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Energy and Water Development: FY2017 Appropriations

Updated June 23, 2017

Congressional Research Service
https://crsreports.congress.gov
R44465

CRS REPORT
Prepared for Members and
Committees of Congress

Summary

The Energy and Water Development appropriations bill provides funding for civil works projects of the Army Corps of Engineers (Corps), the Department of the Interior's Bureau of Reclamation (Reclamation) and Central Utah Project (CUP), and the Department of Energy (DOE), as well as the Nuclear Regulatory Commission (NRC) and several other independent agencies. DOE typically accounts for about 80% of the bill's total funding.

FY2017 funding for energy and water development programs was provided by Division D of the Consolidated Appropriations Act, 2017 (P.L. 115-31), an omnibus funding measure passed by Congress May 4, 2017, and signed into law the following day. (This followed a series of continuing resolutions.) Total funding for Division D was $38.89 billion, offset by $436 million in rescissions. That total was $1.27 billion above the Obama Administration request and $1.54 billion over the FY2016 level, excluding rescissions. The Obama Administration also proposed $2.26 billion in new mandatory funding for DOE, which was not approved. Proposed reductions for the Corps, Reclamation, and CUP were also rejected.

The Senate approved its version of the FY2017 Energy and Water Development appropriations bill on May 12, 2016 (H.R. 2028, S.Rept. 114-236), which would have increased budget authority for energy and water programs by $261 million over the request (0.7%), including adjustments. The House Appropriations Committee completed action on April 19, 2016 (H.R. 5055, H.Rept. 114-532), but the bill was defeated on the House floor on May 26, 2016. As passed by the Appropriations Committee, the House version would have provided $4 million more than the request, after offsets and other adjustments.

Major Energy and Water Development funding highlights for FY2017 include

- *Definition of "Fill Material" Under the Clean Water Act*. The Senate-passed bill included provisions to prohibit the Corps during FY2017 from changing the definition of "fill material" in relation to the Federal Water Pollution Control Act. The restriction was included in the enacted omnibus measure.
- *40% Requested Boost for Energy Efficiency and Renewable Energy.* The Obama Administration requested an increase of $829.2 million (40.1%) in discretionary funding for DOE's Office of Energy Efficiency and Renewable Energy (EERE) for FY2017, which the House committee and the Senate did not approve. The omnibus measure provided a 0.9% funding increase.
- *Nuclear Waste "Consent-Based Siting."* The Obama Administration proposed to triple funding in FY2017 for DOE to develop a consent-based nuclear waste siting program, to $76.3 million. The House Appropriations Committee rejected the proposal, instead providing $170 million to pursue a waste repository at Yucca Mountain, NV. The Senate approved $61.0 million for consent-based siting. The omnibus measure provided $22.5 million for consent-based siting, $62.5 million for used fuel R&D, and no funds for Yucca Mountain.
- *Surplus Plutonium Disposition.* Construction of the Mixed-Oxide Fuel Fabrication Facility (MFFF), which would make fuel for nuclear reactors out of surplus weapons plutonium, would have been terminated beginning in FY2017 by the Obama Administration's budget request. The Senate approved the Administration halt, while the House panel voted to continue construction. The omnibus measure continued construction with a 1.5% funding cut from FY2016.

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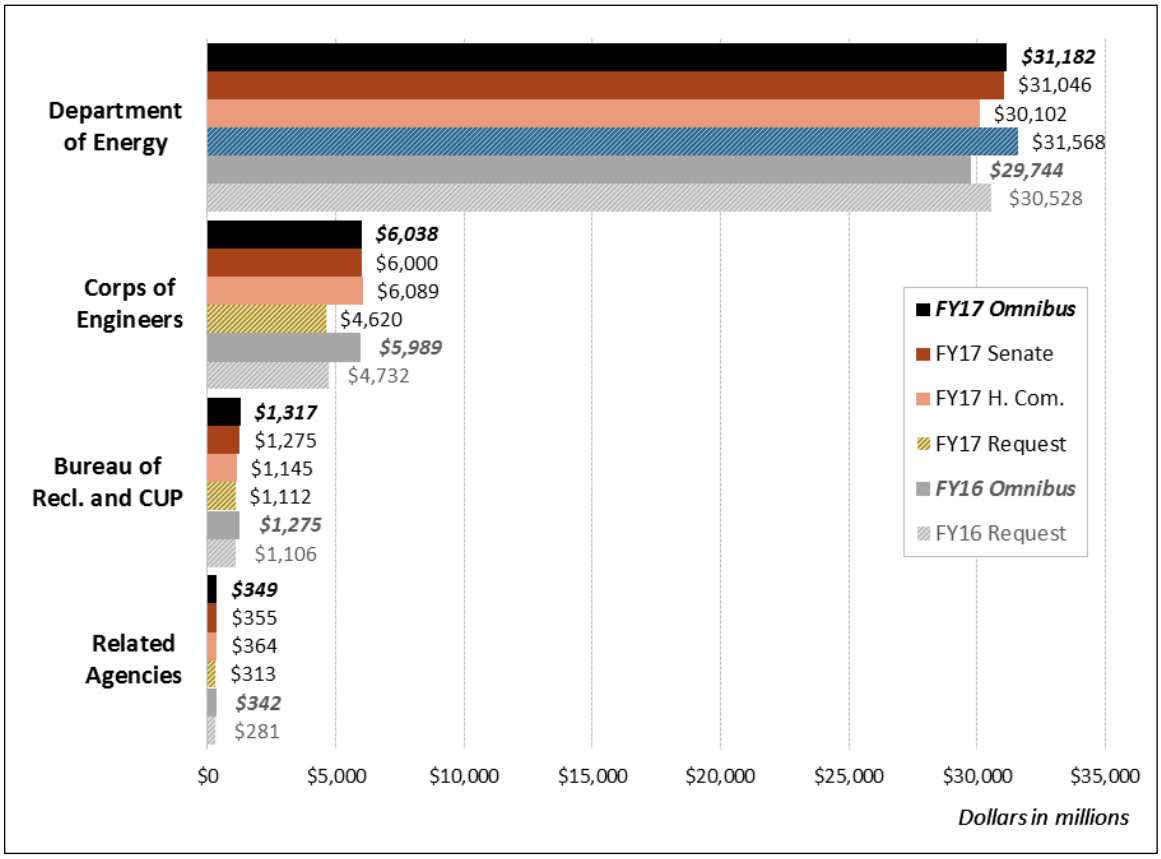
Introduction and Overview

The Energy and Water Development appropriations bill includes funding for civil works projects of the U.S. Army Corps of Engineers (Corps), the Department of the Interior's Central Utah Project (CUP) and Bureau of Reclamation (Reclamation), the Department of Energy (DOE), and a number of independent agencies, including the Nuclear Regulatory Commission (NRC) and the Appalachian Regional Commission (ARC).

FY2017 funding for energy and water development programs was provided by Division D of the Consolidated Appropriations Act, 2017 (P.L. 115-31), an omnibus funding measure passed by Congress May 4, 2017, and signed into law the following day. (This followed a series of continuing resolutions.) Total funding for Division D was $38.89 billion, offset by $436 million in rescissions. That total was $1.27 billion above the Obama Administration request and $1.54 billion over the FY2016 level, excluding rescissions. The Obama Administration also had proposed $2.26 billion in new mandatory funding for DOE, which was not approved. Proposed reductions for the Corps, Reclamation, and CUP were also rejected. **Figure 1** compares the major components of the Energy and Water Development bill.

Figure 1. Major Components of the Energy and Water Development Appropriations Bill



Sources: P.L. 115-31 and explanatory statement, S.Rept. 114-236, H.Rept. 114-532, P.L. 115-31, FY2017 agency budget justifications, congressional appropriations explanatory statements, Congressional Budget Office. Includes some adjustments.

The Senate Appropriations Committee approved its version of the FY2017 Energy and Water Development appropriations bill on April 14, 2016 (S. 2804, S.Rept. 114-236). For floor consideration, the Senate called up the House-passed FY2016 Energy and Water Development bill (H.R. 2028) and substituted the language of S. 2804 as passed by the Senate Appropriations Committee. The Senate approved the measure May 12, 2016, by a vote of 90-8. Total appropriations in the bill were $261 million (0.7%) above the request, including budget scorekeeping offsets.

The House Appropriations Committee completed action on April 19, 2016 (H.R. 5055, H.Rept. 114-532). As passed by committee, the House bill would have provided an increase of $4 million over the request. However, the House rejected the bill May 26, 2016, by a vote of 112-305. The bill's defeat in the House was widely ascribed to the adoption of several controversial amendments from both sides of the aisle, such as language on sexual orientation and gender identity and a provision to block heavy water imports from Iran.[1]

Similarly to FY2017, funding for FY2016 Energy and Water Development programs was included in an omnibus funding measure for the entire federal government passed on December 18, 2015, the Consolidated Appropriations Act, 2016 (P.L. 114-113). The omnibus measure provided a total of $37.3 billion for energy and water programs for FY2016, an increase of 5.8% over FY2015. Funding in the omnibus measure included $29.7 billion for DOE (up 5.7%), $6.0 billion for the Corps (up 9.8%), $1.3 billion for Reclamation (up 11.8%), and $342 million for independent agencies (up 27.0%).[2] For more information, see CRS Report R43966, *Energy and Water Development: FY2016 Appropriations*, by Mark Holt.

Budgetary Limits

Congressional consideration of the annual Energy and Water Development appropriations bill is affected by certain procedural and statutory budget enforcement measures. The procedural budget enforcement is primarily through limits associated with the budget resolution on total discretionary spending and spending under the jurisdiction of each appropriations subcommittee. Statutory budget enforcement is derived from the Budget Control Act of 2011 (BCA; P.L. 112-25).

The BCA established limits on defense and nondefense discretionary spending. These limits are in effect for each of the fiscal years from FY2012 through FY2021, and are primarily enforced by an automatic spending reduction process called sequestration. The Bipartisan Budget Act of 2013 (P.L. 113-67) established higher levels for the FY2014 and FY2015 spending limits than what would have otherwise been in effect. The original BCA process to calculate the limits would have again become effective starting in FY2016, but higher limits for FY2016 and FY2017 were enacted by the Bipartisan Budget Act of 2015 (P.L. 114-74).

For more information on discretionary spending limits, see CRS Insight IN10389, *Bipartisan Budget Act of 2015: Adjustments to the Budget Control Act of 2011*, by Grant A. Driessen, and

[1] "House Rejects Spending Bill After Gay Rights Measure Added," Roll Call, May 26, 2016, http://www.rollcall.com/news/policy/15907-2.

[2] For details, see the Explanatory Statement for the Consolidated Appropriations Act, 2016, Division D, *Congressional Record*, December 17, 2015, Book II, p. H10056, https://www.congress.gov/crec/2015/12/17/CREC-2015-12-17-bk2.pdf. The grand total in the Explanatory Statement includes $26.9 million in rescissions but excludes $111.1 million in additional scorekeeping adjustments that would reduce the grand total to $37.2 billion, the subcommittee allocation shown in S.Rept. 114-197. See Senate Committee on Appropriations, *Comparative Statement of New Budget Authority FY2016*, January 12, 2016, p. 11.

CRS Report R44062, *Congressional Action on FY2016 Appropriations Measures*, by Jessica Tollestrup.

Funding Issues and Initiatives

Congressional consideration of Energy and Water Development appropriations for FY2017 included debate over several controversial proposals. The issues described in this section—listed approximately in the order they appear in the Energy and Water Development bill—were selected based on the total funding involved and the percentage of increases or decreases, the amount of congressional attention received, and their impact on broader public policy considerations.

Proposed Cuts to Corps and Reclamation Budgets

For the Army Corps of Engineers, the Obama Administration requested $4.620 billion in FY2017 and $4.732 billion in FY2016. Congress appropriated $6.038 billion for the Corps in FY2017 and $5.989 billion in FY2016. Similarly, the FY2017 and FY2016 requests for the Bureau of Reclamation were $1.112 billion and $1.106 billion, respectively, and Congress appropriated $1.307 billion in FY2017 and $1.275 billion in FY2016. Both the House Appropriations Committee and the Senate had voted to reject the Administration's proposed FY2017 budget reductions for the Corps, instead recommending increases over the FY2016 appropriations level. For Reclamation, the House Appropriations Committee had approved a reduction from FY2016, while the Senate had approved level funding.

Definition of "Fill Material" Under the Clean Water Act

As approved by the Senate, H.R. 2028 (§103) prohibited the Corps during FY2017 from changing the definition of "fill material" or "discharge of fill material" in relation to the Federal Water Pollution Control Act. The Obama Administration objected to the restriction, contending that it "could hamstring future regulatory work in this area, putting our water resources at risk."[3] However, the prohibition was included in the enacted measure.

California Drought and Central Valley Project Operations

During consideration of the FY2017 Energy and Water Development Appropriations Bill, California was in the midst of a long-standing drought, and drought-related provisions derived from a previously enacted House bill, H.R. 2898, were incorporated by the House Appropriations Committee as new general provisions in H.R. 5055 for the Bureau of Reclamation.[4] However, those provisions were not included in the FY2017 Consolidated Appropriations Act. Sections 204 and 205 of H.R. 5055 would have, among other things, authorized alterations to pumping restrictions related to certain species listed under the Endangered Species Act (ESA). These restrictions govern how much water the Federal Central Valley Project (CVP) and the California State Water Project (SWP) can send (or "export") south of the Sacramento/San Joaquin Delta (Delta). The changes were generally consistent with provisions in H.R. 2898, with some

[3] Office of Management and Budget, Statement of Administration Policy, April 20, 2016, https://obamawhitehouse.archives.gov/sites/default/files/omb/legislative/sap/114/saphr2028s_20160420.pdf.

[4] H.R. 2898 was enacted by the House on July 17, 2015. For analysis of H.R. 2898 and related legislation, see CRS Report R44316, *Western Water and Drought: Legislative Analysis of H.R. 2898 and S. 1894*, coordinated by Pervaze A. Sheikh.

exceptions. For example, similar to Section 103(a)-(e) of H.R. 2898, Section 204 of H.R. 5055 would have set negative flows on the Old and Middle Rivers as they pertain to listed species.[5] Like H.R. 2898, the House bill would have set these flows at -5,000 cubic feet per second, or the high end of allowable flows under current Biological Opinions, unless collected information allowed the Secretary of the Interior to conclude that a lower flow rate (i.e., less pumping) would be needed to protect species. While most of the drought provisions in Sections 204-205 of H.R. 5055 were derived from Sections 103 and 307 of H.R. 2898, there are some notable differences between comparable sections in the two bills, in particular Sections 205(b) and 205(g). Similarly, Section 206 of H.R. 5055 included provisions similar to Sections 501-504 of H.R. 2898, which aimed to protect certain California water rights priorities, among other things. However, Sections 206(b) and 206(d) of H.R. 5055 contained several notable differences compared to comparable provisions in H.R. 2898.

Large Proposed Increase for Energy Efficiency and Renewables

The Obama Administration requested an increase of $829.2 million (40.1%) in discretionary funding for DOE's Office of Energy Efficiency and Renewable Energy (EERE) for FY2017, for a total of $2.898 billion. In addition, the Administration requested mandatory funding of $1.335 billion for 21st Century Clean Transportation Plan Investments within EERE. Both the House Appropriations Committee and the Senate voted to reject the Administration's proposed FY2017 budget increases for EERE, with the House panel approving a cut from FY2016 and the Senate approving level funding. The Obama Administration "strongly" objected to the rejection of the proposed EERE funding increases. According to a Statement of Administration Policy on the Senate bill, "At this funding level, the number of research, development, and demonstration projects supported in cooperation with industry, universities, and the national labs would be reduced, limiting innovation and technological advancement."[6] The Consolidated Appropriations Act provided $2.09 billion, a $17.2 million (0.9%) increase over the FY2016 funding level. The mandatory funding proposals were not enacted. For more information, see CRS Report R44262, *DOE's Office of Energy Efficiency and Renewable Energy (EERE): Appropriations Status*, by Kelsi Bracmort.

Nuclear Waste Management

DOE proposed to triple its funding for the Integrated Waste Management System (IWMS) in FY2017—from $22.5 million to $76.3 million. The funding would have accelerated development of "consent based" storage and disposal sites for highly radioactive "spent," or "used," fuel from nuclear power plants. In addition, research and development (R&D) on used fuel disposition would have risen from $62.5 million to $74.3 million, an increase of nearly 19%. According to DOE's budget justification, IWMS was to focus during the next 10 years on opening a pilot interim storage facility, initially for spent fuel from closed reactors, development of a spent fuel transportation system, and making progress on a larger storage facility. DOE's proposed consent-based waste facilities were to be an alternative to a planned permanent underground repository at Yucca Mountain, NV, which the Obama Administration wanted to abandon but that the Trump Administration has proposed to revive. The Obama Administration also proposed that, starting in

[5] The Old and Middle Rivers are channels of the San Joaquin River as it enters the Delta. The location of these channels can result in reverse flows when the CVP and SWP pumps are turned on and operating at higher levels, thus resulting in a negative flow rate. Higher pumping levels result in higher negative flows, which in turn increase the probability of fish being drawn into the pumps (entrained) and that habitat will be modified (e.g., increased turbidity and other factors affecting fish habitat).

[6] Ibid.

FY2018, discretionary funds for IWMS be supplemented by mandatory appropriations from the Nuclear Waste Fund, a Treasury account that holds fees paid by nuclear power plants. The House Appropriations Committee, reiterating its position of previous years, provided no funding for IWMS and instead approved $150.0 million for DOE to resume work on the Yucca Mountain project (as well as $20 million for NRC licensing). In contrast, the Senate approved $61.0 million for IWMS and included an authorization (§306) and a $10.0 million appropriation for DOE to develop a consent-based waste storage pilot facility. The Consolidated Appropriations Act provided $22.5 million for IWMS and nothing for Yucca Mountain. The Obama Administration's mandatory funding proposal was not enacted.

For more background, see CRS Report RL33461, *Civilian Nuclear Waste Disposal*, by Mark Holt.

Fossil Fuels R&D Budget Reorganization

The Obama Administration proposed to no longer categorize the DOE Fossil Fuels Research and Development program by type of fuel (coal, oil, and natural gas) in FY2017. Instead, fossil fuels R&D was to consist of subprograms focusing on carbon capture and storage and advanced power systems, fuel supply impact mitigation, and National Energy Technology Laboratory activities. The total funding request of $600 million was to be offset by $240 million of prior-year balances, leaving a net appropriation of $360 million. The Obama Administration's proposed restructuring of the fossil fuels budget and the proposed funding reduction were mostly rejected by the House Appropriations Committee and the Senate, and in the Consolidated Appropriations Act, which provided a total of $668 million for fossil energy R&D.

International Thermonuclear Experimental Reactor

The International Thermonuclear Experimental Reactor (ITER), under construction in France, continues to draw congressional concerns about management, schedule, and cost. The United States is to pay 9.09% of the project's construction costs, including contributions of components, cash, and personnel. The total U.S. share of the cost was estimated in 2015 at between $4.0 billion and $6.5 billion, up from $1.45 billion to $2.2 billion in 2008. The Obama Administration's proposed U.S. contribution for FY2017 was $125.0 million, $10.0 million above the FY2016 enacted level. As directed by P.L. 114-113, DOE issued a report in May 2016 on whether the United States should continue as an ITER partner or terminate its participation. DOE recommended that U.S. participation continue at least two more years but be reevaluated before FY2019.[7] The House Appropriations Committee approved the Administration's $125.0 million request for FY2017, pending the recommendation of the DOE report. The Senate approved no funding, as the Senate Appropriations Committee had recommended the previous year. The Consolidated Appropriations Act provided $50 million.

Upgrading Nuclear Weapons Infrastructure

The Weapons Activities account in DOE's National Nuclear Security Administration (NNSA) supports programs that maintain U.S. nuclear missile warheads and gravity bombs and the infrastructure programs that support that mission. In hearings on the FY2017 budget, NNSA Administrator Frank G. Klotz testified, "The age and condition of NNSA's infrastructure will, if

[7] DOE, *U.S. Participation in the ITER Project*, May 2016, http://science.energy.gov/~/media/fes/pdf/DOE_US_Participation_in_the_ITER_Project_May_2016_Final.pdf.

not addressed, put the mission, the safety of our workers, the public, and the environment at risk. More than half of NNSA's facilities are over 40 years old while 30% of them date back to the Manhattan Project era. The FY2017 budget request for Infrastructure and Operations was $2.722 billion, an increase of $442.8 million, 19.4% above the FY2016 enacted level."[8] For the entire Weapons Activities account, the DOE budget request for FY2017 totaled $9.235 billion, an increase of approximately 4.4% over FY2016. That funding total was approved by the Senate, while the House panel recommended an additional $8.4 million. The Consolidated Appropriations Act provided $9.246 billion for Weapons Activities, including $2.808 for Infrastructure and Operations.

Surplus Plutonium Disposition

The Mixed-Oxide Fuel Fabrication Facility (MFFF), which would make fuel for nuclear reactors out of surplus weapons plutonium, has faced sharply escalating construction and operation cost estimates. Because of those rising costs, DOE had proposed to terminate the MFFF project in FY2017, reducing the program's funding from $340.0 million to $270.0 million. DOE completed a congressionally mandated study of MFFF and a potentially less expensive alternative plutonium disposal method during FY2015, to dilute the surplus plutonium for disposal at the Waste Isolation Pilot Plant (WIPP) in New Mexico. For FY2017, DOE proposed to complete a preconceptual design for the dilute and dispose option. The Senate approved the Obama Administration's funding request, while the House panel voted to continue construction at the FY2016 funding level. The Consolidated Appropriations Act provided $335 million to continue MFFF construction, a 1.5% reduction from FY2016. Congress had previously rejected Obama Administration proposals to place MFFF in "cold standby" in FY2015 and FY2016, contending that the project was needed to satisfy an agreement with Russia on disposition of surplus weapons plutonium and promises to the state of South Carolina, where MFFF is located. For more information, see CRS Report R43125, *Mixed-Oxide Fuel Fabrication Plant and Plutonium Disposition: Management and Policy Issues*, by Mark Holt and Mary Beth D. Nikitin.

Cleanup of DOE Nuclear Facilities

DOE's Office of Environmental Management (EM) is responsible for environmental cleanup and waste management at the department's nuclear facilities. The total FY2017 appropriations request for EM activities was $5.445 billion, a reduction of $773 million (14.2%) from FY2016. That discretionary funding was to be supplemented by $673.7 million in mandatory funding from the U.S. Enrichment Corporation (USEC) Fund, an account that had been used by USEC when it was a government corporation, before being privatized in 1996. Mandatory spending from the USEC fund would have been offset by renewed fee collections from nuclear utilities to pay for cleaning up DOE uranium enrichment facilities. The House Appropriations Committee recommended a slight decrease for nuclear facility cleanup, while the Senate approved a slight increase. Both the House committee and the Senate rejected the proposed offsets, and they were not they included in the Consolidated Appropriations Act, which provided $6.42 billion for EM activities.

[8] Statement of Lt. Gen. Frank G. Klotz, USAF (Ret), Administrator, National Nuclear Security Administration, U.S. Department of Energy, on the Fiscal Year 2017 President's Budget Request Before the Subcommittee on Energy and Water Development House Committee on Appropriations, March 1, 2016, http://docs.house.gov/meetings/AP/AP10/20160301/104561/HHRG-114-AP10-Wstate-KlotzF-20160301.pdf.

Bill Status and Recent Funding History

Table 1 indicates the steps taken during consideration of FY2017 Energy and Water Development appropriations, which were enacted as Division D of the Consolidated Appropriations Act, 2017, P.L. 115-31. (For more details, see the CRS Appropriations Status Table at http://www.crs.gov/AppropriationsStatusTable/Index.)

Table 1. Status of Energy and Water Development Appropriations, FY2017

Subcommittee Markup							Final Approval		
House	Senate	House Report	House Passed	Senate Report	Senate Passed	Conf. Report	House	Senate	Public Law
4/13/2016	4/13/2016	4/19/2016	Failed 5/26/2016	4/14/2016	5/12/2016	None	5/3/2017	5/4/2017	5/5/2017

Table 2 includes budget totals for energy and water development appropriations enacted for FY2009 through FY2017.

Table 2. Energy and Water Development Appropriations, FY2009 to FY2017

(budget authority in billions of current dollars)

FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017
40.5[a]	33.4	31.7	34.4[b]	36.0[c]	34.1	34.8	37.3	38.4

Source: Compiled by CRS from totals provided by congressional budget documents.

Notes: Figures exclude permanent budget authorities and reflect rescissions. Figures for FY2016 and previous years are enacted levels.

a. Includes $7.5 billion in one-time funding for the Advanced Technology Vehicle Manufacturing Loan Program.

b. Includes $1.7 billion in emergency funding for the Corps of Engineers.

c. Includes $5.4 billion in emergency funding for the Corps of Engineers.

Description of Major Energy and Water Programs

The annual Energy and Water Development Appropriations bill includes four titles: Title I—Corps of Engineers—Civil; Title II—Department of the Interior (Central Utah Project and Bureau of Reclamation); Title III—Department of Energy; and Title IV—Independent Agencies, as shown in **Table 3**. Major programs in the bill are described in this section in the approximate order they appear in the bill. Previous appropriations and recommendations for FY2017 are shown in the accompanying tables, and additional details about many of these programs are provided in separate CRS reports as indicated.

Table 3. Energy and Water Development Appropriations Summary

(budget authority in millions of current dollars)

Title	FY2016 Request	FY2016 Approp.	FY2017 Request	FY2017 H. Comm.	FY2017 Senate	FY2017 Approp.
Title I: Corps of Engineers	4,732	5,989	4,620	6,089	6,000	6,038
Title II: CUP and Reclamation	1,106	1,275	1,112	1,145	1,275	1,317
Title III: Department of Energy	30,528	29,744	31,568	30,102	30,743	31,182
Title IV: Independent Agencies	281	342	312	363	355	349
Subtotal	36,647	37,350	37,612	37,700	38,373	38,886
Rescissions and Scorekeeping Adjustments[a]	-611	-27	-64	-140	-836	-436
E&W Total	**36,036**	**37,323[b]**	**37,547**	**37,560**	**37,537**	**38,450**

Sources: P.L. 115-31 and explanatory statement, S.Rept. 114-236, H.Rept. 114-532, Administration budget requests, H.Rept. 113-486, S.Rept. 114-54, Congressional Budget Office, H.R. 2029 explanatory statement, https://www.congress.gov/crec/2015/12/17/CREC-2015-12-17-bk2.pdf.

a. Budget "scorekeeping" refers to official determinations of spending amounts for congressional budget enforcement purposes. These scorekeeping adjustments may include offsetting revenues from various sources and rescissions.

b. The grand total in the Explanatory Statement includes $26.9 million in rescissions but excludes $111.1 million in additional scorekeeping adjustments that would reduce the grand total to $37.185 billion, the subcommittee allocation shown in S.Rept. 114-197. See Senate Committee on Appropriations, Comparative Statement of New Budget Authority FY2016, January 12, 2016, p. 11.

Agency Budget Justifications

FY2017 budget justifications for the largest agencies funded by the annual Energy and Water Development Appropriations bill can be found at

- Title I, Army Corps of Engineers, Civil Works, http://www.usace.army.mil/Missions/CivilWorks/Budget.aspx
- Title II
  - Bureau of Reclamation, http://www.usbr.gov/budget/2017/fy2017_budget_justifications.pdf
  - Central Utah Project, https://www.doi.gov/sites/doi.gov/files/uploads/FY2017_CUPCA_Budget_Justification.pdf
- Title III, Department of Energy, http://energy.gov/cfo/downloads/fy-2017-budget-justification
- Title IV, Independent Agencies
  - Nuclear Regulatory Commission, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1100/
  - Appalachian Regional Commission, http://www.arc.gov/images/newsroom/publications/fy2017budget/FY2017PerformanceBudgetFeb2016.pdf

- Defense Nuclear Facilities Safety Board, http://www.dnfsb.gov/sites/default/files/About/Budget%20Requests/2017/FY%202017%20CONG%20Budget%20Request_0.pdf
- Delta Regional Authority, https://issuu.com/deltaregionalauthority/docs/j-book-insert_finalforprint
- Denali Commission, https://www.denali.gov/images/documents/budget_justification/FY_2017_Budget_Justification_FINAL_.pdf

Corps of Engineers

The U.S. Army Corps of Engineers is an agency in the Department of Defense with both military and civilian responsibilities. Under its civil works program, which is funded by the Energy and Water Appropriations bill, the Corps plans, builds, operates, and in some cases maintains water resources facilities for coastal and inland navigation, riverine and coastal flood risk reduction, and aquatic ecosystem restoration. In recent decades, Corps studies, construction projects, and other activities have been generally authorized in Water Resources Development Acts before they were considered eligible for Corps appropriations. Congress enacted a water resources development act in June 2014, the Water Resources Reform and Development Act of 2014 (WRRDA, P.L. 113-121). This bill authorized new Corps projects and altered numerous Corps policies and procedures.[9]

Unlike highways and municipal water infrastructure programs, federal funds for the Corps are not distributed to states or projects based on a formula or delivered via competitive grants. Instead, the Corps generally is directly involved in the planning, design, and construction of projects that are cost-shared with nonfederal project sponsors.

In addition to the President's budget request for the Corps identifying funding for site-specific projects, Congress identified during the discretionary appropriations process many additional Corps projects to receive funding or adjusted the funding levels for the projects identified in the President's request.[10] In the 112th Congress, site-specific project line items added by Congress (i.e., earmarks) became subject to House and Senate earmark moratorium policies. As a result, Congress generally has not added funding at the project level since FY2010. In lieu of the traditional project-based increases, Congress has included "additional funding" for select categories of Corps projects (e.g., "ongoing navigation work"), and provided direction and limitations on the use of these funds. In FY2016, Congress added $1.257 billion in additional funding for Corps activities. For more information, see CRS In Focus IF10361, *Army Corps of Engineers: FY2017 Appropriations*, by Charles V. Stern, and CRS In Focus IF10176, *Army Corps of Engineers: FY2016 Appropriations*, by Charles V. Stern.

[9] For detailed background on the WRRDA 2014 legislation, see CRS Report R43298, *Water Resources Reform and Development Act of 2014: Comparison of Select Provisions*, by Nicole T. Carter et al.

[10] While congressional earmarks make up a relatively small percentage of most agency budgets, a significant number of Corps projects historically received additional funding from Congress for construction or operational expenditures. In recent years, Congress has provided the Corps funding above the President's request in appropriations legislation and provided guidance to the agency on how to distribute the additional funding for several broad categories of projects in accompanying reports or explanatory text. Generally, Congress has instructed the Corps to make additional project level allocations in a "work plan" and report back to Congress. Some of the categories to be funded in the work plan were designated by Congress as only being available for projects which were not included in the Administration's budget request. Recent work plan allocations are available at http://www.usace.army.mil/Missions/CivilWorks/Budget.aspx.

Table 4. Army Corps of Engineers

(budget authority in millions of current dollars)

Program	FY2014 Approp.	FY2015 Approp.	FY2016 Approp.	FY2017 Request	FY2017 H. Com.	FY2017 Senate	FY2017 Approp.
Investigations and Planning	125.0	122.0	121.0	85.0	120.0	126.5	121.0
Construction	1,656.0	1,639.5	1,862.3	1,090.0	1,945.6	1,813.6	1,876.0
Mississippi River and Tributaries (MR&T)	307.0	302.0	345.0	222.0	345.0	368.0	362.0
Operation and Maintenance (O&M)	2,861.0	2,908.5	3,137.0	2,705.0	3,157.0	3.173.8	3,149.0
Regulatory	200.0	200.0	200.0	200.0	200.0	200.0	200.0
General Expenses	182.0	178.0	179.0	180.0	180.0	180.0	181.0
FUSRAP[a]	103.5	101.5	112.0	103.0	103.0	103.0	112.0
Flood Control and Coastal Emergencies (FC&CE)	28.0	28.0	28.0	30.0	34.0	30.0	32.0
Office of the Asst. Secretary of the Army	5.0	3.0	4.8	5.0	4.8	5.0	4.8
Rescission		-28.0					
Total Title I	**5,467.5**	**5,454.5**	**5,989**	**4,620**	**6,089.3**	**6,000.0**	**6,037.8**

Sources: P.L. 115-31 and explanatory statement, S.Rept. 114-236, H.Rept. 114-532, FY2017 and FY2016 budget requests and Work Plans for FY2013, FY2014, and FY2015; S.Rept. 114-54; P.L. 113-2; H.R. 2029 explanatory statement. FY2017 request numbers can be found at https://obamawhitehouse.archives.gov/sites/default/files/omb/budget/fy2017/assets/budget.pdf.

a. Formerly Utilized Sites Remedial Action Program.

Bureau of Reclamation

Most of the large dams and water diversion structures in the West were built by, or with the assistance of, the Bureau of Reclamation. While the Army Corps of Engineers built hundreds of flood control and navigation projects, Reclamation's original mission was to develop water supplies, primarily for irrigation to reclaim arid lands in the West for farming and ranching. Reclamation has evolved into an agency that assists in meeting the water demands in the West while protecting the environment and the public's investment in Reclamation infrastructure. Reclamation municipal and industrial water deliveries have more than doubled since 1970.

Today, Reclamation manages hundreds of dams and diversion projects, including more than 300 storage reservoirs in 17 western states. These projects provide water to approximately 10 million acres of farmland and a population of 31 million. Reclamation is the largest wholesale supplier of water in the 17 western states and the second-largest hydroelectric power producer in the nation. Reclamation facilities also provide substantial flood control, recreation, and fish and wildlife benefits. Operations of Reclamation facilities are often controversial, particularly for their effect

on fish and wildlife species and conflicts among competing water users during drought conditions.

As with the Corps of Engineers, the Reclamation budget is made up largely of individual project funding lines and relatively few "programs." Also similar to the Corps, these Reclamation projects have often been subject to earmark disclosure rules. The current moratorium on earmarks restricts congressional steering of money directly toward specific Reclamation projects.

Reclamation's single largest account, Water and Related Resources, encompasses the agency's traditional programs and projects, including construction, operations and maintenance, dam safety, and ecosystem restoration, among others.[11] Reclamation also typically requests funds in a number of smaller accounts, and has proposed additional accounts in recent years. Congress has provided Reclamation additional appropriations in recent years to address drought conditions in the West, including $50 million in FY2015 and $100 million in FY2016. Implementation and oversight of the Central Utah Project (CUP) is conducted by a separate office within the Department of the Interior.

For more information, see CRS In Focus IF10375, *Bureau of Reclamation: FY2017 Appropriations*, by Charles V. Stern.

Table 5. Bureau of Reclamation

(budget authority in millions of current dollars)

Program	FY2014 Approp.	FY2015 Approp.	FY2016 Approp.	FY2017 Request	FY2017 H. Com.	FY2017 Senate	FY2017 Approp.
Water and Related Resources	954.1	978.1	1,119,0	813.4	983.0	1,114.4	1,155,9
Policy and Administration	60.0	58.5	59.5	59.0	59.0	59.0	59.0
CVP Restoration Fund (CVPRF)	53.3	57.0	49.5	55.6	55.6	55.6	55.6
Calif. Bay-Delta (CALFED)	37.0	37.0	37.0	36.0	36.0	36.0	36.0
San Joaquin Restoration Fund[a]	-	-	-	36.0	-	-	-
Indian Water Rights Settlement[a]	-	-	-	106.2	-	-	-
Rescission	0	-.5	0	0	0	0	0
Gross Current Reclamation Authority	**1,104.4**	**1,130.1**	**1,265.0**	**1,106.2**	**1,133.6**	**1,265.0**	**1,306.5**
Central Utah Project (CUP) Completion	8.7	9.9	10.0	5.6	11.0	10.0	10.5
Total, Title II Current Authority (CUP and Reclamation)	**1,113.1**	**1,140.0**	**1,275.0**	**1,111.8**	**1,144.6**	**1,275.0**	**1,317.0**

[11] The Water and Related Resources Account is largely funded by the Reclamation Fund, which receives and distributes receipts related to a number of federal activities (including royalties received from oil and gas leasing on federal lands). For more on this fund and financing of selected Reclamation Projects, see CRS Report R41844, *The Reclamation Fund: A Primer*, by Charles V. Stern.

Sources: P.L. 115-31 and explanatory statement, S.Rept. 114-236, H.Rept. 114-532, FY2017 and FY2016 budget requests, H.R. 83 Explanatory Statement, S.Rept. 114-54, H.R. 2029 explanatory statement. Excludes offsets and permanent appropriations.

Notes: Totals may not add due to rounding. CVP = Central Valley Project.

a. As in previous requests, the Administration's request included funding for these items, which have in the past been funded within the Water and Related Resources Account, as new accounts. For FY2017, the House Appropriations Committee and the Senate again rejected the Administration's proposal for these new accounts.

Department of Energy

The Energy and Water Development bill has funded all DOE programs since FY2005. Major DOE activities include research and development (R&D) on renewable energy, energy efficiency, nuclear power, and fossil energy, the Strategic Petroleum Reserve, energy statistics, general science, environmental cleanup, and nuclear weapons and nonproliferation programs. **Table 6** provides the recent funding history for DOE programs, which are briefly described further below.

Table 6. Department of Energy

(budget authority in millions of current dollars)

Program	FY2015 Approp.	FY2016 Approp.	FY2017 Request	FY2017 H. Com.	FY2017 Senate	FY2017 Approp.
ENERGY PROGRAMS						
Energy Efficiency and Renewable Energy	1,914.2	2,069.2	2,898.4	1,825.0	2,073,0	2,090.2
Electricity Delivery and Energy Reliability	147.0	206.0	262.3	225.0	206.0	230.0
Nuclear Energy	833.4	986.2	993.9	1,011.6	1,057.9	1,016.6
Fossil Energy R&D	571.0	632.0	360.0	645.0	632.0	668.0
Naval Petroleum and Oil Shale Reserves	20.0	17.5	15.0	15.0	15.0	15.0
Elk Hills School Lands Fund	15.6	0	0	0	0	0
Strategic Petroleum Reserve	200.0	212.0	257.0	257.0	200.0	223.0
Northeast Home Heating Oil Reserve	1.6	7.6	6.5	6.5	6.5	6.5
Energy Information Administration	117.0	122.0	131.1	122.0	122.0	122.0
Non-Defense Environmental Cleanup	246.0	255.0	218.4	226.7	255.0	247.0
Uranium Enrichment Decontamination and Decommissioning Fund	625.0	673.7	0	698.5	717.7	768.0
Science	5,067.7	5,350.2	5,572.1	5,400.0	5,400.0	5,392.0
Advanced Research Projects Agency-Energy (ARPA-E)	280.0	291.0	350.0	305.9	325.0	306.0
Nuclear Waste Disposal	0	0	0	150.0	0	0
Departmental Admin. (net)	126.0	131.0	167.0	131.0	129.1	143.0
Office of Inspector General	40.5	46.4	44.4	44.4	44.4	44.4

Program	FY2015 Approp.	FY2016 Approp.	FY2017 Request	FY2017 H. Com.	FY2017 Senate	FY2017 Approp.
Office of Indian Energy	0	0	22.9	0	20.0	0
Advanced Technology Vehicles Manufacturing Loans	4.0	6.0	5.0	5.0	5.0	5.0
Title 17 Loan Guarantee	17.0	17,0	1,027.0[a]	7.0	7.0	7.0
Tribal Indian Energy Loan Guarantee	0	0	0	0	9.0	0[c]
Office of Technology Transitions	—	—	8.4	7.0	0	0
Rescission (Clean Coal Technology)	-6.6	0	0	0	0	0
TOTAL, ENERGY PROGRAMS	**10,232,7**	**11,026.6**	**12,339.4**	**11,082.6**	**11,183.3**	**11,283.7**
DEFENSE ACTIVITIES						
National Nuclear Security Administration (NNSA)						
Weapons Activities	8,186.7[b]	8,846.9	9,234.7	9,243.1	9,285.1	9,245.6
Nuclear Nonproliferation	1,616.6	1,940.3	1,807.9	1,807.9	1,821.9	1,882.9
Naval Reactors	1.234.0	1,375.5	1,420.1	1,420.1	1,351.5	1,419.8
Office of Admin./Salaries and Expenses	369.6	363.8	412.8	382.4	408.6	390.0
Total, NNSA	**11,407.3**	**12,526.5**	**12,875.6**	**12,853.6**	**12,867.2**	**12,938.3**
Defense Environmental Cleanup	5,000.0	5,289.7	5,235.4	5,227.0	5,379.0	5,405.0
Defense Uranium Enrichment D&D	463.0	0	155.1	0	717.7	563.0
Other Defense Activities	754.0	776.4	791.6	776.4	791.6	784.0
TOTAL, DEFENSE ACTIVITIES	**17,624.3**	**18,592.7**	**19,057.6**	**18,856.9**	**19,755.5**	**19,690.3**
POWER MARKETING ADMINISTRATION (PMAs)						
Southeastern	0	0	0	0	0	0
Southwestern	11.4	11.4	11.1	11.1	11.1	11.1
Western	93.4	93.4	95.6	95.6	95.6	95.6
Falcon and Amistad O&M	0.2	0.2	0.2	0.2	0.2	0.2
TOTAL, PMAs	**105.0**	**105.0**	**106.9**	**106.9**	**106.9**	**106.9**
Subtotal, DOE	**28,152.9**	**29,744.2**	**31,568.3**	**30,102.5**	**31,045.7**	**31,182**
Offsets	**-236.1**	**-26.9**	**-64.4**	**-139.6**	**-303**	**-435.8**
Total, DOE	**27,916.8**	**29,717.3**	**31,503.9**	**29,962.9**	**30,743.0**	**30.746.0**

Sources: P.L. 115-31 and explanatory statement, S.Rept. 114-236, H.Rept. 114-532, FY2017 budget request, H.R. 83 Explanatory Statement, FY2015 budget request, H.Rept. 113-486, S.Rept. 114-54, Congressional Budget Office, H.R. 2029 explanatory statement.

Notes: Totals may not add due to rounding.

a. $1.02 billion under Title 17 Loan Guarantees is a Congressional Budget Office scoring adjustment of the Administration's request for $4 billion in additional loan guarantee authority, which did not include any appropriations.

b. This is the level as enacted in the FY2015 appropriations bill. NNSA proposed to change its budget structure for FY2016, such as transferring Nuclear Counterterrorism Incident Response from Weapons Activities to Defense Nuclear Nonproliferation. The FY2015 Weapons Activities figure comparable to the FY2016 figure is $8,007.7 million.

c. Appropriation of $9.0 million entirely offset by rescission.

Energy Efficiency and Renewable Energy

The Obama Administration had declared energy efficiency and renewable energy (EERE) to be a high priority, contending that they were essential for job creation, economic growth, and U.S. manufacturing competitiveness. Congress did not support most of President Obama's proposed annual funding increases, although a boost of about $150 million was approved for FY2016.

The Sustainable Transportation program area includes electric vehicles, vehicle efficiency, and alternative fuels. DOE's electric vehicle program is driven by the 10-year EV-Everywhere Challenge (launched in 2012), which aims to cut costs in half for battery and electric drivetrains for plug-in electric vehicles (EVs) by 2022. A key supporting technology goal is to cut the cost of battery capacity from $264/kilowatt-hour (kwh) in 2015 to $125/kwh by 2022. The fuel cell program targets a cost of $40 per kilowatt (kw) and a durability of 5,000 hours (equivalent to 150,000 miles) by 2020. For hydrogen produced from renewable resources, the target is to bring the cost below $4.00 per gasoline gallon-equivalent (gge) by 2020. Bioenergy goals include the development of "drop-in" fuels that would be largely compatible with existing energy infrastructure.

Renewable power programs focus on electricity generation from solar, wind, water, and geothermal sources. DOE's SunShot Initiative is aimed at halving the cost of solar power to 6 cents per kwh to make solar power cost-competitive without subsidies by 2020. For land-based windfarms, there is a cost target of 5.7 cents/kwh by 2020. For offshore wind settings, the target is 16.7 cents/kwh (unsubsidized) by 2020. The geothermal program aims to lower the risk of resource exploration and cut power production costs to 6 cents/kwh for newly developed technologies by 2030.

In the energy efficiency program area, the advanced manufacturing program is intended to support deployment of industrial efficiency and clean energy manufacturing technologies, including the installation of 40 gigawatts of new combined heat and power capacity by 2020 and improving the energy efficiency of commercial and industrial buildings by 20% during the next decade. The building technologies program has a goal of reducing building energy use 30% by 2030. The EERE program also provides grants to fund energy efficiency improvements and energy planning. Weatherization grants support state and local governments in providing home energy services to low-income families that help them reduce energy costs and save money. State energy grants support both administrative and program activities at many state energy offices.

Electricity Delivery and Energy Reliability

The DOE Office of Electricity Delivery and Energy Reliability (OE) has the mission of supporting more economically competitive, environmentally responsible, secure, and resilient U.S. energy infrastructure. To achieve that mission, OE supports electric grid modernization and resiliency through research and development (R&D), demonstration projects, partnerships, facilitation, modeling and analytics, and emergency preparedness and response. It is the federal government's lead entity for energy sector-specific responses to energy security emergencies—whether caused by physical infrastructure problems or by cybersecurity issues.

DOE's 2015 Grid Modernization Multi-Year Program Plan describes the department's vision for "a future electric grid that provides a critical platform for U.S. prosperity, competitiveness, and innovation by delivering reliable, affordable, and clean electricity to consumers where they want it, when they want it, how they want it." To help achieve this vision, DOE has established three key national goals:

- 10% reduction in the economic costs of power outages by 2025;
- 33% decrease in the cost of reserve margins while maintaining reliability by 2025; and
- 50% decrease in the net integration costs of distributed energy resources by 2025.[12]

For more details, see CRS Report R44357, *DOE's Office of Electricity Delivery and Energy Reliability (OE): A Primer, with Appropriations for FY2017*, by Corrie E. Clark.

Nuclear Energy

DOE's nuclear energy program for FY2017 has four major stated goals:

- Improve the safety, reliability, and economics of nuclear power plants;
- Implement a "consent based" strategy for developing nuclear waste storage and disposal facilities;
- Develop improved waste management and fuel cycle technologies; and
- Understand and minimize the risks of nuclear proliferation and terrorism.

The Reactor Concepts program area includes research on advanced reactors, including advanced small modular reactors, and research to enhance the "sustainability" of existing commercial light water reactors. Advanced reactor research focuses on "Generation IV" reactors, as opposed to the existing fleet of commercial light water reactors, which are generally classified as generations II and III. R&D under this program focuses on advanced coolants, fuels, materials, and other technology areas that could apply to a variety of advanced reactors. The program also is supporting NRC efforts to develop a new, "technology neutral" licensing framework for advanced reactors. Cost-shared research with the nuclear industry is also conducted on extending the life of existing commercial light water reactors beyond 60 years, the maximum operating period currently licensed by NRC. This subprogram is also conducting research to understand the Fukushima disaster and to develop accident prevention and mitigation measures.

The nuclear energy program also provides design and licensing funding for small modular reactors (SMRs), which range from about 40 to 300 megawatts of electrical capacity. Support under this subprogram is currently being provided to the NuScale Power SMR, which has a generating capacity of 50 megawatts, and for licensing two potential SMR sites. Under the company's current concept, up to 12 reactors would be housed in a single pool of water, which would provide emergency cooling. A design certification application for the NuScale SMR was fully submitted to NRC on January 25, 2017. FY2017 is to be the final year of funding for SMR licensing support, according to DOE's budget justification.

The Fuel Cycle Research and Development program conducts generic research on nuclear waste management and disposal, as well as implementing the Integrated Waste Management System, which seeks to find "consent based" nuclear waste sites. In general, the program is investigating

[12] DOE, *Grid Modernization Multi-Year Program Plan, November 2015*, http://energy.gov/sites/prod/files/2016/01/f28/Grid%20Modernization%20Multi-Year%20Program%20Plan.pdf.

ways to separate radioactive constituents of spent fuel for reuse or to be bonded into stable waste forms. Other major research areas in the Fuel Cycle R&D program include the development of accident-tolerant fuels for existing commercial reactors, evaluation of fuel cycle options, development of improved technologies to prevent diversion of nuclear materials for weapons, and exploration of deep borehole disposal technology.

Fossil Energy Research and Development

DOE's FY2017 Fossil Energy R&D Program focuses primarily on carbon capture and storage for power plants fueled by coal and natural gas. Major activities include the following:

- Carbon Capture subprogram for separating CO_2 in both precombustion and postcombustion systems;
- Carbon Storage subprogram on long-term geologic storage of CO_2, including storage site characterization, brine extraction storage tests, and postinjection monitoring technologies;
- Advanced Energy Systems subprogram on advanced fossil energy systems integrated with CO_2 capture and sequestration;
- Supercritical Transformational Electric Power (STEP) Generation Program, developing technology to replace the conventional steam cycle in electric turbine-generators with supercritical carbon dioxide; and
- Cross-Cutting Research and Analysis on innovative systems.

For more information, see CRS In Focus IF10589, *DOE Fossil Energy Research & Development: Funding for CCS*, by Peter Folger, CRS Report R44472, *Funding for Carbon Capture and Sequestration (CCS) at DOE: In Brief*, by Peter Folger, and CRS Report R44387, *Recovery Act Funding for DOE Carbon Capture and Sequestration (CCS) Projects*, by Peter Folger.

Strategic Petroleum Reserve

The Strategic Petroleum Reserve (SPR), authorized by the Energy Policy and Conservation Act (P.L. 94-163) in 1975, consists of caverns built within naturally occurring salt domes in Louisiana and Texas. The SPR provides strategic and economic security against foreign and domestic disruptions in U.S. oil supplies via an emergency stockpile of crude oil. The program fulfills U.S. obligations under the International Energy Program, which avails the United States of International Energy Agency (IEA) assistance through its coordinated energy emergency response plans, and provides a deterrent against energy supply disruptions.

By early 2010, the SPR's capacity reached 727 million barrels.[13] The federal government has not purchased oil for the SPR since 1994. Beginning in 2000, additions to the SPR were made with royalty-in-kind (RIK) oil acquired by the Department of Energy in lieu of cash royalties paid on production from federal offshore leases. In September 2009, the Secretary of the Interior announced a transitional phasing out of the RIK Program. DOE has been conducting a major maintenance program to address aging infrastructure and a deferred maintenance backlog at SPR facilities.

[13] For details on the SPR, see CRS Report R41687, *The Strategic Petroleum Reserve and Refined Product Reserves: Authorization and Drawdown Policy*, by Anthony Andrews and Robert Pirog.

In the summer of 2011, the President ordered an SPR sale in coordination with an International Energy Administration sale under treaty obligation because of Libya's supply curtailment. The U.S. sale of 30.6 million barrels reduced the SPR inventory to 695.9 million barrels.

In March 2014, DOE's Office of Petroleum Reserves conducted a test sale that delivered 5.0 million barrels of crude oil over a 47-day period that netted $468.6 million in cash receipts to the U.S. government (SPR Petroleum Account).

In 2015, DOE purchased 4.2 million barrels of crude oil for the SPR using proceeds from the 2014 test sale. According to the DOE budget justification, the SPR's drawdown capacity in FY2017 will be 4.25 million barrels per day. Currently, the SPR contains about 685 million barrels.[14]

The Bipartisan Budget Act of 2015 (P.L. 114-74) authorizes the sale of 58 million barrels of oil from the SPR. The authorized sales total 5 million barrels per fiscal year for 2018-2021, 8 million barrels in FY2022, and 10 million barrels per year in FY2023-FY2025. In addition, the Fix America's Surface Transportation Act (P.L. 114-94) authorizes the sale of 66 million barrels of oil from the SPR. The authorized sales would total 16 million barrels in FY2023 and 25 million barrels in each of fiscal years 2024 and 2025.

Science

The DOE Office of Science conducts basic research in six program areas: advanced scientific computing research, basic energy sciences, biological and environmental research, fusion energy sciences, high-energy physics, and nuclear physics. According to DOE's FY2017 budget justification, the Office of Science "is the Nation's largest Federal sponsor of basic research in the physical sciences and the lead Federal agency supporting fundamental scientific research for our Nation's energy future."

DOE's Advanced Scientific Computing Research (ASCR) program focuses on developing and maintaining computing and networking capabilities for science and research in applied mathematics, computer science, and advanced networking. The program plays a key role in the DOE-wide effort to advance the development of exascale computing, which seeks to build a computer that can solve scientific problems a thousand times faster than today's best machines. DOE has asserted that the department is on a path to have a capable exascale machine by the early 2020s.

Basic Energy Sciences (BES), the largest program area in the Office of Science, focuses on understanding, predicting, and ultimately controlling matter and energy at the electronic, atomic, and molecular level. The program supports research in disciplines such as condensed matter and materials physics, chemistry, and geosciences. BES also provides funding for scientific user facilities (e.g., the National Synchrotron Light Source II, and the Linac Coherent Light Source-II), and certain DOE research centers and hubs (e.g., Energy Frontier Research Centers, as well as the Batteries and Energy Storage and Fuels from Sunlight Innovation Hubs).

Biological and Environmental Research (BER) seeks a predictive understanding of complex biological, climate, and environmental systems across a continuum from the small scale (e.g., genomic research) to the large (e.g., Earth systems and climate). Within BER, Biological Systems Science focuses on plant and microbial systems, while Biological and Environmental Research supports climate-relevant atmospheric and ecosystem modeling and research. BER facilities and

[14] DOE, "Strategic Petroleum Reserve Inventory," https://www.spr.doe.gov/dir/dir.html.

centers include three Bioenergy Research Centers and the Environmental Molecular Science Laboratory at Pacific Northwest National Laboratory.

Fusion Energy Sciences (FES) seeks to increase understanding of the behavior of matter at very high temperatures and to establish the science needed to develop a fusion energy source. FES provides funding for the International Thermonuclear Experimental Reactor (ITER) project, a multinational effort to design and build an experimental fusion reactor. According to DOE, ITER "aims to generate fusion power 30 times the levels produced to date and to exceed the external power applied ... by at least a factor of ten." However, many U.S. analysts have expressed concern about ITER's cost, schedule, and management, as well as the budgetary impact on domestic fusion research.

The High Energy Physics (HEP) program conducts research on the fundamental constituents of matter and energy, including studies of dark energy and the search for dark matter. Nuclear Physics supports research on the nature of matter, including its basic constituents and their interactions. A major project in the Nuclear Physics program is the construction of the Facility for Rare Isotope Beams at Michigan State University. The Continuous Electron Beam Accelerator Facility Upgrade project is to be completed is to be completed in FY2017, according to the DOE budget justification.[15]

A separate DOE office, the Advanced Research Projects Agency–Energy (ARPA-E), was authorized by the America COMPETES Act (P.L. 110-69) to support transformational energy technology research projects. DOE budget documents describe ARPA-E's mission as overcoming long-term, high-risk technological barriers to the development of energy technologies.

For more details, see CRS Report R44516, *Federal Research and Development Funding: FY2017*, coordinated by John F. Sargent Jr.

Loan Guarantees and Direct Loans

DOE's Loan Programs Office provides loan guarantees for projects that deploy specified energy technologies, as authorized by Title XVII of the Energy Policy Act of 2005 (EPACT05, P.L. 109-58), and direct loans for advanced vehicle manufacturing technologies. Section 1703 of the act authorizes loan guarantees for advanced energy technologies that reduce greenhouse gas releases, and Section 1705 established a temporary program for renewable energy and energy efficiency projects.

Title XVII allows DOE to provide loan guarantees for up to 80% of construction costs for eligible energy projects. Successful applicants must pay an up-front fee, or "subsidy cost," to cover potential losses under the loan guarantee program. Under the loan guarantee agreements, the federal government would repay all covered loans if the borrower defaulted. This would reduce the risk to lenders and allow them to provide financing at below-market interest rates. The following is a summary of loan guarantee amounts available for various technologies:

- $8.3 billion for non-nuclear technologies under Section 1703;
- $2 billion for unspecified projects from FY2007 under Section 1703;
- $18.5 billion ceiling for nuclear power plants ($8.3 billion committed);
- $4 billion allocated for loan guarantees for uranium enrichment plants;

[15] DOE, *FY2016 Budget Justification*, Volume 4, http://www.energy.gov/cfo/downloads/fy-2016-budget-justification.

- $1.183 billion ceiling for renewable energy and energy efficiency projects under Section 1703, in addition to other ceiling amounts, which can include applications that were pending under Section 1705 before it expired; and
- An appropriation of $161 million for subsidy costs for renewable energy and energy efficiency loan guarantees under Section 1703. If the subsidy costs averaged 10% of the loan guarantees, this funding could leverage loan guarantees totaling about $1.6 billion.

Nuclear Weapons Activities

In the absence of explosive nuclear weapons testing, the United States has adopted a science-based program to maintain and sustain confidence in the reliability of the U.S. nuclear stockpile. Congress established the science-based Stockpile Stewardship Program in the FY1994 National Defense Authorization Act (P.L. 103-160). The goal of the program, as amended by the FY2010 National Defense Authorization Act (P.L. 111-84, §3111), is to ensure "that the nuclear weapons stockpile is safe, secure, and reliable without the use of underground nuclear weapons testing." The program is operated by the National Nuclear Security Administration (NNSA), a semiautonomous agency within DOE that Congress established in the FY2000 National Defense Authorization Act (P.L. 106-65, Title XXXII). NNSA implements the Stockpile Stewardship Program through the activities funded by Weapons Activities account in the NNSA budget.

Most of NNSA's weapons activities take place at the nuclear weapons complex (the "complex"), which consists of three laboratories (Los Alamos National Laboratory, NM; Lawrence Livermore National Laboratory, CA; and Sandia National Laboratories, NM and CA); four production sites (Kansas City National Security Campus, MO; Pantex Plant, TX; Savannah River Site, SC; and Y-12 National Security Complex, TN); and the Nevada National Security Site (formerly Nevada Test Site). NNSA manages and sets policy for the complex; contractors to NNSA operate the eight sites.

There are three major program areas in the Weapons Activities account.

Directed Stockpile Work involves work directly on nuclear weapons in the stockpile, such as monitoring their condition; maintaining them through repairs, refurbishment, life extension, and modifications; conducting R&D in support of specific warheads; and dismantlement. The number of warheads has fallen sharply since the end of the Cold War, and continues to decline. As a result, a major activity of Directed Stockpile Work is interim storage of warheads to be dismantled; dismantlement; and disposition (i.e., storing or eliminating warhead components and materials).

Research, Development, Test, and Evaluation (RDT&E) includes five programs that focus on "efforts to develop and maintain critical capabilities, tools, and processes needed to support science based stockpile stewardship, refurbishment, and continued certification of the stockpile over the long-term in the absence of underground nuclear testing." This area includes operation of some large experimental facilities, such as the National Ignition Facility at Lawrence Livermore National Laboratory.

Infrastructure and Operations (formerly Readiness in Technical Base and Facilities) has as its main funding elements material recycle and recovery, recapitalization of facilities, and construction of facilities. The latter included two controversial and expensive projects, the Uranium Processing Facility (UPF) at the Y-12 National Security Complex (TN) and the Chemistry and Metallurgy Research Replacement (CMRR) Project, which deals with plutonium, at Los Alamos National Laboratory (NM).

Weapons Activities also has several smaller programs, including the following:

- **Secure Transportation Asset,** providing for safe and secure transport of nuclear weapons, components, and materials;
- **Defense Nuclear Security,** providing operations, maintenance, and construction funds for protective forces, physical security systems, personnel security, and related activities;
- **Information Technology and Cybersecurity,** whose elements include cybersecurity, enterprise secure computing, and Federal Unclassified Information Technology; and
- **Legacy Contractor Pensions,** providing supplemental funds for pensions for retirees from Los Alamos and Lawrence Livermore National Laboratories who began employment when the University of California was the contractor for those labs.

For more information, see CRS Report R44442, *Energy and Water Development: FY2017 Appropriations for Nuclear Weapons Activities*, by Amy F. Woolf.

Defense Nuclear Nonproliferation

DOE's nonproliferation and national security programs provide technical capabilities to support U.S. efforts to prevent, detect, and counter the spread of nuclear weapons worldwide. These nonproliferation and national security programs are administered by NNSA's Office of Defense Nuclear Nonproliferation, which was reorganized in 2015.

Global Materials Security has two major program elements. The "First Line of Defense" focuses on increasing the security of vulnerable stockpiles of nuclear material in other countries. The "Second Line of Defense" is intended to "improve partner countries' abilities to deter, detect, and interdict illicit trafficking," according to DOE's FY2016 budget justification. Activities toward achieving those goals include the provision of equipment and training, workshops and exercises, and collaboration with international organizations.

Materials Management and Minimization conducts activities to minimize and, where possible, eliminate stockpiles of weapons-useable material around the world. Major activities include conversion of reactors that use highly enriched uranium (useable for weapons) to low enriched uranium, removal and consolidation of nuclear material stockpiles, and disposition of excess nuclear materials.

Nonproliferation and Arms Control works on "strengthening the nonproliferation and arms control regimes in order to reduce proliferation and terrorism risks," according to the FY2016 justification. This program conducts reviews of nuclear export applications and technology transfer authorizations, implements treaty obligations, and analyzes nonproliferation policies and proposals.

Other programs under Defense Nuclear Nonproliferation include research and development and construction. The Nonproliferation Construction program consists of the Mixed Oxide (MOX) Fuel Fabrication Facility (described under "Surplus Plutonium Disposition" above), which the Administration proposes to terminate. Nuclear Counterterrorism and Incident Response (formerly under Weapons Activities) "supports nuclear incident engagement to strengthen and exercise national and international radiological and nuclear counterterrorism, counterproliferation, and incident response capabilities," according to the FY2017 budget justification.

Cleanup of Former Nuclear Sites

The development and production of nuclear weapons for national defense purposes during half a century since the beginning of the Manhattan Project resulted in a waste and contamination legacy that continues to present substantial challenges today. In 1989, DOE established the Office of Environmental Management primarily to consolidate its responsibilities for the cleanup of former nuclear weapons production sites that had been administered under multiple offices.[16]

DOE's nuclear cleanup efforts are broad in scope and include the disposal of large quantities of radioactive and other hazardous wastes generated over decades; management and disposal of surplus nuclear materials; remediation of extensive contamination in soil and groundwater; decontamination and decommissioning of excess buildings and facilities; and safeguarding, securing, and maintaining facilities while cleanup is underway.[17] The Office of Environmental Management also is responsible for the cleanup of DOE sites that were involved in civilian nuclear energy research, which also generated wastes and contamination. These research sites add a nondefense component to the office's mission, albeit smaller in terms of the scope of their cleanup and associated funding.[18]

DOE has identified more than 100 "geographic" sites in over 30 states that historically were involved in the production of nuclear weapons and nuclear energy research for civilian purposes.[19] The geographic scope of these sites is substantial, collectively encompassing a land area of approximately 2 million acres. Cleanup remedies are in place and operational at the majority of these sites. The responsibility for the long-term stewardship of these sites has been transferred to the Office of Legacy Management and other offices within DOE for the operation and maintenance of cleanup remedies and monitoring.[20] Some of the smaller sites for which DOE initially was responsible were transferred to the Army Corps of Engineers in 1997 under the Formerly Utilized Sites Remedial Action Program (FUSRAP). Once the Corps completes the cleanup of a FUSRAP site, it is transferred back to DOE for long-term stewardship under the Office of Legacy Management.

Much work remains to be done at the sites that are still administered by the Office of Environmental Management. DOE expects cleanup to continue for several years or even decades at some of these sites, and estimates additional cumulative funding needs ranging from $191.6 billion to $224.3 billion over the long term to fulfill the cleanup liability of the United States.[21]

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[16] In 1989, DOE created the Office of Environmental Restoration and Waste Management, which later was renamed the Office of Environmental Management.

[17] The term "cleanup" often is used in reference to the remediation of risks at a site. Cleanup may be accomplished through various means to prevent potentially harmful levels of exposure to wastes and contamination. Cleanup may not necessarily entail the removal of all hazards from a site, but in some instances may involve the permanent containment of wastes or contamination to address exposure risks. If residual wastes or contamination remains on-site after cleanup is complete, long-term stewardship may continue to monitor residual wastes or contamination and ensure that cleanup measures continue to operate effectively.

[18] For additional information on the history, mission, and scope of the Office of Environmental Management, see DOE's website: http://energy.gov/em/office-environmental-management.

[19] For an interactive map and listing of each site, see DOE's Office of Environmental Management website, http://energy.gov/em/cleanup-sites. There are links to separate maps for active and completed sites.

[20] The Office of Legacy Management administers the long-term stewardship of DOE sites that do not have a continuing mission once cleanup remedies are in place. Sites that have a continuing mission are transferred to the DOE offices that administer those missions, which are responsible for their long-term stewardship.

[21] Department of Energy, Office of Chief Financial Officer, *FY2016 Congressional Budget Request*, February 2015, Volume 5, Environmental Management, p. 89.

The Office of Environmental Management has completed the cleanup of 91 sites in 30 states and the Commonwealth of Puerto Rico, and plans to continue the cleanup of 16 sites in 11 states in FY2017.[22]

Three appropriations accounts fund the Office of Environmental Management. The Defense Environmental Cleanup account is the largest in terms of funding, and it finances the cleanup of former nuclear weapons production sites. The Non-Defense Environmental Cleanup account funds the cleanup of federal nuclear energy research sites. Title XI of the Energy Policy Act of 1992 (P.L. 102-486) established the Uranium Enrichment Decontamination and Decommissioning (D&D) Fund to pay for the cleanup of three federal facilities that enriched uranium for national defense and civilian purposes.[23] Title X of P.L. 102-486 also authorized the reimbursement of uranium and thorium licensees for their costs of cleaning up contamination at sites that processed nuclear materials for national defense purposes at these federal facilities.[24] The three federal uranium enrichment facilities are located near Paducah, KY; Piketon, OH (Portsmouth plant); and Oak Ridge, TN.

The adequacy of funding for the Office of Environmental Management to attain cleanup milestones across the entire site inventory has been a recurring issue. Cleanup milestones are enforceable measures incorporated into compliance agreements negotiated among DOE, EPA, and the states. These milestones establish time frames for the completion of specific actions to satisfy applicable requirements at individual sites.[25]

Power Marketing Administrations

DOE's four Power Marketing Administrations (PMAs)—Bonneville Power Administration (BPA), Southeastern Power Administration (SEPA), Southwestern Power Administration (SWPA), and Western Area Power Administration (WAPA)—were established to sell the power generated by the dams operated by the Bureau of Reclamation and the Army Corps of Engineers.[26] The primary purpose of these projects in many cases was conservation and management of water resources—including irrigation, flood control, recreation, or other objectives.

Title IV: Independent Agencies

Independent agencies that receive funding from the Energy and Water Development bill include the Nuclear Regulatory Commission (NRC), the Appalachian Regional Commission (ARC), and the Denali Commission. Their recent appropriations history is shown in **Table 7**.

[22] Department of Energy, Office of Chief Financial Officer, *FY2017 Congressional Budget Request*, February 2016, Volume 5, Environmental Management, p. 5. See p. 30 for discretionary appropriations by site. One of these sites, the Waste Isolation Pilot Plant in New Mexico, is not a cleanup site itself, but is a permanent, geologic repository for "transuranic" wastes that are removed from other DOE sites for disposal.

[23] 42 U.S.C. §2297g.

[24] 42 U.S.C. §2296a.

[25] Compliance agreements for individual sites are available on DOE's Office of Environmental Management website: http://energy.gov/em/compliance-documents.

[26] Net funding for the Western Area Power Administration includes the Colorado River Basins Power Marketing Fund.

Nuclear Regulatory Commission

NRC is an independent agency that establishes and enforces safety and security standards for nuclear power plants and users of nuclear materials. Major budget categories for NRC are Nuclear Reactor Safety ($462.3 million for FY2017), Nuclear Materials and Waste Safety ($113.7 million), Decommissioning and Low-Level Waste ($27.2 million), and Integrated University Program ($15.0 million). NRC is required by law to charge fees to nuclear reactors and other regulated entities that are equal to about 90% of its total budget, excluding specified items. As a result, NRC's net appropriation is only about 10% of its total funding level.

Table 7. Independent Agencies Funded by Energy and Water Development Appropriations

(budget authority in millions of current dollars)

Program	FY2016 Approp.	FY2017 Request	FY2017 H. Comm.	FY2017 Senate	FY2017 Approp.
Appalachian Regional Commission	146.0	120.0	146.0	151.0	152.0
Nuclear Regulatory Commission	*1,002.1*	*982.3*	*948.2*	*951.1*	*917.1*
(Revenues)	*-882.9*	*-861.2*	*-796.9*	*832.2*	*804.6*
Net NRC (including Inspector General)	119.2	121.1	151.3	118.8	112.5
Defense Nuclear Facilities Safety Board	29.2	31.0	31.0	31.0	30.9
Nuclear Waste Technical Review Board	3.6	3.6	3.6	3.6	3.6
Denali Commission	11.0	15.0	11.0	15.0	15.0
Delta Regional Authority	25.0	16.0	15.0	25.0	25.0
Northern Border Regional Commission	7.5	5.0	5.0	10.0	10.0
Southeast Crescent Regional Commission	0.3	0	0.3	0	0.3
Total	**341.7**	**311.6**	**363.2**	**354.4**	**349.2**

Sources: P.L. 115-31 and explanatory statement, S.Rept. 114-236, H.Rept. 114-532, FY2017 Agency budget justifications, H.R. 83 Explanatory Statement, agency budget requests, H.Rept. 113-486, S.Rept. 114-54, CBO, H.R. 2029 explanatory statement.

Note: Figures may not add due to rounding.

Congressional Hearings

The following hearings have been held by the Energy and Water Development subcommittees of the House and Senate Appropriations Committees on the FY2017 budget request. Testimony and opening statements are posted on most of the web pages cited for each hearing, along with webcasts in many cases.

House

- *Nuclear Regulatory Commission*, February 10, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394347.
- *Bureau of Reclamation*, February 11, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394349.

- *Army Corps of Engineers, Civil Works*, February 26, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394385.
- *Department of Energy*, March 1, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394427.
- *Department of Energy, National Nuclear Security Administration*, March 1, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394426.
- *Department of Energy, Applied Energy Programs*, March 2, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394425.
- *Department of Energy, Office of Science*, March 2, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394425.
- *Department of Energy, Environmental Management*, March 15, 2016, http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=394441.

Senate

- *Nuclear Regulatory Commission*, February 24, 2016, http://www.appropriations.senate.gov/hearings/energy-and-water-hearing-on-fy17-nuclear-regulatory-commission-budget-request.
- *Army Corps of Engineers and Bureau of Reclamation*, March 2, 2016, http://www.appropriations.senate.gov/hearings/hearing-on-the-fy17-budget-request-for-the-army-corps-of-engineers-and-the-us-dept-of-the-interior-bureau-of-reclamation.
- *Department of Energy*, March 9, 2016, http://www.appropriations.senate.gov/hearings/hearing-on-the-fy17-us-dept-of-energy-budget-request.
- *National Nuclear Security Administration*, March 16, 2016, http://www.appropriations.senate.gov/hearings/hearing-to-review-the-fy17-budget-request-for-the-national-nuclear-security-administration.

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