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Energy and Water Development: FY2015 Appropriations

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January 30, 2015

Congressional Research Service
7-....
www.crs.gov
R43567

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), for the Department of the Interior's Bureau of Reclamation (Reclamation), and the Department of Energy (DOE), as well as the Nuclear Regulatory Commission (NRC) and several other independent agencies.

President Obama's FY2015 budget request for Energy and Water Development was released in March 2014. Including adjustments, the request totaled $34.26 billion, compared with a total of $34.13 billion appropriated for FY2014. The House approved the Energy and Water Development Appropriations Bill for FY2015 by a vote of 253-170 on July 10, 2014 (H.R. 4923, H.Rept. 113-486), with a funding total of $34.20 billion. The House adopted several amendments that did not change the total funding level from the bill as reported by the Appropriations Committee. The Senate Appropriations Committee's subcommittee on Energy and Water Development approved its version of the bill on June 17, 2014, with a total of $34.21 billion, but the full committee did not take it up.

Final FY2015 Energy and Water Development funding was included in the Consolidated and Further Continuing Appropriations Act, 2015 (H.R. 83). Energy and Water funding totaled $34.78 billion, $519 million above the request and $653 million above FY2014, including rescissions. The consolidated appropriations measure passed the House December 11, 2014, and the Senate December 13, 2014, and was signed by the President on December 16, 2014 (P.L. 113-235).

Major issues in the debate over the Energy and Water Development bill included:

- the distribution of appropriations for Corps (Title I) and Reclamation (Title II) projects that have historically received congressional appropriations above Administration requests;
- alternatives to the proposed national nuclear waste repository at Yucca Mountain, NV, which the Administration has abandoned (Title III: Nuclear Waste Disposal);
- proposed FY2015 spending levels for Energy Efficiency and Renewable Energy (EERE) programs (Title III) that were more than 20% higher in the Administration's request than the amount appropriated for FY2014;
- DOE funding for a joint effort with the Departments of the Navy and Agriculture for commercial-scale biorefineries that produce military-specification fuels;
- cost, schedule, and management concerns for the international ITER project, which seeks to design and build an experimental fusion reactor (Title III, Science);
- long-standing controversy over facilities for processing uranium and plutonium components for nuclear weapons (Title III, Nuclear Weapons Stockpile Stewardship); and
- the Administration's proposal, rejected in the enacted version, to suspend construction of the MOX Fuel Fabrication Facility (MFFF), which is intended to convert surplus nuclear weapons plutonium into civilian nuclear reactor fuel.

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The House Appropriations Committee approved the Energy and Water Development Appropriations Bill for FY2015 on June 20, 2014 (H.R. 4923, H.Rept. 113-486), with a total spending level of $34.20 billion.[1] The House passed the bill on July 10, 2014, by a vote of 253-170. Several floor amendments were approved that did not change the total funding level, including:

- Three amendments to increase Corps of Engineers construction funding by a total of $6.5 million (H.Amdt. 972, H.Amdt. 973, H.Amdt. 974);
- Increasing the Corps construction account by $57.6 million and reducing nuclear energy programs by $73.3 million (H.Amdt. 979);
- Amendments to increase the Bureau of Reclamation's Water and Related Resources account by $10 million and renewable energy and energy efficiency by a net total of $2 million (H.Amdt. 986, H.Amdt. 995);
- Increasing Department of Energy (DOE) non-defense environmental cleanup by $4 million (H.Amdt. 999); and
- Increasing DOE's Advanced Research Projects Agency—Energy (ARPA-E) by $20 million (H.Amdt. 1003).

The Senate Appropriations Committee's subcommittee on Energy and Water Development approved its version of the FY2015 bill on June 17, 2014, with a total of $34.21 billion (including budget scorekeeping adjustments).[2] The subcommittee's draft bill and report were released by the Appropriations Committee on July 24, 2014.[3] The subcommittee would increase funding for the Army Corps of Engineers to $5.13 billion and for the Department of the Interior's Bureau of Reclamation to $1.23 billion. Funding for the Department of Energy would total $28.36 billion, including $205.9 million in rescissions. Full committee markup scheduled for June 19, 2014, was postponed because of Administration objections to a planned amendment to block proposed Environmental Protection Agency carbon dioxide regulations, according to media reports.[4] No further action on the Senate draft bill was taken.

[1] H.Rept. 113-724, p. 11.

[2] That total includes $34.986 billion minus $778 million in scorekeeping adjustments that are not shown in the currently posted subcommittee draft report. See Senate Committee on Appropriations, Comparative Statement of Budget Authority, Energy and Water, July 16, 2014.

[3] Senate Committee on Appropriations, "FY15 E&W Subcommittee Reported Bill and Draft Report," news release, July 24, 2014, http://www.appropriations.senate.gov/news/fy-2015-ew-subcommittee-reported-bill-and-draft-report.

[4] Hallerman, Tamar, "Grim Outlook for Spending Bills after Senate Suspends 'Minibus' Debate," *CQ Roll Call*, June 19, 2014, http://www.cq.com/doc/news-4499341?0&srcpage=news&srcsec=cqn.

Status

Table 1 indicates the status of the FY2015 funding legislation.

Table 1. Status of Energy and Water Development Appropriations, FY2015

Subcommittee Markup		House	House	Senate	Senate	Conf.	Final Approval		Public
House	Senate	Report	Passage	Report	Passage	Report	House	Senate	Law
6/10/14	6/17/14	6/20/14	7/10/14	None	None	None	12/11/14	12/13/14	12/16/14

Overview

The Energy and Water Development 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).

The Budget Control Act and Energy and Water Development Appropriations for FY2015

FY2015 discretionary appropriations were considered in the context of the Budget Control Act of 2011 (BCA, P.L. 112-25), which established discretionary spending limits for FY2012-FY2021, enforced by an automatic spending reduction process of sequestration. In December 2013 Congress passed H.J.Res. 59 (P.L. 113-67), which contained the Bipartisan Budget Act (BBA), establishing less stringent spending caps for FY2014 and FY2015 than the BCA. For details, see CRS Report R43411, *The Budget Control Act of 2011: Legislative Changes to the Law and Their Budgetary Effects*, coordinated by (name redacted).

The Opportunity, Growth, and Security Initiative

The Obama Administration added to its FY2015 budget a new government-wide proposal referred to as the Opportunity, Growth, and Security Initiative. It was a $56 billion fund that would have been divided equally between defense and nondefense expenditures. The cost of the initiative would have been offset largely with targeted spending cuts and closed tax loopholes. The FY2015 House Appropriations Committee report did not mention the Administration initiative, nor did the draft report released by the Senate Appropriations Committee, and it was not included in the final FY2015 consolidated bill.

According to the Administration, the initiative would have provided an additional $1.6 billion for the Department of Energy, including:

- $355 million for "strengthening national resilience to climate change," including grants to states and increased weatherization programs, as well as distributed energy generation;
- $200 million for the proposed "Race to the Top" grants to states to implement energy savings;

- $484 million for other energy initiatives; and
- $600 million for nuclear weapons programs, including Readiness in Technical Base and Facilities and Site Stewardship, and nuclear nonproliferation research and development (R&D).[5]

Funding proposed through the Opportunity, Growth, and Security Initiative is not included in the FY2015 funding levels in the tables that follow.

Table 2 includes budget totals for energy and water development appropriations enacted for FY2008 to FY2015.

Table 2. Energy and Water Development Appropriations, FY2008 to FY2015

(budget authority in billions of current dollars)

FY2008	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015
30.9	40.5[a]	33.4	31.7	34.4[b]	36.0[c]	34.1	34.8

Source: Compiled by CRS.

Note: Figures represent current dollars, exclude permanent budget authorities, and reflect rescissions.

a. Includes $7.5 billion for 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.

Table 3 lists totals for each of the bill's four titles.

Table 3. Energy and Water Development Appropriations Summary

($ millions)

Title	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Subc.	FY2015 Final
Title I: Corps of Engineers	10,068.2[a]	5,467.5	4,561.0	5,557	5,162.0	5,482.5
Title II: CUP & Reclamation	1,014.0	1,113.1	1,043.5	1,023	1,230.5	1,140.5
Title III: Department of Energy	25,160.7	27,355.5	28,443.0	27,214	28,565.3	28,152.9
Title IV: Independent Agencies	252.2	265.1	248.7	312	262.7	269.0
Scorekeeping Adjustments[b]	-525.5	-74.4	-35.1	96	-1,012.5	-264.6
E&W Total	**35,969.6**[a]	**34,126.8**	**34,261.1**	**34,202**	**34,208.0**	**34,780.3**

Source: FY2015 budget request, H.Rept. 113-486, Congressional Budget Office, Senate Appropriations Committee.

a. Includes $5,350 billion in supplemental funding for the Corps of Engineers under the Disaster Relief Appropriations Act, 2013 (P.L. 113-2).

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

[5] http://www.slideshare.net/energy/fy-2015-budget-rollout-secretary-moniz-presentation-to-press-and-stakeholders.

Tables 4 through **16** provide budget details for Title I (Corps of Engineers), Title II (Department of the Interior), Title III (Department of Energy), and Title IV (independent agencies) for FY2013-FY2015. Accompanying these tables is a discussion of the key issues involved in the major programs in the four titles.

Title I: Army Corps of Engineers[6]

The Energy and Water Development bill provides funding for the civil program of the U.S. Army Corps of Engineers (Corps), an agency in the Department of Defense with both military and civilian responsibilities. Under its civil works program, the Corps plans, builds, operates, and maintains a wide range of water resources facilities. The Corps attracts congressional attention because its projects can have significant local and regional economic benefits and environmental effects, in addition to their water resource development purposes. Corps appropriations are generally authorized in water resources development acts. Most recently, Congress enacted a new water resources development act in June of 2014, the Water Resources Reform and Development Act of 2014 (WRRDA, P.L. 113-121). This bill authorized new Corps projects and studies and altered numerous Corps policies and procedures.[7]

In most years, the President's budget request for the Corps is below the agency's enacted appropriation. For FY2015, Congress appropriated $5.454 billion for the Corps in P.L. 113-235. The President's FY2015 budget request for the Corps was $4.561 billion. The House approved $5.557 billion for the Corps, and the Senate appropriations subcommittee recommended $5.162 billion. For FY2014, Congress had provided $5.468 billion in the agency's annual civil works appropriations in P.L. 113-76.

For more on the evolution of Corps civil works funding in recent years, see CRS In Focus IF00012, *Army Corps Civil Works Funding: A Primer (In Focus)*, by (name redacted). Additionally, in recent years riverine and coastal flooding resulted in the agency receiving supplemental funds. For more on the recent history of Corps civil works supplemental appropriations, see CRS Report R42841, *Army Corps Supplemental Appropriations: Recent History, Trends, and Policy Issues*, by (name redacted) and (name redacted) .

Earmarks and the Corps of Engineers

Corps funding is part of the debate over congressionally directed spending, or "earmarks." 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. Generally about 85% of the appropriations for Corps civil works activities are directed to specific projects.

In addition to specific projects identified for funding in the President's budget, for decades Congress annually identified during the discretionary appropriations process many additional Corps projects to receive funding.[8] 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

[6] This section was prepared by (name redacted) and (name redacted).

[7] For more information, see CRS Report R43298, *Water Resources Reform and Development Act of 2014: Comparison of Select Provisions*, by (name redacted) et al.

[8] 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.

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.[9] Congress continued this practice in FY2015, providing $974 million in "additional funding" for select categories of Corps projects in the Investigations, Construction, O&M, and MR&T accounts. This was consistent with the approach of the House- and Senate-passed bills for FY2015 appropriations.

Table 4. Energy and Water Development Appropriations
Title I: Army Corps of Engineers

($ millions)

Program	FY2013 Final	FY2013 Supplem.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 S. Sub.	FY2015 Approp.
Investigations and Planning	118.5	50.0	125.0	80.0	115.0	125.0	122.0
Construction	1,586.6	3,461.0	1,656.0	1,125.0	1,711.0	1,421.0	1,639.5
Mississippi River & Tributaries (MR&T)	238.0	0.0	307.0	245.0	260.0	305.0	302.0
Operation and Maintenance (O&M)	2,286.0	821.0	2,861.0	2,600.0	2,963.6	2,800.0	2,908.5
Regulatory	182.9	0.0	200.0	200.0	200.0	200.0	200.0
General Expenses	175.3	0.0	182.0	178.0	177.0	178.0	178.0
FUSRAP[a]	99.9	0.0	103.5	100.0	100.0	100.0	101.5
Flood Control & Coastal Emergencies (FC&CE)	25.6	1,008.0	28.0	28.0	28.0	28.0	28.0
Office of the Asst. Secretary of the Army	4.6	10.0	5.0	5.0	2.0	5.0	3.0
Total Title I	**4,718.3**[b]	**5,350.0**[c]	**5,467.5**	**4,533.0**[d]	**5,556.6**	**5,162.0**	**5,454.5**[e]

Source: FY2013 Work Plan, P.L. 113-76, FY2015 budget request H.Rept. 113-486, Senate Appropriations Committee, H.R. 83 Explanatory Statement.

a. Formerly Utilized Sites Remedial Action Program.

b. FY2013 is the final allocation after sequestration and across-the-board rescission.

c. $5.35 billion in supplemental funding related to the consequences of Hurricane Sandy was provided under the Disaster Relief Appropriations Act, 2013 (P.L. 113-2).

d. Includes $28 million rescission.

e. Includes $28 million rescission.

[9] Congress provided additional funding and guidance for several broad categories of projects in the FY2015 consolidated appropriations Explanatory Statement. The FY2014 statement 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 through FY2014 are available at http://www.usace.army.mil/Missions/CivilWorks/Budget.aspx.

Key Policy Issues—Corps of Engineers

Project Backlog and New Starts

The large number of authorized Corps studies and projects that have not received appropriations to date, or that are authorized and have received funding but are incomplete, is often referred to as the "backlog" of authorized projects. Estimates of the construction backlog range from $20 billion to more than $80 billion, depending on which projects are included (e.g., those that meet Administration budget criteria, those that have received funding in recent appropriations, those that have never received appropriations). The backlog raises policy questions, such as which activities to fund among authorized activities.[10]

Recent budget requests by the Administration have included few new studies and construction starts, and enacted appropriations for FY2011, FY2012, and FY2013 barred any funding for new projects (defined as projects or studies that have not received appropriations previously). For FY2014, P.L. 113-76 allowed up to nine new study starts and four new construction starts. For FY2015, the Administration requested funding for one new construction start and 10 new studies.[11] In its report, the House Appropriations Committee recommended that no new starts be funded. The Senate Appropriations subcommittee recommended funding the same new start studies and construction project requested by the Administration, and also recommended directing the Administration to propose an additional 10 new study starts and five new construction starts after enactment of the bill. The enacted measure provided for 10 new study starts and four new construction starts during FY2015.

Navigation Trust Funds

In addition to regular appropriations, two congressionally authorized trust funds are administered by the Corps and require annual appropriations. The Harbor Maintenance Trust Fund and the Inland Waterways Trust Fund support cost-shared investments in federal navigation infrastructure and have both received attention in recent years. While the Harbor Maintenance Trust Fund has a surplus balance, the Inland Waterways Trust Fund currently faces a shortfall and a curtailment of activities. Both trust funds are subject to appropriations. Authorization issues associated with these trust funds are often addressed through Water Resources Development Acts, or similar legislation.[12] Both trust funds are discussed below.

Harbor Maintenance Trust Fund

In 1986, Congress enacted the Harbor Maintenance Tax (HMT) to recover operation and maintenance (O&M) costs at U.S. coastal and Great Lakes harbors from maritime shippers. O&M is mostly the dredging of harbor channels to their authorized depths and widths. The tax is levied on importers and domestic shippers using coastal or Great Lakes ports. The tax revenues are

[10] For more information, see CRS Report R41243, *Army Corps of Engineers: Water Resource Authorizations, Appropriations, and Activities*, by (name redacted) and (name redacted) .

[11] The Administration's FY2014 proposed new starts were Hamilton City, CA (Ecosystem Restoration); Lower Colorado River Basin, TX (Flood Risk Management); Louisiana Coastal Area, LA (Ecosystem Restoration); Columbia River, OR and WA (Navigation).

[12] For more on congressional consideration of Corps trust fund authorization as part of broad Corps authorization legislation, see CRS Report R43298, *Water Resources Reform and Development Act of 2014: Comparison of Select Provisions*, by (name redacted) et al.

deposited into the Harbor Maintenance Trust Fund (HMTF), from which Congress appropriates funds for most harbor dredging.

In 1990, Congress increased the HMT rate from 4 cents per $100 of cargo value to 12.5 cents per $100 of cargo value in the Omnibus Budget Reconciliation Act (P.L. 101-508). In recent years, HMTF annual expenditures have remained relatively flat while HMT collections have increased due to rising import volume.[13] Consequently, a large surplus in the HMTF has developed. The maritime industry seeks to enact a "spending guarantee" to spend down the surplus in the HMT. Some harbor channels are not being maintained at their authorized depth and width, which may in some cases require ships with the deepest drafts to "light load" or wait for high tide. Harbors primarily used by fishing vessels or recreational craft have also complained of insufficient maintenance dredging. Since spending from the HMTF requires an appropriation from Congress, spending more from the HMTF could reduce available funding for other Energy and Water Development activities under congressional budget caps.

The Administration's FY2015 budget requested $915 million from the HMTF, leaving an estimated-end-of-year balance of more than $9.5 billion. The Water Resources Reform and Development Act of 2014, enacted in June 2014, included changes to the Harbor maintenance activities that sought to increase HMTF spending to levels based on "targeted" percentages of HMTF collections (but only if this funding does not come at the expense of available funding for other Corps activities).[14] While the exact amount of total HMTF funding provided in P.L. 113-235 was not delineated, the House Appropriations Committee Report noted a significant increase in its recommended spending level compared to the Administration request, indicating that its funding for HMTF activities was more than $1.1 billion.[15] The Senate subcommittee indicated that the "target" WRRDA level of $1.2 billion in FY2015 was not possible under its discretionary allocations, and that recommended HMTF activities in FY2015 were funded at a similar level to FY2014 (approximately $1.09 billion). For more information on harbor maintenance funding, see CRS Report R41042, *Harbor Maintenance Trust Fund Expenditures*, by (name redacted)

Inland Waterways Trust Fund

Since the 1980s, expenditures for construction and major rehabilitation projects on inland waterways have been cost-shared on a 50/50 basis between the federal government and users through the Inland Waterways Trust Fund (IWTF).[16] IWTF monies derive from a fuel tax on commercial vessels on designated waterways, plus investment interest on the balance.[17] Since FY2007, there has been a looming shortfall in the IWTF. In recent years Congress has taken measures to ensure temporary solvency of the IWTF, either by appropriating federal funds beyond the aforementioned 50% federal requirement (FY2009 and FY2010), by limiting IWTF expenditures to the amount available under current-year fuel tax revenues (FY2011-FY2013), or by altering the IWTF cost-share requirements for individual projects (FY2014).

[13] The exception was 2009, when collections declined along with import volume.

[14] The changes, which were provided for in §2101 of P.L. 113-121, are described further in CRS Report R43298, *Water Resources Reform and Development Act of 2014: Comparison of Select Provisions*, by (name redacted) et al.

[15] The House committee report stated that its recommendation for these activities was more than $1.1 billion. The Senate subcommittee report included no such estimate.

[16] Funding for operations and maintenance on inland waterways is provided for separately under the O&M account. For more information on inland waterways, see CRS Report R41430, *Inland Waterways: Recent Proposals and Issues for Congress*, by (name redacted) .

[17] Pursuant to the Water Resources Development Act of 1986 (P.L. 99-662), the fuel tax has been fixed at $0.20 per gallon since 1992.

In the past, multiple Administrations have proposed fees (e.g., lock user fees, congestion fees) that would have increased IWTF revenues. These fees have been opposed by users and rejected by Congress. In 2011, users endorsed a plan of their own that would increase the current fuel tax by $0.06-$0.08 per gallon and alter the cost-share arrangement for some IWTF projects to increase the portion paid for by the federal government. In the 113th Congress, H.R. 1149 and S. 407 would have authorized this proposal and raised the fuel tax by $0.06 and $0.09, respectively.

Recent estimates by the Corps indicate that one project, Olmsted Locks and Dam on the Ohio River, is expected to use up the majority of IWTF revenues without significant changes to the cost-sharing requirements for that project.[18] At the same time, other navigation construction and major rehabilitation work is expected to stall. Without a new source of revenue or some other change directed by Congress, the overall number of inland waterway construction projects is expected to remain limited. Changes to IWTF policies have historically been under the jurisdiction of the authorizing committees, but in recent years appropriators have expressed frustration with the lack of action on this issue.

For FY2015, the Administration once again requested appropriations for IWTF projects that are below projected fuel tax revenues.[19] The FY2015 Administration budget requested approximately $85 million in inland waterway spending from the IWTF, with an equal amount to be drawn from the General Fund of the Treasury. The Administration also assumed an additional $80 million in new revenues from an unspecified user fee, presumably separate from the current fuel tax. The majority of FY2015 requested IWTF funds ($80 million of the $85 million requested from the IWTF) was for the Olmsted Project. This approach of limited funding devoted mostly to the Olmsted Project was similar to the Administration's requests for FY2011-FY2014.

Since the FY2015 budget request was released, the Water Resources Reform and Development Act of 2014 (WRRDA) was enacted. WRRDA included some changes for inland waterways, including a reduction in the IWTF cost share required for the Olmsted Project from 50% to 15% (and a corresponding increase in the General Fund requirement, from 50% to 85%), and an increase in the ceiling on rehabilitation projects that can be funded from the General Fund, from $8 million to $20 million. With these changes enacted, the House recommended significant funding from the IWTF for projects other than the Olmsted Project for the first time in several years. The House recommended $169 million for construction work on the Olmsted Project (15% from the IWTF) and $112 million for work on other projects (50% cost-shared with the IWTF), for a total of $281 million on all inland waterways construction. The Senate subcommittee report included no total funding estimates for IWTF projects, but the Senate noted that its recommendation conformed to the alterations in WRRDA and included an additional $60 million for unspecified IWTF projects (in addition to the requested funding for the Olmsted Project). P.L. 113-235 included $160 million for Olmsted and $112 million for other inland waterways construction projects. For more information on inland waterways, see CRS Report R41430, *Inland Waterways: Recent Proposals and Issues for Congress*, by (name redacted) .

[18] Currently the Olmsted Project accounts for almost all IWTF appropriations. The project was originally authorized at a cost of $775 million (plus inflationary increases) but recently required an increase to its authorization ceiling in accordance with Section 902(b) of the Water Resources Development Act of 1986 (33 U.S.C. §2280). The FY2014 Continuing Appropriations Act, P.L. 113-46, increased the project's authorization from $775 million to $2.92 billion.

[19] Assuming annual fuel tax revenues of approximately $95 million, spending on inland waterways construction for FY2015 would be approximately $190 million for each year (or approximately $60 million less than the average funding provided from FY1992-FY2010).

Ecosystem Restoration Projects

The Corps portion of the Energy and Water bill typically includes funding for ecosystem restoration projects, such as restoration of the Everglades in South Florida.[20] Previously, some in Congress had criticized the fact that while the Corps had requested reductions for some "traditional" water project activities in recent budgets, funding requests for Corps environmental activities, which include ecosystem restoration projects, had largely remained steady. For FY2014, the Administration requested $449 million (approximately 9% of the total FY2014 Corps request, spread among several accounts) for ecosystem restoration projects. For FY2015, however, the Administration requested $336 million, representing 7% of the total request. No breakdown for these projects was available in the House committee or Senate subcommittee recommendations.

Continuing Authorities Program

Projects funded under the Corps' Continuing Authorities Program (CAPs) are typically smaller projects that can be carried out without obtaining a project-specific study or construction authorization or project-specific appropriations.[21] CAPs are referred to by the section number in the bill where the CAP was first authorized. The Administration's FY2015 budget requested a total of $10 million for four CAPs, or a significant decrease from the total of $53 million provided for eight CAPs in FY2014 in the Explanatory Statement accompanying P.L. 113-76. The House Appropriations Committee recommended $56.8 million for eight CAP sections, or $46.8 million more than the Administration's request. The Senate subcommittee recommended $50 million for these projects. P.L. 113-235 included $36.8 million spread over eight programs.

Title II: Department of the Interior[22]

Bureau of Reclamation and Central Utah Project

Title II of the Energy and Water Development bill includes funding for two sets of activities within the Department of the Interior: the Bureau of Reclamation and the Central Utah Project Completion Act (CUPCA). For FY2014, P.L. 113-76 provided $1.104 billion for Title II.

For the purposes of Energy and Water appropriations, the FY2015 request for the Bureau of Reclamation and CUPCA was $1.043 billion. In its budget request, the Administration typically includes an "offset" for the Central Valley Project (CVP) Restoration Fund. Counting this offset of $56.9 million in its FY2015 request, "net" discretionary authority requested by the Administration for these accounts was $986 million.[23] As in previous years, additional funding is expected to be available for FY2015 via "permanent and other" funds, but these funds are not included in net discretionary totals and therefore not reflected below.

[20] Along with the Department of the Interior, the Corps typically receives funding for the Comprehensive Everglades Restoration Program, or CERP. For more information regarding Everglades restoration funding, see CRS Report R42007, *Everglades Restoration: Federal Funding and Implementation Progress*, by (name redacted).

[21] Information on each CAP is provided in CRS Report R41243, *Army Corps of Engineers: Water Resource Authorizations, Appropriations, and Activities*, by (name redacted) and (name redacted).

[22] This section was prepared by (name redacted) and (name redacted).

[23] Counting of this offset is consistent with prior year budgets.

Table 5. Energy and Water Development Appropriations
Title II: Central Utah Project Completion Account

($ millions)

Program	FY2013 Approp.	FY2014 Approp.	FY2015 Request[a]	FY2015 House	FY2015 S. Subc.	FY2015 Appro.
Central Utah Water Conservancy District	19.8	7.7	[6.3]	7.5	5.0	7.6
Mitigation and Conservation Commission Activities	1.2	1.0	[1.0]	1.0	1.0	1.0
Expenses of the Secretary of the Interior	—	—	—	1.3	1.3	1.3
Total, Central Utah Project	**21.0**	**8.7**	**[7.3]**	**9.9**	**7.3**	**9.9**

Source: FY2015 budget request, H.Rept. 113-486, Senate Appropriations Committee, H.R. 83 Explanatory Statement.

Notes: Amounts shown in brackets are for comparison purposes only.

a. The FY2015 budget proposed to transfer the Central Utah Project Completion Account to the Bureau of Reclamation. See **Table 6** below for Administration recommendations for this account.

Table 6. Energy and Water Development Appropriations
Title II: Bureau of Reclamation

($ millions)

Program	FY2013 Approp.	FY2014 Approp.[a]	FY2015 Request[a]	FY2015 House	FY2015 S. Subc.	FY2015 Appro.
Water and Related Resources	848.2	954.1	760.7	856.4	1,069.7	978.1
Policy and Administration	56.9	60.0	59.5	53.8	59.5	58.5
CVP Restoration Fund (CVPRF)	50.4	53.3	57.0	57.0	57.0	57.0
Calif. Bay-Delta (CALFED)	37.6	37.0	37.0	37.0	37.0	37.0
San Joaquin Restoration Fund[b]	-	-	32.0	-	-	32.0
Indian Water Rights Settlement[b]	-	-	90.0	-	-	90.0
Central Utah Project Completion[a]	-	-	7.3	-	-	-
Gross Current Reclamation Authority	**993.0**	**1,104.4**	**1,043.5**	**1,004.2**	**1,223.2**	**1,130.0**
Total, Title II Current Authority (CUP and Reclamation)	**1,014.0**	**1,113.1**	**1,043.5**	**1,003.7**	**1,230.0**	**1,140.0**

Source: FY2015 budget request, H.Rept. 113-486, Senate Appropriations Committee, H.R. 83 Explanatory Statement.

Notes: Totals may not add due to rounding.

a. As in recent previous requests, the Administration proposed to transfer the Central Utah Project Completion Account to the Bureau of Reclamation and establish it as a Reclamation account.

b. As in previous requests, the Administration's request includes funding for these items, which have in the past been funded within the Water and Related Resources Account, as new accounts. For FY2015, the House and the Senate subcommittee again rejected the Administration's proposal for these new accounts.

Central Utah Project

The Administration requested $7.3 million for CUPCA in FY2015, or $1.4 million less than the FY2014 enacted amount. In FY2015 the Administration once again proposed to make Reclamation responsible for oversight and implementation of CUPCA and transition this account to Reclamation's purview. (These responsibilities are currently in a separate office in DOI.) Similar to previous years' requests, the House recommended maintaining CUPCA as a separate account and recommended $9.9 million for the project. The Senate subcommittee agreed with the Administration's request, but similar to the House prohibited delegation of responsibility for carrying out the act to the Bureau of Reclamation. P.L. 113-235 provided the same funding level and account breakdown as the House, $9.9 million.

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. Whereas the Army Corps of Engineers built hundreds of flood control and navigation projects, Reclamation's mission was to develop water supplies, primarily for irrigation to reclaim arid lands in the West. 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.

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, previously 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 as had been done in the past.

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. Reclamation also typically requests funds in a number of smaller accounts, and has proposed additional accounts in recent years.[24] For FY2015, the Administration requested $1.04 billion for the Water and Related Resources account and other Reclamation accounts. The House Appropriations Committee recommended $1.013 billion and the Senate subcommittee recommended $1.23 billion for these programs. P.L. 113-235 provided $1.13 billion for all Reclamation accounts, or $87 million more than the Administration's FY2015

[24] The Administration has previously requested that two accounts be created independently of the Water and Related Resources account: Indian Water Rights Settlements and San Joaquin River Restoration Settlement. In FY2015, the enacted bill provided the funding for Indian Water Rights Settlements and San Joaquin River Restoration within the Water and Related Resources account (rather than as independent accounts).

request. Previously, the FY2014 enacted bill provided $1.113 billion for Reclamation projects and programs.

Drought in California

Drought conditions in California and other states throughout the West have received attention in recent appropriations bills, including in FY2015. The enacted appropriations bill for FY2014 (P.L. 113-76) included multiple provisions related to Reclamation drought response and related authorities. For example, it extended through FY2017 authority for Reclamation to provide loans under the Reclamation States Emergency Drought Relief Act (43 U.S.C. 2214(c)) for projects that would mitigate losses associated with drought conditions. It also expanded the Secretary of the Interior's authority to participate in nonfederal groundwater banking in California and waived certain reporting provisions for transfer of irrigation water among selected federal water contractors, while also directing Reclamation and the Fish and Wildlife Service to expedite "programmatic environmental compliance" to facilitate CVP water transfers. P.L. 113-76 also extended the authorization of the Calfed Bay-Delta Authorization Act (P.L. 108-351) through 2015 (continuing certain provisions of the law that were set to expire at the end of FY2014).

In FY2015 appropriations, both the House and the Senate subcommittee have encouraged Reclamation to use its available authorities to address the drought. The Administration also requested, and the Senate subcommittee recommended, an extension of Reclamation's authority under the Reclamation States Emergency Drought Relief Act (i.e., authorities other than the loan authority that was extended in FY2014 enacted appropriations) from FY2012 to FY2017. The House did not recommend this extension. The Senate draft report also proposed increasing the total authorization of appropriations for that program from $90 million to $110 million. In addition, the Senate subcommittee included language which would direct Reclamation to "provide the maximum quantity of water supplies possible ... in accordance with existing law," available to certain agricultural and municipal irrigation contractors in California's Central Valley. This language is similar to authority proposed in S. 2198, another bill which aims to alleviate drought effects in California.

Reclamation's FY2015 request also proposed funding for individual projects and programs that received added attention due to the drought. For instance, Reclamation proposed $1.5 million in new funding within its WaterSMART program for a Drought Response Program (see "WaterSMART Program," below) that received added congressional attention due to the drought's ongoing effects. The House argued that the Administration had not adequately explained the program, but provided it with $1.47 million in funding. The Senate subcommittee recommended increasing funding for the program to $15 million, and the final enacted bill included $50 million for "Western Drought Response." Some legislation, such as S. 2198, has also proposed increasing the scope and potential recipients of Reclamation WaterSMART funds to incorporate drought-related concerns. However, no such language was included in FY2015 appropriations.

San Joaquin River Restoration Fund

The San Joaquin River Restoration Fund was authorized by the enactment of Title X of the Omnibus Public Land Management Act of 2009 (P.L. 111-11), the San Joaquin River Restoration Settlement Act. The Fund is to be used to implement fisheries restoration and water management provisions of a stipulated settlement agreement for the *Natural Resources Defense Council et al.*

v. Rodgers lawsuit.[25] The Fund is supported through the combination of a reallocation of Central Valley Project Restoration Fund receipts from the Friant Division water users and accelerated payment of Friant water users' capital repayment obligations, as well as other federal and non-federal sources. The Settlement Act provided $88 million from the Restoration Fund to be available without further appropriation. Reclamation reports that in FY2015, the balance of the aforementioned mandatory appropriations is expected to be spent, and without further congressional action, additional receipts will not be available until October 2019.

In lieu of additional mandatory funding for restoration until 2019, the Administration requested discretionary funding of $32 million for San Joaquin restoration activities as a separate account in FY2015. In its recommendation for FY2015, the House provided no funding for implementation of the San Joaquin River Restoration Settlement. The Senate subcommittee agreed with the Administration's request. P.L. 113-235 disagreed with the Administration's proposed transfer of this funding to a new account, but provided this funding within the Central Valley Project appropriation for the Friant Division, in the Water and Related Resources Account.

WaterSMART Program

In recent years Reclamation has combined funding for "bureau-wide" programs promoting water conservation into a single program—the WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program. The program is part of the Department of the Interior's focus on water conservation, re-use, and planning. The FY2015 WaterSMART numbers are shown below in **Table 7**. The FY2015 request for all WaterSMART programs was $52 million. The House approved approximately $51 million for these programs. The Senate subcommittee recommended $115 million for these programs, or $63 million more than the Administration request. P.L. 113-235 provided $51 million for these programs.

The WaterSMART Program request included two new components in FY2015: Drought Response and Resilient Infrastructure. Both programs would attempt to respond to the effects of climate change. The Resilient Infrastructure Program would attempt to identify and expand opportunities and use information to adapt Reclamation facility operations to account for climate change and reduce the potential effects of wildfire on Reclamation facilities. The Drought Response Program would fund new "comprehensive" planning actions, as well as implementation actions under existing authorities to address water shortages. The House agreed with the requested funding, while the Senate subcommittee recommended $13.5 million more than the Administration's request for drought response and plans. P.L. 113-235 provided no funding for drought response within the WaterSMART program, but instead provided $50 million for "Western Drought Response" as a separate line item in the enacted bill.[26]

[25] Construction of Friant Dam in the 1940s and subsequent diversion of San Joaquin River water to off-stream agricultural uses blocked salmon migration and dewatered stretches of the San Joaquin, resulting in elimination of spring-run Chinook into the upper reaches of the river. One goal of the settlement is to bring back the salmon run; another is to reduce or avoid adverse water supply impacts to Friant Division long-term contractors. For more information on the settlement agreement and the San Joaquin River Restoration Fund, see CRS Report R40125, *Title X of H.R. 146: San Joaquin River Restoration*, by (name redacted) and (name redacted) .

[26] Reclamation is to provide the appropriations committees its Work Plan for these funds, as well as other funds for "ongoing work," within 45 days of the bill's enactment.

Table 7. Reclamation WaterSMART Program

($ millions)

Program Name	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 S. Subc.	FY2015 Approp.
WaterSMART Grants	22.6	19.0	19.0	18.6	65.0	19.0
Basin Studies	6.0	4.7	3.9	3.8	4.5	3.9
Title XVI Projects	20.0	21.5	21.5	21.0	24.5	21.5
Drought Response	—	—	1.5	1.5	15.0	0.0[a]
Resilient Infrastructure	—	—	1.5	1.5	1.5	1.5
Cooperative Watershed Management Program	0.3	0.3	0.3	0.3	0.3	0.3
Water Conservation Field Services	6.2	3.4	4.5	4.4	4.5	4.5
Total	**52.0**	**48.9**	**52.1**	**51.0**	**115.3**	**$50.7**

Source: FY2013 Bureau of Reclamation Operating Plan, Bureau of Reclamation FY2015 Congressional Justifications, H.Rept. 113-135, S.Rept. 113-47, H.Rept. 113-486, Senate Appropriations Committee, Explanatory Statement accompanying P.L. 113-76, H.R. 83 Explanatory Statement.

a. P.L. 113-235 provided no funding for drought response within the WaterSMART program, but provided $50 million for "Western Drought Response" as a separate line item.

Title III: Department of Energy

The Energy and Water Development bill has funded all DOE's programs since FY2005. Major DOE activities funded by the Energy and Water bill include research and development on renewable energy and energy efficiency, nuclear power, fossil energy R&D, the Strategic Petroleum Reserve, energy statistics, general science, environmental cleanup, and nuclear weapons programs.

The FY2013 continuing resolution, P.L. 113-6, funded DOE programs at $25.1 billion, including the sequestration requirements of the Budget Control Act. The FY2014 bill, P.L. 113-76, appropriated $27.3 billion for DOE. The Administration's request for FY2015 was $28.4 billion. The House approved $27.3 billion, and the Senate Committee on Appropriations subcommittee on Energy and Water Development recommended $28.4 billion. The enacted FY2015 measure provided $27.9 billion for DOE.

Table 8. Energy and Water Development Appropriations
Title III: Department of Energy

($ millions)

Program	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	FY2015 Approp.
ENERGY PROGRAMS						
Energy Efficiency and Renewable Energy	1,691.8	1,901.7	2,316.7	1,791.0	2,072.9	1,923.9
Electricity Delivery and Energy Reliability	129.2	147.3	180.0	160.0	174.0	147.3
Nuclear Energy	708.4	889.2	863.4	826.0	777.0	833.5
Fossil Energy R&D	498.7	562.1	475.5	593.0	475.5	571.0
Naval Petrol. and Oil Shale Reserves	14.1	20.0	20.0	20.0	20.0	20.0
Elk Hills School Lands Fund	0.0	0.0	15.6	15.6	15.6	15.6
Strategic Petroleum Reserve	182.6	189.4	205.0	205.0	205.0	200.0
Northeast Home Heating Oil Reserve	3.6	8.0	1.6	1.6	1.6	7.6
Energy Information Administration	99.5	117.0	122.5	120.0	117.0	117.0
Non-Defense Environmental Cleanup	223.5	231.8	226.2	245,0	246.0	246.0
Uranium Enrichment D&D Fund	448.2	598.8	531.0	586.0	594.0	625.0
Science	4,681.2	5,071.0	5,111.2	5,071.0	5,086.0	5,071.0
Advanced Research Projects Agency-Energy (ARPA-E)	250.6	280.0	325.0	300.0	280.0	280.0
Nuclear Waste Disposal	0.0	0.0	0.0	150.0	0.0	0.0
Departmental Admin. (net)	119.2	126.4	129.1	91.0	110.0	126.0
Office of Inspector General	39.8	42.1	39.9	42.1	39.9	40.5
Office of Indian Energy	0.0	0.0	16.0	0.0	16.0	0.0
Adv. Tech. Vehicles Manuf. Loan	5.7	6.0	4.0	4.0	4.0	4.0
Sec. 1705 Loan Guarantee	0.0	20.0	17.0	17.0	17.0	17.0
Rescission (Clean Coal Technology)	0.0	0.0	-6.6	-6.6	-6.6	-6.6
TOTAL, ENERGY PROGRAMS	**9,096.2**	**10,210.8**	**10,592.9**	**10,231.7**	**10,109.8**	**10,232.7**
DEFENSE ACTIVITIES						
National Nuclear Security Administration (NNSA)						
Weapons Activities	6,966.9	7,781.0	8,314.9	8,204.2	8,314.9	8,186.7
Nuclear Nonproliferation	2,237.4	1,954.0	1,555.2	1,555.2	1,978.0	1,616.6
Naval Reactors	994.1	1,095.0	1,377.1	1,215.3	1,208.0	1.234.0
Office of Administrator	377.5	377.0	410.8	386.9	390.0	370.0
Total, NNSA	**10,575.8**	**11,207.0**	**11,658.0**	**11,361.6**	**11,890.9**	**11,407.3**
Defense Environmental Cleanup	4,627.1	5,000.0	4,864.5	4,801.3	5,565.0	5,000.0

Program	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	FY2015 Approp.
Other Defense Activities	760.0	755.0	753.0	754.0	753.0	754.0
Defense Nuclear Waste Disposal	-0.7	0.0	0.0	0.0	0.0	0.0
TOTAL, DEFENSE ACTIVITIES	**15,962.1**	**16,962.0**	**17,738.5**	**16,916.9**	**18,208.9**	**17,624.3**
POWER MARKETING ADMINISTRATION (PMAs)						
Southeastern	0.0	0.0	0.0	0.0	0.0	0.0
Southwestern	11.2	11.9	11.4	11.4	11.4	11.4
Western	90.9	95.9	93.4	93.4	93.4	93.4
Falcon & Amistad O&M	0.2	0.4	0.2	0.2	0.2	0.2
TOTAL, PMAs	**102.0**	**108.2**	**105.0**	**105.0**	**105.0**	**105.0**
Offsets		**-74.5**	**-6.6**	**-39**	**-64.3**	**-236.1**
Total, Title III	**25,160.7**	**27,281.0**	**28,436.5**	**27,214.0**	**28,359.4**	**27,916.8**

Source: H.R. 83 Explanatory Statement, FY2015 budget request, H.Rept. 113-486, Congressional Budget Office, Senate Appropriations Committee. Totals may not add due to rounding.

Key Policy Issues—Department of Energy

DOE administers a wide variety of programs with different functions and missions. In the following pages, some of the most important programs are described and major issues are identified, in approximately the order in which they appear in **Table 8**.

Energy Efficiency and Renewable Energy (EERE)[27]

President Obama has declared energy efficiency and renewable energy to be a high priority, stressing their importance to jobs, economic growth, and U.S. manufacturing competitiveness. For example, the 2013 *Economic Report of the President* noted that "President Obama has set a goal of once again doubling generation from wind, solar, and geothermal sources by 2020." But Congress so far has not supported his efforts to boost spending for these programs. His proposed FY2011 budget for EERE of $2.4 billion was reduced to $1.8 billion, the FY2012 request for $3.2 billion was cut to $1.8 billion, the FY2013 request for $2.3 billion was cut to $1.7 billion, and the FY2014 request for $2.8 billion was cut to $1.9 billion.

For FY2015, DOE requested $2.32 billion for the EERE programs. Compared with the FY2014 appropriation, the FY2015 request would have increased EERE funding by about $416 million, or nearly 22%.

DOE requested an additional $180 million for the Office of Electricity Delivery and Energy Reliability (OE) programs (described in the next section). **Table 9** gives the programmatic breakdown for EERE and OE.

[27] This section was prepared by (name redacted).

Table 9. Energy Efficiency and Renewable Energy Programs

($ millions)

Program	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	FY2015 Approp.
Hydrogen/Fuel Cell Technologies	95.8	93.0	93.0	100.0	93.0	97.0
Biomass and Biorefinery Systems	185.2	232.4	253.2	180.0	253.2	225.0
Solar Energy	269.1	257.2	282.3	178.0	248.0	233.0
Wind Energy	86.1	88.2	115.0	107.0	109.0	107.0
Geothermal Technology	35.0	45.8	61.5	46.0	61.5	55.0
Water Power (Hydro/Ocean)	54.7	58.6	62.5	38.5	69.0	61.0
Subtotal, Renewables and Hydrogen	725.9	775.2	867.5	649.5	833.7	778.0
Vehicle Technologies	303.2	289.9	359.0	277.5	290.0	280.0
Building Technologies	204.6	178.0	211.7	165.0	178.0	172.0
Advanced Manufacturing	114.3	180.6	305.1	206.0	231.8	200.0
Federal Energy Management	28.3	28.3	36.2	20.0	29.0	27.0
Subtotal, Efficiency R&D	650.3	676.7	912.0	668.5	728.8	679.0
Facilities and Infrastructure	24.9	46.0	56.0	56.0	56.0	56.0
Program Direction	160.5	162.0	160.0	150.0	160.0	160.0
Strategic Programs	23.6	23.6	21.8	12.0	22.0	21.0
R&D Subtotal	1,585.1	1,683.5	2,017.3	1,536.0	1,800.5	1,694.0
Tribal Energy Program	9.4	7.0	0.0[a]	0.0	0.0	0.0
Clean Energy Economic Development Projects	0.0	0.0	14.0	0.0	0.0	0.0
Subtotal, Demonstration and Deployment	9.4	7.0	14.0	0.0	0.0	0.0
Weatherization Grants	131.7	174.0	227.6	203.0	227.6	193.0
State Energy Grants	47.1	50.0	63.1	50.0	50.0	50.0
Use of Prior Year Balances	-81.6	-2.4	-5.2	0.0	-5.2	0.0
Floor amendments	—	—	—	2.0	—	—
Rescission	—	—	—	-18.0	0.0	-13.1
Total EERE Appropriation[b]	1,691.8	1,901.7	2,316.7	1,773.0	2,072.9	1,923.9
Electricity Delivery and Energy Reliability (OE)	129.2	147.2	180.0	160.0	174.0	147.3

Source: H.R. 83 Explanatory Statement, House and Senate appropriations reports, FY2015 budget request.

a. DOE requested that this funding line be moved from EERE to the Office of Tribal Energy.

b. The House Appropriations Committee had recommended $1,789.0 million and a rescission of $18.1 million. In floor action, $7 million was cut from "renewable energy construction" and $9 million was added for EERE general use. The resulting effects of those changes on specific subprograms have not yet been determined. For subprograms, the table shows the amounts identified in the committee report.

EERE-wide Cross-Cutting Initiatives

The FY2015 request continued an emphasis on five broad initiatives that cut across multiple EERE programs:

(1) Grid Integration Initiative. Under this initiative, launched in 2012, EERE's vehicles, solar, and buildings programs would work in coordination with DOE's Grid Tech Team[28] to address electric grid integration barriers and opportunities associated with variable, distributed renewable energy generators, electric vehicle charging, and building efficiency and controls. Thus, EERE would coordinate with DOE's Office of Electricity Delivery and Energy Reliability (OE).

(2) EV Everywhere Grand Challenge. This DOE-wide initiative aims to make technology breakthroughs that would enable the United States, by 2022, to become the first country in the world to invent and produce plug-in electric vehicles that are as affordable and convenient as gasoline-powered vehicles.

(3) SunShot Grand Challenge. This DOE-wide initiative seeks to achieve directly cost-competitive solar power by 2020.

(4) Clean Energy Manufacturing Initiative. This relatively new EERE initiative aims to dramatically improve U.S. competitiveness in the manufacture of clean energy products (such as solar modules, LED lights, batteries, and wind blades) and to increase energy productivity as a means to strengthen U.S. competitiveness across multiple manufacturing industries.

(5) Wide Bandgap Semiconductors for Clean Energy Initiative. Wide bandgap semiconductor technology was initially developed for military and solid-state lighting uses. DOE contends it is a key next-generation platform for semiconductor devices with the potential for developing high-power-conversion electronics that are much more compact, more energy efficient, and able to operate at much higher temperatures and voltages than existing commercial technology. DOE contends that this "revolutionary" technology could be a platform for the next generation of electric vehicle drivetrains, solar inverters, high-efficiency motors, solid-state transformers for the grid, and many other critical, clean energy applications.

House Action

Expressing concern about controlling budget expenses—and citing a need to focus EERE programs on efforts to curb gasoline and electricity prices—the House Appropriations Committee recommended cutting overall EERE funding relative to the FY2014 level by $112.7 million ($527.7 million below the request). The committee report stressed a priority on "research that only the government is likely to do" and "has commercialization possibilities only in the distant future." The committee identified several "major oversight initiatives," including seven for EERE and four under OE.

The committee cited a concern about the "proliferation of centers," including Energy Innovation Hubs and Clean Energy Manufacturing Institutes (CEMIs). The committee report noted that many centers have been funded repeatedly and "lack a concrete goal after which they would be terminated." The committee reiterated FY2014 direction to DOE to provide a comprehensive list of all centers and details on program and technical goals. Further, the report called for ongoing review and frequent updates—as well as greater transparency, evaluation, and prioritization.

[28] DOE created the Grid Tech Team to develop a stronger and more extensive network of public-private partnerships to ease the transition to a more modern grid. DOE, EDER, *DOE Grid Tech Team*, http://energy.gov/oe/services/doe-grid-tech-team.

As an overarching focus, the committee encouraged DOE to assess the feasibility of ultraconductive copper as a crosscutting technology area, including funding for prototype development and manufacturing scale-up. Ultraconductive copper is a composite material that includes less than 1% of carbon nanotubes suspended in more than 99% of copper. It has an electrical conductivity, at room temperature, up to double that of pure copper. The European Commission, the main administrative agency of the European Union (EU), launched an "ultrawire" R&D initiative late in 2013.[29]

The committee report contained several management and program directives for FY2015. One directive specified that no funding is to be provided for the Grid Integration Initiative under Vehicles, Solar, and Buildings programs.[30] The committee also adopted an amendment suggesting that regulations which specify how to calculate the social cost of carbon "should not" be made final until after incorporating public comment and findings from a Government Accountability Office (GAO) report. Other selected directives are noted below, in the context of specific program areas.

Also, the committee sought a rescission of $18.1 million for EERE.[31] In floor action, the rescission was adopted along with four amendments that affect EERE funding for FY2015: H.Amdt. 986 (Noem) reduced funding for renewable energy construction by $7 million, H.Amdt. 995 (Bonamici) increased EERE funding by $9 million, H.Amdt. 1020 (Burgess) prohibited EERE spending to enforce lighting efficiency standards for BPAR and ER reflector lamps, and H.Amdt. 1042 (Weber) prohibited the use of funds for the Cape Wind Energy Project.

Senate Appropriations Subcommittee Action: Draft Report Recommendations

The draft committee report provided two areas of general guidance that would affect EERE programs. First, the draft report noted that a recent Governmental Accountability Office (GAO) report had raised concern about the "potential for overlap and duplication" among energy efficiency programs at DOE, the Department of Housing and Urban Development (HUD), and the Environmental Protection Agency (EPA). Thus, the committee would direct DOE to lead production of a report on the topic (including actions to eliminate or consolidate such programs), establish a coordinating council mechanism, and report on the fulfillment of that coordinating mechanism. Second, the draft committee report encouraged DOE to form partnerships with non-profit groups to provide "grid technology testing and technical assistance to the electric industry to address the variability of renewable power generation."

Hydrogen/Fuel Cell Program

This program aims to reduce petroleum use, greenhouse gas emissions, and criteria air pollutants, while contributing to a more diverse and efficient energy infrastructure. The program supports applied research, development, and demonstration (RD&D) of hydrogen and fuel cell technologies, as well as efforts to overcome economic and institutional barriers to commercial deployment. The fuel cell program targets a cost below $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 (dispensed and untaxed) below $4.00 per gasoline gallon-equivalent (gge) by 2020. DOE requested $93 million—virtually the same as the FY2014

[29] Ultra Conductive Copper-Carbon Nanotube Wire, http://ultrawire.eu/.

[30] See report p. 96, 97, and 101.

[31] See report p. 208.

appropriation. In addition to R&D, the funding would address barriers to commercialization by supporting early market fuel cell demonstrations and by developing equipment codes and standards. The House committee recommended a $7 million (8%) increase above the FY2014 level. The draft Senate report recommended the same amount as the FY2014 enacted level. Also, it recommended that DOE take actions to "transform" the size, cost, scalability, and interoperability of new retail hydrogen stations. The final appropriation was $4 million higher than the FY2014 level.

Bioenergy (Biomass and Biorefinery) Program

This program aims to foster a domestic bioenergy industry that produces renewable biofuels, bioproducts, and biopower. The goals are to curb oil dependence, reduce greenhouse gas emissions, and stimulate economic and job development—especially in farms and forests. While biofuels and industrial bioproducts (plastics, solvents, and alcohols) may soon be price-competitive, swings in oil prices pose an ongoing challenge to achieving cost-competitiveness. The program is intended to overcome a feedstock collection barrier by focusing on converting raw biomass to solid pellets or to "green crude" bio-oil that would be easy to transport at large scale.

Recent goals expand the program scope to include the development of biofuels that would contribute to production targets of the Renewable Fuel Standard (RFS). These "drop-in" liquid fuels are largely compatible with existing infrastructure that deliver, blend, and dispense fuels. Examples include biomass-based hydrocarbon fuels (renewable gasoline, diesel, and jet fuel), hydrocarbons from algae, and biobutanol. The program aims to help the non-food "drop-in" biofuels reach a wholesale finished-fuel cost under $3 per gge by 2017 and $3/gge for algal biomass productivity by 2020.

DOE requested $253 million in FY2015 for Bioenergy (Biomass and Biorefinery) programs, a $21 million increase over the FY2014 appropriation. The largest requested subprogram increase would support a joint effort with the Departments of the Navy and Agriculture for commercial-scale biorefineries that produce military-specification fuels. The increase would be partially offset by a $16 million cut for feedstocks, due to greater reliance on feedstock activities at the U.S. Department of Agriculture. The House committee bill proposed a $52 million cut (23%) below FY2014. The draft Senate report recommended a $21 million (9%) increase over FY2014. The draft Senate report expressed "concern" that DOE is interpreting biomass too narrowly and is failing to consider "promising noncellulosic forms" of biomass projects. The final appropriation cut $7 million from the FY2014 level.

Also, the House committee report specified that no funding was to be provided for the joint "drop-in biofuels" initiative with the Navy and the Department of Agriculture to develop commercial biodiesel and jet biofuels production capacity for defense purposes.[32] In direct contrast, the draft Senate report expressed support for the drop-in biofuels collaboration and recommended the full requested amount of $60 million. The final agreement provided "up to" $45 million for this collaborative project.

Solar Energy

For the Solar Program, DOE requested $282 million, an increase of $25 million over the FY2014 appropriation. The funding would support the SunShot Initiative goal to achieve a cost of solar

[32] See report p. 96.

power of 6 cents/kwh to make solar power cost-competitive without subsidies by 2020. This includes solar photovoltaic R&D; activities that enable a 50% reduction in non-hardware "soft costs"; and development and demonstration of innovative solar energy manufacturing technologies to increase U.S. competitiveness, in support of DOE's Clean Energy Manufacturing Initiative. FY2015 funding would also support development of advanced thermal storage and supercritical carbon dioxide power cycles so that concentrated solar power could achieve baseload grid parity. The House committee bill proposed a $79 million (31%) cut below FY2014, while the draft Senate report recommended a cut of $9 million (4%). The final appropriation cut funding by $24 million below the FY2014 level.

Wind Energy

There are three key goals for the Wind Program. First, for land-based windfarms, there is a goal for the energy cost of utility-scale turbines to reach 5.7 cents/kilowatt-hour (kwh) by 2020 and 4.2 cents/kwh by 2030. Second, for offshore settings, the goal is to cut energy cost from 21 cents/kwh in 2010 to 17 cents/kwh (unsubsidized) by 2020. Third, there is an overall goal to increase installed windfarm capacity from 60 billion watts (gigawatts, gw) in 2012 to 125 gw by 2020 and 300 gw by 2030.

DOE requested a $27 million increase over the FY2014 appropriation, to $115 million. The main share of that increase—$22 million for Technology Validation and Market Transformation—was focused on support for three advanced offshore wind demonstration projects planned for operation by 2017. The remaining increase would support an Atmosphere to Electrons initiative, to optimize wind farms with improved performance and lower the cost of wind energy. FY2015 funding would also enable pursuit of new designs, materials, and manufacturing processes for longer blades to capture greater wind resource and to address transportation barriers, in support of DOE's Clean Energy Manufacturing Initiative and of achieving full market cost competition for wind energy. The House approved a $19 million (21%) cut below FY2014. The draft Senate report recommended an increase of $21 million (24%) over FY2014. Also, in House floor action, H.Amdt. 1042 (Weber) was adopted, which would have prohibited the use of funds for the Cape Wind Energy Project. The final appropriation increased funding by $19 million over the FY2014 level.

Geothermal Technologies

This program aims to lower the risk of resource exploration and cut power production costs to 6 cents/kwh for hydrothermal power by 2020 and for newly developed technologies by 2030. DOE requested $62 million, an increase of $16 million over the FY2014 appropriation. The funding would continue site characterization of the Frontier Observatory for Research in Geothermal Energy (FORGE). FORGE is a dedicated site that enables testing of novel technologies and techniques, with a central focus on optimization and validation of enhanced geothermal systems. FY2015 funding would also accelerate "play fairway" analyses that provide assessments of exploration risk and the probability of finding new resources on a regional scale, resulting in maps and studies that reduce the industry's drilling and development risks. The House committee bill proposed nearly the same amount as FY2014. The draft Senate report recommended $16 million (34%) more than in FY2014. The final appropriation increased funding by $9 million over the FY2014 level.

Water Power

Water power technologies employ marine and hydrokinetic (wave, tidal, current, and ocean thermal) resources—and conventional hydropower resources—to generate electricity. Hydropower technology is well established, but the fledgling industry for marine and hydrokinetic (MHK) power facilities is still looking to develop a clear technology theme. For the Water Power Program, DOE requested $63 million, an increase of $4 million over the FY2014 appropriation. The funding would support the launch of HydroNEXT, a new EERE initiative that focuses on conducting R&D that would allow for increased hydropower opportunities at non-powered dams, water conveyance systems, and new stream reach development. It would also support development of new low-cost modular hydropower systems that minimize civil works and environmental impacts. Further, FY2015 funding would support marine and hydrokinetic activities to develop and validate open-source design tools and support testing of wave and tidal energy systems, to enable industry to develop robust next generation systems. The House committee bill proposed a $20 million (34%) cut below FY2014.The draft Senate report recommended a $10 million (18%) increase over FY2014. The final appropriation increased funding by $2 million over the FY2014 level.

Vehicle Technologies

This program is driven by the 10-year EV-Everywhere Challenge (launched in 2012), which aims to achieve parity for plug-in electric vehicle (EV) affordability and convenience by 2022. The EV Challenge focuses on advanced battery technology, power electronics, and advanced charging technology. A key supporting technology goal is to cut 2008 battery production cost 70% by 2015 (and 88% by 2022). Further, the program seeks to achieve (1) a cut of 1.8 million barrels per day (16%) in the national oil use trend by 2020, (2) a fuel economy of 62 miles per gallon (mpg) for cars by 2025, and (3) a 50% increase in heavy duty truck fuel economy from baseline levels by 2015. Also, the program participates in the Grid Integration Initiative.

To help achieve those goals and support the EV Everywhere initiative, DOE requested $359 million, an increase of $69 million—the second-largest program increase for FY2015. There are four main parts to the $69 million increase. First, funding for batteries and electric drives would increase by $27 million, focused on reducing weight and costs, developing motors and magnets without rare earths, and improving wide bandgap semiconductors for power electronics. Second, funding for outreach and deployment would rise by $19 million to initiate Alternative Fuel Vehicle Community Partner projects. Third, funding for materials technology would increase by $16 million, emphasizing carbon fiber and other composites, lightweight materials compatible with manufacturing infrastructure, and high temperature materials for valves and turbochargers. Fourth, funding for fuels and lubricants would rise by $11 million, mainly to expand work on drop-in biofuel compatibility with components and infrastructure—to replace conventional gasoline, diesel, and jet fuel. The House committee bill proposed a $12 million (4%) cut below FY2014. The draft Senate report recommended nearly the same amount as FY2014. The report expressed committee support for grid integration activities. The final appropriation cut funding by $10 million below the FY2014 level.

Building Technologies

This program develops energy efficiency measures to curb building-related energy costs, with a goal of reducing energy use 50% by 2030. The program strategy is designed with three linked paths: Improve building components (envelope/windows, HVAC, lighting, and sensors/controls),

strengthen market pull (through cooperation with private industry), and raise energy efficiency levels for new equipment (via standards) and new buildings (via model codes).

DOE requested $212 million for FY2015, an increase of $34 million over the FY2014 appropriation. The funding emphasizes emerging technologies, to accelerate the development of lighting, heating and cooling, and other energy efficiency solutions for the nation's buildings that offer savings of 50% or more; and supports the equipment and appliance standards programs to establish minimum energy efficiency requirements pursuant to federal statutes. FY2015 funding also would help home builders achieve high efficiency levels, improve access for homeowners to home improvement services, and improve the information, tools, and resources available to the commercial sector, with a goal of achieving 20% energy savings by 2020.

Two major increases were proposed. First, funding for emerging technologies would increase by $23 million, focused on R&D on sensors, controls, and grid integration, and on new air conditioning technologies. Second, a $13 million increase would aim to accelerate equipment efficiency standards and building codes.

The House committee bill proposed a $13 million (7%) cut below FY2014. The draft Senate report recommended the same funding as in FY2014. The final appropriation was a cut of $6 million below the FY2014 level.

Some constraints on FY2015 funding for building technologies were adopted by the House during committee and floor action. Two amendments adopted in committee markup would affect DOE energy efficiency standards programs operated under the Buildings office.[33] One amendment directed DOE to work with stakeholders to allow for the continued manufacture and use of grid-enabled water heaters.[34] That technology would otherwise be non-compliant with DOE energy efficiency standards for residential water heaters that are scheduled to take effect in April 2015. The other amendment (new Section 315) would prohibit DOE from using funds from the bill to "finalize, implement, or enforce" a rulemaking that would establish energy efficiency standards for ceiling fans.[35] Further, in House floor action, H.Amdt. 1020 (Burgess) was adopted, which prohibits EERE spending to enforce lighting efficiency standards for BPAR and ER reflector lamps.[36] The provisions for grid-enabled water heaters and ceiling fans were not included in the final agreement, but the prohibition on DOE enforcement of efficiency standards for certain reflector lamps was enacted as Section 313 of Division D.

Advanced Manufacturing

Domestic manufacturers face increasing challenges in the global marketplace. The Advanced Manufacturing Office (AMO) was designed to focus on national interests—especially concerns about jobs, critical materials, and international competitiveness. The general goal for AMO programs is to reduce the energy use of manufactured goods across targeted product life-cycles

[33] The list of adopted House amendments is at http://appropriations.house.gov/uploadedfiles/hmkp-113-ap00-20140618-sd005.pdf.

[34] This provision appears on p. 101 of the report. A related provision appeared as a proposed amendment to the Shaheen-Portman bill, S. 2262. For more information, see CRS Report R43524, *S. 2262, Shaheen-Portman Bill 2014: Energy Savings and Industrial Competitiveness Act*, by (name redacted)

[35] More background on the DOE rulemaking process for ceiling fans is at http://www1.eere.energy.gov/buildings/appliance_standards/rulemaking.aspx/ruleid/65.

[36] BPAR is the acronym for bulged parabolic (shaped) aluminized reflector light bulb. ER is the acronym for the elliptical reflector type of light bulb. http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/58.

by 50% over 10 years. More specific objectives include (1) 50% energy savings through advanced materials and industrial processes, (2) helping leading companies cut energy intensity by 25% over 10 years, and (3) facilitating installation of 40 gigawatts (gw, million kilowatts) of combined heat and power equipment by 2020.[37]

To meet these goals and objectives, DOE requested $305 million, a net increase of $125 million over the FY2014 appropriation—the largest EERE program increase requested for FY2015. Most of the requested increase—about $109 million—would be directed to the subprogram on Advanced Manufacturing R&D Facilities. Also, a $9 million increase would be provided for Advanced Manufacturing R&D Projects, mainly for the Advanced Incubator.

The proposed $109 million increase for Advanced R&D Facilities includes up to $70 million to create at least one new Clean Energy Manufacturing Institute (CEMI) and provide support for two existing institutes. The new institute would address any one of several topics: nanomaterials for energy, next generation electric machines, bio-manufacturing, smart manufacturing, or other topics. The two existing institutes are the Next Generation Power Electronics Manufacturing Innovation Institute (MII, North Carolina) and the Advanced Composites MII (announced in March 2014).

The CEMIs form part of a larger proposed interagency network aimed at bringing together universities, industry, and the government to jointly invest in solving industry-relevant problems. This activity aims to improve U.S. manufacturing competitiveness, in support of DOE's Clean Energy Manufacturing Initiative and the President's initiative for a multi-agency National Network for Manufacturing Innovation (NNMI).[38] A key goal is for each institute to become financially sustainable within five to seven years after it is established.

CEMI is a relatively new EERE cross-cutting activity that would be anchored by AMO and would incorporate activities under many of EERE's other programs.[39] The main goal is to improve U.S. competitiveness in the manufacturing of clean energy products, such as solar photovoltaic modules, LEDs, batteries, and wind turbine blades. The CEMI institutes would provide small- and medium-sized enterprises affordable access to cutting-edge physical and virtual manufacturing capabilities (e.g., 3-D printing equipment) and facilitate technology use in the U.S. manufacturing sector to bolster its global competitiveness. DOE plans to invest $70 million-$120 million into each CEMI institute, to be used over a five- to seven-year period. For the four CEMI institutes, the House committee bill included $56 million and the draft Senate report recommended $98 million. In the event that DOE seeks funds in the future for additional CEMIs, the House report directed that the request include "a specific research topic" associated with each newly proposed CEMI. The draft Senate report specified that, for the third and each subsequent CEMI there shall be a competitive process, committee notification, development of performance measures, and demonstration of progress toward funding self-sufficiency with prior CEMIs. The final agreement adopted those House and Senate directives, and required an EERE report that provides performance measures to assess the effectiveness of existing CEMIs.

[37] DOE, EERE-Advanced Manufacturing Office, *FY14 Budget At-a-Glance*, http://www1.eere.energy.gov/office_eere/pdfs/budget/manufacturing_ataglance_2014.pdf.

[38] For the NNMI, there are currently four institutes in place and five additional institutes scheduled to be established in 2014, and there is a goal to establish a total of 45 institutes over 10 years.

[39] Going forward, DOE expects to establish CEMIs as an alternative to the concept of "manufacturing demonstration facilities" (MDFs), which it implemented in FY2012 with the establishment of the Critical Materials Hub (discussed in the next paragraph). DOE's Oak Ridge National Laboratory is the home for AMO's first MDF focused on additive manufacturing and low-cost carbon fiber. For more on MDFs, see http://www1.eere.energy.gov/manufacturing/rd/m/mdf.html.

Another R&D facility, the Critical Materials Hub (led by Ames National Laboratory), was created in FY2012 to focus on technologies that enable manufacturers to make better use of critical materials (e.g., rare earth elements) and to eliminate the need for materials that are vulnerable to supply disruptions. Many rare earth elements are essential to technologies of the clean energy industry.[40] Examples include wind turbines, solar photovoltaic panels, electric vehicles, and energy-efficient lighting. DOE requested $25 million—level funding—to extend the Hub's operation for a fourth year. Both the House committee bill and the draft Senate report would provide the full $25 million for the Critical Materials Hub. The final appropriation included $25 million for this Hub.

Also, DOE requested $10 million of further support for the Manufacturing Demonstration Facility (MDF) at Oak Ridge National Laboratory. Both the House committee bill and the draft Senate report would provide the full $10 million for the MDF.

Overall, the House committee bill proposed a $25 million (14%) increase over FY2014, while the draft Senate report recommended a $51 million (28%) increase over FY2014. The final appropriation provided a $19 million increase over the FY2014 level.

Federal Energy Management Program (FEMP)

FEMP provides expertise, training, and other services to help federal agencies achieve congressionally mandated energy efficiency and renewable energy goals. DOE requested $36 million, about $8 million more than the FY2014 appropriation. The increase would support expanded marketing and outreach and the development and implementation of tools to streamline energy savings performance contracts (ESPCs), expanding the General Services Administration's (GSA's) schedule for equipment replacements, and devising a new protocol for measurement and verification of ESPCs. The House committee bill proposed an $8 million (29%) cut below FY2014. The draft Senate report recommended a small increase over FY2014. The final appropriation cut funding by about $1 million below the FY2014 level.

Program Direction

This administrative program funds federal employees, contract support, and operational costs. DOE requested $185 million, about a $20 million increase over the FY2014 DOE-estimated level. (The House committee bill combined EERE with OE management—there is no separate FY2014 estimate for EERE.) The increase would cover an EERE reorganization that would consolidate information technology and establish an active project management (APM) system to oversee competitive grants and cooperative agreements. The House committee bill proposed a $12 million (7%) cut below FY2014. The draft Senate report recommended the full amount of the request, which would be a $2 million cut from FY2014. The final appropriation cut funding by $2 million below the FY2014 level.

Strategic Programs

The Office of Strategic Programs (formerly Program Support) is a crosscutting EERE office focused on accelerating development, commercialization, and adoption of energy efficiency and renewable energy technologies. Strategic EERE planning and partnerships support the transition of EERE technologies to market, communications and engagement with energy stakeholders, development of international markets for U.S. clean energy companies, and policy analysis for

[40] The Hub also supports materials needs for defense and other strategic industries.

decision making and management of the EERE portfolio. For this program, DOE requested a decrease of about $2 million relative to the FY2014 appropriation. The House committee bill proposed a $12 million (49%) cut from FY2014. The draft Senate report recommended slightly more than the full request. The final appropriation adopted a cut of nearly $3 million relative to the FY2014 level.

Weatherization Grant Program

This program addresses regulatory, financial, and planning barriers faced by state and local governments. The goal is to foster technologies, practices, and policies that support state and local governments in providing home energy services to low-income families that help them reduce energy costs and save money. DOE has noted that many states have expended leftover Recovery Act funds and now need new funds to avoid cutting core programs and services.[41] DOE requested a $54 million increase over the FY2014 appropriation, solely to increase the number of households served in the FY2015 cycle. The House committee bill proposed a $29 million cut (17%) below FY2014. The draft Senate report recommended the full amount of the request. The final appropriation provided $19 million more than the FY2014 level.

State Energy Grant Program

This program supports both administrative and program activities at many state energy offices. DOE requested an increase of $13 million over the FY2014 appropriation. The proposed increase would help support a new, $10 million program of Clean Energy and Economic Development Partnerships to assist regional shale gas growth zones in creating "sustainable" economic development roadmaps. Rapid local growth associated with shale gas development challenges infrastructure and services. Thus, the proposed program would focus on economic diversification and the long term, to reduce the potential for a boom-bust cycle. Also, $4 million in state grant funding would be used to establish a new Local Technical Assistance Program, which would support scale-up and adoption of energy efficiency and clean energy technologies. The House committee bill proposed the same amount as FY2014, as did the draft Senate report. The final appropriation kept funding at the FY2014 level.

Electricity Delivery and Energy Reliability (OE) Program[42]

This office supports electric grid modernization and resiliency through R&D, demonstration, 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 requested an increase of $33 million over the FY2014 appropriation, which includes a $15 million increase for the Infrastructure Security subprogram and a $10 million increase for the Smart Grid R&D subprogram. The House approved a $13 million increase over FY2014, while the draft Senate report recommended a $27 million increase. The final appropriation provided flat funding at the FY2014 level. The Explanatory Statement for the final agreement did not provide detailed figures for the following OE subprograms.

[41] For more details about the program see CRS Report R42147, *DOE Weatherization Program: A Review of Funding, Performance, and Cost-Effectiveness Studies*, by (name redacted)

[42] This section was prepared by (name redacted).

For R&D programs, the House provided a $4 million increase over the FY2014 level of nearly $106 million, while the draft Senate report recommended a $12 million increase over FY2014.

The Smart Grid R&D subprogram aims to modernize the electricity distribution system, which includes improved reliability, operational efficiency, resiliency, and disaster recovery. The requested increase would expand R&D on microgrids—localized power grids that can disconnect from the traditional grid to operate autonomously. Microgrids can help mitigate grid disturbances and strengthen grid resilience. The increase would also support an evolution towards higher performance smart grids, or "Smart Grid 2.0." The House provided level funding at nearly $15 million, while the draft Senate report recommended an increase of nearly $10 million over FY2014.

For the Cybersecurity R&D subprogram, the House approved a nearly $4 million increase over the FY2014 level of about $43 million, while the draft Senate report recommended a cut of nearly $2 million below FY2014.

The Infrastructure Security and Energy Restoration subprogram helps secure U.S. energy infrastructure against all types of hazards, respond to and reduce the impact of disruptive events, and assist in quickly restoring energy when events occur. The requested increase would support the development of advanced mitigation solutions for hardening infrastructure against all hazards, including geomagnetic disturbances, physical threats, and devastating weather events. The House approved $16 million, an $8 million increase over FY2014. The draft Senate report recommended $23 million, a $15 million increase over FY2014.

The House committee report called for up to $1 million to be used for a study on the future resilience and reliability of the nation's power grid. The committee also directed DOE to prepare a report on the "physical and cyber security of the electricity grid." The draft Senate report stressed the importance of integrating distributed and intermittent renewable energy power generation into existing power grid infrastructure. Also, the draft Senate report encouraged DOE to expand partnerships for the development of microgrids in diverse regions.

Nuclear Energy[43]

The consolidated appropriations act provided $913.5 million for nuclear energy programs, offset by $80.0 million in rescissions for a net appropriation of $833.5 million. Including the rescissions, net funding for nuclear energy is $29.9 million below the Obama Administration's FY2015 funding request of $863.4 million, and $55.7 million below the FY2014 level. Not including the rescission, the total spending level is higher than the request and the FY2014 amount. DOE's FY2015 nuclear R&D budget justification described the following major goals for the program:

- 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.

DOE's Office of Nuclear Energy is to lead a major initiative announced in the FY2015 budget request to commercialize the Brayton cycle for commercial power plants. Called Supercritical

[43] This section was prepared by (name redacted).

Transformational Electric Power Generation (STEP), the initiative is to be a joint effort by DOE's nuclear energy, fossil energy, and renewable energy programs. The Brayton cycle uses supercritical gas to drive electric generators rather than the steam cycle that dominates the industry today. DOE's budget justification predicted that Brayton-cycle power plants could reach efficiencies of up to 50%, compared with 33% for steam-cycle plants. The STEP program is to reach a 50-50 cost sharing agreement with the private sector in FY2015 to develop a 10 megawatt (electric) Brayton cycle pilot plant. The funding request for the STEP initiative, provided within the nuclear energy budget, totaled $27.5 million for FY2015.

The House Appropriations committee had recommended $899.0 million for nuclear energy, $35.6 million above the Administration request. However, an amendment on the House floor (H.Amdt. 979) reduced the nuclear total by $73.3 million to provide more funding for the Corps of Engineers. The amendment did not specify how the reduction would be allocated among Nuclear Energy programs.

The Senate subcommittee draft report recommended $777.0 million for nuclear energy programs, $86.4 million below the request. The draft rejected the Administration's $97 million request for small modular reactor licensing support and cut the $100.5 million request for reactor concepts R&D by 45%.

The House Appropriations committee report agreed with the Administration's $27.5 million request for the STEP initiative and authorized DOE to "modify" the 50% cost-sharing goal for qualifying pilot plants. The draft Senate report also recommended the full STEP request but cautioned that the program should "be limited in scope, schedule, and cost." The consolidated appropriations act included $5.0 million for STEP under Nuclear R&D, focusing on preparing a solicitation for a cost-shared demonstration program with the private sector. An additional $10.0 million for STEP was included under Coal R&D.

Reactor Concepts

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. The consolidated appropriations act provided $133.0 million for Reactor Concepts, $32.5 million above the request and $20.0 million above the FY2014 level.

Much of this program had previously focused on the Next Generation Nuclear Plant (NGNP), a high-temperature gas-cooled reactor demonstration project authorized by the Energy Policy Act of 2005. The reactor was intended to produce high-temperature heat that could be used to generate electricity, help separate hydrogen from water, or be used in other industrial processes. Under EPACT05, the Secretary of Energy was to decide by the end of FY2011 whether to proceed toward construction of a demonstration plant. Then-Secretary of Energy Steven Chu informed Congress on October 17, 2011, that DOE would not proceed with a demonstration plant design "at this time" but would continue research on the technology. Potential obstacles facing NGNP include low prices for natural gas, the major competing fuel, and private-sector unwillingness to pay half the project's costs.[44] Congress accepted the Administration's proposal for FY2014 to shift remaining NGNP research activities to the Advanced Reactor Concepts subprogram.

[44] Section 988(c) of the Energy Policy Act of 2005 (P.L. 109-58) requires a 50% industry cost share for DOE demonstration and commercial application activities, although the Energy Secretary may reduce that share "as necessary and appropriate, taking into consideration any technological risk relating to the activity."

DOE proposed to combine the Small Modular Reactor (SMR) R&D and Advanced Reactor Concepts subprograms into the Advanced Reactor Technologies subprogram in FY2015. The funding request for the combined subprogram was $70.2 million, a reduction of $12.6 million from the combined subprograms in FY2014. Reactor concepts being developed by the Advanced Reactor Technology subprogram are generally classified as "Generation IV" reactors, as opposed to the existing fleet of commercial light water reactors, which are generally classified as generations II and III. Nuclear technology development under this program focuses on "fast reactors," using high-energy neutrons, fluoride salt-cooled high-temperature reactors, and high temperature gas-cooled reactors. International research collaboration in this area would continue under the Generation IV International Forum (GIF).

The House Appropriations committee recommended $138.0 million for Reactor Concepts, $37.5 million more than the request and $25.0 million above FY2014. The committee agreed with the proposal to consolidate Advanced SMR research with Advanced Reactor Concepts. The House panel voted to boost funding for the Advanced Reactor Concepts subprogram to $101.0 million, adding funding for high temperature gas reactor research. As noted above, the House approved an amendment to reduce the committee's recommended total nuclear funding level without specifying cuts in individual nuclear programs.

DOE's FY2015 request for the Light Water Reactor Sustainability subprogram was $30.3 million, $350,000 above the FY2014 appropriation. The House panel recommended $35.0 million. The program conducts research on extending the life of existing commercial light water reactors beyond 60 years, the maximum operating period currently licensed by the Nuclear Regulatory Commission (NRC). The program, which is cost-shared with the nuclear industry, studies the aging of reactor materials and analyzes safety margins of aging plants. This subprogram is also conducting research to understand the Fukushima disaster and to develop prevention and mitigation measures, according to the DOE justification.

The draft Senate bill and report would have cut reactor concepts to $55.0 million, consisting of $49.2 million for the combined Advanced Reactor Technologies subprogram and $5.8 million for Light Water Reactor Sustainability. The draft report directed DOE to focus the Light Water Reactor Sustainability subprogram on "understanding of accident scenarios, such as those exhibited in the Fukushima Daiichi nuclear disaster."

The consolidated appropriations act specified that $33.0 million of Reactor Concepts funding be used for graphite fuel research previously conducted under the NGNP program. The consolidated measure agreed to combine SMR research into Reactor Concepts.

Small Modular Reactor Licensing Support

Rising cost estimates for large conventional nuclear reactors—widely projected to be $6 billion or more—have contributed to growing interest in proposals for small modular reactors (SMRs). Ranging from about 40 to 300 megawatts of electrical capacity, such reactors would be only a fraction of the size of current commercial reactors, which typically exceed 1,000 megawatts. Several modular reactors would be installed together to make up a power block with a single control room, under most concepts. Current SMR proposals would use a variety of technologies, including high-temperature gas technology and the light water (LWR) technology used by today's commercial reactors.

The consolidated appropriations act provided $54.5 million for technical support for licensing small modular reactors, $42.5 million below the request and $55.5 million below the FY2014 level. Under the program, DOE is to pay up to half the costs associated with NRC design certification and licensing of selected SMRs, as well as for economic studies and other analyses

that would support SMR deployment in general. The program has focused on LWR designs because they are believed most likely to be deployed in the near term, according to DOE. The FY2015 budget justification says the SMR licensing and technical support program will continue through FY2017 and cost DOE a total of $452 million. The program is similar to DOE's support for larger commercial reactor designs under the Nuclear Power 2010 Program, which ended in FY2010.

A consortium led by Babcock & Wilcox (B&W) was announced by DOE in November 2012 as the first award recipient under the program. DOE and the B&W consortium signed a cooperative agreement in April 2013 to implement the award, allowing for federal payments of around $226 million over five years to design and license a commercial demonstration of B&W's 180 megawatt mPower SMR. The mPower demonstration plant would potentially be constructed at the Tennessee Valley Authority's Clinch River site near Oak Ridge, TN, by 2022, according to the DOE justification. However, B&W announced April 14, 2014, that it would reduce its spending on the project to $15 million per year and delay the mPower's design certification application to NRC indefinitely, citing a lack of investors and customer contracts for the design.[45] Because of the project's slowdown, DOE reportedly stopped paying matching funds to B&W after the first quarter of 2014.[46]

DOE selected a second SMR to receive assistance under the program in December 2013. The NuScale Power SMR has a generating capacity of only 45 megawatts. Under the company's current concept, up to 12 reactors would be housed in a single pool of water, which would provide emergency cooling. The NuScale SMR is intended to be ready for commercial operation by around 2025, according to DOE.[47] The DOE budget justification contends that reduced funding for the SMR program will be sufficient for both the B&W and NuScale projects in FY2015.

Because of the uncertainty about the B&W SMR project, the House Appropriations Committee cut the SMR program to $54.5 million, with all of the remaining funding directed to the NuScale project. However, the committee said that it "will consider additional funding according to developments." The Senate draft report recommended no new funding for SMR licensing support, citing the availability of $85.0 million in prior-year funds that could be reprogrammed for the NuScale project. The consolidated appropriations measure adopted the House position.

Small modular reactors would go against the overall trend in nuclear power technology toward ever-larger reactors intended to spread construction costs over a greater output of electricity. Proponents of small reactors contend that they would be economically viable despite their far lower electrical output because modules could be assembled in factories and shipped to plant sites, with minimal on-site fabrication, and because their smaller size would allow for simpler and more effective safety systems. In addition, although modular plants might have similar or higher costs per kilowatt-hour than conventional large reactors, their ability to be constructed in smaller increments could reduce electric utilities' financial commitment and risk.

[45] Babcock & Wilcox Company, "B&W Announces Restructuring of Small Modular Reactor Program," news release, April 14, 2014, http://www.babcock.com/news-room/Pages/BW-Announces-Restructuring-of-Small-Modular-Reactor-Program.aspx.

[46] McAuliffe, Michael, "B&W Says DOE Stops Matching Funds after SMR Program Slowdown," *Nucleonics Week,* August 14, 2014, p. 3.

[47] DOE Office of Nuclear Energy, "Small Modular Nuclear Reactors," http://www.energy.gov/ne/nuclear-reactor-technologies/small-modular-nuclear-reactors.

Fuel Cycle Research and Development

The Fuel Cycle Research and Development Program conducts "long-term, science-based" research on a wide variety of technologies for improving the management of spent nuclear fuel, according to the DOE budget justification. In general, the program is investigating ways to separate radioactive constituents of spent fuel for re-use or to be bonded into stable waste forms. The FY2015 consolidated appropriations act provided $197.0 million for this program, a slight increase from the $189.1 million request and $186.5 million appropriated for FY2014.

The Administration requested a nearly one-third increase for the Used Nuclear Fuel R&D subprogram, from $60.0 million in FY2014 to $79.0 million in FY2015. This subprogram focuses on establishing a new spent fuel management system, consistent with the Administration's moves to terminate the previously authorized waste repository program at Yucca Mountain, NV. DOE released its Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste in January 2013 that calls for a "consent-based siting process" for nuclear storage and disposal facilities. The Used Fuel subprogram would also conduct waste transportation analyses and research on potential waste repositories, including salt caverns and deep boreholes, according to the DOE justification. DOE also proposed that Congress provide mandatory appropriations for the spent fuel management program beginning in FY2018 to supplement discretionary appropriations. (See the "Nuclear Waste Disposal" section for more details.)

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 technology to increase nuclear fuel resources, such as uranium extraction from seawater.

The House Appropriations Committee recommended $182.0 million for Fuel Cycle R&D, $7.1 million below the request and $4.5 million below FY2014. The committee provided $60.1 million for accident-tolerant fuels research, $55.0 million for Used Nuclear Fuel Disposition, and $55.0 million for used-fuel disposition R&D, such as long-term dry cask storage.

The Senate draft report recommended $230.0 million for Fuel Cycle R&D, including $119.0 million for Used Nuclear Fuel Disposition. Within Used Fuel Disposition, $89.0 million was to be provided for developing a consolidated spent fuel storage facility through a consent-based siting process. Such a storage facility could hold spent fuel from nuclear power plants until a permanent underground repository could be developed. The draft report also recommended $60.1 million for accident-tolerant fuels.

Of the funding provided by the consolidated appropriations act, $60.1 million was specified for accident-tolerant fuels, $49.0 million for used nuclear fuel disposition R&D, and $22.5 million to develop the Administration's proposed waste management system, including $3.0 million to "design, procure, and test" rail casks. No funding was provided for a consolidated spent fuel storage facility, as authorized by the Senate draft bill.

Fossil Energy Research and Development[48]

For FY2015, the Obama Administration requested $475.5 million for the Fossil Energy Research and Development program (FE R&D) with the provision that it remain available until expended

[48] This section was prepared by (name redacted).

and that $114.2 million remain available until September 30, 2016, for program direction. The request represented a 15% decrease from the FY2014 appropriation of $562.1 million.

Congress provided $571.0 million for FY2015 in P.L. 113-235 for FE R&D, $95.5 million above the President's request (+20%), and $8.9 million above the FY2014 amount (+1.6%). Some activities received increases in funding, and some received decreases, compared to the FY2014 enacted amounts (see **Table 10**). The main activities are listed below, showing the change of the enacted amount for FY2015 compared with the FY2014 appropriation.

- A Carbon Capture sub-program focuses on separating CO_2 in both pre-combustion and post-combustion systems (-$4 million).
- The Carbon Storage sub-program focuses on long-term geologic storage of CO_2, including small- and large-scale CO_2 injection tests. The Regional Sequestration Partnerships would be renamed Storage Infrastructure. No funding was requested for beneficial use/reuse of CO_2 (-$8.9 million).
- An Advanced Energy Systems sub-program focuses on improving availability and efficiency of fossil energy systems integrated with CO_2 capture. The Advanced Energy Systems sub-program focuses on gasification, oxy-combustion, advanced turbines, and other energy systems (+$3.5 million).
- The Cross-Cutting Research activity serves as a bridge between basic and applied research by fostering development and deployment of innovative systems (+$7.1 million).
- National Energy Technology Laboratory (NETL) Coal R&D supports in-house research activities. Congress noted that it would provide $15 million above the President's request to continue support for extracting rare-earth elements from coal and coal byproduct streams (no change from FY2014).
- Supercritical Transformational Electric Power (STEP) Generation Program, a new program in FY2015 not included in the President's request under NE R&D (+$10.0 million).

Other FE R&D activities in the budget proposal outside of the coal program include:

- Natural Gas Technologies with a focus on ongoing methane hydrates research and on collaborative research regarding hydraulic fracturing (+$4.3 million).
- Unconventional Fossil Energy Technologies from Petroleum activities (-$10.4 million).
- Program Direction provides funding for DOE headquarters, field offices, and contractor support (-$1.0 million).

The new program funded by Congress under coal, the Supercritical Transformational Electric Power (STEP) Generation Program, would be a joint initiative with the Office of Nuclear Energy and the Solar Energy Program within the Office of Energy Efficiency and Renewable Energy. The STEP program is intended to promote the development of large-scale supercritical carbon dioxide power conversion; instead of water and steam, CO_2 would be used to transform heat energy in turbine systems. (For more on STEP, see "Nuclear Energy.")

Under Natural Gas Technologies (total $25.1 million for FY2015), Congress provided $15 million for methane hydrates research, and $10.1 million for collaborative research and development regarding hydraulic fracturing. Congress further specified that funding for hydraulic fracturing is for research that aims to improve both the economics and recoverability of reserves

and to address the health, safety, and environmental risks of shale gas extraction. The Administration did not request any funding for this activity in FY2015.

With its $571.0 million appropriation, Congress directed DOE to submit a comprehensive program plan and research and development roadmap no more than 180 days after enactment of P.L. 113-235.

Table 10 shows proposed funding and changes compared with FY2014 and FY2013 for FE R&D activities.

Table 10. Fossil Energy Research and Development

($ millions)

	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	Conf.FY2015 Approp.
Coal						
Natural Gas CCS	0.0	0.0	25.0	0.0	25.0	0.0
Carbon Capture	63.7	92.0	77.0	90.0	77.0	88.0
Carbon Storage	106.7	108.9	80.1	100.0	80.1	100.0
Advanced Energy Systems	92.4	99.5	51.0	107.0	46.0	103.0
Cross Cutting Research	45.6	41.9	35.3	50.0	30.3	49.0
NETL Coal R&D	33.3	50.0	34.0	50.0	34.0	50.0
STEP (Supercritical CO_2)				15.0		10.0
Coal Subtotal	**341.9**	**392.3**	**302.4**	**412.0**	**292.4**	**400.0**
Natural Gas Technologies	13.9	20.6	35.0	22.6	40.0	25.1
Unconventional Fossil Energy	4.6	15.0	0.0	13.0	5.0	4.6
Program Direction	114.2	120.0	114.2	120.0	114.2	119.0
Plant and Capital Equipment	16.0	16.0	15.3	16.8	15.3	15.7
FE Environmental Restoration	7.5	5.9	7.9	7.9	7.9	5.9
Special Recruitment Program	0.7	0.7	0.7	0.7	0.7	0.7
Subtotal	**498.7**	**570.5**	**475.5**	**593.0**	**475.5**	**571.0**
Use of Prior Year Balance	**0.0**	**-8.5**	**0.0**	**0.0**	**0.0**	**0.0**
Total	**498.7**	**562.1**	**475.5**	**593.0**	**475.5**	**571.0**

Source: H.R. 83 Explanatory Statement.

Notes: Coal was formerly Carbon Capture and Sequestration Demonstration. Totals may not sum exactly due to rounding.

Strategic Petroleum Reserve[49]

The Strategic Petroleum Reserve (SPR), authorized by the Energy Policy and Conservation Act (P.L. 94-163) in 1975, consists of caverns formed out of 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 maximum capacity reached 727 million barrels.[50] 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.

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 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 to evaluate the ability to sell, draw down, and distribute crude oil given the significant changes in domestic crude oil production, increased imports of Canadian crude oil, and changes to crude oil distribution infrastructure upon which the SPR relies. The SPR Test Sale delivered 4,998,146 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). The SPR Petroleum Account current balance is $250.8 million.

The FY2015 House Appropriations Committee report noted that DOE in May 2014 had announced the establishment of the first regional gasoline reserve, to be stored at various locations in the Northeast, with receipts from the SPR test sale. The committee found that the gasoline reserve "may have merit and deserves further consideration" but criticized "the timing of these announcements, the use of receipts from the test sale rather than appropriated funds, and the lack of prior consultation with the Congress."

The Bipartisan Budget Act of 2013 (P.L. 113-67) rescinded all available funds in the SPR Petroleum Account and permanently repealed the federal government's authority to accept oil through royalty-in-kind.

The Consolidated Appropriations Act of 2014 (P.L. 113-76) prohibited the waiver of the navigation and vessel-inspection requirements under the Jones Act (46 U.S.C. 501(b)) for transporting crude oil distributed from the SPR until the Secretary of Homeland Security takes adequate measures to ensure the use of U.S. flag vessels.

For FY2015, the Administration requested $205.0 million to operate the SPR, an 8.3% increase over the FY2014 appropriation of $189.4 million. The funding increase above FY2014 is primarily for a major maintenance program to address aging infrastructure and the deferred maintenance backlog. The House and the Senate subcommittee approved the $205.0 million request to operate the SPR. However, the final appropriations measure cut the funding to $200.0 million.

[49] This section was prepared by (name redacted).

[50] For details on the SPR see CRS Report R41687, *The Strategic Petroleum Reserve and Refined Product Reserves: Authorization and Drawdown Policy*, by (name redacted) and (name redacted)

Science[51]

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. Through (primarily) these programs, DOE was the third-largest federal funder of basic research and the largest federal funder of research in the physical sciences in FY2014.[52] **Table 11** includes FY2013 and FY2014 current plan funding; as well as the budget request, House and Senate recommendations, and final action for FY2015.[53]

Table 11. Science

($ millions)

Program	FY2013 Current[a]	FY2014 Current[b]	FY2015 Request	FY2015 House	FY2015 S. Sub.	FY2015 Approp.
Advanced Scientific Computing Research (ASCR)	405.0	463.5	541.0	541.0	557.0	541.0
Basic Energy Sciences (BES)	1,551.3	1,662.7	1,806.5	1,702.0	1,806.5	1,733.2
Biological and Environmental Research (BER)	560.7	593.6	628.0	540.0	627.5	592.0
Fusion Energy Sciences (FES)	377.8	495.9	416.0	540.0	341.0	467.5
High Energy Physics (HEP)	727.5	774.9	744.0	775.0	774.5	766.0
Nuclear Physics (NP)	507.2	554.8	593.6	600.0	601.6	595.5
Workforce Development for Teachers and Scientists (WDTS)	17.5	26.5	19.5	n/s	29.5	19.5
Science Laboratories Infrastructure (SLI)	105.7	97.8	79.2	n/s	66.7	79.6
Safeguards and Security (S&S)	77.5	87.0	94.0	n/s	94.0	93.0
Program Direction (PD)	174.9	185.0	189.4	180.0	187.7	183.7
SBIR/STTR (Office of Science)[c]	116.1	128.5	n/a	n/a	n/a	n/a
Subtotal	**4,261.1**	**5,070.2**	**5,111.2**	**5,071.0**	**5,086.0**	**5,071.0**

[51] This section was prepared by Heather Gonzalez.

[52] Based on preliminary FY2014 data from Tables 7 and 22 of National Science Foundation, National Center for Science and Engineering Statistics, *Federal Funds for Research and Development: Fiscal Years 2012-14*, NSF 14-316 (September 2014).

[53] The Senate Committee on Appropriations published a draft subcommittee bill and an accompanying subcommittee report (also draft), on its website on July 24, 2014. Copies available upon request.

Program	FY2013 Current[a]	FY2014 Current[b]	FY2015 Request	FY2015 House	FY2015 S. Sub.	FY2015 Approp.
SBIR/STTR (DOE-wide transfer)[c]	60.1	64.7	n/a	n/a	n/a	n/a
Total	**4,681.2**	**5,131.0**[d]	**5,111.2**	**5,065.7**[e]	**5,079.0**[f]	**5,067.7**[g]

Source: Data in the "FY2013 Current," "FY2014 Current," and "FY2015 Request" columns are from the December 3, 2014, Office of Science, "FY2013-FY2015 Appropriation Summary," available at http://science.energy.gov/~/media/budget/pdf/sc-congressional-appropriations/fy-2015/FY_2013-2015_SC_Funding_Summary.pdf. Data in the column titled "House" are from H.Rept. 113-486 and H.R. 4923 (Energy and Water Development and Related Agencies Appropriations Act, 2015) as passed by the House. Data in the column titled "Senate Subc." are from the draft subcommittee report and bill as published on the Senate Committee on Appropriations website on July 24, 2014. Data in the column titled "FY2015 Approp." are from P.L. 113-235 (Consolidated and Further Continuing Appropriations Act, 2015) and pp. H9710-H9711 of the Explanatory Statement printed in the December 11, 2014, *Congressional Record*.

a. Funding levels in this column reflect the enacted appropriation, plus the reallocation of funding within the Office of Science for a congressionally approved reprogramming request, the reallocation of SBIR/STTR funding within the Office of Science to the SBIR/STTR (Office of Science) line, and the transfer of SBIR/STTR funding from other DOE programs into the SBIR/STTR (DOE-wide transfer) line.

b. Funding levels in this column reflect the enacted appropriation, plus the reallocation of funding within the Office of Science for a congressionally approved reprogramming request, the reallocation of SBIR/STTR funding within the Office of Science to the SBIR/STTR (Office of Science) line, and the transfer of SBIR/STTR funding from other DOE programs into the SBIR/STTR (DOE-wide transfer) line. Also includes use of prior-year funds in the amount of $3.8 million transferred to SBIR.

c. For more information about the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, see CRS Report R43695, *Small Business Innovation Research and Small Business Technology Transfer Programs*, by (name redacted) Details for FY2014 and FY2015 are not yet available.

d. Includes a $3.8 million reduction for use of prior-year balances.

e. Includes a $5.3 million rescission of prior-year balances.

f. Includes a $7.0 million rescission of prior-year balances.

g. P.L. 113-235, Division D, Title V, Section 309 rescinds $3.3 million in unobligated balances from prior years from the Science account.

P.L. 113-235 provides $5.068 billion to the Office of Science in FY2015.[54] This amount is roughly equivalent to the FY2014 current level of $5.066 billion.[55] The Obama Administration requested $5.111 billion for the Office of Science in FY2015, the House recommended $5.066 billion,[56] and the draft Senate bill would have provided $5.079 billion.[57] Overall, the Explanatory Statement, which accompanied P.L. 113-235, adopts the recommendations in the House report (H.Rept. 113-486) unless otherwise specifically noted in the statement.[58]

[54] This funding level includes $5.071 billion in enacted FY2015 funding for Science plus a $3 million rescission of unobligated balances from prior years as per P.L. 113-235, Division D, Title V, Sec. 309.

[55] This funding level includes $5.070 billion in current FY2014 funding for Science plus a $4 million reduction for use of prior year balances.

[56] This funding level includes $5.071 billion in proposed FY2015 funding for Science plus a $5 million rescission of unobligated balances from prior years as per H.R. 4923, Sec. 309.

[57] This funding level includes $5.086 billion in proposed FY2015 funding for Science plus a $7 million rescission of unobligated balances from prior years as per the draft Senate bill, Sec. 313.

[58] See "Explanatory Statement Submitted by Mr. Rogers of Kentucky, Chairman of the House Committee on Appropriations Regarding the House Amendment to the Senate Amendment on H.R. 83," *Congressional Record*, daily edition, vol. 160, no. 151—Book II (December 11, 2014), beginning on p. H9307; referred to herein as the "Explanatory Statement."

By program, the largest increase in the FY2015 appropriations law goes to ASCR, which receives $78 million (17%) more than its FY2014 current funding level. The largest decrease is to FES, which receives $28 million (-6%) less than it did in FY2014. Compared with the FY2014 funding level, the largest recommended increase in the House report would have accrued to ASCR ($78 million, or 17%), while the only decrease would have accrued to BER ($54 million, or -9%). The draft Senate report also recommended a substantial increase for ASCR ($94 million, or 20%); its only decrease would have accrued to FES ($155 million, -31%). Most of the proposed FES reduction would have come from termination of U.S. involvement in the ITER project. (See "Fusion Energy Sciences (FES)" for more information about this draft recommendation.)

Advanced Scientific Computing Research (ASCR)

ASCR receives a total of $541 million in FY2015. This amount is $78 million (17%) over the FY2014 funding level and is equal to both the Administration's request and the House report recommendation. The draft Senate report would have provided $557 million to ASCR in FY2015.

Most of the Administration's requested increase was for exascale computing activities. According to the ASCR budget request, "Capable exascale computing, with a hundred to thousand fold improvement in true application performance over today's systems, is the next frontier of development in High Performance Computing (HPC), extending capability significantly beyond today's petascale computers to address the next generation of scientific, engineering, and large-data problems."[59] Given its perceived importance to national security and economic competitiveness, exascale computing is a DOE priority. DOE leadership asserts that the department is on a path to have a capable machine by the early 2020s.[60]

The House and draft Senate reports both recommended the requested level for ASCR-funded Exascale Computing ($91 million) in FY2015. In addition, the House and draft Senate reports both recommended the requested levels for the Argonne Leadership Computing Facility (ALCF, $80 million) and Oak Ridge Leadership Computing Facility (ORLCF, $104 million). The two committee recommendations diverged from each other on the question of funding for the National Energy Research Scientific Computing Center (NERSCC) at Lawrence Berkeley National Laboratory. The House report recommended the requested level of $69 million, while the draft Senate report recommended $85 million. The final agreement, as described in the Explanatory Statement, provided $91 million for ASCR-funded Exascale Computing, $104 million for ORLCF, $80 million for ALCF, and $76 million for NERSCC. The Explanatory Statement also provided $3 million for the Computational Sciences Graduate Fellowship program.[61]

Basic Energy Sciences (BES)

FY2015 funding for BES is $1.733 billion. This amount is $70 million (4%) more than the FY2014 funding level of $1.663 billion. The FY2015 request for BES, the largest Office of

[59] FY2015 DOE budget request, volume 4 (Science), p. 17.

[60] Testimony of Office of Science Acting Director Patricia Dehmer, in U.S. Congress, House Committee on Appropriations, Subcommittee on Energy and Water Development, *Budget Hearing—Department of Energy, Science*, hearings, 113th Cong., 2nd sess., March 25, 2014, at http://appropriations.house.gov/calendararchive/eventsingle.aspx?EventID=373120.

[61] Also included in the Explanatory Statement are DOE-wide provisions limiting funding for educational activities to those expressly included in the budget justification or appropriations documents. See Explanatory Statement, p. H9698.

Science program, was $1.807 billion. The House report recommended $1.702 billion; the draft Senate report recommended the request.

Most of the requested BES increase was for scientific user facilities ($34 million) or construction ($37 million). For facilities, DOE plans to cease National Synchrotron Light Source (NSLS) operations—and transition the NSLS-II from a construction project to operations—in FY2015. Construction increases would provide $63 million for research and development activities, long-lead procurements, and prototyping for the Linac Coherent Light Source-II (LCLS-II). The Administration also requested $24 million for the (new) Computational Materials Science activity in FY2015.

The House report recommended $128 million for BES construction in FY2015, which is below the $139 million request for the LCLS-II. (The LCLS-II is the only project with a request for BES construction funding in FY2015.) The House report further recommended $105 million for NSLS-II operations, $100 million for Energy Frontier Research Centers (EFRCs), $10 million for the Experimental Program to Stimulate Competitive Research (EPSCoR), and $8 million for Computational Materials Sciences; as well as $24 million for the Batteries and Energy Storage Innovation Hub and no funding for the Fuels from Sunlight Innovation Hub.[62]

The draft Senate report also recommended $100 million for EFRCs and $24 million for the Batteries and Energy Storage Innovation Hub. However, the draft Senate report differed from the House report in its recommendations for EPSCoR ($15 million); Computational Materials Sciences ($18 million); and the Fuels from Sunlight Innovation Hub, which the draft Senate report would have funded at $24 million (if the Office of Science completes an internal and peer review of the Hub). The draft Senate report also recommended the requested level ($139 million) for LCLS-II construction.

As described in the Explanatory Statement, the final agreement includes $100 million for EFRCs, $24 million for the Batteries and Energy Storage Innovation Hub, $10 million for EPSCoR, $8 million for Computational Materials Sciences, $15 million for the Fuels from Sunlight Innovation Hub; and $139 million for LCLS-II construction.

Biological and Environmental Research (BER)

The Explanatory Statement provides $592 million for BER in FY2015, close to the FY2014 funding level. The Administration requested $628 million, which the draft Senate report would have provided. The House report recommended $540 million.

Within BER, the Administration sought to reduce funding for Biological Systems Science by $12 million. Of this amount, $10 million would have come from a 66% decrease in funding for Radiological Sciences. The request indicated that the reduction in funding for Radiological Sciences represented a shift in focus from nuclear medicine research to bioenergy and environmental research within the Biological Systems Science portfolio.[63] The Administration's request for the other major BER activity, Climate and Environmental Sciences, would have increased funding by $30 million in FY2015. Most of this increase would have provided for a

[62] According to the House report, the Fuels from Sunlight Innovation Hub received its final year of funding within a five-year term in FY2014. (H.Rept. 113-486, p. 119.)

[63] U.S. Department of Energy, *FY2015 Congressional Budget Request, Science and Advanced Research Projects Agency-Energy*, vol. 4, March 2014, p. 103.

new activity, Climate Model Development and Validation ($29 million), which sought to improve existing models' representation of extreme events, as well as their quantification of uncertainty.[64]

The House report would have provided $75 million for the three Bioenergy Research Centers (same as the request) and recommended no funding for the proposed Climate Model Development and Validation activity. The draft Senate report recommended $29 million (just under the requested level) for the Climate Model Development and Validation activity, as well as $46 million for the operation of the Environmental Molecular Science Laboratory at Pacific Northwest National Laboratory.

The Explanatory Statement provides $75 million for the three Bioenergy Research Centers, $46 million for the Environmental Molecular Science Laboratory at Pacific Northwest National Laboratory, and no funding for the Climate Model Development and Validation activity.

Fusion Energy Sciences (FES)

FY2015 funding for FES is $468 million, which is $28 million (-6%) less than the FY2014 current level. The Administration requested $416 million for FES in FY2015. The House report recommended $540 million; the draft Senate report recommended $341 million. Most of the differences between these various funding levels derived from the way each recommendation provided for U.S. contributions to the ITER project.

ITER is a multi-national effort to design and build an experimental fusion reactor, which is currently under construction in France.[65] 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."[66] However, many U.S. analysts have expressed concern about ITER's cost, schedule, and management.[67] Some policy makers and U.S. fusion researchers also express concern about the impact of ITER's funding on the availability of DOE resources for the domestic fusion program.

The Administration's FY2015 budget request, the House bill and report, and the draft Senate bill and report each sought to address these concerns, albeit differently. The FY2015 budget request for the U.S. contribution to ITER was $150.0 million, or $50 million less than the FY2014

[64] U.S. Department of Energy, Office of Science Acting Director Patricia Dehmer, "FY2015 Budget Request to Congress for DOE's Office of Science," PowerPoint presentation, March 4, 2014.

[65] According to the ITER agreement, the U.S. contribution to ITER is 9.09% of construction costs. However, more than 80% of U.S. ITER project funding is spent at universities and businesses within the United States. (For example, the United States is designing, engineering, and procuring ITER's cooling water system as part of the U.S. contribution.) Other contributors include China, India, Japan, South Korea, the Russian Federation, and the European Union. In exchange for its contribution, the United States gains 100% access to ITER's research output. More information about the U.S. ITER program is available at https://www.usiter.org/index.shtml.

[66] U.S. Department of Energy, *FY2015 Congressional Budget Request, Science and Advanced Research Projects Agency-Energy*, vol. 4, March 2014, p. 137, http://energy.gov/sites/prod/files/2014/04/f14/Volume_4.pdf.

[67] In 2008, the cost for the U.S. share of ITER was estimated to be between $1.45 billion and $2.2 billion. Schedule delays, design and scope changes, and other factors have placed upward pressure on ITER costs. According to the FY2015 DOE budget request, the "present U.S. assessment of the project is that it cannot, under current conditions, meet the most recent schedule" (DOE, FY2015 budget request, volume 4, p. 137) and that the "best estimate" of the current total cost range is between $4.0 and $6.5 billion (Ibid., p. 146). A June 2014 Government Accountability Office review of DOE's cost and schedule estimates for the U.S. ITER project concluded, among other things, that the unreliability of the overall international project schedule limited DOE's ability to produce a reliable cost and schedule estimate for the U.S. project. (See U.S. Government Accountability Office, *Fusion Energy: Actions Needed to Finalize Cost and Schedule Estimates for U.S. Contributions to an International Experimental Reactor* (GAO-14-499), June 2014, http://www.gao.gov/products/GAO-14-499.)

current plan funding level of $200 million and $75 million less than the $225 million annual cap on ITER funding that DOE proposed in 2012.[68] The Administration's request noted that the present U.S. assessment of the international ITER project is that it cannot meet the most recent proposed schedule. The FY2015 request further stated that the request "will ensure that U.S. in-kind contributions maintain [the] U.S. commitment to FY2015 project needs."[69]

The House, on the other hand, recommended $225 million for the U.S. contribution to ITER—$200 million for in-kind hardware contributions and $25 million for cash contributions. Both the House-passed bill (H.R. 4923) and House report specified that U.S. cash contributions to the international ITER project would be contingent upon the ITER governing council's implementation of recommendations from a 2013 management assessment report.[70]

Unlike both the Administration and the House, which sought to continue funding the ITER project, the draft Senate report recommended that the United States withdraw from ITER altogether. It provided $75 million to FES to complete existing contracts and fund the U.S. ITER office in FY2015. (The draft Senate bill contained similar provisions.) Citing a June 2014 Government Accountability Office (GAO) report on the ITER project, the draft Senate report stated

> The Committee cannot support a project with no specified price tag or date of completion, especially when the project is the most complicated engineering construction project in the world with significant, unresolved project management problems.[71]

The FY2015 agreement, as described in the Explanatory Statement and in the text of P.L. 113-235, funds ITER at the requested level of $150 million, with the proviso that U.S. cash contributions must be withheld until the governing council implements the recommendations of the 2013 management assessment report. P.L. 113-235 further provides that this prohibition may be waived if the Secretary of Energy determines that the governing council is making satisfactory progress towards implementing the recommendations.

In addition to the ITER project, the FY2015 FES budget request noted DOE's intention to shutter the Alcator C-Mod facility at the Massachusetts Institute of Technology (MIT) in late FY2016[72] and proposed a 61% ($11 million) reduction in funding for High Energy Density Laboratory Plasmas science. The House report recommended specific funding levels for a number of FES activities, including $315 million for domestic fusion research (above both the FY2015 request and FY2014 current level), as well as $22 million for research and facilities operations at the Alcator C-Mod and $18 million for High Energy Density Laboratory Plasmas. Among other things, the draft Senate report recommended $17 million for High Energy Density Laboratory Plasmas, similar to the FY2014 current plan funding level.

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[68] According to the FY2015 budget request, "In the spring of 2012… DOE and its oversight organizations agreed to support an annual funding level of no more than $225,000,000 per year beginning in FY2014." U.S. Department of Energy, FY2015 Congressional Budget Request, Science and Advanced Research Projects Agency-Energy, vol. 4, March 2014, p. 137, http://energy.gov/sites/prod/files/2014/04/f14/Volume_4.pdf.

[69] Ibid.

[70] Excerpts of this report were published in the online *New Yorker*. See Raffi Khatchadourian, "How to Fix ITER," *The New Yorker*, February 28, 2014, http://www.newyorker.com/news/daily-comment/how-to-fix-iter.

[71] Draft Senate report, p. 102.

[72] The Obama Administration sought to eliminate funding for the Alcator C-Mod facility in FY2014. However, congressional appropriators included funding for the facility in the Joint Explanatory Statement that accompanied the Consolidated Appropriations Act, 2014 (P.L. 113-76). See "Joint Explanatory Statement," *Congressional Record*, January 15, 2014, pp. H881-H893.

Among other items, the Explanatory Statement provided $22 million for Alcator C-Mod, noting that FY2016 will be the final year of funding for the MIT tokamak and directing DOE to plan for an orderly shutdown. The Explanatory Statement also directed the Office of Science to seek community engagement on its forthcoming FES strategic planning and priorities report. High Energy Density Laboratory Plasmas received $18 million in FY2015. The Explanatory Statement provided $318 million for the FES research line item.

High Energy Physics (HEP)

The Explanatory Statement provided $766 million to HEP in FY2015, $9 million (-1%) less than the FY2014 current funding level. The Administration requested a reduction for HEP in FY2015 (to $744 million). Both the House committee and draft Senate reports recommended maintaining HEP at close to FY2014 funding levels in FY2015.

The HEP request sought overall reductions in Energy Frontier Experimental Physics, Intensity Frontier Experimental Physics, Theoretical and Computational Physics, Advanced Technology R&D, and Construction, as well as overall increases in Cosmic Frontier Experimental Physics and Accelerator Stewardship. The FY2015 HEP request did not include funding for the Long Baseline Neutrino Experiment (LBNE), which received funding for design activities in FY2014. The request indicated that HEP intends to further develop LBNE program plans in FY2015.[73]

The House and draft Senate reports would have provided increases over requested levels for Energy Frontier Experimental Physics, Cosmic Frontier Experimental Physics, Theoretical and Computational Physics, and Advanced Technology R&D. The House report also recommended an increase over the request for Intensity Frontier Experimental Physics; the draft Senate report recommended about $6 million less ($245 million compared to $251 million). The two reports differed on, among other things, funding for Accelerator Stewardship. The House report recommended $3 million while the draft Senate report recommended the requested level of $19 million. The House report also recommended $22 million for LBNE R&D, as well as engineering and design activities. However, the House report recommended no funding for long-lead procurements or construction activities associated with the LBNE project. The draft Senate report recommended $22 million for LBNE engineering and design.

The Explanatory Statement provides $22 million for the LBNE, including $10 million for R&D and $12 million for engineering and design, but provides no funding for long-lead procurements or construction activities. Accelerator Stewardship receives $10 million (about the same as FY2014). The agreement further provides higher-than-requested funding levels for Intensity Frontier Experimental Physics, Cosmic Frontier Experimental Physics, Theoretical and Computational Physics, and Advanced Technology R&D.

[73] The LBNE was initially conceptualized as an experiment that would beam certain particles (underground) from Fermilab in Batavia, IL, to the Sanford Underground Research Facility in Lead, SD. The project was determined to be too expensive as initially proposed. Scientists are considering whether to modify the experiment to an above-ground option that may make it less expensive (but perhaps less scientifically useful) or seek international partners to assist with the cost of the underground option. See Pallab Ghosh, "UK Backs Huge Neutrino Plan," *BBC News*, February 14, 2104, at http://www.bbc.com/news/science-environment-26017957; and Adam Hurlburt, "Feds Support Underground Neutrino Experiment," *Black Hills Pioneer*, January 23, 2014, at http://www.bhpioneer.com/local_news/article_bdc8b8c8-8452-11e3-84f7-....bb2963f4.html .

Nuclear Physics (NP)

Nuclear Physics receives $596 million in FY2015. This amount is $41 million (7%) more than the FY2014 funding level. The FY2015 request for NP was $594 million. The House report recommended $600 million; the draft Senate report recommended $602 million.

The largest change in the FY2015 NP request was a $35 million increase in construction funding for the Facility for Rare Isotope Beams (FRIB) at Michigan State University. This increase would be partially offset by a $9 million reduction in funding for the 12GeV CEBAF (Continuous Electron Beam Accelerator Facility) Upgrade project, which is reaching completion. Funding increases for the FRIB would support the continuation of planned construction activities and final technical design. Both the House and draft Senate reports recommended the requested level for FRIB. The Explanatory Statement, by reference to the House report, provided the requested level for FRIB.

ARPA-E[74]

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. FY2015 funding for ARPA-E is $280 million, the same as FY2014 enacted funding. The Administration sought $325 million for ARPA-E in FY2015. As in FY2013 and FY2014, the FY2015 ARPA-E request included two research thrust areas: Transportation Systems ($148 million requested) and Stationary Power Systems ($148 million requested). The House would have provided $300 million for ARPA-E in FY2015; the draft Senate bill recommended $280 million.

Nuclear Waste Disposal[75]

Current funding for DOE's civilian nuclear waste disposal activities is included under the Office of Nuclear Energy's Fuel Cycle Research and Development Program, in the Used Nuclear Fuel Disposition subprogram. As noted in the Nuclear Energy section of this report, the Administration requested $79 million for the Used Nuclear Fuel Disposition subprogram for FY2015, an increase of $19 million from FY2014.

Through the Used Nuclear Fuel subprogram, DOE's Office of Nuclear Energy is carrying out activities formerly conducted by the Office of Civilian Radioactive Waste Management (OCRWM), which was established by the Nuclear Waste Policy Act of 1982 (NWPA, 42 U.S.C. 10101 et seq.) to dispose of highly radioactive waste from nuclear power plants and defense facilities. OCRWM had been developing a permanent nuclear waste repository at Yucca Mountain, NV, as specified by an NWPA amendment in 1987. Funding for OCWRM ended after FY2010, so the office has been closed and activities at the Yucca Mountain site halted. No funding for Yucca Mountain was requested for FY2015. In line with the request, the final FY2015 appropriations act did not include any new funding for Yucca Mountain and it reduced the request for Used Nuclear Fuel Disposition—not involving Yucca Mountain—by $7.5 million.

The Obama Administration "has determined that developing the Yucca Mountain repository is not a workable option and the Nation needs a different solution for nuclear waste disposal,"

[74] This section was prepared by Heather Gonzalez.

[75] This section was prepared by (name redacted).

according to the DOE FY2011 budget justification. To develop alternative waste management strategies, the Administration established the Blue Ribbon Commission on America's Nuclear Future, which issued its final report to the Secretary of Energy on January 26, 2012.[76] The Blue Ribbon Commission recommended that future efforts to develop nuclear waste facilities follow a "consent based" approach and be carried out by a new organization, rather than DOE. The commission said the new nuclear waste entity should have "assured access" to the Nuclear Waste Fund, which holds fees collected from nuclear power plant operators to pay for waste disposal. Under NWPA, those funds cannot be spent without appropriation by Congress.

DOE released its *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste* in January 2013 in response to the Blue Ribbon Commission report. The strategy called for a pilot interim storage facility for spent fuel from closed nuclear reactors to open by 2021 and a larger storage facility, possibly at the same site, to open by 2025. A site for a permanent underground waste repository would be selected by 2026, and the repository would open by 2048. Storage and disposal sites would be selected by a new waste management organization through a consent-based process, as recommended by the Blue Ribbon Commission.[77]

Under the category of Nuclear Waste Disposal, the House approved $150.0 million in FY2015 for DOE to restart its supporting activities for the Yucca Mountain licensing process at the Nuclear Regulatory Commission (NRC). As it has in previous years, the House Appropriations Committee noted that Yucca Mountain is by law the only candidate site for a national repository for highly radioactive waste. The panel rejected the Administration's attempts to "unilaterally" develop and implement a new nuclear waste policy.

Much of the Administration's nearly one-third funding boost for Used Nuclear Fuel Disposition in FY2015, under the Nuclear Energy category, would go for R&D on long-term storage of high-burnup fuels—nuclear fuel rods that have been irradiated much longer than was typical in the past. The higher funding request would also pay for deep borehole demonstration tests, as well as continuing evaluations of crystalline rock, clay/shale, and salt as potential media for a permanent underground repository, according to the DOE budget justification.

The FY2015 request for the Used Nuclear Fuel subprogram proposed $30 million for an integrated waste management system to develop preliminary processes for storage, transportation, disposal, and consent-based siting—of which $24.0 million would come from the Nuclear Waste Fund. The FY2015 draft Senate bill would have authorized DOE to conduct a voluntary siting process for consolidated spent fuel storage (Section 308) and provide $89.0 million under Used Fuel Disposition for the project, including $24.0 million from the Nuclear Waste Fund. The final FY2015 appropriations measure did not include the House-passed funding for Yucca Mountain or the waste storage facility proposed by the Senate panel, but it provided $22.5 million for the Administration's proposed integrated waste management system, although not from the Nuclear Waste Fund as requested.

The FY2015 budget request included a proposal to change the nuclear waste funding system along the lines proposed by the Blue Ribbon Commission. Discretionary funding (annual

[76] Blue Ribbon Commission on America's Nuclear Future, *Report to the Secretary of Energy*, January 2012, http://brc.gov/sites/default/files/documents/brc_finalreport_jan2012.pdf.

[77] DOE, *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*, January 2013, http://energy.gov/sites/prod/files/Strategy%20for%20the%20Management%20and%20Disposal%20of%20Used%20Nuclear%20Fuel%20and%20High%20Level%20Radioactive%20Waste.pdf.

appropriations by Congress) would continue to pay for "regular and recurring" expenses of the nuclear waste program. In the past, discretionary appropriations for the program have come from both the Nuclear Waste Fund, to pay for disposal of commercial reactor waste, and from the General Fund, to pay for defense waste disposal.

Beginning in FY2018, under the Administration proposal, the discretionary appropriations for spent nuclear fuel management would be supplemented by mandatory appropriations, first from incoming nuclear waste fee revenues and eventually from past fees and interest that have accumulated in the Waste Fund. If Congress enacted such mandatory appropriations, the specified funding would be automatically provided to the waste program without the need for annual congressional approval. A similar proposal in FY2014 was not approved by Congress, and it was not included in the House-passed or draft Senate bills for FY2015, nor in the final measure.

DOE's proposal to pay for nuclear waste activities with annual waste fee collections has also been jeopardized by a ruling by the U.S. Court of Appeals for the District of Columbia Circuit that DOE must stop collecting the fees. NWPA requires the Secretary of Energy to adjust the fees as necessary to cover the waste program's anticipated costs, but the Court ruled that DOE's current waste plans are too vague to allow a reasonable estimate to be calculated.[78] In response to the court ruling, DOE reportedly stopped collecting the waste fee on May 16, 2014, eliminating about $750 million in revenues collected each year from the nuclear power industry.[79]

DOE had filed a license application with NRC for the proposed Yucca Mountain repository in June 2008 but filed a motion to withdraw the application on March 3, 2010. An NRC licensing panel rejected DOE's withdrawal motion June 29, 2010, on the grounds that NWPA requires full consideration of the license application by NRC. The full NRC Commission deadlocked on the issue September 9, 2011, leaving the licensing panel's decision in place and prohibiting DOE from withdrawing the Yucca Mountain application. However, the commission ordered at the same time that the licensing process be halted because of "budgetary limitations."[80] No funding was provided in FY2012 through FY2014 or requested for FY2015 to continue Yucca Mountain licensing activities. However, the U.S. Court of Appeals for the District of Columbia Circuit ruled on August 13, 2013, that NRC must continue work on the Yucca Mountain license application as long as funding is available. The Court determined that NRC had at least $11.1 million in previously appropriated funds for that purpose.[81] The House-passed FY2015 energy and water bill included $55.0 million for NRC to continue Yucca Mountain licensing, but it was not included in the Senate draft bill or final appropriations measure.

NWPA required DOE to begin taking waste from nuclear plant sites by January 31, 1998. Nuclear utilities, upset over DOE's failure to meet that deadline, have won two federal court decisions upholding the department's obligation to meet the deadline and to compensate utilities for any resulting damages. Utilities have also won several cases in the U.S. Court of Federal Claims.

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[78] U.S. Court of Appeals for the District of Columbia Circuit, *National Association of Regulatory Utility Commissioners v. U.S. Department of Energy*, No. 11-1066, decided November 19, 2013, http://www.cadc.uscourts.gov/internet/opinions.nsf/2708C01ECFE3109F85257C280053406E/$file/11-1066-1466796.pdf.

[79] Hiruo, Elaine, "DOE Implements Court-Ordered Suspension of Nuclear Waste Fee," *NuclearFuel*, May 26, 2014.

[80] Nuclear Regulatory Commission, "In the Matter of U.S. Department of Energy (High-Level Waste Repository)," CLI-11-07, September 9, 2011, http://www.nrc.gov/reading-rm/doc-collections/commission/orders/2011/2011-07cli.pdf.

[81] U.S. Court of Appeals for the District of Columbia Circuit, *In re: Aiken County et al*., No. 11-1271, writ of mandamus, August 13, 2013, http://www.cadc.uscourts.gov/internet/opinions.nsf/BAE0CF34F762EBD985257BC6004DEB18/$file/11-1271-1451347.pdf.

DOE estimates that liability payments would eventually exceed $20 billion if DOE were to begin removing waste from reactor sites by 2020, the previous target for opening Yucca Mountain.[82] (For more information, see CRS Report R42513, *U.S. Spent Nuclear Fuel Storage*, by (name redacted); CRS Report RL33461, *Civilian Nuclear Waste Disposal*, by (name redacted); and CRS Report R40996, *Contract Liability Arising from the Nuclear Waste Policy Act (NWPA) of 1982*, by (name redacted).)

Loan Guarantees and Direct Loans[83]

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. No funding for additional loans and loan guarantees was requested for FY2015. However, $42 million was requested for loan guarantee program administrative expenses, the same as the FY2014 level. The FY2015 funding request would be offset by $25 million in fees, for a net appropriation of $17 million. An additional $6 million, with $2 million in offsets, was requested for vehicle manufacturing loan program administrative expenses. The House-passed bill, the Senate draft, and the final bill approved the requested amounts.

Two major loan guarantee programs are currently administered by the DOE Loan Programs Office:

- *Section 1703 innovative clean energy technology loan guarantees*. Loan guarantees are provided for "new or significantly improved technologies," as compared to existing commercial technologies, that "avoid, reduce, or sequester" air pollutants and greenhouse gas emissions. Eligible technology categories include renewable energy, advanced fossil energy, advanced nuclear energy, energy efficiency, and pollution control.
- *Section 1705 renewable energy, electric transmission, and advanced biofuels loan guarantees*. Established by Section 406 of the American Recovery and Reinvestment Act (ARRA, P.L. P.L. 111-5), the Section 1705 program was designed as a temporary economic stimulus measure available through the end of FY2011. Unlike the Section 1703 program, which is limited to innovative technologies, loan guarantees were provided to already-commercialized renewable energy and electric transmission technologies.

Title XVII allows DOE to provide loan guarantees for up to 80% of construction costs for eligible energy projects. Under such 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. Energy Secretary Ernest Moniz signed agreements on February 20, 2014, for the first Section 1703 loan guarantees, totaling $6.5 billion for two nuclear reactors in Georgia.[84] (For more about the Georgia loan guarantees, see CRS Insight IN10054, *DOE Section 1703 Vogtle Nuclear Project Loan Guarantees: How Can Credit Subsidy Fees Be Zero?*, by (name redacted) and (name redacted).) *DOE Section 1703 Vogtle Nuclear*

[82] Ibid., p. 80.

[83] This section was prepared by (name redacted). For more details on loan guarantees, see CRS Report R42152, *Loan Guarantees for Clean Energy Technologies: Goals, Concerns, and Policy Options*, by (name redacted)

[84] Mirshak, Meg, "Energy Secretary Moniz Visits Vogtle to Finalize Loan Guarantee," *Augusta Chronicle*, February 21, 2014, http://chronicle.augusta.com/news/metro/2014-02-20/energy-secretary-moniz-visits-vogtle-finalize-loan-guarantee.

Project Loan Guarantees: How Can Credit Subsidy Fees Be Zero?, by (name redacted) and (name redacted). Under Section 1705, final loan guarantees have been issued for 24 projects, totaling about $14.4 billion.[85]

DOE's first loan guarantee under Section 1705 was issued in September 2009 to Solyndra Inc., a manufacturer of photovoltaic equipment. Solyndra's bankruptcy announcement on August 31, 2011, prompted strong congressional criticism of the Administration's management of the loan guarantee program.[86] Solyndra's DOE loan guarantee totaled $535 million, and the company's bankruptcy placed most or all of that amount at risk. (For details, see CRS Report R42058, *Market Dynamics That May Have Contributed to Solyndra's Bankruptcy*, by (name redacted).)

Subsidy Costs

Title XVII requires the estimated future government costs resulting from defaults on guaranteed loans to be covered up-front by appropriations or by payments from project sponsors (borrowers). These "subsidy costs" are calculated as the present value of the average possible future net costs to the government for each loan guarantee, on a case-by-case basis. If those calculations are accurate, the subsidy cost payments for all the guaranteed projects together should cover the future costs of the program. However, the Congressional Budget Office has predicted that the up-front subsidy cost payments will prove too low by at least 1% and is scoring bills accordingly.[87] As a result, appropriations bills that provide loan guarantee authorizations include an adjustment totaling 1% of the loan guarantee ceiling.

Subsidy costs for Section 1703 loan guarantees must usually be paid by project sponsors, because no appropriations for that program were provided before FY2011 (as described below). ARRA, in contrast, appropriated $6 billion to cover the subsidy costs of Section 1705 loan guarantees, so subsidy cost payments were not required from project sponsors under that program. However, $2 billion of the Section 1705 subsidy cost appropriation was subsequently transferred to the "cash for clunkers" automobile trade-in program by P.L. 111-47, and another $1.5 billion was rescinded to help pay for the Education Jobs and Medicaid Assistance Act (P.L. 111-226), leaving $2.5 billion. Of the $2.5 billion available for subsidy costs, $1.9 billion was obligated by the program's deadline at the end of FY2011.[88]

Authorized Loan Guarantee Amounts

Under the Federal Credit Reform Act (FCRA), federal loan guarantees cannot be provided without an authorized level in an appropriations act or an appropriation for the subsidy costs. Pursuant to FCRA, the FY2007 continuing resolution (P.L. 110-5) established an initial cap of $4

[85] U.S. Department of Energy Loan Programs Office, "The Financing Force Behind America's Clean Energy Economy," https://lpo.energy.gov/. For a critique of the loan guarantee process, see U.S. Government Accountability Office, *DOE Loan Guarantees: Further Actions Are Needed to Improve Tracking and Review of Applications*, GAO-12-157, March 2012, http://www.gao.gov/products/GAO-12-157.

[86] Opening Statement of the Honorable Cliff Stearns, Chairman, Subcommittee on Oversight and Investigations.

"Solyndra and the DOE Loan Guarantee Program," September 14, 2011, http://republicans.energycommerce.house.gov/Media/file/Hearings/Oversight/091411/Stearns.pdf.

[87] Congressional Budget Office, *S. 1321, Energy Savings Act of 2007*, CBO Cost Estimate, Washington, DC, June 11, 2007, pp. 7-9, http://www.cbo.gov/ftpdocs/82xx/doc8206/s1321.pdf; and CBO, Fair-Value Accounting for Federal Credit Programs, Issue Brief, March 2012, http://www.cbo.gov/publication/43027.

[88] DOE Weekly Financial and Activity Report, September 30, 2011, http://www.recovery.gov/transparency/agency/reporting/agency_reporting2.aspx?agency_code=89&dt=09/30/2011.

billion on loan guarantees under the Section 1703 program, without allocating that amount among the various eligible technologies. Additional loan guarantee authority was subsequently provided for specific technologies and then further modified as described below.

Unobligated appropriations for subsidy cost payments under the Section 1705 loan guarantee program were no longer available after FY2011, as noted above. However, the FY2011 Continuing Appropriations Act provided $170 million, with no expiration, to pay subsidy costs for renewable energy and efficiency projects under the Section 1703 program. The act also provided authority for up to $1.183 billion in loan guarantees for those renewable energy and efficiency projects, in addition to the $32.8 billion in Section 1703 authority remaining from earlier appropriations acts for all technologies. The additional loan guarantee authority and subsidy cost appropriation provided by the FY2011 Continuing Appropriations Act is available to projects that applied under the expiring Section 1705 before February 24, 2011.

Following is a summary of the various elements of the current DOE loan guarantee program, as modified by the FY2011 Continuing Appropriations Act (CR):

- $8.3 billion ceiling in the CR on non-nuclear technologies under Section 1703, reduced from ceilings set in FY2009.
- $2 billion for unspecified projects from FY2007 under Section 1703, not affected by CR.
- $18.5 billion ceiling for nuclear power plants ($6.5 billion finalized; $1.8 billion conditionally committed).
- $4 billion allocated for loan guarantees for uranium enrichment plants ($2 billion conditionally committed).
- $1.183 billion ceiling for renewable energy and energy efficiency projects under Section 1703, in addition to other ceiling amounts, which can include pending applications under Section 1705.
- An appropriation of $170 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 support loan guarantees totaling $1.7 billion.
- $2.5 billion for Section 1705 subsidy costs appropriated by ARRA. As noted above, about $1.9 billion of this funding was used to pay the subsidy costs for $14 billion in loan guarantees with final commitments under Section 1705, for which the deadline was September 30, 2011.[89] Therefore, the remainder is not currently available to the program for new loan guarantees.

Advanced Technology Vehicle Manufacturing Loans

DOE also administers the Advanced Technology Vehicles Manufacturing (ATVM) Loan Program established by the Energy Independence and Security Act of 2007 (P.L. 110-140).[90] The FY2009 Continuing Resolution appropriated $7.5 billion to allow DOE to issue up to $25 billion in direct loans. The program was designed to provide loans to eligible automobile manufacturers and parts suppliers for making investments in their plant capacity to produce vehicles with improved fuel

[89] DOE Loan Programs Office, "Our Projects," http://lpo.energy.gov/our-projects.

[90] For more details, see CRS Report R42064, *The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program: Status and Issues*, by (name redacted) and (name redacted)

economy. Along with the EPACT loan guarantee programs, the ATVM Loan Program is administered by the DOE Loan Programs Office. DOE reports that five ATVM loans have been issued, totaling $8.4 billion. Two of those projects, totaling $579 million, are no longer active.[91]

Nuclear Weapons Stockpile Stewardship[92]

Congress established the 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).

Stockpile stewardship consists of all activities in NNSA's Weapons Activities account, as described below. **Table 12** presents Weapons Activities funding, including the FY2015 request and House and Senate action. In approving its version of the FY2015 Energy and Water Development Appropriations Bill, the House did not amend the Weapons Activities section as reported by the House Appropriations Committee. NNSA also manages two programs outside of the Weapons Activities account: Defense Nuclear Nonproliferation, discussed later in this report, and Naval Reactors.

Most stewardship 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 Plant, 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.

Table 12. Funding for Weapons Activities, FY2013-FY2015

($ millions)

Program	FY2013 Enacted	FY2014 Enacted	FY2015 Request	FY2015 House	FY2015 Sen. Subc.	FY2015 Enacted
DSW	1,946.6	2,442.0	2,746.6	2,697.0	2,673.3	2,692.6
Campaigns	1,556.7	1,658.3	1,841.3	1,727.0	1,789.5	1,766.2
RTBF[a]	1,972.6	2,067.4	2,055.5	2,046.0	2,077.5	2,033.4
Site Stewardship	72.8	87.3	82.4	79.5	0	76.5
Other[b]	1,422.1	1,525.9	1,588.9	1,654.7	1,774.4	1,617.9
Total	**6,970.8**	**7,781.0**	**8,314.9**	**8,204.2**	**8,314.9**	**8,186.7**

Source: FY2015 NNSA Congressional Budget Request, FY2015 House and Senate Appropriations Committee reports on Energy and Water Development Appropriations, H.R. 83 Explanatory Statement.

Notes: Details may not add to totals due to rounding. DSW: Directed Stockpile Work; RTBF: Readiness in Technical Base and Facilities. P.L. 113-235 renamed "Campaigns" "Research, Development, Test, and Evaluation."

[91] U.S. Department of Energy Loan Programs Office, "The Financing Force Behind America's Clean Energy Economy," https://lpo.energy.gov/?page_id=45.

[92] This section was prepared by Jonathan Medalia.

a. For FY2014, NNSA proposed to eliminate RTBF and split its functions between Nuclear Programs (a new program) and Site Stewardship. P.L. 113-76 retained RTBF and Site Stewardship. Also for FY2014, NNSA proposed to shift Nuclear Counterterrorism Incident Response and National Security Applications from Weapons Activities to Defense Nuclear Nonproliferation. P.L. 113-76 retained Nuclear Counterterrorism Incident Response in Weapons Activities and made no mention of National Security Applications. P.L. 113-76 also moved Domestic Uranium Enrichment Research, Development, and Demonstration into Weapons Activities from Defense Nuclear Nonproliferation, a separate account. See text for details.

b. For FY2013, "other" includes Secure Transportation Asset, Nuclear Counterterrorism Incident Response, NNSA CIO Activities, Defense Nuclear Security, Legacy Contractor Pensions, and National Security Applications. For FY2014, in P.L. 113-76, "other" includes Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Defense Nuclear Security, Information Technology and Cyber Security, Legacy Contractor Pensions, Domestic Uranium Enrichment Research, Development, and Demonstration, and a rescission. For FY2015 request, "other" includes Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Counterterrorism and Counterproliferation Programs, Defense Nuclear Security, Information Technology and Cyber Security, and Legacy Contractor Pensions. For FY2015 House bill, "other" includes Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Defense Nuclear Security, Information Technology and Cyber Security, Legacy Contractor Pensions, and Domestic Uranium Enrichment. For FY2015 Senate Appropriations Committee draft bill, "other" includes Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Counterterrorism and Counterproliferation Programs, Environmental Projects and Operations, Nuclear Materials Integration, Minority Serving Institution Partnerships Program, Defense Nuclear Security, Information Technology and Cyber Security, Legacy Contractor Pensions, and Domestic Uranium Enrichment. For FY2015, "other" in P.L. 113-235 included Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Counterterrorism and Counterproliferation Programs, Defense Nuclear Security, Information Technology and Cyber Security, Legacy Contractor Pensions, Domestic Uranium Enrichment, and a rescission.

Table 13. Weapons Activities: FY2015 Request and FY2016-FY2019 Plan

($ millions, except bottom row: $ billions)

	FY2015	FY2016	FY2017	FY2018	FY2019
DSW	2,746.6	2,833.5	2,969.5	3,325.7	3,408.8
Campaigns	1,841.3	1,966.9	1,905,3	1,913.6	1,977.7
RTBF	2,055.5	2,458.9	2,770.4	2,645.4	2,764.4
Site Stewardship	82.4	84.4	84.5	84.5	85.2
Other[a]	1,588.9	1,563.7	1,531.8	1,507.5	1,466.1
Total	**8,314.9**	**8,907.2**	**9,261.4**	**9,476.6**	**9,702.3**
Nov. 2010 "1251 report" projection	**8.7**	**8.9**	**8.9-9.0**	**9.2-9.3**	**9.4-9.6**

Source: FY2015 NNSA Congressional Budget Request for rows through Total; bottom row, U.S. White House. "November 2010 Update to the National Defense Authorization Act of FY2010 Section 1251 Report: New START Treaty Framework and Nuclear Force Structure Plans," p. 9, http://www.lasg.org/CMRR/Sect1251_update_17Nov2010.pdf.

Notes: Details may not add to totals due to rounding. DSW, Directed Stockpile Work; RTBF, Readiness in Technical Base and Facilities.

a. "Other" includes Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Counterterrorism and Counterproliferation Programs, Defense Nuclear Security, Information Technology and Cyber Security, and Legacy Contractor Pensions.

Nuclear Weapons Complex Reconfiguration

The nuclear weapons complex currently consists of eight sites, but it had many more personnel and sites during the Cold War. Despite the post-Cold War reductions, many in Congress have for years wanted the complex to change further, in various ways: fewer personnel, greater efficiency, smaller footprint at each site, increased security, and the like. After numerous exchanges between DOE and the appropriating and authorizing committees, such issues still remain.

According to a White House document of May 2010, the President provided Congress with a classified report (the "1251 report") required by the FY2010 National Defense Authorization Act, Section 1251, "on the comprehensive plan to: (1) maintain delivery platforms [that is, bombers, missiles, and submarines that deliver nuclear weapons]; (2) sustain a safe, secure, and reliable U.S. nuclear weapons stockpile; and (3) modernize the nuclear weapons complex."[93] According to that document, "the Administration intends to invest $80 billion in the next decade to sustain and modernize the nuclear weapons complex." The Administration submitted a revised Section 1251 report in November 2010, projecting weapons stockpile and infrastructure costs for FY2011-FY2020 at between $85.4 billion and $86.2 billion. The request for FY2015 was below the 1251 report figures; in contrast, the projections for FY2016-FY2019 are at or above the figures in the 1251 report, as **Table 13** shows.

New Budget Structure

In its FY2015 draft report, the Senate Appropriations Committee directed NNSA to use a new structure for the FY2016 budget submission. It would include four categories:

> Directed Stockpile Work for maintaining and refurbishing weapons systems; Science, Technology, and Engineering for science-based stockpile stewardship activities; Major Production Capabilities for new infrastructure investments in critical nuclear and non-nuclear capabilities; and Site Operations and Maintenance for non-security operations of sites and maintenance of general infrastructure.[94]

The committee stated that this structure would increase transparency and would reflect NNSA's current programmatic focus.

General Requirements in P.L. 113-235

Owing to concerns about cost growth and transparency, P.L. 113-235 contained several sections relating to cost and oversight. Section 304 required construction of high-hazard nuclear facilities to have independent oversight by the Office of Independent Enterprise Assessments "to ensure the project is in compliance with nuclear safety requirements." Section 305 required an independent cost estimate for approving performance baseline and starting construction for projects with total cost over $100 million. Section 308 required the Secretary of Energy to provide an analysis of alternatives for each major warhead refurbishment program reaching the development engineering stage.

[93] U.S. White House. "The New START Treaty—Maintaining a Strong Nuclear Deterrent," fact sheet, May 13, 2010, http://www.america.gov/st/texttrans-english/2010/May/20100514114003xjsnommis0.6300318.html.

[94] Senate Appropriations Committee, draft report on Energy and Water Development Appropriations Bill, 2015, p. 108, http://www.appropriations.senate.gov/sites/default/files/E%26W%20Report%20w%20Chart%2010REPT.PDF.

Directed Stockpile Work (DSW)

This program 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 FY2014 appropriation for DSW was $2,442.0 million. For FY2015, the request was $2,746.6 million, the House provided $2,697.0 million, the Senate Appropriations Committee draft recommended $2,673.3 million, and P.L. 113-235 provided $2,692.6 million. Specific items under DSW include the following:

Life Extension Programs (LEPs). These programs aim to extend the life of existing warheads through design, certification, manufacture, and replacement of components. An LEP for the W76 warhead for the Trident II submarine-launched ballistic missile is ongoing, as is an LEP for the B61 mod 12. (A "mod" is a modification or version of a bomb or warhead type.)

For FY2015, NNSA requested the following for LEPs:

- $643.0 million for the B61-12 LEP, with the first production unit slipping to FY2020.
- $259.2 million for the W76 LEP.
- $165.4 million for the W88 Alt 370.
- $9.4 million for an LEP for a cruise missile warhead. FY2015 is the first year for which NNSA requested funds for this warhead under the LEP heading. The LEP would seek to use common components from other LEPs and to improve warhead safety and security. The LEP will consider variations of two warheads, the W80 (currently deployed on air-launched cruise missiles) and the W84 (formerly deployed on ground-launched cruise missiles).

No funds for IW-1 or the W78 LEP. NNSA "does not propose further funding for the W78 LEP." In addition, NNSA has deferred IW-1, and projects the first production unit as FY2030.

The House provided full funding for the B61-12 LEP, the W76 LEP, and the W88 Alt 370 requests. It provided no funds, as requested, for the W78 LEP. It added $7.6 million above the request "for a new life extension study for the cruise missile warhead." The House Appropriations Committee stated that since the high cost of the B61-12 LEP "will continue to exert significant pressure on the NNSA's budget," the bill "contains an updated provision that permanently establishes a requirement to conduct a comprehensive analysis of alternatives as part of all future life extension programs."

The Senate Appropriations Committee draft report recommended full funding for the B61 LEP, the W76 LEP, and the W88 Alt 370. Regarding the W76, "The Committee remains concerned about the affordability of this program." It provided no funds, as requested, for the W78 LEP. It recommended no funds for the cruise missile warhead life extension study because "NNSA has not provided sufficient justification" for the study. Further, "The Committee is reluctant to provide funding for a new cruise missile warhead when the Air Force cannot identify sufficient funding in its budget planning documents to design and procure a cruise missile to deliver the refurbished warhead."

P.L. 113-235 provided full funding for the B61 LEP, the W76 LEP, the W88 Alt 370, and the cruise missile warhead life extension study. Regarding the latter, the Explanatory Statement noted a requirement for NNSA to provide a report on military requirements, cost, and schedule at the start of a design definition and cost study, should those activities be requested subsequently. The law provided no funds for the W78 LEP.

Stockpile Systems. This program involves routine maintenance, replacement of limited-life components, surveillance, assessment, and the like for all weapon types in the stockpile. The FY2013 appropriation was $518.8 million. For 2014, the W78/W88 study and the Alt 370 advanced sufficiently to move to Life Extension Programs. As a result, the Stockpile Systems funding request declined to $454.5 million for FY2014; that amount was appropriated. The FY2015 request was $531.1 million; the House provided the requested amount, and the Senate Appropriations Committee draft recommended that amount, and P.L. 113-235 provided that amount.

Weapons Dismantlement and Disposition (WDD). The number of warheads has fallen sharply since the end of the Cold War, and continues to decline. WDD involves interim storage of warheads to be dismantled; dismantlement; and disposition (i.e., storing or eliminating warhead components and materials). The FY2013 appropriation was $40.7 million. For FY2014, the request was $49.3 million and the appropriation was $54.3 million. The FY2015 request was $30.0 million. The House provided the FY2014 amount for FY2015, which was $24.3 million above the Administration request; the House Appropriations Committee stated that NNSA continued to cut funding for dismantlement despite clear requirements for it. The Senate Appropriations Committee draft recommended $40.0 million, with the increase intended to help NNSA meet its yearly dismantlement targets. The committee also expressed concern over a potential "dismantlement workload gap in the mid-2020s." P.L. 113-235 provided $50.0 million; the Explanatory Statement directed NNSA to "report on the options available to avoid a dismantlement workload gap in the mid-2020s while still meeting the 2022 dismantlement goal."

Stockpile Services. This category includes Production Support; R&D Support; R&D Certification and Safety; Management, Technology, and Production; and Plutonium Infrastructure Sustainment. NNSA states, "Stockpile Services provides the foundation for the production capability and capacity within the nuclear security enterprise. All enduring systems, LEPs, and dismantlements rely on Stockpile Services to provide the base development, production and logistics capability needed to meet program requirements. In addition, Stockpile Services funds research, development, and production activities that support two or more weapons-types, and work that is not identified or allocated to a specific weapon-type." The FY2013 appropriation was $844.3 million. For FY2014, the request was $910.2 million and the appropriation was $940.3 million. The FY2015 request was $1,108.5 million; much of the increase was for R&D for certification and safety of warheads (+$50.3 million), and for preparations to increase tritium production (+$60.1 million).

For FY2015, the House provided $1,027.0 million. The largest reduction, $47.0 million, was for R&D for certification and safety. The House Appropriations Committee stated, "It is essential that the NNSA establish dedicated funding to conduct Significant Finding Investigations and respond to stockpile issues, rather than continuing to fund technology maturation and exploratory development activities within Stockpile Services in an effort to distribute funding for these activities across multiple control points." (A Significant Finding Investigation is a formal investigation into a potential problem with a nuclear weapon.) The Senate Appropriations Committee draft recommended $1,034.6 million. P.L. 113-235 provided $1,034.5 million.

Campaigns

These are "multi-year, multi-functional efforts" that "provide specialized scientific knowledge and technical support to the directed stockpile work on the nuclear weapons stockpile." Many campaigns have significance for policy decisions. For example, the Science Campaign's goals include improving the ability to assess warhead performance without nuclear testing, improving readiness to conduct nuclear tests should the need arise, and maintaining the scientific

infrastructure of the nuclear weapons laboratories. Campaigns also fund some large experimental facilities, such as the National Ignition Facility at Lawrence Livermore National Laboratory. Note that P.L. 113-235 renamed "Campaigns" "Research, Development, Test, and Evaluation." The FY2014 and FY2015 requests included five campaigns:

Science Campaign. The FY2013 appropriation was $321.2 million. For FY2014, the request was $397.9 million, and P.L. 113-76 provided $369.7 million. The FY2015 request was $456.4 million. NNSA stated that the increase was to provide capabilities to provide certain LEP options, provide improved diagnostic capabilities for certain nuclear experiments, and enable technologies to improve surety (safety, security, use control, use denial, etc.) for future LEPs. The House provided $395.1 million. The House Appropriations Committee stated that the increased funds were for a "robust experimental effort … to better understand the properties of plutonium" in support of possible pit reuse, and recommended no funds for certain radiography capabilities, requiring NNSA to "provide a clear and direct linkage to stockpile needs if additional radiography capabilities are needed." The Senate Appropriations Committee draft recommended $437.4 million. It supported efforts to reuse pits, secondaries, and other components, and required several reports. P.L. 113-235 provided $412.1 million, of which $21.0 million is for designing new radiography capabilities at U1a, the part of the Nevada National Security Site where certain weapons-related experiments are conducted.

Engineering Campaign. This campaign "funds activities that assess and improve fielded nuclear and non-nuclear engineering components without further underground testing." For FY2013, $127.7 million was appropriated. For FY2014, the request was $149.9 million and the appropriation provided the requested amount. The FY2015 request was $136.0 million. Some of these reductions reflect delays in portions of the nuclear weapons program. The House provided the requested amount. The Senate Appropriations Committee draft recommended $144.6 million, an increase of $8.6 million, and recommended increasing funds for enhanced surveillance by $8.6 million. Enhanced surveillance seeks to assess aging of nuclear weapons. P.L. 113-235 provided the requested amount.

Inertial Confinement Fusion Ignition and High Yield Campaign. This campaign is developing tools to create extremely high temperatures and pressures in the laboratory—approaching those of a nuclear explosion—to support weapons-related research and attract scientific talent to the Stockpile Stewardship Program. The centerpiece of this campaign is the National Ignition Facility (NIF), the world's largest laser. NIF is intended to produce "ignition," the point at which a nuclear fusion reaction generates more energy than is used by the lasers to create the reaction. While achieving ignition has been delayed, NIF has nonetheless proven to be of value to stockpile stewardship at energy levels that do not reach ignition. NIF was controversial in Congress for many years, but controversy waned as the program progressed. NIF was dedicated in May 2009.[95] For FY2013, the appropriation for this campaign was $446.7 million. For FY2014, the request was $401.0 million and the appropriation was $514.0 million. The FY2015 request was $512.9 million; the House reduced the request by $0.9 million. The Senate Appropriations Committee draft recommended an increase of $4.5 million. The committee directed NNSA to, among other things, provide an assessment of the level of confidence that NIF will, by December 2015, achieve ignition. P.L. 113-235 provided the requested amount; the Explanatory Statement directed NNSA to provide "an assessment on whether the likelihood of achieving ignition at the NIF has increased since December 2012 and the level of confidence that the NNSA will achieve ignition at the NIF by December 2015."

[95] Lawrence Livermore National Laboratory, "Dedication of World's Largest Laser Marks the Dawn of a New Era," press release, May 29, 2009, https://publicaffairs.llnl.gov/news/news_releases/2009/NR-09-05-05.html.

Advanced Simulation and Computing (ASC) Campaign. This campaign develops computation-based models of nuclear weapons that integrate data from other campaigns, past test data, laboratory experiments, etc., to create what NNSA calls "the computational surrogate for nuclear testing to determine weapon behavior." ASC also supports nonproliferation, emergency response, and nuclear forensics. Some analysts doubt that simulation can be relied upon to provide the confidence needed to certify the safety, security, and reliability of warheads, and advocate a return to testing. For FY2013, the appropriation was $545.8 million. For FY2014, the request was $564.3 million and the appropriation was $569.3 million. The FY2015 request was $610.1 million. Much of the increase results from "beginning the transition of integrated codes to work efficiently on emerging high-performance computers," developing codes, and maintaining computer resources and facilities. The House provided $20.1 million below the requested amount. The Senate Appropriations Committee draft recommended an increase of $10.0 million. P.L. 113-235 provided $598.0 million, of which $50.0 million is for the exascale initiative, which is intended to further increase computing capability.

Readiness Campaign. This campaign "operates the capability for producing tritium to maintain the national inventory needed for the nuclear weapons stockpile." The FY2013 appropriation was $115.3 million. The FY2014 request increased to $197.8 million. The FY2014 appropriation provided no funds for one subprogram of the campaign, moved a tritium subprogram to Stockpile Services, and provided $55.4 million for a third subprogram, Nonnuclear Readiness. The FY2015 request was $125.9 million, all of which was for the latter subprogram, which "develops capabilities to manufacture components used for Directed Stockpile Work." The House Appropriations Committee recommended no funds for this campaign. Instead, it recommended establishing an Advanced Manufacturing Campaign "to develop, demonstrate, and utilize advanced technologies that are needed to enhance the NNSA's secure manufacturing capabilities and ensure timely support for the production of nuclear weapons and other critical national security components," and recommended $93.9 million for this campaign. The bill as passed by the House did not amend this provision. The Senate Appropriations Committee draft recommended $70.0 million. P.L. 113-235 provided no funds for this campaign; instead, it provided $107.2 million for Advanced Manufacturing Development, the components of which are additive manufacturing, component manufacturing development, and process technology development. The Explanatory Statement directed NNSA to provide "a ten-year strategic plan for using additive manufacturing to reduce costs at NNSA production facilities while meeting stringent qualification requirements."

Readiness in Technical Base and Facilities (RTBF)

This program funds infrastructure and operations at nuclear weapons complex sites. For FY2013, the appropriation was $1,972.6 million. For FY2014, NNSA proposed transferring its programs to other programs for which the total request was $2,450.5 million. The appropriation retained RTBF and provided $2,067.4 million for it. For FY2015, the request was $2,055.5 million, the House provided $2,046.0 million, and the Senate Appropriations Committee draft recommended $2,077.5 million. P.L. 113-235 provided $2,033.4 million; the Explanatory Statement directed NNSA to provide "a ten-year strategic plan that would reduce the deferred maintenance backlog below fiscal year 2014 baseline levels and dispose of unneeded facilities." To this end, P.L. 113-235 provided, within RTBF, $224.6 million for recapitalization activities at all eight weapons complex sites.

RTBF has several subprograms. The largest is Operations of Facilities (FY2014 appropriation, $984.5 million; FY2015 request, $896.0 million; the House provided the requested amount; the Senate Committee draft recommended the requested amount, and P.L. 113-235 provided the

requested amount). The second largest is Construction (FY2014 appropriation, $422.1 million; FY2015 request, $402.8 million; the House provided $437.6 million; the Senate Committee draft recommended $438.5 million; and P.L. 113-235 provided $425.0 million).

The Construction subprogram includes controversial programs. As background, a modern nuclear weapon has two stages. Detonation of the "primary" provides the energy to detonate the "secondary." The core of the primary is the "pit," which uses plutonium; the secondary uses uranium and other materials. NNSA has encountered problems in building facilities to manufacture both components.

The Rocky Flats Plant (CO) manufactured pits on an industrial scale, up to 2,000 per year, during the Cold War. It ceased production in 1989; since then, NNSA has manufactured at most 11 pits in a year, and several larger-scale projects have been rejected or deferred, in substantial part because of cost growth. One was part of the Chemistry and Metallurgy Research Replacement (CMRR) project. It was to consist of two buildings, the Radiological Laboratory-Utility-Office Building (RLUOB), which was completed in FY2010, and the Nuclear Facility (NF). These two buildings, when combined with the existing Plutonium Facility 4 (PF-4), would permit NNSA to make pits on a larger scale and to exit the Chemistry and Metallurgy Research (CMR) building, which was opened for operations in 1952, by approximately 2019. (CMR, RLUOB, and PF-4 are at Los Alamos National Laboratory (NM).) NF was "deferred" for at least five years in the FY2013 budget request and has since been canceled, but NNSA still needed a way to exit CMR and to have a larger pit manufacturing capacity. (See CRS Report R43406, *U.S. Nuclear Weapon "Pit" Production Options for Congress*, and CRS Report R43685, *Manufacturing Nuclear Weapon "Pits": A Decisionmaking Approach for Congress*, both by (name redacted), for further details.)

For FY2015, NNSA proposed moving certain tasks from CMR to RLUOB and others from CMR to PF-4, though the budget justification document did not include the amount requested for these subprograms. While NF has been canceled, the CMRR project's budget line remains open. The House Appropriations Committee recommended $35.7 million for the CMRR project. Within RTBF, it recommended providing these funds under Construction rather than Program Readiness to provide greater transparency. It approved subprojects that were consistent with the original intent of the CMRR project, i.e., moving certain analytic activities out of CMR. The House did not amend this provision. The Senate Appropriations Committee draft also recommended $35.7 million for CMRR, with $3.7 million to transfer certain activities from CMR to RLUOB and $32.0 million to transfer other activities from CMR to PF-4; together, these transfers would help NNSA exit CMR. P.L. 113-235 provided $35.7 million for CMRR. NNSA has also proposed reinforced-concrete "modules" to house certain operations currently in PF-4. The Senate Appropriations Committee draft urged NNSA to conduct a thorough analysis of alternatives before proceeding with modules.

Secondaries are made in the Building 9212 Complex at the Y-12 National Security Complex, which was built during and shortly after World War II; one report called it "decrepit." NNSA planned to replace it with the Uranium Processing Facility (UPF). However, a recent projection of UPF cost was $8.5 billion, well over $6.5 billion, the top of the preliminary cost range, so the FY2015 request stated that NNSA is exploring alternatives intended to "deliver Building 9212 capabilities for not more than $6.5 billion and no later than 2025." The House provided $335.0 million, as requested, for UPF, but the House Appropriations Committee stated in its report, "No funding shall be available for site preparation or facility construction until the NNSA achieves 90 percent design completion for the entire project." The Senate Appropriations Committee draft also recommended $335.0 million. It stated that the new cost estimate made the original UPF "unaffordable." It directed NNSA to provide "a program requirements document … with an

integrated strategy for the entire enriched uranium mission" and to form an independent review team to provide a semiannual assessment of progress in meeting goals of the requirements document. P.L. 113-235 provided $335.0 million for UPF. The Explanatory Statement did not include a restriction on use of funds for construction before achieving 90% design completion, but directed NNSA to report on the preliminary project execution plan.

Other Programs

Weapons Activities also has several smaller programs, including:

Secure Transportation Asset provides for safe and secure transport of nuclear weapons, components, and materials. It includes special vehicles for this purpose, communications and other supporting infrastructure, and threat response. For FY2013, the appropriation was $201.5 million. The FY2014 request was $219.2 million; the appropriation was $210.0 million. The FY2015 request was $233.8 million, and the House provided $219.0 million. The House Appropriations Committee stated that the reduction was "due to excessive prior-year balances in program direction" and NNSA not providing sufficiently detailed acquisition plans for certain vehicles. The Senate Appropriations Committee draft recommended providing the requested amount. P.L. 113-235 provided $219.0 million.

The **Nuclear Counterterrorism Incident Response Program** "responds to and mitigates nuclear and radiological incidents worldwide and has a lead role in defending the Nation from the threat of nuclear terrorism." For FY2014, NNSA proposed transferring this program to Defense Nuclear Nonproliferation "to align all NNSA funding for reducing global nuclear dangers in one appropriation." Congress rejected this approach; P.L. 113-76 provided $228.2 million and retained the program in Weapons Activities. For FY2015, NNSA requested $173.4 million, and the House provided $202.9 million. Among other things, the bill provided $25.0 million for certain emergency response-related R&D that had been traditionally funded in Weapons Activities; the Administration requested no funds in the Nuclear Counterterrorism Incident Response Program for this R&D. The Senate Appropriations Committee draft recommended providing the requested amount. P.L. 113-235 provided $177.9 million, of which $142.6 million "is for emergency response activities to fully support the ninth stabilization city"—an additional city that would receive counterterrorism training and equipment.

The **Counterterrorism and Counterproliferation Program** "sustain[s] and exercise[s] the U.S. Government's ability to understand nuclear terrorism and to counter nuclear device proliferation." It conducts "national and international outreach to strengthen nuclear counterterrorism capabilities" and is "a key nexus to coordinate and integrate other nuclear technical counterterrorism efforts existing within the Federal government." FY2015 is the first year for which NNSA has requested funding, $76.9 million, for this program in Weapons Activities. The House Appropriations Committee recommended no funding for this program under Weapons Activities, maintaining that it and similar programs should be located in Defense Nuclear Nonproliferation, another NNSA component, instead of Weapons Activities. The House did not amend this provision. The Senate Appropriations Committee draft recommended providing $70.0 million. P.L. 113-235 provided $46.1 million.

The **Site Stewardship** program seeks to "bring focus on environmental compliance, nuclear materials disposition and developing the needed skills and talent for NNSA's enduring technical workforce at the laboratories and production plants." The FY2014 appropriation for this program was $87.3 million; the FY2015 request was $82.4 million. The House provided $79.5 million. The Senate Appropriations Committee draft recommended no funds for this program. P.L. 113-235 provided $76.5 million.

Defense Nuclear Security provides operations, maintenance, and construction funds for protective forces, physical security systems, personnel security, and the like. It "provides protection from a full spectrum of threats, especially terrorism, for NNSA personnel, facilities, nuclear weapons, and information." Prior to FY2014, this program was a component of Safeguards and Security. In the FY2014 request, NNSA abolished Safeguards and Security and made Defense Nuclear Security a standalone program. The FY2014 appropriation was $679.0 million. The FY2015 request was $618.1 million; the House provided $650.1 million, $32.0 million above the request. The House Appropriations Committee recommended the increase on grounds that NNSA had underfunded this program. "The Committee expects the NNSA to request a more appropriate level of funding in future years to ensure protection of special nuclear materials at the NNSA sites." The Senate Appropriations Committee draft recommended the requested amount. P.L. 113-235 provided $636.1 million.

Information Technology and Cybersecurity elements include cybersecurity, enterprise secure computing, and Federal Unclassified Information Technology. The latter will provide "commodity computing infrastructure" to support a "shift from a traditional, costly desktop support model to a cloud-provisioned virtualized desktop-based solution." The FY2014 appropriation was $145.1 million. The FY2015 request was $179.6 million; the House fully funded this request, and the Senate Appropriations Committee draft also recommended doing so. P.L. 113-235 provided the requested amount.

Legacy Contractor Pensions: For many decades, the University of California (UC) operated Los Alamos and Lawrence Livermore National Laboratories. Laboratory employees, as UC employees, could participate in the UC pension plan. When the operation of the two labs was privatized, the contracts between DOE and the new laboratory operators included provisions that mirrored the pension that lab staff who were UC employees when the labs were privatized would have received had the labs remained with UC. These pensions were larger than those provided to employees hired after privatization. To make up the difference, NNSA paid into the pension plan for the UC employees. For Weapons Activities, the FY2014 appropriation for this payment was $279.6 million. (NNSA requested an additional amount for this purpose under Defense Nuclear Nonproliferation.) The FY2015 request was $307.1 million; the House fully funded this request, and the Senate Appropriations Committee draft also recommended doing so. P.L. 113-235 provided the requested amount. Note that projected requests decline subsequently, with the projected request falling to $87.4 million in FY2019.

Domestic Uranium Enrichment: No funds were requested for this program for FY2015; the House provided $96.0 million. The House Appropriations Committee, in its report, stated, "The NNSA has concluded its project to demonstrate the technical viability of centrifuges with the United States Enrichment Corporation. Funding for Domestic Uranium Enrichment is provided to maintain those centrifuges in warm standby while the Department conducts further analysis of its tritium and enriched uranium requirements." The committee directed the Secretary of Defense, the Secretary of Energy, NNSA, and the Nuclear Weapons Council to study this topic. The Senate Appropriations Committee draft recommended providing $110.0 million for this program. "The committee directs that the Department of Energy shall use these funds only to maintain existing centrifuges and facilities associated with domestic enrichment capabilities and safeguard intellectual property rights." P.L. 113-235 provided $97.2 million. It provided funds "to maintain centrifuges in standby and to conduct further analysis of enriched uranium and tritium needs." Among other things, the Explanatory Statement directed NNSA to evaluate tritium stockpile requirements and barred use of FY2015 funds to build centrifuges for enriched uranium production.

Nonproliferation and National Security Programs[96]

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 the National Nuclear Security Administration.

Table 14. DOE Defense Nuclear Nonproliferation Programs

($ millions)

Program	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	FY2015 Approp.
Global Threat Reduction Initiative	$462.9	$442.1	$333.5	$342.9	$469.4	$325.8
Defense Nuclear Nonproliferation Research and Development (formerly Nonproliferation and Verification R&D)	420.5	398.8	360.8	452.7	393.4	393.4
Nonproliferation and International Security	143.1	128.7	141.4	144.2	141,4	141.4
International Materials Protection and Cooperation	527.9	419.6	305.5	233.4	355.8	270.9
Fissile Materials Disposition	663.8	526.1	311.1	430.0	515.1	430.0
Legacy Contractor Pensions	51.4	93.7	102.9	102.9	102.9	102.9
Rescissions and Use of Prior Year Funds	-32.2	-55.0	0.0	-151	0	-47.7
Total	**2,237.4**	**1,954.0**	**1,555.2**	**1,592.2**	**1,978**	**1,616.4**

Source: FY2015 budget request; H.Rept. 113-486; Senate Appropriations Committee; P.L. 113-235; Explanatory Statement; Congressional Record Vol. 160, No.151, December 11, 2014.

Notes: Numbers may not add due to rounding. Negative numbers denote appropriations offsets.

For FY2015 the Administration requested $1,555.2 million for Defense Nuclear Nonproliferation programs and Congress appropriated $1,641.4 million. After rescissions and use of prior-year funds, the total appropriated was $1,616.4 million. The bill directs the use of prior-year balances from the Russian Fissile Material Disposition subaccount and does not fund the request for international material protection work in Russia.

Overall, the request included reductions in virtually all nonproliferation programs, in particular the U.S. plutonium disposition program (see below). Both the House bill and the Senate Appropriations subcommittee increased funding for these programs. The House Appropriations Committee report said that no new cooperative nonproliferation programs with the Russian Federation could be funded, and directed DOE to report to Congress on whether ongoing and new nuclear security programs with Russia are addressing U.S. national security goals. The Senate subcommittee recommended an increase of $422.8 million above the request and expressed

[96] This section was prepared by Mary Beth Nikitin.

concern that the NNSA's budget request "does not make nonproliferation activities a priority and fails to provide the necessary resources to complete critical nonproliferation efforts."

Defense Nuclear Nonproliferation R&D

The Nonproliferation and Verification R&D program was funded at $393.4 million for FY2015. The request for FY2015 was $360.8 million. Both House and Senate panels recommended an increase to advance nuclear detection technologies. The House report directed DOE to form a lead office responsible for coordinating development of a national nuclear forensics capability. The Senate subcommittee and the final bill directed NNSA to conduct a joint study with DOD on whether there is still a need to build and deploy space sensors for atmospheric testing. The Explanatory Statement says that within these funds, $66.9 million is for the National Center for Nuclear Security, acceleration of efforts to "develop the next generation of warhead monitoring technologies, improve low-yield nuclear test detection capabilities and deploy long-range remote monitoring technologies for plutonium and uranium production detection."

Nonproliferation and International Security

Nonproliferation and International Security programs include international safeguards, export controls, and treaties and agreements. The FY2015 request for these programs was $141.4 million, compared with $128.7 million appropriated for FY2014. The House increased funding for this program for the purpose of accelerating technical review of export licenses for dual-use commodities, according to the committee report. However, the final appropriation matched the request at $141.4 million.

International Materials Protection and Cooperation

International Materials Protection and Cooperation (IMPC), which works with partner countries to secure nuclear warheads and weapons-usable material, was funded at $270.9 million (FY2015 request was $305.5 million). The decrease from previous years, according to DOE's FY2015 budget justification document, reflects a shift "to a sustainability phase with the Russian Federation" in which "security costs are increasingly transitioned to the Russian side." DOE programs that enhance security at Russian warhead storage facilities have ended, in part because of the conclusion of the work and in part because of the lapse in cooperation with Russia's Ministry of Defense, even before the spring 2014 events in Ukraine.

The IMPC request for FY2015 included a reduction in the Second Line of Defense program, mostly border and port detection programs, from $272.0 million in FY2013 and $190.0 million in FY2014, to a requested $117.7 million for FY2015. According to DOE, the decline in funding between FY2014 and FY2015 is due to both a one-time funding increase in FY2014 to support a key detection program and adjustments that were made in FY2015 because of the need to fund higher NNSA priorities following a strategic review of the program. The House Appropriations Committee excluded funding for any IMPC activities in Russia, resulting in a House appropriation that was $72.1 million lower than the request. The Senate subcommittee funded this program at $50 million over the request, to include $150 million for Second Line of Defense. The final bill did not include $66.9 million requested for IMPC projects in Russia, and forbade funding for the Multiple Integrated Laser Engagement System in Russia.

Fissile Materials Disposition

The goal of the Fissile Materials Disposition (FMD) program is disposal of U.S. surplus weapons plutonium by converting it into fuel for commercial power reactors, and a similar program in

Russia. The U.S. side of the program originally included construction of three projects at Savannah River, SC: a facility to fabricate "mixed-oxide" (MOX) reactor fuel, a pit disassembly and conversion facility (PDCF), and a waste solidification facility. However, controversy developed over whether the pit disassembly project was necessary. The FY2012 request for the Fissile Materials Disposition program was $892.2 million, including $172 million for the PDCF, but the final bill appropriated $685.4 million for the program, and included no funding for the PDCF project, because, the conference report stated, "NNSA has not completed a study of alternatives or a conceptual design report with a cost and schedule estimate."

The FY2013 request for FMD programs was $921.3 million. No funding was sought for the PDCF; NNSA said it would use existing facilities for pit disassembly. The waste solidification facility was completed and no further funding was requested. The major cause of the increase was the planned cold start-up of the MOX facility. However, no funding increase for the MOX project was included in the FY2013 continuing resolution, and the start-up was delayed. The actual FY2013 MOX appropriation was $401.0 million; the total FMD appropriation was $631.6 million. In the meantime the estimated total cost for the facility was increased from $4.8 billion to $7.7 billion, in part to expand its capability to carry out the functions of the cancelled PDCF plant.

In its FY2014 budget request, NNSA decided to slow down completion of the MOX plant, and begin a process of "evaluating alternatives for a new and affordable plutonium disposition strategy." It asked for a total of $502.6 million for FMD programs, including $320 million for the MOX plant. The House bill would have appropriated the requested amount, but the House Appropriations Committee report said no additional funding would be provided to study alternatives to the MOX plant, since NNSA had not submitted any alternatives that had not been "exhaustively studied" or would likely cost less. The Senate Appropriations Committee rejected the pause in MOX construction, funding the facility at $430.6 million and total FMD programs at $669.2 million. The final appropriations bill, P.L. 113-76, provided $343.5 million for MOX construction, and a total of $526.1 million for the whole FMD program.

The FY2015 budget request continued the Administration's policy of maintaining the MOX project in cold stand-by "while we further analyze options to complete the plutonium disposition mission more efficiently." The FY2015 request for the total FMD program was $311.1 million. (For more details, see CRS Report R43125, *Mixed-Oxide Fuel Fabrication Plant and Plutonium Disposition: Management and Policy Issues*, by (name redacted) and (name redacted).) The House provided $430 million for this program, $118.9 million above the budget request, with the committee report directing the continuation of work on the construction of the MOX fabrication facility and prohibiting any use of funds to place the project in cold standby. The Senate subcommittee also recommended continued construction of the MOX fabrication facility and funding the program at $515.1 million. The Senate subcommittee report directed NNSA to provide an assessment of alternatives for plutonium disposition and a recommended approach within 120 days of enactment. However, the Explanatory Statement for the final bill directed NNSA to submit an independently verified lifecycle cost estimate for "the option to complete construction and operate the MOX facility and the option to downblend and dispose of the material in a repository."

The final FY2015 appropriation included $345 million for continued construction of the Savannah River MOX Fuel Fabrication Facility, and the Explanatory Statement prohibited NNSA from placing the project in cold standby in FY2015.

Global Threat Reduction Initiative

The Global Threat Reduction Initiative (GTRI) is aimed at converting research reactors around the world from using highly enriched uranium, removing and disposing of excess nuclear materials, and protecting nuclear materials from theft or sabotage. The FY2015 appropriation for this program was $325.8 million, compared with the FY2014 amount of $442.1 million. The FY2015 request was $333.5 million. The Administration has explained the program decrease by saying that the program is accomplishing its goals, and therefore there is less material to be removed.

The House approved funding at $9.4 million above the request. The House Committee report also eliminated funds for conversion costs of a reactor fueled by highly enriched uranium (HEU) at the Kurchatov Institute in Russia, "which has ties to the Russian military." The Senate subcommittee recommended funding at $136 million above the request to include: $39 million for developing a Molybdenum-99 isotope for nuclear medicine produced with low-enriched uranium by 2016; an additional $55 million for nuclear and radiological material removal efforts; and additional funds for domestic nuclear and radiological material security programs. The final FY2015 appropriation did not provide $25.4 million sought for GTRI projects in Russia. It specified that $67.9 million within the GTRI account should be used to achieve the goal of securing all buildings in the United States with Category 1 source materials (with high risk for use in nuclear explosives) by 2016.

Cleanup of Former Nuclear Weapons Production Sites and Civilian Nuclear Energy Research Sites[97]

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 legacy of wastes and contamination 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.[98] These 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.[99] 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 non-defense component to the office's mission, albeit smaller in terms of the scope of their cleanup and associated funding.[100]

[97] This section was prepared by David Bearden.

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

[99] 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.

[100] For additional information on the history, mission, and scope of the Office of Environmental Management, see (continued...)

Efforts to clean up the environmental legacy of nuclear weapons production and nuclear energy research represent the single largest environmental liability of the United States, exceeding the cleanup liability of Department of Defense facilities. The need for annual appropriations of several billion dollars for ongoing cleanup efforts at nuclear weapons production sites and nuclear energy research sites has generated continuing interest within Congress about the long-term financial liability of the United States to address potential risks at these sites. How to ensure the protection of public safety, human health, and the environment in the most expedient and cost-effective manner has been a perennial issue in the appropriations debate.

DOE has identified in excess of 100 "geographic" sites in over 30 states that historically were involved in the production of nuclear weapons and nuclear energy research for civilian purposes.[101] 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.[102] (See the "Office of Legacy Management" section of this report.) 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). The cleanup of these sites is funded within the civil works budget of the Corps.[103] (See **Table 4**.) 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, necessitating tens of billions of dollars to fulfill the cleanup liability of the United States. By the end of FY2014, the Office of Environmental Management planned to have completed the cleanup of 91 sites in 30 states and the Commonwealth of Puerto Rico, and to continue the cleanup of 16 sites in 11 states.[104]

The Hanford site in the state of Washington has the lengthiest estimated time frame, with cleanup scheduled for completion in 2070.[105] DOE estimates that the costs to complete the cleanup of Hanford and the other remaining sites could range between $180.9 billion and $219.0 billion from FY2014 into the future, exceeding the past costs already incurred across the entire site inventory.[106] A substantial proportion of these funding needs and time frames is due to challenges

(...continued)

DOE's website: http://energy.gov/em/office-environmental-management.

[101] 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.

[102] 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.

[103] Enacted October 13, 1997, the Energy and Water Development Appropriations Act for FY1998 (P.L. 105-62) directed DOE to transfer the cleanup of 21 FUSRAP sites to the Army Corps of Engineers. DOE has remained responsible for determining the eligibility of additional sites, and Congress has designated certain sites in legislation.

[104] Department of Energy, Office of Chief Financial Officer, *FY2015 Congressional Budget Request*, March 2014, Volume 5, Environmental Management, p. 5. See p. 84 for a list of the 16 sites where cleanup is planned to continue in FY2015. One of these 16 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.

[105] Ibid., p 84.

[106] Ibid., p. 83. DOE reports that the Office of Environmental Management has incurred $109.4 billion in past costs (continued...)

in managing, treating, and disposing of millions of gallons of high-level radioactive wastes stored in hundreds of tanks at the Hanford site, the Savannah River Site in South Carolina, and the Idaho National Laboratory.

Over time, DOE periodically has revised its estimates as project baselines and assumptions change. These estimates have varied widely over the years by many billions of dollars. DOE typically estimates a range of costs, rather than a single dollar amount, to reflect uncertainties in the cleanup process. For example, final decisions have yet to be made at some sites to determine the actions that will be necessary to remediate contamination. Methods to dispose of vast quantities of wastes, and the scheduling of these actions, also could affect cleanup costs and time frames. The costs of long-term stewardship after the completion of cleanup also are excluded from the above cost estimates. Long-term stewardship entails an even greater degree of uncertainty, considering the lengthy time frames of maintenance and monitoring once cleanup remedies are in place and operational, especially at sites where the cleanup method may entail the permanent containment of radioactive wastes.

FY2015 appropriations for the Office of Environmental Management and Office of Legacy Management are discussed separately below.

Office of Environmental Management

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 were used to enrich uranium for national defense and civilian purposes.[107] 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.[108] The three federal uranium enrichment facilities are located near Paducah, KY; Piketon, OH (Portsmouth plant); and Oak Ridge, TN.

P.L. 113-235 appropriated a total of $5.87 billion for these three accounts combined to fund the Office of Environmental Management in FY2015 after accounting for offsets and rescissions, an increase above both the President's request of $5.62 billion and the FY2014 enacted appropriations of $5.83 billion. As passed by the House, H.R. 4923 had proposed $5.63 billion for FY2015, and the Senate subcommittee draft bill had recommended $5.94 billion. Various issues regarding funding for the Office of Environmental Management that have received attention in the FY2015 appropriations debate are discussed below, followed by a breakout of proposed funding levels by account, major site, and program area.

(...continued)

from FY1997 through FY2013. Including these past costs, the estimated total "life-cycle" costs of cleanup range from $290.3 billion to $328.4 billion. DOE has used FY1997 as the baseline, or starting point, for the time frame of these life-cycle estimates. Historically, DOE also has reported $35 billion in past costs incurred since the establishment of the Office of Environmental Management in 1989 through FY1996, yielding a total of $144.4 billion in past costs incurred from 1989 to FY2013. Comprehensive information on past costs incurred prior to the establishment of the Office of Environmental Management in 1989 is not readily available.

[107] 42 U.S.C. §2297g.

[108] 42 U.S.C. §2296a.

Cleanup Milestones

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, the Environmental Protection Agency (EPA), and the states. These milestones establish time frames for the completion of specific actions to satisfy applicable requirements at individual sites.[109]

In its FY2015 budget justification, DOE noted its anticipation that the President's request would provide sufficient funds to meet enforceable cleanup milestones due in FY2015. However, DOE acknowledged that meeting these milestones may involve negotiations of compliance requirements with federal and state environmental regulators.[110] In its report on H.R. 4923, the House Appropriations Committee noted its concern about the ability of DOE to meet cleanup commitments due to the committee's anticipation "that funding available for environmental cleanup will continue to be highly constrained for the next several years."[111]

In its draft report, the Senate subcommittee expressed concern about the ability of DOE to attain cleanup milestones, particularly at the Hanford site in FY2015 and future fiscal years under deadlines established in the existing compliance agreement with EPA and the state of Washington (referred to as the Tri-Party Agreement).[112]

P.L. 113-235 provided an overall increase above the President's request for most DOE sites administered by the Office of Environmental Management, making more resources available for cleanup needs overall. However, the enacted funding level for some sites in FY2015 is less than the President requested, including the Savannah River Site in South Carolina and the NNSA sites and Nevada off-sites. See **Table 15**.

Waste Isolation Pilot Plant

The adequacy of funding to re-open the Waste Isolation Pilot Plant (WIPP) emerged as a prominent issue in the FY2015 appropriations debate. WIPP is the centralized geologic repository located in New Mexico that serves as the site for the permanent disposal of defense-related transuranic wastes generated at other DOE sites.[113] Incidents in February 2014 at WIPP involving a fire resulting from a truck hauling accident inside the repository and a separate radiological release have resulted in the temporary closure of the facility and suspension in the receipt of new shipments of transuranic wastes from other sites.[114] DOE has been investigating the nature of the incidents and issued a recovery plan on September 30, 2014, to resume the operation of WIPP.[115]

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

[110] DOE, Office of Chief Financial Officer, *FY2015 Congressional Budget Request*, March 2014, Volume 5, Environmental Management, p. 6.

[111] See H.Rept. 113-486, pp. 148-149.

[112] See Senate subcommittee draft report, pp. 121-122.

[113] DOE generally characterizes transuranic wastes as clothing, tools, rags, residues (e.g., waste sludge), debris, soil, and other items contaminated with plutonium and certain other radionuclides.

[114] Information on these incidents is available on the DOE website: http://www.wipp.energy.gov/wipprecovery/accident_desc.html.

[115] Information on these investigations and the recovery plan is available on the DOE website: http://www.wipp.energy.gov/wipprecovery/path_forward.html.

The plan outlines measures that are intended to allow the resumption of limited waste disposal operations sometime during the first quarter of calendar year 2016.

P.L. 113-235 appropriated $320 million within the Defense Environmental Cleanup account for WIPP in FY2015, a $104 million increase above both the President's request and the FY2014 enacted appropriations of $216 million. The Explanatory Statement accompanying H.R. 83 noted that the increase is intended to "fully support the WIPP recovery effort" and directed DOE to include a separate accounting of all funds supporting the WIPP recovery plan in the President's FY2016 budget request.[116] The Administration initially had formulated the President's FY2015 budget request prior to the timing of the incidents that resulted in the closure of the facility. The President's request therefore had not included any funds for the recovery effort when the Administration originally submitted it to Congress.

As passed by the House, Section 310 of H.R. 4923 had proposed to transfer up to $120 million from accounts of the National Nuclear Security Administration (NNSA) to the Defense Environmental Cleanup account of the Office of Environmental Management for WIPP.[117] In its report on H.R. 4923, the House Appropriations Committee had noted that these funds would have been intended for recovery efforts to re-open WIPP to receive waste shipments, and had expressed concern about the potential effects of the closure of WIPP on DOE's ability to meet cleanup commitments at other DOE sites where transuranic wastes are awaiting disposal.[118] The funds available for this transfer would have been supplemental to the $236 million for WIPP that the House included within the Defense Environmental Cleanup account in H.R. 4923. With these funds combined, the House bill would have provided up to $356 million for WIPP in FY2015.

In its draft report, the Senate subcommittee also had commented on the incidents that have resulted in the closure of WIPP and the efforts of DOE to re-open the repository to receive transuranic wastes awaiting shipment from other sites. The subcommittee had expressed its concern about the lack of a detailed budget justification for the funding that would be needed to resume operations. The subcommittee had noted that it is "prepared to fund necessary additional investigation and recovery operations at WIPP to ensure the safe rehabilitation and continuation of the facility" and urged DOE to submit a detailed remediation plan "so that resources are properly allocated."[119] The Senate subcommittee bill would have provided $318 million for WIPP recovery efforts in FY2015 within the Defense Environmental Cleanup account.

Uranium Enrichment D&D Fund

The adequacy of the balance of the Uranium Enrichment D&D Fund to finance the cleanup of federal uranium enrichment facilities also was an issue in the FY2015 appropriations debate. The Office of Management and Budget (OMB) estimated that $3.0 billion would be available for appropriation from the Uranium Enrichment D&D Fund at the beginning of FY2015, consisting of unexpended past assessments on nuclear utilities that expired in October 2007, past federal

[116] *Congressional Record*, vol. 160, Book II (December 11, 2014), pp. H9705-H9706.

[117] From funds in excess of current requirements for NNSA contractor pension plan payments, Section 310 of H.R. 4923 would have authorized transfers of up to $90 million from the NNSA Weapons Activities account, and up to $30 million from the NNSA Defense Nuclear Nonproliferation account, to the Defense Environmental Cleanup account of the Office of Environmental Management to "support decontamination and other requirements" at WIPP.

[118] See H.Rept. 113-486, p. 129, and pp. 148-149.

[119] See Senate subcommittee draft report, p. 123.

payments that Congress had ceased in FY2012, and interest accrued on the unexpended balance.[120]

P.L. 113-235 appropriated $625 million from the Uranium Enrichment D&D Fund in FY2015 for the cleanup of federal uranium enrichment facilities and related sites. As noted earlier in this report, these federal facilities are located near Paducah, KY; Piketon, OH (Portsmouth plant); and Oak Ridge, TN. The FY2015 enacted appropriation is an increase above the Senate subcommittee recommendation of $594 million, the House-passed amount of $586 million in H.R. 4923, the President's FY2015 budget request of $531 million, and the FY2014 enacted appropriations of $598.8 million.

Of the FY2015 enacted appropriations of $625 million, P.L. 113-235 allocated $10 million to reimburse uranium/thorium licensees for their costs of cleaning up contamination attributed to national defense purposes. As passed by the House, H.R. 4923 had included $20 million for these reimbursement payments. In its report on that bill, the House Appropriations Committee noted the status of unpaid claim balances and directed DOE to request sufficient funding in the future to pay approved claims.[121] The Senate subcommittee bill had included $10 million for the uranium/thorium licensee reimbursement payments, the amount in the final bill enacted in P.L. 113-235. In its draft report, the Senate subcommittee had expressed concern similar to the House regarding the status of the unpaid claim balances and also directed DOE to include sufficient funding in its annual budget requests to pay approved claims.[122]

As the Senate subcommittee bill had proposed and the President had requested, P.L. 113-235 appropriated an additional $463 million to resume the federal payment to the Uranium Enrichment D&D Fund through a transfer from the Defense Environmental Cleanup account. As passed by the House, H.R. 4923 did not include any funding for this federal payment. Whether to reauthorize the payment has been a recurring issue, since Congress had ceased it in FY2012. The federal payment historically has been treated as an offset to the funding for the Office of Environmental Management because the payment does not become available to DOE until Congress subsequently appropriates it out of the Uranium Enrichment D&D Fund.

The Explanatory Statement accompanying H.R. 83 noted that while the federal payment to the Uranium Enrichment D&D Fund would resume in FY2015, no authority was provided to resume collections of assessments from nuclear utilities that once helped to finance the Uranium Enrichment D&D Fund.[123] As the President had proposed, Section 310 of the Senate subcommittee bill would have reauthorized the collection of up to $200 million in assessments on nuclear utilities in FY2015 to generate additional revenues for the Uranium Enrichment D&D Fund. As passed by the House, H.R. 4923 would not have reauthorized the collection of these assessments. The authority to collect the assessments expired in October 2007 under existing law.

As authorized in the Energy Policy Act of 1992, both federal payments and nuclear utility assessments originally financed the Uranium Enrichment D&D Fund.[124] This sharing of liability was based on the premise that the federal government and the nuclear utilities benefited from services provided by federal uranium enrichment facilities and that both therefore should share the cleanup costs at these facilities. Nuclear utilities have asserted that they fulfilled their original

[120] Office of Management and Budget, *FY2015 Budget of the U.S. Government,* Appendix, p. 408.

[121] See H.Rept. 113-486, p. 117.

[122] See Senate subcommittee draft report, p. 98.

[123] *Congressional Record,* vol. 160, Book II (December 11, 2014), p. H9706.

[124] 42 U.S.C. §2297g-1.

obligations under the Energy Policy Act of 1992. However, the Obama Administration has observed that additional revenues eventually would be needed based on the remaining balance of the Uranium Enrichment D&D Fund, compared to more recent estimates of cleanup costs.

DOE last estimated in December 2010 that the balance of the Uranium Enrichment D&D fund would be exhausted by FY2020 without additional revenues, leaving a shortfall of $11.8 billion to complete the cleanup of federal uranium enrichment facilities over the long term.[125] If the fund were fully expended, DOE would remain responsible for the cleanup costs under existing law, subject to appropriations by Congress.[126] In its draft report, the Senate subcommittee directed DOE to update its December 2010 report on the status of the Uranium Enrichment D&D Fund, in accordance with Section 1805 of the Atomic Energy Act.[127] The Explanatory Statement accompanying H.R. 83 directed DOE to provide a status report on the Uranium Enrichment D&D Fund (including a general schedule of cleanup milestones and costs) to the House and Senate Appropriations Committees no later than 90 days after enactment.[128] The report also is to include an updated timeline and explanation of cost and schedule assumptions for DOE's assumption of responsibility for certain process buildings in FY2015 in support of the transition of the Paducah Gaseous Diffusion Plant from the United States Enrichment Corporation (USEC) back to DOE.

Breakout by Account, Site, and Program Activity

Table 15 presents FY2015 appropriations for each of the three appropriations accounts that fund the DOE Office of Environmental Management, as enacted in P.L. 113-235, as passed by the House in H.R. 4923 and as proposed in the Senate subcommittee bill. The table compares these amounts to the President's FY2015 budget request and the enacted appropriations for FY2014 and FY2013 (post-sequestration). The table also provides a breakout within each account by major site and program activity and presents the net total funding level for the Office of Environmental Management for the three accounts combined. Rescissions and offsets are reflected in the table, including the use of unobligated balances of prior appropriations and the federal payment to the Uranium Enrichment D&D Fund.

As in past fiscal years, the Hanford site in the state of Washington, the Idaho National Laboratory, and the Savannah River Site in South Carolina constitute the largest portions of the FY2015 appropriations for the Office of Environmental Management. The scope and complexity of wastes and contamination at these sites are among the greatest cleanup challenges among the inventory of the remaining sites where cleanup is not complete.

Table 15. Appropriations for the Office of Environmental Management

($ millions)

Account/Site or Program Activity	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	FY2015 Approp.
Defense Environmental Cleanup						
Closure Sites Administration	4.9	4.7	4.9	4.9	4.9	4.9
Hanford	1,974.5	2,151.2	2,083.1	2,085.1	2,176.0	2,153.0

[125] DOE, *Uranium Enrichment Decontamination and Decommissioning Report to Congress*, December 2010, p. 42.

[126] 42 U.S.C. §2297g-2(c).

[127] 42 U.S.C. §2297g-4.

[128] *Congressional Record*, vol. 160, Book II (December 11, 2014), p. H9701.

Account/Site or Program Activity	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	FY2015 Approp.
- Richland Operations	*877.1*	*941.0*	*848.1*	—	*941.0*	*941.0*
- Office of River Protection	*1,097.4*	*1,210.2*	*1,235.0*	—	*1,235.0*	*1,212.0*
Idaho National Laboratory	355.8	387.0	367.2	380.2	367.2	380.2
NNSA Sites and Nevada Off-sites	279.2	314.7	293.6	249.0	293.6	258.6
Oak Ridge Reservation	183.5	215.0	206.9	212.8	228.9	223.1
Savannah River Site	1,094.7	1,134.2	1,150.1	1,104.9	1,150.1	1,121.3
Waste Isolation Pilot Plant	197.8	216.2	216.0	236.0	318.0	320.0
Program Direction	295.8	300.0	280.8	280.8	280.8	280.8
Program Support	18.2	18.0	15.0	17.0	15.0	15.0
Safeguards and Security	231.8	241.0	234.0	234.0	254.5	240.0
Technology Development	9.8	18.0	13.0	10.0	13.0	14.0
Federal Payment to Uranium Enrichment D&D Fund	0.0	0.0	463.0	0.0	463.0	463.0
Use of Prior Year Balances	-19.0	0.0	0.0	-13.4	0.0	0.0
Rescission	0.0	0.0	0.0	0.0	0.0	-10.8
Defense Environmental Cleanup Subtotal	**4,627.1**	**5,000.0**	**5,327.5**	**4,801.3**	**5,565.0**	**5,463.0**
Non-Defense Environmental Cleanup						
Fast Flux Test Reactor	2.6	2.5	2.6	2.6	2.6	2.6
Gaseous Diffusion Plants	95.3	96.2	104.4	104.4	104.4	104.4
Small Sites	66.0	71.2	60.2	65.2	80.0	80.0
West Valley Demonstration Project	59.6	64.0	59.0	59.0	59.0	59.0
Construction Security Upgrades	—	—	—	10.0	—	—
Use of Prior Year Balances	0.0	-2.2	0.0	0.0	0.0	0.0
House Floor Amendment (H.Amdt. 999)	—	—	—	4.0	—	—
Non-Defense Environmental Cleanup Subtotal	**223.5**	**231.8**	**226.2**	**245.2**	**246.0**	**246.0**
Uranium Enrichment D&D Fund						
Gaseous Diffusion Plants	448.2	598.8	505.1	540.1	558.1	589.1
- Oak Ridge	*200.4*	*196.0*	*137.9*	*157.9*	*182.9*	*167.9*
- Paducah	*92.5*	*265.2*	*207.2*	*207.2*	*207.2*	*207.2*
- Portsmouth	*155.3*	*137.6*	*160.0*	*175.0*	*168.0*	*214.0*
Pension, Community, and Regulatory Support	—	—	25.9	25.9	25.9	25.9
Title X Uranium/Thorium Reimbursements	0.0	0.0	0.0	20.0	10.0	10.0
Uranium Enrichment D&D Fund Subtotal	**448.2**	**598.8**	**531.0**	**586.0**	**594.0**	**625.0**
Offset for Federal Payment to Uranium Enrichment D&D Fund	0.0	0.0	-463.0	0.0	-463.0	-463.0
Office of Environmental Management Total	**5,298.7**	**5,830.6**	**5,621.7**	**5,632.4**	**5,942.0**	**5,871.0**

Sources:

FY2015 enacted amounts are as presented in the Explanatory Statement accompanying the Consolidated and Further Continuing Appropriations Act, 2015 (H.R. 83), issued in the *Congressional Record*, December 11, 2014, Book II, pp. H9709-H9710, and pp. H9716-H9718.

FY2015 amounts for the House and the President's request, and the FY2014 enacted amounts, are as presented by the House Appropriations Committee in its report on H.R. 4923 (H.Rept. 113-486, pp. 163-164 and pp. 180-183). FY2015 House amounts reflect the $4 million increase for the Non-Defense Environmental Cleanup account approved in a floor amendment (H.Amdt. 999) to H.R. 4923.

FY2015 Senate amounts reflect the markup of the Senate subcommittee on Energy and Water Development of the Senate Appropriations Committee, as presented in its draft bill and draft report (pp. 132-133 and pp. 142-145).

FY2013 enacted appropriations reflect the application of sequestration and other rescissions, as reported by DOE. Numbers may not add due to rounding.

Notes:

In the Defense Environmental Cleanup account, the House Committee on Appropriations consolidated the funding for both the Richland Operations Office and the Office of River Protection into one line-item for the Hanford site in its report on H.R. 4923. Although the committee presented a breakout of this funding for specific projects, it did not present a consolidated amount for each office separately as in past years.

Pension, Community, and Regulatory Support is broken out in the Uranium Enrichment D&D Fund for FY2015 as a separate line-item. This activity received funding within the account total enacted for FY2013 and FY2014, but was not broken out for those fiscal years.

Office of Legacy Management

Once cleanup remedies are in place under the Office of Environmental Management, DOE's Office of Legacy Management administers the long-term stewardship of sites that do not have a continuing mission and at which residual contamination or wastes may remain. The Office of Legacy Management also is responsible for the long-term stewardship of sites that had been transferred from DOE to the Army Corps of Engineers under the FUSRAP program in 1997. Once the Corps completes the cleanup of a site under this program, it is responsible for the initial two years of operation and maintenance, after which time the site is transferred back to DOE's Office of Legacy Management for long-term stewardship.[129]

The Office of Legacy Management also manages the payment of pensions and retirement benefits of former contractor personnel who worked at DOE sites that do not have a continuing mission,[130] among other supporting activities.[131] The federal role in the management of these former contractor pensions and benefits stems from the long-term nature of the projects and the associated length of employment for the personnel who performed the work for DOE. These pensions and benefits are earned and accrued by contractor employees while in active employment at DOE sites and are payable after their employment ends.[132]

The Office of Legacy Management has been funded entirely within DOE's Other Defense Activities account since FY2009.[133] P.L. 113-235 appropriated $172 million for the Office of

[129] Memorandum of Understanding Between the U.S. Department of Energy and the U.S. Army Corps of Engineers Regarding Program Administration and Execution of the Formerly Utilized Sites Remedial Action Program (FUSRAP), March 1999.

[130] Similar to long-term stewardship responsibilities, the payment of pensions and post-retirement benefits of workers at sites with a continuing DOE mission is assigned to the program office within DOE that is responsible for administering that mission, rather than the Office of Legacy Management.

[131] For more information on the history, mission, and scope of the activities of the Office of Legacy Management, see DOE's website: http://energy.gov/lm/office-legacy-management.

[132] For more information on DOE's management of former contractor pensions and benefits, see the Office of Legacy Management Post-Closure Benefits Program website: http://www.lm.doe.gov/default.aspx?id=172.

[133] Prior to FY2009, Congress appropriated funding for the relatively small number of non-defense sites administered by the Office of Legacy Management within a stand-alone account. The majority of the sites administered by this office were involved in the U.S. nuclear weapons program, but some of the sites were contaminated by civilian nuclear (continued...)

Legacy Management within this account for FY2015, the same amount as the President's request, the House-passed amount in H.R. 4923, and the Senate subcommittee bill. The FY2015 appropriation is $5 million less than the FY2014 enacted appropriations of $177 million.[134] DOE had attributed the requested reduction mostly to more recent savings in pension and benefits costs. DOE also has established a performance target of lowering site long-term stewardship costs by at least 2% annually through cost-efficiencies while continuing to comply with all applicable regulatory requirements.[135] However, funding needs for the Office of Legacy Management may increase over time as cleanup is completed at additional sites that are transferred from the Office of Environmental Management and the FUSRAP program for long-term stewardship. The Office of Legacy Management will be responsible for the long-term stewardship of 96 sites in FY2015.[136] DOE projects that the number of these sites will increase to a total of 129 by FY2020.[137]

Estimating the long-term funding needs for the Office of Legacy Management is inherently challenging because of the lengthy time horizons that are involved. For example, actions may be necessary for many decades to operate and maintain cleanup remedies and monitor contaminant levels to ensure the effectiveness of the remedies over time. At sites where the cleanup entails the permanent containment of radioactive wastes, long-term stewardship may continue indefinitely because of the time needed for radioactive elements to decay to acceptable levels. Enforcement of land use restrictions or other institutional controls also may be necessary in perpetuity at sites that are not cleaned up for unrestricted use, in order to prevent potentially harmful exposures. These and other factors make it difficult to reliably estimate the financial liability of the United States for long-term stewardship of sites contaminated from the historic production of nuclear weapons and civilian nuclear energy research in the 20th century.[138]

Power Marketing Administrations[139]

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.[140] In many cases, conservation and management of water resources—including irrigation, flood control, recreation, or other objectives—were the primary purpose of federal

(...continued)

energy research activities.

[134] See H.Rept. 113-486, p. 184, and Senate subcommittee draft report, p. 146.

[135] DOE, Office of Chief Financial Officer, *FY2015 Congressional Budget Request*, March 2014, Volume 2, Other Defense Activities, p. 77.

[136] Ibid.

[137] DOE, Office of Legacy Management, *2011-2020 Strategic Plan*, DOE/LM-0512, January 2011, p. 5, available on DOE's website: http://energy.gov/lm/downloads/2011-2020-strategic-plan.

[138] DOE annually estimates the financial liabilities of long-term stewardship as a portion of other environmental liabilities of the department, but does not report a separate estimate just for long-term stewardship. Furthermore, DOE estimates these liabilities only for the first 75 years and acknowledges that costs are likely to be incurred beyond this time frame that "cannot reasonably be estimated." See Department of Energy, *Fiscal Year 2014 Agency Financial Report*, November 2014, "Environmental Cleanup and Disposal Liabilities," pp. 67-69, available on DOE's website: http://energy.gov/sites/prod/files/2014/11/f19/DOE_FY2014_AFR.pdf.

[139] This section was prepared by (name redacted).

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

projects. (For more information, see CRS Report RS22564, *Power Marketing Administrations: Background and Current Issues*, by (name redacted) .)

Priority for PMA power is extended to "preference customers," which include municipal utilities, cooperatives, and other "public" bodies. The PMAs sell power to these entities "at the lowest possible rates" consistent with what they describe as "sound business practice." The PMAs are responsible for covering their expenses and for repaying debt and the federal investment in the generating facilities.

The Obama Administration's FY2015 request for the PMAs was $82 million. This is slightly less than the FY2014 enacted level of $85 million.[141] The FY2015 budget request continued a change enacted in FY2010 that reclassified receipts from the PMAs from mandatory to discretionary. This change offsets many of the expenses of WAPA, SWPA, and SEPA that were previously paid for with discretionary appropriations. As a result of the change, two PMAs require discretionary funding in addition to their receipts: SWPA requested $11.4 million and WAPA requested $93.4 million. Receipts for SEPA are expected to offset all operating costs in FY2015. In addition, $228,000 is requested for Falcon and Amistad operations and maintenance, and collections of $23 million from Colorado River basins score as an additional offset toward the net discretionary appropriation for WAPA. The House agreed with the Administration's requested levels for all of the PMAs, as did the Senate subcommittee. P.L. 113-235 enacted the proposed funding levels.

BPA is a self-funded agency under authority granted by P.L. 93-454 (16 U.S.C. §838), the Federal Columbia River Transmission System Act of 1974, and receives no appropriations. However, it funds some of its activities from permanent borrowing authority with the Treasury, which was increased in FY2003 from $3.75 billion to $4.45 billion (a $700 million increase). The American Recovery and Reinvestment Act (ARRA, P.L. 111-5) further increased the amount of borrowing that BPA conducts under the Transmission System Act by $3.25 billion to the current authority for $7.7 billion in bonds outstanding to the Treasury.

ARRA also provided WAPA borrowing authority for the purpose of planning, financing, or building new or upgraded electric power transmission lines to facilitate the delivery of renewable energy resources constructed by or expected to be constructed after the date of enactment. The authority to borrow from the U.S. Treasury had not previously been available to WAPA. It is now available on a permanent, indefinite basis, with the amount of borrowing outstanding not to exceed $3.25 billion.

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.

[141] This total includes an offset to WAPA of -$23 million from the Colorado River Basins Power Marketing Fund.

Table 16. Energy and Water Development Appropriations
Title IV: Independent Agencies

($ millions)

Program	FY2013 Approp.	FY2014 Approp.	FY2015 Request	FY2015 House	FY2015 Sen. Sub.	FY2015 Approp.
Appalachian Regional Commission	$64.9	80.3	68.2	80.3	80.0	90.0
Nuclear Regulatory Commission	*987.3*	*1,055.9*	*1,059.5*	*1,064.5*	*1,059.5*	*1,015.3*
(Revenues)	*-860.8*	*-930.7*	*-935.3*	*-890.3*	*-935.3*	*-895.5*
Net NRC (including Inspector General)	126.5	125.2	124.3	174.3	124.3	119.8
Defense Nuclear Facilities Safety Board	26.8	28.0	30.2	29.2	28.0	28.5
Nuclear Waste Technical Review Board	3.2	3.4	3.4	3.4	3.4	3.4
Denali Commission	10.0	10.0	7.4	10.0	10.0	10.0
Delta Regional Authority	11.0	12.0	12.3	12.0	12.0	12.0
Northern Border Regional Commission	1.5	5.0	3.0	3.0	5.0	5.0
Southeast Crescent Regional Commission	0.3	0.3	0	0.3	0	0.3
Fed. Coord. Alaska Gas Projects	1.0	1.0	0	0	0	0
Total	**245.4**	**265.1**	**248.7**	**312.4**	**262.7**	**269.0**

Source: H.R. 83 Explanatory Statement, FY2015 budget request, H.Rept. 113-486, CBO, Senate Appropriations Committee.

Notes: Figures may not add due to rounding.

Key Policy Issues—Independent Agencies

Nuclear Regulatory Commission[142]

For FY2015 the Nuclear Regulatory Commission (NRC) requested $1.0595 billion ($124.3 million net, including the inspector general's office). The total funding request is $3.6 million above the FY2014 level but would constitute a net reduction of $1.0 million because of higher offsetting fees. Major activities conducted by NRC include safety regulation and licensing of commercial nuclear reactors and oversight of nuclear materials users.[143]

In comparison with the request, the House approved a total funding increase of $5 million for NRC. However, a smaller revenue offset would have resulted in a $50 million increase in the net appropriation, to $174.3 million (including the inspector general's office). The Senate subcommittee recommended the same amount as the Administration request. The consolidated appropriations act reduced NRC's total spending level by $44.2 million from the request. The reduction was based on the availability of $34.2 million in carryover funds and $10.0 million in lower staffing levels.

The NRC budget request included $237.9 million for new reactor activities, $16.5 million above the FY2014 level. Until 2007, no new commercial reactor construction applications had been

[142] This section was prepared by (name redacted).

[143] U.S. Nuclear Regulatory Commission, *FY 2015 Congressional Budget Justification*, NUREG-1100, Vol. 30, March 2014, http://pbadupws.nrc.gov/docs/ML1406/ML14064A167.pdf.

submitted to NRC since the 1970s. However, volatile fossil fuel prices, the possibility of controls on carbon emissions, and incentives provided by the Energy Policy Act of 2005 prompted electric utilities and other generating companies to apply for licenses for 30 new reactors. Several of those applications were subsequently withdrawn or suspended, though, as falling natural gas prices reduced the competitiveness of nuclear power. NRC issued combined construction and operating licenses for four new reactors at two sites in Georgia and South Carolina in early 2012. Nine license applications for new reactors are still under active NRC review, according to the FY2015 justification.

NRC's proposed FY2015 budget included no funds for licensing DOE's previously planned Yucca Mountain nuclear waste repository. Because the Obama Administration wants to cancel the Yucca Mountain project and filed a motion to withdraw the license application on March 3, 2010, the NRC's FY2011 appropriation was used to close out its licensing activities. As discussed in the "Nuclear Waste Disposal" section of this report, the U.S. Court of Appeals for the District of Columbia Circuit ordered NRC on August 13, 2013, to continue reviewing the Yucca Mountain license application, using $11.1 million in leftover funding. The House provided $55.0 million for NRC to continue adjudicating the Yucca Mountain license application, while the Senate subcommittee included no similar provision. No Yucca Mountain funding was included in the enacted appropriation.

For regulation of operating reactors, NRC's FY2015 budget request included $577.3 million, $12.8 million below the FY2014 level. Those activities include reactor safety inspections, license renewals and modifications, collection and analysis of reactor performance data, and oversight of security exercises. The Fukushima nuclear disaster in Japan increased congressional and public concern about the safety of U.S. nuclear power plants. NRC established a task force 10 days after the accident to review NRC's regulatory system. NRC issued the first regulatory orders resulting from that review on March 12, 2012, and is currently working on additional regulations.[144] Regulation and oversight activities related to cybersecurity have also been increasing, according to the budget justification.

The Senate subcommittee draft report expressed concern over NRC regulation of nuclear materials, such as radioactive sources that "are vulnerable to theft and could be used by terrorists to build dirty bombs." The subcommittee's draft bill included requirements that NRC establish mandatory security standards for the most risk-significant categories of radioactive materials and increase inspections. No similar provisions were included in the H.R. 83 Explanatory Statement.

The Energy Policy Act of 2005 permanently extended a requirement that 90% of NRC's budget be offset by fees on licensees. Not subject to the offset are expenditures from the Nuclear Waste Fund to pay for waste repository licensing, spending on general homeland security, and DOE defense waste oversight. The offsets in the FY2015 budget request would have resulted in a net appropriation of $124.2 million. Net funding in the final bill was $119.8 million.

[144] U.S. Nuclear Regulatory Commission, "Actions in Response to the Japan Nuclear Accident," http://www.nrc.gov/japan/japan-info.html. For a timeline of NRC actions, see http://www.nrc.gov/reactors/operating/ops-experience/japan/japan-timeline.html.

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