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115TH CONGRESS, *2d Session* | SENATE | REPORT 115–258

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS BILL, 2019

MAY 24, 2018.—Ordered to be printed

Mr. ALEXANDER, from the Committee on Appropriations, submitted the following

REPORT

[To accompany S. 2975]

The Committee on Appropriations reports the bill (S. 2975) making appropriations for energy and water development and related agencies for the fiscal year ending September 30, 2019, and for other purposes, reports favorably thereon and recommends that the bill do pass.

New obligational authority

Total of bill as reported to the Senate	$43,766,000,000
Amount of 2018 appropriations	60,582,716,000
Amount of 2019 budget estimate	31,610,121,000
Bill as recommended to Senate compared to—	
2018 appropriations	−16,816,716,000
2019 budget estimate	+12,155,879,000

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tensive written justifications for determinations of what costs are reimbursable for complex projects involving major Federal expenditures and multiple funding sources.

GENERAL PROVISIONS—DEPARTMENT OF THE INTERIOR

Section 201. The bill includes a provision regarding reprogramming.

Section 202. The bill includes a provision regarding the San Luis Unit and Kesterson Reservoir.

TITLE III

DEPARTMENT OF ENERGY

OVERVIEW OF RECOMMENDATION

The Committee recommends $34,990,015,000 for the Department of Energy, an increase of $9,512,377,000 above the budget request.

The Committee recommendation sets priorities by supporting the Office of Science and ARPA–E, leading the world in scientific computing, addressing the Federal Government's responsibility for environmental cleanup and disposal of used nuclear fuel, keeping large construction projects on time and on budget, effectively maintaining our nuclear weapons stockpile, and supporting our nuclear Navy.

INTRODUCTION

The mission of the Department of Energy [Department] is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. To accomplish this mission, the Secretary of Energy [Secretary] relies on a world-class network of national laboratories, private industry, universities, States, and Federal agencies, which allows our brightest minds to solve our Nation's most important challenges.

The Committee's recommendation for the Department includes funding in both defense and non-defense budget categories. Defense funding is recommended for atomic energy defense activities, including the National Nuclear Security Administration, which manages our Nation's stockpile of nuclear weapons, prevents proliferation of dangerous nuclear materials, and supports the Navy's nuclear fleet; defense environmental cleanup to remediate the former nuclear weapons complex; and safeguards and security for Idaho National Laboratory. Non-defense funding is recommended for the Department's energy research and development programs (including nuclear, fossil, and renewable energy, energy efficiency, grid modernization and resiliency, and the Office of Science), power marketing administrations, the Federal Energy Regulatory Commission, and administrative expenses.

REPROGRAMMING GUIDELINES

The Committee's recommendation includes control points to ensure the Secretary spends taxpayer funds in accordance with congressional direction. The Committee's recommendation also in-

cludes reprogramming guidelines to allow the Secretary to request permission from the Committee for certain expenditures, as defined below, which would not otherwise be permissible. The Secretary's execution of appropriated funds shall be fully consistent with the direction provided under this heading and in section 301 of the bill, unless the Committee includes separate guidelines for specific actions in the bill or report.

Prior to obligating any funds for an action defined below as a reprogramming, the Secretary shall notify and obtain approval of the Committees on Appropriations of both Houses of Congress. The Secretary shall submit a detailed reprogramming request in accordance with section 301 of the bill, which shall, at a minimum, justify the deviation from prior congressional direction and describe the proposed funding adjustments with specificity. The Secretary shall not, pending approval from the Committee, obligate any funds for the action described in the reprogramming proposal.

The Secretary is also directed to inform the Committees on Appropriations of both Houses of Congress promptly and fully when a change in program execution and funding is required during the fiscal year.

Definition.—A reprogramming includes:

—the reallocation of funds from one activity to another within an appropriation;

—any significant departure from a program, project, activity, or organization described in the agency's budget justification as presented to and approved by Congress;

—for construction projects, the reallocation of funds from one construction project identified in the agency's budget justification to another project or a significant change in the scope of an approved project;

—adoption of any reorganization proposal which includes moving prior appropriations between appropriations accounts; and

—any reallocation of new or prior year budget authority, or prior year deobligations.

Direction on Research and Development Activities

The budget request proposes a shift away from later-stage research and development activities to refocus the Department on an early-stage research and development mission. The Committee believes that such an approach will not successfully integrate the results of early-stage research and development into the U.S. energy system and thus will not adequately deliver innovative energy technologies, practices, and information to American consumers and companies. The Committee directs the Department to implement mid- and late-stage research and development activities as directed in this report in a timely manner.

Crosscutting Initiatives

The recommendation supports several crosscutting initiatives funded in prior years that reach outside of individual program offices to draw on the diverse disciplines within the agency as a whole. These initiatives, which address the Energy-Water Nexus; grid modernization; subsurface science, technology and engineering

research, development, and deployment; cybersecurity; advanced materials, and the Beyond Batteries Initiative have allowed for a more comprehensive review of complex issues.

Grid Modernization.—The Department is directed to continue the ongoing work between the national laboratories, industry, and universities to improve grid reliability and resiliency through the strategic goals of the Grid Modernization Initiative and encourages the Department to include all applied energy programs to ensure broad energy system resilience and modernization. Further, the Committee supports the Grid Modernization Laboratory Consortium and supports continued implementation of the Grid Multi-Year Program Plan. The Committee directs the Department to emphasize national grid resilience modeling and improved grid cyber resilience to address emerging national resilience challenges of the grid and related energy systems, planned investments in energy storage to improve grid flexibility and resilience, and advanced sensors and control paradigms that promise to improve energy system resilience of the future smart grid. The Committee recognizes that the inaugural projects funded for a 3-year duration will be concluding in fiscal year 2019 and therefore the Department is directed to continue support for the Grid Modernization Initiative and the Grid Modernization Laboratory Consortium and provide a plan to Congress to extend the multi-year program plan to include priorities for field validation of the most successful research outcomes with industry and State stakeholders to accelerate adoption of the key Department results.

Beyond Batteries Initiative.—The Committee is supportive of the Department's approach to consider energy storage holistically, and focus on advances in controllable loads, hybrid systems, and new approaches to energy storage. The Committee agrees that advances in this wide range of energy storage technologies will allow for loads to be combined with generation from all sources to optimize use of existing assets to provide grid services, and increase grid reliability. The Department shall continue to use all of its capabilities to accelerate the development of storage technologies, including the basic research capabilities of the Office of Science, the technology expertise of the Office of Energy Efficiency and Renewable Energy, the grid-level knowledge of the Office of Cybersecurity, Energy Security and Emergency Response, and the rapid technology development capabilities of ARPA–E. The Committee directs the Department to coordinate efforts among various existing Department programs to maximize efficiency of funds and expand vital research.

The Department is encouraged to prioritize achieving a long-term goal of deploying technologies at $100/kWh or less cost installed while being able to cycle twice per day, discharging for at least 4 hours, with a lifetime of roughly 20 years or at least 8,000 cycles.

Subsurface Crosscut.—The Committee supports the ongoing Subsurface Technology and Engineering Research [SubTER] Initiative, focused on revolutionizing sustainable subsurface energy production and storage through transformational improvements in the ability to access, characterize, predict, and adaptively manipulate subsurface fracture and flow processes. SubTER aims to double reservoir recovery, decrease the environmental footprint, and enhance energy security and public safety. The Committee supports the

SubTER program's approach to increasing domestic supply of oil, gas, and geothermal energy resources by manipulating the permeability of subsurface rock formations to injection fluids. To validate methods which enhance oil and gas recovery from fracking wells, the Committee encourages the Department to conduct pilot field tests of promising technologies with university and industry partners to reduce permeability and control the flow of fluids in the subsurface with targets of blocking highly permeable pathways that reduce sweep efficiency in porous rock and plugging fractures in shales.

Energy-Water Nexus.—The Committee recognizes water and energy are critical resources that are reciprocally linked. The Energy-Water Nexus crosscut consists of a collaboration of agencies, national laboratories, State and local governments, utilities, industry, and the science community working collectively to address energy and water resource challenges, specifically as they relate to energy security and energy sector water needs.

Advanced Materials.—The Committee supports the Department's attention to advanced materials research and development, focusing on lightweight materials and composites, and corrosion and materials under extremes. The Committee understands in previous years, other program offices independently had standalone existing materials programs, and continues to support formal coordination across offices through the Materials Working Group. Continued coordination supports the Department's ability to impact the materials development cycle from scientific discovery to technological innovation and deployment.

Cybersecurity Crosscut.—Cybersecurity activities within the Department cover a broad scope ranging from the protection of Department assets against cybersecurity threats to improving cybersecurity in the electric power and oil and natural gas sectors to other areas in the national security portfolio. As cybersecurity threats become more complex, and the Department increases its focus on cybersecurity research and development, it is vital that there be clear crosscutting objectives and coordination across the Department. The Committee directs the Department to develop a plan that integrates all of the Department's cybersecurity research, development, and deployment investments, and brief the Committees on Appropriations of both Houses of Congress within 90 days after enactment of this act.

Arctic Energy Office.—The Committee supports the promotion of research, development, and deployment of electric power technology that is cost-effective and well-suited to meet the needs of rural and remote regions of the United States, especially where permafrost is present or located nearby. In addition, the Committee further supports research, development and deployment in such regions of enhanced oil recovery technology, including heavy oil recovery, reinjection of carbon, and extended reach drilling technologies; gas-to-liquids technology and liquefied natural gas, including associated transportation systems; small hydroelectric facilities, river turbines, and tidal power; natural gas hydrates, coal bed methane, and shallow bed natural gas; and alternative energy, including wind, geothermal, and fuel cells. The Department is encouraged to support a renewed focus on the Arctic region, and as a cross-cut-

ting activity, use the Arctic Energy Office as a centralized area to support the use of energy resources, but also innovative activities, including microgrids and integrated energy systems.

Regional Initiatives.—The Committee continues to urge the Department to utilize investments through existing regional capabilities that include industry, universities, and State and regional economic development assets. The Committee further encourages the national laboratories to expand their geographic outreach through people and access to specialized equipment and user facilities in order to contribute to the success of these regional initiatives.

COMMONLY RECYCLED PAPER

The Secretary shall not expend funds for projects that knowingly use as a feedstock commonly recycled paper that is segregated from municipal solid waste or collected as part of a collection system that commingles commonly recycled paper with other solid waste at any point from the time of collection through materials recovery.

ENERGY PROGRAMS

ENERGY EFFICIENCY AND RENEWABLE ENERGY

Appropriations, 2018	$2,321,778,000
Budget estimate, 2019	695,610,000
Committee recommendation	2,322,000,000

The Committee recommends $2,322,000,000 for Energy Efficiency and Renewable Energy [EERE], an increase of $1,626,390,000 above the budget request. Within available funds, the Committee recommends $162,500,000 for program direction.

Congressional Direction.—The Committee directs the Department to maintain a diverse portfolio of early-, mid-, and late-stage research, development, and market transformation activities. Regular consultation with industry is encouraged to avoid duplication of private-sector efforts. The Committee further directs the Department to fully execute the funds appropriated in this act, as directed in this report, in a timely manner and to keep Congress apprised of progress in implementing funded programs, projects, and activities. Further, the Committee directs the Department to give priority to stewarding the assets and optimizing the operations of EERE-designated user facilities across the Department of Energy complex. In future budget requests, the Committee directs EERE to demonstrate a commitment to operations and maintenance of facilities that support the Department's critical missions.

Workforce Development.—The development of a skilled workforce is critical to the successful deployment and long-term sustainability of energy efficient and renewable energy technologies. The Committee encourages funding within EERE programs to be allocated to training and workforce development programs that assist and support workers in trades and activities required for the continued growth of the U.S. energy efficiency and clean energy sectors. Furthermore, the Committee encourages the Department to work with 2-year, public community, and technical colleges for job training programs that lead to an industry-recognized credential in the energy workforce.

Electrification Futures Study.—The Committee encourages continued coordination between the EERE and the Office of Cybersecurity, Energy Security, and Emergency Response to evaluate the impacts of mass electrification on the utility business model and the electricity distribution system of the U.S. through the Electrification Futures Study.

Cybersecurity.—The Committee believes cybersecurity vulnerabilities must be addressed as renewable energy technologies enter into the marketplace. The Committee also believes there is a gap with respect to distributed generators and behind-the-substation generators, storage, smart buildings technologies and electric vehicles where the potential for cyberattacks will continue to grow and threaten the modern grid. Within funds recommended for EERE, not less than $20,000,000 is recommended to establish a program that will bring cybersecurity into early-stage technology R&D so that it is built into new technology for this effort. Within 180 days after enactment of this act, the Department shall submit to the Committees on Appropriations of both Houses of Congress a multi-year program plan for this effort to encompass all EERE programs.

Energy Star.—The Department is encouraged to support the Environmental Protection Agency's efforts to reexamine Energy Star guidelines and standard operating procedures to ensure transparency, predictability, and consistency for all stakeholders.

VEHICLE TECHNOLOGIES

The Committee recommends $337,500,000 for Vehicle Technologies, including $7,000,000 for operations and maintenance of the National Transportation Research Center.

Within this amount, the Committee recommends not less than $163,200,000 for Battery and Electrification Technologies to lower the cost of batteries across light-, medium- and heavy-duty vehicles through battery processing science, advanced battery chemistries, materials research, and modeling and simulation of battery performance. The Committee recommends not less than $38,100,000 for electric drive research and development including high power density electric drive systems, wireless charging and power electronic for extreme fast charging. The Committee also supports research and development to lower the cost of batteries for electric vehicles through cobalt-free materials and roll-to-roll manufacturing. Funding in this area shall also support research and development to improve electric motor technology through advanced material processing and the use of high-performance computing for multi-physics discovery to understand these new processes.

The Committee further recommends $25,000,000 for Energy Efficient Mobility Systems, including the Systems and Modeling for Accelerated Research in Transportation [SMART] Mobility, Big Data Solutions for Mobility [Big Data], and Advanced Computing for Energy [ACE] initiatives, including HPC4Mobility and HPC-enabled analytics. These investments are critical to expanding U.S. energy security, economic vitality, and quality of life. Therefore, the Committee supports continued funding for research that allows the U.S. to continue its leadership in advancing state-of-the-art transportation infrastructure.

The Committee recommends $43,000,000 for Advanced Engine and Fuel Technologies for research focused on advanced fuel formulations that optimize engine performance. Within this amount, $24,500,000 is recommended for the Co-Optimization of Engine and Fuels Multi-Laboratory Consortium.

The Committee recommends $60,000,000 for Materials Technology. Within this amount, $25,000,000 is recommended for early-stage research on multi-material joining and propulsion materials at the national laboratories, and carbon fiber-reinforced composites at the Carbon Fiber Technology Facility.

Within available funds, the Committee recommends $10,000,000 for continued funding of section 131 of the 2007 Energy Independence and Security Act for transportation electrification.

The Committee recommends $25,000,000 to continue the five awards under the SuperTruck II program and encourages the Department to provide additional early-stage research funding for heavy-duty vehicle technologies as part of the program.

Within available funds, the Committee recommends $46,300,000 for Outreach, Deployment, and Analysis. Within this amount, $37,800,000 is recommended for deployment through the Clean Cities Program. The Department is encouraged to ensure balance in the award of funds to achieve varied aims in fostering broader adoption of clean vehicles and installation of supporting infrastructure. The Committee further encourages the Department to prioritize projects in States where the transportation sector is responsible for a higher percentage of the State's total energy consumption and is the largest source of greenhouse gases.

The Committee supports Advanced Vehicle Competitions, a collegiate engineering competition that provides hands-on, real-world experience to demonstrate a variety of advanced technologies and designs, and supports development of a workforce trained in advanced vehicles. The Committee recommends $2,500,000 following the successful EcoCAR 3 competition to support a new 4-year collegiate engineering competition, EcoCAR 4.

The Committee recommends $10,000,000 to continue improving the energy efficiency of commercial off-road vehicles, including up to $5,000,000 for fluid power systems.

The Committee is concerned with the Department's lack of requested funding for natural gas vehicle research and development. With an abundant source of low-cost domestic natural gas, this resource as a transportation fuel is becoming the alternative fuel of choice for high fuel use fleets and off-road vehicles. Further research is needed on natural gas storage, natural gas engines, and fueling infrastructure optimization. Within available funding, the Committee recommends $15,000,000 to address technical barriers to the increased use of natural gas vehicles, including the development of novel compression and liquefaction technologies, advanced materials, and improvements in processes for conditioning, storing and dispensing natural gas. The Committee directs the Department to undertake a comprehensive study, with stakeholder input, on natural gas vehicle deployment in on- and off-road transportation, identifying barriers to increased deployment of natural gas vehicles.

BIOENERGY TECHNOLOGIES

The Committee recommends $215,000,000 for Bioenergy Technologies.

Within available funds, the Committee recommends not less than $30,000,000 for Advanced Algal Systems to sustain the investment in development of algal biofuels.

The Committee further recommends $30,000,000 for Feedstock Supply and Logistics, $50,000,000 for Demonstration and Market Transformation, and $10,000,000 for Analysis and Sustainability.

The Committee further recommends $95,000,000 for Conversion Technologies. Within this amount, $20,000,000 is recommended to continue activities of the Agile Biology Foundry intended to achieve substantial improvements in conversion efficiencies and the scale-up of biological processes with lower development costs and lead times.

Within available funds, the Committee recommends $5,000,000 within Conversion Technologies to continue the research biopower program, which makes full and innovative use of biomass, municipally-derived biosolids, municipal solid waste, and livestock waste.

Within available funds the Committee recommends $5,000,000 to support the development and testing of new domestic manufactured low-emission, high-efficiency, residential wood heaters that supply easily accessed and affordable renewable energy and have the potential to reduce the national costs associated with thermal energy.

The Committee recognizes that biomethane or anaerobic digesters can provide important solutions to meet renewable energy goals, as well as address environmental and economic challenges and divert organic waste from landfills. The Committee encourages the Department to fund research, development, and demonstration activities to help lower upfront development costs and promote smaller-scale, community digesters. Within available funds for Conversion Technologies, the Committee recommends $5,000,000 to improve the efficiency of community and smaller digesters that accept both farm and food wastes.

Within available funding, the Committee recommends not less than $10,000,000 to establish a multi-university partnership to conduct research and enhance educational programs that improve alternative energy production derived from urban and suburban wastes. The Committee further directs the Department to collaborate with institutions in Canada and Mexico to leverage capacity and capitalize on North American resources.

Within available funds, the Committee supports research to develop the foundation for scalable technologies to use carbon dioxide produced in biorefineries to produce higher value fuels, chemicals or materials.

HYDROGEN AND FUEL CELL TECHNOLOGIES

The Committee recommends $115,000,000 for Hydrogen and Fuel Cell Technologies.

Within the amounts recommended, the Committee recommends $39,000,000 for Hydrogen Fuel Research and Development for efforts to reduce the cost and improve the performance of hydrogen

generation and storage systems, hydrogen measurement devices for fueling stations, hydrogen compressor components, and hydrogen station dispensing components. The Department shall continue to research novel onboard hydrogen tank systems, as well as trailer delivery systems to reduce cost of delivered hydrogen. Further, the Department is directed to support research and development activities that reduce the use of platinum group metals, provide improvements in electrodes and membranes and balance-of-plant components and systems. The Committee recommends $1,000,000 for Systems Analysis, including research on in-situ metrology for process control systems for manufacturing of key hydrogen system components.

Within the amounts recommended, $19,000,000 is recommended for Hydrogen Infrastructure Research and Development. Further, the Department is directed to continue the H2@Scale Initiative, which couples current research efforts within the program with new opportunities for using hydrogen to provide grid resiliency and advance a wide range of industrial processes for the production of fuels, chemicals, and materials.

The Committee recommends $19,000,000 for Technology Acceleration activities, including $3,000,000 for manufacturing research and development, and $7,000,000 for industry-led efforts to demonstrate a hydrogen-focused integrated renewable energy production, storage, and transportation fuel distribution/retailing system. Regular consultation with industry is encouraged to avoid duplication of private-sector activities.

The Committee further recommends $7,000,000 for Safety, Codes, and Standards to maintain a robust program and engage regulatory and code officials to support their technical needs relative to infrastructure and vehicle safety.

The Committee encourages the Secretary to work with the Secretary of Transportation and industry on coordinating efforts to deploy hydrogen fueling infrastructure.

SOLAR ENERGY

The Committee recommends $239,500,000 for Solar Energy.

Within available funds, the Committee recommends $55,000,000 for Concentrating Solar Power research, development, and demonstration to reduce overall system costs, better integrate subsystem components, develop higher-temperature receivers, and improve the design of solar collection and thermal energy storage. Within this amount, $5,000,000 is recommended for competitively selected projects focused on advanced thermal desalination technologies.

The Committee recommends $70,000,000 for Photovoltaic Research and Development to develop new or improved high-performance cell materials and architectures and achieve greater than 40-percent cell efficiencies. The Department is encouraged to cooperate with industry and academia in its research and development efforts.

The Committee recommends $35,000,000 for Balance of System Soft Cost Reduction to reduce non-hardware costs through new techno-economic tools and methodologies for distributed energy resources; an assessment of the potential for block-chain technologies

to improve management of distributed solar; and standardization of planning, permitting, and installation tools and methodologies. Within this amount, the Committee recommends not less than $1,000,000 for the joint Solar Ready Vets program within the Department of Defense as a way to train America's veterans to fill the growing need for solar industry workers.

Within the amounts recommended for Balance of System Soft Cost Reduction, $5,000,000 is recommended to re-invigorate the National Community Solar Partnership program to provide technical assistance to low- and moderate-income individuals, businesses, non-profit organizations, and State, local, and tribal governments to increase use of community solar installations.

Further, the Committee recommends $49,500,000 for Systems Integration to address the technical barriers to increased solar penetration on the grid, including grid reliability, dispatchability, power electronics, and communications. The Committee encourages research and development efforts to target grid storage improvements, demand-response and load-shaping technologies, and modeling and planning tools for distributed energy resources.

The Committee recommends $30,000,000 for Manufacturing Competitiveness to develop advanced low-cost manufacturing process technologies, including thickness reduction and faster processing with fewer steps. Within this area, the Committee also supports early-stage research on photovoltaics based on earth abundant materials focusing on scalable production methods, material stability, and ultrahigh efficiency tandem photovoltaic cell manufacturing approaches. To directly address fundamental barriers that could limit new technology's adoption, the Committee believes the fastest approach for rapid commercialization of new photovoltaic technologies would be to bring national laboratory capabilities and academia, in partnership with early-stage companies to develop a new photovoltaic U.S. manufacturing base. The Department is directed to create a 5-year domestic manufacturing capability consortium focused on inherently scalable production methods such as solution processing, roll-to-roll manufacturing, the science of inherent material stability, and ultrahigh efficiency through tandem manufacturing. Within available funds, the Committee recommends not less than $10,000,000 for the first year of the consortium.

WIND ENERGY

The Committee recommends $80,000,000 for Wind Energy.

The Committee supports research using high-performance computing, modeling and simulation, including the Atmosphere to Electrons initiative, and reliability and grid integration efforts. Further, the Department is directed to give priority to stewarding the assets and optimizing the operations of the Department-owned wind research and development facilities. Within available funds, the Committee recommends not less than $30,000,000 for the National Wind Technology Center, which shall include the development of a large-scale research platform to support next-generation wind energy science and manufacturing and systems integration of multiple energy generation, consumption, and storage technologies with the grid.

The Committee encourages the Department to prioritize distributed wind technologies that reduce costs and improve performance, and to collaborate with industry to invest in the development and demonstration of technologies and practices that advance distributed wind. Within available funds, the Committee recommends $10,000,000 for distributed wind.

The Committee directs the Department to support the advancement of innovative technologies for offshore wind development, including freshwater, deepwater, shallow water, and transitional depth installations. In addition, the Department is directed to support the innovative offshore wind demonstration projects for which funding has been allocated in previous fiscal years, and further supports efforts to optimize their development, design, construction methods, testing plans, and economic value proposition. The Committee recommends not less than $6,000,000 in new project development for the offshore wind demonstration projects to be allocated equitably between the approved projects, and to provide not less than 18 months of additional development to ensure success. The Committee further directs the Department to support the deployment and testing of scale floating wind turbines designed to reduce energy costs. Within available funds, the Committee recommends not less than $30,000,000 for the Department to prioritize early-stage research on materials and manufacturing methods and advanced components that will enable accessing high-quality wind resources, on development that will enable these technologies to compete in the marketplace without the need for subsidies, and on activities that will accelerate fundamental offshore-specific research and development such as those that target technology and deployment challenges unique to U.S. waters. Further, the Committee recommends not less than $10,000,000 for existing national-level offshore wind test facilities.

The Committee supports the Department's research on the effects of offshore wind, especially the impact of marine sound and other stressors on marine mammals, and encourages the Department to work with nonprofit research institutions, like aquariums, to continue this work.

WATER POWER

The Committee recommends $105,000,000 for Water Power.

Hydropower Technologies.—Within available funds, the Committee recommends $35,000,000 for conventional hydropower and pumped storage activities, including up to $6,600,000 for the purposes of section 242 of the Energy Policy Act of 2005. Within available funds, the Department is directed to continue research, development, and deployment efforts on pumped hydropower storage technologies and use cases.

Marine and Hydrokinetic Technology Research, Development, and Deployment.—The Committee recommends $70,000,000 for marine and hydrokinetic technology research, development, and deployment activities, including research into mitigation of marine ecosystem impacts of these technologies.

Within the funding available for marine and hydrokinetic technology, $30,000,000 is recommended for a balanced portfolio of competitive solicitations to support industry-led and university re-

search, development, and deployment of marine and hydrokinetic technologies; and support wave, ocean current, tidal and in-river energy conversion components and systems across the high- and low-technology readiness spectrum to increase energy capture, reliability, survivability, and integration into local or regional grids for lower costs and to assess and monitor environmental effects. Within this amount, not less than $8,000,000 is recommended to support collaborations between universities, Marine Renewable Energy Centers, and national laboratories. Further, not less than $5,000,000 is recommended to prioritize infrastructure needs at marine and hydrokinetic technology testing sites operated by Marine Renewable Energy Centers. The Department is directed to support ongoing design of the previously awarded open-water wave energy test facility within available funds. The Department is also directed to continue its coordination with the U.S. Navy on marine energy technology demonstration.

The Committee encourages close coordination between the Department and the Federal Energy Regulatory Commission, the Bureau of Ocean Energy Management, the National Oceanic and Atmospheric Administration, other relevant agencies and industry to reduce the amount of time to permit marine energy test and validation projects.

GEOTHERMAL TECHNOLOGIES

The Committee recommends $85,000,000 for Geothermal Technologies.

Within available funds, $53,000,000 is recommended for Enhanced Geothermal Systems. To facilitate necessary technology development and expand understanding of subsurface dynamics, the Committee recommends $30,000,000 for the continuation of activities of the Frontier Observatory for Research in Geothermal Energy [FORGE], with activities to include ongoing novel subsurface characterization, full-scale well drilling, and technology research and development to accelerate the commercial pathway to large-scale enhanced geothermal systems power generation.

Further, the Committee recommends $15,000,000 for Hydrothermal, $10,000,000 for Low-Temperature and Co-produced Resources, and $7,000,000 for Systems Analysis.

The Committee recognizes that enhanced geothermal systems are versatile, inherently modular, and scalable from residential utilization to district heating opportunities and large power parks that can provide baseload capacity. The Committee encourages the Department to support enhanced geothermal system applications for industrial and residential uses.

The Committee directs the Department to continue its efforts to identify prospective geothermal resources in areas with no obvious surface expressions.

ADVANCED MANUFACTURING

The Committee recommends $311,000,000 for Advanced Manufacturing.

The Committee recommends $80,000,000 for Advanced Manufacturing Research and Development Projects.

The Committee recommends $171,000,000 for Advanced Manufacturing Research and Development Facilities. The Committee recommends $25,000,000 for the Manufacturing Demonstration Facility and the Carbon Fiber Technology Facility for early-stage research in additive manufacturing, carbon fiber and composites development, and manufacturing of multi-material systems to reduce the energy intensity and life-cycle energy consumption of domestic manufactured products, thereby increasing the competitiveness of U.S. manufacturing industries. Within funding for the Manufacturing Demonstration Facility, $5,000,000 is recommended for the development of additive systems and automation technologies that have the potential to deposit multiple materials allowing for hybrid material solutions that enhance performance in extreme environments and enable precise property profiles.

The Committee recognizes the important role large-area additive manufacturing can play in helping to advance the deployment of building, transportation, and clean energy technologies. The Committee directs the Department to further foster the partnership between the National Laboratories, universities, and industry to use bio-based thermoplastics composites, such as micro- and nano-cellulosic materials, and large-area 3–D printing to overcome challenges to the cost and deployment of building, transportation, and energy technologies.

In addition, the Committee recommends $20,000,000 to support the development of additive manufacturing involving nanocellulosic feedstock materials made from forest products to overcome challenges to the cost and deployment of building, transportation, and energy technologies, and encourages the Department to leverage expertise and capabilities for large-scale additive manufacturing through partnerships between universities and the Manufacturing Demonstration Facility.

To ensure grid reliability and resiliency, energy storage at scale must be achieved. Validation of materials for production of energy storage is both slow and expensive, currently taking an average of 18 years from concept to commercialization. For technologies such as batteries, materials innovation is traditionally separate from scale-up and device integration, and this disconnect slows progress. Therefore, within the amounts recommended, the Committee recommends $20,000,000 for a manufacturing demonstration facility specifically focused on accelerating the processes needed for clean energy materials to go from discovery to scale-up, which will drive manufacturing innovation, lower the cost of battery energy storage, and spur job creation by bringing down the timeline for validation from an average of 18 years to an average of 5 years.

The Committee recommends $25,000,000 for the third year of research and development efforts to lower the cost and energy intensity of technologies to provide clean, safe water through the Energy-Water Desalination Hub. The Committee is concerned that after 2 years of funding for this hub in fiscal years 2017 and 2018, the Department still has not completed the cooperative agreement solicitation and award process to begin work in this important research area. Therefore, upon enactment of this act, the Committee directs the Department to brief the Committees on Appropriations of both Houses of Congress on schedule and milestones for solic-

iting and evaluating proposals from qualified consortia and awarding a 5-year cooperative agreement.

The Committee recommends $56,000,000 to support four Clean Energy Manufacturing Institutes [CEMIs], including $14,000,000 each for the Smart Manufacturing Innovation Institute, the Reducing Embodied-energy and Decreasing Emissions [REMADE] Institute, and the Rapid Advancement in Process Intensification Deployment [RAPID] Institute, and a CEMI selection to be announced. The Committee notes the PowerAmerica Next Generation Power Electronics Manufacturing Innovation Institute and the Advanced Composites Manufacturing Innovation Institute have both received $70,000,000 over the past 5 years to stand up a sustainable effort, and encourages the Department to work with one or more national laboratories and universities to build a sustainable plan for these institutes. The Committee is pleased with the ongoing work of the innovative advanced manufacturing opportunities through the CEMIs, and directs the Department to issue a solicitation and make an award for the sixth CEMI not later than October 1, 2018.

The Committee recommends $25,000,000 to continue Critical Materials Hub. The Committee notes many municipal recycling facilities where collected recyclables are separated, now use technologies which are aging and inefficient. The Committee directs the Department to conduct a study to determine if the eddy current technology, which is now in use by most facilities, might be upgraded to increase the supply of recycled aluminum and to make recommendations as to how this might be accomplished and report to the Committees on Appropriations of both Houses of Congress within 180 days after enactment of this act.

The Committee recommends $40,000,000 for the Industrial Technical Assistance program. Within this amount, the Committee recommends $12,000,000 to provide ongoing support for the Combined Heat and Power [CHP] Technical Assistance Partnerships [TAPs] and related CHP Technical Partnership activities at the Department, including $5,000,000 for the TAPs and $7,000,000 for related CHP activities. The Committee also encourages the Department to prioritize research, development, and demonstration of district energy systems, and work to accelerate greater deployment of district energy systems in communities, campuses, industries, and cities nationwide by supporting adaptive regional and local technology, and market opportunities.

The Committee encourages the Department to continue its efforts of extending the Industrial Assessment Centers to underserved areas and furthering the geographic reach of the program to regions that are less likely to be adequately serviced because of their distance from the current Centers. Therefore, the Committee recommends $10,000,000 to expand the technical assistance provided by the Industrial Assessment Centers and fund no fewer than two but no more than four additional centers. The Committee recognizes the great potential for energy savings in municipal, industrial, and agricultural wastewater treatment systems and encourages the Department to expand on the technical assistance provided by the Industrial Assessment Centers to address these needs. Within the funds recommended for the Industrial Assessment Cen-

ters, the Committee recommends $3,000,000 for wastewater treatment technical assistance.

Within available funds, the Committee recommends $10,000,000 for district heating. The Committee further directs the Department to collaborate with industry on the potential energy efficiency and energy security gains to be realized with district energy systems.

The Committee supports research and development on improving foundational materials and processes applicable to aluminum and other primary metal industries.

The Committee supports the issuance of a competitive solicitation for university/industry-led teams to improve the efficiency of drying processes, which consume approximately 10 percent of the energy used in the manufacturing sector.

The Committee directs the Department to develop a national smart manufacturing plan that will identify areas where the Department can facilitate more rapid development, deployment and adoption of smart manufacturing technologies. The Department shall submit a plan to the Committees on Appropriations of both Houses of Congress not later than 180 days after the enactment of this act.

BUILDING TECHNOLOGIES

The Committee recommends $225,000,000 for Building Technologies.

Within available funds, the Committee recommends $39,000,000 for the Commercial Building Integration program for a program of core research and development of more cost-effective integration techniques and technologies that could help the transition toward deep retrofits. In addition, the Committee encourages the Department to increase engagement with private sector stakeholders to develop market-transforming policies and investments in commercial building retrofits.

Within available funds, the Committee recommends $28,000,000 for the Residential Building Integration program. The Committee encourages funding to be concentrated on industry teams to facilitate research, demonstrate and test new systems, and facilitate widespread deployment through direct engagement with builders, the construction trades, equipment manufacturers, smart grid technology and systems suppliers, integrators, and State and local governments.

The Committee recommends $108,000,000 for the Emerging Technologies subprogram. Within available funds, the Committee recommends not less than $30,000,000 for building-grid integration research and development consistent with a transactive energy system, including development of advanced transactive control methodologies, field validation and testing in existing buildings, continuation of the Building-to-Grid Integration Demonstration, and coordination with the Office of Cybersecurity, Energy Security, and Emergency Response transactive energy systems activities. Within this amount, $5,000,000 is recommended to continue promoting regional demonstrations of new, utility-led, residential Connected Communities advancing smart grid systems. Further, within available funds for Emerging Technologies, the Committee recommends not less than $18,000,000 for HVAC & Refrigeration R&D,

$14,000,000 for Building Envelope and $5,300,000 for Building Energy Modeling.

Within available funds for Emerging Technologies, the Committee recommends $25,000,000 for research, development, demonstration, and commercial application activities related to advanced solid-state lighting technology development. If the Secretary finds solid-state lighting technology eligible for the Twenty-First Century Lamp prize, specified under section 655 of the Energy Independence and Security Act of 2007, $5,000,000 shall be made available to fund the prize or additional projects for solid-state lighting research and development.

Within available funds, the Committee recommends $10,000,000 for research and development for energy efficiency efforts related to the direct use of natural gas in residential applications, including gas heat pump heating and water heating, onsite combined heat and power, natural gas appliance venting, green pilots, and micrometers.

Within available funds, the Committee recommends $5,000,000 for novel earlier stage research, development, and demonstration of technologies to advance energy efficient, high-rise Cross-Laminated Timber [CLT] building systems. The Committee directs the Department to support university research, in partnership with national labs, for developing, building, and evaluating CLT wall systems for embodied energy content, operating energy efficiency, wall moisture profiles, structural connector durability, and health monitoring sensors.

The Committee recommends $50,000,000 for Equipment and Buildings Standards. The Department has missed two deadlines for reports to Congress mandated by section 305 of the Energy Independence and Security Act [EISA] of 2007. These reports are invaluable sources of information for the Committee and other stakeholders about the status of energy conservation standards and the Department's plans to comply with its statutory obligations. The Department shall submit to the Committees on Appropriations of both Houses of Congress a status report within 30 days after enactment of this act. The Committee recommends $7,000,000 for the Building Energy Codes Program to provide assistance to States and to organizations that develop model codes and standards to improve building resilience as well as efficiency.

Energy efficiency is a critical component of infrastructure development strategies. The Committee recognizes the importance of the Transformation in Cities initiative for local government planning and directs the Department to continue to support the goals of the initiative.

The Committee is concerned with the Department's recently announced plans to cancel the 2019 Solar Decathlon, pending a reevaluation of the program. The Committee recommends not less than $5,000,000 for the Solar Decathlon. The annual competition has engaged thousands of university students to apply energy research and development to the practical concerns of housing by balancing design excellence and smart energy production and innovation, energy efficiency, and market potential. While the Committee understands that commercialization of technology is important, this should not become the sole or even the primary focus of the com-

petition. Therefore, not later than 30 days after the enactment of this act, the Department shall brief the Committees on Appropriations of both Houses of Congress on its plans for preserving the Solar Decathlon in its current form, any adjustments to the competition, and plans by the Department to accelerate adoption of suitable energy and water efficient technologies in the marketplace.

FEDERAL ENERGY MANAGEMENT PROGRAM

The Committee recommends $31,000,000 for the Federal Energy Management Program.

The Committee encourages the continued use of the Assisting Federal Facilities with Energy Conservation Technologies grant program to leverage more private sector investment in aging Federal facilities and infrastructure.

WEATHERIZATION AND INTERGOVERNMENTAL PROGRAM

The Committee recommends $306,000,000 for the Weatherization and Intergovernmental Program.

Within this amount, $251,000,000 is recommended for the Weatherization Assistance Program [WAP], including $248,000,000 for Weatherization Assistance Grants and $3,000,000 for Training and Technical Assistance; and $55,000,000 is recommended for State Energy Program grants.

The Committee recognizes the importance of providing Federal funds under the Weatherization and Intergovernmental Program to States and tribes in a timely manner to avoid any undue delay of services to eligible low-income households, and to encourage local high-impact energy efficiency and renewable energy initiatives and energy emergency preparedness. Therefore, the full amount of the funds recommended for WAP and the State Energy Program shall be obligated to States, tribes, and other direct grantees not later than 60 days after enactment of this act.

Within available funds, $500,000 is recommended for current WAP grant recipients via the Weatherization Innovation Pilot Program to develop and implement strategies to treat harmful substances, including vermiculite.

The Committee supports WAP's continued participation in the interagency working group on Healthy Homes and Energy with the Department of Housing and Urban Development. The Department is encouraged to further coordinate with the Office of Lead Hazard Control and Healthy Homes on energy-related housing projects. The Committee directs the Department to begin tracking the occurrence of window replacements, which supports the reduction of lead-based paint hazards in homes.

STRATEGIC PROGRAMS

The Committee recommends $12,500,000 for Strategic Programs.

Within available funds, $2,500,000 is recommended for the Energy Transition Initiative [ETI] to support ongoing initiatives to address high energy costs, reliability, and inadequate infrastructure challenges faced by island and remote communities. The Committee supports ETI's efforts to develop a cross-sector initiative of organizations pursuing energy transition efforts that will address

energy challenges, build capacity, accelerate the sharing of best practices and innovations between similarly-situated regions, and leverage specialized expertise into commercial opportunity. The Committee further directs the Department to support initiatives for building of cost-effective, resilient energy infrastructure on island and remote communities, including in Alaska, the Caribbean, Hawaii, New England, and elsewhere.

CYBERSECURITY, ENERGY SECURITY, AND EMERGENCY RESPONSE

Appropriations, 2018	.....
Budget estimate, 2019	$95,800,000
Committee recommendation	260,000,000

The Committee recommends $260,000,000 for Cybersecurity, Energy Security, and Emergency Response, an increase of $164,200,000 above the budget request. Within available funds, the Committee recommends $28,500,000 for program direction.

Early-Stage Research, Electricity Sector.—The Committee rejects the budget's sole focus on early-stage research. Most utilities have limited research and development budgets, primarily due to regulatory constraints designed to keep electricity costs low for consumers. Additionally, utilities are unlikely to implement new concepts because most utilities would need to use their own systems for testing and evaluation, which could impact consumers. State public utility commissions also have limited budgets that do not support research and development. The States rely heavily on the Department's technical assistance on assessments of data and tools to help them evaluate grid modernization alternatives. The Department plays a vital role, not only in early-stage research, but also in deployment, field testing, and evaluation.

CYBERSECURITY FOR ENERGY DELIVERY SYSTEMS

The Committee recommends $80,829,000 for Cybersecurity for Energy Delivery Systems.

The Committee recommends $10,000,000 for the DarkNet project to explore opportunities for getting the Nation's critical infrastructure off the Internet and shielding the Nation's electricity infrastructure from disruptive cyber penetration.

The Committee supports extension of cyber risk information sharing tools to close remaining vulnerabilities in the distribution and transmission system. The Committee encourages the Department to continue existing work within ongoing programs and to invest in research addressing power system vulnerabilities in supply chain and life cycle management for critical power system components and advanced adaptive defensive methods for grid control systems.

TRANSMISSION RELIABILITY

The Committee recommends $39,000,000 for Transmission Reliability.

The Committee supports continued investment in advanced grid modeling algorithms and tool development to ensure resilient grid controls and protection systems that meet the challenges of the emerging smart grid.

RESILIENT DISTRIBUTION SYSTEMS

The Committee recommends $38,671,000 for Resilient Distribution Systems.

Within available funding, $5,000,000 is recommended to develop high fidelity sensors and use data analytics to improve operations in steady-state and under extreme conditions, and to continue early-stage research to develop low-cost, printable sensors that can predict the health of critical equipment in the electric delivery system.

The Committee supports the promotion of regional demonstrations of new, utility-led, residential Connected Communities advancing smart grid systems. The Department shall focus on identifying and addressing technical and regulatory barriers impeding grid integration of distributed energy systems to reduce energy costs and improve the resiliency and reliability of the electric grid. The Committee supports advanced control concepts and open test beds for new distribution control tools for enhanced distribution system resilience.

ENERGY STORAGE

The Committee recommends $41,000,000 for Energy Storage.

Within available funds, the Committee continues to support development of an operational energy storage test facility capable of performance-driven data in a utility environment.

The Committee supports the Beyond Batteries initiative and cost-shared demonstrations of energy storage technologies with the private sector needed to achieve the Department's technology goal. Low-cost, grid-scale energy storage is crucial to a 21st century electricity grid, and the Department's storage research, development and deployment efforts shall support nationwide efforts to improve grid resiliency, reliability, and security, empower consumers, and increase integration of a broad range of generation sources.

The Committee encourages the Department to further the development and demonstration of non-battery advanced storage components, including compressed air energy storage development and demonstration to enable efficiency improvements for utility-scale, bulk energy storage solutions.

The Committee notes that innovation and advancement in distributed energy resources is helping the Nation's power grid to better address reliability, resiliency, safety, and accessibility. This enhances our Nation's energy security and global leadership. The Committee encourages the Department to further advance the development and demonstration of innovative battery and non-battery energy storage components. Energy storage is needed to better enable distributed energy resources; integrate intermittent uses such as water heaters, electric vehicle chargers, battery storage systems, and pumps; help balance supply and demand in the power grid to aid consumers to better manage their energy costs; protect residential and commercial customers and public services from power interruptions; and improve grid security and reliability.

The Committee supports grid-scale field demonstrations of energy storage projects, either as single facilities or as aggregations of units, with a focus on new use cases rather than new battery

chemistry. The Committee encourages the Department to support State energy offices and universities with energy storage planning and deployment, and to participate in industry-led safety codes and standards development. The Committee also supports funding for development of analytical methods for including energy storage in electric system planning, as well as for development of software tools to better value energy storage technologies. The Committee encourages the Department to remain committed to research and development partnerships related to the development and deployment of energy storage, with stakeholders in diverse geographic regions with unique market dynamics and policy challenges that can help to inform nationwide efforts to improve grid resiliency, reliability, and security, empower consumers, and increase integration of a broad range of generation sources. The Committee encourages the Department to make additional investments in cutting-edge storage technologies and relevant software, including conventional and advanced batteries. The Committee further encourages the Department to prioritize pilot scale initiatives with relevant utilities and State energy organizations that have the potential to advance real-time deployment and testing of these technologies.

The Committee is supportive of research for novel materials and system components to resolve key cost and performance challenges for electrochemical energy storage systems based on earth abundant advanced chemistries. In addition, the Committee supports continued materials research that will improve the understanding and predictability of energy storage systems and components, as well as enable safer and more reliable materials and systems to be developed.

TRANSFORMER RESILIENCE AND ADVANCED COMPONENTS

The Committee recommends $7,000,000 for Transformer Resilience and Advanced Components.

Within available funds, the Committee directs the Department to continue to support research and development for advanced components and grid materials for low-cost, power flow control devices, including both solid state and hybrid concepts that use power electronics to control electromagnetic devices and enable improved controllability, flexibility, and resiliency.

INFRASTRUCTURE SECURITY AND ENERGY RESTORATION

The Committee recommends $18,000,000 for Infrastructure Security and Energy Restoration.

The Committee supports further development of energy sector situational awareness capabilities through Eagle-I, the Federal Government's situational awareness tool for national power outages. The Committee encourages the Department to further illustrate how to benefit from increased access to more varied sources of data.

The Committee previously directed the Department to submit a report identifying strategic laboratory, university, and industry partnerships that would enhance national security and assist industry in addressing critical threats, including electromagnetic pulses [EMP], geomagnetic disturbances [GMD], cyber-attacks, and supply chain disruptions. The Committee looks forward to receiving

this report expeditiously. The Committee supports the establishment of an EMP/GMD testing facility that can, without posing risk to the existing grid, replicate EMP/GMD events and cyber-attacks on a real world configuration of critical grid components and systems. Such a facility is necessary to expose entire substations, including devices such as Extra High Voltage Transformers and subsystem components, to the combined effects of the complete composite EMP Waveform for early stage research and development, as well as testing and validation purposes at both the transmission and distribution levels. The Committee encourages the Department to ensure such a facility to be a collaborative public-private effort between national laboratories, utilities, and research universities.

NUCLEAR ENERGY

Appropriations, 2018	$1,205,056,000
Budget estimate, 2019	757,090,000
Committee recommendation	1,206,000,000

The Committee recommends $1,206,000,000 for Nuclear Energy, an increase of $448,910,000 above the budget request. The Committee's recommendation prioritizes funding for programs, projects and activities that will ensure a strong future for nuclear power in the United States.

Nuclear power provides more than 20 percent of our Nation's electricity and nearly 60 percent of our emissions-free electricity. Electricity generation from our Nation's operating nuclear power plants is critical to our national security, economy, and way of life. Nuclear power is a reliable, resilient source of power, and the Department is encouraged to seek opportunities to take advantage of that fact to meet its long-term needs.

RESEARCH AND DEVELOPMENT

INTEGRATED UNIVERSITY PROGRAM

The Committee recommends $5,000,000 for the Integrated University Program.

The Committee notes the administration repeatedly attempts to defund this program, despite continued success in developing highly qualified nuclear specialists to meet national needs.

NUCLEAR ENERGY ENABLING TECHNOLOGY

The Committee recommends $149,200,000 for Nuclear Energy Enabling Technology.

Within this amount, the Committee recommends $50,000,000 for Crosscutting Technology Development, $28,200,000 for Nuclear Energy Advanced Modeling and Simulation, $41,000,000 for National Scientific User Facilities, and $30,000,000 for the Energy Innovation Hub for Modeling and Simulation. The Committee notes that the budget request made the short-sighted recommendation to cancel the Energy Innovation Hub for Modeling and Simulation for the second year in a row, despite the important contributions it continues to make to improving operations and safety of operating nuclear reactors, and its likely application in licensing accident tolerant fuels and other advanced technologies.

REACTOR CONCEPTS RESEARCH, DEVELOPMENT, AND DEMONSTRATION

The Committee recommends $302,000,000 for Reactor Concepts Research, Development, and Demonstration.

Advanced nuclear technologies hold great promise for reliable, safe, emission-free energy and should be a priority for the Department. The Department was previously directed to provide a report that sets aggressive, but achievable goals to demonstrate a variety of private-sector advanced reactor designs and fuel types by the late 2020s. The Department is directed to expedite that report and provide it to the Committee as soon as possible.

Advanced Reactor Technology.—Within available funds, the Committee recommends $150,000,000, for Advanced Reactor Technology, including $22,000,000 for the fourth year of the advanced reactor concepts program.

The Committee supports the Department's goal to accelerate reactor manufacturing, development, and deployment of advanced reactors. The Department is encouraged to leverage its technological capabilities in materials research and development, advanced manufacturing, high-fidelity modeling and simulation, sensors and control systems to transform the methods of reactor design, manufacturing, licensing and operation. The Committee recommends $30,000,000 above the budget request for the demonstration of a Transformational Challenge Reactor concept.

Versatile Fast Reactor.—The Committee supports the budget request and recommends $15,000,000 for the Versatile Fast Reactor. The Department was previously directed to provide a report that details all current programs and projects within the Office of Nuclear Energy, whether the Department plans to continue to support each program or project, and the expected out-year funding through completion of the program or project. The Department is directed to expedite that report and provide it to the Committee as soon as possible.

Light Water Reactor Sustainability.—Within available funds, the Committee recommends $47,000,000. The most cost-effective way for the United States to maintain low-cost, carbon-free electricity is to safely extend the lives of our Nation's existing nuclear reactors from 60 to 80 years. Therefore, the Committee recommends additional funding above the budget request for this activity as a priority. The Committee directs the Secretary to use funding in this activity to continue research and development work on the technical basis for subsequent license renewal. The Secretary shall focus funding in this program on materials aging and degradation, advanced instrumentation and control technologies, and component aging modeling and simulation. The Secretary shall also coordinate with industry to determine other areas of high-priority research and development in this area.

FUEL CYCLE RESEARCH AND DEVELOPMENT

The Committee recommends $267,300,000 for Fuel Cycle Research and Development.

Within available funds, $30,000,000 is recommended for Material Recovery and Waste Form Development, $6,000,000 is recommended for Materials Protection, Accountancy, and Controls for

Transmutation, and $8,500,000 is recommended for Systems Analysis and Integration.

The Committee continues to strongly support the recommendations of the Blue Ribbon Commission on America's Nuclear Future and believes that near-term action is needed to address the accumulating inventory of spent nuclear fuel. The Committee recommends $35,300,000 for Integrated Waste Management System activities. Funding is recommended to implement plans to consolidate spent nuclear fuel from around the United States to one or more private or government interim central storage facilities. Priority shall be given to accepting spent nuclear fuel from shutdown reactors, and to accelerating the development of a transportation capability to move spent fuel from its current storage locations. Within funds recommended, the Committee recommends up to $10,000,000 for the Secretary, within existing authorities, to contract for the management of spent nuclear fuel to which the Secretary holds the title or has a contract to accept title, which includes contracting with a private company for consolidated interim storage of spent nuclear fuel.

The Committee directs the Secretary to work across the administration and to report to the Committees on Appropriations of both Houses of Congress, not later than 180 days after the date of enactment of this act, with information regarding existing resources and funding opportunities for which communities hosting decommissioned/decommissioning reactors may be eligible. The report shall also include what opportunities exist for these affected communities to consider alternative uses for these sites upon completion of the decommissioning process.

The Committee does not adopt the budget proposal to eliminate research and development activities previously funded in this account. The Committee recommends $62,500,000 to continue research and development activities on behavior of spent fuel in long-term storage, under transportation conditions, and in various geologic media, which will continue to be important to developing a solution to the waste problem. Priority shall be placed on the ongoing study of the performance of high-burnup fuel in dry storage and on the potential for direct disposal of existing spent fuel dry storage canister technologies.

The Committee continues to place a high priority on the development of nuclear fuels with enhanced accident-tolerant characteristics to significantly mitigate the potential consequences of a nuclear accident. The Committee urges the Secretary to maintain focus and priority on achieving results in these efforts. The Committee recommends $125,000,000 for the Advanced Fuels program. The Department is directed to continue implementation of the accident tolerant fuels development program, the goal of which remains development of accident tolerant nuclear fuels leading to commercial reactor fuel assembly testing by 2022. Within this amount not less than $55,600,000 is recommended to continue the participation of three industry-led teams in Phase 2 of the cost-shared research and development program. Further, the Committee recommends not less than $20,000,000 to support accident tolerant fuels development at the national laboratories and other facilities, including at the Advanced Test Reactor, the Transient

Reactor Test Facility, and the Halden reactor. In addition to amounts awarded through the Small Business Innovation Research and Small Business Technology Transfer programs, $3,000,000 is to continue the previously awarded small business projects to develop ceramic cladding for accident tolerant fuels.

Finally, the United States currently lacks either a supply of high assay low enriched uranium [HALEU], or a process to make HALEU, for advanced reactor designs that would require enrichment up to 20 percent, below levels considered usable for nuclear weapons. The Committee recommends $10,000,000 for the Department to begin work to design and build a demonstration facility to produce HALEU from naval spent nuclear fuel or other available HEU within the Department's inventory. The Committee notes that using naval spent fuel for this purpose has the added benefit of potentially reducing the volume of waste that would eventually require disposal in a permanent repository.

INFRASTRUCTURE

RADIOLOGICAL FACILITIES MANAGEMENT

The Committee recommends $29,000,000 for Radiological Facilities Management, including $20,000,000 for continued safe operations and maintenance of Oak Ridge National Laboratory hot cells.

IDAHO FACILITIES MANAGEMENT

The Committee recommends $238,000,000 for Idaho Facilities Management. The Advanced Test Reactor [ATR] is a vital asset that provides research capability across the Department. The Department was previously directed to provide a report that lists all current and planned users for the ATR for the next 3 years, the operating cost attributed to each user, and the source of funds that will be applied to cover the costs for each user. The Department is directed to expedite that report and provide it to the Committee as soon as possible.

FOSSIL ENERGY RESEARCH AND DEVELOPMENT

Appropriations, 2018	$726,817,000
Budget estimate, 2019	502,070,000
Committee recommendation	727,000,000

The Committee recommends $727,000,000 for Fossil Energy Research and Development, an increase of $224,930,000 above the budget request. Within available funds, the Committee recommends $61,070,000 for program direction.

Early-Stage Research and Development.—The Fossil Energy Research and Development program advances transformative scientific research, development, and deployment of technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels. Fossil energy is an essential part of the United States' energy future, and the National Energy Technology Laboratory [NETL] supports the Office of Fossil Energy in this critical national priority. The Committee rejects the approach to only provide funds for early-stage research. Such restrictions would cripple inno-

vation and development, and would reduce the number of energy technologies adopted in the marketplace.

Fossil Energy Roadmap.—The Committee previously directed the Department to develop a cohesive policy and technology strategy and supporting roadmap or long term plan for its Fossil Energy Research and Development portfolio and supporting infrastructure. This roadmap will guide the discovery or advancement of technological solutions and incorporate lessons learned for the future of research, development, and demonstration efforts on advanced carbon capture and storage [CCS] technologies, advanced fossil energy systems, and crosscutting fossil energy research, as well as guide the discovery or advancement of technological solutions for the prudent and sustainable development of unconventional oil and gas. The Committee looks forward to receiving the roadmap expeditiously.

NETL.—No funds shall be used for the closure of NETL sites. The Committee supports NETL's mission to discover, develop, and deploy new technologies to support a strong domestic fossil energy path. The Committee previously directed the Department to conduct a comprehensive assessment of Fossil Energy writ large to include the Fossil Energy Headquarters programs, NETL, and relevant competencies of other national laboratories which support the mission of the Office of Fossil Energy. The Committee looks forward to receiving the assessment expeditiously.

National Carbon Capture Center.—The Committee recommends funding for the National Carbon Capture Center consistent with the cooperative agreement and fiscal year 2018. The Committee continues to encourage the Department to establish university partnerships to support ongoing fossil energy programs, to promote broader research into CCS technologies, and to expand its technology transfer efforts. The Department has previously funded several university-based CCS projects and is encouraged to build on an established research base to support ongoing research and to address the wider implementation of CCS technologies.

The Committee reiterates the importance of adequate Federal support to promote design-related work and testing for a commercial-scale, post-combustion carbon dioxide capture project on an existing coal-fueled generating unit as well as fossil energy research, development, and deployment of breakthrough technologies.

COAL CCS AND POWER SYSTEMS

The Committee recommends $463,030,000 for Coal CCS and Power Systems.

The Committee does not support the Department's proposal to reorganize or consolidate the Carbon Capture, Carbon Storage, Advanced Energy Systems, crosscutting research and development programs, and the Supercritical CO_2 Technology Program [STEP].

The Committee supports the Department's Cooperative Agreements to develop cost sharing partnerships to conduct basic, fundamental, and applied research that assist industry in developing, deploying, and commercializing efficient, low-carbon, nonpolluting energy technologies that could compete effectively in meeting requirements for clean fuels, chemical feedstocks, electricity, and water resources. The Committee encourages the Department to fund activi-

ties that promote the reuse of captured carbon dioxide from coal, natural gas, industrial facilities, and other sources for the production of fuels and other valuable products. Within the ongoing CCS Program, the Department is encouraged to pursue an aggressive timeline to develop advanced carbon storage and utilization technologies and enhanced oil recovery that will improve the economics associated with domestic energy production. The Committee supports small-scale and modular coal-fired technologies with reduced carbon outputs or carbon capture that can support incremental power generation capacity additions that will enable a step-change in performance, efficiency, or cost of electricity as compared to the technology in existence on the date of enactment.

The Committee supports small-scale and modular coal-fired technologies with reduced carbon outputs or carbon capture that can support incremental power generation capacity additions that will enable a step-change in performance, efficiency, or cost of electricity as compared to the technology in existence on the date of enactment.

The Committee recommends research and development as well as pilot-scale activities that will improve the performance, reliability and efficiency of both new- and existing-fossil fuel fired power plants, including solvent-based, heat-integrated carbon capture and storage research and testing at pilot-scale facilities installed at a commercial power plant with focus on solvent physical property impact on column performance, transformative approaches to mitigate emissions, and solvent quality maintenance to ultimately reduce capital and operating costs; development and testing of materials for highly efficient energy platforms; advancement of gasification systems; development of carbon products from coal; development of transformational energy conversion systems including pressurized oxycombustion, supercritical CO_2 cycles, and chemical looping technologies; advancement of turbine technologies for higher efficiency and pressure cycles; development of fuel cells; coal and methane to liquid fuels; development and testing of advanced water management technologies; and continued investigation of rare earths recovery from coal and coal refuse.

Within funds available for CCS and Power Systems, the Committee recommends not less than $30,000,000 to support a new solicitation for Front-End Engineering and Design [FEED] studies of two commercial-scale carbon capture power projects for retrofit at an existing coal plant and for a coal or natural gas plant that generates carbon dioxide suitable for utilization or storage. A FEED study shall incorporate work from feasibility studies and testing to provide specific project definition, detailed design, scopes of work, material purchasing and construction schedules, cost for project execution, and subsurface, structural, and environmental permitting requirements.

Carbon Capture.—Achieving low-cost carbon capture technology is important to facilitating economic environmental mitigation solutions for the power and industrial sectors while opening up a broader carbon utilization economy. The Committee encourages the Department to focus its Carbon Capture research, development and deployment efforts on improving the efficiency and decreasing the costs of carbon capture technologies, demonstrating carbon capture

technologies for private sector-driven adoption at fossil energy power systems and industrial sources, and to identify how these technologies can be integrated within business models and operations. This includes small- and large-scale pilot testing of technologies moving through the program pipeline on both coal and natural gas applications, as well as on industrial sources.

Carbon Storage.—Within available funds for Carbon Storage, the Committee recommends $12,000,000 for Carbon Use and Reuse to continue research and development activities to support valuable and innovative uses for carbon. The Committee believes the potential for carbon dioxide utilization technologies to become economically viable has improved in recent years, and these technologies should continue to receive attention from the Office of Fossil Energy. The Committee urges the Office of Fossil Energy to prioritize research on carbon dioxide utilization technologies, direct air capture technologies, and industrial source capture. The Committee also encourages the Office of Fossil Energy to collaborate with the Bioenergy Technologies program within the EERE, the private sector, and academia to support projects that utilize carbon dioxide in the production of algae and other potentially marketable products. The Committee supports early-stage research and development in conversion of coal pitch/coal to carbon fiber and in other value-added products for alternative uses of coal. Within Carbon Storage, the Committee recommends $55,000,000 for Storage Infrastructure. The Committee recognizes the successful work of the Regional Carbon Sequestration Partnerships and the important role they play in supporting the research and development of carbon utilization and storage. The Committee supports the focus on infrastructure development strategies through continued efforts to expand regional geological characterization to reduce uncertainties, collect and analyze data, facilitate and inform regional permitting and policy challenges. The Department is directed to fulfill prior commitments to the Regional Carbon Sequestration Partnerships. Further, the Committee recommends funding beyond the current phase, through a multiyear continuation of competitively selected partnerships to expand the work of the existing partnerships. The Committee recommends not less than $20,000,000 for a competitive continuation of the Regional Carbon Sequestration Partnership Program and not less than $30,000,000 to continue the four-phase CarbonSAFE initiative. The Committee directs the Department to work collaboratively with the Regional Carbon Sequestration Partnerships to develop a Storage Infrastructure roadmap through 2025 to identify the knowledge gaps and technology and policy developments that are needed to close those gaps.

Advanced Energy Systems.—The Committee recommends up to $30,000,000 for solid oxide fuel cell systems, which supports research and development to enable efficient, cost-effective electricity generation with minimal use of water. The Committee encourages the Department to promote and assist in the research and development of new higher efficiency gas turbines used in power generation systems to allow the United States to upgrade and increase the reliability and resiliency of the Nation's electrical grid system, to better compete against the threat of foreign competitors who are being subsidized by their governments, while reducing the cost of

electricity and significantly lowering emissions. This includes awarding grants and funding contract proposals from industry, small businesses, universities and other appropriate parties.

The Committee supports coal and coal biomass to liquids activities and encourages the Department to focus on research and development to improve cost and efficiency of coal-to-fuels technology implementation and polygeneration. The Committee recognizes the importance of emerging technologies such as, coal-to-liquids [CTL] fuel conversion. Within available funds, the Committee supports research and development that will ensure CTL technologies have an opportunity to grow. The Committee supports the activities proposed in Power Generation Efficiency which would focus on improving the reliability and efficiency of existing plants through early stage research and development.

Crosscutting Research.—The Committee supports Advanced Ultrasupercritical Materials research and development to identify, test, qualify, and develop a domestic supply chain capable of producing components from high temperature steam materials.

STEP.—The Committee rejects the proposed changes in the request to the STEP Program, and recommends $25,000,000 to complete the necessary design and construction of the 10MW pilot facility, and conduct the necessary testing, including long-duration testing for the facility.

NETL Coal Research and Development.—Within available funds for NETL Coal Research and Development, the Committee recommends $18,000,000 for the Department to continue its external agency activities to develop and test advanced separation technologies and accelerate the advancement of commercially viable technologies for the recovery of rare earth elements and minerals from U.S. coal and coal byproduct sources. The Committee expects research to support pilot-scale and experimental activities for near-term applications.

NATURAL GAS TECHNOLOGIES

The Committee recommends $53,200,000 for Natural Gas Technologies.

Risk-Based Data Management System.—Within available funds, the Committee recommends $5,200,000 to continue the Risk Based Data Management System [RBDMS] to support a cloud-based application and necessary cybersecurity initiatives. In addition, funding shall support the continued integration of FracFocus and RBDMS for improved public access to State-oil and gas-related data, as well as for State regulatory agencies to support electronic permitting for operators, eForms for improved processing time for new permits, operator training from the improved FracFocus 3.2 after enhancements are implemented, and miscellaneous reports, such as *Produced Water Report: Current and Future Beneficial Uses Report.* The Committee supports the continued efforts to provide public transparency, while protecting proprietary information.

Methane Hydrate Activities.—The Committee recommends $20,000,000 for methane hydrates. The Committee notes that the budget request includes no money for actual research into the methods for producing methane hydrates. The Committee encourages the Department to perform a long-term methane hydrate pro-

duction test in the Arctic, as proposed in the Methane Hydrate Advisory Committee's earlier recommendations (May 21, 2014) to the Department.

Environmentally Prudent Development.—The Committee recommends $10,000,000 for the Environmentally Prudent Development subprogram.

Emissions Mitigation from Midstream Infrastructure.—The Committee recommends $12,000,000 for the Emissions Mitigation from Midstream Infrastructure subprogram. The Committee recommends funds for natural gas infrastructure research, including advanced materials and novel sensor technologies. The Department is directed to incorporate this research into its ongoing work in this field, so that it shall complement the Emissions Mitigation from Midstream Infrastructure subprogram.

Emissions Quantification from Natural Gas Infrastructure.—The Committee recommends $6,000,000 for the Emissions Quantification from Natural Gas Infrastructure research subprogram.

UNCONVENTIONAL FOSSIL ENERGY TECHNOLOGIES

The Committee recommends $54,000,000 for Unconventional Fossil Energy Technologies. The Committee notes the importance of providing research support that will assure sustainable, reliable, affordable, and environmentally sound supplies of domestic unconventional fossil energy resources.

The Committee understands the Department is continuing to conduct a study on the feasibility of establishing an ethane storage and distribution hub in central Appalachia. The Department is directed to identify the Federal agencies with jurisdictional oversight of such a project and to coordinate with the liaisons of those agencies to streamline the permitting application and approval process for a central Appalachian ethane storage and distribution hub. Further, the Department is directed to brief the Committees on Appropriations of both Houses of Congress on their findings and recommendations once complete.

The Department is encouraged to explore research and development for safe drilling and completion technologies that use no fresh water and can be deployed in horizontal wells.

Within available funds, $15,500,000 is recommended for research to better understand reservoirs and to improve low recovery factors from unconventional natural gas and oil wells and $15,500,000 is recommended to continue research toward enhanced recovery technologies in shale oil, low permeability reservoirs, residual oil zone reservoirs, fractured reservoirs, and conventional oil reservoirs. The Department shall solicit, award and manage these research projects on a nationwide basis directly with researchers from universities and not-for-profit research organizations. The projects may include research projects to improve environmental mitigation, water quality and treatment, infrastructure technology as well as the societal impacts of unconventional shale plays. These awards shall identify ways to improve existing technologies, encourage prudent development, provide cost-effective solutions, and develop a better understanding of these reservoirs' resource potential.

The Committee recommends $17,500,000 for the Unconventional Field Test Sites.

The Committee recognizes the Department's ongoing efforts to support research into the exploration for and development of emerging unconventional oil and/or gas reservoirs, and directs the Department to direct future allocations to projects in locations geologically representative of the unconventional reservoir of interest. The Committee encourages continued efforts to characterize emerging unconventional reservoirs but with emphasis on geographic areas where geological conditions are optimal for the generation and accumulation of economically significant amounts of oil or gas in the geological formation(s) being studied, as indicated by published reports and existing early-stage commercial activity. The Committee further encourages a focus of available resources on potential unconventional reservoirs for which there is limited data rather than well-known existing reservoirs. University-led research is preferred to ensure a broad range of expertise is utilized to address the entire range of environmental, socio-economic, geological, and technical challenges associated with unconventional oil and gas development. The Committee also recognizes that private industry participation in very early development phase research projects, although desirable, is often difficult to achieve due to the highly proprietary nature of early-stage exploration data.

The Committee recommends $4,000,000 for further research on multipronged approaches for characterizing the constituents of and managing the cleaning of water produced during the extraction of oil and natural gas, of which $2,000,000 is recommended to partner with research universities engaged in the study of characterizing, cleaning, treating, and managing produced water and who are willing to engage though public private partnerships with the energy industry to develop and assess commercially viable technology to achieve the same. The Committee encourages the Department to work with the energy producing industry to identify and develop—to a commercial scale—technologies that can characterize, clean and effectively treat produced water to have beneficial reuse.

The Committee directs the Department to continue its research partnership with the Department of Transportation on the crude oil characterization study to improve the safety of crude oil transported by rail. The Committee recommends up to $1,500,000 for completion of the study.

The Committee recognizes that the United States possesses vast domestic coal reserves that cannot be mined economically at current prices. Although some natural gas is absorbed by coal and can be economically recovered through methane extraction, more efficient recovery mechanisms are feasible. To validate methods for recovering a greater fraction of energy contained in deep coal deposits, the Committee encourages the Department to conduct pilot field tests of technologies for in-situ biological conversion of coal to natural gas with university participants, and evaluate the feasibility of converting coal deposits in both the Western and Eastern United States into natural gas.

NATIONAL ENERGY TECHNOLOGY LABORATORY

The Committee recommends $50,000,000 for NETL Research and Operations and $45,000,000 for NETL Infrastructure.

NETL Infrastructure.—The Committee directs the Department to prioritize funds to provide site-wide upgrades for safety, avoid an increase in deferred maintenance, and provide for the continued update and refresh of Joule through the final year of a 3-year lease.

NAVAL PETROLEUM AND OIL SHALE RESERVES

Appropriations, 2018	$4,900,000
Budget estimate, 2019	10,000,000
Committee recommendation	10,000,000

The Committee recommends $10,000,000 for Naval Petroleum and Oil Shale Reserves, the same as the budget request.

STRATEGIC PETROLEUM RESERVE

Appropriations, 2018	$252,000,000
Budget estimate, 2019	175,105,000
Committee recommendation	175,105,000

The Committee recommends $175,105,000 for the Strategic Petroleum Reserve, the same as the budget request.

NORTHEAST HOME HEATING OIL RESERVE

Appropriations, 2018	$6,500,000
Budget estimate, 2019	10,000,000
Committee recommendation	10,000,000

The Committee recommends $10,000,000 for the Northeast Home Heating Oil Reserve, the same as the budget request.

ENERGY INFORMATION ADMINISTRATION

Appropriations, 2018	$125,000,000
Budget estimate, 2019	115,035,000
Committee recommendation	125,000,000

The Committee recommends $125,000,000 for the Energy Information Administration, an increase of $9,965,000 above the budget request.

The Committee recognizes the importance of building energy information and the opportunity for better data collection presented by new technologies. The Department is encouraged to upgrade the Commercial Buildings Energy Consumption Surveys to a real-time data collection system with rapid reporting of results, without compromising statistical validity or data security.

NON-DEFENSE ENVIRONMENTAL CLEANUP

Appropriations, 2018	$298,400,000
Budget estimate, 2019	218,400,000
Committee recommendation	353,240,000

The Committee recommends $353,240,000 for Non-Defense Environmental Cleanup, an increase of $134,840,000 above the budget request.

Small Sites.—The Committee recommends $174,000,000 for Small Sites. Within the available funds, the Committee recommends $10,000,000 for work required pursuant to the agreement reached in 2012 between the Department, the Advisory Council on

Historic Preservation, and State and local governments to complete the demolition of K–25 in exchange for preserving the historic contributions made by the K–25 site to the Manhattan Project. The Committee also recommends $20,000,000 for operations, maintenance, and cleanup activities to support the Manhattan Project National Historical Park sites in Hanford, Washington, and Los Alamos, New Mexico. The Park tells an important story in our Nation's history: the development and production of the technology and materials necessary to create the world's first atomic bomb.

Within available funds, the Committee recommends $55,000,000 to continue work at Lawrence Berkeley National Laboratory, $45,000,000 for Moab, and $25,000,000 to continue the removal of the High Flux Beam Reactor stack at Brookhaven.

URANIUM ENRICHMENT DECONTAMINATION AND DECOMMISSIONING FUND

Appropriations, 2018	$840,000,000
Budget estimate, 2019	752,749,000
Committee recommendation	840,818,000

The Committee recommends $840,818,000 for Uranium Enrichment Decontamination and Decommissioning [UED&D] activities, an increase of $88,069,000 above the budget request.

The Committee recommendation includes $195,000,000 for East Tennessee Technology Park to continue cleanup and demolition of all remaining facilities including the K–1200 complex and the K–1600 complex, and to conduct remedial actions, and site closure activities. The Committee also recommends $206,000,000 for Paducah, and $408,099,000 for Portsmouth. Additional funding of $60,000,000 above the budget request is recommended for the Portsmouth Site, and the Department shall not barter, transfer, or sell uranium during fiscal year 2019 to generate additional funding for Portsmouth cleanup that is in excess of the amount of funding recommended.

SCIENCE

Appropriations, 2018	$6,259,903,000
Budget estimate, 2019	5,390,972,000
Committee recommendation	6,650,000,000

The Committee recommends $6,650,000,000 for Science, an increase of $1,259,028,000 above the budget request.

Distinguished Scientist Program.—The Committee recommends $4,000,000 to support the Department's Distinguished Scientist Program, as authorized in section 5011 of Public Law 110–69 to promote scientific and academic excellence through collaborations between institutions of higher education and national laboratories to be funded from across all Office of Science programs.

Quantum Information Science.—The Committee supports the Office of Science's coordinated and focused research program in quantum information science to support the Department's science, energy, and national security missions. This emerging field of science promises to yield revolutionary new approaches to computing, sensing, communication, and metrology, as well as our understanding of the universe, and accordingly the Committee recommends

Calendar No. 437

115TH CONGRESS, *2d Session* | SENATE | REPORT 115–258

ENERGY AND WATER DEVELOPMENT APPROPRIATIONS BILL, 2019

MAY 24, 2018.—Ordered to be printed

Mr. ALEXANDER, from the Committee on Appropriations, submitted the following

REPORT

[To accompany S. 2975]

The Committee on Appropriations reports the bill (S. 2975) making appropriations for energy and water development and related agencies for the fiscal year ending September 30, 2019, and for other purposes, reports favorably thereon and recommends that the bill do pass.

New obligational authority

Total of bill as reported to the Senate	$43,766,000,000
Amount of 2018 appropriations	60,582,716,000
Amount of 2019 budget estimate	31,610,121,000
Bill as recommended to Senate compared to—	
2018 appropriations	−16,816,716,000
2019 budget estimate	+12,155,879,000

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tensive written justifications for determinations of what costs are reimbursable for complex projects involving major Federal expenditures and multiple funding sources.

GENERAL PROVISIONS—DEPARTMENT OF THE INTERIOR

Section 201. The bill includes a provision regarding reprogramming.

Section 202. The bill includes a provision regarding the San Luis Unit and Kesterson Reservoir.

TITLE III

DEPARTMENT OF ENERGY

OVERVIEW OF RECOMMENDATION

The Committee recommends $34,990,015,000 for the Department of Energy, an increase of $9,512,377,000 above the budget request.

The Committee recommendation sets priorities by supporting the Office of Science and ARPA–E, leading the world in scientific computing, addressing the Federal Government's responsibility for environmental cleanup and disposal of used nuclear fuel, keeping large construction projects on time and on budget, effectively maintaining our nuclear weapons stockpile, and supporting our nuclear Navy.

INTRODUCTION

The mission of the Department of Energy [Department] is to ensure America's security and prosperity by addressing its energy, environmental, and nuclear challenges through transformative science and technology solutions. To accomplish this mission, the Secretary of Energy [Secretary] relies on a world-class network of national laboratories, private industry, universities, States, and Federal agencies, which allows our brightest minds to solve our Nation's most important challenges.

The Committee's recommendation for the Department includes funding in both defense and non-defense budget categories. Defense funding is recommended for atomic energy defense activities, including the National Nuclear Security Administration, which manages our Nation's stockpile of nuclear weapons, prevents proliferation of dangerous nuclear materials, and supports the Navy's nuclear fleet; defense environmental cleanup to remediate the former nuclear weapons complex; and safeguards and security for Idaho National Laboratory. Non-defense funding is recommended for the Department's energy research and development programs (including nuclear, fossil, and renewable energy, energy efficiency, grid modernization and resiliency, and the Office of Science), power marketing administrations, the Federal Energy Regulatory Commission, and administrative expenses.

REPROGRAMMING GUIDELINES

The Committee's recommendation includes control points to ensure the Secretary spends taxpayer funds in accordance with congressional direction. The Committee's recommendation also in-

cludes reprogramming guidelines to allow the Secretary to request permission from the Committee for certain expenditures, as defined below, which would not otherwise be permissible. The Secretary's execution of appropriated funds shall be fully consistent with the direction provided under this heading and in section 301 of the bill, unless the Committee includes separate guidelines for specific actions in the bill or report.

Prior to obligating any funds for an action defined below as a reprogramming, the Secretary shall notify and obtain approval of the Committees on Appropriations of both Houses of Congress. The Secretary shall submit a detailed reprogramming request in accordance with section 301 of the bill, which shall, at a minimum, justify the deviation from prior congressional direction and describe the proposed funding adjustments with specificity. The Secretary shall not, pending approval from the Committee, obligate any funds for the action described in the reprogramming proposal.

The Secretary is also directed to inform the Committees on Appropriations of both Houses of Congress promptly and fully when a change in program execution and funding is required during the fiscal year.

Definition.—A reprogramming includes:

—the reallocation of funds from one activity to another within an appropriation;

—any significant departure from a program, project, activity, or organization described in the agency's budget justification as presented to and approved by Congress;

—for construction projects, the reallocation of funds from one construction project identified in the agency's budget justification to another project or a significant change in the scope of an approved project;

—adoption of any reorganization proposal which includes moving prior appropriations between appropriations accounts; and

—any reallocation of new or prior year budget authority, or prior year deobligations.

Direction on Research and Development Activities

The budget request proposes a shift away from later-stage research and development activities to refocus the Department on an early-stage research and development mission. The Committee believes that such an approach will not successfully integrate the results of early-stage research and development into the U.S. energy system and thus will not adequately deliver innovative energy technologies, practices, and information to American consumers and companies. The Committee directs the Department to implement mid- and late-stage research and development activities as directed in this report in a timely manner.

Crosscutting Initiatives

The recommendation supports several crosscutting initiatives funded in prior years that reach outside of individual program offices to draw on the diverse disciplines within the agency as a whole. These initiatives, which address the Energy-Water Nexus; grid modernization; subsurface science, technology and engineering

research, development, and deployment; cybersecurity; advanced materials, and the Beyond Batteries Initiative have allowed for a more comprehensive review of complex issues.

Grid Modernization.—The Department is directed to continue the ongoing work between the national laboratories, industry, and universities to improve grid reliability and resiliency through the strategic goals of the Grid Modernization Initiative and encourages the Department to include all applied energy programs to ensure broad energy system resilience and modernization. Further, the Committee supports the Grid Modernization Laboratory Consortium and supports continued implementation of the Grid Multi-Year Program Plan. The Committee directs the Department to emphasize national grid resilience modeling and improved grid cyber resilience to address emerging national resilience challenges of the grid and related energy systems, planned investments in energy storage to improve grid flexibility and resilience, and advanced sensors and control paradigms that promise to improve energy system resilience of the future smart grid. The Committee recognizes that the inaugural projects funded for a 3-year duration will be concluding in fiscal year 2019 and therefore the Department is directed to continue support for the Grid Modernization Initiative and the Grid Modernization Laboratory Consortium and provide a plan to Congress to extend the multi-year program plan to include priorities for field validation of the most successful research outcomes with industry and State stakeholders to accelerate adoption of the key Department results.

Beyond Batteries Initiative.—The Committee is supportive of the Department's approach to consider energy storage holistically, and focus on advances in controllable loads, hybrid systems, and new approaches to energy storage. The Committee agrees that advances in this wide range of energy storage technologies will allow for loads to be combined with generation from all sources to optimize use of existing assets to provide grid services, and increase grid reliability. The Department shall continue to use all of its capabilities to accelerate the development of storage technologies, including the basic research capabilities of the Office of Science, the technology expertise of the Office of Energy Efficiency and Renewable Energy, the grid-level knowledge of the Office of Cybersecurity, Energy Security and Emergency Response, and the rapid technology development capabilities of ARPA–E. The Committee directs the Department to coordinate efforts among various existing Department programs to maximize efficiency of funds and expand vital research.

The Department is encouraged to prioritize achieving a long-term goal of deploying technologies at $100/kWh or less cost installed while being able to cycle twice per day, discharging for at least 4 hours, with a lifetime of roughly 20 years or at least 8,000 cycles.

Subsurface Crosscut.—The Committee supports the ongoing Subsurface Technology and Engineering Research [SubTER] Initiative, focused on revolutionizing sustainable subsurface energy production and storage through transformational improvements in the ability to access, characterize, predict, and adaptively manipulate subsurface fracture and flow processes. SubTER aims to double reservoir recovery, decrease the environmental footprint, and enhance energy security and public safety. The Committee supports the

SubTER program's approach to increasing domestic supply of oil, gas, and geothermal energy resources by manipulating the permeability of subsurface rock formations to injection fluids. To validate methods which enhance oil and gas recovery from fracking wells, the Committee encourages the Department to conduct pilot field tests of promising technologies with university and industry partners to reduce permeability and control the flow of fluids in the subsurface with targets of blocking highly permeable pathways that reduce sweep efficiency in porous rock and plugging fractures in shales.

Energy-Water Nexus.—The Committee recognizes water and energy are critical resources that are reciprocally linked. The Energy-Water Nexus crosscut consists of a collaboration of agencies, national laboratories, State and local governments, utilities, industry, and the science community working collectively to address energy and water resource challenges, specifically as they relate to energy security and energy sector water needs.

Advanced Materials.—The Committee supports the Department's attention to advanced materials research and development, focusing on lightweight materials and composites, and corrosion and materials under extremes. The Committee understands in previous years, other program offices independently had standalone existing materials programs, and continues to support formal coordination across offices through the Materials Working Group. Continued coordination supports the Department's ability to impact the materials development cycle from scientific discovery to technological innovation and deployment.

Cybersecurity Crosscut.—Cybersecurity activities within the Department cover a broad scope ranging from the protection of Department assets against cybersecurity threats to improving cybersecurity in the electric power and oil and natural gas sectors to other areas in the national security portfolio. As cybersecurity threats become more complex, and the Department increases its focus on cybersecurity research and development, it is vital that there be clear crosscutting objectives and coordination across the Department. The Committee directs the Department to develop a plan that integrates all of the Department's cybersecurity research, development, and deployment investments, and brief the Committees on Appropriations of both Houses of Congress within 90 days after enactment of this act.

Arctic Energy Office.—The Committee supports the promotion of research, development, and deployment of electric power technology that is cost-effective and well-suited to meet the needs of rural and remote regions of the United States, especially where permafrost is present or located nearby. In addition, the Committee further supports research, development and deployment in such regions of enhanced oil recovery technology, including heavy oil recovery, reinjection of carbon, and extended reach drilling technologies; gas-to-liquids technology and liquefied natural gas, including associated transportation systems; small hydroelectric facilities, river turbines, and tidal power; natural gas hydrates, coal bed methane, and shallow bed natural gas; and alternative energy, including wind, geothermal, and fuel cells. The Department is encouraged to support a renewed focus on the Arctic region, and as a cross-cut-

ting activity, use the Arctic Energy Office as a centralized area to support the use of energy resources, but also innovative activities, including microgrids and integrated energy systems.

Regional Initiatives.—The Committee continues to urge the Department to utilize investments through existing regional capabilities that include industry, universities, and State and regional economic development assets. The Committee further encourages the national laboratories to expand their geographic outreach through people and access to specialized equipment and user facilities in order to contribute to the success of these regional initiatives.

COMMONLY RECYCLED PAPER

The Secretary shall not expend funds for projects that knowingly use as a feedstock commonly recycled paper that is segregated from municipal solid waste or collected as part of a collection system that commingles commonly recycled paper with other solid waste at any point from the time of collection through materials recovery.

ENERGY PROGRAMS

ENERGY EFFICIENCY AND RENEWABLE ENERGY

Appropriations, 2018	$2,321,778,000
Budget estimate, 2019	695,610,000
Committee recommendation	2,322,000,000

The Committee recommends $2,322,000,000 for Energy Efficiency and Renewable Energy [EERE], an increase of $1,626,390,000 above the budget request. Within available funds, the Committee recommends $162,500,000 for program direction.

Congressional Direction.—The Committee directs the Department to maintain a diverse portfolio of early-, mid-, and late-stage research, development, and market transformation activities. Regular consultation with industry is encouraged to avoid duplication of private-sector efforts. The Committee further directs the Department to fully execute the funds appropriated in this act, as directed in this report, in a timely manner and to keep Congress apprised of progress in implementing funded programs, projects, and activities. Further, the Committee directs the Department to give priority to stewarding the assets and optimizing the operations of EERE-designated user facilities across the Department of Energy complex. In future budget requests, the Committee directs EERE to demonstrate a commitment to operations and maintenance of facilities that support the Department's critical missions.

Workforce Development.—The development of a skilled workforce is critical to the successful deployment and long-term sustainability of energy efficient and renewable energy technologies. The Committee encourages funding within EERE programs to be allocated to training and workforce development programs that assist and support workers in trades and activities required for the continued growth of the U.S. energy efficiency and clean energy sectors. Furthermore, the Committee encourages the Department to work with 2-year, public community, and technical colleges for job training programs that lead to an industry-recognized credential in the energy workforce.

Electrification Futures Study.—The Committee encourages continued coordination between the EERE and the Office of Cybersecurity, Energy Security, and Emergency Response to evaluate the impacts of mass electrification on the utility business model and the electricity distribution system of the U.S. through the Electrification Futures Study.

Cybersecurity.—The Committee believes cybersecurity vulnerabilities must be addressed as renewable energy technologies enter into the marketplace. The Committee also believes there is a gap with respect to distributed generators and behind-the-substation generators, storage, smart buildings technologies and electric vehicles where the potential for cyberattacks will continue to grow and threaten the modern grid. Within funds recommended for EERE, not less than $20,000,000 is recommended to establish a program that will bring cybersecurity into early-stage technology R&D so that it is built into new technology for this effort. Within 180 days after enactment of this act, the Department shall submit to the Committees on Appropriations of both Houses of Congress a multi-year program plan for this effort to encompass all EERE programs.

Energy Star.—The Department is encouraged to support the Environmental Protection Agency's efforts to reexamine Energy Star guidelines and standard operating procedures to ensure transparency, predictability, and consistency for all stakeholders.

VEHICLE TECHNOLOGIES

The Committee recommends $337,500,000 for Vehicle Technologies, including $7,000,000 for operations and maintenance of the National Transportation Research Center.

Within this amount, the Committee recommends not less than $163,200,000 for Battery and Electrification Technologies to lower the cost of batteries across light-, medium- and heavy-duty vehicles through battery processing science, advanced battery chemistries, materials research, and modeling and simulation of battery performance. The Committee recommends not less than $38,100,000 for electric drive research and development including high power density electric drive systems, wireless charging and power electronic for extreme fast charging. The Committee also supports research and development to lower the cost of batteries for electric vehicles through cobalt-free materials and roll-to-roll manufacturing. Funding in this area shall also support research and development to improve electric motor technology through advanced material processing and the use of high-performance computing for multi-physics discovery to understand these new processes.

The Committee further recommends $25,000,000 for Energy Efficient Mobility Systems, including the Systems and Modeling for Accelerated Research in Transportation [SMART] Mobility, Big Data Solutions for Mobility [Big Data], and Advanced Computing for Energy [ACE] initiatives, including HPC4Mobility and HPC-enabled analytics. These investments are critical to expanding U.S. energy security, economic vitality, and quality of life. Therefore, the Committee supports continued funding for research that allows the U.S. to continue its leadership in advancing state-of-the-art transportation infrastructure.

The Committee recommends $43,000,000 for Advanced Engine and Fuel Technologies for research focused on advanced fuel formulations that optimize engine performance. Within this amount, $24,500,000 is recommended for the Co-Optimization of Engine and Fuels Multi-Laboratory Consortium.

The Committee recommends $60,000,000 for Materials Technology. Within this amount, $25,000,000 is recommended for early-stage research on multi-material joining and propulsion materials at the national laboratories, and carbon fiber-reinforced composites at the Carbon Fiber Technology Facility.

Within available funds, the Committee recommends $10,000,000 for continued funding of section 131 of the 2007 Energy Independence and Security Act for transportation electrification.

The Committee recommends $25,000,000 to continue the five awards under the SuperTruck II program and encourages the Department to provide additional early-stage research funding for heavy-duty vehicle technologies as part of the program.

Within available funds, the Committee recommends $46,300,000 for Outreach, Deployment, and Analysis. Within this amount, $37,800,000 is recommended for deployment through the Clean Cities Program. The Department is encouraged to ensure balance in the award of funds to achieve varied aims in fostering broader adoption of clean vehicles and installation of supporting infrastructure. The Committee further encourages the Department to prioritize projects in States where the transportation sector is responsible for a higher percentage of the State's total energy consumption and is the largest source of greenhouse gases.

The Committee supports Advanced Vehicle Competitions, a collegiate engineering competition that provides hands-on, real-world experience to demonstrate a variety of advanced technologies and designs, and supports development of a workforce trained in advanced vehicles. The Committee recommends $2,500,000 following the successful EcoCAR 3 competition to support a new 4-year collegiate engineering competition, EcoCAR 4.

The Committee recommends $10,000,000 to continue improving the energy efficiency of commercial off-road vehicles, including up to $5,000,000 for fluid power systems.

The Committee is concerned with the Department's lack of requested funding for natural gas vehicle research and development. With an abundant source of low-cost domestic natural gas, this resource as a transportation fuel is becoming the alternative fuel of choice for high fuel use fleets and off-road vehicles. Further research is needed on natural gas storage, natural gas engines, and fueling infrastructure optimization. Within available funding, the Committee recommends $15,000,000 to address technical barriers to the increased use of natural gas vehicles, including the development of novel compression and liquefaction technologies, advanced materials, and improvements in processes for conditioning, storing and dispensing natural gas. The Committee directs the Department to undertake a comprehensive study, with stakeholder input, on natural gas vehicle deployment in on- and off-road transportation, identifying barriers to increased deployment of natural gas vehicles.

BIOENERGY TECHNOLOGIES

The Committee recommends $215,000,000 for Bioenergy Technologies.

Within available funds, the Committee recommends not less than $30,000,000 for Advanced Algal Systems to sustain the investment in development of algal biofuels.

The Committee further recommends $30,000,000 for Feedstock Supply and Logistics, $50,000,000 for Demonstration and Market Transformation, and $10,000,000 for Analysis and Sustainability.

The Committee further recommends $95,000,000 for Conversion Technologies. Within this amount, $20,000,000 is recommended to continue activities of the Agile Biology Foundry intended to achieve substantial improvements in conversion efficiencies and the scale-up of biological processes with lower development costs and lead times.

Within available funds, the Committee recommends $5,000,000 within Conversion Technologies to continue the research biopower program, which makes full and innovative use of biomass, municipally-derived biosolids, municipal solid waste, and livestock waste.

Within available funds the Committee recommends $5,000,000 to support the development and testing of new domestic manufactured low-emission, high-efficiency, residential wood heaters that supply easily accessed and affordable renewable energy and have the potential to reduce the national costs associated with thermal energy.

The Committee recognizes that biomethane or anaerobic digesters can provide important solutions to meet renewable energy goals, as well as address environmental and economic challenges and divert organic waste from landfills. The Committee encourages the Department to fund research, development, and demonstration activities to help lower upfront development costs and promote smaller-scale, community digesters. Within available funds for Conversion Technologies, the Committee recommends $5,000,000 to improve the efficiency of community and smaller digesters that accept both farm and food wastes.

Within available funding, the Committee recommends not less than $10,000,000 to establish a multi-university partnership to conduct research and enhance educational programs that improve alternative energy production derived from urban and suburban wastes. The Committee further directs the Department to collaborate with institutions in Canada and Mexico to leverage capacity and capitalize on North American resources.

Within available funds, the Committee supports research to develop the foundation for scalable technologies to use carbon dioxide produced in biorefineries to produce higher value fuels, chemicals or materials.

HYDROGEN AND FUEL CELL TECHNOLOGIES

The Committee recommends $115,000,000 for Hydrogen and Fuel Cell Technologies.

Within the amounts recommended, the Committee recommends $39,000,000 for Hydrogen Fuel Research and Development for efforts to reduce the cost and improve the performance of hydrogen

generation and storage systems, hydrogen measurement devices for fueling stations, hydrogen compressor components, and hydrogen station dispensing components. The Department shall continue to research novel onboard hydrogen tank systems, as well as trailer delivery systems to reduce cost of delivered hydrogen. Further, the Department is directed to support research and development activities that reduce the use of platinum group metals, provide improvements in electrodes and membranes and balance-of-plant components and systems. The Committee recommends $1,000,000 for Systems Analysis, including research on in-situ metrology for process control systems for manufacturing of key hydrogen system components.

Within the amounts recommended, $19,000,000 is recommended for Hydrogen Infrastructure Research and Development. Further, the Department is directed to continue the H2@Scale Initiative, which couples current research efforts within the program with new opportunities for using hydrogen to provide grid resiliency and advance a wide range of industrial processes for the production of fuels, chemicals, and materials.

The Committee recommends $19,000,000 for Technology Acceleration activities, including $3,000,000 for manufacturing research and development, and $7,000,000 for industry-led efforts to demonstrate a hydrogen-focused integrated renewable energy production, storage, and transportation fuel distribution/retailing system. Regular consultation with industry is encouraged to avoid duplication of private-sector activities.

The Committee further recommends $7,000,000 for Safety, Codes, and Standards to maintain a robust program and engage regulatory and code officials to support their technical needs relative to infrastructure and vehicle safety.

The Committee encourages the Secretary to work with the Secretary of Transportation and industry on coordinating efforts to deploy hydrogen fueling infrastructure.

SOLAR ENERGY

The Committee recommends $239,500,000 for Solar Energy.

Within available funds, the Committee recommends $55,000,000 for Concentrating Solar Power research, development, and demonstration to reduce overall system costs, better integrate subsystem components, develop higher-temperature receivers, and improve the design of solar collection and thermal energy storage. Within this amount, $5,000,000 is recommended for competitively selected projects focused on advanced thermal desalination technologies.

The Committee recommends $70,000,000 for Photovoltaic Research and Development to develop new or improved high-performance cell materials and architectures and achieve greater than 40-percent cell efficiencies. The Department is encouraged to cooperate with industry and academia in its research and development efforts.

The Committee recommends $35,000,000 for Balance of System Soft Cost Reduction to reduce non-hardware costs through new techno-economic tools and methodologies for distributed energy resources; an assessment of the potential for block-chain technologies

to improve management of distributed solar; and standardization of planning, permitting, and installation tools and methodologies. Within this amount, the Committee recommends not less than $1,000,000 for the joint Solar Ready Vets program within the Department of Defense as a way to train America's veterans to fill the growing need for solar industry workers.

Within the amounts recommended for Balance of System Soft Cost Reduction, $5,000,000 is recommended to re-invigorate the National Community Solar Partnership program to provide technical assistance to low- and moderate-income individuals, businesses, non-profit organizations, and State, local, and tribal governments to increase use of community solar installations.

Further, the Committee recommends $49,500,000 for Systems Integration to address the technical barriers to increased solar penetration on the grid, including grid reliability, dispatchability, power electronics, and communications. The Committee encourages research and development efforts to target grid storage improvements, demand-response and load-shaping technologies, and modeling and planning tools for distributed energy resources.

The Committee recommends $30,000,000 for Manufacturing Competitiveness to develop advanced low-cost manufacturing process technologies, including thickness reduction and faster processing with fewer steps. Within this area, the Committee also supports early-stage research on photovoltaics based on earth abundant materials focusing on scalable production methods, material stability, and ultrahigh efficiency tandem photovoltaic cell manufacturing approaches. To directly address fundamental barriers that could limit new technology's adoption, the Committee believes the fastest approach for rapid commercialization of new photovoltaic technologies would be to bring national laboratory capabilities and academia, in partnership with early-stage companies to develop a new photovoltaic U.S. manufacturing base. The Department is directed to create a 5-year domestic manufacturing capability consortium focused on inherently scalable production methods such as solution processing, roll-to-roll manufacturing, the science of inherent material stability, and ultrahigh efficiency through tandem manufacturing. Within available funds, the Committee recommends not less than $10,000,000 for the first year of the consortium.

WIND ENERGY

The Committee recommends $80,000,000 for Wind Energy.

The Committee supports research using high-performance computing, modeling and simulation, including the Atmosphere to Electrons initiative, and reliability and grid integration efforts. Further, the Department is directed to give priority to stewarding the assets and optimizing the operations of the Department-owned wind research and development facilities. Within available funds, the Committee recommends not less than $30,000,000 for the National Wind Technology Center, which shall include the development of a large-scale research platform to support next-generation wind energy science and manufacturing and systems integration of multiple energy generation, consumption, and storage technologies with the grid.

The Committee encourages the Department to prioritize distributed wind technologies that reduce costs and improve performance, and to collaborate with industry to invest in the development and demonstration of technologies and practices that advance distributed wind. Within available funds, the Committee recommends $10,000,000 for distributed wind.

The Committee directs the Department to support the advancement of innovative technologies for offshore wind development, including freshwater, deepwater, shallow water, and transitional depth installations. In addition, the Department is directed to support the innovative offshore wind demonstration projects for which funding has been allocated in previous fiscal years, and further supports efforts to optimize their development, design, construction methods, testing plans, and economic value proposition. The Committee recommends not less than $6,000,000 in new project development for the offshore wind demonstration projects to be allocated equitably between the approved projects, and to provide not less than 18 months of additional development to ensure success. The Committee further directs the Department to support the deployment and testing of scale floating wind turbines designed to reduce energy costs. Within available funds, the Committee recommends not less than $30,000,000 for the Department to prioritize early-stage research on materials and manufacturing methods and advanced components that will enable accessing high-quality wind resources, on development that will enable these technologies to compete in the marketplace without the need for subsidies, and on activities that will accelerate fundamental offshore-specific research and development such as those that target technology and deployment challenges unique to U.S. waters. Further, the Committee recommends not less than $10,000,000 for existing national-level offshore wind test facilities.

The Committee supports the Department's research on the effects of offshore wind, especially the impact of marine sound and other stressors on marine mammals, and encourages the Department to work with nonprofit research institutions, like aquariums, to continue this work.

WATER POWER

The Committee recommends $105,000,000 for Water Power.

Hydropower Technologies.—Within available funds, the Committee recommends $35,000,000 for conventional hydropower and pumped storage activities, including up to $6,600,000 for the purposes of section 242 of the Energy Policy Act of 2005. Within available funds, the Department is directed to continue research, development, and deployment efforts on pumped hydropower storage technologies and use cases.

Marine and Hydrokinetic Technology Research, Development, and Deployment.—The Committee recommends $70,000,000 for marine and hydrokinetic technology research, development, and deployment activities, including research into mitigation of marine ecosystem impacts of these technologies.

Within the funding available for marine and hydrokinetic technology, $30,000,000 is recommended for a balanced portfolio of competitive solicitations to support industry-led and university re-

search, development, and deployment of marine and hydrokinetic technologies; and support wave, ocean current, tidal and in-river energy conversion components and systems across the high- and low-technology readiness spectrum to increase energy capture, reliability, survivability, and integration into local or regional grids for lower costs and to assess and monitor environmental effects. Within this amount, not less than $8,000,000 is recommended to support collaborations between universities, Marine Renewable Energy Centers, and national laboratories. Further, not less than $5,000,000 is recommended to prioritize infrastructure needs at marine and hydrokinetic technology testing sites operated by Marine Renewable Energy Centers. The Department is directed to support ongoing design of the previously awarded open-water wave energy test facility within available funds. The Department is also directed to continue its coordination with the U.S. Navy on marine energy technology demonstration.

The Committee encourages close coordination between the Department and the Federal Energy Regulatory Commission, the Bureau of Ocean Energy Management, the National Oceanic and Atmospheric Administration, other relevant agencies and industry to reduce the amount of time to permit marine energy test and validation projects.

GEOTHERMAL TECHNOLOGIES

The Committee recommends $85,000,000 for Geothermal Technologies.

Within available funds, $53,000,000 is recommended for Enhanced Geothermal Systems. To facilitate necessary technology development and expand understanding of subsurface dynamics, the Committee recommends $30,000,000 for the continuation of activities of the Frontier Observatory for Research in Geothermal Energy [FORGE], with activities to include ongoing novel subsurface characterization, full-scale well drilling, and technology research and development to accelerate the commercial pathway to large-scale enhanced geothermal systems power generation.

Further, the Committee recommends $15,000,000 for Hydrothermal, $10,000,000 for Low-Temperature and Co-produced Resources, and $7,000,000 for Systems Analysis.

The Committee recognizes that enhanced geothermal systems are versatile, inherently modular, and scalable from residential utilization to district heating opportunities and large power parks that can provide baseload capacity. The Committee encourages the Department to support enhanced geothermal system applications for industrial and residential uses.

The Committee directs the Department to continue its efforts to identify prospective geothermal resources in areas with no obvious surface expressions.

ADVANCED MANUFACTURING

The Committee recommends $311,000,000 for Advanced Manufacturing.

The Committee recommends $80,000,000 for Advanced Manufacturing Research and Development Projects.

The Committee recommends $171,000,000 for Advanced Manufacturing Research and Development Facilities. The Committee recommends $25,000,000 for the Manufacturing Demonstration Facility and the Carbon Fiber Technology Facility for early-stage research in additive manufacturing, carbon fiber and composites development, and manufacturing of multi-material systems to reduce the energy intensity and life-cycle energy consumption of domestic manufactured products, thereby increasing the competitiveness of U.S. manufacturing industries. Within funding for the Manufacturing Demonstration Facility, $5,000,000 is recommended for the development of additive systems and automation technologies that have the potential to deposit multiple materials allowing for hybrid material solutions that enhance performance in extreme environments and enable precise property profiles.

The Committee recognizes the important role large-area additive manufacturing can play in helping to advance the deployment of building, transportation, and clean energy technologies. The Committee directs the Department to further foster the partnership between the National Laboratories, universities, and industry to use bio-based thermoplastics composites, such as micro- and nano-cellulosic materials, and large-area 3–D printing to overcome challenges to the cost and deployment of building, transportation, and energy technologies.

In addition, the Committee recommends $20,000,000 to support the development of additive manufacturing involving nanocellulosic feedstock materials made from forest products to overcome challenges to the cost and deployment of building, transportation, and energy technologies, and encourages the Department to leverage expertise and capabilities for large-scale additive manufacturing through partnerships between universities and the Manufacturing Demonstration Facility.

To ensure grid reliability and resiliency, energy storage at scale must be achieved. Validation of materials for production of energy storage is both slow and expensive, currently taking an average of 18 years from concept to commercialization. For technologies such as batteries, materials innovation is traditionally separate from scale-up and device integration, and this disconnect slows progress. Therefore, within the amounts recommended, the Committee recommends $20,000,000 for a manufacturing demonstration facility specifically focused on accelerating the processes needed for clean energy materials to go from discovery to scale-up, which will drive manufacturing innovation, lower the cost of battery energy storage, and spur job creation by bringing down the timeline for validation from an average of 18 years to an average of 5 years.

The Committee recommends $25,000,000 for the third year of research and development efforts to lower the cost and energy intensity of technologies to provide clean, safe water through the Energy-Water Desalination Hub. The Committee is concerned that after 2 years of funding for this hub in fiscal years 2017 and 2018, the Department still has not completed the cooperative agreement solicitation and award process to begin work in this important research area. Therefore, upon enactment of this act, the Committee directs the Department to brief the Committees on Appropriations of both Houses of Congress on schedule and milestones for solic-

iting and evaluating proposals from qualified consortia and awarding a 5-year cooperative agreement.

The Committee recommends $56,000,000 to support four Clean Energy Manufacturing Institutes [CEMIs], including $14,000,000 each for the Smart Manufacturing Innovation Institute, the Reducing Embodied-energy and Decreasing Emissions [REMADE] Institute, and the Rapid Advancement in Process Intensification Deployment [RAPID] Institute, and a CEMI selection to be announced. The Committee notes the PowerAmerica Next Generation Power Electronics Manufacturing Innovation Institute and the Advanced Composites Manufacturing Innovation Institute have both received $70,000,000 over the past 5 years to stand up a sustainable effort, and encourages the Department to work with one or more national laboratories and universities to build a sustainable plan for these institutes. The Committee is pleased with the ongoing work of the innovative advanced manufacturing opportunities through the CEMIs, and directs the Department to issue a solicitation and make an award for the sixth CEMI not later than October 1, 2018.

The Committee recommends $25,000,000 to continue Critical Materials Hub. The Committee notes many municipal recycling facilities where collected recyclables are separated, now use technologies which are aging and inefficient. The Committee directs the Department to conduct a study to determine if the eddy current technology, which is now in use by most facilities, might be upgraded to increase the supply of recycled aluminum and to make recommendations as to how this might be accomplished and report to the Committees on Appropriations of both Houses of Congress within 180 days after enactment of this act.

The Committee recommends $40,000,000 for the Industrial Technical Assistance program. Within this amount, the Committee recommends $12,000,000 to provide ongoing support for the Combined Heat and Power [CHP] Technical Assistance Partnerships [TAPs] and related CHP Technical Partnership activities at the Department, including $5,000,000 for the TAPs and $7,000,000 for related CHP activities. The Committee also encourages the Department to prioritize research, development, and demonstration of district energy systems, and work to accelerate greater deployment of district energy systems in communities, campuses, industries, and cities nationwide by supporting adaptive regional and local technology, and market opportunities.

The Committee encourages the Department to continue its efforts of extending the Industrial Assessment Centers to underserved areas and furthering the geographic reach of the program to regions that are less likely to be adequately serviced because of their distance from the current Centers. Therefore, the Committee recommends $10,000,000 to expand the technical assistance provided by the Industrial Assessment Centers and fund no fewer than two but no more than four additional centers. The Committee recognizes the great potential for energy savings in municipal, industrial, and agricultural wastewater treatment systems and encourages the Department to expand on the technical assistance provided by the Industrial Assessment Centers to address these needs. Within the funds recommended for the Industrial Assessment Cen-

ters, the Committee recommends $3,000,000 for wastewater treatment technical assistance.

Within available funds, the Committee recommends $10,000,000 for district heating. The Committee further directs the Department to collaborate with industry on the potential energy efficiency and energy security gains to be realized with district energy systems.

The Committee supports research and development on improving foundational materials and processes applicable to aluminum and other primary metal industries.

The Committee supports the issuance of a competitive solicitation for university/industry-led teams to improve the efficiency of drying processes, which consume approximately 10 percent of the energy used in the manufacturing sector.

The Committee directs the Department to develop a national smart manufacturing plan that will identify areas where the Department can facilitate more rapid development, deployment and adoption of smart manufacturing technologies. The Department shall submit a plan to the Committees on Appropriations of both Houses of Congress not later than 180 days after the enactment of this act.

BUILDING TECHNOLOGIES

The Committee recommends $225,000,000 for Building Technologies.

Within available funds, the Committee recommends $39,000,000 for the Commercial Building Integration program for a program of core research and development of more cost-effective integration techniques and technologies that could help the transition toward deep retrofits. In addition, the Committee encourages the Department to increase engagement with private sector stakeholders to develop market-transforming policies and investments in commercial building retrofits.

Within available funds, the Committee recommends $28,000,000 for the Residential Building Integration program. The Committee encourages funding to be concentrated on industry teams to facilitate research, demonstrate and test new systems, and facilitate widespread deployment through direct engagement with builders, the construction trades, equipment manufacturers, smart grid technology and systems suppliers, integrators, and State and local governments.

The Committee recommends $108,000,000 for the Emerging Technologies subprogram. Within available funds, the Committee recommends not less than $30,000,000 for building-grid integration research and development consistent with a transactive energy system, including development of advanced transactive control methodologies, field validation and testing in existing buildings, continuation of the Building-to-Grid Integration Demonstration, and coordination with the Office of Cybersecurity, Energy Security, and Emergency Response transactive energy systems activities. Within this amount, $5,000,000 is recommended to continue promoting regional demonstrations of new, utility-led, residential Connected Communities advancing smart grid systems. Further, within available funds for Emerging Technologies, the Committee recommends not less than $18,000,000 for HVAC & Refrigeration R&D,

$14,000,000 for Building Envelope and $5,300,000 for Building Energy Modeling.

Within available funds for Emerging Technologies, the Committee recommends $25,000,000 for research, development, demonstration, and commercial application activities related to advanced solid-state lighting technology development. If the Secretary finds solid-state lighting technology eligible for the Twenty-First Century Lamp prize, specified under section 655 of the Energy Independence and Security Act of 2007, $5,000,000 shall be made available to fund the prize or additional projects for solid-state lighting research and development.

Within available funds, the Committee recommends $10,000,000 for research and development for energy efficiency efforts related to the direct use of natural gas in residential applications, including gas heat pump heating and water heating, onsite combined heat and power, natural gas appliance venting, green pilots, and micrometers.

Within available funds, the Committee recommends $5,000,000 for novel earlier stage research, development, and demonstration of technologies to advance energy efficient, high-rise Cross-Laminated Timber [CLT] building systems. The Committee directs the Department to support university research, in partnership with national labs, for developing, building, and evaluating CLT wall systems for embodied energy content, operating energy efficiency, wall moisture profiles, structural connector durability, and health monitoring sensors.

The Committee recommends $50,000,000 for Equipment and Buildings Standards. The Department has missed two deadlines for reports to Congress mandated by section 305 of the Energy Independence and Security Act [EISA] of 2007. These reports are invaluable sources of information for the Committee and other stakeholders about the status of energy conservation standards and the Department's plans to comply with its statutory obligations. The Department shall submit to the Committees on Appropriations of both Houses of Congress a status report within 30 days after enactment of this act. The Committee recommends $7,000,000 for the Building Energy Codes Program to provide assistance to States and to organizations that develop model codes and standards to improve building resilience as well as efficiency.

Energy efficiency is a critical component of infrastructure development strategies. The Committee recognizes the importance of the Transformation in Cities initiative for local government planning and directs the Department to continue to support the goals of the initiative.

The Committee is concerned with the Department's recently announced plans to cancel the 2019 Solar Decathlon, pending a reevaluation of the program. The Committee recommends not less than $5,000,000 for the Solar Decathlon. The annual competition has engaged thousands of university students to apply energy research and development to the practical concerns of housing by balancing design excellence and smart energy production and innovation, energy efficiency, and market potential. While the Committee understands that commercialization of technology is important, this should not become the sole or even the primary focus of the com-

petition. Therefore, not later than 30 days after the enactment of this act, the Department shall brief the Committees on Appropriations of both Houses of Congress on its plans for preserving the Solar Decathlon in its current form, any adjustments to the competition, and plans by the Department to accelerate adoption of suitable energy and water efficient technologies in the marketplace.

FEDERAL ENERGY MANAGEMENT PROGRAM

The Committee recommends $31,000,000 for the Federal Energy Management Program.

The Committee encourages the continued use of the Assisting Federal Facilities with Energy Conservation Technologies grant program to leverage more private sector investment in aging Federal facilities and infrastructure.

WEATHERIZATION AND INTERGOVERNMENTAL PROGRAM

The Committee recommends $306,000,000 for the Weatherization and Intergovernmental Program.

Within this amount, $251,000,000 is recommended for the Weatherization Assistance Program [WAP], including $248,000,000 for Weatherization Assistance Grants and $3,000,000 for Training and Technical Assistance; and $55,000,000 is recommended for State Energy Program grants.

The Committee recognizes the importance of providing Federal funds under the Weatherization and Intergovernmental Program to States and tribes in a timely manner to avoid any undue delay of services to eligible low-income households, and to encourage local high-impact energy efficiency and renewable energy initiatives and energy emergency preparedness. Therefore, the full amount of the funds recommended for WAP and the State Energy Program shall be obligated to States, tribes, and other direct grantees not later than 60 days after enactment of this act.

Within available funds, $500,000 is recommended for current WAP grant recipients via the Weatherization Innovation Pilot Program to develop and implement strategies to treat harmful substances, including vermiculite.

The Committee supports WAP's continued participation in the interagency working group on Healthy Homes and Energy with the Department of Housing and Urban Development. The Department is encouraged to further coordinate with the Office of Lead Hazard Control and Healthy Homes on energy-related housing projects. The Committee directs the Department to begin tracking the occurrence of window replacements, which supports the reduction of lead-based paint hazards in homes.

STRATEGIC PROGRAMS

The Committee recommends $12,500,000 for Strategic Programs.

Within available funds, $2,500,000 is recommended for the Energy Transition Initiative [ETI] to support ongoing initiatives to address high energy costs, reliability, and inadequate infrastructure challenges faced by island and remote communities. The Committee supports ETI's efforts to develop a cross-sector initiative of organizations pursuing energy transition efforts that will address

energy challenges, build capacity, accelerate the sharing of best practices and innovations between similarly-situated regions, and leverage specialized expertise into commercial opportunity. The Committee further directs the Department to support initiatives for building of cost-effective, resilient energy infrastructure on island and remote communities, including in Alaska, the Caribbean, Hawaii, New England, and elsewhere.

CYBERSECURITY, ENERGY SECURITY, AND EMERGENCY RESPONSE

Appropriations, 2018	.....
Budget estimate, 2019	$95,800,000
Committee recommendation	260,000,000

The Committee recommends $260,000,000 for Cybersecurity, Energy Security, and Emergency Response, an increase of $164,200,000 above the budget request. Within available funds, the Committee recommends $28,500,000 for program direction.

Early-Stage Research, Electricity Sector.—The Committee rejects the budget's sole focus on early-stage research. Most utilities have limited research and development budgets, primarily due to regulatory constraints designed to keep electricity costs low for consumers. Additionally, utilities are unlikely to implement new concepts because most utilities would need to use their own systems for testing and evaluation, which could impact consumers. State public utility commissions also have limited budgets that do not support research and development. The States rely heavily on the Department's technical assistance on assessments of data and tools to help them evaluate grid modernization alternatives. The Department plays a vital role, not only in early-stage research, but also in deployment, field testing, and evaluation.

CYBERSECURITY FOR ENERGY DELIVERY SYSTEMS

The Committee recommends $80,829,000 for Cybersecurity for Energy Delivery Systems.

The Committee recommends $10,000,000 for the DarkNet project to explore opportunities for getting the Nation's critical infrastructure off the Internet and shielding the Nation's electricity infrastructure from disruptive cyber penetration.

The Committee supports extension of cyber risk information sharing tools to close remaining vulnerabilities in the distribution and transmission system. The Committee encourages the Department to continue existing work within ongoing programs and to invest in research addressing power system vulnerabilities in supply chain and life cycle management for critical power system components and advanced adaptive defensive methods for grid control systems.

TRANSMISSION RELIABILITY

The Committee recommends $39,000,000 for Transmission Reliability.

The Committee supports continued investment in advanced grid modeling algorithms and tool development to ensure resilient grid controls and protection systems that meet the challenges of the emerging smart grid.

RESILIENT DISTRIBUTION SYSTEMS

The Committee recommends $38,671,000 for Resilient Distribution Systems.

Within available funding, $5,000,000 is recommended to develop high fidelity sensors and use data analytics to improve operations in steady-state and under extreme conditions, and to continue early-stage research to develop low-cost, printable sensors that can predict the health of critical equipment in the electric delivery system.

The Committee supports the promotion of regional demonstrations of new, utility-led, residential Connected Communities advancing smart grid systems. The Department shall focus on identifying and addressing technical and regulatory barriers impeding grid integration of distributed energy systems to reduce energy costs and improve the resiliency and reliability of the electric grid. The Committee supports advanced control concepts and open test beds for new distribution control tools for enhanced distribution system resilience.

ENERGY STORAGE

The Committee recommends $41,000,000 for Energy Storage.

Within available funds, the Committee continues to support development of an operational energy storage test facility capable of performance-driven data in a utility environment.

The Committee supports the Beyond Batteries initiative and cost-shared demonstrations of energy storage technologies with the private sector needed to achieve the Department's technology goal. Low-cost, grid-scale energy storage is crucial to a 21st century electricity grid, and the Department's storage research, development and deployment efforts shall support nationwide efforts to improve grid resiliency, reliability, and security, empower consumers, and increase integration of a broad range of generation sources.

The Committee encourages the Department to further the development and demonstration of non-battery advanced storage components, including compressed air energy storage development and demonstration to enable efficiency improvements for utility-scale, bulk energy storage solutions.

The Committee notes that innovation and advancement in distributed energy resources is helping the Nation's power grid to better address reliability, resiliency, safety, and accessibility. This enhances our Nation's energy security and global leadership. The Committee encourages the Department to further advance the development and demonstration of innovative battery and non-battery energy storage components. Energy storage is needed to better enable distributed energy resources; integrate intermittent uses such as water heaters, electric vehicle chargers, battery storage systems, and pumps; help balance supply and demand in the power grid to aid consumers to better manage their energy costs; protect residential and commercial customers and public services from power interruptions; and improve grid security and reliability.

The Committee supports grid-scale field demonstrations of energy storage projects, either as single facilities or as aggregations of units, with a focus on new use cases rather than new battery

chemistry. The Committee encourages the Department to support State energy offices and universities with energy storage planning and deployment, and to participate in industry-led safety codes and standards development. The Committee also supports funding for development of analytical methods for including energy storage in electric system planning, as well as for development of software tools to better value energy storage technologies. The Committee encourages the Department to remain committed to research and development partnerships related to the development and deployment of energy storage, with stakeholders in diverse geographic regions with unique market dynamics and policy challenges that can help to inform nationwide efforts to improve grid resiliency, reliability, and security, empower consumers, and increase integration of a broad range of generation sources. The Committee encourages the Department to make additional investments in cutting-edge storage technologies and relevant software, including conventional and advanced batteries. The Committee further encourages the Department to prioritize pilot scale initiatives with relevant utilities and State energy organizations that have the potential to advance real-time deployment and testing of these technologies.

The Committee is supportive of research for novel materials and system components to resolve key cost and performance challenges for electrochemical energy storage systems based on earth abundant advanced chemistries. In addition, the Committee supports continued materials research that will improve the understanding and predictability of energy storage systems and components, as well as enable safer and more reliable materials and systems to be developed.

TRANSFORMER RESILIENCE AND ADVANCED COMPONENTS

The Committee recommends $7,000,000 for Transformer Resilience and Advanced Components.

Within available funds, the Committee directs the Department to continue to support research and development for advanced components and grid materials for low-cost, power flow control devices, including both solid state and hybrid concepts that use power electronics to control electromagnetic devices and enable improved controllability, flexibility, and resiliency.

INFRASTRUCTURE SECURITY AND ENERGY RESTORATION

The Committee recommends $18,000,000 for Infrastructure Security and Energy Restoration.

The Committee supports further development of energy sector situational awareness capabilities through Eagle-I, the Federal Government's situational awareness tool for national power outages. The Committee encourages the Department to further illustrate how to benefit from increased access to more varied sources of data.

The Committee previously directed the Department to submit a report identifying strategic laboratory, university, and industry partnerships that would enhance national security and assist industry in addressing critical threats, including electromagnetic pulses [EMP], geomagnetic disturbances [GMD], cyber-attacks, and supply chain disruptions. The Committee looks forward to receiving

this report expeditiously. The Committee supports the establishment of an EMP/GMD testing facility that can, without posing risk to the existing grid, replicate EMP/GMD events and cyber-attacks on a real world configuration of critical grid components and systems. Such a facility is necessary to expose entire substations, including devices such as Extra High Voltage Transformers and subsystem components, to the combined effects of the complete composite EMP Waveform for early stage research and development, as well as testing and validation purposes at both the transmission and distribution levels. The Committee encourages the Department to ensure such a facility to be a collaborative public-private effort between national laboratories, utilities, and research universities.

NUCLEAR ENERGY

Appropriations, 2018	$1,205,056,000
Budget estimate, 2019	757,090,000
Committee recommendation	1,206,000,000

The Committee recommends $1,206,000,000 for Nuclear Energy, an increase of $448,910,000 above the budget request. The Committee's recommendation prioritizes funding for programs, projects and activities that will ensure a strong future for nuclear power in the United States.

Nuclear power provides more than 20 percent of our Nation's electricity and nearly 60 percent of our emissions-free electricity. Electricity generation from our Nation's operating nuclear power plants is critical to our national security, economy, and way of life. Nuclear power is a reliable, resilient source of power, and the Department is encouraged to seek opportunities to take advantage of that fact to meet its long-term needs.

RESEARCH AND DEVELOPMENT

INTEGRATED UNIVERSITY PROGRAM

The Committee recommends $5,000,000 for the Integrated University Program.

The Committee notes the administration repeatedly attempts to defund this program, despite continued success in developing highly qualified nuclear specialists to meet national needs.

NUCLEAR ENERGY ENABLING TECHNOLOGY

The Committee recommends $149,200,000 for Nuclear Energy Enabling Technology.

Within this amount, the Committee recommends $50,000,000 for Crosscutting Technology Development, $28,200,000 for Nuclear Energy Advanced Modeling and Simulation, $41,000,000 for National Scientific User Facilities, and $30,000,000 for the Energy Innovation Hub for Modeling and Simulation. The Committee notes that the budget request made the short-sighted recommendation to cancel the Energy Innovation Hub for Modeling and Simulation for the second year in a row, despite the important contributions it continues to make to improving operations and safety of operating nuclear reactors, and its likely application in licensing accident tolerant fuels and other advanced technologies.

REACTOR CONCEPTS RESEARCH, DEVELOPMENT, AND DEMONSTRATION

The Committee recommends $302,000,000 for Reactor Concepts Research, Development, and Demonstration.

Advanced nuclear technologies hold great promise for reliable, safe, emission-free energy and should be a priority for the Department. The Department was previously directed to provide a report that sets aggressive, but achievable goals to demonstrate a variety of private-sector advanced reactor designs and fuel types by the late 2020s. The Department is directed to expedite that report and provide it to the Committee as soon as possible.

Advanced Reactor Technology.—Within available funds, the Committee recommends $150,000,000, for Advanced Reactor Technology, including $22,000,000 for the fourth year of the advanced reactor concepts program.

The Committee supports the Department's goal to accelerate reactor manufacturing, development, and deployment of advanced reactors. The Department is encouraged to leverage its technological capabilities in materials research and development, advanced manufacturing, high-fidelity modeling and simulation, sensors and control systems to transform the methods of reactor design, manufacturing, licensing and operation. The Committee recommends $30,000,000 above the budget request for the demonstration of a Transformational Challenge Reactor concept.

Versatile Fast Reactor.—The Committee supports the budget request and recommends $15,000,000 for the Versatile Fast Reactor. The Department was previously directed to provide a report that details all current programs and projects within the Office of Nuclear Energy, whether the Department plans to continue to support each program or project, and the expected out-year funding through completion of the program or project. The Department is directed to expedite that report and provide it to the Committee as soon as possible.

Light Water Reactor Sustainability.—Within available funds, the Committee recommends $47,000,000. The most cost-effective way for the United States to maintain low-cost, carbon-free electricity is to safely extend the lives of our Nation's existing nuclear reactors from 60 to 80 years. Therefore, the Committee recommends additional funding above the budget request for this activity as a priority. The Committee directs the Secretary to use funding in this activity to continue research and development work on the technical basis for subsequent license renewal. The Secretary shall focus funding in this program on materials aging and degradation, advanced instrumentation and control technologies, and component aging modeling and simulation. The Secretary shall also coordinate with industry to determine other areas of high-priority research and development in this area.

FUEL CYCLE RESEARCH AND DEVELOPMENT

The Committee recommends $267,300,000 for Fuel Cycle Research and Development.

Within available funds, $30,000,000 is recommended for Material Recovery and Waste Form Development, $6,000,000 is recommended for Materials Protection, Accountancy, and Controls for

Transmutation, and $8,500,000 is recommended for Systems Analysis and Integration.

The Committee continues to strongly support the recommendations of the Blue Ribbon Commission on America's Nuclear Future and believes that near-term action is needed to address the accumulating inventory of spent nuclear fuel. The Committee recommends $35,300,000 for Integrated Waste Management System activities. Funding is recommended to implement plans to consolidate spent nuclear fuel from around the United States to one or more private or government interim central storage facilities. Priority shall be given to accepting spent nuclear fuel from shutdown reactors, and to accelerating the development of a transportation capability to move spent fuel from its current storage locations. Within funds recommended, the Committee recommends up to $10,000,000 for the Secretary, within existing authorities, to contract for the management of spent nuclear fuel to which the Secretary holds the title or has a contract to accept title, which includes contracting with a private company for consolidated interim storage of spent nuclear fuel.

The Committee directs the Secretary to work across the administration and to report to the Committees on Appropriations of both Houses of Congress, not later than 180 days after the date of enactment of this act, with information regarding existing resources and funding opportunities for which communities hosting decommissioned/decommissioning reactors may be eligible. The report shall also include what opportunities exist for these affected communities to consider alternative uses for these sites upon completion of the decommissioning process.

The Committee does not adopt the budget proposal to eliminate research and development activities previously funded in this account. The Committee recommends $62,500,000 to continue research and development activities on behavior of spent fuel in long-term storage, under transportation conditions, and in various geologic media, which will continue to be important to developing a solution to the waste problem. Priority shall be placed on the ongoing study of the performance of high-burnup fuel in dry storage and on the potential for direct disposal of existing spent fuel dry storage canister technologies.

The Committee continues to place a high priority on the development of nuclear fuels with enhanced accident-tolerant characteristics to significantly mitigate the potential consequences of a nuclear accident. The Committee urges the Secretary to maintain focus and priority on achieving results in these efforts. The Committee recommends $125,000,000 for the Advanced Fuels program. The Department is directed to continue implementation of the accident tolerant fuels development program, the goal of which remains development of accident tolerant nuclear fuels leading to commercial reactor fuel assembly testing by 2022. Within this amount not less than $55,600,000 is recommended to continue the participation of three industry-led teams in Phase 2 of the cost-shared research and development program. Further, the Committee recommends not less than $20,000,000 to support accident tolerant fuels development at the national laboratories and other facilities, including at the Advanced Test Reactor, the Transient

Reactor Test Facility, and the Halden reactor. In addition to amounts awarded through the Small Business Innovation Research and Small Business Technology Transfer programs, $3,000,000 is to continue the previously awarded small business projects to develop ceramic cladding for accident tolerant fuels.

Finally, the United States currently lacks either a supply of high assay low enriched uranium [HALEU], or a process to make HALEU, for advanced reactor designs that would require enrichment up to 20 percent, below levels considered usable for nuclear weapons. The Committee recommends $10,000,000 for the Department to begin work to design and build a demonstration facility to produce HALEU from naval spent nuclear fuel or other available HEU within the Department's inventory. The Committee notes that using naval spent fuel for this purpose has the added benefit of potentially reducing the volume of waste that would eventually require disposal in a permanent repository.

INFRASTRUCTURE

RADIOLOGICAL FACILITIES MANAGEMENT

The Committee recommends $29,000,000 for Radiological Facilities Management, including $20,000,000 for continued safe operations and maintenance of Oak Ridge National Laboratory hot cells.

IDAHO FACILITIES MANAGEMENT

The Committee recommends $238,000,000 for Idaho Facilities Management. The Advanced Test Reactor [ATR] is a vital asset that provides research capability across the Department. The Department was previously directed to provide a report that lists all current and planned users for the ATR for the next 3 years, the operating cost attributed to each user, and the source of funds that will be applied to cover the costs for each user. The Department is directed to expedite that report and provide it to the Committee as soon as possible.

FOSSIL ENERGY RESEARCH AND DEVELOPMENT

Appropriations, 2018	$726,817,000
Budget estimate, 2019	502,070,000
Committee recommendation	727,000,000

The Committee recommends $727,000,000 for Fossil Energy Research and Development, an increase of $224,930,000 above the budget request. Within available funds, the Committee recommends $61,070,000 for program direction.

Early-Stage Research and Development.—The Fossil Energy Research and Development program advances transformative scientific research, development, and deployment of technologies that enable the reliable, efficient, affordable, and environmentally sound use of fossil fuels. Fossil energy is an essential part of the United States' energy future, and the National Energy Technology Laboratory [NETL] supports the Office of Fossil Energy in this critical national priority. The Committee rejects the approach to only provide funds for early-stage research. Such restrictions would cripple inno-

vation and development, and would reduce the number of energy technologies adopted in the marketplace.

Fossil Energy Roadmap.—The Committee previously directed the Department to develop a cohesive policy and technology strategy and supporting roadmap or long term plan for its Fossil Energy Research and Development portfolio and supporting infrastructure. This roadmap will guide the discovery or advancement of technological solutions and incorporate lessons learned for the future of research, development, and demonstration efforts on advanced carbon capture and storage [CCS] technologies, advanced fossil energy systems, and crosscutting fossil energy research, as well as guide the discovery or advancement of technological solutions for the prudent and sustainable development of unconventional oil and gas. The Committee looks forward to receiving the roadmap expeditiously.

NETL.—No funds shall be used for the closure of NETL sites. The Committee supports NETL's mission to discover, develop, and deploy new technologies to support a strong domestic fossil energy path. The Committee previously directed the Department to conduct a comprehensive assessment of Fossil Energy writ large to include the Fossil Energy Headquarters programs, NETL, and relevant competencies of other national laboratories which support the mission of the Office of Fossil Energy. The Committee looks forward to receiving the assessment expeditiously.

National Carbon Capture Center.—The Committee recommends funding for the National Carbon Capture Center consistent with the cooperative agreement and fiscal year 2018. The Committee continues to encourage the Department to establish university partnerships to support ongoing fossil energy programs, to promote broader research into CCS technologies, and to expand its technology transfer efforts. The Department has previously funded several university-based CCS projects and is encouraged to build on an established research base to support ongoing research and to address the wider implementation of CCS technologies.

The Committee reiterates the importance of adequate Federal support to promote design-related work and testing for a commercial-scale, post-combustion carbon dioxide capture project on an existing coal-fueled generating unit as well as fossil energy research, development, and deployment of breakthrough technologies.

COAL CCS AND POWER SYSTEMS

The Committee recommends $463,030,000 for Coal CCS and Power Systems.

The Committee does not support the Department's proposal to reorganize or consolidate the Carbon Capture, Carbon Storage, Advanced Energy Systems, crosscutting research and development programs, and the Supercritical CO_2 Technology Program [STEP].

The Committee supports the Department's Cooperative Agreements to develop cost sharing partnerships to conduct basic, fundamental, and applied research that assist industry in developing, deploying, and commercializing efficient, low-carbon, nonpolluting energy technologies that could compete effectively in meeting requirements for clean fuels, chemical feedstocks, electricity, and water resources. The Committee encourages the Department to fund activi-

ties that promote the reuse of captured carbon dioxide from coal, natural gas, industrial facilities, and other sources for the production of fuels and other valuable products. Within the ongoing CCS Program, the Department is encouraged to pursue an aggressive timeline to develop advanced carbon storage and utilization technologies and enhanced oil recovery that will improve the economics associated with domestic energy production. The Committee supports small-scale and modular coal-fired technologies with reduced carbon outputs or carbon capture that can support incremental power generation capacity additions that will enable a step-change in performance, efficiency, or cost of electricity as compared to the technology in existence on the date of enactment.

The Committee supports small-scale and modular coal-fired technologies with reduced carbon outputs or carbon capture that can support incremental power generation capacity additions that will enable a step-change in performance, efficiency, or cost of electricity as compared to the technology in existence on the date of enactment.

The Committee recommends research and development as well as pilot-scale activities that will improve the performance, reliability and efficiency of both new- and existing-fossil fuel fired power plants, including solvent-based, heat-integrated carbon capture and storage research and testing at pilot-scale facilities installed at a commercial power plant with focus on solvent physical property impact on column performance, transformative approaches to mitigate emissions, and solvent quality maintenance to ultimately reduce capital and operating costs; development and testing of materials for highly efficient energy platforms; advancement of gasification systems; development of carbon products from coal; development of transformational energy conversion systems including pressurized oxycombustion, supercritical CO_2 cycles, and chemical looping technologies; advancement of turbine technologies for higher efficiency and pressure cycles; development of fuel cells; coal and methane to liquid fuels; development and testing of advanced water management technologies; and continued investigation of rare earths recovery from coal and coal refuse.

Within funds available for CCS and Power Systems, the Committee recommends not less than $30,000,000 to support a new solicitation for Front-End Engineering and Design [FEED] studies of two commercial-scale carbon capture power projects for retrofit at an existing coal plant and for a coal or natural gas plant that generates carbon dioxide suitable for utilization or storage. A FEED study shall incorporate work from feasibility studies and testing to provide specific project definition, detailed design, scopes of work, material purchasing and construction schedules, cost for project execution, and subsurface, structural, and environmental permitting requirements.

Carbon Capture.—Achieving low-cost carbon capture technology is important to facilitating economic environmental mitigation solutions for the power and industrial sectors while opening up a broader carbon utilization economy. The Committee encourages the Department to focus its Carbon Capture research, development and deployment efforts on improving the efficiency and decreasing the costs of carbon capture technologies, demonstrating carbon capture

NETL Infrastructure.—The Committee directs the Department to prioritize funds to provide site-wide upgrades for safety, avoid an increase in deferred maintenance, and provide for the continued update and refresh of Joule through the final year of a 3-year lease.

NAVAL PETROLEUM AND OIL SHALE RESERVES

Appropriations, 2018	$4,900,000
Budget estimate, 2019	10,000,000
Committee recommendation	10,000,000

The Committee recommends $10,000,000 for Naval Petroleum and Oil Shale Reserves, the same as the budget request.

STRATEGIC PETROLEUM RESERVE

Appropriations, 2018	$252,000,000
Budget estimate, 2019	175,105,000
Committee recommendation	175,105,000

The Committee recommends $175,105,000 for the Strategic Petroleum Reserve, the same as the budget request.

NORTHEAST HOME HEATING OIL RESERVE

Appropriations, 2018	$6,500,000
Budget estimate, 2019	10,000,000
Committee recommendation	10,000,000

The Committee recommends $10,000,000 for the Northeast Home Heating Oil Reserve, the same as the budget request.

ENERGY INFORMATION ADMINISTRATION

Appropriations, 2018	$125,000,000
Budget estimate, 2019	115,035,000
Committee recommendation	125,000,000

The Committee recommends $125,000,000 for the Energy Information Administration, an increase of $9,965,000 above the budget request.

The Committee recognizes the importance of building energy information and the opportunity for better data collection presented by new technologies. The Department is encouraged to upgrade the Commercial Buildings Energy Consumption Surveys to a real-time data collection system with rapid reporting of results, without compromising statistical validity or data security.

NON-DEFENSE ENVIRONMENTAL CLEANUP

Appropriations, 2018	$298,400,000
Budget estimate, 2019	218,400,000
Committee recommendation	353,240,000

The Committee recommends $353,240,000 for Non-Defense Environmental Cleanup, an increase of $134,840,000 above the budget request.

Small Sites.—The Committee recommends $174,000,000 for Small Sites. Within the available funds, the Committee recommends $10,000,000 for work required pursuant to the agreement reached in 2012 between the Department, the Advisory Council on

$105,000,000 as requested across the Office of Science programs to advance early stage fundamental research in this field of science.

Small Business Innovation Research.—The Committee recognizes the importance of small businesses in meeting the research and development mission of the Department and is concerned that the Department's previous delays in issuing Small Business Innovation Research [SBIR] and Small Business Technology Transfer [STTR] awards had a negative impact on small businesses. The Committee directs the Department to meet its congressionally mandated deadlines of reviewing small businesses' applications for SBIR/STTR awards as required by P.L. 112–81.

ADVANCED SCIENTIFIC COMPUTING RESEARCH

The Committee recommends $980,000,000 for Advanced Scientific Computing Research.

The Committee recommends $232,706,000 for the Exascale Computing Project. In addition, the Committee recommends $205,000,000 for the Oak Ridge Leadership Computing Facility, $145,000,000 for the Argonne Leadership Computing Facility, $110,000,000 for the National Energy Research Scientific Computing Center, and $85,000,000 for ESnet. The Committee supports the Department's efforts to fully fund an upgrade to ESnet and urges the Department to submit budget requests that provide ESnet the ability to procure the technology and operational resources needed for mission success. Further, the Committee recommends $10,000,000 for the Computational Sciences Graduate Program. The Committee recommends not less than $24,000,000 for Research and Evaluation Prototypes.

The Committee recommends not less than $159,000,000 for Mathematical, Computational, and Computer Sciences Research to support the development of critical tools for advanced computing. The Committee is supportive of recent research thrusts to develop scientific machine learning tools to enhance scientific discovery from user facility data and fundamental research in quantum information science that will lay the groundwork for deployable quantum computing systems.

The Committee recommends $75,667,000 for Computational Partnerships [SciDAC]. Within available funding for SciDAC, the Committee recommends up to $13,000,000 to support work on artificial intelligence and big data focused on the development of algorithms and methods to identify new ways of extracting information from data generated at the Office of Science's large user facilities or validating use of machine learning in the Office of Science's program's scientific simulations. This is the only funding recommended within the Office of Science that shall be available for this work. Further, none of the funding in the Office of Science is available for clinical trials or therapeutics.

BASIC ENERGY SCIENCES

The Committee recommends $2,193,400,000 for Basic Energy Sciences [BES].

The Committee recommends not less than $110,000,000 for the Energy Frontier Research Centers to continue multi-disciplinary, fundamental research needed to address scientific grand chal-

lenges. The Committee continues to support the EPSCoR program and its goals of broadening participation in sustainable and competitive basic energy research in eligible jurisdictions. The Committee recommends $20,000,000 for EPSCoR and directs the Department to resume annual or at minimum, biennial, Implementation Grant solicitations. The Committee further directs the Department to submit a report to the Committees on Appropriations of both Houses of Congress not later than 90 days after enactment of this act that provides a plan for future solicitations.

The Committee recommends not less than $519,009,000 to fully fund optimal operations at the five BES light sources and to adequately invest in the recapitalization of key instruments and infrastructure, and in staff and other resources necessary to deliver critical scientific capabilities to users. Within the available funds, the Committee recommends $118,200,000 for the operation of NSLS–II. Recognizing that the Department has constructed only half of the 60 beamlines that the NSLS–II can accommodate, and has not yet requested funding for the construction of additional beamlines in fiscal year 2019, the Committee directs the Department to submit as part of its fiscal year 2020 budget request a plan for the build-out of additional beamlines to fully leverage the capabilities of the NSLS–II.

The Committee recommends $285,000,000 for high-flux neutron source operations which will allow for both Spallation Neutron Source [SNS] and High Flux Isotope Reactor [HFIR] to proceed with the most critical deferred repairs, replace outdated instruments, and make essential machine improvements. The Committee does not recommend funding for the Lujan Neutron Scattering Center.

The Committee recommends not less than $140,000,000 to fully fund optimal operations at the five BES Nanoscale Science Research Centers and to adequately invest in the recapitalization of key instruments and infrastructure, and in staff and other resources necessary to deliver critical scientific capabilities to users.

The Committee recommends $24,088,000 for the Batteries and Energy Storage Hub, the Joint Center for Energy Storage Research [JCESR]. The Committee is highly supportive of the work of JCESR to develop energy storage research prototypes for transportation and grid applications beyond lithium-ion technologies. These prototypes will demonstrate the potential to scale up manufacturing prototype batteries to decrease costs and increase energy density of novel energy storage concepts. The Committee supports the continued research and development for JCESR, to ensure the outcome of basic research leads to practical solutions that are competitive in the marketplace.

The Committee recommends not less than $15,000,000 for the Fuels from Sunlight Hub. The Committee directs the Department of Energy to submit a solar fuels research initiative strategic plan within 120 days after enactment of this act. The 10-year plan shall include research challenges and opportunities, program goals and milestones to overcome scientific and technological impediments, a description of coordination between the Office of Science, EERE, and ARPA–E to leverage basic research and early-stage translational research in solar fuels to accelerate the pace of inno-

vation, an assessment of U.S. leadership in solar fuels research relative to international competition and the extent to which the Department's investments are sufficient to maintain U.S. leadership.

The Committee supports funding for energy research activities related to enhanced efficiency in energy conversion and utilization, including emergent polymer optoelectronic technologies, to ensure continued competitiveness in a global marketplace. The Department is directed to continue its partnership with qualified institutions of higher education in this effort. The Committee encourages the Department to continue funding to support research and development needs of graduate and post-graduate science programs at Historically Black Colleges and Universities.

The Committee recommends $26,000,000 for exascale systems.

Within the amounts recommended for Construction, the Committee recommends $70,000,000 for the Proton Power Upgrade project at the Spallation Neutron Source, $15,000,000 for the Second Target Station preliminary engineering design and to continue work towards a project baseline, $50,000,000 for the Advanced Light Source Upgrade, $140,000,000 for the Advanced Photon Source Upgrade, $28,000,000 for LCLS–II HE, and $139,300,000 for LCLS–II.

Not less than $14,100,000 is available for Other Project Costs, of which $6,000,000 is for the High Energy Upgrade at LCLS–II; $6,100,000 is for LCLS–II; and $2,000,000 is for the Advanced Light Source Upgrade.

BIOLOGICAL AND ENVIRONMENTAL RESEARCH

The Committee recommends $715,000,000 for Biological and Environmental Research. The Committee recognizes the unique and beneficial role that the Department plays for the Nation in the advancement of biosciences to address core departmental missions in energy and the environment. The Department is directed to give priority to optimizing the operation of Biological and Environmental Research User Facilities.

The Committee recommends $371,000,000 for Biological Systems Science, including not less than $100,000,000 for the four recently selected Bioenergy Research Centers. The Committee directs the Department to maintain Genomic Science as a top priority and recommends $90,000,000 for Foundational Genomics Research and $34,908,000 for Biomolecular Characterization and Imaging Science. The Committee recommends $70,000,000 for the Joint Genome Institute, an essential component for genomic research. The Committee recognizes the importance of the emerging field of microbiome research to the mission objectives of the Office of Science and more broadly within the Department, especially in relation to energy security and environmental sustainability. To address programmatic opportunities in microbiome research and development and to maintain U.S. leadership in the field, the Committee recommends an additional $10,000,000 to begin the establishment of a national microbiome database. The Department should lead this effort in collaboration with other Federal agencies.

The Committee recommends $344,000,000 for Earth and Environmental Systems Sciences. Within available funding for Earth and Environmental Systems Sciences, the Committee recommends

not less than $40,000,000 for Terrestrial Ecosystem Science, of which not less than $10,000,000 is for NGEE-Arctic, $8,300,000 is for the SPRUCE field site, $5,800,000 is for Next Generation Ecosystem Experiments Tropics, $6,800,000 is for Watershed Function SFA, and $5,700,000 is for AmeriFLUX Long-Term Earth System Observations. Within available funding for Earth and Environmental Systems Sciences, the Committee recommends not less than $22,143,000 for Subsurface Biogeochemical Research, including not less than $3,000,000 to support on-going research and discovery related to mercury biogeochemical transformations in the environment.

The Committee recommends $97,000,000 for Earth and Environmental Systems Modeling and directs the Department to expend appropriated funds for earth system modeling, and regional and global model analysis. The Committee further directs the Department to make land-energy interactions, land biogeochemistry, uncertainty quantification, and model evaluation (e.g., ILAMB) a priority within the regional and global modeling activities, and continue to support performance optimization of coupled systems for execution on high performance and exascale systems. The Committee recommends $15,000,000 to support the exascale computing initiative.

Within available funds, not less than $133,500,000 is recommended for Facilities and Infrastructure in the Earth and Environmental Systems Sciences program, including $45,000,000 for the Environmental Molecular Sciences Laboratory, and $68,000,000 for the Atmospheric Radiation Measurement [ARM] User Facility. The Committee also recommends an additional $17,500,000 to replace the ARM mobile unit. The Committee supports the Department's proposal to initiate a terrestrial-aquatic interfaces pilot project and encourages the Department to explore as part of this pilot the resilience of ecosystems in coastal regions in response to changing environments and extreme weather events.

The Committee encourages the Department to increase its funding for academia to perform independent evaluations of climate models using existing data sets and peer-reviewed publications of climate-scale processes to determine various models' ability to reproduce the actual climate.

FUSION ENERGY SCIENCES

The Committee recommends $425,000,000 for Fusion Energy Sciences.

U.S. Contribution to ITER.—The Committee recommends $122,000,000 for the in-kind contributions and related support activities of the International Thermonuclear Experimental Reactor [ITER] project. The Committee does not recommended funding for the cash contribution.

The Committee recommends not less than $7,000,000 for the Material Plasma Exposure eXperiment and not less than $92,500,000 for DIII–D.

The Committee directs the Fusion Energy Sciences Advisory Committee to review establishing a reactor concepts research, development, and deployment activity. Within 180 days after enactment of this act, the Department is directed to brief the Commit-

tees on Appropriations of both Houses of Congress on a recommendation, which if supported, will include a technical plan, program and eligibility requirements, and funding profile for future fiscal years.

HIGH ENERGY PHYSICS

The Committee recommends $1,010,000,000 for High Energy Physics. The Committee strongly supports the Department's efforts to advance the recommendations of the Particle Physics Project Prioritization Panel Report [P5], which established clear priorities for the domestic particle physics program.

The Committee recommends $7,500,000 for the Dark Energy Spectroscopic Instrument; $14,450,000 for the G2 Dark Matter Experiment LUX–ZEPLIN; and $10,000,000 for the Facility for Advanced Accelerator Experimental Tests II. The Committee notes that fabrication of the Large Synoptic Survey Telescope Camera will be complete with fiscal year 2018 funding and recommends $6,250,000 for ongoing efforts for commissioning and initial operation of the camera.

In accordance with the P5, the Committee strongly urges the Department to maintain a balanced portfolio of small-, medium- and large-scale experiments, and to ensure adequate funding for the basic research program at universities and the national laboratories. In particular, in addition to the support for the Long Baseline Neutrino Facility to study neutrino physics, the Committee urges the Department to support the P5 recommendation for a next-generation Stage 4 Cosmic Microwave Background experiment for precision studies of the early universe.

Four years into executing the P5, the Committee commends the Office of Science and the high energy physics community for achieving significant accomplishments and meeting the milestones and goals set forth in the strategic plan, including advancing the high-luminosity accelerator and detector upgrades for the Large Hadron Collider, construction of the Long Baseline Neutrino Facility/Deep Underground Neutrino Experiment, completing the construction of second generation dark matter and dark energy experiments, operating the world's highest power beams for neutrino physics, building a successful prototype of the strongest accelerator magnet ever built, and discovering new configurations of matter. The Committee encourages the Department and the high energy physics community to continue to provide progress reports on meeting P5 goals. The Committee recommends $145,000,000 to continue construction of the Long Baseline Neutrino Facility/Deep Underground Neutrino Experiment, consistent with the Department's project cost profile, and $35,000,000 for the PIP–II accelerator upgrade.

A recent National Academies study, *Opportunities in Intense Ultrafast Lasers, Towards the Brightest Light*, highlighted the importance of investing in high-intensity laser technology to maintain U.S. leadership and open up new frontiers of science. To help advance this important area of research, the Committee directs the Department to provide a plan within 90 days after enactment of this act that responds to the recommendations of this study concerning this important national capability.

NUCLEAR PHYSICS

The Committee recommends $710,000,000 for Nuclear Physics, and strongly supports the Long Range Plan for Nuclear Science released in October 2015 to address important scientific questions with modest or constrained growth in the nuclear science budgets, while still maintaining a strong, vital and world-leading program.

Within available funds, the Committee recommends $75,000,000 for the Facility for Rare Isotope Beams [FRIB], and encourages the Department to work with Michigan State University to commence early operations at FRIB. The Committee also recommends $11,500,000 for the Stable Isotope Production Facility to provide increased domestic capacity for production of critically needed enriched stable isotopes for research, defense, and industry, and reduce the Nation's dependence on foreign supplies. The Committee also recommends $6,600,000 for the Gamma-Ray Energy Tracking Array, which will enable advanced, high resolution gamma ray detection capabilities for FRIB.

The Committee further recommends optimal operations at the Relativistic Heavy Ion Collider, Continuous Electron Beam Accelerator Facility, the Argonne Tandem Linac Accelerator System, and the Brookhaven Linac Isotope Producer Facility.

WORKFORCE DEVELOPMENT FOR TEACHERS AND SCIENTISTS

The Committee recommends $24,500,000 for Workforce Development for Teachers and Scientists. Within available funds, the Committee recommends $11,300,000 for the Science Undergraduate Laboratory Internship; $1,000,000 for the Community College Institute of Science and Technology; $4,500,000 for the Graduate Student Research Program; $1,200,000 for the Albert Einstein Distinguished Educator Fellowship; $2,900,000 for the National Science Bowl; $750,000 for Technology Development and Online Application; $600,000 for Evaluation Studies; $500,000 for Outreach; and $50,000 for Laboratory Equipment Donation Program.

SCIENCE LABORATORIES INFRASTRUCTURE

The Committee recommends $302,100,000 for Science Laboratories Infrastructure.

Within these funds, the Committee recommends $26,000,000 for nuclear operations at Oak Ridge National Laboratory. In future budget requests, the Committee directs the Office of Science to work with the Office of Nuclear Energy to demonstrate a commitment to operations and maintenance of nuclear facilities at Oak Ridge National Laboratory that support multiple critical missions.

ADVANCED RESEARCH PROJECTS AGENCY—ENERGY

Appropriations, 2018	$353,314,000
Budget estimate, 2019	
Committee recommendation	375,000,000

The Committee recommends $375,000,000 for the Advanced Research Projects Agency—Energy [ARPA–E], an increase of $375,000,000 above the budget request. Within available funds, the Committee recommends $33,250,000 for program direction.

ARPA–E was established by the America COMPETES Act of 2007 following a recommendation by the National Academies of Sciences, Engineering, and Medicine in the *Rising Above the Gathering Storm* report. Since receiving its first funding in fiscal year 2009, ARPA–E continues to catalyze and support the development of transformational, high-impact energy technologies to ensure the Nation's economic and energy security and technological leadership. Project sponsors continue to form strategic partnerships and new companies, as well as secure private sector funding to help move ARPA–E technologies closer to the market.

The Committee definitively rejects the short-sighted proposal to terminate ARPA–E, and instead increases investment in this transformational program and directs the Department to continue to spend funds provided on research and development and program direction. The Department shall not use any appropriated funds to plan or execute the termination of ARPA–E.

INNOVATIVE TECHNOLOGY LOAN GUARANTEE PROGRAM

ADMINISTRATIVE EXPENSES

GROSS APPROPRIATION

Appropriations, 2018	$33,000,000
Budget estimate, 2019	10,000,000
Committee recommendation	33,000,000

OFFSETTING COLLECTIONS

Appropriations, 2018	−$10,000,000
Budget estimate, 2019	−15,000,000
Committee recommendation	−15,000,000

NET APPROPRIATION

Appropriations, 2018	$23,000,000
Budget estimate, 2019	−5,000,000
Committee recommendation	18,000,000

The Committee recommends $33,000,000 in funding for the Loan Guarantee Program, an increase of $23,000,000 above the budget request. This funding is offset by $15,000,000 in collections from loan guarantee applicants, for a net appropriation of $18,000,000. An additional $44,000,000 is credited to the bill as an adjustment from negative subsidies associated with this program. No funds recommended under this heading may be used to plan, develop, implement or pursue the elimination of the Title XVII Innovative Technologies Loan Program.

ADVANCED TECHNOLOGY VEHICLES MANUFACTURING LOAN PROGRAM

Appropriations, 2018	$5,000,000
Budget estimate, 2019	1,000,000
Committee recommendation	5,000,000

The Committee recommends $5,000,000 for the Advanced Technology Vehicles Manufacturing Loan Program, an increase of $4,000,000 above the budget request.

TRIBAL ENERGY LOAN GUARANTEE PROGRAM

Appropriations, 2018	$1,000,000
Budget estimate, 2019	−8,500,000
Committee recommendation	1,000,000

The Committee recommends $1,000,000 for the Tribal Energy Loan Guarantee Program, an increase of $9,500,000 above the budget request.

OFFICE OF INDIAN ENERGY POLICY AND PROGRAMS

Appropriations, 2018	.....
Budget estimate, 2019	.....
Committee recommendation	$18,000,000

The Committee recommends $18,000,000 for the Office of Indian Energy Policy and Programs. The activities of this office have previously been funded in the Departmental Administration account.

DEPARTMENTAL ADMINISTRATION

(GROSS)

Appropriations, 2018	$285,652,000
Budget estimate, 2019	235,534,000
Committee recommendation	266,000,000

(MISCELLANEOUS REVENUES)

Appropriations, 2018	−$96,000,000
Budget estimate, 2019	−96,000,000
Committee recommendation	−96,000,000

NET APPROPRIATION

Appropriations, 2018	$189,652,000
Budget estimate, 2019	139,534,000
Committee recommendation	170,000,000

The Committee recommends $266,000,000 in funding for Departmental Administration. This funding is offset by $96,000,000 in revenue for a net appropriation of $170,000,000.

The Committee has reduced the number of control points in this account to provide flexibility to the Department in its management and funding of its support functions. The Department is directed to continue to submit its budget request for this account in its current structure. The Other Departmental Administration activity includes Technology Transition Management, Chief Human Capital Officer, Chief Information Officer, Office of Small and Disadvantaged Business Utilization, General Counsel, Energy Policy and Systems Analysis, Technology Transitions, International Affairs, Public Affairs, Economic Impact and Diversity, and Office of Energy Jobs Development. The Office of Indian Energy Policy and Programs is funded in a separate account.

Within International Affairs, the Committee recommends $2,000,000 for the Israel Binational Industrial Research and Development [BIRD] Foundation and $4,000,000 to continue the U.S.-Israel Center of Excellence in Energy Engineering and Water Technology as authorized by the United States-Israel Strategic Partnership Act. This joint research and development center between the

U.S. and Israel shall focus on collaborative research initiatives among universities, research institutions, and industry partners that could include hydrocarbon extraction and processing, energy infrastructure and policies, process water treatment, alternative energy sources, and impacts on coastal communities. Funding provided shall be matched with Israeli government and industry funding. The Department is directed to expeditiously obligate funding provided in fiscal year 2018 and provide to the Committees on Appropriations of both Houses of Congress a briefing on implementation and management. The Committee directs the Department to ensure the center is cost-shared with Israel and non-federal partners.

Technology Transfer.—Within the amount recommended for Other Departmental Administration, the Committee recommends $8,505,000 for the Office of Technology Transition. In awarding funding from the Technology Commercialization Fund, the Department shall assure cost match with private partners is in accordance with cost sharing in section 988 of the Energy Policy Act of 2005 (42 U.S.C. 16352).

Small Refinery Exemption.—The Department is directed to continue to follow the direction included in the Energy and Water Development and Related Agencies Appropriations Act, 2018, under this heading.

OFFICE OF THE INSPECTOR GENERAL

Appropriations, 2018	$49,000,000
Budget estimate, 2019	51,330,000
Committee recommendation	51,330,000

The Committee recommends $51,330,000 for the Office of the Inspector General, the same as the request.

ATOMIC ENERGY DEFENSE ACTIVITIES

NATIONAL NUCLEAR SECURITY ADMINISTRATION

The Committee recommendation for the National Nuclear Security Administration [NNSA] continues funding for recapitalization of our nuclear weapons infrastructure, while modernizing and maintaining a safe, secure, and credible nuclear deterrent without the need for underground testing. This is among our most important national security priorities.

At the same time, the Committee supports continuing important efforts to secure and permanently eliminate remaining stockpiles of nuclear and radiological materials overseas and in the United States that could be used for nuclear or radiological weapons. In addition, the Committee supports Naval Reactors and the important role they play in enabling the Navy's nuclear fleet.

The NNSA is a semi-autonomous agency within the Department. The NNSA Act clearly lays out the functions of the NNSA, and gives the Administrator authority over, and responsibility for, those functions. No funds shall be used to reorganize, reclassify, or study combining any of those functions with the Department. Funds may be used to evaluate any other function not specifically listed as an NNSA function in the NNSA Act, such as a chief scientist or office of policy.

INTEGRATED UNIVERSITY PROGRAM

The Committee directs the Secretary to carry out the requirements of 42 U.S.C. 16274a in support of university research and development in areas relevant to the NNSA's mission. Within available funds, the Committee recommends not less than $5,000,000 for the Integrated University Program to cultivate the next generation of leaders in nonproliferation, nuclear security, and international security. Together with funds from the Office of Nuclear Energy and the Nuclear Regulatory Commission, this program ensures highly qualified nuclear specialists will be available to meet national needs. The Committee directs the Department to request funding for this program in future budget years. Funding for this program shall not come from prior year funds.

In addition to the Integrated University Program within Defense Nuclear Nonproliferation, the NNSA manages several university-related programs, ranging from fellowships and scholarships to university research. The NNSA has not been able to provide a clear accounting of these various programs, and is directed to provide a report annually with the budget request that lists all of the university programs requested, the recommended funding level, and the value that program provides the NNSA.

PROJECT MANAGEMENT

The Committee is concerned about the NNSA's ability to properly estimate costs and timelines for large projects. The NNSA is encouraged to assess current performance on projects costing more than $750,000,000, and make appropriate project management changes. The Committee encourages the NNSA to identify problems in cost and schedule estimates early, and provide updated information to the Committees on Appropriations of both Houses of Congress in a timely manner.

WEAPONS ACTIVITIES

Appropriations, 2018	$10,642,138,000
Budget estimate, 2019	11,017,078,000
Committee recommendation	10,850,000,000

The Committee recommends $10,850,000,000 for Weapons Activities, a decrease of $167,078,000 below the budget request, to ensure the safety, security, reliability, and effectiveness of the Nation's nuclear weapons stockpile without the need for nuclear testing.

DIRECTED STOCKPILE WORK

The Committee recommends $4,700,501,000 for Directed Stockpile Work.

Life Extension Programs.—The Committee recommends $1,919,988,000 for Life Extension Programs [LEPs] and Major Alterations, which fully funds all LEPs and major alterations in the budget request, consistent with the plan of record approved by the Nuclear Weapons Council. The NNSA needs to ensure that LEPs are completed on time and on budget to prevent impact on other high priorities, such as modernizing aging infrastructure, critical nonproliferation activities to combat nuclear terrorism, and naval nuclear propulsion.

Weapons Dismantlement and Disposition.—The Committee recommends $56,000,000 for the dismantlement of retired nuclear weapons removed from the stockpile.

Strategic Materials.—The Committee supports the budget request for strategic materials, including management of existing material stockpiles and methods to replenish the supply needed for our national security programs. As the Department progresses through the ongoing warhead life extension programs, it will require the necessary strategic materials to meet the stockpile demands. The NNSA is encouraged to explore all options, including leveraging qualified industrial partners, to ensure it can maintain a consistent supply of purified uranium metal and other strategic materials.

The Committee continues to support the Nuclear Weapons Council's program of record for plutonium pit production to meet the Fiscal Year 2015 National Defense Authorization Act requirement of 30 pits per year at Los Alamos National Laboratory by 2026.

Within available funds, NNSA is directed to contract with a third-party federally-Funded Research and Development Corporation to conduct an independent assessment of the NNSA's decision to conduct pit production operations at two sites. NNSA shall identify and execute a contract with an independent FFRDC, not directly involved in plutonium pit production, not later than 60 days after enactment of this a act. NNSA shall not proceed with conceptual design activities for the recently announced preferred alternative until an FFRDC is under contract. The assessment shall include an analysis of the four options evaluated in the recent Plutonium Pit Production Engineering Assessment, all identified risks, engineering requirements, workforce development requirements, and other factors considered. The FFRDC shall submit its report to the Committees on Appropriations of both the Houses of Congress not later than 210 days after enactment of this act.

Domestic Uranium Enrichment.—The Department's approved Mission Need Statement [MNS] for Domestic Uranium Enrichment states that in 2014–2015, the American Centrifuge Plant had successfully completed its mission of providing reliability and operational data. The Department's research and development on small centrifuges has not yet reached that level of maturity. The MNS also stated that the cost range to enrich uranium using AC–100 would cost approximately twice as much as using small centrifuges. The Committee is concerned that the Department lacks a credible plan to obtain adequate data on small centrifuge operations to complete the Analysis of Alternatives for uranium enrichment as scheduled. The Committee recommends $50,000,000 for Domestic Uranium Enrichment, including not more than $5,000,000 for research, development, and demonstration of AC–100 and not less than $45,000,000 for research, development and demonstration of small centrifuges. No funds are recommended for uranium downblending within this account.

Tritium Sustainment.—The Committee recommends $290,275,000 for tritium sustainment, including $85,000,000 to downblend uranium for tritium production.

RESEARCH, DEVELOPMENT, TECHNOLOGY, AND ENGINEERING

The Committee recommends $2,042,289,000 for Research, Development, Technology, and Engineering.

Science.—The Committee directs the Administrator to enter into a contract with the group known as JASON for a study to assess the efforts of the NNSA to understand plutonium aging and the lifetime of plutonium pits in nuclear weapons. The Administrator shall make available all information that is necessary to successfully complete a meaningful study on a timely basis. Not later than 18 months after the date of enactment of this act, the Administrator shall submit to Congress a report on the findings of the study. The report shall include recommendations of the study for improving the knowledge, understanding, and application of the fundamental and applied sciences related to the study of plutonium aging and pit lifetimes, an estimate of minimum and likely lifetimes for pits in current warheads, and the feasibility of reusing pits in modified nuclear weapons. The report shall be submitted in unclassified form but may include a classified annex.

Academic Alliances and Partnerships.—The Committee recognizes the importance of the Academic Alliances and Partnerships program in supporting fundamental science and technology research at universities that support stockpile stewardship, the development of the next generation of highly-trained workforce, and the maintenance of a strong network of independent technical peers. The Committee is also aware of the expertise provided to the NNSA by academic alliances and the centers of excellence program. The Committee encourages the NNSA to fund new centers of excellence, especially in the field of materials under extreme conditions research. The Committee recommends $53,364,000. Within this amount, not less than $20,000,000 is recommended for the Minority Serving Institution Partnership Program, within which not less than $2,000,000 is recommended for Tribal Colleges and Universities.

Engineering.—The Committee recommends $22,500,000 to complete the recapitalization of the Microsystems and Engineering Sciences Applications silicon fabrication facility, consistent with the budget request. The Committee also supports increased investment in Enhanced Surety in recognition of new threats and the challenges maintaining readiness on aging systems. Within the available funding, $5,000,000 is recommended for next-generation technology development for warhead system certification and the protection against theft/loss and terrorism incident.

Inertial Confinement Fusion Ignition and High-Yield.—The Committee finds that the Inertial Confinement Fusion and High Yield [ICF] program continues to be a critical and essential component of nuclear stockpile certification without underground nuclear weapons testing, maintaining U.S. leadership in high energy density physics and laser technologies, and developing the next-generation workforce. Therefore, the Committee recommends $544,934,000 for the ICF program. Within available funds, the Committee recommends $344,000,000 for inertial confinement fusion activities at the National Ignition Facility, $63,100,000 is recommended for Sandia National Laboratory's Z facility, and

$80,000,000 is recommended for the University of Rochester's Omega facility. Within available funds for facility operations and other amounts, the Committee recommends not less than $30,000,000 for target research, development, and production. To ensure a robust, diverse, and competitive vendor base for targets, the Committee directs the NNSA to compete as much scope as practicable and limit sole-source contracts to $15,000,000 or less. The Committee further encourages continued research by the NNSA in High Energy Density Plasmas and recognizes the partnerships between the laboratories and research universities to address the critical need for skilled graduates to replace an aging workforce at our NNSA laboratories.

Advanced Simulation and Computing.—The Committee recommends $703,404,000 for advanced simulation and computing. Within available funds, the Committee recommends not less than $163,000,000 for activities associated with the exascale initiative, such as advanced system architecture design contracts with vendors and advanced weapons code development to effectively use new high performance computing platforms. Within funds provided, the Committee recommends up to $13,000,000 for work on integration of artificial intelligence approaches into mechanistic modeling and prediction.

Advanced Manufacturing Development.—The Committee recommends $96,838,000 for Advanced Manufacturing Development. Within available funds, $35,914,000 is recommended for Process Technology Development, including $5,000,000 to modernize and upgrade legacy applications at weapons production facilities to improve manufacturing and safety.

INFRASTRUCTURE AND OPERATIONS

The Committee recommends $2,749,048,000 for Infrastructure and Operations.

Project 06–D–141, Uranium Processing Facility, Y–12, Oak Ridge, Tennessee.—The Committee recommends $703,000,000 to continue construction activities of the five remaining subprojects of the Uranium Processing Facility, including the Main Process Building and the Salvage and Accountability Building. The Committee notes that the designs for these nuclear facilities have reached the 90 percent completion milestone and the NNSA Administrator has approved the cost and schedule baselines for both buildings.

The Committee supports the ongoing effort to replace existing enriched uranium capabilities currently residing in Building 9212 by 2025 for not more than $6,500,000,000 and the strategy of breaking the project into more manageable subprojects. This practice is specifically permitted by DOE Order 413.3B, and is a practical approach for any project of this magnitude.

DEFENSE NUCLEAR NONPROLIFERATION

Appropriations, 2018	$1,999,219,000
Budget estimate, 2019	1,862,825,000
Committee recommendation	1,902,000,000

The Committee recommends $1,902,000,000 for Defense Nuclear Nonproliferation, an increase of $39,175,000 above the budget request.

Defense Nuclear Nonproliferation provides a vitally important component of our national security—preventing nuclear materials and weapons from falling into the wrong hands, including non-weapons nations, terrorist organizations, and other non-state entities. This mission is challenged by an increasingly dangerous world with emerging and evolving threats, in addition to the proliferation of technologies that simplify production, manufacturing, and design of nuclear materials and weapons. The Committee recognizes the importance of bilateral and multilateral agreements and organizations in detecting, intercepting, and deterring nuclear and radiological threats. The Committee urges the full use of these partnerships to further strengthen U.S. and global security. Within available funds, the Committee recommends up to $18,000,000 to partner with interested State or local governments to improve capabilities to train first-responders, and other experts in nuclear operations, safeguards, cyber, and emergency operations.

To preserve and advance uranium and engineering expertise for purposes of national security and nonproliferation, the Committee encourages the ongoing collaboration between the Department's Office of Intelligence and the Defense Nuclear Nonproliferation program. Further, as the pathways to proliferation increase, it is vital to maintain the skilled workforce and unique infrastructure to detect nuclear proliferation and support policymakers in the future. The Department is directed to provide a report to the Committees on Appropriations of both Houses of Congress within 90 days after enactment of this act that provides a plan to maintain the necessary technical competencies and infrastructure. The Department is directed to coordinate with other government agencies and non-government entities to ensure it addresses the broad spectrum of nonproliferation needs.

Domestic Radiological Security.—The Committee recommends $115,433,000 for Domestic Radiological Security, including not less than $25,000,000 for the Cesium Irradiator Replacement Program.

Nonproliferation and Arms Control.—The Committee recommends $129,703,000 for Nonproliferation and Arms Control activities. Within available funds, the Committee recommends not less than $3,000,000 for international cooperation between governmental and non-governmental organizations at the national and sub-national levels to implement robust export control protocols.

Defense Nuclear Nonproliferation Research and Development.—The Committee recommends $487,270,000 for Defense Nuclear Nonproliferation Research and Development. The Committee supports a robust research and development capability to support nonproliferation initiatives. Proliferation of illicit nuclear materials and weapons continues to be a high-consequence threat, and our ability to detect the production and movement of these materials is vitally important. Research and development in this area is especially important. The Committee recommendation supports continued research and development of novel enrichment technologies to support nonproliferation goals, and recommends $7,500,000 for this purpose. The Committee also supports exploration and develop-

ment of material disposal technologies, and recommends up to $10,000,000 for this purpose.

Low Enriched Uranium for Naval Applications.—Within available funds for Defense Nuclear Nonproliferation Research and Development, the Committee recommends $10,000,000 for Advanced Low Enriched Uranium Fuel Research and Development for the national laboratories to develop low-enriched fuels that could replace highly enriched uranium for naval applications. Consistent with section 7319 of title 10, United States Code, this funding is recommended within the Defense Nuclear Nonproliferation account. This work shall be managed within Defense Nuclear Nonproliferation.

Seismic Research Instruments.—Several U.S. Government agencies reduce the costs of seismic research by utilizing shared-use instruments instead of owning, operating, and maintaining their own equipment. The Committee directs that within 180 days after enactment of this act, the NNSA shall submit a report to Committees on Appropriations of both Houses of Congress on the cost-effectiveness of establishing an agreement between the Department and one or more instrument centers to maintain and provide shared use of any instruments the Department acquires, rather than the Department doing so internally.

MOX Construction.—The Committee recommends $220,000,000 for closeout costs associated with the termination of MOX Fuel Fabrication Facility construction, consistent with the budget request and the Secretary's waiver to terminate the project.

Use of Prior Year Funds.—The Committee recommendation assumes the use of $19,000,000 in prior year funds as recommended in the budget request, and the use of $55,000,000 in prior year funds from Nonproliferation Construction.

NAVAL REACTORS

Appropriations, 2018	$1,620,000,000
Budget estimate, 2019	1,788,618,000
Committee recommendation	1,620,000,000

The Committee recommends $1,620,000,000 for Naval Reactors, a decrease of $168,618,000 below the budget request. The Committee's recommendation fully funds important national priorities, including the *Columbia*-class replacement submarine design and the prototype refueling. Naval Reactors currently relies on high-enriched uranium from weapons that have been removed from the stockpile to fuel the Navy's aircraft carriers and submarines. The Committee encourages Naval Reactors to work with the NNSA to ensure there is a long-term plan that meets the Navy's needs for high-enriched uranium.

COLUMBIA-CLASS REACTOR SYSTEMS DEVELOPMENT

The Committee recommends $138,000,000 for *Columbia*-Class Reactor Systems Development. *Columbia*-class submarines must be delivered on time to maintain our survivable deterrent. The Committee directs Naval Reactors to provide the report in the Energy and Water Development and Related Agencies Appropriations Act,

2018, on technical risks to delivering the lead submarine on time, and mitigation strategies for those risks.

NAVAL REACTORS DEVELOPMENT

The Committee recommends $475,000,000 for Naval Reactors Development. Within the available funds, the Committee recommends $83,000,000 for the Advanced Test Reactor and $2,000,000 for planning, preparation, and shipments of unirradiated or irradiated material to support a pilot project on ZIRCEX.

CONSTRUCTION

The Committee recommends $233,194,000 for Construction. Within available funds, the Committee recommends $209,000,000 for the Spent Fuel Handling Facility in Idaho, $13,200,000 for the Fire System Upgrade at Bettis, and $10,994,000 to replace an overhead piping utility distribution system at the KS site.

FEDERAL SALARIES AND EXPENSES

Appropriations, 2018	$407,595,000
Budget estimate, 2019	422,529,000
Committee recommendation	408,000,000

The Committee recommends $408,000,000 for Federal Salaries and Expenses, a decrease of $14,529,000 below the budget request.

DEFENSE ENVIRONMENTAL CLEANUP

Appropriations, 2018	$5,988,048,000
Budget estimate, 2019	5,630,217,000
Committee recommendation	5,988,000,000

The Committee recommendation for Defense Environmental Cleanup is $5,988,000,000, an increase of $357,783,000 above the budget request. Within available funds, the Department is directed to fund the hazardous waste worker training program at $10,000,000.

Future Budget Requests.—The Committee directs the Department to include out-year funding projections in the annual budget request for Environmental Management, and an estimate of the total cost and time to complete each site.

Richland.—As a signatory to the Tri-Party Agreement, the Department is required to meet specific compliance milestones toward the cleanup of the Hanford site. Among other things, the Department committed to provide the funding necessary to enable full compliance with its cleanup milestones. Unfortunately, if the Department's fiscal year 2019 budget request were enacted without change, future fiscal year Tri-Party Agreement milestones could be at risk, threatening high-risk cleanup projects near the City of Richland, Washington and the economically and environmentally important Columbia River. The Committee recognizes that significant progress has been made at the Hanford Site. However, because the Department's budget request could slow or halt critical cleanup work and threaten the Department's compliance with its legal obligations under the Tri-Party Agreement, the Committee recommends $838,171,000 for Richland Operations. Additional funding is recommended for cleanup of the 300–296 waste site

under the 324 Building, interim stabilization of PUREX Tunnel #2, risk reduction activities associated with legacy waste sites, K-West facility cleanup and deactivation, site-wide infrastructure, and community and regulatory support. The Committee recommends no funding for the Department to carry out activities relating to single-shell tank stabilization nor activities in the Office of River Protection's tank farms within this control point.

Within available funds, the Department recommends $8,5000,000 for the Hazardous Materials Management and Emergency Response facilities. Further, within available funds, the Department is directed to support the recently established Hanford Workforce Engagement Center to provide education and advocacy to current and former Hanford employees on all available Federal and State compensation programs, and to identify if a capability to resolve disputes and concerns can be integrated into the Hanford Workforce Engagement Center. Funding for maintenance and public safety efforts at B Reactor in the Manhattan Project National Historical Park is recommended within the Non-Defense Environmental Cleanup account.

Oak Ridge Reservation.—The Committee recommends $410,000,000 for the Oak Ridge Reservation, including $10,000,000 to continue preliminary design of a new landfill. The existing onsite waste disposal facility is expected to reach capacity before all cleanup activities are completed. The new landfill needs to be completed to ensure that there is no interruption of cleanup activities. Additional funds above the budget request are recommended to address the growing backlog of deferred maintenance associated with excess contaminated facilities, several of which are on the Department's list of high-risk facilities, and to focus efforts at reducing threats to worker safety and health. Efforts should also be focused on cleanup of facilities needed for other purposes, such as hot cells, reactors, and other excess facilities located in the central campus at Oak Ridge National Laboratory.

U–233 Disposition Program.—The Committee recommends $52,300,000 for the disposition of material in Building 3019. Removal of legacy material from this building, an aging facility in the heart of the Oak Ridge National Laboratory central campus, must remain a high priority for the Department. Removal of the Uranium 233 will enable the overall security posture at the laboratory to be relaxed, which will reduce costs and eliminate nuclear safety issues, and make the campus more conducive to collaborative science. The Committee encourages the Department to seek opportunities to expedite the disposition of material in Building 3019, including public-private partnerships that may reduce the overall cost of cleanup. At the same time, the Department shall consider direct disposal of remaining material that may not be suitable to processing.

Mercury Treatment Facility.—The Committee recommends $76,000,000 for construction of the Outfall 200 Mercury Treatment Facility. Remediation of mercury contamination at the Oak Ridge Reservation is an important precursor to full site remediation. Reducing the mercury being released into the East Fork of Poplar Creek continues to be among the highest priorities for the Environmental Management program.

Office of River Protection.—The Committee recommends $1,573,000,000 for the Office of River Protection. Funds above the budget request are recommended to resume engineering, procurement, and design work on the High-Level Waste Treatment Facility, to ensure compliance with the 2016 Consent Decree and Tri-Party Agreement milestones, and to continue tank waste retrievals. Funds that support the Waste Treatment Plant project are recommended separately for: (1) Low-Activity Waste Treatment Facility, Analytical Laboratory, and Balance of Facilities; (2) High-Level Waste Treatment Facility; (3) Pre-Treatment Facility; and (4) Low Activity Waste Pretreatment System. The Committee recommends no funding for the Department to carry out activities relating to the test bed initiative for low activity waste disposition. The Committee is aware of efforts to remove high-curie constituents from high-level waste tanks to facilitate low-activity waste vitrification through the Direct Feed Low Activity Waste concept and meet consent decree requirements. Funding is provided to install and test one tank-side treatment device. The Department shall not proceed with expansion of this approach until it reports to the Committees on Appropriations of both Houses of Congress on how this approach will be integrated with existing and planned capital facilities, how lifecycle cost compare to other approaches, strategy for obtaining State permits, and plans for ancilliary waste streams. The Department shall report to the Committees on Appropriations of both Houses of Congress before moving ahead with any plans to place the High Level Waste Treatment Facility or the Pretreatment Facility into preservation mode for an extended period of time.

The Committee recognizes the Department's efforts to improve working conditions in the tank farms and to address chemical vapor exposures by implementing recommendations from the 2014 Hanford Tank Vapor Assessment Report. The Committee is aware of three subsequent reviews conducted by the Department's Office of the Inspector General and Office of Enterprise Assessments, and the National Institute for Occupational Safety and Health. Within available funds in the Tank Farms Activities control point, the Department is directed to continue ongoing work to address chemical vapor exposures, implement recommendations from all reviews, and maintain a safe work environment for Hanford employees.

Savannah River Site.—The Committee recommends $1,400,000,000 for the Savannah River site. Within available funds, $3,000,000 is for disposition of spent fuel from the High Flux Isotope Reactor. The Committee remains concerned about the coordination among the Office of Environmental Management, the NNSA, and the Office of Management and Budget when planning for retiree pension payments at the Savannah River Site. The Department is directed to provide the report required in the Energy and Water Development and Related Agencies Appropriations Act, 2018 on retiree pension payments as soon as possible.

Waste Isolation Pilot Plant.—The Department proposes to dispose of 34 metric tons of surplus plutonium at the Waste Isolation Pilot Plant [WIPP] in New Mexico. The Department is directed to work cooperatively with the State of New Mexico, recognizing the limits in the Land Withdrawal Act and New Mexico's status as an independent regulator of the WIPP facility. Further, no later than

February 1, 2019, the Department shall submit to the Committees on Appropriations of both Houses of Congress, a plan for obtaining all necessary final state and Federal permits; acquiring independent scientific and technical review of dilute and dispose processes and waste forms to ensure compliance with waste acceptance criteria; defining any legislative changes necessary to accommodate this material and the existing WIPP waste inventory; and outlining any necessary design and construction modifications to the current facility, including cost and schedule impacts of any modifications needed to WIPP facilities or for developing additional repositories.

Technology Development and Demonstration.—The Committee recommends $28,954,000 for Technology Development and Demonstration. The Committee supports the Department's efforts to expand technology development and demonstration to address its long-term and technically complex cleanup challenges. Within the amount recommended, not less than $5,000,000 is recommended for work on qualification, testing and research to advance the state-of-the-art on containment ventilation systems. Further, the Department is directed to take the necessary steps to implement and competitively award a cooperative university affiliated research center for that purpose.

Within available funds provided, not less than $5,000,000 is recommended to fund the existing cooperative agreement with the Consortium for Risk Evaluation with Stakeholder Participation [CRESP] and up to $5,000,000 is recommended for research and development of robotics to enhance worker safety.

OTHER DEFENSE ACTIVITIES

Appropriations, 2018	$840,000,000
Budget estimate, 2019	853,300,000
Committee recommendation	840,000,000

The Committee recommends $840,000,000 for Other Defense Activities, a decrease of $13,300,000 from the budget request. Within available funds, the Committee recommends $254,378,000 for Specialized Security Activities. Within the available funds for Environment, Health and Safety, the Committee recommends not less than $1,000,000 for the Epidemiologic Study of One Million U.S. Radiation Workers and Veterans, which was originally approved by the Office of Science in 2012.

POWER MARKETING ADMINISTRATIONS

No funds are recommended to divest transmission assets of the Power Marketing Administrations [PMA]. The Committee reminds the Department of the prohibition on studying transfer of PMA assets in Public Law 99–349.

The Committee understands the Department has used existing authorities to reorganize the reporting structure for the Power Marketing Administrations [PMAs), shifting responsibilities from the Deputy Secretary of Energy to the Assistant Secretary of the Office of Electricity. While the Committee understands the expertise of the Office of Electricity and recognizes the already existing relationship between PMAs and the Office of Electricity, the Committee remains concerned with this unnecessary change and urges

the Department to continue the long-standing practice of the PMA's organizational reporting to the Deputy Secretary of Energy.

The bill includes reductions of $16,000,000 and $44,000,000 to the annual expense requests for Southwestern Power Administration and Western Area Power Administration, respectively, to account for the Congressional Budget Office's [CBO] initial estimate of collections assumed in the budget request. CBO inadvertently misreported its estimate of annual expense collections associated with the level of funding for administrative expenses proposed in the fiscal year 2019 President's request by approximately $60,000,000 (in the aggregate), but the oversight was not discovered until after the House Committee on Appropriations had reported its version of the fiscal year 2019 Energy and Water Development appropriations bill and, therefore, could not be corrected prior to the Senate Committee on Appropriations taking action on this bill. CBO has indicated that it will adjust its estimate of the annual expense collection estimate prior to the conference between the House and Senate. Assuming that the Committee provides the requested level for annual expenses in the conference, the updated collection estimates will be at or around the levels in the budget request. The Committee has included additional lines in the detail table accompanying Title III of this report to show these adjustments.

Additionally, CBO has continued to raise questions about the current receipt authority provided in this and prior year appropriations acts to create carryover of unobligated balances for purchase power and wheeling expenditures [PPW]. Since the scoring for PPW receipts has historically equaled expenses as a result of a 2001 scoring agreement, the Committee continues to be unable to recommend the full budget request for PPW expenses for the Southeastern Power Administration, Southwestern Power Administration, or Western Area Power Administration due to CBO scoring. The Committee recommends the full amount for PPW expenses that CBO has estimated will be spent for those purposes in fiscal year 2019, which is approximately $200,000,000 lower (in the aggregate) than the budget request. The Committee will continue to work to resolve the differences in the CBO and administration estimates for PPW expenses.

OPERATIONS AND MAINTENANCE, SOUTHWESTERN POWER ADMINISTRATION

Appropriations, 2018	$11,400,000
Budget estimate, 2019	26,400,000
Committee recommendation	10,400,000

The Committee recommends a net appropriation of $10,400,000 for the Southwestern Power Administration.

CONSTRUCTION, REHABILITATION, OPERATIONS AND MAINTENANCE, WESTERN AREA POWER ADMINISTRATION

Appropriations, 2018	$93,372,000
Budget estimate, 2019	132,372,000
Committee recommendation	89,372,000

The Committee recommends a net appropriation of $89,372,000 for the Western Area Power Administration.

FALCON AND AMISTAD OPERATING AND MAINTENANCE FUND

Appropriations, 2018	$228,000
Budget estimate, 2019	228,000
Committee recommendation	228,000

The Committee recommends a net appropriation of $228,000 for the Falcon and Amistad Operating and Maintenance Fund.

FEDERAL ENERGY REGULATORY COMMISSION

SALARIES AND EXPENSES

Appropriations, 2018	$367,600,000
Budget estimate, 2019	369,900,000
Committee recommendation	369,900,000

REVENUES APPLIED

Appropriations, 2018	−$367,600,000
Budget estimate, 2019	−369,900,000
Committee recommendation	−369,900,000

The Committee recommends a net appropriation of $0 for the Federal Energy Regulatory Commission [FERC]. California recently experienced one of its worst fire seasons in modern history, resulting in severe challenges to the well-being of utilities and the electric system in that State. The Committee is concerned that the safe, reliable, and affordable delivery of electricity to consumers could be compromised by the increasing frequency and severity of natural disasters due to climate change—including hurricanes, floods, and wildfires. As FERC reviews way to improve the resilience of the electric transmission system, the Committee directs FERC to include the evaluation of just and reasonable cost-recovery mechanisms for the development of resilient infrastructure and system repair and restoration, as well as practices to better prepare the Nation's bulk power system for natural disasters. FERC shall study the impacts and effects of strict liability doctrines on utilities' ability to invest in the reliability and resilience of transmission systems. FERC is directed to report its findings and recommendations to the Committees on Appropriations of both Houses of Congress, not later than 90 days after the enactment of this act.

The Committee encourages FERC to prioritize meaningful opportunities for public engagement and coordination with State and local governments in the Federal permitting and review processes of energy infrastructure proposals. Specifically, review processes should remain transparent and consistent, and ensure the health, safety, and security of the environment and each affected community.

Oroville Dam.—FERC is directed to brief the Committees on Appropriations of both Houses of Congress on its response to the recommendations of the external independent panel reviewing FERC's dam safety practices in light of the 2017 incident at Oroville Dam in California within 60 days of receiving the external independent panel's report.

FERC shall require the licensee of Oroville Dam to request the United States Society on Dams to nominate independent consultants to prepare a level 2 risk analysis, consistent with the Commission's guidelines, for use in conducting the next Part 12 safety review of Oroville Dam, currently scheduled for 2019. FERC shall ensure the independence of the nominated consultants from the licensee.

The Committee encourages FERC to prioritize meaningful opportunities for public engagement and coordination with State and local governments in the Federal permitting and review processes of energy infrastructure proposals. Specifically, review processes should remain transparent and consistent, and ensure the health, safety, and security of the environment and each affected community.

DEPARTMENT OF ENERGY

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
ENERGY PROGRAMS					
ENERGY EFFICIENCY AND RENEWABLE ENERGY					
Sustainable Transportation:					
Vehicle technologies	337,500	68,500	337,500	.....	+269,000
Bioenergy technologies	221,545	37,000	215,000	−6,545	+178,000
Hydrogen and fuel cell technologies	115,000	58,000	115,000	.....	+57,000
Subtotal, Sustainable Transportation	674,045	163,500	667,500	−6,545	+504,000
Renewable Energy:					
Solar energy	241,600	67,000	239,500	−2,100	+172,500
Wind energy	92,000	33,000	80,000	−12,000	+47,000
Water power	105,000	45,000	105,000	.....	+60,000
Geothermal technologies	80,906	30,000	85,000	+4,094	+55,000
Subtotal, Renewable Energy	519,506	175,000	509,500	−10,006	+334,500
Energy Efficiency:					
Advanced manufacturing	305,000	75,000	311,000	+6,000	+236,000
Building technologies	220,727	57,000	225,000	+4,273	+168,000
Federal energy management program	27,000	10,000	31,000	+4,000	+21,000
Weatherization and Intergovernmental Programs:					
Weatherization:					
Weatherization assistance program	248,000	.....	248,000	.....	+248,000
Training and technical assistance	3,000	.....	3,000	.....	+3,000
Subtotal, Weatherization	251,000	.....	251,000	.....	+251,000
State Energy Program Grants	55,000	.....	55,000	.....	+55,000
Subtotal, Weatherization and Intergovernmental Program	306,000	.....	306,000	.....	+306,000

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Subtotal, Energy Efficiency	858,727	142,000	873,000	+14,273	+731,000
Corporate Support:					
Facilities and infrastructure:					
National Renewable Energy Laboratory [NREL]	92,000	90,000	97,000	+5,000	+7,000
Program direction	162,500	125,110	162,500	.....	+37,390
Strategic programs	15,000	.....	12,500	−2,500	+12,500
Subtotal, Corporate Support	269,500	215,110	272,000	+2,500	+56,890
Subtotal, Energy efficiency and renewable energy	2,321,778	695,610	2,322,000	+222	+1,626,390
TOTAL, ENERGY EFFICIENCY AND RENEWABLE ENERGY	2,321,778	695,610	2,322,000	+222	+1,626,390
ELECTRICITY DELIVERY AND ENERGY RELIABILITY					
Research and development:					
Transmission Reliability	39,000	.....	.....	−39,000	.....
Resilient Distribution Systems	38,000	.....	.....	−38,000	.....
Cyber security for energy delivery systems	75,829	.....	.....	−75,829	.....
Energy storage	41,000	.....	.....	−41,000	.....
Transformer resilience and advanced components	7,000	.....	.....	−7,000	.....
Subtotal, Research and development	200,829	.....	.....	−200,829	.....
Transmission Permitting and Technical Assistance	7,000	.....	.....	−7,000	.....
Infrastructure security and energy restoration	12,000	.....	.....	−12,000	.....
Program direction	28,500	.....	.....	−28,500	.....
Reliability	248,329	.....	.....	−248,329	.....
TOTAL, ELECTRICITY DELIVERY AND ENERGY RELIABILITY	248,329	.....	.....	−248,329	.....

CYBERSECURITY, ENERGY SECURITY, AND EMERGENCY RESPONSE					
Research and development:					
Cybersecurity for energy delivery systems	.....	70,000	80,829	+80,829	+10,829
Transmission reliability	.....	.....	39,000	+39,000	+39,000
Resilient distribution systems	.....	.....	38,671	+38,671	+38,671
Energy storage	.....	.....	41,000	+41,000	+41,000
Transformer resilience and advanced components	.....	.....	7,000	+7,000	+7,000
Subtotal, Research and development	.....	70,000	206,500	+206,500	+136,500
Transmission permitting and technical assistance	.....	.....	7,000	+7,000	+7,000
Infrastructure security and energy restoration	.....	18,000	18,000	+18,000	.....
Program direction	.....	7,800	28,500	+28,500	+20,700
TOTAL, CYBERSECURITY, ENERGY SECURITY, AND EMERGENCY RESPONSE	.....	95,800	260,000	+260,000	+164,200
ELECTRICITY DELIVERY					
Transmission reliability	.....	13,000	.....	.....	−13,000
Resilient distribution systems	.....	10,000	.....	.....	−10,000
Energy storage	.....	8,000	.....	.....	−8,000
Transformer resilience and advanced components	.....	5,000	.....	.....	−5,000
Transmission permitting and technical assistance	.....	6,000	.....	.....	−6,000
Program direction	.....	19,309	.....	.....	−19,309
TOTAL, ELECTRICITY DELIVERY	.....	61,309	.....	.....	−61,309
NUCLEAR ENERGY					
Research and development:					
Integrated university program	5,000	.....	5,000	.....	+5,000
STEP R&D	5,000	.....	.....	−5,000	.....
Nuclear energy enabling technologies	159,000	116,000	149,200	−9,800	+33,200
Reactor concepts RD&D	237,000	163,000	302,000	+65,000	+139,000
Fuel cycle research and development	260,056	60,000	267,300	+7,244	+207,300
International nuclear energy cooperation	3,000	2,500	2,500	−500	.....
Subtotal, Research and development	669,056	341,500	726,000	+56,944	+384,500
Infrastructure:					
Radiological facilities management:					
Space and defense infrastructure	20,000	.....	20,000	.....	+20,000

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Research reactor infrastructure	9,000	9,000	9,000	.....	.....
Subtotal, Radiological facilities management	29,000	9,000	29,000	.....	+20,000
INL facilities management:					
INL operations and infrastructure	288,000	204,000	238,000	−50,000	+34,000
Construction:					
16–E–200 Sample preparation laboratory	6,000	.....	.....	−6,000	.....
Subtotal, INL facilities management	294,000	204,000	238,000	−56,000	+34,000
Subtotal, Infrastructure	323,000	213,000	267,000	−56,000	+54,000
Idaho sitewide safeguards and security	133,000	136,090	133,000	.....	−3,090
Program direction	80,000	66,500	80,000	.....	+13,500
TOTAL, NUCLEAR ENERGY	1,205,056	757,090	1,206,000	+944	+448,910
FOSSIL ENERGY RESEARCH AND DEVELOPMENT					
Coal CCS and Power Systems:					
Carbon Capture	100,671	20,000	104,015	+3,344	+84,015
Carbon Storage	98,096	20,000	103,015	+4,919	+83,015
Advanced Energy Systems	112,000	135,000	116,000	+4,000	−19,000
Cross Cutting Research	58,350	78,300	61,000	+2,650	−17,300
NETL Coal Research and Development	53,000	65,000	54,000	+1,000	−11,000
STEP (Supercritical CO2)	24,000	25,000	25,000	+1,000	.....
Transformational Coal Pilots	35,000	.....	.....	−35,000	.....
Subtotal, Coal CCS and Power Systems	481,117	343,300	463,030	−18,087	+119,730
Natural Gas Technologies:					
Research	50,000	5,500	53,200	+3,200	+47,700
Unconventional fossil energy technologies from petroleum—oil technologies	40,000	14,000	54,000	+14,000	+40,000

Program direction	60,000	61,070	61,070	+1,070	.....
Special recruitment programs	700	200	700	.....	+500
NETL Research and Operations	50,000	40,000	50,000	.....	+10,000
NETL Infrastructure	45,000	38,000	45,000	.....	+7,000
TOTAL, FOSSIL ENERGY RESEARCH AND DEVELOPMENT	726,817	502,070	727,000	+183	+224,930
Naval Petroleum and Oil Shale Reserves	20,200	20,550	20,550	+350	.....
Use of prior year balances	−15,300	−10,550	−10,550	+4,750	.....
TOTAL, NAVAL PETROLEUM AND OIL SHALE RESERVES	4,900	10,000	10,000	+5,100	.....
STRATEGIC PETROLEUM RESERVE					
Strategic Petroleum Reserve	252,000	175,105	175,105	−76,895	.....
Sale of crude oil	−350,000	−300,000	−350,000	.....	−50,000
Use of sale proceeds	350,000	.....	350,000	.....	+350,000
TOTAL, STRATEGIC PETROLEUM RESERVE	252,000	−124,895	175,105	−76,895	+300,000
SPR PETROLEUM ACCOUNT					
SPR Petroleum Account	8,400	.....	8,400	.....	+8,400
TOTAL, SPR PETROLEUM ACCOUNT	8,400	.....	8,400	.....	+8,400
NORTHEAST HOME HEATING OIL RESERVE					
Northeast Home Heating Oil Reserve	10,000	10,000	10,000	.....	.....
Use of prior year balances	−3,500	.....	.....	+3,500	.....
TOTAL, NORTHEAST HOME HEATING OIL RESERVE	6,500	10,000	10,000	+3,500	.....
ENERGY INFORMATION ADMINISTRATION	125,000	115,035	125,000	.....	+9,965
NON-DEFENSE ENVIRONMENTAL CLEANUP					
Fast Flux Test Reactor Facility (WA)	2,240	2,240	2,240	.....	.....
Gaseous Diffusion Plants	101,304	100,575	102,000	+696	+1,425
Small sites	119,856	55,031	174,000	+54,144	+118,969
West Valley Demonstration Project	75,000	60,554	75,000	.....	+14,446

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
TOTAL, NON–DEFENSE ENVIRONMENTAL CLEANUP	298,400	218,400	353,240	+54,840	+134,840
URANIUM ENRICHMENT DECONTAMINATION AND DECOMMISSIONING FUND					
Oak Ridge	194,673	151,039	195,000	+327	+43,961
Nuclear facility D&D, Paducah	205,530	202,581	206,000	+470	+3,419
Portsmouth:					
Nuclear facility D&D, Portsmouth	342,389	306,931	366,931	+24,542	+60,000
Construction:					
15–U–408 On–site waste disposal facility, Portsmouth	38,882	41,168	41,168	+2,286	.....
Subtotal, Portsmouth	381,271	348,099	408,099	+26,828	+60,000
Pension and community and regulatory support	22,794	21,030	21,030	−1,764	.....
Title X uranium/thorium reimbursement program	35,732	30,000	10,689	−25,043	−19,311
TOTAL, URANIUM ENRICHMENT DECONTAMINATION AND DECOMMISSIONING FUND	840,000	752,749	840,818	+818	+88,069
SCIENCE					
Advanced scientific computing research	605,000	666,304	747,294	+142,294	+80,990
Construction:					
17–SC–20 SC Exascale Computing Project	205,000	232,706	232,706	+27,706	.....
Subtotal, Advanced scientific computing research	810,000	899,010	980,000	+170,000	+80,990
Basic energy sciences:					
Research	1,744,900	1,635,700	1,751,100	+6,200	+115,400
Construction:					
13–SC–10 LINAC coherent light source II, SLAC	192,100	139,300	139,300	−52,800	.....
18–SC–10 APS Upgrade, ANL	93,000	60,000	140,000	+47,000	+80,000
18–SC–11 Spallation Neutron Source Proton Power Upgrade (PPU), ORNL	36,000	.....	70,000	+34,000	+70,000
18–SC–12 Advanced Light Source Upgrade (ALS–U), LBNL	16,000	10,000	50,000	+34,000	+40,000

18–SC–13 LINAC coherent light source II HE, SLAC	8,000	5,000	28,000	+20,000	+23,000
19–SC–14 Second Target Station, ORNL	.....	.....	15,000	+15,000	+15,000
Subtotal, Construction	345,100	214,300	442,300	+97,200	+228,000
Subtotal, Basic energy sciences	2,090,000	1,850,000	2,193,400	+103,400	+343,400
Biological and environmental research	673,000	500,000	715,000	+42,000	+215,000
Fusion energy sciences:					
Research	410,111	265,000	303,000	−107,111	+38,000
Construction:					
14–SC–60 ITER	122,000	75,000	122,000	.....	+47,000
Subtotal, Fusion energy sciences	532,111	340,000	425,000	−107,111	+85,000
High energy physics:					
Research	767,600	627,000	800,000	+32,400	+173,000
Construction:					
11–SC–40 Long baseline neutrino facility / deep underground neutrino experiment, FNAL	95,000	113,000	145,000	+50,000	+32,000
11–SC–41 Muon to electron conversion experiment, FNAL	44,400	30,000	30,000	−14,400	.....
18–SC–42 PIP–II, FNAL	1,000	.....	35,000	+34,000	+35,000
Subtotal, Construction	140,400	143,000	210,000	+69,600	+67,000
Subtotal, High energy physics	908,000	770,000	1,010,000	+102,000	+240,000
Nuclear physics:					
Operations and maintenance	586,800	525,000	635,000	+48,200	+110,000
Construction:					
14–SC–50 Facility for rare isotope beams, Michigan State University	97,200	75,000	75,000	−22,200	.....
Subtotal, Nuclear physics	684,000	600,000	710,000	+26,000	+110,000
Workforce development for teachers and scientists	19,500	19,000	24,500	+5,000	+5,500
Science laboratories infrastructure:					
Infrastructure support:					
Payment in lieu of taxes	1,713	1,513	1,713	.....	+200
Oak Ridge landlord	6,382	6,434	6,434	+52	.....
Facilities and infrastructure	70,347	30,724	48,253	−22,094	+17,529
Oak Ridge nuclear operations	26,000	10,000	26,000	.....	+16,000

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Subtotal, Infrastructure support	104,442	48,671	82,400	−22,042	+33,729
Construction:					
19–SC–71 Science User Support Center, BNL	.....	2,000	10,000	+10,000	+8,000
19–SC–72 Electrical Capacity and Distribution Capability, ANL	.....	20,000	60,000	+60,000	+40,000
18–SC–71 Energy Sciences Capability, PNNL	20,000	4,000	35,000	+15,000	+31,000
17–SC–71 Integrated Engineering Research Center, FNAL	20,000	5,000	32,500	+12,500	+27,500
17–SC–73 Core Facility Revitalization, BNL	30,000	13,632	42,200	+12,200	+28,568
15–SC–78 Integrative genomics building, LBNL	38,350	13,549	.....	−38,350	−13,549
15–SC–76 Materials design laboratory, ANL	44,500	20,000	.....	−44,500	−20,000
19–SC–73 Translational Research Capability, ORNL	.....	.....	35,000	+35,000	+35,000
19–SC–74 BioEPIC Building, LBNL	.....	.....	2,000	+2,000	+2,000
19–SC–75 CEBAF Renovation and Expansion, TJNAF	.....	.....	1,000	+1,000	+1,000
19–SC–76 Craft Resources Support Facility, ORNL	.....	.....	1,000	+1,000	+1,000
19–SC–77 Large Scale Collaboration Center, SLAC	.....	.....	1,000	+1,000	+1,000
Subtotal, Construction:	152,850	78,181	219,700	+66,850	+141,519
Subtotal, Science laboratories infrastructure	257,292	126,852	302,100	+44,808	+175,248
Safeguards and security	103,000	106,110	106,000	+3,000	−110
Science program direction	183,000	180,000	184,000	+1,000	+4,000
TOTAL, SCIENCE	6,259,903	5,390,972	6,650,000	+390,097	+1,259,028
NUCLEAR WASTE DISPOSAL	.....	90,000	.....	.....	−90,000
ADVANCED RESEARCH PROJECTS AGENCY-ENERGY					
ARPA–E projects	324,064	.....	341,750	+17,686	+341,750
Program direction	29,250	.....	33,250	+4,000	+33,250
TOTAL, ADVANCED RESEARCH PROJECTS AGENCY-ENERGY	353,314	.....	375,000	+21,686	+375,000

TITLE 17—INNOVATIVE TECHNOLOGY LOAN GUARANTEE PROGRAM					
Administrative expenses	33,000	10,000	33,000	.....	+23,000
Offsetting collection	−10,000	−15,000	−15,000	−5,000	.....
Rescission	.....	−240,000	.....	.....	+240,000
Title 17 negative subsidy	15,000	−44,000	−44,000	−59,000	.....
Rescission of emergency funding	.....	−383,433	.....	.....	+383,433
TOTAL, TITLE 17—INNOVATIVE TECHNOLOGY LOAN GUARANTEE PROGRAM	38,000	−672,433	−26,000	−64,000	+646,433
ADVANCED TECHNOLOGY VEHICLES MANUFACTURING LOAN PROGRAM					
Administrative expenses	5,000	1,000	5,000	.....	+4,000
Rescission of emergency funding	.....	−4,300,000	.....	.....	+4,300,000
TOTAL, ADVANCED TECHNOLOGY VEHICLES MANUFACTURING LOAN PROGRAM	5,000	−4,299,000	5,000	.....	+4,304,000
TRIBAL ENERGY LOAN GUARANTEE PROGRAM					
Administrative expenses	1,000	.....	1,000	.....	+1,000
Rescission	.....	−8,500	.....	.....	+8,500
TOTAL, TRIBAL ENERGY LOAN GUARANTEE PROGRAM	1,000	−8,500	1,000	.....	+9,500
OFFICE OF INDIAN ENERGY POLICY AND PROGRAMS					
Administrative Expenses	.....	.....	13,200	+13,200	+13,200
Program Direction	.....	.....	4,800	+4,800	+4,800
TOTAL, OFFICE OF INDIAN ENERGY POLICY AND PROGRAMS	.....	.....	18,000	+18,000	+18,000
DEPARTMENTAL ADMINISTRATION					
Administrative operations:					
Salaries and expenses:					
Office of the Secretary:					
Program direction	5,300	5,395	5,395	+95	.....
Chief Financial Officer	48,484	48,912	48,912	+428	.....
Chief Information Officer	126,274	96,793	131,593	+5,319	+34,800
Office of Indian energy policy and programs	18,000	10,005	.....	−18,000	−10,005
Congressional and intergovernmental affairs	6,200	6,212	4,212	−1,988	−2,000
Economic impact and diversity	10,169	10,005	10,005	−164	.....

DEPARTMENT OF ENERGY—Continued

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Other Departmental Administration	174,225	173,901	168,883	−5,342	−5,018
Subtotal, Salaries and expenses	388,652	351,223	369,000	−19,652	+17,777
Subtotal, Administrative operations	388,652	351,223	369,000	−19,652	+17,777
Strategic partnership projects	40,000	40,000	40,000	.....	.....
Subtotal, Departmental administration	428,652	391,223	409,000	−19,652	+17,777
Use of prior–year balances	.....	−2,000	.....	.....	+2,000
Funding from other defense activities	−143,000	−153,689	−143,000	.....	+10,689
Total, Departmental administration (gross)	285,652	235,534	266,000	−19,652	+30,466
Miscellaneous revenues	−96,000	−96,000	−96,000	.....	.....
TOTAL, DEPARTMENTAL ADMINISTRATION (net)	189,652	139,534	170,000	−19,652	+30,466
OFFICE OF THE INSPECTOR GENERAL	49,000	51,330	51,330	+2,330	.....
TOTAL, ENERGY PROGRAMS	12,933,049	3,785,071	13,281,893	+348,844	+9,496,822
ATOMIC ENERGY DEFENSE ACTIVITIES					
NATIONAL NUCLEAR SECURITY ADMINISTRATION					
WEAPONS ACTIVITIES					
Directed stockpile work:					
Life Extension Programs and Major Alterations:					
B61 Life extension program	788,572	794,049	794,049	+5,477	.....
W76–1 Life extension program	224,134	48,888	48,888	−175,246	.....
W88 Alteration program	332,292	304,285	304,285	−28,007	.....

W80–4 Life extension program	399,090	654,766	654,766	+255,676	.....
IW–1	.....	53,000	53,000	+53,000	.....
W76–2 Modification program	.....	65,000	65,000	+65,000	.....
Subtotal, Life Extension Programs and Major Alterations	1,744,088	1,919,988	1,919,988	+175,900	.....
Stockpile systems:					
B61 Stockpile systems	59,729	64,547	64,547	+4,818	.....
W76 Stockpile systems	51,400	94,300	94,300	+42,900	.....
W78 Stockpile systems	60,100	81,329	81,329	+21,229	.....
W80 Stockpile systems	80,087	80,204	80,204	+117	.....
B83 Stockpile systems	35,762	35,082	35,082	−680	.....
W87 Stockpile systems	83,200	83,107	83,107	−93	.....
W88 Stockpile systems	131,576	180,913	180,913	+49,337	.....
Subtotal, Stockpile systems	501,854	619,482	619,482	+117,628	.....
Weapons dismantlement and disposition	56,000	56,000	56,000	.....	.....
Stockpile services:					
Production support	485,400	512,916	512,916	+27,516	.....
Research and Development support	31,150	38,129	38,129	+6,979	.....
R and D certification and safety	196,840	216,582	216,582	+19,742	.....
Management, technology, and production	285,400	300,736	300,736	+15,336	.....
Subtotal, Stockpile systems	998,790	1,068,363	1,068,363	+69,573	.....
Strategic materials:					
Domestic uranium enrichment	60,000	100,704	50,000	−10,000	−50,704
Uranium sustainment	24,000	87,182	87,182	+63,182	.....
Plutonium sustainment	210,367	361,282	361,282	+150,915	.....
Tritium sustainment	198,152	205,275	290,275	+92,123	+85,000
Lithium sustainment	.....	29,135	29,135	+29,135	.....
Strategic materials sustainment	216,196	218,794	218,794	+2,598	.....
Subtotal, Strategic materials:	708,715	1,002,372	1,036,668	+327,953	+34,296
Subtotal, Directed stockpile work	4,009,447	4,666,205	4,700,501	+691,054	+34,296
Research, Development, Test and Evaluation (RDT&E):					
Science:					
Advanced certification	57,710	57,710	57,710	.....	.....
Primary assessment technologies	89,313	95,057	89,313	.....	−5,744

DEPARTMENT OF ENERGY—Continued

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Dynamic materials properties	120,000	131,000	120,000	.....	−11,000
Advanced radiography	37,600	32,544	32,544	−5,056	.....
Secondary assessment technologies	76,833	77,553	77,553	+720	.....
Academic alliances and partnerships	52,963	53,364	53,364	+401	.....
Enhanced capabilities for subcritical experiments	40,105	117,632	80,000	+39,895	−37,632
Subtotal, Science	474,524	564,860	510,484	+35,960	−54,376
Engineering:					
Enhanced surety	39,717	43,226	43,226	+3,509	.....
Weapons system engineering assessment technology	23,029	27,536	23,029	.....	−4,507
Nuclear survivability	45,230	48,230	45,230	.....	−3,000
Enhanced surveillance	45,147	58,375	45,147	.....	−13,228
Stockpile responsiveness	30,000	34,000	30,000	.....	−4,000
Subtotal, Engineering	183,123	211,367	186,632	+3,509	−24,735
Inertial confinement fusion ignition and high yield:					
Ignition	79,575	22,434	79,575	.....	+57,141
Support of other stockpile programs	23,565	17,397	23,565	.....	+6,168
Diagnostics, cryogenics and experimental support	77,915	51,453	77,915	.....	+26,462
Pulsed power inertial confinement fusion	7,596	8,310	7,596	.....	−714
Joint program in high energy density laboratory plasmas	9,492	.....	9,492	.....	+9,492
Facility operations and target production	346,791	319,333	346,791	.....	+27,458
Subtotal, Inertial confinement fusion ignition and high yield	544,934	418,927	544,934	.....	+126,007
Advanced simulation and computing:					
Advanced simulation and computing	721,244	656,401	656,401	−64,843	.....
Construction:					
18–D–670 Exascale class computer cooling equipment, LANL	22,000	24,000	24,000	+2,000	.....
18–D–620 Exascale computing facility modernization project, LLNL	3,000	23,000	23,000	+20,000	.....

Subtotal, Construction	25,000	47,000	47,000	+22,000	.....
Subtotal, Advanced simulation, Computing and Construction	746,244	703,401	703,401	−42,843	.....
Advanced manufacturing development:					
Additive manfacturing	12,000	17,447	17,447	+5,447	.....
Component manufacturing development	38,644	48,477	43,477	+4,833	−5,000
Process technology development	34,896	30,914	35,914	+1,018	+5,000
Subtotal, Advanced manufacturing development	85,540	96,838	96,838	+11,298	.....
Subtotal, Research, Development, Test and Evaluation (RDT&E)	2,034,365	1,995,393	2,042,289	+7,924	+46,896
Infrastructure and Operations:					
Operations of facilities	848,470	891,000	874,000	+25,530	−17,000
Safety and environmental operations	110,000	115,000	110,000	.....	−5,000
Maintenance and repair of facilities	515,138	365,000	250,000	−265,138	−115,000
Recapitalization:					
Infrastructure and safety	482,661	431,631	320,000	−162,661	−111,631
Capability based investments	130,000	109,057	105,000	−25,000	−4,057
Subtotal, Recapitalization	612,661	540,688	425,000	−187,661	−115,688
Construction:					
19–D–125 Plutonium infrastructure recapitalization, LANL	.....	.....	.....	.....	.....
19–D–670 138kV Power Transmission System Replacement, NNSS	.....	6,000	.....	.....	−6,000
18–D–680 Material staging facility, PX	5,200	.....	10,418	+5,218	+10,418
18–D–660 Fire station, Y–12	28,000	.....	.....	−28,000	.....
18–D–650 Tritium production capability, SRS	.....	27,000	27,000	+27,000	.....
18–D–690 Lithium production capability, Y–12	5,000	19,000	19,000	+14,000	.....
17–D–640 U1a complex enhancements project, NNSA	22,100	53,000	53,000	+30,900	.....
17–D–630 Electrical distribution system, LLNL	6,000	.....	.....	−6,000	.....
16–D–515 Albuquerque Complex project	98,000	47,953	47,953	−50,047	.....
15–D–613 Emergency Operations Center, Y–12	7,000	.....	.....	−7,000	.....
07–D–220 Radioactive liquid waste treatment facility, LANL	2,100	.....	.....	−2,100	.....
07–D–220–04 TRU liquid waste facility, LANL	17,895	.....	.....	−17,895	.....
06–D–141 Uranium Processing Facility, Y–12	663,000	703,000	703,000	+40,000	.....
Chemistry and metallurgy replacement:					
04–D–125 Chemistry and metallurgy replacement project, LANL	.....	235,095	235,095	+235,095	.....
04–D–125–04 RLUOB equipment installation, phase 2	127,025	.....	.....	−127,025	.....
04–D–125–05 PF–4 equipment installation	50,214	.....	.....	−50,214	.....

DEPARTMENT OF ENERGY—Continued

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Subtotal, Chemistry and metallurgy replacement	177,239	235,095	235,095	+57,856	.....
Subtotal, Construction	1,031,534	1,091,048	1,095,466	+63,932	+4,418
Subtotal, Infrastructure and Operations	3,117,803	3,002,736	2,754,466	−363,337	−248,270
Secure transportation asset:					
Operations and equipment	185,568	176,617	176,617	−8,951	.....
Program direction	105,600	102,022	102,022	−3,578	.....
Subtotal, Secure transportation asset	291,168	278,639	278,639	−12,529	.....
Defense nuclear security:					
Defense nuclear security	686,977	690,638	690,638	+3,661	.....
Security improvements program	30,000	.....	.....	−30,000	.....
Construction:					
17–D–710 West end protected area reduction project, Y–12	53,600	.....	.....	−53,600	.....
Subtotal, Defense nuclear security	770,577	690,638	690,638	−79,939	.....
Information technology and cyber security	186,728	221,175	221,175	+34,447	.....
Legacy contractor pensions	232,050	162,292	162,292	−69,758	.....
TOTAL, WEAPONS ACTIVITIES	10,642,138	11,017,078	10,850,000	+207,862	−167,078
DEFENSE NUCLEAR NONPROLIFERATION					
Global material security:					
International nuclear security	46,339	46,339	46,339	.....	.....
Domestic radiologic security	110,433	90,764	115,433	+5,000	+24,669
International radiologic security	78,907	59,576	78,907	.....	+19,331
Nuclear smuggling detection	154,429	140,429	154,429	.....	+14,000

Subtotal, Global material security	390,108	337,108	395,108	+5,000	+58,000
Material management and minimization:					
Conversion	.....	98,300	88,300	+88,300	−10,000
Nuclear material removal	32,925	32,925	32,925	.....	.....
Material disposition	183,669	200,869	200,869	+17,200	.....
Laboratory and partnership support	92,000	.....	15,000	−77,000	+15,000
Subtotal, Material management and minimization	308,594	332,094	337,094	+28,500	+5,000
Nonproliferation and arms control	134,703	129,703	129,703	−5,000	.....
Defense nuclear nonproliferation R&D:					
Proliferation detection	278,255	273,200	281,521	+3,266	+8,321
Nuclear detonation detection	195,749	182,895	195,749	.....	+12,854
Nonproliferation fuels development	82,500	.....	10,000	−72,500	+10,000
Subtotal, Defense nuclear nonproliferation R&D	556,504	456,095	487,270	−69,234	+31,175
Nonproliferation construction:					
99–D–143 Mixed Oxide (MOX) Fuel Fabrication Facility, SRS	335,000	220,000	220,000	−115,000	.....
18–D–150 Surplus plutonium disposition project, SRS	.....	59,000	59,000	+59,000	.....
Subtotal, Nonproliferation construction	335,000	279,000	279,000	−56,000	.....
Legacy contractor pensions	40,950	28,640	28,640	−12,310	.....
Nuclear counterterrorism and incident response	282,360	319,185	319,185	+36,825	.....
Use of prior–year balances	.....	−19,000	−74,000	−74,000	−55,000
Subtotal, Defense Nuclear Nonproliferation	2,048,219	1,862,825	1,902,000	−146,219	+39,175
Rescission	−49,000	.....	.....	+49,000	.....
TOTAL, DEFENSE NUCLEAR NONPROLIFERATION	1,999,219	1,862,825	1,902,000	−97,219	+39,175
NAVAL REACTORS					
Columbia–class reactor systems development	156,700	138,000	138,000	−18,700	.....
Naval reactors development	473,065	514,951	475,000	+1,935	−39,951
S8G Prototype refueling	250,000	250,000	200,000	−50,000	−50,000
Naval reactors operations and infrastructure	466,884	525,764	525,764	+58,880	.....
Construction:					
19–D–930 KS Overhead Piping	.....	10,994	10,994	+10,994	.....

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
17–D–911 BL Fire System Upgrade	.....	13,200	13,200	+13,200	.....
15–D–904 NRF Overpack Storage Expansion 3	13,700	.....	.....	−13,700	.....
15–D–903 KL Fire System Upgrade	15,000	.....	.....	−15,000	.....
14–D–901 Spent fuel handling recapitalization project, NRF	197,000	287,000	209,000	+12,000	−78,000
Subtotal, Construction	225,700	311,194	233,194	+7,494	−78,000
Program direction	47,651	48,709	48,042	+391	−667
TOTAL, NAVAL REACTORS	1,620,000	1,788,618	1,620,000	.....	−168,618
FEDERAL SALARIES AND EXPENSES	407,595	422,529	408,000	+405	−14,529
TOTAL, NATIONAL NUCLEAR SECURITY ADMINISTRATION	14,668,952	15,091,050	14,780,000	+111,048	−311,050
DEFENSE ENVIRONMENTAL CLEANUP					
Closure sites administration	4,889	4,889	4,889	.....	.....
Richland:					
River corridor and other cleanup operations	183,692	89,577	209,577	+25,885	+120,000
Central plateau remediation	662,879	562,473	618,473	−44,406	+56,000
RL Community and regulatory support	10,121	5,121	10,121	.....	+5,000
RL Excess facilities D&D	.....	.....	.....	.....	.....
Construction:					
18–D–404 WESF Modifications and capsule storage	6,500	1,000	.....	−6,500	−1,000
Subtotal, Richland	863,192	658,171	838,171	−25,021	+180,000
Idaho National Laboratory:					
Idaho cleanup and waste disposition	420,000	346,026	346,026	−73,974	.....
Idaho community and regulatory support	4,071	3,200	3,200	−871	.....

ID Excess facilities D&D	10,000	.....	.....	−10,000	.....
Subtotal, Idaho National Laboratory	434,071	349,226	349,226	−84,845	.....
NNSA sites and Nevada offsites:					
Lawrence Livermore National Laboratory	1,175	1,704	1,704	+529	.....
Separations Process Research Unit	4,800	15,000	15,000	+10,200	.....
Nevada	60,136	60,136	60,136	.....	.....
Sandia National Laboratory	2,600	2,600	2,600	.....	.....
Los Alamos National Laboratory	220,000	191,629	220,000	.....	+28,371
LLNL Excess facilities D&D	100,000	.....	50,000	−50,000	+50,000
Subtotal, NNSA sites and Nevada offsites	388,711	271,069	349,440	−39,271	+78,371
Oak Ridge Reservation:					
OR Nuclear facility D&D	118,203	90,221	189,000	+70,797	+98,779
U233 disposition program	50,311	45,000	52,300	+1,989	+7,300
OR Cleanup and disposition	71,000	67,000	74,000	+3,000	+7,000
Construction:					
17–D–401 On–site waste disposal facility	10,000	5,000	10,000	.....	+5,000
14–D–403 Outfall 200 mercury treatment facility	17,100	11,274	76,000	+58,900	+64,726
Subtotal, Construction	27,100	16,274	86,000	+58,900	+69,726
OR Community & regulatory support	5,605	4,711	5,700	+95	+989
OR Technology development and deployment	3,000	3,000	3,000	.....	.....
OR Excess facilities D&D	125,000	.....	.....	−125,000	.....
Subtotal, Oak Ridge Reservation	400,219	226,206	410,000	+9,781	+183,794
Office of River Protection:					
Waste treatment and immobilization plant commissioning	8,000	15,000	15,000	+7,000	.....
Rad liquid tank waste stabilization and disposition	719,000	677,460	771,947	+52,947	+94,487
Construction:					
15–D–409 Low activity waste pretreatment system	93,000	56,053	56,053	−36,947	.....
01–D–16 A–D Waste treatment and immobilization plant	.....	675,000	655,000	+655,000	−20,000
18–D–16 Waste treatment and immobilization plant—LBL/Direct feed LAW	630,000	.....	.....	−630,000	.....
01–D–16 D High–level waste facility	75,000	.....	60,000	−15,000	+60,000
01–D–16 E Pretreatment facility	35,000	15,000	15,000	−20,000	.....
Subtotal, Construction	833,000	746,053	786,053	−46,947	+40,000

DEPARTMENT OF ENERGY—Continued

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Subtotal, Office of River Protection	1,560,000	1,438,513	1,573,000	+ 13,000	+ 134,487
Savannah River Site:					
SR Site risk management operations	482,960	517,436	517,436	+ 34,476	
SR Community and regulatory support	11,249	4,749	4,749	− 6,500	
SR Radioactive liquid tank waste stabilization and disposition	637,105	805,686	732,863	+ 95,758	− 72,823
Construction:					
19–D–701 SR Security system replacement					
18–D–402 Saltstone disposal unit #8/9	500	37,450	37,450	+ 36,950	
18–D–402 Emergency Operations Center Replacement, SR	500	1,259	1,259	+ 759	
17–D–402 Saltstone disposal Unit #7, SRS	30,000	41,243	41,243	+ 11,243	
05–D–405 Salt waste processing facility, SRS	150,000	65,000	65,000	− 85,000	
Subtotal, Construction	181,000	144,952	144,952	− 36,048	
Subtotal, Savannah River Site	1,312,314	1,472,823	1,400,000	+ 87,686	− 72,823
Waste Isolation Pilot Plant:					
Waste Isolation Pilot Plant	270,971	311,695	311,695	+ 40,724	
Construction:					
15–D–411 Safety significant confinement ventilation system, WIPP	86,000	84,212	84,212	− 1,788	
15–D–412 Exhaust shaft, WIPP	19,600	1,000	1,000	− 18,600	
Subtotal, Waste Isolation Pilot Plant	376,571	396,907	396,907	+ 20,336	
Program direction	300,000	300,000	300,000		
Program support	14,979	12,979	12,979	− 2,000	
Safeguards and Security	298,102	324,434	324,434	+ 26,332	
Technology development	35,000	25,000	28,954	− 6,046	+ 3,954
Excess facilities		150,000			− 150,000
Use of prior year balances					

TOTAL, DEFENSE ENVIRONMENTAL CLEANUP	5,988,048	5,630,217	5,988,000	−48	+357,783
OTHER DEFENSE ACTIVITIES					
Environment, health, safety and security:					
Environment, health, safety and security	130,693	135,194	132,583	+1,890	−2,611
Program direction	68,253	70,653	70,653	+2,400	.....
Subtotal, Environment, Health, safety and security	198,946	205,847	203,236	+4,290	−2,611
Independent enterprise assessments:					
Independent enterprise assessments	24,068	24,068	24,068	.....	.....
Program direction	50,863	52,702	52,702	+1,839	.....
Subtotal, Independent enterprise assessments	74,931	76,770	76,770	+1,839	.....
Specialized security activities	262,912	254,378	254,378	−8,534	.....
Office of Legacy Management:					
Legacy management	137,674	140,575	140,575	+2,901	.....
Program direction	16,932	18,302	18,302	+1,370	.....
Subtotal, Office of Legacy Management	154,606	158,877	158,877	+4,271	.....
Defense related administrative support	143,000	153,689	143,000	.....	−10,689
Office of hearings and appeals	5,605	5,739	5,739	+134	.....
Use of prior year balances	.....	−2,000	−2,000	−2,000	.....
TOTAL, OTHER DEFENSE ACTIVITIES	840,000	853,300	840,000	.....	−13,300
DEFENSE NUCLEAR WASTE DISPOSAL	.....	30,000	.....	.....	−30,000
TOTAL, ATOMIC ENERGY DEFENSE ACTIVITIES	21,497,000	21,604,567	21,608,000	+111,000	+3,433
POWER MARKETING ADMINISTRATIONS [1]					
SOUTHEASTERN POWER ADMINISTRATION					
Operation and maintenance:					
Purchase power and wheeling	66,070	73,184	73,184	+7,114	.....
Program direction	6,379	6,500	6,500	+121	.....
Subtotal, Operation and maintenance	72,449	79,684	79,684	+7,235	.....

DEPARTMENT OF ENERGY—Continued

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Less alternative financing [PPW]	−15,070	−13,824	−13,824	+1,246	.....
Offsetting collections (for PPW)	−51,000	−59,360	−59,360	−8,360	.....
Offsetting collections (PD)	−6,379	−6,500	−6,500	−121	.....
TOTAL, SOUTHEASTERN POWER ADMINISTRATION	.....	.....	.....	.....	.....
SOUTHWESTERN POWER ADMINISTRATION					
Operation and maintenance:					
Operating expenses	16,680	17,006	17,006	+326	.....
Purchase power and wheeling	50,000	93,000	93,000	+43,000	.....
Program direction	31,335	32,995	32,995	+1,660	.....
Construction	14,932	16,875	16,875	+1,943	.....
Reduction due to CBO initial estimates of collections	.....	.....	−16,000	−16,000	−16,000
Subtotal, Operation and maintenance	112,947	159,876	143,876	+30,929	−16,000
Less alternative financing (for O&M)	−9,042	−8,894	−8,894	+148	.....
Less alternative financing (for PPW)	−10,000	−10,000	−10,000	.....	.....
Less alternative financing (Const)	−9,417	−12,180	−12,180	−2,763	.....
Offsetting collections (PD)	−16,035	−29,695	−29,695	−13,660	.....
Offsetting collections (for O&M)	−2,853	−5,707	−5,707	−2,854	.....
Offsetting collections (for PPW)	−40,000	−83,000	−83,000	−43,000	.....
Use of prior year balances	−14,200	.....	.....	+14,200	.....
Southwestern Power Administration CBO initial estimates of collections	.....	16,000	16,000	+16,000	.....
TOTAL, SOUTHWESTERN POWER ADMINISTRATION	11,400	26,400	10,400	−1,000	−16,000
WESTERN AREA POWER ADMINISTRATION					
Operation and maintenance:					
Construction and rehabilitation	52,272	32,632	32,632	−19,640	.....
Operation and maintenance	72,407	77,056	77,056	+4,649	.....

Purchase power and wheeling	498,072	567,362	567,362	+69,290	.....
Program direction	235,722	238,483	238,483	+2,761	.....
Reduction due to CBO initial estimates of collections	.....	.....	−43,000	−43,000	−43,000
Subtotal, Operation and maintenance	858,473	915,533	872,533	+14,060	−43,000
Less alternative financing (for O&M)	−5,068	−7,758	−7,758	−2,690	.....
Less alternative financing (for Construction)	−40,500	−27,077	−27,077	+13,423	.....
Less alternative financing (for Program Dir.)	−38,398	−39,136	−39,136	−738	.....
Less alternative financing (for PPW)	−289,072	−260,954	−260,954	+28,118	.....
Offsetting collections (for program direction)	−116,050	−150,761	−150,761	−34,711	.....
Offsetting collections (for O&M)	−13,854	−25,009	−25,009	−11,155	.....
Offsetting collections (Public Law 108–477, Public Law 109–103)	−209,000	−306,408	−306,408	−97,408	.....
Offsetting collections (Public Law 98–381)	−9,306	−9,058	−9,058	+248	.....
Use of prior–year balances	−43,853	.....	.....	+43,853	.....
Western Area Power Administration CBO initial estimates of collections	.....	43,000	43,000	+43,000	.....
TOTAL, WESTERN AREA POWER ADMINISTRATION	93,372	132,372	89,372	−4,000	−43,000
FALCON AND AMISTAD OPERATING AND MAINTENANCE FUND					
Operation and maintenance	5,048	5,329	5,329	+281	.....
Offsetting collections	−3,948	−4,979	−4,979	−1,031	.....
Less alternative financing	−872	−122	−122	+750	.....
CBO estimate for third party financing	872	122	122	−750	.....
TOTAL, FALCON AND AMISTAD OPERATING AND MAINTENANCE FUND	1,100	350	350	−750	.....
TOTAL, POWER MARKETING ADMINISTRATIONS	105,872	159,122	100,122	−5,750	−59,000
FEDERAL ENERGY REGULATORY COMMISSION					
Federal Energy Regulatory Commission	367,600	369,900	369,900	+2,300	.....
FERC revenues	−367,600	−369,900	−369,900	−2,300	.....
TOTAL, FEDERAL ENERGY REGULATORY COMMISSION	.....	.....	.....	.....	.....
General Provisions					
Title III Rescissions:					
Northeast gasoline supply reserve sale	.....	−71,000	.....	.....	+71,000
Strategic Petroleum Reserve crude oil sale	.....	−15,000	.....	.....	+15,000

DEPARTMENT OF ENERGY—Continued

[In thousands of dollars]

	2018 Appropriations	Budget estimate	Committee recommendation	Committee recommendation compared to—	
				2018 Appropriations	Budget estimate
Strategic Petroleum Reserve use of sale proceeds	.....	15,000	.....	.....	−15,000
Total, General Provisions	.....	−71,000	.....	.....	+71,000
GRAND TOTAL, DEPARTMENT OF ENERGY	34,535,921	25,477,760	34,990,015	+454,094	+9,512,255
(Appropriations)	(34,584,921)	(30,409,693)	(34,990,015)	(+405,094)	(+4,580,322)
(Rescissions)	(−49,000)	(−248,500)	.....	(+49,000)	(+248,500)
(Rescissions of emergency funding)	.....	(−4,683,433)	.....	.....	(+4,683,433)
SUMMARY OF ACCOUNTS					
Energy efficiency and renewable energy	2,321,778	695,610	2,322,000	+222	+1,626,390
Electricity delivery and energy reliability	248,329	.....	.....	−248,329	.....
Cybersecurity, Energy Security, and Emergency Response	.....	95,800	260,000	+260,000	+164,200
Electricity delivery	.....	61,309	.....	.....	−61,309
Nuclear energy	1,205,056	757,090	1,206,000	+944	+448,910
Fossil Energy Research and Development	726,817	502,070	727,000	+183	+224,930
Naval Petroleum & Oil Shale Reserves	4,900	10,000	10,000	+5,100	.....
Strategic petroleum reserve	252,000	−124,895	175,105	−76,895	+300,000
SPR Petroleum Account	8,400	.....	8,400	.....	+8,400
Northeast home heating oil reserve	6,500	10,000	10,000	+3,500	.....
Energy Information Administration	125,000	115,035	125,000	.....	+9,965
Non–Defense Environmental Cleanup	298,400	218,400	353,240	+54,840	+134,840
Uranium enrichment D&D fund	840,000	752,749	840,818	+818	+88,069
Science	6,259,903	5,390,972	6,650,000	+390,097	+1,259,028
Nuclear Waste Disposal	.....	90,000	.....	.....	−90,000
Advanced Research Projects Agency–Energy	353,314	.....	375,000	+21,686	+375,000
Title 17 Innovative technology loan guarantee program	38,000	−672,433	−26,000	−64,000	+646,433
Advanced technology vehicles manufacturing loan pgm	5,000	−4,299,000	5,000	.....	+4,304,000
Tribal Energy Loan Guarantee program	1,000	−8,500	1,000	.....	+9,500
Office of Indian Energy Policy and Programs	.....	.....	18,000	+18,000	+18,000
Departmental administration	189,652	139,534	170,000	−19,652	+30,466

Office of the Inspector General	49,000	51,330	51,330	+2,330	.....
Atomic energy defense activities:					
National Nuclear Security Administration:					
Weapons activities	10,642,138	11,017,078	10,850,000	+207,862	−167,078
Defense nuclear nonproliferation	1,999,219	1,862,825	1,902,000	−97,219	+39,175
Naval reactors	1,620,000	1,788,618	1,620,000	.....	−168,618
Federal Salaries and Expenses	407,595	422,529	408,000	+405	−14,529
Subtotal, National Nuclear Security Admin	14,668,952	15,091,050	14,780,000	+111,048	−311,050
Defense environmental cleanup	5,988,048	5,630,217	5,988,000	−48	+357,783
Other defense activities	840,000	853,300	840,000	.....	−13,300
Defense nuclear waste disposal	.....	30,000	.....	.....	−30,000
Total, Atomic Energy Defense Activities	21,497,000	21,604,567	21,608,000	+111,000	+3,433
Power marketing administrations [1]:					
Southeastern Power Administration	.....	.....	.....	.....	.....
Southwestern Power Administration	11,400	26,400	10,400	−1,000	−16,000
Western Area Power Administration	93,372	132,372	89,372	−4,000	−43,000
Falcon and Amistad operating and maintenance fund	1,100	350	350	−750	.....
Total, Power Marketing Administrations	105,872	159,122	100,122	−5,750	−59,000
Federal Energy Regulatory Commission:					
Salaries and expenses	367,600	369,900	369,900	+2,300	.....
Revenues	−367,600	−369,900	−369,900	−2,300	.....
General Provisions	.....	−71,000	.....	.....	+71,000
Strategic Petroleum Reserve crude oil sale	.....	−15,000	.....	.....	+15,000
Strategic Petroleum Reserve use of sale proceeds	.....	15,000	.....	.....	−15,000
Total Summary of Accounts, Department of Energy	34,535,921	25,477,760	34,990,015	+454,094	+9,512,255

[1] Totals include alternative financing costs, reimbursable agreement funding, and power purchase and wheeling expenditures. Offsetting collection totals reflect funds collected for annual expenses, including power purchase and wheeling.

GENERAL PROVISIONS—DEPARTMENT OF ENERGY

Section 301. The bill includes a provision related to reprogramming.

Section 302. The bill includes a provision to authorize intelligence activities pending enactment of the fiscal year 2019 Intelligence Authorization Act.

Section 303. The bill includes a provision related to independent cost estimates.

Section 304. The bill includes a provision concerning a pilot program for consolidated storage of spent nuclear fuel.

TITLE IV

INDEPENDENT AGENCIES

The budget request proposes to eliminate the Delta Regional Authority, Denali Commission, and Northern Border Regional Commission. The budget requests funding to conduct closeout of the agencies in fiscal year 2019. The Committee strongly opposes the termination of these agencies, and recommends funding to continue their activities. The Administration shall continue all activities funded by this act, as well as follow directive language included in this report. No funds shall be used for the planning of or implementation of termination of these agencies.

APPALACHIAN REGIONAL COMMISSION

Appropriations, 2018	$155,000,000
Budget estimate, 2019	152,000,000
Committee recommendation	155,000,000

The Committee recommends $155,000,000 for the Appalachian Regional Commission [ARC], an increase of $3,000,000 above the budget request. Established in 1965, the Appalachian Regional Commission is an economic development agency composed of 13 Appalachian States and a Federal co-chair appointed by the President. Within available funding, $73,000,000 is recommended for base funds.

Further, not less than $16,000,000 shall be for a program of industrial site and workforce development in Southern and South Central Appalachia, focused primarily on the automotive supplier sector and the aviation sector. Up to $13,500,000 of that amount is recommended for activities in Southern Appalachia. The funds shall be distributed to States that have distressed counties in Southern and South Central Appalachia using the ARC Area Development Formula.

Within available funding, the Committee recommends $16,000,000 for a program of basic infrastructure improvements in distressed counties in Central Appalachia. Funds shall be distributed according to ARC's distressed counties formula and shall be in addition to the regular allocation to distressed counties.

Within available funds, the Committee recommends $50,000,000 for the POWER Initiative to support communities, primarily in Appalachia, that have been adversely impacted by the closure of coal-powered generating plants and a declining coal industry by pro-