECURITY ADMINISTRATION

The National Nuclear Security Administration (NNSA) is responsible for maintaining a safe, secure, and effective nuclear weapons stockpile; for preventing, countering, and responding to evolving and emerging nuclear proliferation and terrorism threats; for providing safe, reliable and long-term nuclear propulsion to the Nation's Navy as it protects American

and Allied interests around the world; and for supporting the federal workforce that carries out these critical responsibilities.

To support NNSA activities, the FY 2018 Budget Request proposes $13.9 billion for the NNSA, $1.4 billion, over the FY 2016 Enacted level. The request makes the necessary investments to ensure the reliability of the nuclear stockpile, modernize the Nation's aging nuclear infrastructure, address nuclear proliferation and radiological threats at home and abroad, and meet the current and future national defense requirements of America's nuclear navy.

NATIONAL NUCLEAR SECURITY ADMINISTRATION

NNSA Programs	FY18 ($M)
• Weapons Activities	10,239
• Defense Nuclear Nonproliferation	1,793
• Naval Reactors	1,480
• Federal Salaries and Expenses	419
NNSA Total	**13,931**

The Budget Request includes $10.2 billion for Weapons Activities, $1.4 billion above the FY 2016 Enacted level, to maintain the safety, security, and effectiveness of the nuclear stockpile, to continue the nuclear modernization program, and to modernize NNSA's nuclear security infrastructure portfolio. Highlights include:

- $1.74 billion for Life Extension Programs (LEPs) and Major Alterations, $442 million above FY 2016 Enacted, to support the nuclear weapons program. This program, which is subject to modification as a new Nuclear Posture Review is developed, includes modernization through life extension of the Nation's stockpile that implements the "3+2" strategy to consolidate the stockpile into three ballistic missile warheads and two air-delivered systems.

- $2.8 billion for Infrastructure and Operations, $524 million above FY 2016, to continue the stabilization of deferred maintenance; execute recapitalization projects to improve the condition and extend the design life of structures; and reduce safety, security, environmental, and program risk. The Budget Request provides funding to support construction of the Uranium Processing Facility (UPF) and associated buildings; continued construction of the Chemistry and Metallurgical Research Replacement (CMRR) facility to sustain plutonium science activities; and construction of the Albuquerque Complex Project to replace aging and degrading facilities.

The FY 2018 Budget Request includes $1.8 billion for Defense Nuclear Nonproliferation, $147 million below the FY 2016 Enacted level, to continue missions across the entire nuclear threat spectrum. The proposal will fund ongoing work to secure or eliminate nuclear and radiological materials worldwide; to counter illicit trafficking and efforts to acquire dangerous materials or technologies; and to ensure that the United States remains ready to respond to nuclear and radiological incidents at home and abroad. The Budget Request includes $270 million, $70 million below FY 2016, to terminate the Mixed Oxide (MOX) Fuel Fabrication Facility with an orderly and safe closure of the facility. In addition, $9 million is requested to pursue the dilute and dispose method as an alternative for plutonium disposition.

The request includes $1.5 billion for Naval Reactors (NR), an increase of $104 million from the FY 2016 level, to support the current fleet and to create the future fleet. Among other things, the NR request funds continued design and development of the reactor plant for the *Columbia*-class submarine; the refueling of a Research and Training Reactor in New York to facilitate *Columbia*-class reactor development efforts; and construction of a new spent fuel handling facility at the Naval Reactors Facility at Idaho National Laboratory.

The Budget Request also includes $419 million for NNSA Federal Salaries and Expenses to support 1,715 federal full-time equivalent (FTE) employees who provide federal oversight of the nuclear security enterprise. This workforce is responsible for managing and executing NNSA's weapons activities and nonproliferation missions.

SCIENCE

The Office of Science is the Nation's largest Federal supporter of basic research in the physical sciences, and funds early-stage programs in physics, chemistry, materials science, biology, environmental science, applied mathematics, and computer and computational science. The portfolio supports scientific research and the design, development, construction, and operation of unique, open-access scientific user facilities. Over 27,000 researchers from universities, national laboratories, industry, and international partners are expected to use the Office of Science's user facilities in FY 2018.

The FY 2018 Budget Request includes $4.5 billion for the Office of Science, $874 million below FY 2016 Enacted. The FY 2018 proposal refocuses Office of Science resources on its core mission of facilitating cutting edge, early-stage research. In doing so, the Budget Request provides robust funding for the national laboratories, ensures operation of Office of Science user facilities, and accelerates the Nation's path to exascale computing. Highlights of the Budget Request include:

SCIENCE

Science Programs	FY18 ($M)
• Advanced Scientific Computing Research	722
• Basic Energy Sciences	1,555
• Biological and Environmental Research	349
• Fusion Energy Sciences	310
• High Energy Physics	673
• Nuclear Physics	503
• Infrastructure and Administration	348
• Workforce Development for Teachers and Scientists	14
Science Total	**4,473**

- $722 million for Advanced Scientific Computing Research, an increase of $101 million from FY 2016 Enacted. The funding includes $347 million for research, development, and design to ultimately develop exascale computing systems, which would offer a thousand fold improvement in true application performance over current high performance computers.

- $1.6 billion for Basic Energy Sciences (BES), $295 million below FY 2016 Enacted. The FY 2018 request supports core research activities, as well as the Energy Frontier Research Centers program, with an emphasis on emerging high priorities in quantum materials and chemistry, materials and chemical research related to interdependent energy-water issues, and other areas. The request funds continued construction of the Linac Coherent Light Source-II at SLAC National Accelerator Laboratory and the upgrade of the Advanced Photon Source at Argonne National Laboratory, and supports operation of BES user facilities.

- $349 million for Biological and Environmental Research, $260 million below FY 2016 Enacted, to support foundational genomic sciences, including the Bioenergy Research Centers and focus on increasing the sensitivity and reducing the uncertainty of earth and environmental systems predictions.

- $310 million for Fusion Energy Sciences, a decrease of $128 million from FY 2016 Enacted levels, including $247 million for domestic research and fusion facilities, and $63 million for the ITER project.

- $673 million for High Energy Physics, a decrease of $122 million from FY 2016 Enacted levels. This level of funding supports the highest priority activities and projects as identified by the high energy physics community, including the Long Baseline Neutrino Facility and Deep Underground Neutrino Experiment hosted at Fermilab, with international partners. The request also funds the High-Luminosity Large Hadron Collider Accelerator Upgrade.

- $503 million for Nuclear Physics, a decrease of $114 million from FY 2016 Enacted levels, to support ongoing high-priority research and vital projects including operations at the Continuous Electron Beam Accelerator Facility (CEBAF), and construction of the Facility for Rare Isotope Beams and the Stable Isotope Production Facility.

- $14 million for Workforce Development for Teachers and Scientists (WDTS), a decrease of $6 million from FY 2016 Enacted levels. The requested funding focuses WDTS efforts on STEM undergraduate and graduate student training at DOE national laboratories and the National Science Bowl® competition.

ENERGY

The FY 2018 Request provides $2.2 billion for energy and related programs, $2.4 billion below the FY 2016 Enacted level. Energy programs enhance U.S. security and economic growth through transformative science, technology innovation, and market solutions to meet the Nation's energy challenges.

The FY 2018 Budget Request prioritizes earlier-stage research and development (R&D) at the national laboratories to develop innovative technologies to provide for later-stage development and deployment by the private sector. It emphasizes energy technologies best positioned to enable American energy independence and domestic job-growth in the

near to mid-term. To achieve this, the Budget Request consolidates programs focused on bringing technologies to the market into one office, the Office of Technology Transitions. This consolidation will create a robust technology transfer program to transfer breakthroughs from the national laboratories to the private sector.

The FY 2018 Budget Request provides $1.9 billion for energy R&D activities, $2.3 billion below the FY 2016 Enacted level. Highlights include:

ENERGY

Energy Programs	FY18 ($M)
• Energy Efficiency and Renewable Energy	636
• Electricity Delivery and Energy Reliability	120
• Fossil Energy Research and Development	280
• Fossil Energy Petroleum Reserves	200
• Nuclear Energy	703
• Yucca Mountain and Interim Storage	120
• Indian Energy	10
• Office of Technology Transitions	7
• Advanced Research Projects Agency—Energy	20
• Loan Programs	–
• Energy Information Administration	118
Energy Total	**2,214**

- $636 million for Energy Efficiency and Renewable Energy, $1.4 billion below the FY 2016 Enacted level, focusing resources on early stage R&D across a variety of technologies that support American energy independence and domestic job-growth. Maintaining America's leadership in making sustainable transportation cleaner and more efficient ($183.6 million), enabling renewable power generation technologies to directly compete with other electricity sources without subsidies ($134.3 million), energy efficiency to improve affordability, energy security, and energy productivity ($159.5 million), and other associated activities will spur private-sector research, development and commercialization of these critical energy technologies. The Weatherization and State Energy subprograms are eliminated to reduce Federal intervention in State-level energy policy and implementation.

- $120 million for Electricity Delivery and Energy Reliability, a decrease of $86 million from FY 2016 Enacted. Funds are focused on early stage R&D on technologies to improve grid reliability, efficiency, flexibility, functionality and security. The proposal also supports grid analytics, technical assistance, permitting, and R&D on next-generation, early stage grid cybersecurity solutions.

- $703 million for Nuclear Energy, $283 million below the FY 2016 Enacted level. The Request focuses on early stage R&D, and funds promising emerging technologies with the highest potential pay-off for accident tolerant fuels and advanced reactor technologies, with additional support for Nuclear Energy Enabling Technologies cooperative research with universities and industry. DOE closes the Small Modular Reactors (SMR) Licensing Technical Support program having achieved its goal to commercialize SMR technology in FY 2017. The request invests in early-stage R&D on next generation reactor technologies, including $20 million supporting advanced small modular reactors.

- $120 million for the Yucca Mountain and Interim Storage Program, including $30 million in defense funding and $90 million from the Nuclear Waste Fund, to accelerate progress on fulfilling the Federal Government's obligations to address nuclear waste, enhance national security, and reduce future taxpayer burden. The Budget Request includes $90.4 million to restart NRC licensing activities for the Yucca Mountain nuclear waste repository, $6.6 million for an interim storage program to develop a capability for earlier acceptable of spent nuclear fuel, and $23 million for program direction.

- $280 million for Fossil Energy Research and Development, $352 million below the FY 2016 Enacted level. The focus on cutting edge, early stage R&D will develop innovative new technologies for adoption, demonstration and deployment by the private sector. This will bolster energy security and domestic energy production, while advancing clean coal technologies. The Department proposes to initiate consolidation of sites at the National Energy Technology Laboratory (NETL) to strengthen this essential laboratory's footprint.

- In line with Administration priorities, the Budget Request terminates the Advanced Research Projects Agency—Energy and the Department's Loan Programs, while funding federal staff to oversee existing awards to completion and monitor the loan portfolio. The Budget Request also eliminates funding for the Office of Energy Policy and Systems Analysis, to avoid duplicative efforts already accomplished by the program offices. Termination of these three programs will save over $300 million in FY 2018.

The FY 2018 Budget Request provides $200 million for the Petroleum Reserves, including the Strategic Petroleum Reserve (SPR), Naval Petroleum and Oil Shale Reserves, and Northeast Home Heating Oil Reserve, including $180 million for operations and maintenance of the SPR.

The President's Budget includes a mandatory budget proposal to sell approximately 270 million barrels of SPR crude oil by 2027, roughly half of the remaining SPR inventory after all sales currently authorized by law are completed, resulting in deficit reduction of $17 billion over 10 years. The SPR program will conduct a comprehensive analysis to determine the selection of sites to be decommissioned as the SPR footprint is reduced from four to two sites. The Budget continues the sale of SPR oil for the Energy Security and Infrastructure Modernization Fund authorized by the Bipartisan Budget Act of 2015 to support an effective modernization program for the SPR, but at a reduced funding level due to the anticipated closure of two of the SPR's four storage sites.

As the Northeast Gasoline Supply Reserve (NGSR) is operationally ineffective and not cost-efficient as a regional product reserve, the Budget Request also proposes to liquidate the NGSR and sell its one million barrels of refined petroleum product in FY 2018, resulting in an estimated $69 million in receipts that offset discretionary spending.

The Budget Request includes $118 million for the Energy Information Administration, $4 million below FY 2016 Enacted, to continue supporting the collection, analysis, and dissemination of independent and impartial energy information and analysis to promote sound policymaking, efficient markets, and public understanding.

ENVIRONMENTAL MANAGEMENT

The Budget Request includes $6.5 billion for Environmental Management, $290 million above the FY 2016 Enacted level, for the cleanup of millions of gallons of liquid radioactive waste, thousands of tons of spent (used) nuclear fuel and nuclear materials, disposition of large volumes of transuranic and mixed/low-level waste, huge quantities of contaminated soil and water, and deactivation and decommissioning of excess facilities. This program manages the cleanup resulting from five decades of nuclear weapons development and production and Government-sponsored nuclear energy research. To date, EM has completed cleanup activities at 91 sites in 30 states and in the Commonwealth of Puerto Rico. EM is currently responsible for cleaning up the remaining 16 sites in 11 states.

Highlights of the FY 2018 Budget Request for Environmental Management include:

- $225 million for a targeted effort to accelerate deactivation and decommissioning of selected high-risk Y-12 National Security Complex and Lawrence Livermore National Laboratory excess facilities not currently in the program's inventory to achieve substantial risk reduction within four years.

- $1.5 billion, $90 million above the FY 2016 Enacted level, for the Office of River Protection to safely manage and treat approximately 56 million gallons of radioactive liquid waste currently stored in 177 underground storage tanks at Hanford, including continued progress on the Waste Treatment and Immobilization Plant and related facilities.

- $1.4 billion, $111 million above the FY 2016 Enacted level, to provide support at the Savannah River Site for the Liquid Tank Waste Management Program, and to continue construction and commissioning activities to start up the Salt Waste Processing Facility in 2018, construction of the Saltstone Disposal Unit #7, design for Saltstone Disposal

Units # 8 and 9, and operation of the Actinide Removal Process and Modular Caustic Side Extraction Unit.

- $800 million, $190 million less than the FY 2016 Enacted level, for Richland to continue achievement of important cleanup progress at Hanford required by the Tri-Party Agreement, including soil and groundwater remediation, facility decontamination and decommissioning, and stabilization and disposition of nuclear materials and spent nuclear fuel.

- $418 million, $129 million above FY 2016 Enacted, to continue progress on the decontamination and decommissioning project at the Portsmouth Gaseous Diffusion Plant, safe operation of the Depleted Uranium Hexafluoride Conversion Facility, and design and construction of the On-Site Waste Disposal facility.

- $390 million, $78 million less than the FY 2016 Enacted level, to continue deactivation and demolition of remaining facilities at the East Tennessee Technology Park at the Oak Ridge site, continue preparation of Building 2026 to support processing of the remaining U-233 material at the Oak Ridge National Laboratory, and support activities for the Outfall 200 Mercury Treatment Facility.

ENVIRONMENTAL MANAGEMENT

DOE Cleanup Sites and Program	FY18 ($M)
• River Protection	1,504
• Savannah River	1,448
• Richland/Hanford	800
• Portsmouth	418
• Oak Ridge	390
• Idaho	359
• Program Direction	300
• Carlsbad/Waste Isolation Pilot Plant (WIPP)	323
• Paducah	270
• Excess Facilities	225
• Los Alamos	192
• West Valley Demonstration Project	64
• Nevada	60
• Headquarters Operations	43
• Moab	35
• Uranium Thorium Reimbursements	30
• Technology Development	25
• Energy Technology Engineering Center	9
• Other Sites	5
• Sandia National Laboratory	3
• Separation Process Research Unit (SPRU)	2
• Brookhaven	2
• Lawrence Livermore National Laboratory	1
Environmental Management Total	**6,508**

- $359 million, $43 million less than FY 2016 Enacted, to continue major clean-up projects at the Idaho site such as commissioning the Integrated Waste Treatment Unit, processing, characterization, and packaging of contact-handle and remote-handled transuranic waste, and operating the Advanced Mixed Waste Treatment Project.

- $323 million, $18 million above FY 2016 Enacted, to safely continue waste emplacement at the Waste Isolation Pilot Plant (WIPP), the Nation's only mined geologic repository for permanent disposal of defense-generated transuranic waste. The Budget Request also invests in projects that will increase airflow in the WIPP underground for simultaneous mining and waste emplacement operations.

- $270 million, $2 million more than FY 2016 Enacted, for the Paducah site to continue ongoing environmental cleanup, depleted uranium hexafluoride (DUF6) conversion facility operations, and environmental remediation and further stabilization of the gaseous diffusion plant, in addition to activities to support decision making for site cleanup.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR*	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Department of Energy Budget by Appropriation					
Energy and Water Development, and Related Agencies					
Energy Programs					
Energy Efficiency and Renewable Energy	2,069,194	2,069,059	636,149	-1,433,045	-69.3%
Electricity Delivery and Energy Reliability	206,000	205,608	120,000	-86,000	-41.7%
Nuclear Energy	986,161	984,286	703,000	-283,161	-28.7%
Fossil Energy Programs					
Fossil Energy Research and Development	632,000	630,799	280,000	-352,000	-55.7%
Naval Petroleum and Oil Shale Reserves	17,500	17,467	4,900	-12,600	-72.0%
Strategic Petroleum Reserve	212,000	211,597	180,000	-32,000	-15.1%
Strategic Petroleum Account	0	0	8,400	+8,400	N/A
Northeast Home Heating Oil Reserve	7,600	7,586	6,500	-1,100	-14.5%
Total, Fossil Energy Programs	**869,100**	**867,449**	**479,800**	**-389,300**	**-44.8%**
Uranium Enrichment Decontamination and Decommissioning (UED&D) Fund	673,749	767,014	752,749	+79,000	+11.7%
Energy Information Administration	122,000	121,768	118,000	-4,000	-3.3%
Non-Defense Environmental Cleanup	255,000	254,515	218,400	-36,600	-14.4%
Science	5,347,000	5,336,835	4,472,516	-874,484	-16.4%
Advanced Research Projects Agency - Energy	291,000	290,446	20,000	-271,000	-93.1%
Nuclear Waste Disposal	0	0	90,000	+90,000	N/A
Departmental Administration	130,971	130,722	145,652	+14,681	+11.2%
Office of the Inspector General	46,424	46,336	49,000	+2,576	+5.5%
Title 17 - Innovative Technology Loan Guarantee Program	17,000	14,920	0	-17,000	-100.0%
Advanced Technology Vehicles Manufacturing Loan Program	6,000	5,989	0	-6,000	-100.0%
Total, Energy Programs	**11,019,599**	**11,094,947**	**7,805,266**	**-3,214,333**	**-29.2%**
Atomic Energy Defense Activities					
National Nuclear Security Administration					
Weapons Activities	8,846,948	8,830,130	10,239,344	+1,392,396	+15.7%
Defense Nuclear Nonproliferation	1,940,302	1,936,614	1,793,310	-146,992	-7.6%
Naval Reactors	1,375,496	1,372,881	1,479,751	+104,255	+7.6%
Federal Salaries and Expenses	363,766	363,937	418,595	+54,829	+15.1%
Total, National Nuclear Security Administration	**12,526,512**	**12,503,562**	**13,931,000**	**+1,404,488**	**+11.2%**
Environmental and Other Defense Activities					
Defense Environmental Cleanup	5,289,742	5,279,686	5,537,186	+247,444	+4.7%
Other Defense Activities	776,425	774,949	815,512	+39,087	+5.0%
Defense Nuclear Waste Disposal	0	0	30,000	+30,000	N/A
Total, Environmental and Other Defense Activities	**6,066,167**	**6,054,635**	**6,382,698**	**+316,531**	**+5.2%**
Total, Atomic Energy Defense Activities	**18,592,679**	**18,558,197**	**20,313,698**	**+1,721,019**	**+9.3%**
Power Marketing Administrations					
Southeastern Power Administration	0	0	0	0	N/A
Southwestern Power Administration	11,400	11,378	11,400	0	N/A
Western Area Power Administration	93,372	93,194	93,372	0	N/A
Falcon and Amistad Operating and Maintenance Fund	228	228	228	0	N/A
Colorado River Basins Power Marketing Fund	-23,000	-23,000	-23,000	0	N/A
Total, Power Marketing Administrations	**82,000**	**81,800**	**82,000**	**0**	**N/A**
Federal Energy Regulatory Commission (FERC)	0	0	0	0	N/A
Subtotal, Energy and Water Development and Related Agencies	**29,694,278**	**29,734,944**	**28,200,964**	**-1,493,314**	**-5.0%**
Excess Fees and Recoveries, FERC	-23,587	-15,882	-9,000	+14,587	+61.8%
Title XVII Loan Guarantee Program Section 1703 Negative Credit Subsidy Receipt	-68,000	-67,871	-35,000	+33,000	+48.5%
Sale of Northeast Gas Reserve	0	0	-69,000	-69,000	N/A
Use of Advanced Research Projects Agency - Energy Balances	0	0	-46,367	-46,367	N/A
Total, Funding by Appropriation	**29,602,691**	**29,651,191**	**28,041,597**	**-1,561,094**	**-5.3%**

*The Consolidated Appropriations Act was not available when the Department of Energy developed the FY 2018 Congressional Budget. Therefore, the FY 2017 Annualized CR amounts reflect the P.L. 114-254 continuing resolution level annualized to a full year.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR*	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Department of Energy Budget by Organization					
National Nuclear Security Administration					
Weapons Activities	8,846,948	8,830,130	10,239,344	+1,392,396	+15.7%
Defense Nuclear Nonproliferation	1,940,302	1,936,614	1,793,310	-146,992	-7.6%
Naval Reactors	1,375,496	1,372,881	1,479,751	+104,255	+7.6%
Federal Salaries and Expenses	363,766	363,937	418,595	+54,829	+15.1%
Total, National Nuclear Security Administration	**12,526,512**	**12,503,562**	**13,931,000**	**+1,404,488**	**+11.2%**
Science	**5,347,000**	**5,336,835**	**4,472,516**	**-874,484**	**-16.4%**
Energy					
Energy Efficiency and Renewable Energy	2,069,194	2,069,059	636,149	-1,433,045	-69.3%
Electricity Delivery and Energy Reliability	206,000	205,608	120,000	-86,000	-41.7%
Fossil Energy	869,100	867,449	479,800	-389,300	-44.8%
Nuclear Energy	986,161	984,286	703,000	-283,161	-28.7%
Office of Indian Energy Policy and Programs	16,000	15,970	10,000	-6,000	-37.5%
Office of Technology Transitions	0	0	6,876	+6,876	N/A
Total, Energy	**4,146,455**	**4,142,372**	**1,955,825**	**-2,190,630**	**-52.8%**
Advanced Research Projects Agency - Energy (ARPA-E)	**291,000**	**290,446**	**20,000**	**-271,000**	**-93.1%**
Energy Information Administration	**122,000**	**121,768**	**118,000**	**-4,000**	**-3.3%**
Credit Programs					
Title 17 - Innovative Technology Loan Guarantee Program	17,000	14,920	0	-17,000	-100.0%
Advanced Technology Vehicles Manufacturing Loan	6,000	5,989	0	-6,000	-100.0%
Total, Credit Programs	**23,000**	**20,909**	**0**	**-23,000**	**-100.0%**
Environmental Management	**6,218,491**	**6,301,215**	**6,508,335**	**+289,844**	**+4.7%**
Yucca Mountain and Interim Storage	**0**	**0**	**120,000**	**+120,000**	**N/A**
Office of Legacy Management	**167,180**	**166,862**	**154,606**	**-12,574**	**-7.5%**
Environment, Health, Safety and Security Mission Support	**180,998**	**180,654**	**199,458**	**+18,460**	**+10.2%**
Chief Information Officer	**73,218**	**73,079**	**91,443**	**+18,225**	**+24.9%**
Management	**65,000**	**64,876**	**53,758**	**-11,242**	**-17.3%**
Project Management Oversight and Assessments	**0**	**0**	**15,192**	**+15,192**	**N/A**
Chief Human Capital Officer	**24,500**	**24,453**	**25,500**	**+1,000**	**+4.1%**
Hearings and Appeals	**5,500**	**5,490**	**5,605**	**+105**	**+1.9%**
Economic Impact and Diversity	**10,000**	**9,981**	**10,000**	**0**	**0**
Corporate Management					
Office of the Secretary	5,008	4,998	5,300	+292	+5.8%
Strategic Partnership Projects and Revenues	-83,971	-83,811	-56,000	+27,971	+33.3%
Other Revenues	0	0	0	0	N/A
Chief Financial Officer	47,024	46,935	48,484	+1,460	+3.1%
Congressional and Intergovernmental Affairs	6,300	6,288	6,200	-100	-1.6%
Public Affairs	3,431	3,424	6,589	+3,158	+92.0%
General Counsel	31,000	30,941	33,000	+2,000	+6.5%
International Affairs	18,000	17,966	18,878	+878	+4.9%
Office of Small and Disadvantaged Business Utilization	3,000	2,994	3,000	0	0
Energy Policy and Systems Analysis	31,297	31,238	10,432	-20,865	-66.7%
Total, Corporate Management	**61,089**	**60,973**	**75,883**	**+14,794**	**+24.2%**
Office of Enterprise Assessments	**73,534**	**73,394**	**74,931**	**+1,397**	**+1.9%**
Specialized Security Activities	**230,377**	**229,939**	**237,912**	**+7,535**	**+3.3%**
Office of the Inspector General	**46,424**	**46,336**	**49,000**	**+2,576**	**+5.5%**
Power Marketing Administrations	**82,000**	**81,800**	**82,000**	**0**	**0**
Federal Energy Regulatory Commission	**-23,587**	**-15,882**	**-9,000**	**+14,587**	**+61.8%**
Title XVII Loan Guarantee Program Section 1703					
Negative Credit Subsidy Receipt	**-68,000**	**-67,871**	**-35,000**	**+33,000**	**+48.5%**
Sale of Northeast Gas Reserve	**0**	**0**	**-69,000**	**-69,000**	**N/A**
Use of Unobligated ARPA-E Balances	**0**	**0**	**-46,367**	**-46,367**	**N/A**
Total, Funding by Organization	**29,602,691**	**29,651,191**	**28,041,597**	**-1,561,094**	**-5.3%**

*The Consolidated Appropriations Act was not available when the Department of Energy developed the FY 2018 Congressional Budget. Therefore, the FY 2017 Annualized CR amounts reflect the P.L. 114-254 continuing resolution level annualized to a full year.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
National Nuclear Security Administration					
Federal Salaries and Expenses	363,766	363,973	418,595	+54,829	+15.1%
Weapons Activities	8,846,948	8,830,130	10,239,344	+1,392,396	+15.7%
Defense Nuclear Nonproliferation	1,940,302	1,936,614	1,793,310	-146,992	-7.6%
Naval Reactors	1,375,496	1,372,881	1,479,751	+104,255	+7.6%
Total, National Nuclear Security Administration	**12,526,512**	**12,503,598**	**13,931,000**	**+1,404,488**	**+11.2%**

Major Outyear Priorities and Assumptions

Estimates for the FY 2018 – FY 2023 base budget topline for the National Nuclear Security Administration reflect FY 2018 levels inflated by 2.1 percent annually. This outyear topline does not reflect a policy judgement. Instead, the Administration will make a policy judgement on amounts for the National Nuclear Security Administrations' FY 2019 – FY 2023 topline in the FY 2019 Budget, in accordance with the National Security Strategy and Nuclear Posture Review that are currently under development.

Appropriation Overview

National Nuclear Security Administration (NNSA) FY 2018 Budget Request is $13,931,000,000, an increase of $1,404,488,000 (11.2 percent) above the FY 2016 Enacted level to fund NNSA's mission to support the security and safety of our nation. NNSA pursues four major national security endeavors: (1) use science to maintain a safe, secure, and effective nuclear weapons stockpile; (2) reduce the threat posed by nuclear proliferation and terrorism both domestically and internationally, including unsecured or excess nuclear and radiological materials; (3) prepare to respond to, and mitigate, nuclear and radiological incidents worldwide; and (4) design and maintain safe and effective nuclear propulsion for the U.S. Navy. The FY 2018 Budget Request maintains the current Program of Record to modernize America's nuclear stockpile and infrastructure and support U.S. Navy nuclear propulsion requirements. The Request also supports the nonproliferation goals outlined in NNSA's *Prevent, Counter, and Respond—A Strategic Plan to Reduce Global Nuclear Threats (NPCR).* The Request also supports efforts to formulate a comprehensive Government-wide Reform Plan to create a lean, accountable, more efficient government; effectively and efficiently deliver NNSA programs; and align the NNSA federal workforce to meet the needs of today and the future.

Program Highlights

Weapons Activities FY 2018 Budget Request is $10,239,344,000, a $1,392,396,000 (15.7 percent) increase above the FY 2016 Enacted level. Weapons Activities funds programs primarily at eight NNSA Management and Operating (M&O) sites by a workforce of approximately 39,000 people managed by a Federal workforce composed of civilian and military staff. The Request is aligned with Department of Defense (DOD) requirements to ensure the U.S. nuclear deterrent continues to be safe, secure, and effective.

The FY 2018 Budget Request reflects an increase from FY 2016 Enacted levels to meet the Administration's commitments to the programs and capabilities required to sustain a safe, secure, and effective nuclear stockpile. Increases are requested for Directed Stockpile Work, including for the B61-12 and W80-4 Life Extension Programs (LEPs) and W88 Alteration program (formerly W88 ALT 370) and includes updated estimates for the B61-12 LEP and W88 Alteration program. The Weapons Request also includes increases for Infrastructure and Operations which includes funding to continue the stabilization of deferred maintenance; start construction on the Albuquerque Complex; and increase investment to upgrade aging infrastructure to address safety and programmatic risks, improve productivity, and lower operating costs. This Request also increases funding for the Uranium Processing Facility (UPF) to initiate construction/procurements primarily for, but not limited to, the Main Process Building, Salvage and Accountability Building and Mechanical Electrical Building subprojects. Research, Development, Test, and Evaluation (RDT&E) reflects an increase in Advanced Simulation and Computing, particularly exascale projects, to transition integrated codes to work efficiently on emerging, high-performance computers; develop next-generation codes; maintain computing resources and facilities; and work with industry to ensure NNSA requirements continue to be addressed as high-performance computing evolves.

The Request includes increased funding for the Secure Transportation Asset for the Safeguards Transporter (SGT) Risk Reduction Initiatives to manage the SGT beyond its design life, procurement of long-lead parts and materials for the two full scale Mobile Guardian Transporter (MGT) prototypes systems.

Defense Nuclear Nonproliferation (DNN) FY 2018 Budget Request is $1,793,310,000, a $146,992,000 (7.6 percent) decrease below the FY 2016 Enacted level. The nuclear nonproliferation strategy addresses the entire nuclear threat spectrum by preventing the acquisition of nuclear weapons or weapons-usable materials, countering efforts of state-sponsors of terrorism or terrorists to acquire such weapons or materials, and responding to nuclear or radiological incidents. The DNN Request provides policy and technical leadership to prevent or limit the spread of materials, technology, and expertise relating to weapons of mass destruction; pursue the dilute and dispose strategy to fulfill the United States' commitment to dispose of 34 metric tons of plutonium; advances technologies that detect the proliferation of weapons of mass destruction worldwide; eliminates and secures inventories of surplus materials and infrastructure usable for nuclear weapons; ensures a technically trained response to nuclear and radiological incidents worldwide; and supports emergency management. The DNN programs require less new budget authority in FY 2018 compared to FY 2016 Enacted level primarily due to the availability of prior year carryover balances and lower University of California (UC) legacy pension costs. Excluding UC pension payments and construction projects, the FY 2018 Request for nonproliferation and counterterrorism programs is higher than the FY 2017 Request.

Naval Reactors (NR) FY 2018 Budget Request for is $1,479,751,000, a $104,255,000 (7.6 percent) increase above the FY 2016 Enacted level. This funding supports operations, infrastructure, and development for the Navy's fleet of nuclear-powered aircraft carriers and submarines and funds three major DOE initiatives – the *Columbia*-class Reactor System Development, Land-based S8G Prototype Refueling Overhaul, and Spent Fuel Handling Recapitalization Project. This funding also provides for Naval Reactors' Federal program direction activities. The NR appropriation provides for safe and effective integrated nuclear propulsion systems for the U.S. Navy.

NNSA Federal Salaries and Expenses (FSE) FY 2018 Budget Request is $418,595,000, a $54,829,000 (15.1 percent) increase above the FY 2016 Enacted level, which included a one-time prior year rescission of $19,900,000 related to a construction project. Excluding the rescission, the FY 2018 Request reflects a 9.1 percent increase above the FY 2016 Enacted level. The Request provides funding for the salary, benefits, and support expenses of 1,715 federal full-time equivalents (FTEs) to provide federal program and project management and appropriate oversight of the nuclear security enterprise responsible for managing and executing NNSA's Weapons Activities and Defense Nuclear Nonproliferation mission. NNSA supports the effort to formulate a comprehensive Government-wide Reform Plan to create a lean, accountable, more efficient government; effectively and efficiently deliver NNSA programs; and align the NNSA federal workforce to meet the needs of today and the future. As NNSA enters the next phase of the nuclear modernization efforts, a highly skilled federal workforce is necessary for appropriate oversight principally in LEPs and major project management. As of mid-March 2017, NNSA on-board staffing levels were 16.8 percent lower than FY 2010 FTE levels, while funding has increased 27.7 percent from FY 2010 Enacted levels to the FY 2017 request for Weapons Activities and Defense Nuclear Nonproliferation, primarily for the nuclear modernization program. Working with U.S. Office of Personnel Management (OPM) experts, NNSA is developing a Human Capital Management Plan (HCMP) that institutionalizes a consistent staffing analysis and career development methodology to support NNSA management responsibilities and prepare for an anticipated wave of retirements.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
National Nuclear Security Administration					
NNSA Federal Salaries And Expenses					
Federal Salaries and Expenses	383,666	382,937	418,595	+34,929	+9.1%
Subtotal, NNSA Federal Salaries and Expenses	**383,666**	**382,937**	**418,595**	**+34,929**	**+9.1%**
Rescission of Prior Year Balances (OA)	-19,900	-19,000	0	+19,900	+100.0%
Total, NNSA Federal Salaries And Expenses	**363,766**	**363,937**	**418,595**	**+54,829**	**+15.1%**

Appropriation Overview

NNSA's **Federal Salaries and Expenses** (FSE) pays for costs associated with recruiting, training, and maintaining a federal staff to perform program and project management and appropriate oversight of $13 billion in funding across the nuclear security enterprise. FSE provides for the salaries and benefits of 1,715 full-time equivalents (FTEs), space and occupancy needs, travel costs, support service contractors, training, and other related expenses. 74 percent of FSE funds are for employee salaries and benefits.

The NNSA workforce consists of a diverse cadre of project managers, scientists, engineers, foreign affairs specialists, and highly technical support staff. The workforce also is comprised of mission support staff in information technology and cybersecurity, corporate project management, procurement and contract management, safety and health, cost estimating and program evaluation, financial management, human capital management, and legal services. The Department of Energy and NNSA collaboratively work to identify ways to reduce overlap in mission support functions to minimize funding required to achieve our mission.

NNSA is disbursed geographically throughout the United States, reflecting NNSA's work with the nuclear security enterprise. FSE funds federal staff geographically located in Washington, DC; Germantown, Maryland; Albuquerque, New Mexico; and at seven federal field offices: Kansas City Field Office (Missouri); Lawrence Livermore Field Office (California); Los Alamos Field Office (New Mexico); Nevada Field Office (Nevada); NNSA Production Office (Texas and Tennessee); Sandia Field Office (New Mexico); and Savannah River Field Office (South Carolina).

Program Highlights

The FY 2018 Budget Request for NNSA FSE supports recruitment, training, and retention of a highly skilled federal workforce for effective program and project management and federal oversight of $14 billion in funding to maintain the nuclear weapons stockpile, support the nuclear modernization program, and execute NNSA's prevent, counter, and response nonproliferation efforts. The $418,595,000 request reflects a $54,829,000 (15.1 percent) increase above FY 2016 Enacted level, which included a one-time rescission of $19,900,000 for a construction project previously funded in FSE. Excluding the rescission, the FY 2018 Request reflects a 9.1 percent increase above the FY 2016 Enacted level to pay for the salaries, benefits, and other expenses of 1,715 federal FTEs. The Request includes a 1.9 percent cost of living increase; 5.5 percent benefit escalation; transfers additional funding to the Department's Working Capital Fund; and includes a functional transfer of $2,000,000 from FSE to Weapons Activities, Information Technology and Cybersecurity for NNSA Field Office federal unclassified information technology and telecommunication costs.

NNSA projects a total FSE workforce of 1,680 FTEs by the end of FY 2017 and 1,715 FTEs by the end of FY 2018. The requested level reflects a reduction from NNSA's planned 1,740 FTE level for FY 2018 as identified in the FY 2017 Budget Request. NNSA supports the effort to formulate a comprehensive Agency Reform Plan, in accordance with Office of Management and Budget (OMB) Memorandum 17-22. The goal is to create a lean, accountable, more efficient government; effectively and efficiently deliver NNSA programs; and align the NNSA federal workforce to meet the needs of today and the future. As NNSA enters the next phase of the nuclear modernization efforts, a highly skilled federal workforce will be required for appropriate oversight principally in Life Extension Programs (LEPs) and major project management. As of mid-March 2017, NNSA on-board staffing levels were 16.8 percent lower than FY 2010 FTE levels, while funding has increased 27.7 percent from FY 2010 Enacted levels to the FY 2017 request for Weapons Activities and Defense Nuclear Nonproliferation, primarily for the nuclear modernization program.

Working with U.S. Office of Personnel Management (OPM) experts, NNSA is developing a Human Capital Management Plan (HCMP) that institutionalizes a consistent staffing analysis and career development methodology to support NNSA management responsibilities and prepare for an anticipated wave of retirements. Succession planning is critical since 44 percent of the current NNSA workforce will be eligible to retire by 2022. The NNSA workforce plan will focus on long-term shaping of the federal workforce to ensure the right skills mix at all levels. Specifically, strategic consideration of each business line and methods to gain efficiencies, eliminate redundancies and unnecessary bureaucracy, and ensure resources are aligned to mission requirements. This includes critically thinking about recruiting and hiring actions and conducting workforce planning activities to align NNSA workforce with current and future mission needs.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
National Nuclear Security Administration					
Weapons Activities					
Directed Stockpile Work	3,387,792	3,313,543	3,977,026	+589,234	+17.4%
Science	423,059	427,859	487,521	+64,462	+15.2%
Engineering	131,377	133,996	193,123	+61,746	+47.0%
Inertial Confinement Fusion Ignition and High Yield	511,050	516,185	532,934	+21,884	+4.3%
Advanced Simulation and Computing	623,006	648,095	734,244	+111,238	+17.9%
Advanced Manufacturing Development	130,056	87,705	80,540	-49,516	-38.1%
Infrastructure and Operations	2,279,124	2,408,217	2,803,137	+524,013	+23.0%
Secure Transportation Asset	237,118	256,438	325,064	+87,946	+37.1%
Defense Nuclear Security	682,891	661,512	686,977	+4,086	+0.6%
Information Technology and Cybersecurity	157,588	170,088	186,728	+29,140	+18.5%
Legacy Contractor Pensions	283,887	248,492	232,050	-51,837	-18.3%
Subtotal, Weapons Activities	**8,846,948**	**8,872,130**	**10,239,344**	**+1,392,396**	**+15.7%**
Use of Prior Year Balances	0	-42,000	0	0	N/A
Total, Weapons Activities	**8,846,948**	**8,830,130**	**10,239,344**	**+1,392,396**	**+15.7%**

Appropriation Overview

Weapons Activities (WA) appropriation programs support the Nation's safe, secure, and effective nuclear deterrent including support for the infrastructure of science, technology, and engineering capabilities. Weapons Activities provides for the maintenance and refurbishment of nuclear weapons to continue sustained confidence in their safety, reliability, and performance; investment in scientific, engineering, and manufacturing capabilities to enable certification of the enduring nuclear weapons stockpile; and manufacture of nuclear weapon components. Weapons Activities also provides for maintenance and investment in the NNSA nuclear complex to be more responsive and cost effective. This work is done in partnership with the Department of Defense (DOD).

NNSA's Management and Operating (M&O) contractors employ approximately 39,000 people to execute these programs, primarily at eight geographical sites, and managed by a Federal workforce, composed of civilian and military staff. Additional details about these programs will be included in the FY 2018 Stockpile Stewardship and Management Plan (SSMP), planned for release in June 2017.

The FY 2018 Request provides a 15.7% increase from the FY 2016 Enacted Level to maintain the current Program of Record as described in the FY 2017 FYNSP, with fact-of-life adjustments made from the progression of existing activities and programs, updated cost estimates, and any necessary adjustments to requirements due to ongoing planning. The Administration is updating the Nuclear Posture Review (NPR) and National Defense Strategy and will adjust future budget requests as needed once they are completed. FY 2018 funding increases are requested in a number of areas as noted below.

Program Highlights

- **Directed Stockpile Work (DSW)**
  DSW encompasses activities that support the nuclear weapons stockpile. These activities include maintenance and surveillance; planned refurbishment; reliability assessment; weapon dismantlement and disposition; and research, development, and certification of technology efforts to meet stockpile requirements and strategic materials. Requested increases in Life Extension Programs (LEP) and Major Alterations (Alt) support planned workscope for the B61-12 LEP, W80-4 LEP, and W88 Alteration program and updates baselines estimates for the B61-12 LEP and W88 Alteration program. This additional funding is required to maintain alignment with DOD schedules. Increases are included for Plutonium Sustainment to fabricate four to five development (DEV) W87 pits, continue investments to replace end-of-life pit production equipment, and install equipment to increase production capacity. The Tritium Sustainment increase supports increased Tritium production associated with TVA reactor fuel and operational costs.

The increase in Domestic Uranium Enrichment supports the start of an effort to downblend available stocks of highly enriched uranium for use in tritium production, which delays the need for a domestic uranium enrichment capability.

- **Research, Development, Test and Evaluation (RDT&E)**
  RDT&E develop and maintain critical capabilities, tools, and processes needed to support science-based stockpile stewardship, refurbishment, and continued certification of the stockpile without the use of underground nuclear explosive testing. The FY 2018 request funds required annual assessments and increases funding in several areas to support future LEP options and system certification, including Hydrodynamic and subcritical experiments and Enhanced Capabilities for Subcritical Experiments (ECSE). Funding is also increased in FY 2018 for Advanced Simulation and Computing, particularly for exascale computing projects, to transition integrated codes to work efficiently on emerging, high-performance computers; develop next-generation codes; maintain computing resources and facilities; and resources work with industry to assure NNSA requirements continue to be addressed as high-performance computing evolves. The Inertial Confinement Fusion Ignition and High Yield program continues operations at NNSA's three major high energy density facilities – National Ignition Facility (NIF) at Lawrence Livermore National Laboratories (LLNL), Z Pulsed Power facility at Sandia National Laboratories (SNL), and Omega laser facility at Rochester University. These programs provide key data that reduces uncertainty in calculations of nuclear weapons performance. Finally, NNSA is proposing an increase to Nuclear Survivability in the Engineering program to sustain NNSA's trusted microsystems capability.

- **Infrastructure and Operations (I&O)**
  I&O maintains, operates, and modernizes the NNSA infrastructure in a safe, secure, and cost-effective manner to enable program results. Infrastructure and Operations activities provide a comprehensive approach to arresting the declining state of NNSA infrastructure while maximizing return on investment, and reducing enterprise risk. The program also plans, prioritizes, and constructs state-of-the-art facilities, infrastructure, and scientific tools through Capability Based Investments and Line Item Construction projects. For FY 2018, funding will continue the stabilization of deferred maintenance; execute recapitalization projects to improve the condition and extend the design life of structures, capabilities, and systems to meet program demands; decrease overall operating costs; and reduce safety, security, environmental, and program risk. Funding is also requested to initiate construction/procurements primarily for UPF's Main Process Building, Mechanical Electrical Building, and Salvage and Accountability Building subprojects. The increase also supports continued construction of the Chemistry and Metallurgy Research Replacement (CMRR) Project at LANL to sustain plutonium science activities. Increased funding also provides for general-purpose construction projects including the construction of the Albuquerque Complex Project to replace the aging and degrading Federal facility in Albuquerque.

- **Secure Transportation Asset (STA)**
  STA supports the safe, secure movement of nuclear weapons, special nuclear material, and weapon components. The Program Direction in this account provides for the secure transportation workforce, including Federal agents. In FY 2018, the STA will continue workforce capability and asset modernization initiatives. These initiatives include increasing the number of Federal Agents, the Safeguards Transporter (SGT) Risk Reduction Initiatives to manage the SGT beyond its design life, procurement of long-lead parts and materials for the two full scale Mobile Guardian Transporter prototypes systems, and deferred facilities maintenance and minor construction projects at multiple sites.

- **Defense Nuclear Security (DNS)**
  DNS provides protection for NNSA nuclear weapons and special nuclear materials, facilities, and personnel against a full spectrum of threats, ranging from local security incidents to terrorism. This program employs over 1,500 protective force officers, and 1,100 additional security professionals and support staff responsible for meeting all security requirements at NNSA sites. In FY 2018, the Request includes funding for positions in key security program areas at the sites, such as classified matter protection, technical surveillance countermeasures, and nuclear materials measurements, accounting, and physical inventory. It also includes preliminary planning and conceptual design funds for future projects to sustain and recapitalize the Perimeter Intrusion Detection and Assessment Systems (PIDAS) at the Pantex and Y-12 sites.

- **Information Technology (IT) and Cybersecurity**
  This program provides for a range of IT support functions and manages NNSA's cybersecurity programs both with NNSA's M&Os and through DOE's Working Capital Fund (WCF). In FY 2018, the program will support the recapitalization of the Enterprise Secure Network, modernize the Cybersecurity infrastructure, implement the Identity Control and Access Management project at NNSA Headquarters and site elements, execute and coordinate Public Key Infrastructure and other Committee on National Security Systems requirements, and continue to leverage the NNSA Network Vision framework to increase the efficiency and cost-effectiveness of NNSA IT services, consistent with the DOE Cyber Strategy.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
National Nuclear Security Administration					
Defense Nuclear Nonproliferation					
Defense Nuclear Nonproliferation Programs					
Material Management and Minimization	316,584	312,507	332,094	+15,510	+4.9%
Global Material Security	426,751	421,255	337,108	-89,643	-21.0%
Nonproliferation and Arms Control	130,203	128,526	129,703	-500	-0.4%
Defense Nuclear Nonproliferation R&D	419,333	413,933	446,095	+26,762	+6.4%
Nonproliferation Construction	340,000	335,622	279,000	-61,000	-17.9%
Subtotal, Defense Nuclear Nonproliferation Programs	**1,632,871**	**1,611,843**	**1,524,000**	**-108,871**	**-6.7%**
Nuclear Counterterrorism and Incident Response Program	234,390	231,372	277,360	+42,970	+18.3%
Legacy Contractor Pensions	94,617	93,399	40,950	-53,667	-56.7%
Subtotal, Defense Nuclear Nonproliferation	**1,961,878**	**1,936,614**	**1,842,310**	**-119,568**	**-6.1%**
Use of Prior Year Balances	-21,576	0	0	+21,576	+100.0%
Rescission of Prior Year Balances	0	0	-49,000	-49,000	N/A
Total, Defense Nuclear Nonproliferation	**1,940,302**	**1,936,614**	**1,793,310**	**-146,992**	**-7.6%**

Appropriation Overview

NNSA plays a central role in reducing global nuclear threats across the entire nuclear threat spectrum by preventing the acquisition of nuclear weapons or weapons-usable materials, countering efforts to acquire such weapons or materials, and responding to nuclear or radiological accidents and incidents domestically and abroad.

This appropriation funds the Defense Nuclear Nonproliferation (DNN) program, which works to prevent the unauthorized or illegal acquisition of nuclear weapons or weapons usable-material by states or terrorists, as well as the Nuclear Counterterrorism and Incident Response (NCTIR) program, which primarily supports efforts to counter and respond to nuclear threats. These two programs provide policy and technical leadership to prevent or limit the spread of materials, technology, and expertise related to weapons of mass destruction; develop technologies to detect the proliferation of weapons of mass destruction worldwide; secure or eliminate inventories of nuclear weapons-related materials and infrastructure; ensure a technically trained response to nuclear and radiological incidents worldwide; support enterprise-wide emergency management; and reduce the danger that hostile nations or terrorist groups may acquire nuclear devices, radiological dispersal devices, weapons-usable material, nuclear and dual-use commodities and technology, or nuclear-related expertise that could be used to develop nuclear weapon capabilities.

These activities are carried out in the context of a dynamic global security environment, which is described in NNSA's annual report entitled *Prevent, Counter, and Respond—A Strategic Plan to Reduce Global Nuclear Threats.* This environment is characterized by the persistent vulnerability of nuclear and radiological materials (particularly in regions of conflict); pressure on arms control and nonproliferation regimes from a continued interest in nuclear weapons capabilities by state and non-state actors; the global expansion of nuclear power and possible spread of fuel cycle technology; increasing opportunities for illicit nuclear material trafficking and increasingly sophisticated procurement networks; and the rapid advance of technology (including cyber-related tools) that may shorten nuclear weapon development timelines and directly affect nuclear safeguards and security missions.

Program Highlights

- **Material Management and Minimization (M^3)**
  M^3 addresses the persistent threat posed by vulnerable weapons-usable nuclear materials. The primary objective of the program is to achieve permanent threat reduction by minimizing and, when possible, eliminating weapons-usable nuclear material around the world. The FY 2018 Budget Request supports this objective by funding the conversion or shut-down of research reactors and isotope production facilities that use highly enriched uranium (HEU), the acceleration of the establishment of new, non-HEU-based Mo-99 production facilities in the United States, the removal and disposal of weapons-usable nuclear material, the development of the lifecycle cost estimate and schedule for the dilute and dispose alternative for plutonium disposition, and the increase in costs to down-blend HEU due to the decline in uranium market prices. In addition, political and technical challenges have delayed implementation of

several removal efforts, so prior year uncosted balances will be used to support the removal, consolidation, and disposal of excess nuclear material from civilian sites worldwide.

- **Global Material Security (GMS)**
  GMS enhances nuclear security through nonproliferation by working with partner countries to increase the security of vulnerable nuclear and radiological materials and facilities and to improve partner countries' abilities to deter, detect, and investigate illicit trafficking. These activities aim to prevent terrorists from acquiring radiological or nuclear material that could be used in an attack on the United States or its interests. The decrease reflects a commitment to reduce prior year carryover balances, permitting a lower FY 2018 Budget Request.

- **Nonproliferation and Arms Control (NPAC)**
  NPAC supports activities to prevent the proliferation or use of weapons of mass destruction by state and non-state actors. NPAC develops and implements programs and strategies to: strengthen international nuclear safeguards; control the spread of nuclear and dual-use material, equipment, technology, and expertise; verify nuclear reductions and compliance with nonproliferation and arms control treaties and agreements; and address enduring and emerging nonproliferation and arms control challenges and opportunities. The decrease of $500 thousand, less than one percent of the budget, results from a return to baseline funding following a one-time increase of $3.5 million in FY 2016 for improvements in the 10 CFR Part 810 export control process. The $3.5 million decrease is offset by a $3.0 million increase to Nuclear Verification to enhance training and deployment readiness of the U.S. Uranium and Plutonium Verification Teams.

- **Defense Nuclear Nonproliferation Research and Development (DNN R&D)**
  DNN R&D drives the innovation of unilateral and multi-lateral technical capabilities to detect nuclear detonations; foreign nuclear weapons programs' activities; and the presence, movement, or diversion of special nuclear materials. To meet national and departmental nuclear security requirements, DNN R&D leverages the unique facilities and scientific skills of the Department of Energy, academia, and industry to perform research, including counterterrorism-related R&D, conduct technology demonstrations, develop prototypes, and produce and deliver sensors for integration into operational systems. The FY 2018 Budget increase includes planned activities for early detection of proliferation-related R&D and initiation of a mitigation path for supply chain interruptions to develop U.S. space-based nuclear detonation detection capabilities.

- **Nonproliferation Construction**
  Nonproliferation Construction consolidates construction costs for DNN projects. Construction covers Total Project Costs (TPC), which include Other Project Costs (OPC) and Total Estimated Costs (TEC). The FY 2018 budget request is $279 million, a decrease of $61 million, 17.9% below the FY 2016 enacted level. The Department proposes to terminate the Mixed Oxide Fuel Fabrication (MFFF) project and to pursue the dilute and dispose strategy to fulfill the United States' commitment to dispose of 34 metric tons of surplus U.S. weapon-grade plutonium. The request includes $270 million to bring an orderly and safe closure of the MFFF project. In addition, $9 million is for the Surplus Plutonium Disposition (SPD) project to support the dilute and dispose strategy. The request will support preliminary design upon completion of CD-1, Approve Alternative Selection and Cost Range in FY 2018.

- **Nuclear Counterterrorism and Incident Response (NCTIR)**
  The FY 2018 Request for the NCTIR Program executes the DOE/NNSA's Emergency Management Enterprise program that administers implementation and support of emergency management for all DOE/NNSA offices and sites, and manages the DOE/NNSA Emergency Operations Centers, Emergency Communications Network, Policy Management, Training, Exercises, and Continuity of Operations Program (COOP) activities. NCTIR also applies the unique technical expertise from the NNSA's nuclear security enterprise to prepare for, and prevent, mitigate, and respond to a nuclear or radiological incident domestically or abroad, providing technical advice to the Department of Defense; the Federal Bureau of Investigation; other interagency and international partners; and state and local organizations in support of nuclear counterproliferation, nuclear counterterrorism, nuclear incident response, and nuclear forensics.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
National Nuclear Security Administration					
Naval Reactors					
Naval Reactors Operations and Infrastructure	445,196	444,350	466,884	+21,688	+4.9%
Naval Reactors Development	446,896	446,046	473,267	+26,371	+5.9%
S8G Prototype Refueling	133,000	132,747	190,000	+57,000	+42.9%
Columbia -Class Reactor Systems Development (formerly *Ohio* Replacement reactor Systems Development)	186,800	186,445	156,700	-30,100	-16.1%
Program Direction	42,504	42,423	48,200	+5,696	+13.4%
Construction	121,100	120,870	144,700	+23,600	+19.5%
Total, Naval Reactors	**1,375,496**	**1,372,881**	**1,479,751**	**+104,255**	**+7.6%**

Appropriation Overview

Naval Reactors' (NR) activities directly contribute to meeting the DOE strategic goal for Nuclear Security and NR plays a critical leadership role in meeting the goal to design and maintain safe and effective integrated nuclear propulsion systems for the U.S. Navy. The Naval Reactors program has responsibility for all naval nuclear propulsion work, from reactor plant technology development and design, continuing through reactor plant operation and maintenance, and ending with reactor plant disposal.

Program Highlights

Funding for the program supports continued safe and reliable operation of the Navy's nuclear-powered fleet (75 submarines, 11 aircraft carriers, and 4 research, development, and training platforms), constituting over 45 percent of the Navy's major vessels. The Program's development work consists of refining and improving existing technology to ensure that the U.S. Navy's nuclear propulsion plants are increasingly efficient and effective and will be capable of meeting future threats to national security.

In addition to supporting the existing nuclear fleet, Naval Reactors has three major DOE initiatives: the *Columbia*-Class Reactor System Development, the Land-based S8G Prototype Refueling Overhaul, and the Spent Fuel Handling Recapitalization Project.

Naval Reactors supports the President's national security strategy with the continued development of the reactor plant system for the *Columbia*-Class submarine and stewardship of naval nuclear infrastructure. Ensuring the continuity of a sea-based strategic deterrent, the Budget Request provides for the research, design, and development of the reactor plant system for the *Columbia*-Class submarine, to include the development of a life-of-ship reactor core. The budget further provides funding for the refueling and overhaul of the Land-based S8G Prototype reactor, a critical research and development asset for the long-term. Lastly, the Spent Fuel Handling Recapitalization Project will ensure the continued capability to refuel and defuel aircraft carriers and submarines, which is critical to maintaining the nuclear fleet's operational availability for national security missions.

- **Naval Reactors Operations and Infrastructure**
  The FY 2018 Request will support critical prototype maintenance during planned S8G prototype availability period, facility and systems maintenance and regulatory requirements across the Program's four DOE sites, and necessary general plant projects and capital equipment to recapitalize aging infrastructure and equipment.

- **Naval Reactors Development**
  The FY 2018 Request will support the Advanced Test Reactor at the Idaho National Laboratory, reactor core material development, radioactive test and evaluation efforts, and the procurement of a high performance computer to support reactor plant performance modeling efforts.

- **S8G Prototype Refueling**
  The increase over FY 2016 Enacted levels supports availability planning and preparations, and contractor staffing ramp up in advance of the refueling overhaul start in September 2018.

- ***Columbia*-Class Reactor Systems Development**
  The decrease from FY 2016 Enacted levels is consistent with the planned project profile and supports reactor plant system and long lead time component development to support FY 2019 procurement.

- **Program Direction**
  The FY 2018 Request places Naval Reactors in a position to execute its mission and provide federal oversight of the program's DOE laboratories.

- **Construction**
  The increase over FY 2016 Enacted levels is in accordance with NR's program of record, as detailed in the Ten-Year Facilities Plan.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Science					
Advanced Scientific Computing Research	621,000	619,819	722,010	+101,010	+16.3%
Basic Energy Sciences	1,849,000	1,845,485	1,554,500	-294,500	-15.9%
Biological and Environmental Research	609,000	607,842	348,950	-260,050	-42.7%
Fusion Energy Sciences Program	438,000	437,167	309,940	-128,060	-29.2%
High Energy Physics	795,000	793,489	672,700	-122,300	-15.4%
Nuclear Physics	617,100	615,927	502,700	-114,400	-18.5%
Workforce Development for Teachers and Scientists	19,500	19,463	14,000	-5,500	-28.2%
Science Laboratories Infrastructure	113,600	113,384	76,200	-37,400	-32.9%
Safeguards and Security	103,000	102,805	103,000	0	0.0%
Program Direction	185,000	184,648	168,516	-16,484	-8.9%
Subtotal, Science	**5,350,200**	**5,340,029**	**4,472,516**	**-877,684**	**-16.4%**
Rescission of Prior Year Balances	-3,200	-3,194	0	+3,200	+100.0%
Total, Science	**5,347,000**	**5,336,835**	**4,472,516**	**-874,484**	**-16.4%**

Appropriation Overview

Science (SC) is the nation's largest Federal supporter of basic research in the physical sciences and funds programs in physics, chemistry, materials science, biology, environmental science, applied mathematics, and computer and computational science. The Office of Science portfolio has two principal thrusts: direct support of scientific research, and direct support of the design, development, construction, and operation of unique, open-access scientific user facilities. SC supports over 19,000 researchers at 17 DOE laboratories and about 300 institutions. Over 27,000 researchers from universities, national laboratories, industry, and international partners are expected to use SC user facilities in FY 2018. SC programs invest in foundational science, including basic research for the advancement of clean energy, to transform our understanding of nature and strengthen the connection between advances in fundamental science and technology innovation.

Program Highlights

- **Advanced Scientific Computing Research**
  Advanced Scientific Computing Research (ASCR) supports advanced computational research, applied mathematics, computer science, and networking as well as development and operation of multiple, large high performance and leadership computing user facilities and high performance networking. ASCR increases by $101.0 million, or 16.3 percent, relative to the FY 2016 Enacted level. The Request provides for significantly expanded investments in research and engineering prototypes to develop critical technologies and system integration for exascale, including initiation of exascale node and system architecture design efforts. The Request funds:
  - Research, development, and design to ultimately achieve exascale-capable systems with a thousand fold improvement in true application performance over current high performance computers.
  - Core research in applied mathematics and computer science.
  - Research on the application of high performance computer simulation and modeling to science challenges, including computational partnerships under the Scientific Discovery through Advanced Computing program aimed at understanding the challenges that quantum information and neuromorphic technologies pose to DOE mission applications.
  - Research in data-intensive science to address end-to-end data management challenges, including the massive quantities of data generated by SC facilities and collaborations.
  - Operations and preparation for upgrades at ASCR's four scientific user facilities, including initiation of an upgrade of the Energy Sciences Network and site preparations at the Leadership Computing Facilities in support of the delivery of an exascale-capable computing system in 2021.
  - The Next Generation Networking for Science activity will be eliminated. Collaboratory efforts, currently supported by this activity, will be supported by ongoing computational partnerships to strengthen the interconnectivity of these efforts.

- **Basic Energy Sciences**
  Basic Energy Sciences (BES) supports fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels in order to provide the foundations for new energy technologies, to mitigate the environmental impacts of energy use, and to support DOE missions in energy, environment, and national security. BES decreases by $294.5 million or 15.9 percent from the FY 2016 Enacted level.The Request funds:
  - Core research activities at a reduced level in the broad disciplines of condensed matter and materials physics, chemistry, geosciences, and aspects of physical biosciences to discover new materials and design novel chemical processes.
  - Energy Frontier Research Centers (EFRCs) to overcome hurdles in basic science that require team efforts with a scope and complexity beyond that possible in single-investigator or small-group awards.
  - Core research and the EFRC program that will emphasize emerging high priorities in quantum materials and chemistry, catalysis science, synthesis, instrumentation science, and materials and chemical research related to interdependent energy-water issues.
  - Computational Materials Sciences to develop community codes for the predictive design of functional materials.
  - Computational Chemical Sciences to develop codes that are well-adapted to anticipated exascale architectures.
  - Fundamental research to enable advancement of clean energy technologies, with emphases on targeting novel materials and chemistry for energy efficiency and for use in extreme environments.
  - Continuting operation of BES user facilities at below optimal levels: five x-ray light sources, two neutron scattering centers, and three research centers for nanoscale science with electron beam characterization capabilities.
  - Continued construction of the Linac Coherent Light Source-II (LCLS-II) at SLAC National Accelerator Laboratory.
  - Support for the Advanced Photon Source Upgrade project which is converted from a Major Item of Equipment (MIE) to a line item construction project.

- **Biological and Environmental Research**
  Biological and Environmental Research (BER) supports fundamental research to understand complex biological, biogeochemical, and physical principles of natural systems at scales extending from the genome of microbes and plants to the environmental and ecological processes at the scale of the planet Earth. More specifically, BER seeks to understand how genomic information is translated to functional capabilities, and how that knowledge can enable more confident redesign of microbes and plants for improved energy resilience and sustainability, including improved biofuels and bioproducts, improved carbon storage capabilities, and controlled biological transformation of materials such as nutrients and contaminants in the environment. BER also supports research to advance our understanding of the role of atmospheric, terrestrial, ocean, and subsurface interactions required for predictive tools and approaches needed to inform policies and plans for future energy and resource needs. BER decreases by $260.0 million, or 42.6 percent, below the FY 2016 Enacted level to implement the Administration's shift to focus more on fundamental research in biological and earth and environmental systems science. The Request funds:
  - Research in foundational genomic sciences, including the DOE Bioenergy Research Centers, to provide advances in fundamental biological system science, using approaches that include genome sequencing, proteomics, metabolomics, structural biology, high-resolution imaging and characterization, and integration of information into computational models that can be iteratively tested and validated to advance a predictive understanding of biological systems from molecules to mesoscale.
  - Microbiome research to understand the functional interactions between microbes and plants in targeted environments of relevance to BER's bioenergy challenges.
  - Core research in earth and environmental systems science, with activities focused on scientific analysis of the sensitivity and uncertainty of earth system predictions to physical and biogeochemical processes.
  - Fundamental research on clouds, aerosols, and the terrestrial carbon cycle over a range of environmental conditions at diverse locations to advance understanding of how the Earth's dynamic, physical, and biogeochemical systems (the atmosphere, land, oceans, sea ice, and subsurface) interact.
  - Research in Earth System model development and validationfocused on model components that include the ocean, sea-ice, land-ice, aerosols, atmospheric chemistry, terrestrial carbon cycling, multi-scale dynamical and physical interdependencies, and dynamical cores.
  - Continuting operation of the three BER scientific user facilities: the Joint Genome Institute, the Atmospheric Radiation Measurement Research Facility, and the Environmental Molecular Sciences Laboratory.

- **Fusion Energy Sciences Program**
  Fusion Energy Sciences (FES) supports research to understand matter at very high temperatures and densities and to build the scientific foundation needed to develop a fusion energy source. FES decreases by $128.1 million, or 29.2 percent, below the FY 2016 Enacted level. The Request funds:
  - Support for the DIII-D program research and facility operations, with an emphasis on high priority fusion science areas identified by community research needs workshops in 2015.
  - NSTX-U program research and recovery activities, including the continued analysis of high-impact data while the facility is down for assessment and repair.
  - Core research basic plasma science and fundamental materials research, and research opportunities for U.S. scientists on superconducting tokamaks abroad with world-leading capabilities enabled by U.S. hardware investments.
  - Increased support for Scientific Discovery Through Advanced Computing (SciDAC) in partnership with ASCR, including research to accelerate development of a whole-device modeling capability.
  - Continued funding to support the U.S. Contribution to the ITER project.

- **High Energy Physics**
  High Energy Physics (HEP) supports research to understand how the universe works at its most fundamental level by discovering the most elementary constituents of matter and energy, probing the interactions among them, and exploring the basic nature of space and time. HEP decreases by $122.3 million, or 15.4 percent, below the FY 2016 Enacted level. The Request funds:
  - The highest priority activities and projects identified by the high energy physics community and described in the High Energy Physics Advisory Panel (HEPAP) May 2014 Particle Physics Project Prioritization Panel (P5) report, including increased support for the Long Baseline Neutrino Facility, and Deep Underground Neutrino Experiment hosted at Fermilab, with international partners.
  - Core research activities, at a reduced level of effort, with priority given to areas critical to executing P5 report recommendations.
  - The High-Luminosity Large Hadron Collider Accelerator Upgrade and the Facility for Accelerator and Experimental Tests II MIE projects, which will be initiated in FY 2018.
  - Accelerator Stewardship activities to enable development of real-world accelerator applications, including advanced proton and ion beams for the treatment of cancer (in coordination with NIH), and compact accelerators for environmental remediation.
  - Muon to Electron Conversion Experiment project proceeding to the construction phase, to provide a unique window into charged lepton flavor violation.
  - New, next-generation projects to search for dark matter, LUX-ZEPLIN and SuperCDMS-SNOlab; and the Dark Energy Spectroscopic Instrument to further studies of dark energy.

- **Nuclear Physics**
  Nuclear Physics (NP) supports research to discover, explore, and understand all forms of nuclear matter. NP decreases $114.4 million or 18.5 percent below the FY 2016 Enacted level. The Request funds:
  - Continuous Electron Beam Accelerator Facility operations to initiate the full scientific program with the recently upgraded 12 GeV machine and new scientific equipment in the experimental halls, which will open the opportunity for new discoveries and an improved understanding of quark confinement.
  - Argonne Tandem Linac Accelerator System operations, as the world's premier stable ion beam facility to enable compelling experiments in nuclear structure and astrophysics.
  - Research in Nuclear Physics at universities and laboratories that supports high priority world-class research in nuclear science and preserves critical core competencies.
  - Isotope production facilities to ensure mission readiness for isotope production. These facilities provide isotopes in short supply that are crucial to the Nation's federal complex, research enterprise, and industry. Operation of the Enriched Stable Isotope Prototype Plant is maintained and poised to begin to replenish U.S. inventory and reduce dependence on foreign suppliers.
  - Construction at Michigan State University of the Facility for Rare Isotope Beams at a level below the performance baseline profile; FRIB will provide world-class capability and new discovery potential in nuclear structure and nuclear astrophysics.
  - Continuation of the Gamma-Ray Energy Tracking Array MIE, a premiere gamma-ray tracking device that will enable provision of advanced, high resolution gamma ray detection capabilities for FRIB.

- The Stable Isotope Production Facility MIE, which will provide increased domestic capability for production of critically needed enriched stable isotopes, and reduce the nation's dependency on foreign supply.

- **Workforce Development for Teachers and Scientists**
  - WDTS decreases $5.5 million or 28.2 percent below the FY 2016 Enacted level.
  - Workforce Development for Teachers and Scientists (WDTS) ensures that DOE has the sustained pipeline of science, technology, engineering, and mathematics (STEM) workers to meet national goals and objectives, now and in the future.
  - FY 2018 activities supported by WDTS focus on the training of STEM undergraduate and graduate students at DOE national laboratories and the National Science Bowl® competitions.

- **Science Laboratories Infrastructure**
  - Science Laboratories Infrastructure (SLI) sustains mission-ready infrastructure and safe and environmentally responsible operations by providing the infrastructure necessary to support leading edge research by the SC national laboratories .
  - SLI decreases by $37.4 million or 32.9 percent below the FY 2016 Enacted level to support. The Request funds:
    - One new construction project: the Energy Science Capabilities building at Pacific Northwest National Laboratory; and the continuation of four ongoing construction projects: Materials Design Laboratory at Argonne National Laboratory; the Integrative Genomics Building at Lawrence Berkeley National Laboratory; the Integrated Engineering Research Center at Fermi National Accelerator Laboratory; and the Core Facility Revitalization at Brookhaven National Laboratory.

- **Safeguards and Security**
  - S&S funding remains flat with the FY 2016 Enacted level.
  - Safeguards and Security (S&S) program ensures appropriate security measures are in place to support the SC mission requirement of open scientific research and to protect critical assets within SC national laboratories.

- **Program Direction**
  - PD decreases $16.5 million or 8.9 percent below the FY 2016 Enacted level. The decrease will be accommodated through a restriction in hiring freeze and an organizational review to identify opportunities for functional consolidation and position reductions while improving organizational efficiencies.
  - Program Direction (PD) supports the skilled and motivated Federal workforce that plans, develops, and oversees SC investments in world-leading basic research and scientific user facilities, and provides critical oversight to ten of DOE's national laboratories.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Energy Efficiency and Renewable Energy					
Sustainable Transportation					
Vehicle Technologies	310,000	309,411	82,000	-228,000	-73.5%
Bioenergy Technologies	225,000	224,571	56,600	-168,400	-74.8%
Hydrogen and Fuel Cell Technologies	100,950	100,758	45,000	-55,950	-55.4%
Total, Sustainable Transportation	**635,950**	**634,740**	**183,600**	**-452,350**	**-71.1%**
Renewable Energy					
Solar Energy	241,600	241,141	69,700	-171,900	-71.2%
Wind Energy	95,450	95,269	31,700	-63,750	-66.8%
Water Power	70,000	69,867	20,400	-49,600	-70.9%
Geothermal Technologies	71,000	70,865	12,500	-58,500	-82.4%
Total, Renewable Energy	**478,050**	**477,142**	**134,300**	**-343,750**	**-71.9%**
Energy Efficiency					
Advanced Manufacturing	228,500	228,066	82,000	-146,500	-64.1%
Federal Energy Management Program	27,000	26,949	10,000	-17,000	-63.0%
Building Technologies	200,500	200,119	67,500	-133,000	-66.3%
Weatherization and Intergovernmental Program	265,000	264,496	0	-265,000	-100.0%
Total, Energy Efficiency	**721,000**	**719,630**	**159,500**	**-561,500**	**-77.9%**
Corporate Support					
Program Direction	155,000	154,705	125,849	-29,151	-18.8%
Strategic Programs	21,000	20,960	0	-21,000	-100.0%
Facilities and Infrastructure	62,000	61,882	92,000	+30,000	48.4%
Total, Corporate Support	**238,000**	**237,547**	**217,849**	**-20,151**	**-8.5%**
Subtotal, Energy Efficiency and Renewable Energy	**2,073,000**	**2,069,059**	**695,249**	**-1,377,751**	**-66.5%**
Use of Prior Year Balances*	0	0	-59,100	-59,100	N/A
Rescission of Prior Year Balances	-3,806	0	0	+3,806	100.0%
Total, Energy Efficiency and Renewable Energy	**2,069,194**	**2,069,059**	**636,149**	**-1,433,045**	**-69.3%**

* The proposed Use of Prior Year Balances is not a reprogramming request, but provides notice of intent to use unobligated balances within Congressional Control points to supplement FY 2018 appropriations for the activities described within the CJ for each program.

Appropriation Overview

Office of Energy Efficiency and Renewable Energy (EERE) invests in research and development (R&D) as part of the Department of Energy's (DOE's) broad portfolio approach to address our Nation's energy and environmental challenges. This budget focuses DOE resources toward early-stage R&D, where the Federal role is critically important, and reflects an increased reliance on the private sector to fund later-stage research, development, and commercialization of energy technologies. It emphasizes energy technologies best positioned to enable American energy independence and domestic job-growth in the near to mid-term.

The FY 2018 Budget Request invests $695 million to maintain America's leadership in transformative science and emerging energy technologies in sustainable transportation, renewable power, and energy efficiency. All EERE programs will focus on research that industry either does not have the technical capability to undertake or is too far from market realization to merit sufficient industry focus and critical mass. Knowledge generated by EERE early-stage R&D enables U.S. industries, businesses, and entrepreneurs to develop and deploy innovative energy technologies and gives them the competitive edge needed to excel in the rapidly changing global energy economy. Industry deployment of these technologies creates jobs, reduces U.S. reliance on foreign resources, increases energy affordability, improves energy security, ensures environmental responsibility and offers Americans a broader range of energy choices. The shift away from later-stage development and deployment activities and the increased focus on early-stage R&D provides an opportunity to reorganize and move toward a more efficient organizational structure. In keeping with the direction to generate efficiencies and reduce the cost of government, and to align with reductions in technology program budgets, the Department will reduce EERE Full-Time

Equivalents (FTEs) by approximately 30 percent from the FY 2016 level. Remaining staff will ensure continuity of the essential oversight activities for EERE's project portfolio and maintaining proper stewardship of taxpayer dollars. In a further effort to eliminate redundancies and increase efficiencies across the Department, staff and associated functions from the Office of Strategic Programs will be centralized within corporate Departmental offices, including the Office of International Affairs, the Office of Public Affairs and the Office of Technology Transitions.

Program Highlights

Sustainable Transportation

- **Vehicle Technologies**
  FY 2018 funding supports early-stage R&D to generate knowledge upon which industry can develop and deploy innovative energy technologies for the efficient and secure transportation of people and goods across America. Vehicle Technologies will focus on research that industry either does not have the technical capability to undertake or is too far from market realization to merit sufficient industry focus and critical mass. Within Battery and Electrification Technologies, Advanced Battery R&D will explore new battery chemistry and cell technologies with the potential to reduce the cost of electric vehicle batteries by more than half, to less than $100/kWh (ultimate goal is $80/kWh), increase range to 300 miles, and decrease charge time to 15 minutes or less. Building upon work started in FY 2016, Energy Efficient Mobility Systems (EEMS) will create new ideas and knowledge focused on pathways to significantly improve transportation system efficiency. EEMS research will include the application of new computational models and simulation capabilities to create and test new theories that use vehicle connectivity and automation to improve energy efficiency, big data tools, machine/deep-learning and artificial intelligence, as well as new information science approaches that improve mobility decision making and increase transportation choice. In Advanced Engine and Fuel Technologies, research will aim to improve our understanding of and ability to manipulate combustion, generating knowledge and insight necessary for industry to develop the next generation of engines and fuels capable of improving passenger vehicle fuel economy by 50 percent from a 2009 baseline. In Materials Technology, research will focus on novel approaches to build lightweight, multi-material structures and on creating new materials that can meet the extreme temperatures and pressures that the next generation of vehicle engines will require.

- **Bioenergy Technologies**
  FY 2018 funding supports early-stage R&D that bolsters the body of scientific and engineering knowledge enabling industry to develop and deploy high-performing drop-in biofuels and renewable chemicals at $3 per gallon gasoline equivalent ($3/gge) in the near-term, with an ultimate target of $2/gge. The Program's early-stage R&D emphasizes processes to produce renewable-gasoline, -diesel, and -jet fuels from non-food sources. Research focus areas include: (1) detailed understanding and optimization of the physics and chemistry of each preprocessing step of highly variable biomass; (2) identification and molecular characterization of four high performing algal strains; and (3) development of engineered organisms and novel catalysts. Also, in collaboration with the Vehicles Technology Program, the Program will explore the co-optimization of fuels and engines enabling the development of bio-based fuels/additives that have the potential to realize 15-20% fuel economy gain when blended with petroleum and used in high-efficiency engines.

- **Hydrogen and Fuel Cell Technologies**
  FY 2018 funding supports early-stage R&D to investigate novel hydrogen and fuel cell technologies and concepts that could enable American energy independence and domestic job growth through industry development and deployment. To be cost competitive with gasoline on a cents-per-mile driven basis, the cost of hydrogen from domestic resources needs to be less than $4/gge and the cost of a durable fuel cell system needs to be less than $40/kW. In FY 2018, research will emphasize the acceleration of materials breakthroughs through National laboratory consortia that bring together state-of-the-art core capabilities from multiple labs, while leveraging the results of ongoing projects with university and industry partners using prior year funding. Key areas of research include platinum-free catalysts, materials for advanced water splitting, and hydrogen storage, as well as component and materials research to enable "H2@Scale," a vision for the wide-scale production and utilization of hydrogen across sectors.

Renewable Power

- **Solar Energy**
  FY 2018 funding supports the DOE SunShot Initiative's goal of making solar power one of the least expensive forms of electricity by enabling cost reductions toward the 2030 target of $0.03/kWh for utility-scale solar power. Funding will support early-stage R&D at the National Laboratories, in partnership with academia and industry, with a focus on the next generation of photovoltaics and concentrating solar power technologies. In addition, the Program will advance the

state of knowledge necessary for industry to incorporate increasing solar generation into the electric grid, including focuses on solar power forecasting, power electronics, and power system integrity. National Laboratory research also supports the development of experimental test and evaluation standards and analytic models to guide the direction of R&D activities. Some additional funding is provided for a limited research portfolio at universities, in close coordination with the Office of Science and the National Science Foundation.

- **Wind Energy**
  FY 2018 funding emphasizes fundamental, early-stage R&D, and related testing that builds the knowledge base upon which industry can develop and deploy novel technologies. FY 2018 activities will focus on investigating fundamental systems-level interactions influenced by atmospheric conditions, variable terrain, and machine-to-machine wake interactions. A new R&D effort will focus on the scientific challenges associated with the design and manufacturing of low-specific power rotors for tall wind applications, aimed at enabling industry improvement of wind plant capacity factors by as much as 10%, and mitigating challenges associated with aerodynamic and gravitational loading. Funding will advance collaboration with DoD, FAA, DHS, and other agencies to complete a suite of wind-turbine radar-interference mitigation algorithms for long-range and terminal radar systems. Finally, funded R&D will address long-term wind-related grid integration and grid infrastructure modernization challenges.

- **Water Power**
  FY 2018 funding supports early-stage R&D exploring novel concepts and approaches to capturing hydropower and marine hydrokinetic energy resources. Hydropower activities will advance new approaches to hydropower design, enabling industry to develop and deploy standardized, modular hydropower systems across a range of geologic and hydrologic conditions. Outputs from computationally intensive R&D efforts will also enable industry to incorporate biological modeling in turbine design as well as model approaches to increase hydropower's ability to operate flexibly and respond to the requirements of the grid. Marine hydrokinetic research activities will focus on improving understanding of hydrodynamic loads and power conversion optimization and analytical capabilities to evaluate device and array performance and reliability across operational and extreme conditions.

- **Geothermal Technologies**
  FY 2018 funding supports GTO's Enhanced Geothermal Systems (EGS) collaborative effort, bringing together National Laboratory-led teams, academia, and industry to conduct early-stage R&D that explores the fundamental relationships between seismicity, stress state, and permeability to validate and verify models, providing feedback to inform the next stage of EGS research. The Program will fund the final year of a three-year Hydrothermal effort for three National Laboratory projects targeting innovative, early-stage research on approaches to geothermal exploration through microhole drilling applications, self-healing cements, and subsurface imaging, all of which present such a significant degree of scientific uncertainty that industry is unlikely to invest significant resources. The Budget Request also supports early-stage R&D in waterless fracturing and stimulation fluids, investigating alternative hydraulic fracturing methods to reduce, or eliminate, the use of water. Combined efforts will strengthen the body of knowledge necessary to enable industry to achieve a cost target of $0.06/kWh by 2030 from newly developed geothermal systems.

<u>Energy Efficiency</u>

- **Advanced Manufacturing**
  FY 2018 funding supports early-stage applied R&D focused on advancing and creating new understanding of underlying technologies, materials and processes relevant to the productive use of energy in manufacturing, as well as the competitive manufacturing of energy related products. The Budget for AMO reasserts the proper role of the Federal Government by reflecting an increased reliance on the private sector to fund later-stage research, development, and commercialization of energy technologies and focusing funding toward early-stage R&D. By fostering collaboration between National Laboratories, universities and companies (for-profit and not-for-profit), this budget will enhance the foundational knowledge base in materials and manufacturing processes, focusing on research challenges that present a significant degree of scientific or technical uncertainty and are beyond the horizon in terms of commercialization, making it unlikely that industry will pursue independently.

- **Federal Energy Management Program**
  FY 2018 funding supports FEMP's core activities of assisting Federal agencies to meet energy-related goals and provide Federal energy leadership to the country. FY 2018 funds will support continued assistance on energy projects and energy savings performance contracts, including Energy Savings Performance Contracts (ESPC), Utility Energy Service

Contracts (UESC), and Power Purchase Agreements (PPA), enhancing the energy management skills of the federal workforce, and supporting agency accountability toward federal goals.

- **Building Technologies**
  FY 2018 funding supports early-stage R&D of innovative building energy technologies such as lighting, space conditioning and refrigeration, windows and envelope and their effective integration into efficient, resilient, grid-connected, and secure building systems. The goal of the program is to overcome the high degree of fragmentation across the heterogeneous buildings industry spanning construction to appliance and equipment manufacturing. BTO's research also focuses on developing the physics-based algorithms for improved energy modeling and system controls required to better predict and manage energy efficient appliance/equipment, system, and whole-building energy usage. Additionally, BTO's early stage R&D on advanced and transactive controls will help strengthen the body of knowledge to enable industry to develop and deploy truly "smart" buildings capable of connecting with the power grid in new and increasingly adaptive manners to help with overall electric system efficiency, resiliency and bringing down energy prices across the grid. Finally, it supports DOE working with industry and stakeholders to meet requirements for statutorily-mandated efficiency standards and building energy codes determinations.

- **Weatherization and Intergovernmental Programs**
  No funding is requested in FY 2018 for both the Weatherization Assistance Program (WAP) and the State Energy Program (SEP) due to a departmental shift in focus away from deployment activities and towards early-stage R&D for energy efficiency and renewable energy technologies. In FY 2018 WAP will continue to administer, support and monitor multi-year formula financial assistance awards to 59 grantees (50 states, the District of Columbia, 5 U.S. Territories and 3 Native American Tribes) made with FY 2017 and prior year funding, and accomplish approximately 20,000 to 30,000 low income household retrofits during the latter part of FY 2017 through the end of each grantee's award period of performance. SEP in FY 2018 will continue to administer, support and monitor multi-year formula financial assistance awards to 56 grantees (50 states, the District of Columbia, and 5 U.S. Territories) made with FY 2017 and prior year funding, totaling between $50 million to $70 million. SEP will also complete another cycle of competitive financial assistance awards using FY 2017 funding (subject to final FY 2017 appropriations), and manage 32 to 50+ awards, totaling between $11 million and $16 million.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Electricity Delivery and Energy Reliability					
Transmission Reliability (formerly Clean Energy Transmission and Reliability	39,000	38,926	13,000	-26,000	-66.7%
Resilient Distribution Systems (formerly Smart Grid Research and Development	35,000	34,933	10,000	-25,000	-71.4%
Cybersecurity for Energy Delivery Systems	62,000	61,882	42,000	-20,000	-32.3%
Energy Storage	20,500	20,461	8,000	-12,500	-61.0%
Transformer Resilience and Advanced Components	5,000	4,990	5,000	0	0.0%
Transmission Permitting and Technical Assistance (formerly National Electricity Delivery)	7,500	7,486	6,000	-1,500	-20.0%
Infrastructure Security and Energy Restoration	9,000	8,983	9,000	0	0.0%
Program Direction	28,000	27,947	27,000	-1,000	-3.6%
Total, Electricity Delivery and Energy Reliability	**206,000**	**205,608**	**120,000**	**-86,000**	**-41.7%**

Appropriation Overview

Electricity Delivery and Energy Reliability (OE) leads the Department's efforts to strengthen, transform, and improve energy infrastructure so that consumers have access to reliable, secure, and clean sources of energy. OE provides solutions to market, institutional and operational failures that go beyond any one utility's ability to solve.[a] To accomplish this critical mission, OE works with private industry and Federal, state, local, and tribal governments on a variety of initiatives to modernize the electric grid.

Grid modernization is critical to achieving public policy objectives, sustaining economic growth, supporting environmental stewardship, and mitigating risks to secure the Nation. The goal for the future grid is to deliver reliable, affordable, and clean electricity to consumers where, when, and how they want it.

OE programs work in partnership with industry and other stakeholders as well as other DOE offices, to enhance key characteristics of the U.S. electric transmission and distribution systems:

- Reliability—consistent and dependable delivery of high quality power.
- Flexibility—the ability to accommodate changing supply and demand patterns and new technologies.
- Efficiency—low losses in electricity delivery and more optimal use of system assets.
- Resiliency—the ability to withstand and quickly recover from disruptions and maintain critical function.
- Affordability—more optimal deployment of assets to meet system needs and minimize costs.
- Security—the ability to protect system assets and critical functions from unauthorized and undesirable actors.

Within the appropriation, OE funds:

- Research and Development—pursuing early stage research for technologies to improve grid reliability, efficiency, flexibility, functionality, and security.
- Modeling and Analytics—developing core analytic, assessment, and engineering capabilities that can evolve as the technology and policy needs mature to support decision making within the Department and for stakeholders.
- Institutional Support and Technical Assistance—building capacity in the industry and convening stakeholders to coordinate efforts to transform the electric grid; providing technical assistance to states and regions to improve policies, utility incentives, state laws, and programs that facilitate the modernization of the electric infrastructure.
- Coordination of Federal Transmission Permits—streamlining permits, special use authorizations, and other approvals required under Federal law to site electric transmission facilities.
- Emergency Preparedness and Response—pursuing enhancements to the reliability, survivability, and resiliency of energy infrastructure, and facilitating faster recovery from disruptions to energy supply.

[a] Examples include wide-area visibility, identified from the 2003 Northeast blackout, and faster modeling and analysis, identified in the 2011 Southwest blackout.

Program Highlights

The FY 2018 Budget Request focuses OE's R&D efforts on cutting-edge early stage R&D, while maintaining a robust cybersecurity program.

- **Cybersecurity for Energy Delivery Systems**
  The request supports game-changing early stage R&D to mitigate cyber incidents in today's systems and to develop next-generation resilient energy delivery systems, as well as cyber threat information sharing providing a near-real-time capability for energy owners and operators. The request does not fund the Virtual Energy Sector Advanced Digital Forensics Analysis Platform, which completes implementation and begins transition to the private sector in 2017, the industry-scale electric grid test bed, or cyber and cyber-physical solutions for advanced control concepts for distribution and municipal utilities. The remainder of the CEDS budget includes an increase to establish an Energy Delivery System cybersecurity testing and analysis laboratory with a focus on supply chain vulnerabilities and risks, offset by a reduction due to completion of Cybersecurity Capability Maturity Model (C2M2) toolkit development. C2M2 is available online.

- **Transmission Permitting and Technical Assistance**
  The request assists state, regional, and tribal entities that wish to develop, refine, or otherwise change their electricity-related laws, regulations, policies, and programs. TPTA also implements a number of legal authorities, such as coordination of transmission permitting by Federal agencies, periodic transmission congestion studies, permitting of cross-border transmission lines, authorization of electricity exports, and supporting actions by the Secretary of Energy during electricity emergencies.

- **Infrastructure Security and Energy Restoration**
  The request supports coordination of a national effort to secure U.S. energy infrastructure against all hazards, reduce impacts from disruptive events, and assist with restoration activities. The proposal maintains capability to respond to energy sector emergencies through a regionalized volunteer delivery model and improves the Federal national energy infrastructure situational awareness and visualization capability provided by EAGLE-I. ISER will continue work on evolving threats and hazards and will explore public-private partnerships to focus and support capabilities at DOE National Laboratories that address cyber, physical, and supply chain vulnerabilities.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request*	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Fossil Energy Research and Development*					
CCS and Power Systems					
Carbon Capture	101,000	100,809	16,000	-85,000	-84.2%
Carbon Storage	106,000	105,800	15,000	-91,000	-85.8%
Advanced Energy Systems	105,000	104,800	46,000	-59,000	-56.2%
Cross-cutting Research	50,000	49,905	37,800	-12,200	-24.4%
Supercritical Transformational Electric Power	15,000	14,971	0	-15,000	-100.0%
Total, CCS and Power Systems	**377,000**	**376,285**	**114,800**	**-262,200**	**-69.5%**
Natural Gas Technologies	43,000	42,918	5,500	-37,500	-87.2%
Unconventional Fossil Energy Technologies from Petroleum - Oil Technologies	20,321	20,282	15,000	-5,321	-26.2%
Special Recruitment Programs	700	699	200	-500	-71.4%
NETL Research and Operations	73,713	73,573	78,100	+4,387	+6.0%
NETL Infrastructure	64,348	64,225	63,100	-1,248	-1.9%
Program Direction	52,918	52,817	58,478	+5,560	+10.5%
Subtotal Fossil Energy Research and Development	**632,000**	**630,799**	**335,178**	**-296,822**	**-47.0%**
Use of Prior Year Balances	0	0	-55,178	-55,178	N/A
Total, Fossil Energy Research and Development	**632,000**	**630,799**	**280,000**	**-352,000**	**-55.7%**

*FY 2016 and FY 2017 NETL Research and Development, NETL Infrastructure and Operations, and Program Direction funding is shown in the new, proposed FY 2018 structure.

Appropriation Overview

Fossil Energy Research and Development (FER&D) program advances technologies related to the reliable, efficient, affordable, and environmentally sound use of fossil fuels that are important to our Nation's security and economic prosperity. FER&D leads Federal research and development efforts on early-stage clean coal technologies and also develops technological solutions for the prudent and sustainable development of our domestic unconventional oil and gas resources.

Program Highlights

- **CCS and Power Systems** The CCS and Power Systems program supports secure, affordable, reduced emission fossil energy through early-stage research into technologies that can be further developed and scaled by industry to improve the cost competitiveness and performance of both new and existing plants.

  - **Carbon Capture**
    In FY 2018, the Carbon Capture subprogram will focus on transformational gas separation technologies that can significantly reduce the cost of CO_2 capture. These activities represent a shift away from 2nd generation capture technologies and R&D that is in later-stages of development such as small and large pilot projects. Transformational capture systems are considered to be a set of disruptive technologies that can significantly reduce the cost of capture, targeting a Cost of Electricity (COE) at least 30% less than SOTA (~$30/tonne). These transformational technologies will be able to adapt to the operational demands of advanced power systems and adjust to the increasing need for fossil fuel power plants to be load following electricity generators.

  - **Carbon Storage**
    In FY 2018 the Carbon Storage subprogram will focus on early-stage research across the portfolio. The Storage Infrastructure activity will focus on early-stage research efforts to understand the potential for the offshore oil, gas, and saline bearing formations to be serve as future storage reservoirs. The Advanced Storage R&D activity will focus on developing and validating storage monitoring, simulation and risk assessment technologies, advanced wellbore technologies to detect and mitigate wellbore issues from short/long term exposure of CO_2. The Carbon

wellbore technologies to detect and mitigate wellbore issues from short/long term exposure of CO_2. The Carbon Use and Reuse activity will focus on beneficial uses for captured CO2 and other waste hydrocarbon streams, other than enhanced hydrocarbon recovery. The Sub-Disciplinary Storage R&D activity will focus on assessment and validation of system models and their integration for quantifying risks through the National Risk Assessment Partnership and the collection and distribution of research data through the NETL EDX database.

- **Advanced Energy Systems (AES)**
  In FY 2018 the Advanced Energy Systems subprogram will shift its focus toward early-stage R&D within turbines, fuel cells, and gasification activities. Turbines and fuel cells will focus primarily on new materials and components to withstand variable operating conditions and harden these assets for grid reliability. Gasification systems will focus on the early-stage R&D on modular systems that will utilize new materials and computational modeling to design smaller more reliable and efficient reactors that industry can further scale up and ultimately manufacture with advanced manufacturing, opening up new areas of manufacturing within the U.S. and Global markets. Two new activities will be started to focus on early-stage R&D on novel technologies that with additional investment by industry could improve the plants performance and make the coal units more competitive with other sources of energy. Finally, the program will start an effort on the beneficiation of coal for the United State producers by developing a R&D database of coal combustion properties and properties on other plant process equipment.

- **Cross-cutting Research**
  The Cross-cutting Research program encompasses: 1) Sensors, Controls and Other Novel Concepts, 2) Cross-cutting Materials R&D, 3) Focus Areas for Computational Energy Sciences, 4) Water Management, and 5) Efforts that support University-based energy research. The Sensors, Controls and Other Novel Concepts activity focuses on the development and testing of sensors capable of providing real time measurements critical to the operation, optimization, reliability and efficiency of advanced power systems. Cross-cutting Materials R&D will focus its efforts to use computational tools to discover and design novel materials for fossil fuel applications. Water Management R&D will continue on innovative cooling technologies that offer potential increases in overall plant efficiencies. The University R&D program will merge the University Coal Research and University Turbines Advanced Research Program to enable more effective use of resources.

- **Natural Gas Technologies**
  The Natural Gas Technologies program addresses critical and emergent issues pertaining to the safe and environmentally sustainable supply of domestic natural gas. Specifically, the program's mission is to promote our Nation's energy independence through the prudent development, distribution and storage of our vast natural gas energy resources. The program is comprised of two subprograms: Natural Gas Infrastructure Research, and Gas Hydrates. Given the importance of natural gas in our energy system, it is critical to ensure the safety and reliability of related infrastructure to protect energy reliability, public health, and the environment. To that end, the Natural Gas Infrastructure Research subprogram conducts early-stage R&D on technologies that industry could advance to improve the reliability and operational efficiency of natural gas transmission, distribution, and storage facilities. In addition, while shale gas has been discovered in sufficient quantities to now support and warrant U.S. liquefied natural gas (LNG) exports, the most plentiful supplies of natural gas throughout the world may in fact be the methane molecules trapped in ice-like structures called hydrates. The Gas Hydrates subprogram supports unique early-stage research to evaluate the occurrence, nature, and behavior of the potentially enormous naturally-occurring gas hydrate resources within the U.S., with particular focus on the Arctic and Gulf of Mexico regions.

- **Unconventional Fossil Energy Technologies from Petroleum – Oil Technologies**
  The mission of the Unconventional Fossil Energy Technologies from Petroleum – Oil Technologies program is to advance open information and technologies that will better assure sustainable and responsible development of abundant domestic unconventional fossil energy resources, including tight and shale oil and natural gas. The prudent development of these natural resources is essential to ensuring the Nation's continued energy resilience and security. The Unconventional Fossil Energy Technologies Program is aligned with Administration priorities of enhancing domestic energy production and U.S. energy security.

- **NETL Research and Operations**
  The NETL Research and Development program is new for FY 2018. This restructuring of NETL operational lines is proposed to better describe NETL's funding requirements, increase consistency with other national laboratories, and increase transparency

in how funds are utilized, promoting enhanced visibility into cost drivers and more efficient resource allocation decisions. This program includes certain funds that were part of the former NETL Coal Research and Development program, the former Supercomputer line, and certain funds that were formerly in the NETL portion of Program Direction.

The NETL Research and Development program supports National Energy Technology Laboratory (NETL) research activities. The program is comprised of the following two subprograms: (1) Research and Development; and (2) Feasibility of Recovering Rare Earth Elements (REE). The FY 2018 Budget Request reflects an increased focus on innovative, early-stage research performed at NETL and reduces extramural FER&D collaborations for later-stage R&D. Reduced requirements for extramural research yields proportional reductions to technical support management functions.

The NETL high performance computer, Joule was commissioned in FY 2012. Given the rapid advances in computing technology, high-performance computers typically have an expected life cycle of approximately three years after which standard warranties run out, replacement parts are not readily available, and maintenance costs rapidly escalate. Increased funding is requested to cover the cost of replacing all of the out-of-warranty high-speed processors for one year through a leasing structure. Thanks to advances in technology, the computational power of the next generation equipment will be much greater. It is anticipated that the refresh will upgrade the processing speed from 0.5 pFLOPS to 5 pFLOPS, a 10-fold increase. The increase in funding allows NETL to lease and maintain a world-class supercomputer capable of using the most advanced software to enable key energy research.

- **NETL Infrastructure**
  The NETL Infrastructure and Operations program is new for FY 2018. This budget line includes the former Plant and Capital Equipment program as well as portions of the Environmental Restoration and Program Direction budget lines.

  The NETL Infrastructure and Operations program supports the upkeep of NETL's lab footprint in three geographic locations -- Morgantown, WV; Pittsburgh, PA; and Albany, OR. As part of Department's effort to operate more efficiently, this request includes the initial stages of a consolidation of this footprint. Recognizing the magnitude of this endeavor, the budget includes a phased approach to consolidation of NETL's Albany's research operations into NETL's Eastern sites and commissioning of a Mission Alignment study beginning in FY 2017.

  The NETL Infrastructure and Operations program is comprised of the following subprograms: (1) Site Operations and Maintenance; (2) Plant & Capital Equipment; and (3) Environmental Restoration.

- **Program Direction**
  Program Direction provides the funding for all headquarters personnel and operational expenses for FER&D. Also included is the Import/Export Authorization program, which will continue regulatory reviews and oversight of the transmission of natural gas across the U.S. borders. Program Direction at NETL continues to include functions that are necessary for the performance of NETL activities, such as legal, finance, and procurement.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR*	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Fossil Energy Petroleum Accounts					
Naval Petroleum and Oil Shale Reserves					
Production Operations**	13,330	---	2,900	-10,430	-78.2%
Management	4,170	---	2,000	-2,170	-52.0%
Total, Naval Petroleum and Oil Shale Reserves	**17,500**	**17,467**	**4,900**	**-12,600**	**-72.0%**
Strategic Petroleum Reserve					
Facilities Development and Operations	186,870	---	155,042	-31,828	-17.0%
Management for SPR Operations	25,130	---	24,958	-172	-0.7%
Total, Strategic Petroleum Reserve	**212,000**	**211,597**	**180,000**	**-32,000**	**-15.1%**
Northeast Home Heating Oil Reserve					
Northeast Home Heating Oil Reserve	7,600	---	6,500	-1,100	-14.5%
Total, Northeast Home Heating Oil Reserve	**7,600**	**7,586**	**6,500**	**-1,100**	**-14.5%**
SPR Petroleum Account					
SPR Petroleum Account**	0	---	8,400	+8,400	N/A
Total, SPR Petroleum Accounts	**0**	**0**	**8,400**	**+8,400**	**N/A**
Total, Fossil Energy Petroleum Accounts	**237,100**	**236,650**	**199,800**	**-37,300**	**-15.7%**
Energy Security & Infrastructure Modernization Fund (fully offset by crude oil sales)	**0**	**375,400**	**350,000**	**+350,000**	**N/A**

*FY 2017 amounts reflect the P.L. 114-254 continuing resolution level annualized to a full year. These amounts are shown only at the congressional control level and above, below that, a dash (-) is shown.
**New FY 2018 budget authority will be supplemented with the use of prior year balances.

Appropriation Overview

Fossil Energy Petroleum Accounts consists of three energy security programs, one SPR modernization program, and post-sale remediation activities at Naval Petroleum Reserve No. 1 and 3. The Strategic Petroleum Reserve storage sites are located at four government-owned Gulf Coast locations. Both the Northeast Home Heating Oil Reserve (NEHHOR) and the Northeast Gasoline Supply Reserve (NGSR) consist of Government-owned refined petroleum products stored in leased commercial storage in terminals in the Northeast. Legacy environmental clean-up/remediation continues at the previously-sold Naval Petroleum Reserve No. 1 (Elk Hills, California), and landfill remediation and closure continues as part of post-sale activities at Naval Petroleum Reserve No. 3 (Casper, Wyoming).

Program Highlights

- **Naval Petroleum and Oil Shale Reserves**
  Following the 1998 sale of the government's interests in NPR-1 (Elk Hills, CA), environmental cleanup/remediation activities under the Corrective Action Consent Agreement with the State of California Department of Toxic Substances Control (DTSC) began. Of the 131 Areas of Concern (AOCs) for which DOE is responsible for environmental cleanup, as of April 12, 2017, 51 AOCs have received No Further Action (NFA) certification from California's DTSC, 2 AOCs are being prepared by the Department for NFA certification based on data assessments, 36 AOCs are under DTSC review, 27 AOCs that have undergone an initial field work investigation now require additional testing, and 15 AOCs are awaiting field investigation or remediation activities.

- **Strategic Petroleum Reserve**
  The Strategic Petroleum Reserve (SPR) provides strategic and economic security against foreign and domestic disruptions in oil supplies via an emergency stockpile of crude oil. The program fulfills United States' obligations under the International Energy Program, which avails the U.S. of International Energy Agency (IEA) assistance through its coordinated energy emergency response plans, and provides a deterrent against energy supply disruptions. The FY

2018 Budget will support the SPR's operational readiness and drawdown capabilities of 4.16MB/d. The program will continue both the degasification of crude oil inventory at the West Hackberry site as well as the cavern wellbore diagnostic and remediation activities across all SPR sites to ensure the availability of the SPR's crude oil inventory.

In addition to the discretionary budget request, the Budget proposes to sell approximately 270 million barrels of SPR crude by 2027, leaving roughly half of the remaining SPR inventory after all sales currently authorized by law are completed (approximately 250–260 million barrels). Given the long-term trajectory of domestic energy production and transportation capabilities, a smaller SPR is projected to be able continue to meet international obligations and emergency needs. As sales progress, the proposal closes two of the four Gulf Coast SPR sites. Statutory changes are accordingly proposed to enable these SPR sales and maintain the SPR's operational effectiveness. The SPR Program will commence a comprehensive analysis to determine the long-term footprint and operations of the reserves.

- **Northeast Home Heating Oil Reserve**
  The Northeast Home Heating Oil Reserve (NEHHOR) FY 2018 Budget continues to maintain a 1 million barrel inventory of ultra-low sulfur distillate (ULSD), in three Northeast commercial storage terminals, as a short-term supplement to the Northeast systems' commercial supply of heating oil for deployment in the event of an emergency supply disruption. New commercial storage contracts went into effect on April 1, 2016. The Program will continue to focus its oversight and management on product quality analysis of the Reserve, as well as information technology support for the sales system.

- **SPR Petroleum Account**
  The SPR Petroleum Account funds SPR petroleum acquisition, transportation, and drawdown activities as well as the Northeast Gasoline Supply Reserve (NGSR). As a component of the SPR, the NGSR must follow the same statutory release authorities designed for the SPR, which incorporate national impact thresholds for release. Because the existing release threshold makes the NGSR operationally ineffective as a regional product reserve, and a cost-inefficient use of resources, the Budget proposes to disestablish the NGSR and sell its constituent 1,000,000 barrels of refined petroleum product during fiscal year 2018. The Budget funds the drawdown costs to support non-emergency, multi-year oil sales in FY 2018 as directed by Sections 403 and 404 of the Bipartisan Budget Act of 2015 (P.L. 114–74) and Section 5010 of the 21st Century Cures Act (P.L. 114–255).

  In addition to the discretionary budget request, the Budget proposes to sell approximately 270 million barrels of SPR crude oil by 2027. The proposal includes the sale of a sufficient number of barrels of SPR crude oil needed to raise at least $1,000,000,000 in total sales revenue for deficit reduction not later than fiscal year 2019 and subsequently proposes directed sales in fiscal years 2020 through 2027. Proceeds will be deposited in the General Fund of the Treasury during the fiscal year in which the sales occur.

- **Energy Security and Infrastructure Modernization Fund (ESIM)**
  The Energy Security and Infrastructure Modernization Fund was established in Section 404 of the Bipartisan Budget Act of 2015 to finance modernization of the Strategic Petroleum Reserve (SPR). Funding raised through crude oil sales will support Life Extension and Marine Terminal Enhancement programs. Life extension investments are needed to ensure the SPR can maintain its operational readiness capability, meet its mission requirements, and operate in an environmentally responsible manner. Marine Terminal Enhancements will increase the distribution capacity of the SPR through the addition of dedicated marine terminals within the SPR's distribution system. This FY 2018 funding level continues the financing structure of multi-year (2017 - 2020) oil sales that support an effective modernization program for the SPR. The Budget proposes to reduce the amount of sales available to fund modernization by half, as the SPR's long-term physical footprint is expected to decrease.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Nuclear Energy					
Integrated University Program	5,000	4,990	0	-5,000	-100.0%
STEP R&D	5,000	4,990	0	-5,000	-100.0%
SMR Licensing Technical Support	62,500	62,381	0	-62,500	-100.0%
Reactor Concepts RD&D	141,718	141,449	94,000	-47,718	-33.7%
Fuel Cycle R&D	203,800	203,413	88,500	-115,300	-56.6%
Nuclear Energy Enabling Technologies	111,600	111,388	105,360	-6,240	-5.6%
Radiological Facilities Management	24,800	24,753	9,000	-15,800	-63.7%
Idaho Facilities Management	222,582	222,159	204,140	-18,442	-8.3%
Idaho Sitewide Safeguards and Security	126,161	125,921	133,000	+6,839	5.4%
International Nuclear Cooperation	3,000	2,994	2,500	-500	-16.7%
Program Direction	80,000	79,848	66,500	-13,500	-16.9%
Total, Nuclear Energy	**986,161**	**984,286**	**703,000**	**-283,161**	**-28.7%**

Appropriation Overview

Nuclear Energy (NE) supports the diverse civilian nuclear energy programs of the U.S. Government, leading Federal efforts to research and develop nuclear energy technologies, including generation, safety, and security technologies, to help meet energy security, and proliferation resistance.

Program Highlights

- **Reactor Concepts Research, Development and Demonstration**
  FY 2018 activities will include cost-shared efforts to extend the life of the existing commercial nuclear reactor fleet through research in the areas of materials aging and degradation, safety margin characterization, and safety technologies; and research into advanced reactor technologies, such as fast reactor technologies and high temperature reactor technologies for the production of electricity and high temperature process heat to improve the economic competitiveness and safety of nuclear energy as a resource capable of meeting the Nation's energy, environmental and energy security goals. In FY 2018 the program will begin R&D to evaluate possible gaps in capabilities that would require a new test reactor.

- **Fuel Cycle Research and Development**
  The FY 2018 Budget Request supports progress towards developing one or more light water reactor fuel concepts with significantly enhanced accident tolerance, and high risk/high pay-off research such as advanced separation technologies with improved process control and accountability.

- **Nuclear Energy Enabling Technologies**
  The FY 2018 Budget Request supports R&D and strategic infrastructure investments to develop innovative and crosscutting nuclear energy technologies. This program includes a strong investment in modeling and simulation tools, and provides access to unique nuclear energy research capabilities through its Nuclear Science User Facilities (NSUF).

- **Radiological Facilities Management**
  The FY 2018 Budget Request supports the provision of fresh reactor fuel to, and removal of used fuel from, 25 operating university research reactors to support their continued operation. This provides continued test reactor capability to universities, coupled with research, development, and educational opportunities in support of U.S. nuclear energy initiatives.

- **International Nuclear Energy Cooperation**
  The FY 2018 Budget Request supports existing international engagement with advanced and developing nuclear energy countries in coordination with the Department of State and other agencies, and continues to advance multilateral collaboration with the International Atomic Energy Agency (IAEA), the Organisation for Economic Co-operation and

Development/Nuclear Energy Agency (OECD/NEA), the International Framework for Nuclear Energy Cooperation (IFNEC), and other fora focusing on concepts such as multinational cooperation on used fuel disposal

- **Idaho Facilities Management and Idaho Sitewide Safeguards and Security**
  Idaho Facilities Management program will continue investments at the ATR and Advanced Test Reactor Critical Facility (ATRC) to improve reliability and availability of the ATR, continue preliminary design activities and performance baseline development activities for the Sample Preparation Laboratory (SPL) Project, and resume operations at the Transient Reactor Test Facility (TREAT) following completion of readiness activities. The Idaho Sitewide Safeguards and Security program will complete critical physical security infrastructure investments, support physical security systems life-cycle replacements including installation of the Argus Host and Network Equipment upgrades, maintaining an effective cybersecurity program through the addition of lifecycle hardware/software upgrades and replacements including continuous monitoring, maintaining Industrial Control Systems, essential cybersecurity positions and associated training.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Yucca Mountain and Interim Storage Programs					
Yucca Mountain	0	0	90,400	+90,400	N/A
Interim Storage	0	0	6,600	+ 6,600	N/A
Program Direction	0	0	23,000	+23,000	N/A
Total, Yucca Mountain and Interim Storage	**0**	**0**	**120,000**	**120,000**	**N/A**

Appropriation Overview

The mission of the Yucca Mountain and Interim Storage program is to accelerate progress on fulfilling the Federal Government's obligations to address nuclear waste, enhance national security, and reduce future taxpayer burden. The FY 2018 Budget Request proposes funding from two separate appropriation accounts, Nuclear Waste Disposal ($90 million) and Defense Nuclear Waste Disposal ($30 million).

Program Highlights

- **Yucca Mountain and Interim Storage Programs**

  The FY 2018 Yucca Mountain and Interim Storage Programs' FY 2018 Budget Request is dedicated to resuming the NRC licensing process for Yucca Mountain and initiation of a robust interim storage program. Prior year activities that supported the participation of the Office of Civilian Radioactive Waste Management (OCRWM) in the NRC licensing process were suspended in FY 2010, but will be resumed under the FY 2018 Budget Request.

  This request provides for a program office to provide policy direction and perform functions necessary to the licensing process. This request provides for legal support to represent the Department in the licensing process, as well as to respond to litigation and other legal matters related to the Nuclear Waste Policy Act of 1982. It provides for technical and scientific support necessary to support an affirmative case for the license and to respond to any challenges to the license application. It also provides for the document management activities associated with the licensing process.

  The FY 2018 Budget Request includes funding to develop a robust interim storage enabling near-term consolidation of nuclear waste and safely storing it while a repository is completed.

- **Program Direction**

  The Program Direction budget has been structured to support both licensing and interim storage. Program Direction is needed for a variety of activities, including the salaries of Federal Employees working in furtherance of the NWPA.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request*	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Advanced Research Projects Agency - Energy					
Advanced Research Projects Agency - Energy Projects	261,750	261,252	0	-261,750	-100.0%
Program Direction	29,250	29,194	65,000	+35,750	122.2%
Subtotal, Advanced Research Projects Agency - Energy	**291,000**	**290,446**	**65,000**	**-226,000**	**-77.7%**
Use of Prior Year Balances	0	0	-45,000	-45,000	N/A
Total, Advanced Research Projects Agency - Energy	**291,000**	**290,446**	**20,000**	**-271,000**	**-93.1%**

*In FY 2018, new BA of $20M is requested, a total of $45M of existing funds are being reallocated to program direction, and $46.357M is being cancelled.

Appropriation Overview

As defined by its authorization under the America COMPETES Act of 2007, **Advanced Research Projects Agency-Energy (ARPA-E)** catalyzes transformational energy technologies to enhance the economic, environmental, and energy security of the United States. ARPA-E funded energy projects could advance the ways we generate, store, and use energy.

The Budget Request proposes to eliminate ARPA-E with operations winding down in 2018 and the office shutting down in FY 2019, at which point remaining monitoring and contract closeout activities would be transferred elsewhere within DOE. The Budget assumes that a plan will be developed in FY 2018 to ensure that prudent monitoring and management of ARPA-E contracts and responsible stewardship of taxpayer funds continues after the ARPA-E office closes. The FY 2018 Budget requests an appropriation of $20 million for Program Direction to fund wind down of operations. In addition, ARPA-E requests reallocation of $45 million of prior-year carryover balances from ARPA-E Projects to Program Direction. $8.9 million of the carryover balances will supplement the $20 million requested in FY 2018. The remaining $36.1 million in carryover balances will be used to complete office closure and cover the estimated cost to manage the current projects through completion from FY 2019 to FY 2021.

Program Highlights

The Budget assumes that a combination of the FY 2018 appropriations and carryover balances would be used to manage the current portfolio of approximately 300 projects to completion. In addition, all prior year Project funds would be executed according to prior year appropriations, with the exception of the balances that are requested to be cancelled or repurposed. This would result in the number of projects currently in the portfolio increasing slightly. ARPA-E fully funds projects up front and reimburses projects as costs are incurred. Current ARPA-E projects are funded until FY 2021 and require Federal oversight until completed. Thus, the Budget assumes that Federal oversight of these projects will continue elsewhere within DOE once ARPA-E shuts down. ARPA-E would begin to reduce both Federal and Contractor staff in FY 2018. All ARPA-E staff would either be terminated or transferred elsewhere in DOE by mid FY 2019.

Planned Activities

For FY 2018, the Budget requests $20 million in new program direction appropriations to manage existing projects while proposing to eliminate the program as described in the President's "America First – A Budget Blueprint to Make America Great Again."

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Title 17 - Innovative Technology Loan Guarantee Program					
Administrative Operations	42,000	41,920	2,000	-40,000	-95.2%
Loan Guarantee, Offsetting Collections	-25,000	-27,000	-2,000	+23,000	+92.0%
Total, Title 17 - Innovative Technology Loan Guarantee Program	**17,000**	**14,920**	**0**	**-17,000**	**-100.0%**
**Loan Subsidy Rescission	0	0	-383,433	-383,433	N/A

Appropriation Overview

Innovative Technology Loan Guarantee Program (LGP), as authorized under Title XVII of the Energy Policy Act of 2005 and executed by the Department of Energy's (DOE) Loan Programs Office (LPO), encourages early commercial use of new or significantly improved technologies in energy projects. Projects supported by DOE loan guarantees must avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; employ new or significantly improved technologies compared to commercial technologies in service in the United States at the time the guarantee is issued; and offer a reasonable prospect of repayment of the principal and interest on the guaranteed obligation.

The Budget eliminates the Title XVII program and proposes to cancel all remaining loan volume authority and $383 million in unobligated credit subsidy appropriated under The American Reinvestment and Recovery Act of 2009 (Public Law 111–5). In addition to $2,000,000 in appropriation offset by $2,000,000 in collections, the Loan Programs Office will utilize unobligated balances carried forward from prior year appropriations to cover loan portfolio monitoring and administrative expenses; including salaries for its full time employees as well as the cost of outside advisors for financial, legal, engineering, credit, and market analysis in addition to the cost of monitoring the existing portfolio. All activities not essential for the continued monitoring of the portfolio will be terminated. The LPO will wind down operations in FY 2018 with the expectation that it will shut down in FY 2019 with remaining loan monitoring and closeout activities transferred to another office.

Program Highlights

LPO's final FY 2018 appropriation request is $0, which includes $2,000,000 in appropriation for administrative budget and approximately $2,000,000 in offsetting collections.

- The loan authority provided in prior year appropriations Acts for commitments to guarantee loans under title XVII of the Energy Policy Act of 2005 is cancelled, with the exception of potential obligations made before October 1, 2017.
- LPO will continue to manage its existing portfolio of assets.
- Prior year funds will support LPO's administrative expenses to monitor its existing portfolio.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Advanced Technology Vehicles Manufacturing Loan Program					
Administrative Expenses	6,000	5,989	0	-6,000	-100.0%
Total, Advanced Technology Vehicles Manufacturing Loan Program	**6,000**	**5,989**	**0**	**-6,000**	**-100.0%**
**Loan Subsidy Rescission	0	0	-4,311,615	-4,311,615	N/A

Appropriation Overview

Advanced Technology Vehicles Manufacturing (ATVM) Loan Program supports the manufacturing of advanced technology vehicles and associated components in the United States. ATVM provides loans to automobile and automobile part manufacturers for the cost of re-equipping, expanding, or establishing manufacturing facilities in the United States to produce advanced technology vehicles or qualified components and for associated engineering integration costs.

The Budget eliminates the ATVM Loan Program and proposes to cancel all remaining loan volume authority and appropriated credit subsidy. The Loan Programs Office will utilize unobligated balances carried forward from prior year appropriations to cover loan portfolio monitoring and administrative expenses: including salaries for its full time employees as well as the cost of outside advisors for financial, legal, engineering, credit, and market analysis in addition to the cost of monitoring the existing portfolio. All activities not essential for the continued monitoring of the portfolio will be terminated. This program is being eliminated in the FY 2018 Budget in accordance with Administration priorities, including the focusing of resources toward early-stage research and development. The Loan Programs Office will wind down operations in FY 2018 with the expectation that it will shut down in FY 2019 with remaining loan monitoring and closeout activities transferred to another office.

Program Highlights

LPO is requesting no FY 2018 appropriation for its administrative budget.

- The direct loan authority provided under section 129 of the Consolidated Security, Disaster Assistance, and Continuing Appropriations Act, 2009 is permanently cancelled.
- LPO will continue to manage its existing portfolio of assets.
- Prior year funds will support LPO's administrative expenses to monitor its existing portfolio.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Energy Information Administration					
National Energy Information System	122,000	121,768	118,000	-4,000	-3.3%
Total, Energy Information Administration	**122,000**	**121,768**	**118,000**	**-4,000**	**-3.3%**

Appropriation Overview

U.S. Energy Information Administration (EIA) is the statistical and analytical agency within the U.S. Department of Energy (DOE). EIA collects, analyzes, and disseminates independent and impartial energy information and analysis to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. EIA is the nation's premier source of energy information and, by law, its data, analyses, and forecasts are independent of approval by any other officer or employee of the U.S. Government.

EIA conducts a wide range of data collection, analysis, forecasting, and dissemination activities to ensure that its customers, including Congress, federal and state government, the private sector, the broader public, and the media, have ready access to timely, reliable, and relevant energy information. This information is essential to inform a wide range of energy-related decisions, including utilization strategies; availability of energy sources; business and personal investment decisions; and policy development.

Program Highlights

EIA has evolved its program in recent years to provide an expanding customer base with coverage of increasingly complex and interrelated energy markets. For example, EIA has addressed new energy developments such as the advent of shale gas, tight oil, and distributed solar, as well as the changing economics of nuclear energy, and the removal of restrictions on U.S. crude oil exports. The agency's ability to adapt to a changing industry landscape has been essential to the nation's ongoing dialogue on important energy issues.

The FY 2018 budget request enables EIA to maintain recent program enhancements, continue most core statistical and analysis activities, and follow through on planned cybersecurity initiatives. However, it would not be able to keep pace in addressing key emerging energy issues, including:

- **Data and analysis of important U.S. regional issues**: Key topic areas include electricity transmission infrastructure and modernization initiatives, the economics of existing nuclear generators, and more granular crude oil and petroleum product supply information, including through ongoing collaboration with producing states as part of the National Oil and Gas Gateway.

- **Energy consumption information**: More timely, relevant energy consumption information through the use of alternative data collection modes to increase operational efficiency and integrate new data such as "behind the meter" measurements of electricity consumption by individual devices and appliances from a representative sample of homes and businesses.

- **Modeling:** Develop new models for global hydrocarbon supply and international electricity markets to account for the growing importance of foreign markets, including export markets for natural gas, in determining U.S. energy market conditions.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Environmental Management by Site					
Carlsbad/Waste Isolation Pilot Plant (WIPP)	304,838	304,259	323,041	+18,203	+6.0%
Idaho	401,919	401,154	359,226	-42,693	-10.6%
Oak Ridge	468,407	468,918	390,205	-78,202	-16.7%
Paducah	268,402	266,459	270,203	+1,801	+0.7%
Portsmouth	288,970	382,117	417,936	+128,966	+44.6%
Richland/Hanford	990,653	988,769	800,422	-190,231	-19.2%
River Protection	1,414,000	1,411,311	1,504,311	+90,311	+6.4%
Savannah River	1,336,566	1,334,025	1,447,591	+111,025	+8.3%
Lawrence Berkley National Laboratory	17,000	16,967	0	-17,000	-100.0%
Lawrence Livermore National Laboratory	1,366	1,363	1,175	-191	-14.0%
Nevada	62,385	62,267	60,136	-2,249	-3.6%
Sandia National Laboratories	2,500	2,495	2,600	+100	+4.0%
Separation Process Research Unit (SPRU)	0	0	1,800	+1,800	N/A
West Valley Demonstration Project	61,804	62,506	63,683	+1,879	+3.0%
Brookhaven	0	0	2,000	+2,000	N/A
Energy Technology Engineering Center	10,459	10,439	9,000	-1,459	-13.9%
Los Alamos	185,000	184,648	191,629	+6,629	+3.6%
Moab	38,644	38,571	35,315	-3,329	-8.6%
Excess Facilities	0	0	225,000	+225,000	N/A
Other Sites	14,389	14,362	4,889	-9,500	-66.0%
Headquaters Operations	16,279	16,249	43,173	+26,894	+165.2%
Technology Development	20,000	19,962	25,000	+5,000	+25.0%
Uranium Thorium Reimbursements	32,959	32,959	30,000	-2,959	-9.0%
Program Direction	281,951	281,415	300,000	+18,049	+6.4%
Total, Environmental Management	**6,218,491**	**6,301,215**	**6,508,335**	**+289,844**	**+4.7%**

Appropriation Overview

Office of Environmental Management (EM) supports the Department of Energy (DOE) to meet the challenges of the nation's Manhattan Project and Cold War legacy responsibilities.

EM was established in 1989 and is responsible for the cleanup of millions of gallons of liquid radioactive waste, thousands of tons of spent (used) nuclear fuel and nuclear materials, disposition of large volumes of transuranic and mixed/low- level waste, huge quantities of contaminated soil and water, and deactivation and decommissioning of thousands of excess facilities. This environmental cleanup program results from six decades of nuclear weapons development and production and Government-sponsored nuclear energy research. It involves some of the most dangerous materials known to humankind. To date, EM has completed cleanup activities at 91 sites in 30 states and in the Commonwealth of Puerto Rico. EM is currently responsible for cleaning up the remaining 16 sites in 11 states.

Program Highlights

- **Savannah River**
  At the Savannah River Site, the largest portion of the FY 2018 Request supports the Liquid Tank Waste Management Program. The liquid waste tanks pose the highest public, worker, and environmental risk at the site; therefore, stabilization and preparation for disposal are a high priority. The project scope includes the operation of the Defense Waste Processing Facility and management of the tank farms. In addition, the Request supports commissioning and startup of the Salt Waste Processing Facility, design and construction of Saltstone Disposal Unit #7, design activities for Saltstone Disposal Unit # 8 and 9 and operation of the Actinide Removal Process and Modular Caustic Side Extraction Unit. This unit will be needed until the Salt Waste Processing Facility begins operation. The FY 2018 Request supports the operations of the Saltstone Facility and the Effluent Treatment

Facility. The request also supports the Savannah River Site to maintain H Canyon/HB Line in a safe condition, provides safe, secure storage for spent (used) nuclear fuel in L-Area, supports continuity of K-Area operations to include maintaining the K-Area adequately, and store special nuclear material safely and securely. The increase over the FY 2016 Enacted level provides additional support leading to startup of Salt Waste Processing Facility in 2018; continued surveillance and maintenance of the F Area Complex Facilities (F Canyon, FB Line and 235 F) and the Receiving Basin for off-site Fuels Facility; and additional funding for Salt Disposal Unit #8 and 9 activities.

- **Office of River Protection**
  The Office of River Protection's primary goal is the safe management and treatment of approximately 56 million gallons of radioactive liquid waste currently stored in 177 underground storage tanks at Hanford. Its mission includes operation, maintenance, engineering, and construction activities in the tank farms, as well as managing a multi-year construction project to build a Waste Treatment and Immobilization Plant to process and immobilize the tank waste in a solid glass form that is safe for permanent disposal. The FY 2018 Request reflects continued progress toward important cleanup required by the Consent Decree and Tri-Party Agreement. It will maintain safe operations for the tank farms; achieve progress in meeting regulatory commitments; support the development of facilities necessary to enable waste treatment operations; continue construction focus on the Low-Activity Waste Facility, Balance of Facilities, and Analytical Laboratory; resolve significant technical issues with the Pretreatment facilities; and protect workers, the public, and the environment. The FY 2018 Request includes funding for Waste Treatment and Immobilization Plant ($690,000,000) and Low Activity Waste Pretreatment System ($93,000,000). The mission of the Waste Treatment and Immobilization Plant Project is to construct a treatment facility to blend waste from the tank farms with molten glass and then pour it into stainless steel canisters suitable for long-term storage (in the case of high-level waste) and disposal (in the case of low-level waste). The mission of the Low Activity Waste Pretreatment System is to remove tank waste solids and cesium in order to supply a low activity waste feed stream directly to the Low Activity Waste Facility.

- **Richland**
  The Richland Operations Office manages all cleanup activities at Hanford not managed by the Office of River Protection, while also providing site-wide services shared by the two offices. Cleanup activities include soil and groundwater remediation, facility decontamination and decommissioning, stabilization and disposition of nuclear materials and spent nuclear fuel, and disposition of waste other than the tank waste managed by the Office of River Protection. Richland's FY 2018 Request represents continued achievement of important cleanup progress required by the Tri-Party Agreement. It will maintain Richland safe operations; provide Hanford site-wide services; continue groundwater remediation; operate waste management facilities; support certification of large/small container contact-handled transuranic mixed low-level waste or remote-handled transuranic mixed low-level waste; continue K-Area decontamination and decommissioning remediation; and support K- West Basin sludge removal progress. The decrease from the FY 2016 Enacted level reflects the decommissioning and demolition of the Plutonium Finishing Plant facilities to slab-on-grade, and completed scope and facility modifications to prepare for installation of sludge removal systems for the K West Basin.

- **Oak Ridge**
  At Oak Ridge, the FY 2018 Request will maintain EM facilities in a safe, compliant, and secure manner; operate EM waste management facilities such as the on-site disposal facility, sanitary landfills, and liquid, gaseous and waste operations at Oak Ridge National Laboratory; continue development of Comprehensive Environmental Response, Compensation and Liability Act documentation for the new On-Site Disposal Facility; continue demolition of remaining facilities at East Tennessee Technology Park; and finalize design and initiate early site preparation activities for the Outfall 200 Mercury Treatment Facility at the Y-12 National Security Complex. The processing of legacy transuranic waste debris will continue at the Transuranic Waste Processing Center and technology maturation and design will continue for the Sludge Processing Facility Buildout project. The request also supports continued preparation of Building 2026 to support processing of the remaining U-233 materials at Oak Ridge National Laboratory. The decrease from the FY 2016 Enacted level is attributed to completion of risk reduction activities to abate hazards and stabilize excess facilities at Y-12; and completion of the Consolidated Edison Solidification Project Uranium-233 direct disposal campaign.

- **Idaho**
  The Idaho Cleanup Project is responsible for the treatment, storage, and disposition of a variety of radioactive and hazardous waste streams, including removal and disposition of targeted buried waste sitting above the Snake River Plain Aquifer. The project is also responsible for removing or deactivating unneeded facilities, and removing DOE's inventory of spent (used) nuclear fuel and high-level waste from Idaho. Idaho's FY 2018 Request will support key requirements to continue progress in meeting the Idaho Settlement Agreement commitments. These include supporting operations of the Advanced Mixed Waste Treatment Project to process transuranic and mixed low level wastes and continuing progress towards closing the tank farm, including sodium bearing waste. The FY 2018 Request will also continue progress toward buried waste exhumation under the Accelerated Retrieval Project; exhumations at seven out of nine retrieval areas have been completed and, with FY 2018 funding, the project will complete exhumations at the eighth retrieval area and continue exhumations at the ninth retrieval area. The funding request also supports planning activities for the receipt of offsite spent (used) nuclear fuel from foreign and domestic research reactors, and supports fuel transfers from wet storage to dry storage. Also supports commissioning and start-up of the Integrated Waste Treatment Unit. The decrease from the FY 2016 Enacted level is attributed to progress in legacy waste treatment, completion of retrieval in the aboveground transuranic waste storage area, and efficiencies in waste exhumation.

- **Carlsbad**
  The Carlsbad Field Office is responsible for managing the National Transuranic Waste Program and the Waste Isolation Pilot Plant (WIPP), the Nation's only mined geologic repository for the permanent disposal of defense-generated transuranic waste. The FY 2018 Request will continue WIPP operations including waste emplacements, shipments, maintaining enhancements/improvements established in response to various reports and required actions, and progression of the line item capital asset projects. Line item projects are 15-D-411, Safety Significant Confinement Ventilation System ($43,000,000) and 15-D-412, Exhaust Shaft ($19,600,000) to increase airflow in the WIPP underground for simultaneous mining and waste emplacement operations. The FY 2018 Request also supports the Central Characterization Project and maintains shipping capability between the generator sites and WIPP and inter-site shipments using Type B transportation containers, including maintenance and support for transportation containers. Waste characterization at DOE waste generator sites will be funded by their respective site. Waste characterization certification of legacy transuranic waste at Savannah River Site, Oak Ridge National Laboratory, and Los Alamos National Laboratory will be funded by the Waste Isolation Pilot Plant, whereas the Idaho National Laboratory funds its waste characterization certification. The increase from the FY 2016 enacted levels is attributed to the completion of the WIPP recovery effort and resumption of waste emplacement in FY 2017, activities required to sustain corrective actions implemented during the recovery effort, and activities to increase operations to a rate of up to four shipments a week.

- **Paducah**
  The Paducah site is responsible for a multifaceted portfolio of processing and cleanup activities. The site operates one of two depleted uranium hexafluoride (DUF6) conversion facilities in the EM portfolio, with the Paducah facility expected to continue operations for approximately thirty years. Additionally, Paducah manages high-priority groundwater remediation; deactivation and decommissioning of excess facilities; and disposition of mixed and low-level waste, all with close involvement of local community stakeholders. In addition to ongoing environmental cleanup and DUF6 operations, Paducah's FY 2018 Budget Request supports activities to continue the environmental remediation and further stabilize the gaseous diffusion plant. The stabilization activities include non-destructive characterization, facility modifications, surveillance and maintenance, and activities to remove hazardous materials. The request also supports completion of the Northeast Plume Optimization project, and initiation of C-400 Cleaning Building demolition.

- **Portsmouth**
  The FY 2018 Budget Request will support the deactivation and decommissioning project at the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio. The majority of the Request will be used for deactivation and decommissioning of gaseous diffusion plant ancillary facilities and systems, disposal of waste, small equipment removal, utility optimizations, and hazardous material abatement. The FY 2018 Request also includes funding for design and construction of an on-site landfill for the disposal of waste that is expected to be generated from the demolition of the Portsmouth Gaseous Diffusion Plant and associated facilities. In addition, the request will continue progress on the deactivation and decommissioning of the Portsmouth Gaseous Diffusion Plant and support safe operation of the site's Depleted Uranium Hexafluoride Conversion Facility. The increase from the FY 2016 Enacted level supports construction of the On-Site

Waste Disposal Facility project and additional investments in nuclear facility decontamination and decommissioning.

- **Excess Facilities**
  The FY 2018 Request positions EM to begin to deactivate and decommission specific high-risk excess contaminated facilities at the Y-12 National Security Complex and Lawrence Livermore National Laboratory.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR*	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Environment, Health, Safety and Security Mission Support					
Environment, Health, Safety and Security Mission Support	118,763	-	130,693	+11,930	+10.0%
Program Direction	62,235	-	68,765	+6,530	+10.5%
Total, Environment, Health, Safety and Security Mission Support	**180,998**	**180,654**	**199,458**	**+18,460**	**+10.2%**

*FY 2017 amounts reflect the P.L. 114-254 continuing resolution level annualized to a full year. These amounts are shown only at the congressional control level and above, below that level, a dash (-) is shown.

Appropriation Overview

Environment, Health, Safety and Security (EHSS) supports DOE's commitment to maintain a safe and secure work environment for all Federal and contractor employees; ensures operations do not adversely affect the health and safety of surrounding communities; and protects the national security and other entrusted assets. EHSS is central to achieving DOE's mission in a safe, secure, environmentally responsible manner by providing consistent policy, technical assistance, and corporate leadership for environment, health, safety and security program areas.

Program Highlights

- **Environment, Health and Safety**
  EHSS provides technical and analytical expertise to protect and enhance the safety of all DOE workers, the public, and the environment in support of Departmental missions and goals. EHSS maintains policies and guidance that promote safe, environmentally sustaining work practices in the areas of occupational, facility, nuclear, and radiation safety; environment; and quality assurance. EHSS provides technical assistance to DOE program and site offices and laboratories through activities such as nuclear facility safety bases reviews and corporate-wide services such as accrediting commercial laboratories used by DOE sites for regulatory compliance and employee radiological monitoring programs. EHSS also manages the Employee Concerns program, which manages and provides a DOE enterprise approach to ensure that employee concerns related to environment, health, safety and security and the management of DOE and NNSA programs and facilities are addressed. EHSS supports Departmental and national preparedness and response efforts associated with radiation emergencies and accidents. Health activities support domestic and international research on exposures of workers and the public to nuclear, radiological, and other hazardous materials. EHSS provides health and environmental services to the people of the Marshall Islands; and medical screenings for former DOE and DOE-related vendor employees, and supports the Department of Labor in implementation of the Energy Employee Occupational Illness Compensation Program Act.

- **Security**
  EHSS provides technical security and analytical expertise to develop and assist in the implementation of safeguards and security programs that protect national security assets entrusted to DOE; and to implement the U.S. Government nuclear weapons-related technology classification and declassification program. EHSS maintains policies and guidance related to physical protection, personnel and information security and nuclear materials accountability, in order to be responsive to national security needs and evolving threats. EHSS provides technical assistance to DOE programs, site offices and laboratories to implement cost effective security measures tailored to the mission. EHSS maintains corporate security-related information management systems to determine the potential for an undue risk to individual sites, DOE, and national security. EHSS provides for the protection of DOE Headquarters facilities and access authorizations for DOE Headquarters personnel.

- **Program Direction**
  Provides Federal staffing, travel, support services and other resources required for execution of EHSS program activities and provides technical support for liaison activities with the Defense Nuclear Facilities Safety Board.

($K)

	FY 2016 Current	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Office of Enterprise Assessments					
Enterprise Assessments	24,068	24,022	24,068	0	N/A
Program Direction	49,466	49,372	50,863	+1,397	+2.82%
Total, Office of Enterprise Assessments	**73,534**	**73,394**	**74,931**	**+1,397**	**+1.90%**

Appropriation Overview

Office of Enterprise Assessments (EA) supports the President's and Secretary of Energy's priorities for the United States nuclear security enterprise, strengthening the Department of Energy (DOE or Department) cybersecurity protections, cleaning up contaminated sites, and other infrastructure and science missions. EA provides independent assessments for the DOE senior leadership that report on whether national security material and information assets are appropriately protected; and whether Departmental operations provide for the safety of its employees and the public. In addition, EA implements Congressionally authorized contractor enforcement programs, operates the DOE National Training Center (NTC), and maintains collaborative relationships within and outside the Department. Because EA reports directly to the Office of the Secretary, it is organizationally independent of the DOE entities that develop and implement security and safety policy and programs and can therefore provide a "check and balance," by objectively: 1) observing and reporting on the performance of DOE Federal and contractor organizations' implementation of security and safety policies and programs, 2) applying enforcement actions to contractor organizations for poor performance in adhering to legally enforceable security and safety requirements, and 3) developing and delivering security and safety training programs that reflect best practices and lessons learned from EA independent assessments to enhance workforce performance. EA activities complement, but do not replace the responsibility of DOE line management - reporting through the Under Secretaries - to ensure compliance with security and safety requirements.

Program Highlights

EA's key initiatives in FY 2018 are:

- Strengthening the Department's ability to protect national security assets (special nuclear material [SNM], controlled unclassified information, and classified matter) by:
  - Conducting comprehensive independent security performance assessments and follow-up assessments at DOE National Security / Category I SNM sites (those with high value assets),
  - Utilizing "limited notice" performance tests to provide accurate, up-to-date assessments of DOE site security response capabilities, and
  - Increasing focus on insider threats from employees who may seek to compromise National security and/or the ability of the Department to meet its mission goals.
- Protecting the Department's information systems by conducting and reporting on the results of comprehensive independent cybersecurity performance assessments and unannounced "red team" performance testing to improve systems against external and internal attacks.
- Supporting the Department's nuclear weapons complex and cleanup operations by conducting nuclear safety, worker safety and health, and emergency management performance assessments of:
  - High hazard nuclear construction projects and operations, e.g., at the Los Alamos National Laboratory, Y-12 National Security Complex, Savannah River Site, Hanford Site, and Idaho National Laboratory, and
  - The Waste Isolation Pilot Plant in support of resumed operations.
- Supporting and promoting secure and safe operations throughout the Department by:
  - Maintaining and operating the NTC, providing relevant security and training programs, and implementing the training reciprocity program to enhance performance and increase operational efficiency and effectiveness across the Department, and
  - Administering the DOE contractor Enforcement Program for violations of the Department's security and safety regulations.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Office of Legacy Management					
Legacy Management	154,080	153,787	137674	-16,406	-10.6%
Program Direction	13,100	13,075	16932	+3,832	+29.3%
Total, Office of Legacy Management	**167,180**	**166,862**	**154,606**	**-12,574**	**-7.5%**

Appropriation Overview

Office of Legacy Management (LM) ensures the long-term protection of human health and the environment after site cleanup is completed. LM's responsibilities include DOE closure sites, former uranium mills, sites in the Formerly Utilized Sites Remedial Action Program (FUSRAP), and selected sites conveyed to DOE under other authority. LM also funds the pensions and post-retirement benefits for former contractor personnel after site closure.

The LM program supports the Department of Energy (DOE) efforts to meet the challenges of the Nation's Manhattan Project and Cold War legacy responsibilities by employing effective management and refining operational and support capabilities to pursue departmental missions.

Program Highlights

The majority of LM's activities are long term and focus on maintaining the Department's legal, regulatory, community, and contractual commitments. Management of closure site activities by LM enables other DOE programs to focus on risk reduction and site closure. By the end of FY 2018, LM expects to have responsibility for long-term management of 97 sites. LM's functions span both physical and human resources. In the physical environment, LM conducts long-term surveillance and maintenance of environmental remedies (e.g., groundwater monitoring and disposal cell maintenance) to protect human health and the environment. For each of the sites LM maintains both the physical and electronic records and responds to over 1,600 requests for information each year. LM is responsible for the pension plan contributions and post-retirement benefits (e.g., medical and life insurance) for former contractor workers from eight sites. In addition, LM manages the sites' natural resources, promotes reuse, is responsible for the Department's uranium leasing program and, where possible, transfers sites to external parties.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Office of Hearings and Appeals					
Office of Hearings and Appeals	5,500	5,490	5,605	+105	+1.9%
Total, Office of Hearings and Appeals	**5,500**	**5,490**	**5,605**	**+105**	**+1.9%**

Appropriation Overview

Office of Hearings and Appeals (OHA) is the central administrative adjudicatory body for the Department of Energy. OHA's jurisdiction includes conducting evidentiary hearings to determine an employee's eligibility for a security clearance, Freedom of Information Act and Privacy Act appeals, and requests for exception relief from DOE regulations and orders, such as regulatory relief from the appliance energy efficiency standards. OHA also offers alternative dispute resolution (ADR) services such as mediation for a variety of matters. OHA utilizes video teleconferencing to conduct hearings at DOE field sites in order to reduce travel and other costs.

Program Highlights

Over the last eight years, OHA has reduced its case-processing time in all areas of its jurisdiction without compromising the high quality of its decisions. The Request supports salaries and benefits for 22 FTEs operating in OHA's Personnel Security and Appeals Division, Employee Protection and Exceptions Division, and the Alternative Dispute Resolution Office.

($K)

	FY 2016 Enacted	FY 2017 Annualized	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Departmental Administration					
Office of the Secretary	5,008	4,998	5,300	+292	+5.8%
Congressional and Intergovernmental Affairs	6,300	6,288	6,200	-100	-1.6%
Public Affairs	3,431	3,424	6,589	+3,158	+92.0%
General Counsel	33,000	32,937	33,000	0	0
Economic Impact and Diversity	10,000	9,981	10,000	0	0
Chief Financial Officer	47,024	46,935	48,484	+1,460	+3.1%
Office of Technology Transitions	0	0	6,876	+6,876	N/A
Chief Human Capital Office	24,500	24,453	25,500	+1,000	+4.1%
Office of Indian Energy Policy and Programs	16,000	15,970	10,000	-6,000	-37.5%
Energy Policy and Systems Analysis	31,297	31,238	10432	-20,865	-66.7%
International Affairs	18,000	17,966	18,878	+878	+4.9%
Office of Small and Disadvantaged Business Utilization	3,000	2,994	3,000	0	0
Management	65,000	64,876	53,758	-11,242	-17.3%
Project Management Oversight and Assessment	0	0	15,192	+15,192	N/A
Strategic Partnerships Projects	40,000	39,924	40,000	0	0
Chief Information Officer	73,218	73,079	91,443	+18,225	+24.9%
Subtotal, Departmental Administration (Gross)	**375,778**	**375,063**	**384,652**	**+8,874**	**+2.4%**
Adjustments					
Use of Prior Year Balances	-8,800	-8,783	0	+8,800	+100.0%
Defense-Related Administration Support	-118,836	-118,610	-143,000	-24,164	-20.3%
Subtotal, Adjustments	**-127,636**	**-127,393**	**-143,000**	**-15,364**	**-12.0%**
Miscellaneous Revenues					
Revenues Associated with SPP	-40,000	-39,924	-40,000	0	0
Other Revenues	-77,171	-77,024	-56,000	+21,171	+27.4%
Subtotal, Miscellaneous Revenues	**-117,171**	**-116,948**	**-96,000**	**+21,171**	**+18.1%**
Total, Departmental Administration (Net)	**130,971**	**130,722**	**145,652**	**+14,681**	**+11.2%**

Appropriation Overview

Departmental Administration (DA) appropriation funds 16 management and mission support organizations that have enterprise-wide responsibility for administration, accounting, budgeting, contract and project management, congressional and intergovernmental liaison, domestic and international energy policy, information management, life-cycle asset management, legal services, workforce diversity and equal employment opportunity, ombudsman services, small business advocacy, sustainability, and public affairs, Indian energy policy and technology transitions.

The DA appropriation also budgets for Strategic Partnership Projects of expenses and collections resulting in a net offset, and receives Miscellaneous Revenues from other sources. Additionally, the DA appropriation receives funding from the Other Defense Activities (ODA) appropriation, Defense-Related Administrative Support (DRAS), which is used to offset expenses within the DA appropriation that support defense-funded administrative support activities at DOE.

Program Highlights

In FY 2018, the DA Budget reflects a dedication to strengthen enterprise-wide management and mission support functions, as outlined below:

- **Office of Management (MA):** The FY 2018 Request level reflects the transfer of $15,192,000 and 34 FTEs from MA to the newly established Project Management Oversight and Assessment Office (PM), which will better enable DOE to conduct independent reviews of projects greater than $100,000,000, conduct cost estimating and program evaluation, and perform other critical DOE-wide functions.

- **Chief Information Officer (CIO):** The $19,856,000 increase supports replacement of legacy network infrastructure, consolidation of data centers and enterprise e-mail as well as the implementation of other Administration priorities.

- **Chief Financial Officer (CFO):** The increase of $1,460,000 above the FY 2016 Enacted level as a result of the transfer of $1,484,000 and 12 FTE from the Office of Science for the consolidation of Oak Ridge financial payment operations into CFO.

- **Transfers from EERE to DA:** International Affairs (IA) will increase by $878,000 more than the FY 2016 Enacted due to the transfer of Energy Efficient and Renewable Energy's (EERE) International Office, including 8 FTEs. Staff transferred from EERE will be positioned in IA's HQ and regional offices to assist with international activities related to renewable power and energy efficiency. In addition, Public Affairs (PA) includes a $3,158,000 increase from FY16 Enacted for the transfer of communication functions and personnel from EERE Communications to PA.

- **Energy Policy and Systems Analysis (EPSA):** The decrease of $20,865,000 is in an effort to eliminate redundancies and increase efficiencies across the Department, EPSA's activities will be phased out during FY 2018 in order to close the program by the end of the fiscal year.

- The DA Request also includes the **Office of Technology Transitions (OTT)** ($6,876,000) and the **Office of Indian Energy Policy and Programs** ($10,000,000).

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Office of the Inspector General					
Office of the Inspector General	46,424	44,336	49,000	+2,576	+5.5%
Total, Office of the Inspector General	**46,424**	**44,336**	**49,000**	**+2,576**	**+5.5%**

Appropriation Overview

Office of the Inspector General (OIG) reviews the integrity, economy and efficiency of DOE programs and operations, including the National Nuclear Security Administration and the Federal Energy Regulatory Commission. The OIG has the authority to inquire into all DOE programs and activities as well as related activities. Audits, inspections, investigations and other reviews are used to detect and prevent fraud, waste, abuse, and violations of law.

The Federal Information Security Modernization Act of 2014 directs the OIG to conduct an annual evaluation of DOE's information security systems. The OIG is also charged with reviewing the Department's efforts to eliminate improper payments, in conformance with the Improper Payments Elimination and Recovery Act of 2010. The OIG routinely conducts reviews of the most significant management challenges facing the Department, to include its Environmental Management programs. In addition, the OIG addresses alleged violations of law that impact Department programs, operations, facilities and personnel.

Program Highlights

The OIG focuses its efforts to enhance the efficiency and effectiveness of Department's programs and operations in the following key areas:

- **NNSA Modernization Efforts.** NNSA is undertaking a massive modernization effort that involves major projects (e.g., weapons complex transformation) that benefit from OIG reviews that proactively seek to identify opportunities to improve the efficiency and effectiveness of such operations.
- **Environmental Management.** The federal government's environmental liability was added to the Governmental Accountability Office's High Risk List in 2017. The OIG routinely reviews the efficacy of the Department's environmental programs, which annually expend approximately $6.5 billion.
- **Hotline Allegations.** The OIG uses hotline allegations to identify potential areas of fraud, waste, and abuse.
- **Contractor Whistleblower Retaliation.** OIG conducts reviews of alleged contractor whistleblower retaliation that serve to inform health and safety issues throughout the Department.
- **Mission Support Costs.** OIG assists in identifying potential costs savings in areas such as the estimated $3.5 billion spent each year on National Laboratory support costs.
- **Loan Guarantee Programs.** The potential elimination of the Title 17 Innovative Technology Loan Guarantee program will require the OIG to hire experts to assist with reviews to confirm compliance with loan terms and conditions and program termination requirements.
- **Contract Review.** OIG assesses the Department's award and administration of approximately $25 billion in contracts.

The FY 2018 Budget Request includes an increase of $2.5 million from FY 2016. This increase will ensure that the OIG is able to perform the review of critical elements of Department-wide programs and activities at current operational levels since prior year carryover balances are no longer available.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Power Marketing Administrations					
Southeastern Power Administration					
Southeastern Power Administration	90,500	90,328	81,434	-9,066	-10.0%
Less Alternative Financing/Offsetting Collections	-90,500	-90,328	-81,434	+9,066	+10.0%
Total, Southeastern Power Administration	**0**	**0**	**0**	**0**	**N/A**
Southwestern Power Administration					
Southwestern Power Administration	136,223	136,013	155,947	+19,724	+14.5%
Less Alternative Financing/Offsetting Collections	-124,823	-124,635	-144,547	-19,724	-15.8%
Total, Southwestern Power Administration	**11,400**	**11,378**	**11,400**	**0**	**0**
Western Area Power Administration					
Western Area Power Administration (CROM)					
Western Area Power Administration (CROM)	941,600	950,723	958,398	+16,798	+1.8%
Less Alternative Financing/Offsetting Collections (CROM)	-848,228	-857,529	-865,026	-16,798	-2.0%
Total, Western Area Power Administration (CROM)	**93,372**	**93,194**	**93,372**	**0**	**0**
Falcon and Amistad O&M Fund					
Operation and Maintenance	4,950	4,809	5,048	+98	+2.0%
Less Alternative Financing/Offsetting Collections	-4,722	-4,581	-4,820	-98	-2.1%
Total, Falcon and Amistad O&M Fund	**228**	**228**	**228**	**0**	**0**
Colorado River Basins Power Marketing Fund					
Spending Authority from Offsetting Collections	215,647	213,530	185,396	-30,251	-14.0%
Offsetting Collections	-238,647	-236,530	-208,396	+30,251	+12.7%
Total, Colorado River Basins Power Marketing Fund	**-23,000**	**-23,000**	**-23,000**	**0**	**0**
Total, Western Area Power Administration	**70,600**	**70,422**	**70,600**	**0**	**0**
Total, Power Marketing Administrations	**82,000**	**81,800**	**82,000**	**0**	**0**

Appropriations Overview

Four **Power Marketing Administrations (PMAs)** sell electricity primarily generated by federally owned hydropower projects. Preference in the sale of power is given to public entities and electric cooperatives. Revenues from the sale of Federal power and transmission services are used to repay all related power costs.

Program Highlights

- **Southeastern Power Administration**
  Southeastern markets and delivers all available Federal hydroelectric power from 22 U.S. Army Corps of Engineers (Corps) multipurpose projects to preference customers in an eleven-state area in the southeastern United States. Southeastern does not own or operate any transmission facilities, and contracts with regional utilities that own electric transmission systems to deliver the Federal hydropower to Southeastern's customers. Southeastern's use of receipts and alternative financing offsets its appropriations resulting in a net-zero balance for the program.

- **Southwestern Power Administration**
  Southwestern markets and delivers Federal hydroelectric power from 24 Corps multipurpose projects to preference customers in a six-state area and participates with other water resource users in an effort to balance diverse interests with power needs. To deliver power to its customers, Southwestern maintains 1,380 miles of high-voltage transmission lines, 26 substations/switchyards, and 51 microwave and VHF radio sites.

  The President's budget request for Southwestern includes a proposal to authorize the Federal government to sell the transmission assets of Southwestern Power Administration, which operates and maintains 1,380 miles of high voltage transmission lines and 26 substations/switching stations.

- **Western Area Power Administration**
  Western Area Power Administration (WAPA) markets and transmits Federal power to a 1.3-million-square-mile service area in 15 central and western states from 56 Federally-owned hydroelectric power plants operated by the Bureau of Reclamation (the Bureau), the Army Corps of Engineers (the Corps), and the International Boundary and Water Commission. It also markets a portion of the power from the Navajo Generating Station coal-fired plant near Page, Arizona. WAPA's construction program, conducted in close coordination with preference customers, continues to emphasize replacement, upgrade, and modernization of the electric system infrastructure to bring continued reliability, improved connectivity, and increase flexibility and capability to the power grid. Through extensive partnering efforts, WAPA has obtained significant stakeholder and customer participation in financing much of the construction program. Through transparency WAPA demonstrates the value of its efficient operations that preference customers enjoy. WAPA will continue to make significant efforts to be open, transparent and inclusive of customers and stakeholders in its operational choices and capital planning efforts. WAPA is strengthening its Asset and Risk Management to further ensure capital investments are sufficient and wisely deployed for our Nation and for our customers.

  The President's budget request includes a proposal to repeal the borrowing authority managed by WAPA's Transmission Infrastructure Program (TIP). Separate from the CROM construction program, TIP offers development assistance and debt financing options to deliver or facilitate the delivery of renewable energy resources. The budget also includes a proposal to authorize the Federal government to sell the transmission assets of WAPA, which operates and maintains about 17,000 circuit-miles of high voltage transmission lines and more than 300 substations/switching yards.

- **Bonneville Power Administration**
  Bonneville operates under a business-type budget under the Government Corporation Control Act, 31 U.S.C 9101-10 and on the basis of the self-financing authority provided by the Federal Columbia River Transmission System Act of 1974 (Transmission Act) (Public Law 93-454).

  Bonneville is responsible for meeting the net firm power requirements of its requesting customers through a variety of means, including energy conservation programs, acquisition of renewable and other resources, and power exchanges with utilities both in and outside the region.

  Bonneville provides electric power, transmission, and energy services to a 300,000-square-mile service area in eight states in the Pacific Northwest. Bonneville wholesales the power produced at 31 Federal projects operated by the Corps and the Bureau and from certain non-Federal generating facilities. From these revenues, Bonneville funds the expense portion of its budget and the power operations and maintenance costs of the Bureau and the Corps in the Federal Columbia River Power System (FCRPS). The capital portion of the budget is funded mostly through borrowing from the U.S. Treasury at market rates for similar projects and with some non-Federal financing.

  Bonneville is self-financed and receives no direct annual appropriations from Congress. In FY 2018, estimated total requirements of all Bonneville programs of $4,518 million include estimated budget obligations of $4,185 and estimated capital transfers of $333 million. Estimated obligations include operating expenses of $3,361 million, capital investments of $784 million, and $40 million in projects funded in advance. These investments provide electric utility and general plant requirements associated with the FCRPS's transmission services, capital equipment, hydroelectric projects, conservation, and capital investments to mitigate impacts on the environment, fish, and wildlife.

  The budget includes a proposal to authorize the Federal government to sell the transmission assets of Bonneville Power Administration, which operates and maintains over 15,000 circuit-miles of high voltage transmission lines and 261 substations.

($K)

	FY 2016 Enacted	FY 2017 Annualized CR	FY 2018 Request	FY 2018 vs FY 2016 $	FY 2018 vs FY 2016 %
Federal Energy Regulatory Commission (FERC)					
Just and Reasonable Rates, Terms and Conditions	148,921	148,638	168,111	+19,190	+12.9%
Safe, Reliable, Secure, and Efficient Infrastructure	112,507	112,293	131,836	+19,329	+17.2%
Mission Support through Organizational Excellence	58,372	58,261	67,653	+9,281	+15.9%
FERC Revenues	-319,800	-319,192	-367,600	-47,800	-14.9%
Subtotal, Federal Energy Regulatory Commission	**0**	**0**	**0**	**0**	**N/A**
Fees and Recoveries in Excess of Annual Appropriations	-23,587	-15,882	-9,000	+14,587	+61.8%
Total, Federal Energy Regulatory Commission	**-23,587**	**-15,882**	**-9,000**	**+14,587**	**+61.8%**

Appropriation Overview

Federal Energy Regulatory Commission (FERC or the Commission) is an independent agency within the department that regulates the transmission and wholesale sale of electricity in interstate commerce; the transmission and sale of natural gas for resale in interstate commerce; and the transportation of oil by pipeline in interstate commerce. FERC also reviews proposals to build liquefied natural gas (LNG) terminals as well as interstate natural gas pipelines, and licenses and inspects non-Federal hydropower projects. The Commission protects the reliability of the Nation's bulk-power system and oversees environmental matters related to natural gas pipeline and non-Federal hydro projects. The Commission enforces its regulatory requirements through civil penalties and other means.

FERC's mission is to assist consumers in obtaining reliable, efficient, and sustainable energy services at a reasonable cost through appropriate regulatory and market means. FERC seeks to ensure that rates, terms, and conditions of service are just, reasonable, and not unduly discriminatory or preferential, relying on competitive markets where appropriate. Through its oversight and enforcement authorities, FERC seeks to increase compliance with its rules and regulations and deter market manipulation. FERC's responsibilities also include promoting the development of strong and secure energy infrastructure that operates safely, reliably, and efficiently in the public interest.

Program Highlights

- **Ensure Just and Reasonable Rates, Terms, and Conditions**
  One of the Commission's fundamental statutory responsibilities is to ensure that rates, terms and conditions for wholesale sales and transmission of electric energy and for transportation of natural gas are just and reasonable and not unduly discriminatory or preferential. To fulfill this responsibility, the Commission uses a combination of market and regulatory means, complemented by oversight and enforcement measures. For example, the Commission seeks to improve the competitiveness of organized wholesale electric markets, which in turn encourages entry of new resources, spurs innovation and deployment of new technologies, improves operating performance, and exerts downward pressure on costs. The Commission will continue to pursue market reforms and to evaluate the markets and interstate grid to improve economic efficiency, system operations, and reliability both in light of new developments and in response to state and federal policies to allow all types of resources to compete on a level playing field in jurisdictional markets. Another example of the Commission's use of market and regulatory means in support of this goal is found in the Commission's requirements for public utility transmission providers to participate in an open and transparent regional transmission planning process and to allocate appropriately the costs of new transmission facilities stemming from such a process. In addition, the Commission approves cost-based, and where appropriate, market-based rates for the interstate transportation of natural gas and oil on jurisdictional pipelines, and for the interstate transmission, and wholesale sales of electric energy. FERC also prevents the accumulation and exercise of market power by reviewing proposed mergers and other transactions in the electric industry to ensure that these proposals will not harm the public interest and by removing barriers that may deny access to the market and the interstate grid. The Commission accepts tariff provisions, as appropriate, to allow natural gas and oil pipelines, and public utilities to modify their services to meet their customers' needs.

  Oversight, surveillance and enforcement are essential complements to the Commission's approach to ensure that rates, terms, and conditions of service are just and reasonable and not unduly discriminatory or preferential. The

Commission takes proactive steps to detect problems in energy markets and to reduce the probability that violations will occur. The Commission conducts compliance audits, issues publicly available audit reports, and engages in formal and informal outreach efforts to promote effective compliance programs. Audits are planned and prioritized using a risk-based approach in order to maximize the impact of the Commission's resources. The Commission also conducts public and non-public investigations of possible violations of the statutes, regulations, rules, orders, and tariffs administered by the Commission. These investigations rely upon oversight and surveillance that employ sophisticated technology to monitor market behavior. When violations of sufficient seriousness are discovered, the Commission attempts to resolve the investigation through settlement with appropriate sanctions and future compliance improvements before initiating further enforcement proceedings.

- **Promote Safe, Reliable, Secure, and Efficient Infrastructure**
  The Commission plays an important role in the development of energy infrastructure that operates efficiently, safely and reliably. One aspect of the Commission's role in energy infrastructure development stems from siting authority that includes licensing non-federal hydropower projects, certificating interstate natural gas pipelines and storage projects, authorizing liquefied natural gas (LNG) facilities, and, in certain circumstances, permitting electric transmission lines. Throughout all of these processes, the Commission's goal is to expedite application processing without compromising environmental responsibilities or public participation. The Commission encourages, and sometimes requires, project proponents to engage in early involvement with state and federal agencies, Indian tribes, affected landowners and the public. Another aspect of the Commission's role in energy infrastructure development stems from the Commission's responsibility for the safety of LNG and non-federal hydropower facilities throughout the entire life cycle of a project: design review, construction and operation. To meet this mandate, the Commission primarily relies on physical inspections of the facilities. The Commission is incorporating risk-informed decision making into its dam safety program. By doing so, the Commission is focusing its resources on those structures that pose the greatest risk to public safety.

  The Commission also has an important role in protecting the reliability of the Nation’s electric transmission grid. A Commission-certified Electric Reliability Organization (ERO) develops and enforces mandatory Reliability Standards, subject to the Commission's oversight and approval. The Reliability Standards address the planning and operation, as well as the cyber security and physical protection of the Nation’s electric transmission grid. The ERO’s Reliability Standards development process uses an open and inclusive process that employs extensive negotiation, consultation and coordination among many stakeholders. The Commission may also, upon its own motion or upon complaint, order the ERO to submit a proposed reliability standard or a modification of an existing reliability standard that addresses a specific reliability matter. To that end, the Commission incorporates performance data-driven, risk-informed decision making into its reliability oversight. In addition to establishing foundational and mandatory regulations, the Commission works collaboratively with the governmental and private sectors to utilize state-of-the-art practices as necessary to address advanced cyber and physical security threats to jurisdictional energy infrastructure that can endanger national security and public safety. The Commission works with the owners and operators of key critical infrastructure facilities to identify and share threat information, analyze system vulnerabilities, and assist with effective mitigation that is complementary to, but in excess of, mandatory regulations.

- **Mission Support Through Organizational Excellence**
  The Commission strives to achieve organizational excellence by using resources effectively, adequately equipping employees for success, and executing responsive and transparent processes that strengthen public trust. Trust and understanding increase acceptance of FERC decisions and reduces the potential for contentiousness toward FERC rules and regulations. The Commission advances this objective by promoting transparency and open communication with respect to conduct of the Commission’s business, thereby increasing awareness and understanding of the Commission’s activities.

  The Commission continues to make new investments in its human capital, information technology (IT) resources, and physical infrastructure. The Commission allocates the majority of its budget to directly cover employee compensation costs and, therefore, places extremely high value on its employees, and is focused on ensuring their success. Also, the Commission continues to focus its human capital efforts on the competencies and positions most affected by the potential loss of approximately 30 percent of its staff to retirement by FY 2020. The Commission will focus on the execution of its hiring processes to ensure it maximizes allocated financial resources in a timely fashion. The

Commission will pursue new projects that will advance priority IT initiatives that will modernize core mission and support systems, expand existing data analytics and visualization capabilities, and improve the agency's cyber security posture. The Commission is also undergoing a complex multi-year renovation effort within its headquarters building. The renovation project is expected to be completed during FY 2020 and will enable the agency to realize significant space savings. From project commencement through FY 2017, the Commission expects to fund $5.5 million for this effort using prior year unobligated budget authority. The FY 2018 request includes increases of approximately $11.1 million to continue the modernization effort.