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Energy and Water Development: FY2012 Appropriations

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Summary

The Energy and Water Development appropriations bill provides funding for civil works projects of the Army Corps of Engineers (Corps), the Department of the Interior's Bureau of Reclamation, the Department of Energy (DOE), and a number of independent agencies.

President Obama's FY2012 budget request for Energy and Water Development was released in February 2011, but the Congress was concerned for the first months of the year with completing the appropriations cycle for FY2011. As with other funding bills, the FY2011 Energy and Water Development bill was not taken to the floor in either the House or the Senate in the 111th Congress. Funding for its programs was included in a series of continuing resolutions, and at the beginning of the 112th Congress was part of a major debate over overall spending levels. Energy and Water Development programs were included in the Department of Defense and Full-Year Continuing Appropriations Act (P.L. 112-10) that became law April 15, 2011.

For FY2012 the level of overall spending was a major issue. In addition, issues specific to Energy and Water Development programs included:

- the proposal to offset additional emergency supplemental funding for the Corps, for flood-related expenditures in the Midwest and elsewhere, with cuts in other programs;
- 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, Nevada, which the Administration has abandoned (Title III: Nuclear Waste Disposal); and
- large differences in funding proposals for Energy Efficiency and Renewable Energy (EERE) programs (Title III).

On June 2, 2011, the House Appropriations Subcommittee on Energy and Water Development approved a FY2012 bill that would appropriate $30.6 billion for these programs, compared to the Administration's request of $36.5 billion. The full Appropriations Committee voted out the bill (H.R. 2354) June 15. The bill passed the House July 15 by a vote of 219-196. On September 7 the Senate Appropriations Committee reported out its version of H.R. 2354 (S.Rept. 112-75).

On October 4 the House agreed to a Senate-passed version of H.R. 2608, the Continuing Appropriations Act, 2012, funding government programs at the FY2011 level through November 18. The bill earlier had emergency funding for the Corps and for the Federal Energy Management Administration (FEMA), but that was deleted when agreement could not be reached over whether funding should be offset.

After several more short-term continuing resolutions, the House on December 16 and Senate on December 17 passed the Consolidated Appropriations Act, 2012 (H.R. 2055, P.L. 112-74), including Energy and Water Development Programs in Division B. Emergency funding for the Corps was included, without offsets, in a stand-alone bill (H.R. 3672, P.L. 112-77) that passed on the same days.

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Most Recent Developments

President Obama's FY2012 budget request for Energy and Water Development was released in February 2011, but Congress was concerned for the first months of the year with completing the appropriations cycle for FY2011. A continuing resolution for the rest of the fiscal year, P.L. 112-10, was signed by the President April 15, 2011.

On June 2, 2011, the House Appropriations Subcommittee on Energy and Water Development approved a bill that would have appropriated $30.634 billion for these programs, compared to the $36.505 billion in the President's request. The full House Appropriations Committee voted the bill out June 15 (H.R. 2354). After considering numerous amendments and adopting 32, the House passed the bill July 15 by a vote of 219-196. On September 7 the Senate Appropriations Committee reported out its version of H.R. 2354 (S.Rept. 112-75), funding the programs at $31.626 billion.

On October 4 the House agreed to a Senate-passed version of H.R. 2608, the Continuing Appropriations Act, 2012, funding government programs at the FY2011 level through November 18. The bill earlier had emergency funding for the Corps and the Federal Energy Management Administration (FEMA), but that was deleted when agreement could not be reached over whether funding should be offset. The issue of offsets emerged again in consideration of H.R. 2354, in which the House bill offset emergency Corps funding and the Senate bill did not.

After several more short-term continuing resolutions, the House on December 16 and Senate on December 17 passed the Consolidated Appropriations Act, 2012 (H.R. 2055, P.L. 112-74), including $32.010 billion for Energy and Water Development Programs in Division B. Emergency funding of $1.724 billion for the Corps was included, without offsets, in a stand-alone bill (H.R. 3672, P.L. 112-77) that passed on the same days.

Status

Table 1 indicates the status of the FY2012 funding legislation.

Table 1. Status of Energy and Water Development Appropriations, FY2012

Subcommittee Markup							Final Approval		
House	Senate	House Report	House Passage	Senate Report	Senate Passage	Conf. Report	House	Senate	Public Law
6/2/11	9/6/11	H.Rept. 112-118	7/15/11	S.Rept. 112-75		H.Rept. 112-331	12/16/11	12/17/11	P.L. 112-74

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, the Department of Energy (DOE), and a number of independent agencies, including the Nuclear Regulatory Commission (NRC) and the Appalachian Regional Commission (ARC).

Table 2 includes budget totals for energy and water development appropriations enacted for FY2005 to FY2012.

Table 2. Energy and Water Development Appropriations, FY2005 to FY2012

(budget authority in billions of current dollars)

FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012[a]
30.2	36.7[b]	29.4	30.9	40.5[c]	33.4	31.7	33.7

Source: Compiled by CRS.

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

a. Includes P.L. 112-74 and $1.7 billion in emergency funding for the Corps of Engineers (P.L. 112-77).

b. Includes $6.6 billion in emergency funding for the Corps of Engineers.

c. Includes $7.5 billion for Vehicles Manufacturers Loans.

Table 3 lists totals for each of the bill's four titles. It also lists the total of several scorekeeping adjustments

Table 3. Energy and Water Development Appropriations Summary

($ millions)

Title	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
Title I: Corps of Engineers	$4,857.2	$4,573.0	$4,762.7	$4,864.0	$5002.0
Title II: CUP & Reclamation	1,094.5	1,051.4	934.0	1,067.4	1,076.4
Title III: Department of Energy	25,591.2	30,683.8	24,732.0	25,549.0	25,784.1
Title IV: Independent Agencies	247.0	267.6	276.6	240.6	254.5
E&W Subtotal	**31,790.0**	**36,575.8**	**30,705.4**	**31,721.0**	**32,081.0**
Scorekeeping Adjustments	**-107.9**	**-71.0**	**-71.0**	**-95.0**	**-71.0**
E&W Total	**31,682.0**	**36,504.8**	**30,634.4**	**31,626.0**	**32,010.0**

Source: FY2012 budget request, H.Rept. 112-118, H.R. 2354 as amended, S.Rept. 112-75, H.Rept. 112-74.

Note: Details may not add to totals due to rounding.

Tables 4 through **15** 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 FY2011-FY2012. Accompanying these tables is a discussion of the key issues involved in the major programs in the four titles. For the Department of Energy, P.L. 112-10 did not spell out detailed funding for many subprograms for FY2011. However, the House report for the FY2012 bill, H.R. 2354, did give funding levels for FY2011, and that report is the source for the detailed discussion of programs in Title III.

Title I: Army Corps of Engineers

The Energy and Water Development bill provides funding for the civil program of the U.S. Army Corps of Engineers, 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.

A number of recent changes have affected Corps appropriations, including earmark moratoriums in both houses in the 112th Congress, reductions in funding from previous years, and the drawdown of the American Recovery and Reinvestment Act (ARRA, P.L. 111-5) and other supplemental funding. Additionally, flooding events in the spring and summer of 2011 on the Mississippi and Missouri rivers and in other areas may strain the financial resources of the Corps.

In most years, the President's budget request for the Army Corps of Engineers is below the agency's final appropriation.[1] Enacted appropriations for FY2011 continued this trend. In contrast to the reductions enacted for most other agencies, the Corps received an increase in total funding compared to the President's request. Before accounting for rescissions of prior year funds, the FY2011 appropriation for the Corps was $5.055 billion, or $174 million more than the President's request.[2]

The FY2012 President's request again proposed reductions from the amount enacted by Congress in the previous fiscal year. The President's budget requested $4.573 billion for the Corps, a significant decrease from the FY2011 enacted level. The House-passed bill included $4.763 billion for the Corps, an increase of $189 million from the President's budget. The House also recommended an additional $1.029 billion in emergency supplemental funding for emergency flood-fighting activities. The Senate Appropriations Committee recommended $4.864 billion for the Corps, and an additional $1.044 billion in emergency supplemental funding. The final enacted bill provided $5.002 billion, and a separate bill (P.L. 112-77) provided an additional $1.724 billion in supplemental funding.

An Agency Budget Composed Mainly of Projects

Corps funding is often a part of the debate on 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 a competitive program. Generally about 85% of the appropriations for the Corps' civil works activities are directed to specific projects. Many of these projects are identified in the budget request, and others are added during congressional consideration of the agency's appropriations. Site-specific Corps project line items added by Congress are typically subject to House and Senate chamber rules on earmark disclosure.[3] Absent specific direction from Congress, the Executive Branch may determine project-level allocations internally.

[1] For instance, in FY2010, the Administration requested $5.1 billion and Congress appropriated $5.44 billion.

[2] As shown in **Table 4**, FY2011 included $198 million in rescissions of prior year appropriations in the Construction and MR&T accounts.

[3] While earmarks make up a relatively small percentage of most agency budgets, a significant number of Corps projects have historically received additional funding from Congress for operational expenditures.

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

($ millions)

Program	FY2010 Approp.	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
Investigations and Planning	$160.0	$126.7	$104.0	$104.0	$125.0	$125.0
Construction	2,031.0	1,613.8	1,480.0	1,614.1	1,610.0	1,694.0
Rescission	-	*-176.0*	-	*-50.0*	-	-
Mississippi River & Tributaries (MR&T)	340.0	241.9	210.0	210.0	250.0	252.0
Rescission	-	*-22.0*	*-58.0*	-	-	-
Operation and Maintenance (O&M)	2,400.0	2,365.8	2,314.0	2,369.0	2,360.0	2,412.0
Regulatory	190.0	189.6	196.0	196.0	193.0	193.0
General Expenses	185.0	184.6	185.0	178.6	185.0	185.0
FUSRAP[a]	134.0	129.7	109.0	109.0	109.0	109.0
Flood Control & Coastal Emergencies (FC&CE)	-	-	27.0	27.0	27.0	27.0
Office of the Asst. Secretary of the Army	5.0	5.0	6.0	5.0	5.0	5.0
Total Title I	**5,445.0**	**4,857.2**	**4,573.0**	**4,762.7[b]**	**4,864.0[b]**	**5,002.0**
Emergency Supplemental	-	-	-	*1,028.7[c]*	*1,044[d]*	*1,724[e]*

Source: FY2012 budget request, H.Rept. 112-118 and H.R. 2354, as passed by the House, S.Rept. 112-75, H.Rept. 112-331.

Notes: Annual totals (including FY2011) include rescissions of prior year funds.

a. Formerly Utilized Sites Remedial Action Program.

b. Does not include Emergency Supplemental funding available for obligation.

c. The House included emergency supplemental funding for the Corps under a separate title (Title V) in the following accounts: Construction ($376,000); O&M ($204.9 million); FC&CE ($233.8 million); and MR&T ($589.5 million). These funds were made available through a transfer of Department of Transportation funds for high speed rail projects that was originally provided under Title XII of P.L. 111-5.

d. The Senate bill included emergency supplemental funding for the Corps under Title VI: MR&T ($890 million), O&M ($88 million), and FC&CE ($66 million).

e. Emergency funding was not included in P.L. 112-74. A stand-alone bill, H.R. 3672 (P.L. 112-77) included emergency supplemental funding for the Corps without offsets: MR&T ($802 million), O&M ($534 million) and FC&CE ($388 million).

Key Policy Issues—Corps of Engineers

Emergency Supplemental Funding

In the spring and summer of 2011, major flooding events on the Missouri and Mississippi Rivers and their tributaries has resulted in increased Corps flood-fighting activities and expenditures. To date, the Corps has paid for these activities through the transfer of funds from existing FY2011 projects. However, new flood-fighting activities, including repair of damaged flood control infrastructure (i.e., levees), are likely to result in more expenditures and increased financial stress on the Corps. Without additional appropriations from Congress, the Corps would fund these activities with additional transfers from ongoing projects.

The House-passed bill included $1.029 billion in emergency supplemental funding to the Corps for flood fighting activities.[4] This funding was provided by the House as a transfer of high speed rail funding previously made available under the American Recovery and Reinvestment Act (P.L. 111-5). In its markup of H.R. 2354, the Senate Appropriations Committee provided $1.044 billion in additional funding to the Corps for disaster relief. However, unlike the House, the Senate did not provide this funding through a transfer of prior appropriations. The issue of offsetting emergency appropriations with cuts in other programs caused intense debate over passage of a continuing resolution (H.R. 2608) to keep the government funded as FY2012 began. While Congress did not provide supplemental funding for the Corps in the final enacted bill, it passed a separate bill, H.R. 3672 (P.L. 112-77) that provided $1.724 billion in funding, with no offsets.

New Starts and Authorized Project Backlog

Funding for "new starts" (i.e., projects that have been authorized but not funded) receives attention from Congress because of the large number of authorized Corps projects that have not received appropriations to date (sometimes referred to as the "backlog" of authorized projects). Estimates of the backlog vary from $11 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 whether there is a disconnect between the authorization and appropriations processes, and how to prioritize among authorized activities.[5]

The Administration's FY2012 budget requested limited funding for new construction and investigation starts. That is, the majority of projects included in the Corps FY2012 request were ongoing projects. For FY2012, the Administration requested $11 million in funding for two new construction starts, and $550,000 in funding for four new studies. The House provided no funding for new starts.[6] Likewise, the final enacted bill provided no such funding.

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 Waterway Trust Fund. Both trust funds received attention in the FY2012

[4] H.R. 2354, Title V. See **Table 4** above for account allocations of this funding.

[5] For more information, see CRS Report R41243, *Army Corps of Engineers Water Resource Projects: Authorization and Appropriations*, by Nicole T. Carter and Charles V. Stern.

[6] The House Appropriations Committee noted that it defines "new starts" differently than the Administration. While the Administration seems to define this term as any project which was not included in a previous President's budget request, the committee defines it as any project which has not previously received funding in enacted appropriations.

appropriations process. While the Harbor Maintenance Trust Fund has a surplus balance, the Inland Waterway Trust Fund currently faces a shortfall and potential curtailments of activities.

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.[7] The tax revenues are deposited into the Harbor Maintenance Trust Fund (HMTF) from which Congress appropriates funds for harbor dredging.

In 1990, Congress increased the HMT rate from four cents per $100 of cargo value to 12.5 cents per $100 of cargo value, one of many tax increases in the Omnibus Budget Reconciliation Act (P.L. 101-508) designed to lower the federal deficit at that time. In recent years, HMTF annual expenditures have remained relatively flat while HMT collections have increased due to rising import volume (except in 2009 when collections declined along with import volume). 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 HMTF. Some harbor channels are reportedly not being maintained at their authorized depth and width, requiring 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 FY2012 budget requested $789 million from the HMTF, leaving an estimated-end-of-FY2012 balance of $6,928 million.[8] (For more information on harbor maintenance, see CRS Report R41042, *Harbor Maintenance Trust Fund Expenditures*, by John Frittelli.)

Inland Waterway 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 Waterway Trust Fund (IWTF). IWTF monies derive from a fuel tax imposed on vessels engaged in commercial transportation on designated waterways, plus investment interest on the balance.[9] The IWTF currently has a balance of less than $100 million, and needed funding for eligible work exceeds available funding.

In FY2009 and FY2010 appropriations, as well as the ARRA (P.L. 111-5), Congress provided additional federal funding compared to previous years for new projects and to temporarily ensure solvency of the IWTF.[10] Due to the drawdown of this funding and the lack of new or increased

[7] An estimate by the Corps is that improved collection from domestic shippers could increase annual receipts by $500 million.

[8] The Administration estimates FY2012 HMT collections to total $1,514 million.

[9] 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.

[10] Pursuant to language in these bills, some inland waterway projects have been paid for using IWTF funds, while others were paid for using general revenue funds until they could be brought to a logical stopping point. The effect of these provisions and the additional federal funding under ARRA has been to generally slow down the drop in IWTF

revenues, FY2011 appropriations for inland waterway projects were limited to amounts available with expected current-year fuel tax revenues. In FY2012, the Administration once again requested that appropriations for inland waterway projects be limited to current-year fuel tax revenues.[11]

Without a new source of revenue or some other change directed by Congress, the overall number of inland waterway projects is expected to be limited in FY2012.[12] Previously the Administration submitted a legislative proposal to replace the current fuel tax with a lock user fee that would have increased user-generated revenues. This proposal was widely criticized by Congress and not enacted. More recently, in 2010 user groups proposed changes that would result in an overall increase for inland waterway funding, including an increase to the federal share of inland waterway projects. Congress has not acted on this proposal. (For more information on inland waterways, see CRS Report R41430, *Inland Waterways: Recent Proposals and Issues for Congress*, by Charles V. Stern.)

Asian Carp

In recent years, the Corps has taken on a prominent role in efforts to prevent the Asian carp from encroaching on the Great Lakes through the Chicago Sanitary and Ship Canal (CSSC). Along with the Fish and Wildlife Service, the U.S. Geological Survey, and the Environmental Protection Agency, the Corps is a lead agency in Asian carp monitoring and prevention efforts.

The President's FY2012 budget included $27 million in funding for the Corps to combat Asian carp, an increase of approximately $4 million over the enacted level for FY2011. This amount includes $24 million to construct and operate two electronic barriers on the CSSC and $3 million for a major study (known as the GLMRIS study) evaluating the long-term options for permanent separation of the Great Lakes and Mississippi River drainage basins. Under the current timeline, the remaining cost for the study after FY2012 would be $17.8 million, and the first part of this study is expected to be complete by FY2015. Some groups contend that this is not fast enough, and that the Corps should further expedite the study, which would require additional funding. The final appropriations bill did not specifically mention the Asian carp program. (For more information on Asian Carp prevention efforts, see CRS Report R41082, *Asian Carp and the Great Lakes Region*, by Eugene H. Buck et al.)

Everglades

The Energy and Water bill typically includes funding for restoration of the Everglades in South Florida, including the Corps component of the Comprehensive Everglades Restoration Program, or CERP.[13] In addition to funding for Corps activities through Energy and Water Development appropriations, federal activities in the Everglades are also funded through Department of the Interior appropriations bills. As a result of recent reductions in state funding levels for Everglades restoration, federal funding for Everglades restoration may receive additional scrutiny in coming years.

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balances.

[11] Assuming annual fuel tax revenues of approximately $80 million, overall spending on inland waterways construction for FY2011 and FY2012 would be approximately $160 million for each year (or approximately $90 million less than the average funding provided from FY1992-2010).

[12] According to the Corps, the only project scheduled to receive construction funds through FY2015 under the current baseline is Olmstead Lock & Dam on the Ohio River.

[13] For more information, see CRS Report R42007, *Everglades Restoration: Federal Funding and Implementation Progress*, by Charles V. Stern.

The FY2012 Obama Administration request for the Corps' component of south Florida Everglades restoration work was $163 million. The House-passed bill reduced funding for the Corps component of Everglades restoration by $32 million. In its report, the Committee noted that while it supports funding for Everglades restoration, it did not believe the requested funding was equitable compared to the larger Corps budget. The Senate Appropriations Committee did not include this reduction, and the final enacted bill funded the original request of $163 million.

Other Reductions: Continuing Authorities Programs, Low-Use Navigation

Projects funded under the Corps Continuing Authorities Programs (CAPs) are typically smaller projects that can be carried out without obtaining a project-specific study or construction authorization or project-specific appropriations.[14] CAPs are typically referred to by the section number in the bill where the CAP was first authorized. The Administration's FY2012 budget requested no funding for four of the nine CAPs, including Section 14 (emergency streambank and shoreline protection), Section 103 (shore protection), Section 107 (navigation), and Section 208 (snagging and clearing for flood control). Additionally, the Administration proposed to reprogram $23 million in prior-year carry over from these same four programs to fund four of the remaining five CAPs that are to be continued. The House-passed bill agreed to these reductions, but the Senate bill provided limited funding for several CAPs. The final enacted bill did not agree to the Administration's request, and provided more than $43 million for the CAPs (specifying the amounts by section).

The Administration's FY2012 request also included reductions in several other categories, including a $76 million (45%) reduction for operations and maintenance of navigation projects with low commercial usage. Combined with reductions to other accounts (e.g., Construction), these policies would result in significantly less funding for a number of projects in FY2012 than has been appropriated in prior years. In the past, many of these reductions have been restored by earmarks.

The House-passed bill included an addition of $133 million for the O&M account for "additional" unspecified projects in two areas: navigation ($123 million) and flood and storm damage reduction ($10 million). Similarly, the Senate Appropriations Committee included an additional $149 million for several categories of "ongoing work" within the O&M account, including small or remote harbors and inland navigation channel maintenance. Within the Construction account, the House provided an additional $242 million for additional navigation projects, while the Senate providing $189 million for such projects.[15] Similarly, the final enacted bill included funding for most of these categories, with instructions for the Corps to report back to Congress with a Work Plan describing funding amounts at the project level within 45 days of enactment.

Title II: Department of the Interior

Central Utah Project and Bureau of Reclamation

The Energy and Water Development bill includes funding for the Central Utah Project (CUP) and the Bureau of Reclamation, both part of the Department of the Interior. The total discretionary

[14] A summary of projects under the Continuing Authorities Program is provided on p. 11 of CRS Report R41243, *Army Corps of Engineers Water Resource Projects: Authorization and Appropriations*, by Nicole T. Carter and Charles V. Stern.

[15] The House provided its funding under a single line (e.g., "Additional Navigation") while the Senate provided its funding for several more specific areas of a larger category, "Additional Funding for Ongoing Work."

budget request for Title II funding for the Central Utah Project and Reclamation was approximately $1.051 billion, or a decrease of $45 million from the FY2011 enacted amount. The Obama Administration requested $33 million for the Central Utah Project (CUP) Completion Account in FY2012, or $1 million more than the amount appropriated under the long-term continuing resolution for FY2011 and $9 million less than the 2010 enacted level. The FY2012 request for the Bureau of Reclamation totaled $1.018 billion in gross current budget authority. This amount was $44 million less than the enacted amount for FY2011. The FY2012 request for the Bureau of Reclamation included an "offset" of $52.8 million for the Central Valley Project (CVP) Restoration Fund (Congress does not list this line item as an offset), yielding a "net" discretionary authority of $965.6 million. As in previous years, additional funding is estimated to be available for FY2012 via "permanent and other" funds.

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

($ millions)

Program	FY2010 Approp.	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
Central Utah Water Conservancy District	$38.8	n/a	$29.4	$25.2	$25.4	$25.2
Mitigation and Conservation Commission Activities	1.5	n/a	2.0	2.0	2.0	2.0
DOI Oversight and Administration	1.7	n/a	1.6	1.6	1.6	1.6
DOI Fish and Wildlife Conservation Projects	n/a	n/a	n/a	n/a	n/a	n/a
Total, Central Utah Project	**42.0**	**32.0**	**32.9**	**28.7**	**29.0**	**28.7**

Source: FY2012 budget request, H.Rept. 112-118, S.Rept. 112-75, H.Rept. 112-331.

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

($ millions)

Program	FY2010 Approp.	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
Water and Related Resources	$951.2	$911.7	$805.2	$822.3	$885.7	$895.0
Policy and Administration	61.2	61.1	60.0	60.0	60.0	60.0
CVP Restoration Fund (CVPRF)	35.4	49.9	53.1	53.1	53.1	53.1
Calif. Bay-Delta (CALFED)	40.0	39.9	39.7	35.9	39.7	39.7
San Joaquin Restoration Fund	—	—	9.0	-66.0	—	—
Indian Water Rights Settlement	—	—	51.5	—	—	—
Gross Current Reclamation Authority	**1,087.0**	**1,062.6**	**1,018.4**	**905.3**	**1,038.4**	**1,047.7**
Total, Title II (CUP and Reclamation)	**1,129.7**	**1,094.5**	**1,051.4**	**934.0**	**1,067.4**	**1,076.4**

Source: FY2012 budget request, H.Rept. 112-118, S.Rept. 112-75, H.Rept. 112-331.

Notes: Consistent with prior enacted appropriations, the House provided funding for the proposed Indian Water Rights Settlement account within the Water and Related Resources account.

Reclamation's single largest account, Water and Related Resources, encompasses the agency's traditional programs and projects, including construction, operations and maintenance, the Dam Safety Program, Water and Energy Management Development, and Fish and Wildlife Management and Development, among others. The Obama Administration requested $805.2 million for the Water and Related Resources Account for FY2012, a reduction from FY2011 of $106.5 million or approximately 12%. The House-passed bill recommended $822 million for this account. The Senate Appropriations Committee recommended $885 million. The final enacted bill included $895 million.

Key Policy Issues—Bureau of Reclamation

Background

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. At the same time, 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 and relatively few "programs." Also similar to the Corps, previously Reclamation projects have often been subject to earmark disclosure rules. Thus the current moratorium may have a different effect on the Reclamation budgetary process compared to agencies that receive most of their funds through programs.

Central Valley Project (CVP) Operations

The CVP in California is one of Reclamation's largest and most complex water projects. Recently, Reclamation has had to limit water deliveries and pumping from CVP facilities due to drought and other factors, including environmental restrictions. In previous appropriations bills, this action has resulted in attempts to prevent Reclamation from implementing Biological Opinions (BiOps) which in some cases restrict CVP operations because of the project's potential effects on certain fish species.[16] For example, in FY2011 appropriations, the House included a

[16] The two BiOps in question have found that continued operation of the projects under a plan developed and implemented in 2004 Operations Criteria and Plan (OCAP) would jeopardize the existence of delta smelt and salmon and other endangered species in California. OCAP allowed increased pumping from the delta, which some believe has further imperiled fish species listed as threatened or endangered under the Endangered Species Act. Others note that factors such as invasive species, pollution, and non-federal withdrawals of water from the delta have contributed to fishery declines. Critically low numbers of delta smelt resulted in a court-imposed limit on pumping at certain times. In the meantime, low water deliveries to certain water districts (e.g., those with junior water rights) are reportedly exacerbating unemployment in an area with an economy already challenged by other stressors.

provision prohibiting the use of any federal funds to implement the primary components of these BiOps.[17] A similar amendment was previously proposed during FY2010 appropriations.

Neither the FY2010 nor the FY2011 provisions preventing implementation of BiOps in the CVP were enacted. However, other measures have been passed so as to lessen the impact of these restrictions. For instance, the FY2010 enacted bill included an amendment providing for a two-year authorization of water transfers among certain CVP contractors without meeting particular conditions established by the Central Valley Project Improvement Act (Title 34 of P.L. 102-575).

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.[18] The Fund is supported through the combination of a reallocation of approximately $5.6 million annually in 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. Significant actions planned for FY2012 include release of interim flows and continued planning and environmental compliance for initial channel and structural improvements.

Funding for the San Joaquin River settlement has been controversial in the past. In FY2011 appropriations, the House-passed continuing resolution (H.R. 1) included a requirement that no funding be available for implementation of some of the most important components of the settlement agreement. This provision was not enacted. Recently legislation (H.R. 1837) was introduced that would repeal some portions of the settlement.

For FY2012, Reclamation proposed an allocation of $9 million within a new account for discretionary funds for San Joaquin River restoration activities, as well as $24 million in other receipts into the restoration fund that are available for expenditure without further appropriation. The House eliminated the requested funding for FY2012, and also proposed permanently rescinding unobligated mandatory funds within this account, for a net savings of $66 million. The Senate Appropriations Committee agreed with the Administration's request of $9 million (plus other mandatory funds), but did not provide the discretionary funding within a separate account. The final enacted bill agreed with this recommendation.

WaterSMART Program

In recent years Reclamation has combined funding for several individual "bureau-wide" programs into a single program—the WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program. The program is part of an effort by the Department of the Interior to focus on water conservation, re-use, and planning, and also includes work by the U.S. Geological Survey. In the FY2012 request the WaterSMART program included four individual components:

[17] 112th Congress, H.R. 1.

[18] 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 Betsy A. Cody and Pervaze A. Sheikh.

WaterSMART Grants (formerly known as Challenge Grants), Basin Studies, Title XVI Projects, and Water Conservation Field Services.[19] Reclamation proposed $59 million, a net decrease of approximately $10 million from the corresponding enacted levels for these programs in FY2011. For individual program components of WaterSMART, Reclamation's FY2012 request included $18.5 million for WaterSMART/Challenge Grants (a decrease of $14.5 million from FY2011), $6 million for Basin Studies (same level as FY2011), $29 million for Title XVI Projects (increase of $9 million from FY2011), and $5 million for Water Conservation Field Services (decrease of $2.7 million). The final enacted bill included $12 million for WaterSMART grants, $5 million for Basin Studies, $25 million for Title XVI Projects, and $5 million for Water Conservation Field Services.

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 nuclear power, general science, environmental cleanup, and nuclear weapons programs, as well as programs for fossil fuels, energy efficiency, the Strategic Petroleum Reserve, and energy statistics.

The FY2011 appropriations act, P.L. 112-10, funded DOE programs at $25.6 billion. For FY2012, the Obama Administration requested $30.7 billion for DOE programs. The House bill, H.R. 2354, would have funded DOE at $24.7 billion. The Senate version of H.R. 2354 would have provided $25.5 billion for DOE programs. The final bill, P.L. 112-74, appropriated $25.7 billion.

Table 7. Energy and Water Development Appropriations
Title III: Department of Energy
($ millions)

Program	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
ENERGY PROGRAMS					
Energy Efficiency and Renewable Energy	$1,795.6	$3,200.1	$1,308.6	$1,795.6	$1,815.1
Electricity Delivery and Energy Reliability	141.0	237.7	139.5	141.0	139.5
Nuclear Energy	725.8	754.0	733.6	583.8	768.7
Fossil Energy R&D	444.5	453.0	477.0	258.5	347.0
Clean Coal Technology	-16.5	—	—	—	—
Naval Petrol. and Oil Shale Reserves	20.9	14.9	14.9	14.9	14.9
Strategic Petroleum Reserve	123.1	121.7	192.7	192.7	192.7
SPR Account	—	-250.0	-500.0	-500.0	-500.0
Northeast Home Heating Oil Reserve	11.0	10.1	10.1	10.1	10.1
Northeast Home Heating Oil Reserve Sale	—	-100.0	-100.0	-100.0	-100.0

[19] Prior to FY2012, the Water Conservation Field Services program had been a "bureau-wide" program. For consistency, comparisons to prior year funding in this report include this program within WaterSMART totals.

Program	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
Energy Information Administration	95.0	124.0	105.0	105.0	105.0
Non-Defense Environmental Cleanup	223.5	219.1	254.1	219.1	235.7
Uranium D&D Fund	497.1	504.2	449.0	429.0	472.9
Science	4,842.7	5,416.1	4,800.0	4,842.7	4,889.0
Energy Transformation Acceleration Fund (ARPA-E)	179.6	550.0	179.6	250.0	275.0
Nuclear Waste Disposal	-2.8	0.0	25.0	0.0	0.0
Departmental Admin. (net)	48.7	128.7	-38.5	127.7	126.0
Office of Inspector General	42.8	41.8	41.8	41.8	42.0
Adv. Tech. Vehicles Manuf. Loan	10.0	6.0	6.0	6.0	6.0
Innovative Tech. Loan Guarantee	-0.3	1,060.0	160.0	200	0.0
Better Building Loan Guarantee for Universities, Schools and Hospitals	—	105.0	0.0	0.0	0.0
TOTAL, ENERGY PROGRAMS	9,181.7	12,596.4	8,258.3	8,616.0	8,839.7
DEFENSE ACTIVITIES					
National Nuclear Security Administration (NNSA)					
Weapons Activities	6,896.4	7,589.4	7,091.7	7,190.0	7,234.0
Nuclear Nonproliferation	2,273.7	2,519.5	2,091.8	2,383.3	2,303.3
Naval Reactors	959.2	1,153.7	1,030.6	1,100.0	1,080.0
Office of Administrator	393.3	450.1	400.0	404.0	410.0
Contractor Pay Freeze	—	—	—	-27.3	-27.3
Total, NNSA	10,522.5	11,712.6	10,599.0	11,050.0	11,000.0
Defense Environmental Cleanup	4,979.7	5,406.8	4,937.6	5,002.3	5,023.0
Other Defense Activities	785.0	860.0	814.0	819.0	823.4
Defense Nuclear Waste Disposal	0.0	0.0	0.0	0.0	0.0
TOTAL, DEFENSE ACTIVITIES	16,287.3	17,979.3	16,365.7	16,871.3	16,846.4
POWER MARKETING ADMINISTRATION (PMAs)					
Southeastern	0.0	0.0	0.0	0.0	0.0
Southwestern	13.1	11.9	11.9	11.9	11.9
Western	109.0	96.0	96.0	96.0	96.0
Falcon & Amistad O&M	0.2	0.2	0.2	0.2	0.2
TOTAL, PMAs	122.2	108.1	108.1	108.1	108.1
Contractor Pay Freeze (non-defense)	—	—	—	-46.4	-46.0
Total, Title III	**25,591.2**	**30,683.8**	**24,740.7**	**25,549.0**	**25,748.1**

Source: FY2012 budget request, H.Rept. 112-118, H.R. 2354 as passed, S.Rept. 112-75, H.Rept. 112-331.

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 7**.

Energy Efficiency and Renewable Energy (EERE)

In President Obama's February 2011 State of the Union address, he continued to stress his priority for energy efficiency and clean energy:

> This is our generation's Sputnik moment. Two years ago, I said that we needed to reach a level of research and development we haven't seen since the height of the Space Race. In a few weeks, I will be sending a budget to Congress that helps us meet that goal. We'll invest in biomedical research, information technology, and especially clean energy technology—an investment that will strengthen our security, protect our planet, and create countless new jobs for our people.

In that speech, the President also proposed the establishment of a Clean Energy Standard as a complementary demand-side policy to stimulate a stable market for the supply of new clean energy technologies.[20] The President's 2012 Economic Report further stressed the importance of clean energy innovation and development to new industries, exports, and international competitiveness.

FY2012 Request Overview and Comparison with FY2011 Appropriation

For FY2012, DOE requested $3,200.1 million for the EERE programs. Compared with the FY2010 appropriation, the FY2012 request would have increased EERE funding by $957.6 million, or 42.7%. However, the final FY2011 continuing resolution (P.L. 112-10) reduced EERE funding by $416.9 million (18.6%) relative to the FY2010 appropriation. So, compared with the FY2011 appropriation, the FY2012 request would have increased EERE funding by $1,374.5 million, or 75.3%. That dollar amount was the largest single year increase ever requested for EERE. Given the FY2011 reduction, and the concerns about the budget deficit, there was intense debate over the FY2012 request for EERE. The House Appropriations Committee bill, H.R. 2354, signaled the beginning of that debate by recommending EERE funding at $1,308 million (see below).

DOE requested an additional $237.7 million for Electricity Delivery and Energy Reliability (EDER) programs. Relative to the FY2010 appropriation, that would have been an increase of $65.7 million, or 38.2%. However, P.L. 112-10 set the FY2011 appropriation at $144.7 million. Compared with the FY2011 appropriation, the FY2012 request would have provided an increase of $93.0 million, or 64.2%. Such a large proposed increase was also controversial. **Table 8** gives the programmatic breakdown of the regular appropriations for EERE and EDER.

[20] For more about the Clean Energy Standard, see CRS Report R41720, *Clean Energy Standard: Design Elements, State Baseline Compliance and Policy Considerations*, by Phillip Brown, and CRS Report R41797, *Clean Energy Standard: Potential Qualifying Energy Sources*, coordinated by Kelsi Bracmort.

Table 8. Energy Efficiency and Renewable Energy Programs

($ millions)

Program	FY2010 Approp.	FY2011 Approp.	FY2012 Request	House	Senate	Conf.
Hydrogen/Fuel Cell Technologies	$174.0	$98.0	$100.5	$91.5	$98.0	$104.0
Biomass and Biorefinery Systems	220.0	182.7	340.5	150.0	180.0	200.0
Solar Energy	247.0	263.5	457.0	166.1	290.0	290.0
—Concentrating Solar Power (CSP)	49.7	—-	50.0	—-	—-	—-
—Photovoltaic (PV) Power	128.5	—-	380.0	—-	—-	—-
Wind Energy	80.0	80.0	126.9	76.0	80.0	93.6
Geothermal Technology	44.0	38.0	101.5	38.0	34.0	38.0
Water Power (Hydro/Ocean)	50.0	30.0	38.5	50.0	34.0	59.0
Subtotal, Renew. and Hydrogen	815.0	692.2	1,164.8	571.6	716.0	680.6
Vehicle Technologies	311.4	300.0	588.0	254.0	318.8	330.0
Building Technologies	222.0	210.5	470.7	150.0	210.5	220.0
Industrial Technologies	96.0	108.2	319.8	96.0	96.0	116.0
Federal Energy Management	32.0	30.4	33.1	30.0	30.0	30.0
Subtotal, Efficiency R&D	661.4	649.1	1,411.6	530.0	655.3	696.0
Facilities and Infrastructure	19.0	51.0	26.4	26.4	26.4	26.4
Program Management	185.0	170.0	176.6	110.0	165.0	165.0
Strategic Programs	—-	32.0	53.2	19.0	25.0	25.0
R&D Subtotal	1,680.4	1,594.3	2,832.6	1,263.0	1,587.7	1,697.0
Renewables Deployment	10.0	7.0	10.0	10.0	10.0	10.0
Subtotal, Demon. And Deployment	10.0	7.0	10.0	10.0	10.0	10.0
Weatherization Grants	210.0	174.3	320.0	33.0	174.3	68.0
State Energy Grants	50.0	50.0	63.8	25.0	50.0	50.0
Efficiency Block Grants	0.0	0.0	0.0	0.0	0.0	0.0
Non-specific EERE RDD&D	0.0	0.0	0.0	0.0	0.0	0.0
Cong.-Directed Assistance	292.1	0.0	0.0	0.0	0.0	0.0
Rescission	—	-30.0	—	—	—-	—
Floor Amendments (non-specific)	—	—	—	9.8	—	—
Prior Year Balances	0.0	0.0	-26.4	-26.4	-26.4	0.0
Rescission	0.0	-30.0	0.0	0.0	0.0	-9.9

Program	FY2010 Approp.	FY2011 Approp.	FY2012 Request	House	Senate	Conf.
Total Appropriation	2,242.5	1,795.6	3,200.1	1,308.4[a]	1,795.6	1,815.1
Electricity Delivery and Energy Reliability (EDER)	172.0	141.0	237.7	139.5	141.0	139.5

Sources: FY2012 budget request, H.Rept. 112-118, S.Rept. 112-75, H.Rept. 112-331.

a. House floor amendments: H.Amdt. 608 cut $0.2 million, and H.Amdt. 658 added $10.0 million. In sum, floor amendments increased EERE funding by $3.8 million over the committee recommendation.

Primarily to address major new initiatives, the FY2012 request proposed a large increase relative to the FY2011 appropriation level for each of five program areas. In declining order of funding amount, the largest program increases were proposed for Vehicles ($288.0 million), Buildings ($260.2 million), Industry ($211.5 million), Solar Energy ($193.5 million), and Biomass ($157.8 million).

The House Appropriations Committee report recommended $1,304.6 million for EERE, which was $1,895.4 million (59.2%) less than the FY2012 request. Compared with the request, the committee recommended major cuts for nearly all program areas. It proposed the largest cuts for the five programs that were proposed to be home to key DOE initiatives, as noted above: Vehicles (-$334.0 million), Buildings (-$320.7 million), Industry (-$223.8 million), Solar Energy (-$290.9 million), and Biomass (-$190.5 million).The committee recommended an increase for only one program—Water Power (+$11.5 million).

Relative to the FY2011 appropriation, the committee recommended a cut of $491.0 million (27.3%). This total proposed EERE cut, and proposed cuts for key programs, were smaller than the cuts measured relative to the request, but were still significant. Proposed cuts for the five program areas with key DOE initiatives were: Vehicles (-$46.0 million), Buildings (-$60.5 million), Industry (-$12.2 million), Solar Energy (-$97.4 million), and Biomass (-$32.7 million).

House Appropriations Committee Concerns, Directives, and Funding Recommendations

For FY2012, the House Appropriations Committee report identified "major concerns" about DOE's "strategic direction," putting a special focus on EERE programs. Acknowledging that the nation "faces an unprecedented global race to lead tomorrow's energy sector," the committee nevertheless contended that the DOE request sought "billions of dollars in additional 'clean energy' research and development, [but] it provides little justification for these increases." The committee stated that it would apply strong oversight to ensure good DOE stewardship of public funds and thereby assure "America's innovation leadership."

The committee found that DOE does not adequately follow congressional funding directions, specifically:

> The Committee is concerned that the Department engages in practices that contravene congressional direction for these [annual] funding levels by regularly redirecting a percentage of program budgets to other purposes ...The Department also frequently funds Presidential, Secretarial, and senior management initiatives by redirecting funds away from purposes directed by the Congress ...The Committee is concerned with the Department's lack of transparency and respect for congressional direction, and the recommendation includes language within the Energy Efficiency and Renewable Energy account, where the

> problem may be the most pervasive, requiring reporting on these practices within that account.[21]

The key DOE-proposed initiatives—and the related funding proposals from DOE and the House Appropriations Committee report—are described below.

House-Passed Version of H.R. 2354

The final House-passed bill included $1.308 billion for EERE, which was $487.2 million less than the FY2011 appropriation and $1.892 billion less than the FY2012 request. Compared with the request, the House bill would have provided major decreases for EERE programs, including Vehicle Technologies (-$334.0 million), Building Technologies (-$320.7 million), Solar Technologies (-$290.9 million), Industrial Technologies (-$223.8 million), and Biomass Technologies (-$190.5 million). Also, major cuts would have been applied to Weatherization Grants (-$287.0 million) and to EDER programs (-$98.2 million).

In House floor action, six amendments to EERE funding were adopted: three changed funding levels relative to the committee recommendations and three prohibited certain funding uses.

First, H.Amdt. 600 cut $6.0 million from the International Subprogram under Strategic Programs. Two additional amendments would have restricted certain uses of the remaining $2 million approved for the subprogram: H.Amdt. 675 would have allowed funds to be used only for U.S.-Israel Energy Cooperation and H.Amdt. 684 would have prohibited the use of funds to support EERE activities in China.

Second, two amendments changed overall EERE funding: H.Amdt. 608 cut $0.2 million and H.Amdt. 658 added $10.0 million. So the net change was an addition of $9.8 million.

Third, the Burgess Amendment (H.Amdt. 70) to H.R. 2354 prohibited the use of funds for DOE implementation of energy efficiency standards. The amendment stated that:

> None of the funds made available in this Act may be used—(1) to implement or enforce section 430.32(x) of title 10, Code of Federal Regulations, or (2) to implement or enforce the standards established by the tables contained in section 325(i)(1)(B) of the Energy Policy and Conservation Act (42 U.S.C. 6295(i)(1)(B) with respect to BPAR incandescent reflector lamps, BR incandescent reflector lamps, and ER incandescent reflector lamps.

The Burgess Amendment appears as Section 623 of the House-passed bill. The amendment aims to stop implementation of energy efficiency standards for incandescent light bulbs. The standards were scheduled to begin taking effect on January 1, 2012. Proponents of the amendment contended that it would stop excessive government regulation of consumer lighting products and promote consumer choice. Opponents argued that domestic industry investment in new lighting technologies would be stranded, foreign competitors would gain competitive advantage, and potential energy and cost savings would be lost.

Senate Appropriations Committee Recommendations

The Senate Appropriations Committee's reported version of the bill would have provided $1,795.6 million for EERE, the same amount as the FY2011 appropriation. That amount would have been $1,404.4 million less than the FY2012 request and $487.2 million more than the House bill. Relative to the House-passed bill, the Committee's bill would have provided major increases for Solar Technologies ($123.9 million), Vehicle Technologies ($64.8 million), Building Technologies ($60.5 million), and Hydrogen/Fuel Cell Technologies ($30.0 million). In contrast,

[21] H.Rept. 112-118. Energy and Water Development Appropriations Bill, 2012. p. 74.

Water Technologies would have been cut by $16.0 million. Also, the bill would have applied major increases to Weatherization Grants ($141.3 million), State Energy Grants ($25.0 million), and Program Management ($55.0 million).

The Committee observed that DOE had established energy efficiency standards for many appliances, with the exception of televisions. It noted that recent studies show that set-top boxes that control modern televisions use large amounts of energy, most of which occurs when the television is off. The Committee directed DOE (Appliance Standard Program under the Office of Buildings) to initiate a rulemaking process that would establish efficiency standards for "electronic devices, including both televisions and set-top boxes, within 12 months."

The Senate committee's version of the bill did not contain any provisions similar to those in the Burgess Amendment (§603) of the House-passed bill.

The final version of the bill (P.L. 112-74) included the Burgess Amendment as Section 315.

Solar PV "Sunshot" Initiative

The Sunshot Initiative was the largest new power initiative proposed in the FY2012 request. The initiative aims to reduce utility-scale photovoltaic (PV) cost 75% by 2020, reaching grid parity at a capacity cost target of $1,000 per kilowatt (kw) or at an electric power cost target of six cents per kilowatt-hour (kwh). The Initiative would support the Administration's proposed Clean Energy Standard (CES) by aiming to install 375 gigawatts (gw) of PV power plant capacity by 2030, which was estimated to meet about 13% of projected power demand.

EERE would conduct the Sunshot Initiative in collaboration with DOE's Office of Science and with DOE's Advanced Research Projects Agency-Energy (ARPA-E). The initiative would focus on improving technology and reducing costs for power electronics controls, building integrated photovoltaics (BIPV), and balance of system equipment. The request stated that the ultimate goal is to regain world leadership in PV manufacturing and, thereby, grow jobs.

DOE requested an increase of $213.6 million above the FY2010 appropriation for the Solar Energy Program. The proposed Sunshot Initiative would have accounted for most of the requested $210.8 million increase (above the FY2010 appropriation) in funding for the Photovoltaic R&D subprogram and all of the requested $20.3 million increase (above the FY2010 appropriation) for the Systems Integration subprogram.

For the entire Solar Energy Program for FY2012, DOE requested a $193.5 million increase above the FY2011 appropriation.

The House Appropriations Committee report made no specific statement of support for the Sunshot Initiative, which was identified with the bulk of the DOE requested increase for Solar Programs. For the entire Solar Energy Program, the committee report recommended—and the House approved—a $290.9 million cut below the request ($97.4 million cut below the FY2011 appropriation).

The Senate Appropriations Committee report recommended $123.9 million more than the House approved. Also, the report provided guidance on three solar issues: it directs DOE to continue funding for the Solar Demonstration Zone Project; it encourages DOE to establish a Center for Solar Energy Innovation; and it encourages DOE to support R&D on organic PV cells.

The conference report provided $290.0 million for the Solar Program, an increase of $26.5 million over the FY2011 appropriation. The report does not mention the Sunshot Initiative.

Biomass and Biorefinery Program Initiatives

Under this program, the main subprogram initiative in the FY2012 request was the Cellulosic Biofuels Reverse Auction. The auction would have employed a competitive bidding process for the lowest cost to produce cellulosic biofuels with an innovative "pioneer" or "first-of-its-kind" facility. The goal was to lower the cost per gallon to produce cellulosic biofuels, while providing an investment financing incentive in the form of a guaranteed cash flow. DOE requested $150 million for this production cost subsidy.

DOE requested $25 million for a new Integrated Biorefineries subprogram. These facilities would convert biomass feedstock to advanced biofuels, biopower (process heat and power), and/or bioproducts (chemicals). The funding would continue, and build upon, cost-shared projects begun with industry partners through support provided by the Recovery Act (P.L. 111-5). The new phase in FY2012 would focus on scale-up and replication of biorefineries.

DOE also requested $22.5 million for a new subprogram of pilot-scale demonstrations of utility-scale biomass cofiring with coal. Up to 10 megawatts (mw) of new capacity would be developed by 2015 and an additional 20 mw by 2016. An industry cost share of 20% to 50% would be required for all new biopower projects.

For the entire Biomass and Biorefinery Program for FY2012, DOE requested a $157.8 million increase above the FY2011 appropriation.

For the Biomass Program, the House Appropriations Committee recommended—and the House approved—a $190.5 million cut below the FY2012 request ($32.7 million cut below the FY2011 appropriation). The report stated that the proposed Cellulosic Biofuels Reverse Auction would be ineffective and fiscally unsustainable and, thus, included no funds for it. To avoid possible side effects on crop and food prices, the report directed DOE to conduct work only on biomass technologies "that could not be otherwise used as food."

The Senate Appropriations Committee report recommended $30 million more than the House approved. The report directed that $30 million of its total recommendation go to algae biofuels.

The conference report provided $200.0 million for the Biomass Program, an increase of $17.3 million over the FY2011 appropriation.

Better Buildings Initiative

DOE requested support for a major new commercial buildings initiative, named the Better Buildings Initiative. The initiative would aim to stimulate private sector investment to upgrade offices, stores, schools, municipal buildings, universities, hospitals, and other commercial buildings. The collective goal would be a 20% improvement in energy efficiency by 2020. Tax incentives and financing support would be offered to private building owners. A new $181.6 million "Race to the Green" competitive grant program would be established for state and local governments to streamline regulations, building codes, and performance standards. The goal would be to overcome market barriers and accelerate efficiency upgrades to existing buildings. Also, a Commercial Building Partners subprogram would provide support for new construction and to establish community extension partnerships.

The existing Innovation Hub for Energy Efficient Building Systems Design would have been extended with a new request for $24.4 million. Also, the request sought a $35.0 million increase (above the FY2010 appropriation) to accelerate the scope and effectiveness of equipment efficiency standards.

For the entire Buildings Program for FY2012, DOE requested a $260.2 million increase above the FY2011 appropriation.

The House Appropriations Committee report recommended—and the House approved—a $320.7 million cut below the FY2012 request ($60.5 million cut below the FY2011 appropriation). It specifically included no funds for the proposed Race to the Green grant program. The report recommended $24.4 million for the third year of the Energy Efficient Building Systems Design Energy Innovation Hub. DOE was directed to report to the committee within 60 days of bill enactment on the current status of the Hub, including past and future milestones and performance measures.

The Senate Appropriations Committee report recommended $60.5 million more than the House approved. Further, the report directed that $12 million of the program funding be focused on the manufacturing of light-emitting diode (LED) lighting technology. It also urged that a strategic plan be developed to promote the innovation and use of ground source heat pumps.

The conference report provided $220.0 million, an increase of $9.5 million over the FY2011 appropriation.

Vehicles Program Initiatives

The President announced a goal to put one million electric vehicles (EVs) on the road by 2015. To help achieve that goal, DOE requested $200.0 million (above the FY2010 appropriation) under the Outreach subprogram for Vehicle Technology Deployment to support a new deployment initiative that would make available competitive grants for infrastructure and fleet conversion. Much of that total would be used to support establishment of EV recharging points. That activity would be complemented by an $89.4 million increase (above the FY2010 appropriation) for the Batteries and Electric Drive Technology subprogram to support an R&D initiative that would focus on doubling battery energy density and reducing production cost 70% by 2014.

For the entire Vehicles Program for FY2012, DOE requested a $288.0 million increase above the FY2011 appropriation.

The House Appropriations Committee report recommended—and the House approved—$334.0 million less than the request for the Vehicles Program ($46.0 million less than the FY2011 appropriation). It would have provided $26.5 million for Vehicle Technology Deployment, specifically prohibiting use of funding to support EV vehicle charging points. The report stated that federal funding for such charging points could crowd out businesses that may seek to provide such charging points as a marketable service. Instead, the report directed DOE to use $3 million of its recommended funding to support a National Academy of Sciences study of the market barriers affecting the purchase, deployment, and charging infrastructure for EVs.

The Senate Appropriations Committee report recommended $64.8 million more than the House approved. The report provided two points of special guidance. First, it directed DOE to respond to an overdue congressional requirement that it prepare a status report on revisions to the definition of alternative-fueled vehicles (AFVs) applicable to federal and state fleet conversions. Second, it recommended that $5 million be used to support a National Academy of Sciences study of market barriers to electric vehicles.

The conference report provided $330 million, an increase of $30 million over the FY2011 appropriation.

Industry Program Initiatives

Under the Industry Program, DOE identified a general goal to double energy productivity and reduce carbon intensity by 2020. To meet that goal, it requested an increase of about $225.5 million (above the FY2010 appropriation) for new initiatives. Two "Next Generation" initiatives would be launched: one focused on materials and one focused on manufacturing processes. Those two initiatives would be complemented by two additional initiatives: one focused on industrial technical assistance and one focused on new manufacturing energy systems.

An increase of $89.4 million (above the FY2010 appropriation) would support a Next Generation Materials subprogram. It would aim to achieve breakthroughs in nanomaterials, new cements, ceramics, and other materials to reduce energy and carbon intensity while enhancing U.S. clean energy (green) manufacturing competitiveness. Included in that increase would be $20.0 million to fund a new Innovation Hub for Critical Materials. The hub would be established through a competitive process and would focus on recycling and other strategies to reduce dependence on critical materials.

An increase of $77.4 million (above the FY2010 appropriation) would support a new Next Generation Manufacturing Processes subprogram. The subprogram would aim to provide critical energy and environmental improvements to increase competitiveness and stimulate job growth by improving the productivity, responsiveness, agility, and adaptability of U.S. factories. There would be a focus on production systems, innovative bioprocessing techniques, nano-scale processes, and smart process manufacturing.

A net increase of $44.1 million (above the FY2010 appropriation) would support new initiatives under the Industrial Technical Assistance subprogram. The main initiative would be a new $50.0 million Energy Efficiency Partnership between DOE and the National Institute of Standards and Technology (NIST) at the Department of Commerce. The goal would be to accelerate the development of advanced technologies that allow existing manufacturing facilities to employ energy efficient technologies, such as cogeneration and waste heat recovery. An additional increase of $7.1 million (above the FY2010 appropriation) would have supported an Energy Services Development subprogram, with the goal of conducting free energy audits for small- and medium-sized manufacturers and conducting market development activities for combined heat and power equipment and other energy technologies.

A net increase of $15.0 million (above the FY2010 appropriation) would have supported a new Manufacturing Energy Systems (MES) subprogram. MES centers would have been based at premier U.S. universities to help catalyze private sector efforts in clean energy. Goals would have included accelerating the movement of innovation from laboratory to commercial products and processes, spawning complementary businesses to facilitate technology adoption, and stimulating competitiveness and job creation.

For the entire Industry Program for FY2012, DOE requested a $211.5 million increase above the FY2011 appropriation.

The House Appropriations Committee report recommended—and the House approved—$223.8 million less than the request for the Industry Program ($12.2 million less than the FY2011 appropriation). It would have provided $66.8 million less than the request for Next Generation Materials ($34.0 million below the FY2011 appropriation). From that amount, $20.0 million would have gone to the proposed Critical Materials Energy Innovation Hub. The Committee expressed particular interest in work toward rebuilding/advancing a domestic rare earths supply chain. It directed DOE to report on the Hub's organization, milestones, and plans for coordination

with ARPA-E. The Committee report stated that the proposed Manufacturing Energy Systems program would be redundant, and recommended no funding for it.

The Senate Appropriations Committee report recommended the same level of funding—$96.0 million—as the House approved.

The conference report provided $116.0 million, an increase of $7.8 million over the FY2011 appropriation.

Other Large Increases Proposed

For the Weatherization Grant Program, DOE requested $320.0 million, an increase of $110.0 million over the FY2010 appropriation ($145.7 million above the FY2011 appropriation). From that total, $43.3 million would have gone directly to increasing the number of low-income households that are weatherized. The remaining $67.0 million of the requested increase would have supported the Innovations in Weatherization subprogram. Its goal is to demonstrate new ways to increase the number of homes weatherized and to lower the federal cost per home. DOE's main strategy is to leverage outside funding through partnerships with non-traditional weatherization providers such as foundations, non-profits, labor unions, churches, private contractors, and large companies. The House Appropriations Committee report recommended—and the House approved—$287.0 million less than the request ($141.3 million less than the FY2011 appropriation). The report estimated that the program will have about $1.5 billion of unspent funding from the Recovery Act (P.L. 111-5) available for use in FY2012. The Senate Appropriations Committee report recommended $141.3 million more than the House approved. The conference report provided $68 million, a cut of $106.3 million below the FY2011 appropriation. In real dollar terms, this is the smallest appropriation since the program was established in FY1977.[22]

For the Geothermal Program, DOE requested $101.5 million, an increase of $58.4 million above the FY2010 appropriation ($63.5 million above the FY2011 appropriation). Four subprograms would receive the majority of the funding increase. First, Enhanced Geothermal Systems would have received the largest increase, $18.4 million, to expand work on improving reservoir performance and reducing production costs. Second, a new subprogram, Innovative Exploration Technologies, would have received $15.0 million to develop exploration tools (e.g. remote sensing, seismic processing) to confirm the availability of hydrothermal resources in the Western states. Third, a new subprogram, Low Temperature and Coproduced Resources, would have received $14.0 million to support efforts on low temperature geothermal resources, including fluids co-produced from oil and gas operations that have surface and subsurface infrastructure in place. Fourth, a new subprogram, Permeable Sedimentary Resources, would have been established with $6.0 million focused on geographic expansion of the potential resource base by improving subsurface characterization in sedimentary formations and by helping to adapt tools and technologies from the oil and gas industry. The House Appropriations Committee report recommended—and the House approved—$63.5 million less than the request (just a few thousand dollars less than the FY2011 appropriation). In its report, the Committee expressed concern that DOE had overcommitted to multi-year (mortgaging) funding for this program. The report directed DOE to use FY2012 funds only to pay "mortgages" on past awards, and forbid DOE to announce new funding opportunities until its remaining mortgages for future years are less than half of the overall program appropriation for FY2012. The Senate Appropriations Committee report recommended $4 million less than the House approved. The report directed that

[22] For more details about the history of Weatherization Program funding, see CRS Report R42147, *DOE Weatherization Program: A Review of Funding, Performance, and Cost-Effectiveness Studies*, by Fred Sissine.

at least $5 million be applied to low-temperature geothermal systems. The conference report provided $38 million, which is the same amount as the FY2011 appropriation.

For the Wind Program, DOE requested $126.9 million, a net increase of $47.9 million above the FY2010 appropriation ($48.9 million above the FY2011 appropriation). Together with some subprogram reductions, a total of $63.7 million would have supported demonstration of offshore wind projects under the Technology Development and Testing subprogram. DOE anticipates that the demonstration would accelerate market deployment of more than five gigawatts of currently planned offshore projects. This is the first time since the early 1980s that DOE has proposed a major wind demonstration project. The Cape Wind project off the Massachusetts coast would be the first U.S. commercial offshore wind farm, but it has been delayed for several years. The House Appropriations Committee report recommended—and the House approved—$63.5 million less than the request ($4.0 million less than the FY2011 appropriation). The report stressed the Committee's support for offshore wind development, especially in deepwater locations. The Senate Appropriations Committee report recommends $4 million more than the House approved. It expressed the Committee's support for offshore wind energy technologies and installations. The conference report provided $93.6 million, an increase of $13.6 million over the FY2011 appropriation.

DOE requested $53.2 million for a "new" activity entitled Strategic Programs, an increase of $8.2 million over the FY2010 appropriation ($21.2 million above the FY2011 appropriation). This is actually a renaming of the existing activity entitled Program Support. The only significant change requested is an increase of about $8.1 million for the Innovation and Deployment subprogram. The House Appropriations Committee report recommended—and the House approved—$28.2 million less than the request ($7.0 million less than the FY2011 appropriation). The report specified that $8.0 million would have gone to the International subprogram. The Senate Appropriations Committee report recommended the same amount, $25.0 million, as the House approved. The conference report provided $25 million, a cut of $7 million from the FY2011 appropriation.

Key Program Decreases Proposed

The DOE request did not seek funding for Congressionally Directed Projects, which would have represented a cut of $292.1 million below the FY2010 appropriation (no change from the zero FY2011 appropriation). The House Appropriations Committee report—and the House-approved bill—also did not recommend any funds for Congressionally Directed Projects in FY2012. Likewise, the Senate Appropriations Committee report did not recommend any funds for Congressionally Directed Projects. The conference report did not recommend any funds for these projects.

For the Hydrogen/Fuel Cell Program, DOE requested $100.5 million, a cut of $69.8 million below the FY2010 appropriation (an increase of $2.5 million above the FY2011 appropriation). The cut would have been spread mostly over three subprograms. DOE explained that the funding cut would allow most work to continue, but at a slower pace. First, the Fuel Cells subprogram would have been cut by $30.2 million. It is focused on development of innovative nano materials that can reduce the need for expensive platinum group metals (PGM), development of PGM-free catalysts, development of polymer electrolytes, and reduction of materials degradation. Second, the Market Transformation subprogram would have been eliminated by a cut of $15.0 million. DOE explained that this activity would be put on hold, while performance and cost data are collected for past deployment efforts funded by $42.0 million from the Recovery Act. Third, the Hydrogen Fuel R&D subprogram would have been cut by $10.8 million. It is focused on breakthrough technologies and materials to enable hydrogen production, delivery, and storage for

diverse fuel cell applications. DOE explains that the proposed decrease reflected consolidation of the projects portfolio, completion of current obligations, and limitations on new project starts for hydrogen storage and hydrogen production from wind and solar energy. The House Appropriations Committee report recommended—and the House approved—$9.0 million less than the request ($6.6 million less than the FY2011 appropriation). The Senate Appropriations Committee report recommended $6.6 million more than the House approved. The conference report provided $104 million, an increase of $6 million over the FY2011 appropriation.

For the Water Power Program, DOE requested $38.5 million, $10.2 million less than the FY2010 appropriation ($8.5 million less than the FY2011 appropriation). Water power technologies employ marine and hydrokinetic (wave, tidal, current, and ocean thermal) resources, and conventional hydropower resources, to generate electricity. DOE's request document did not present specifics about the proposed cut. The House Appropriations Committee report recommended—and the House approved—$11.5 million more than the request ($20.0 million more than the FY2011 appropriation). The report recommended that $25.0 million go to marine and hydrokinetic technology and $25.0 million go to conventional hydropower technology. The Senate Appropriations Committee report recommended $16.0 million less than the House approved. Further, the Committee directed that DOE apply a minimum of $10.0 million to building infrastructure at test sites and that DOE apply a minimum of $15.0 million to fund competitions for demonstration projects. The conference report provided $59 million, an increase of $29 million over the FY2011 appropriation.

Electricity Delivery and Energy Reliability Program

The FY2012 request would have provided $237.7 million to the Office of Electricity Delivery and Energy Reliability, which would have been a net increase of $65.7 million above the FY2010 appropriation ($96.7 million above the FY2011 appropriation). Under the R&D Program, significant increases would have been spread over three subprograms. First, the Energy Storage subprogram is focused on key electric power infrastructure issues, including supply congestion, rising penetration of variable renewable energy generation, increased power quality demands, and concern over greenhouse gas emissions. The FY2012 requested increase of $43.4 million (above the FY2010 appropriation) would have aimed to reduce system capital and life-cycle costs for lithium-based batteries and supported grid-scale demonstration projects. Second, the Clean Energy subprogram would have been increased by $23.4 million (above the FY2010 appropriation), of which $19.4 million would have supported a new Innovation Hub for Smart Grid Technology and Systems. Third, the Smart Grid subprogram would have been increased by $13.5 million (above the FY2010 appropriation) to support a new power electronics effort (develop solid state devices to replace electromechanical devices) and to study the impacts of electric vehicle charging on grid performance.

The House Appropriations Committee report recommended—and the House approved—$98.2 million below the request ($1.5 million below the FY2011 appropriation). For Clean Energy Transmission and Reliability the report included $20.0 million, which would have been $40.8 million less than the request ($6.0 million less than the FY2011 appropriation). For Smart Grid R&D the report included $33.8 million, which would have been $11.2 million less than the request ($4.8 million more than the FY2011 appropriation). The Committee directed DOE to report on the Grid Modeling subprogram by 180 days after bill enactment and to report on grid cyber security and risk assessment measures by March 1, 2012.

The Senate Appropriations Committee report recommended $1.5 million more than the House approved. The Committee recommended no funding for DOE's proposed Smart Grid Innovation

Hub. Also, the report encouraged DOE to draw from funds appropriated to provide grants for regional transmission planning and technical assistance for deployment of renewables.

The conference report provided $139.5 million, a $1.5 million decrease below the FY2011 appropriation.

Nuclear Energy

The Obama Administration's FY2012 funding request for nuclear energy research and development totaled $754 million. Including advanced reactors, fuel cycle technology, and infrastructure support, the total nuclear energy request was about $22 million above the FY2011 funding level approved by Congress on April 14, 2011. The FY2011 level is about $37 million below the FY2010 appropriation. The House bill would have cut the Administration request by about $20 million, to $733.6 million. The Senate Appropriations Committee recommended a cut of $170.2 million from the Administration request, for a total of $583.8 million. The conference agreement provides $768.7 million. Those totals exclude funding provided under Other Defense Activities for safeguards and security at DOE's Idaho nuclear facilities, for which $98.5 million was requested and $93.4 million appropriated for FY2012.

The Senate Appropriations Committee report said the Fukushima-Daiichi nuclear disaster in Japan had "resulted in a reexamination of our Nation's policies regarding the safety of commercial reactors and the storage of spent nuclear fuel." The Committee directed the Blue Ribbon Commission on America's Nuclear Future, which is developing recommendations on future U.S. nuclear waste policy, "to develop a comprehensive revision to Federal statutes based on its recommendations" and for DOE to develop a nuclear waste management strategy based on the Commission's recommendations. The Senate panel included funding for various nuclear reactor and waste safety programs throughout the DOE nuclear energy budget. The conferees directed DOE "to develop a strategy for the management of spent nuclear fuel and other nuclear waste" within six months after the Blue Ribbon Commission's final report.

Using reorganized budget categories established for FY2011, the Administration's FY2012 nuclear R&D budget request was consistent with DOE's *Nuclear Energy Research and Development Roadmap* issued in April 2010.[23] The Roadmap lays out the following four main goals for the program:

- Develop technologies and other solutions that can improve the reliability, sustain the safety, and extend the life of current reactors;
- Develop improvements in the affordability of new reactors to enable nuclear energy to help meet the Administration's energy security and climate change goals;
- Develop sustainable nuclear fuel cycles; and
- Understand and minimize the risks of nuclear proliferation and terrorism.

Reactor Concepts

The Reactor Concepts program area includes the Next Generation Nuclear Plant (NGNP) demonstration project and research on other advanced reactors (often referred to as Generation IV reactors). This area also includes funding for developing advanced small modular reactors (discussed in the next section) and to enhance the "sustainability" of existing commercial light

[23] Department of Energy, *Nuclear Energy Research and Development Roadmap*, Report to Congress, Washington, DC, April 2010, http://nuclear.gov/pdfFiles/NuclearEnergy_Roadmap_Final.pdf.

water reactors. The total FY2012 funding request for this program was $125 million. The House bill would have provided $137 million, $12 million above the request but $31.5 million below the FY2011 level. The Senate Appropriations Committee would have cut Reactor Concepts to $31.9 million. The enacted bill provided $115.5 million.

NGNP is a high-temperature gas-cooled reactor demonstration project authorized by the Energy Policy Act of 2005 (EPACT05). The reactor is 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. DOE requested $49.6 million for the NGNP project for FY2012, down from $103 million requested in FY2011. The House bill recommended $63.6 million. Under EPACT05, the Secretary of Energy was to decide by the end of FY2011 whether to proceed toward construction of a demonstration plant. 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.[24] Potential obstacles facing NGNP include low prices for natural gas, the major competing fuel, and private-sector unwillingness to share the project's costs as required by EPACT05.[25] The Senate Appropriations Committee eliminated funding for the NGNP program in its current form, citing its "lack of progress and failure to resolve the upfront cost-share issue." The conferees provided $40 million, including $30 million "to accelerate fuel development and qualification activities."

The FY2012 funding request for the Advanced Reactor Concepts program was $21.9 million, the same as the FY2011 request, and the same as the enacted FY2012 appropriation. The program was described by the FY2011 budget justification as "an expanded version" of the previous Generation IV Nuclear Energy Systems program. "The program will focus on reactors that could dramatically improve performance in sustainability, safety, economics, security, and proliferation resistance," according to the FY2011 and FY2012 justifications. Nuclear technology development under this program includes "fast reactors," using high-energy neutrons, and reactors that would use a variety of heat-transfer fluids, such as liquid sodium and supercritical carbon dioxide. International research collaboration in this area would continue under the Generation IV International Forum (GIF).

DOE's Light Water Reactor Sustainability Program request was $21.4 million, about $4.4 million below the FY2011 request. 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. The program, which is to be cost-shared with the nuclear industry, is to study the aging of reactor materials and analyze safety margins of aging plants. Other research under this program is to focus on improving the efficiency of existing plants, through such measures as increasing plant capacity and upgrading instrumentation and control systems. Research on longer-life LWR fuel is aimed at eliminating fuel leakage and increasing safety and performance, according to the budget justification. The House bill would have provided $25 million for the program. The Senate Appropriations Committee specified that $10 million of Reactor Concepts funding be used "for research and development of the current fleet of operating reactors to determine how long they can safely operate." The conferees adopted the House-passed level of $25 million and directed that an unspecified amount be used to conduct the Senate's proposed research on reactors' safe lifespans.

[24] Idaho National Laboratory, *NGNP Project 2011 Status and Path Forward*, INL/EXT-11-23907, December 2011.

[25] Yanmei Xie, "Cheap Natural Gas, Cost-Share Disagreement Jeopardize NGNP," *Nucleonics Week*, April 28, 2011, p. 1.

Small Modular Light Water Reactors

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 350 megawatts of electrical capacity, such reactors would be only a fraction of the size of current commercial reactors. 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 in the NGNP program and the light water (LWR) technology used by today's commercial reactors.

DOE requested $67 million for FY2012 to provide technical support for licensing small modular LWRs, a substantial boost from the FY2011 request of $38.9 million. The House bill included the full request, while the Senate Appropriations Committee recommended zero. The conferees provided the full request for FY2012 in anticipation of a five-year program totaling $452 million. The program would be similar to DOE's support for larger commercial reactor designs under the Nuclear Power 2010 Program, which ended in FY2010. DOE would provide support for design certification, standards, and licensing. As with the Nuclear Power 2010 Program, at least half the costs of the LWR SMR program are to be covered by industry partners, according to DOE. On January 20, 2012, DOE announced that it would hold a competitive solicitation to award cost-shared financial assistance to as many as two SMR LWR designs.[26]

An additional $28.7 million was requested under the Reactor Concepts program (described in the section above) for SMR advanced concepts R&D. The House bill recommended the same amount, and it was included in the enacted bill. Unlike the SMR licensing support program, which focuses on conventional technology, the SMR advanced concepts program would conduct research on technologies that might be deployed in the longer term, according to the budget justification.

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, and because their smaller size would allow for simpler 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.

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. The total FY2012 funding request for this program was $155 million. The House bill recommended $132 million, $23 million below the request and $55.6 million below the FY2011 level. The Senate Appropriations Committee recommended an increase to $187.9 million, $300,000 above FY2011. The Senate panel included $10 million for modeling and simulation of the safety of spent fuel storage. The Committee recommended $60 million for Used Nuclear Fuel Disposition, including $10 million to develop standardized storage,

[26] Department of Energy, "Energy Department Takes First Step to Spur U.S. Manufacturing of Small Modular Nuclear Reactors," January 20, 2012, http://energy.gov/articles/energy-department-takes-first-step-spur-us-manufacturing-small-modular-nuclear-reactors.

transportation, and disposal canisters, $3 million for spent fuel management partnerships, and $7 million for "characterization of potential geologic repository media." The Senate panel recommended $59 million for developing advanced fuels that might reduce the consequences of nuclear accidents like the Fukushima-Daiichi disaster. The final bill provided $187.4 million for fuel cycle R&D, including $60 million for Used Nuclear Fuel Disposition and $59 million for advanced fuels, as recommended by the Senate panel.

Under the George W. Bush Administration, when it was called the Advanced Fuel Cycle Initiative (AFCI), the program had focused on near-term development and deployment of a specific type of spent fuel reprocessing technology, UREX, which was intended to recycle plutonium, uranium, and other long-lived radioactive materials into new nuclear fuel. AFCI had constituted the domestic portion of the Bush Administration's Global Nuclear Energy Partnership (GNEP) initiative, which had been intended to provide secure nuclear fuel services to discourage the international spread of nuclear fuel cycle technology.

Under the Obama Administration, the program has been redirected toward development of technology options for a wider range of nuclear fuel cycle approaches, including direct disposal of spent fuel (the "once through" cycle) and partial and full recycling, according to the justification. "Specifically, the program will research and develop a suite of technology options that will enable future decision-makers to make informed decisions about how best to manage nuclear waste and used fuel from reactors," the justification says.

Much of the planned research on spent fuel management options has supported the Blue Ribbon Commission on America's Nuclear Future, which is developing alternatives to the planned Yucca Mountain, NV, spent fuel repository, which President Obama wants to terminate. Other major research areas in the Fuel Cycle R&D Program include the development of advanced fuels for existing commercial reactors and advanced reactors, improvements in nuclear waste characteristics, modeling and simulation of fuel cycle options, and technology to increase nuclear fuel resources, such as uranium extraction from seawater.

Nuclear Energy Enabling Technologies

Research under the Nuclear Energy Enabling Technologies (NEET) program is intended to "contribute to a wide variety of existing and developing reactor and fuel cycle technologies," according to the FY2012 DOE budget justification. The funding request for the program was $97.4 million, $46 million above the FY2011 level. The House bill would have provided $95 million, and the Senate Appropriations Committee recommended $68.9 million. The final bill appropriated $74.9 million for the program.

Under the category of Crosscutting Technology Development, for which $41.2 million was requested, research is to be conducted on new types of reactor materials, the weapons proliferation risks of fuel cycle options, advanced nuclear plant manufacturing methods, and advanced sensors and instrumentation. The Energy Innovation Hub for Modeling and Simulation, created in FY2010, had a request of $24.3 million, the same as in FY2011. The Modeling and Simulation Hub is creating a computer model of an operating reactor to allow a better understanding of nuclear technology, with the benefits of such modeling extending to other energy technologies in the future, according to the justification. The conferees provided $36 million for crosscutting technology and the full request for the Modeling and Simulation Hub.

Transformative Nuclear Concepts Research, with a request of $14.6 million, is to provide competitive support to "investigator-initiated transformative projects that are high-risk, high-reward concepts with the potential for making significant leaps forward in advanced nuclear technology development," according to the FY2012 justification. Awards are to be available to

national laboratories, universities, research institutions, and industry. DOE also requested $14.6 million for the National Science User Facility to support up to five university partnerships to conduct experiments "at facilities not normally accessible." Funding for the User Facility had previously been provided under Idaho Facilities Management, according to the House report, which approved the shift. The Senate Committee provided no funding for transformative research. Conferees provided the full request for the User Facility and no funding for transformative research.

Fossil Energy Research and Development

The Obama Administration proposed a new budget structure for the FY2012 Fossil Energy Research and Development (FER&D) program that emphasized coal with a focus on carbon capture and storage (CCS) technologies. The CCS program intends to demonstrate advanced clean coal technologies on a commercial-project scale, and build and operate near-zero atmospheric emissions power plants that capture and store carbon dioxide (CO2). A Carbon Capture sub-program focuses on separate CO2 in both pre-combustion and post-combustion systems. The Carbon Storage sub-program focuses on long-term geologic storage of CO2, including small- and large-scale CO2 injection tests. An Advanced Energy Systems sub-program focuses on improving the efficiency of coal-based power systems to capture CO2. The Advanced Energy Systems sub-program focuses on improving the efficiency of coal-based power systems, enabling affordable CO2 capture, increasing plant availability, and maintaining the highest environmental standards. The Cross-cutting Research activity serves as a bridge between basic and applied research by fostering the development and deployment of innovative systems.

The Administration had proposed cutting Natural Gas, Unconventional Fossil Energy Technologies, and Cooperative R&D for FY2011, and had requested $586.6 million for Fossil Energy R&D. The restructured Fossil Energy Research and Development Program (FER&D) program eliminated spending on Natural Gas, Unconventional Technologies, and Cooperative R&D. For FY2012, the Administration requested $476 million and the use of $23 million in prior-year balances, bringing spending on Fossil Energy R&D to $453 million.

The House Appropriations Committee recommended $477 million for FER&D ($32.5 million above FY2011 and $24 million above the budget request). The committee stated its concern that the Administration's budget request continues to shift the focus of FER&D towards CCS instead of investing in a broad array of research avenues and opportunities to use natural resources more efficiently. The committee recommended $338.8 million for the CCS and Power Systems program ($47.4 million above the budget request). Under this program, $105 million applies to Advanced Energy Systems ($40.8 million above the budget request), of which: $25 million applies to RD&D of solid oxide fuel cell systems; $5 million applies to High Performance Materials ($4 million above the request); $10 million applies to Coal and Coal-Biomass to Liquids program; $8 million applies to Gasification Systems advanced air separation technologies; and $49.4 million for Cross Cutting Research ($6.6 million above the budget request). For Natural Gas Technologies, the committee recommended $15 million ($13 million above FY2011 and $15 million above the budget request), of which $10 million applies to gas hydrates R&D. Finally, the committee recommended $120.85 million for Program Direction ($30.9 million below FY2011 and $38.4 million below the budget request).

The Senate Appropriations Committee recommended $445.5 million for Fossil Energy Research and Development, including the use of $23 million of prior year balances as proposed in the request. This is $7.5 million less than the budget request which reflects a reduction in program direction to FY2011 levels. The committee also rescinds $187 million in prior year funds. The committee recommended $291.4 million for CCS and Power Systems (the same as requested);

$151.7 million for program direction (to remain available until September 30, 2014); $16.8 million for Plant and Capital Equipment; $7.9 million for Fossil Energy Environmental Restoration; and $0.7 million for Special Recruitment Programs.

Table 9. Fossil Energy Research and Development Program (FER&D)

($ millions)

	FY2011 Approp.	FY2012 Request	FY2012 House	FY2012 Senate	P.L. 112-74
FUELS AND POWER SYSTEMS	400.2	0.0	0.0	0.0	0.0
CCS DEMONSTRATION					
Carbon Capture	0.0	68.9	68.9	68.9	68.9
Carbon Storage	0.0	115.5	115.5	115.5	115.5
Advanced Energy Systems	0.0	64.2	105.0	64.2	100.0
Cross Cutting Research	0.0	42.8	49.4	49.4	49.2
National Energy Tech. Lab Coal R&D	0.0	0.0	0.0	0.0	35.0
CCS Subtotal	0.0	291.4	338.8	291.4	368.6
NATURAL GAS TECHNOLOGIES	2.0	0.0	15.0	0.0	15.0
PROGRAM DIRECTION	151.7	159.2	120.8	151.7	120.0
Plant and Capital Equipment	20.0	16.8	16.8	16.8	16.8
Fossil Energy Environmental Restoration	10.0	7.9	7.9	7.9	7.9
Special Recruitment Program	0.7	0.7	0.7	0.7	0.7
Subtotal	**584.5**	**476.0**	**500.0**	**468.5**	**534.0**
Prior-year balances	**0.0**	**-23.0**	**-23.0**	**-23.0**	**0.0**
Rescission	**-140.0**	**0.0**	**0.0**	**-187.0**	**-187.0**
Total	**444.5**	**453.0**	**477.0**	**258.5**	**347.0**

Source: FY2012 Budget Request; H.Rept. 112-118. S.Rept. 112-75, H.Rept. 112-331.

The final bill (P.L. 112-74) appropriated $534 million for FER&D and rescinded $187 million, for a total of $347 million. Of that amount, $368.6 million was allotted to CCS programs, including $35.0 million transferred from Program Direction to fund coal R&D at the National Energy Technology Laboratory. The conference report specified $100 million within CCS for Advanced Energy Systems, and "not less than $25 million" to continue RD&D of solid oxide fuel cell systems.

Strategic Petroleum Reserve

The Strategic Petroleum Reserve (SPR), authorized by the Energy Policy and Conservation Act (P.L. 94-163) in 1975, consists of caverns formed out of naturally occurring salt domes in Louisiana and Texas. The purpose of the SPR is to provide an emergency source of crude oil that may be tapped in the event of a presidential finding that an interruption in oil supply, or an

interruption threatening adverse economic effects, warrants a drawdown from the reserve. By early 2010, the SPR was filled to its current capacity of 727 million barrels.[27]

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. The *Procedures for the Acquisition of Petroleum for the Strategic Petroleum Reserve* include provisions for acquiring crude oil through direct purchase, by transfer of royalty oil from the Department of the Interior, and by receipt of premium barrels resulting from deferral of scheduled deliveries of petroleum for the Reserve.[28] In May 2008, Congress passed legislation (P.L. 110-232) ordering DOE to suspend RIK fill for the balance of the calendar year unless the price of crude oil dropped below $75/barrel. However, the sharp decline in crude oil prices since spiking to $147/barrel in the summer of 2008 brought about a resumption of fill of the SPR. On January 2, 2009, the Bush Administration announced plans that included the purchase of nearly 10.7 million barrels for the SPR to replace oil that was sold after Hurricanes Katrina and Rita in 2005. In May 2009, RIK fill was resumed at an average volume of 26,000 barrels per day, totaling over 6.1 million barrels to be delivered by January 2010. These activities have brought the SPR to capacity.

On September 16, 2009, the Secretary of the Interior announced a transitional phasing out of the RIK Program.[29] As RIK oil and natural gas sales contracts expire, the oil and natural gas properties will revert to in-value status.

The Energy Policy Act of 2005 (EPAct) required expansion of the SPR to its authorized maximum of 1 billion barrels. DOE subsequently evaluated a site in Richton, MS, as a possible location for an additional 160 million barrels of capacity. However, in its FY2011 request, the Administration proposed suspending the SPR's expansion. Instead, it proposed redirecting $71 million in balances previously appropriated for expansion to "partially fund SPR non-Expansion operations and maintenance activities.[30] In support of its proposal, the Administration cited EIA projections that "U.S. petroleum consumption and dependence on imports will decline in the future and the current Reserve's projection [of import replacement capacity] will gradually increase to 90 days by 2025." The Administration consequently reduced the FY2011 request for the SPR to $138.9 million, sharply down from the $243.8 million appropriated for FY2010.

The FY 2011 Continuing Resolution (P.L. 112-10) funded the SPR at $123.1 million, including a rescission of $71.0 million from prior year appropriations. For FY2012, the Administration requested $121.7 million. The Administration also proposed a sale of $500 million in petroleum from the SPR, to be completed not later than March 1, 2012, for deposit in the General Fund of the Treasury. The House Committee recommended the $500 million sale provided that the quantity sold is replaced during FY2012 under paragraph (a)1 or 3 of Section 160 of the Energy Policy and Conservation Act (42 U.S.C 6240 (a)(1) or (3)), which authorizes acquisition of crude oil produced from federal lands, or through purchase or exchange, respectively. Both recommendations preceded the Administration's June 24, 2011 announced sale of 30 million barrels.

The House Appropriations Committee recommended $192.7 million for FY2012 ($69.5 million above FY2011 and $71 million above the budget request). The Senate Appropriations Committee

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

[28] Final Rule, 65376 Federal Register, Vol. 71, No. 216, November 8, 2006; Rules and Regulations.

[29] Bureau of Ocean Management, Regulation and Enforcement. http://www.mrm.boemre.gov/AssetManagement/default.htm.

[30] $14.5 million appropriated under P.L. 110-161, $31.5 under P.L. 110-329, and $25 million under P.L. 111-85.

recommended the same funding, and the final bill appropriated that amount. The final bill also included a rescission of $500 million, rather than the proposed sale of reserves.

Science

The DOE Office of Science conducts basic research in six program areas: basic energy sciences, high-energy physics, biological and environmental research, nuclear physics, advanced scientific computing research, and fusion energy sciences. Through these programs, DOE is the third-largest federal funder of basic research and the largest federal funder of research in the physical sciences.[31] For FY2012, DOE requested $5.416 billion for the Office of Science, an increase of 12% from the FY2011 appropriation of $4.843 billion. The House bill would have provided $4.800 billion. The Senate committee recommended $4.843 billion. The final appropriation was $4.889 billion. (See **Table 10**.)

Table 10. Science

($ millions)

Program	FY2011 Approp.	FY2012 Request	FY2012 House	FY2012 Senate	FY2012 Final
Basic Energy Sciences	$1,678.2	$1,985.0	$1,688.1	$1,693.9	$1,694.0
High Energy Physics	795.4	797.2	797.2	780.2	791.7
Biological and Environmental Research	611.8	717.9	547.1	621.8	611.8
Nuclear Physics	540.1	605.3	552.0	550.1	550.0
Advanced Scientific Computing Research	422.0	465.6	427.1	441.6	442.0
Fusion Energy Sciences	375.5	399.7	406.0	335.5	402.2
Science Program Direction	202.5	216.9	180.0	180.8	185.0
Science Laboratories Infrastructure	125.7	111.8	103.5	136.8	111.8
Safeguards and Security	83.8	83.9	83.9	82.0	82.0
Workforce Development for Teachers and Scientists	22.6	35.6	17.8	20.0	18.5
Rescission	(15.0)	—	—	—	—
Use of Prior-Year Balances	—	(2.7)	(2.7)	—	—
Total	**4,842.7**	**5,416.1**	**4,800.0**	**4,842.7**	**4,889.0**

Sources: FY2012 budget request, H.R. 2354 as passed by the House, H.Rept. 112-118, H.R. 2354 as reported in the Senate, S.Rept. 112-75, P.L. 112-74, and H.Rept. 112-331.

The Administration's stated goal is to double the funding of the Office of Science. This continues a plan initiated by the Bush Administration in January 2006. The original target under both Administrations was to achieve the doubling goal in the decade from FY2006 to FY2016. The current policy no longer specifies a completion date. The FY2012 request was 49% more than the FY2006 baseline. The amount in the House bill was 32% more than the baseline. The Senate committee recommendation was 33% more than the baseline. The final appropriation was 35% more than the baseline.

[31] Based on preliminary FY2009 data from Tables 29 and 22 of National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development: Fiscal Years 2007-09*, NSF 10-305 (May 2010).

The FY2012 request for the largest Office of Science program, basic energy sciences, was $1.985 billion. This included $24 million for the existing Innovation Hub on Fuels from Sunlight, currently funded by EERE, and $34 million for a new Energy Innovation Hub on Materials for Batteries and Energy Storage.[32] The House bill would have provided $1.668 billion for basic energy sciences, including the requested amount for the existing hub and $20 million for the new one. The House committee directed DOE to rank all ongoing multi-year research projects in this program by performance and then terminate the lowest-ranking $25 million. The Senate committee recommended $1.694 billion, including the same amounts as the House for the two hubs. It directed DOE to create a performance ranking of all ongoing multi-year research projects (across the entire Office of Science) but did not specify a sanction for low-ranking projects. The conference report provided $1.694 billion, including the same amounts as the House and Senate bills for the two hubs. The conference report language on performance ranking was similar to the Senate's.

For high-energy physics, the request was $797 million. The House bill would have provided the requested amount. The Senate committee recommended $780 million. The final appropriation was $792 million. Within this program, DOE is reconsidering its options for the future of the Long Baseline Neutrino Experiment (LBNE). The National Science Foundation has decided to cease funding the Deep Underground Science and Engineering Laboratory (DUSEL) at the Homestake mine in South Dakota, which had been a likely site for LBNE's far detector. The House report cautioned DOE against taking over the construction and long-term management of DUSEL but did not specifically address funding for LBNE. The Senate committee recommended no funding for LBNE construction. The conference report provided $21 million for R&D and engineering design for LBNE and $10 million for "minimal, sustaining operations" at the Homestake mine, but no funding for LBNE long-lead procurement or construction. The conferees expressed concern about the project's readiness for construction and directed DOE to submit a project plan with a refined total cost estimate. Scientific interest in LBNE may increase as a result of the September 2011 finding, in a similar experiment in Europe, that neutrinos appear to travel faster than light.

The request for biological and environmental research was $718 million. Within this total, the $103 million requested for foundational genomics research was more than triple the FY2010 level. The House bill would have provided $547 million. The House committee asserted that most of the program's activities in climate and environmental sciences, which account for nearly half of its requested budget, are "not directly related to the core mandate of ... research leading to energy innovations" and that climate research may be better carried out by other federal agencies rather than DOE. The Senate committee recommended $622 million, including $295 million (the FY2011 enacted amount) for climate and environmental sciences. The Senate report recognized the climate and environmental sciences program for its "unique contributions ... in advancing climate research." The final appropriation was $612 million. The conference report did not mention the climate and environmental sciences program.

For nuclear physics, the request was $605 million. As previously planned, this request included $66 million for continued construction of an upgrade at the Continuous Electron Beam Accelerator Facility (CEBAF). The House bill would have provided $552 million. The Senate

[32] The Administration proposed to initiate eight energy innovation hubs in FY2010, but Congress funded only three. The FY2012 budget request proposed funding for six hubs. The topics for the three proposed new hubs were batteries and energy storage, critical materials, and Smart Grid technologies and systems. The aim of the hubs is "to address basic science and technology hindering the nation's secure and sustainable energy future" by assembling multidisciplinary teams of researchers "spanning science, engineering, and other disciplines, but focused on a single critical national need identified by the Department." (DOE FY2011 budget justification, vol. 4, p. 86.)

committee recommended $550 million, including $55 million for construction at CEBAF. The conference report provided $550 million, including $50 million for the CEBAF upgrade. The conference report total for nuclear physics also included $5 million, in addition to the $10 million noted above under high-energy physics, for "minimal, sustaining operations" at the Homestake mine.

The request for advanced scientific computing research was $466 million. The House bill would have provided $427 million. The Senate committee recommended $442 million, which was also the amount provided in the final appropriation.

The request for fusion energy sciences was $400 million. The proposed U.S. contribution to the International Thermonuclear Experimental Reactor (ITER), a fusion facility under construction in France, was $105 million. Despite a slip of several years in the expected start-up date for ITER, DOE stated in February 2011 that "the costs associated with the schedule delays to date ... are manageable within the existing ... cost range" of $1.45 billion to $2.2 billion.[33] Damage to component test facilities in Japan, caused by the Fukushima earthquake and tsunami in March 2011, may result in additional delays.[34] The House bill would have provided $406 million for fusion energy sciences. The House committee expressed its support for ITER but also its concern about the project's future impact on funding for domestic fusion science. The Senate committee recommended $335 million. Like the House committee, it expressed concern about ITER's future impact on the domestic program. The final appropriation for fusion energy sciences was $402 million. The House and Senate committees and the conference report all directed DOE to submit a 10-year plan that considers fusion priorities under various budget scenarios.

ARPA-E

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.[35] It received its first funding in FY2009, mostly through the American Recovery and Reinvestment Act of 2009 (P.L. 111-5), and announced its first round of contract awards in October 2009. DOE budget documents describe ARPA-E's mission as overcoming long-term, high-risk technological barriers to the development of energy technologies. The request for ARPA-E in FY2012 was $550 million, more than triple the FY2011 appropriation of $180 million.[36] In addition, the Administration proposed to allocate $100 million in mandatory funding to ARPA-E from a proposed Wireless Innovation Fund that would be supported by the proceeds of spectrum auctions. The House committee recommended $100 million. A floor amendment increased the House amount to $179.6 million. The Senate committee recommended $250 million. The final appropriation was $275 million.

Nuclear Waste Disposal

President Obama's FY2012 budget included no funding for DOE's 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

[33] DOE FY2012 congressional budget justification, vol. 4, p. 234.

[34] Geoff Brumfiel, "Japan Quake Rocks Fusion Project: Damaged Facilities Force Further Delay to ITER Experiment," *Nature*, May 31, 2011.

[35] For more information, see CRS Report RL34497, *Advanced Research Projects Agency - Energy (ARPA-E): Background, Status, and Selected Issues for Congress*, by Deborah D. Stine.

[36] Some budget documents show the ARPA-E account as the Energy Transformation Acceleration Fund.

at Yucca Mountain, NV, as specified by an NWPA amendment in 1987. No funding was requested or provided for OCRWM in FY2011, so the office has been closed and activities at the Yucca Mountain site halted.

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," according to the DOE FY2011 budget justification.

The House Appropriations Committee "rejects the Administration's wasteful, partisan attempts to shutter the Yucca Mountain nuclear waste repository program," according to a Committee news release.[37] DOE filed a license application with the Nuclear Regulatory Commission (NRC) for the proposed Yucca Mountain repository in June 2008 but under the Obama Administration filed a motion to withdraw the application on March 3, 2010. The FY2012 House bill included $25 million for DOE to continue work on the program and $10 million for NRC "to continue the Yucca Mountain license application."

The Senate Appropriations Committee provided no funding for OCRWM but included significant funding related to nuclear waste policy, safety, and research in the DOE nuclear energy R&D budget. The conferees largely adopted the Senate position, providing no funds for nuclear waste disposal but including waste R&D funding in the nuclear R&D budget.

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."[38] NRC was appropriated $10 million in FY2011 for nuclear waste licensing, the same as the request, which had specified that the funding would be used to close down the licensing process. The FY2012 House bill would have prohibited NRC funds from being used to halt the licensing process unless NRC approved DOE's license withdrawal motion. That language was dropped in the final bill, although language was included to prevent the NRC Chairman from terminating programs without a majority vote of the Commission. No funding was provided in the final bill to continue Yucca Mountain licensing activities.

Alternatives to Yucca Mountain were evaluated by the Blue Ribbon Commission on America's Nuclear Future, which was formally established by DOE on March 1, 2010. The Commission issued its final report to the Secretary of Energy on January 26, 2012.[39] The report recommended options for temporary storage, treatment, and permanent disposal of highly radioactive nuclear waste, along with an evaluation of nuclear waste research and development programs and the need for legislation. It did not recommend specific sites for new nuclear waste facilities or evaluate the suitability of Yucca Mountain.

In its final report, the Commission recommended a "consent-based" approach to siting nuclear waste facilities and that the roles of local, state, and tribal governments be negotiated for each potential site. The development of consolidated waste storage and disposal facilities should begin

[37] House Committee on Appropriations, "Appropriations Committee Releases Fiscal Year 2012 Energy and Water Appropriations Bill," press release, June 1, 2011, http://appropriations.house.gov/News/DocumentSingle.aspx?DocumentID=244898.

[38] 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.

[39] 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.

as soon as possible, the Commission urged. A new waste management organization should be established to develop the repository, along with associated transportation and storage systems, according to the Commission. The new organization 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, DOE could not spend those funds without congressional appropriations.

DOE's Office of Nuclear Energy (NE) has taken over the remaining functions of OCRWM and will "lead all future waste management activities," according to the FY2011 budget justification. Substantial funding has been requested for NE to conduct research on nuclear waste disposal technologies and options and to provide support for the Blue Ribbon Commission (see "Nuclear Energy" section for more details).

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. DOE estimates that liability payments would eventually total $11 billion if DOE were to begin removing waste from reactor sites by 2020, the previous target for opening Yucca Mountain.[40] (For more information, see CRS Report R40202, *Nuclear Waste Disposal: Alternatives to Yucca Mountain*, by Mark Holt; CRS Report RL33461, *Civilian Nuclear Waste Disposal*, by Mark Holt; and CRS Report R40996, *Contract Liability Arising from the Nuclear Waste Policy Act (NWPA) of 1982*, by Todd Garvey.)

Loan Guarantees and Direct Loans[41]

DOE's loan guarantee program for energy technology deployment is authorized by Title XVII of the Energy Policy Act of 2005 (EPACT05, P.L. 109-58). No funding for additional loan guarantees under Title XVII was provided for FY2012, although $38 million was approved for administrative expenses. Two major loan guarantee programs are currently conducted 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 commercial technologies" currently in service 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 are available to already-commercialized renewable energy and electric transmission technologies.

[40] Statement of Edward F. Sproat III, Director of the Office of Civilian Radioactive Waste Management, Before the House Budget Committee, October 4, 2007.

[41] For more details on loan guarantees, see CRS Report R42152, *Loan Guarantees for Clean Energy Technologies: Goals, Concerns, and Policy Options*, by Phillip Brown.

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 low interest rates. DOE reports that it has made conditional loan guarantee commitments to four projects under Section 1703, totaling $10.65 billion for nuclear power, nuclear fuel, and energy efficiency projects. Under Section 1705, final loan guarantees have been issued for 28 projects, totaling $16.13 billion.[42]

DOE issued final rules for the program October 4, 2007.[43] DOE's proposed loan guarantee rules, published May 16, 2007, had faced sharp criticism for limiting the guarantees to 90% of a project's debt. The industry contended that EPACT05 allows all of a project's debt to be covered, as long as debt does not exceed 80% of total construction costs. In its explanation of the proposed rules, DOE expressed concern that guaranteeing 100% of a project's debt could reduce lenders' incentive to perform adequate due diligence and therefore increase default risks. In the final rule, however, DOE agreed to guarantee up to 100% of debt, but only for loans issued by the Federal Financing Bank.

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.[44] 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). However, ARRA appropriated $6 billion to cover the subsidy costs of Section 1705 loan guarantees, so subsidy cost payments are not required from project sponsors under that program. The total loan guarantee amounts that could be provided under ARRA depend on the level of subsidy costs that would be charged. For example, if the subsidy costs averaged 10% of the total guaranteed loans, then $6 billion in subsidy cost appropriations would support $60 billion in loan guarantees. However, $2 billion of 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 had been obligated by the end of FY2011.[45]

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

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

[43] Published October 23, 2007 (72 *Federal Register* 60116).

[44] 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.

[45] 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.

guarantee program.[46] Solyndra's DOE loan guarantee totaled $535 million, and the company's bankruptcy placed most or all of that amount at risk.

Under the Federal Credit Reform Act (FCRA), federal loan guarantees cannot be provided without an authorized level in an appropriations act. The Senate-passed version of omnibus energy legislation in the 110th Congress (H.R. 6) would have explicitly eliminated FCRA's applicability to DOE's planned loan guarantees under EPACT05 (§124(b)). That provision would have given DOE essentially unlimited loan guarantee authority for guarantees whose subsidy costs were paid by project sponsors, but it was dropped from the final legislation (P.L. 110-140). Similar language has been included in subsequent legislative proposals, but not enacted.

Pursuant to FCRA, the FY2007 continuing resolution (P.L. 110-5) established an initial cap of $4 billion on loan guarantees under the program, without allocating that amount among the various eligible technologies. The explanatory statement for the FY2008 omnibus funding act (P.L. 110-161) increased the loan guarantee ceiling to $38.5 billion through FY2009, including $18.5 billion specifically for nuclear power plants and $2 billion for uranium enrichment plants.[47]

The FY2009 Omnibus Appropriations Act (P.L. 111-8) increased DOE's total loan guarantee authority under Section 1703 to $47 billion, in addition to the $4 billion authorized in FY2007, half of which DOE has designated for uranium enrichment. Of the $47 billion, $18.5 billion continued to be reserved for nuclear power, $18.5 was for energy efficiency and renewables, $6 billion was for coal, $2 billion was for carbon capture and sequestration, and $2 billion was for uranium enrichment. The time limits on the Section 1703 loan guarantee authority were eliminated. The FY2011 Department of Defense and Full-Year Continuing Appropriations Act (P.L. 112-10) reduced the previous loan guarantee authority for Section 1703 non-nuclear technologies to $8.3 billion but added new authority for a total of $9.5 billion. Including the $2 billion in FY2007 authority that has not been designated for uranium enrichment, the Section 1703 non-nuclear loan guarantee ceiling stands at about $11.5 billion. Nuclear loan guarantees remain at $18.5 billion, and uranium enrichment totals $4 billion.

Remaining appropriations for subsidy cost payments under the Section 1705 loan guarantee program expired at the end of 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 CR on non-nuclear technologies under Section 1703 ($317 million conditionally committed), reduced from ceilings set in FY2009.
- $2 billion for unspecified projects from FY2007 under Section 1703, not affected by CR.

[46] 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.

[47] *Congressional Record*, December 17, 2007, p. H15585.

- $18.5 billion ceiling for nuclear power plants ($8.3 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 $16.13 billion in loan guarantees with final commitments under Section 1705, for which the deadline was September 30, 2011.[48]

DOE requested an additional appropriation of $200 million in FY2012 to cover the subsidy costs of innovative renewable energy and energy efficiency projects under Section 1703. That funding would support about $1-2 billion in loan guarantees, according to the budget justification. DOE also repeated its unsuccessful request from FY2011 to nearly triple the ceiling on loan guarantees for nuclear power projects, from $18.5 billion to $54.5 billion. The FY2012 House bill would have appropriated $160 million for subsidy costs under Section 1703 and for projects that applied for support under Section 1705 before February 24, 2011. The House bill did not include the proposed $36 billion increase in the nuclear loan guarantee ceiling. The Senate Appropriations Committee approved the full $200 million request for renewable energy subsidy costs but recommended no increase in nuclear loan guarantees. The final bill did not provide additional funding for subsidy costs or increase the existing loan guarantee ceilings.

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). 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 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, plus a conditional commitment of $730 million.[49] DOE did not request any funding for subsidy costs for new loans in FY2012, and the final bill provided funding only for administrative expenses.[50]

Nuclear Weapons Stockpile Stewardship

Congress established the Stockpile Stewardship Program in the FY1994 National Defense Authorization Act, P.L. 103-160, "to ensure the preservation of the core intellectual and technical competencies of the United States in nuclear weapons." The FY2010 National Defense

[48] DOE Loan Programs Office, *Our Projects*, https://lpo.energy.gov/?page_id=45.

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

[50] For more details, see CRS Report R42064, *The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program: Status and Issues*, by Brent D. Yacobucci and Bill Canis.

Authorization Act, P.L. 111-84, Section 3111, amended this language to state that the program is to ensure "(1) the preservation of the core intellectual and technical competencies of the United States in nuclear weapons, including weapons design, system integration, manufacturing, security, use control, reliability assessment, and certification; and (2) 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 11** presents Weapons Activities funding. NNSA manages two programs outside of that account: Defense Nuclear Nonproliferation, discussed later in this report, and Naval Reactors.

P.L. 111-84, Section 3113, established a "stockpile management" program "to provide for the effective management of the weapons in the nuclear weapons stockpile, including the extension of the effective life of such weapons." Objectives for the program include increasing the reliability, safety, and security of the nuclear weapons stockpile and further reducing the likelihood of nuclear testing. Section 3113 required that any changes to the stockpile shall be made to further the objectives set for the program and shall "remain consistent with the basic design parameters by including, to the maximum extent feasible, components that are well understood or are certifiable without the need to resume underground nuclear weapons testing." The stockpile management program is to support the stockpile stewardship program.

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 11. Funding for Weapons Activities

($ millions)

Program	FY2010 Approps.	FY2011 Approps.	FY2012 Request	FY2012 Approps.
DSW	1,564.3	1,885.4	1,963.6	1,879.5
Campaigns	1,574.5	1,690.6	1,796.7	1,702.0
RTBF	1,810.3	1,837.3	2,326.1	2,009.2
Other[a]	1,437.3	1,483.1	1,543.3	1,643.3
Total	**6,386.4**	**6,896.4**	**7,629.7**	**7,234.0**

Source: DOE, *FY2012 Congressional Budget Request,* Vol. 1 (NNSA), p. 45; H. Rept. 112-331, *Military Construction and Veterans Affairs and Related Agencies Appropriations Act, 2012,* conference report to accompany H.R. 2055 [Consolidated Appropriations Act, 2012], pp. 871-873.

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

a. FY2010, FY2011, and FY2012 include Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Facilities and Infrastructure Recapitalization Program, Site Stewardship, Defense Nuclear Security, and Cyber Security. In addition, FY2010 includes Congressionally Directed Projects and Use of Prior Year Balances; FY2011 includes Science, Technology and Engineering Capability and a Rescission; and FY2012 includes National Security Applications, Legacy Contractor Pensions, and a Rescission.

The FY2012 request document includes data from NNSA's Future Years Nuclear Security Program, which projects the budget and components for FY2013-FY2016 (see **Table 12**).

Table 12. NNSA Future Years Nuclear Security Program

($ millions)

	FY2013	FY2014	FY2015	FY2016
DSW	2,111.4	2,327.9	2,530.0	2,630.7
Campaigns	1,809.9	1,812.7	1,815.8	1,852.3
RTBF	2,484.3	2,742.5	2,729.7	2,734.9
Other[a]	1,543.1	1,535.4	1,608.1	1,687.7
Total	**7,948.7**	**8,418.5**	**8,683.5**	**8,905.6**

Source: DOE, *FY2012 Congressional Budget Request,* Vol. 1 (NNSA), p. 46.

Note: Details may not add to totals because of rounding.

a. Includes Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Facilities and Infrastructure Recapitalization Program, Site Stewardship, Defense Nuclear Security, Cyber Security, and National Security Applications.

Nuclear Weapons Complex Reconfiguration

Although the "Complex" currently consists of eight sites, it was much larger during the Cold War in terms of number of sites, budgets, and personnel. Despite the post-Cold War reductions, many in Congress have for years wanted the Complex to change further, in various ways: fewer personnel, lower cost, greater efficiency, smaller footprint at each site, increased security, and the like. In response, in January 2007 NNSA submitted a report to Congress on its plan for transforming the Complex, "Complex 2030."

The House Appropriations Committee, in its FY2008 report, expressed displeasure with this plan and demanded "a comprehensive nuclear defense and nonproliferation strategy," a detailed description translating that strategy into a "specific nuclear stockpile," and "a comprehensive, long-term expenditure plan, from FY2008 through FY2030" before considering further funding for Complex 2030 and a nuclear weapon program, the Reliable Replacement Warhead (RRW). It stated that "NNSA continues to pursue a policy of rebuilding and modernizing the entire complex *in situ* without any thought given to a sensible strategy for long-term efficiency and consolidation." The Senate Appropriations Committee saw an inadequate linkage between warheads, the Complex, and strategy, and "rejects the Department's premature deployment of the NNSA Complex 2030 consolidation effort." The joint explanatory statement accompanying the consolidated appropriations bill said, "The Congress agrees to the direction contained in the House and Senate reports requiring the Administration ... to develop and submit to the Congress a comprehensive nuclear weapons strategy for the 21st century."

On December 18, 2007, NNSA announced its plan, Complex Transformation, a name change from Complex 2030. It would retain existing sites, reduce the weapons program footprint by as much as one-third, close or transfer from weapons activities about 600 structures, reduce the number of weapons workers by 20%-30%, dismantle weapons more rapidly, and build several major new facilities, such as a Uranium Processing Facility at Y-12 National Security Complex, a Weapons Surveillance Facility at Pantex Plant, and a Chemistry and Metallurgy Research

Replacement Nuclear Facility at Los Alamos National Laboratory.[51] For details, see the Final Complex Transformation Supplemental Programmatic Environmental Impact Statement released in October 2008, along with two Records of Decision of December 2008.[52]

The House Appropriations Committee reiterated its FY2008 views in its FY2009 report:

> Before the Committee will consider funding for most new programs, substantial changes to the existing nuclear weapons complex, or funding for the RRW [Reliable Replacement Warhead], the Committee insists that the following sequence be completed:
> (1) replacement of Cold War strategies with a 21st Century nuclear deterrent strategy sharply focused on today's and tomorrow's threats, and capable of serving the national security needs of future Administrations and future Congresses without need for nuclear testing;
> (2) determination of the size and nature of the nuclear stockpile sufficient to serve that strategy;
> (3) determination of the size and nature of the nuclear weapons complex needed to support that future stockpile.[53]

In keeping with this approach, the committee recommended eliminating funds for RRW and for several programs described below. In its FY2009 report, the Senate Appropriations Committee also recommended eliminating RRW funds and made some changes to individual programs. It did not provide general comments on Complex transformation. P.L. 111-8, the FY2009 Omnibus Appropriations Act, provided no RRW funds. Neither the FY2010 nor the FY2011 budgets requested RRW funds. A FY2010 budget document stated, "The Administration proposes to cancel development of the Reliable Replacement Warhead (RRW)—a new design warhead intended to replace the current inventory of nuclear weapons—because it is not consistent with Presidential commitments to move towards a nuclear-free world."[54]

The FY2011 budget request for Weapons Activities was $7,008.8 million, vs. FY2010 actual appropriations of $6,386.4 million. The Department of Defense submitted its Nuclear Posture Review Report in April 2010, which set forth the role of U.S. nuclear forces and plans for sustaining the nuclear arsenal.[55] According to a White House document of May 2010, the President provided Congress with a classified report required by the FY2010 National Defense Authorization Act, Section 1251, "on the comprehensive plan to: (1) maintain delivery platforms [that is, bombers and missiles that deliver nuclear weapons]; (2) sustain a safe, secure, and reliable U.S. nuclear weapons stockpile; and (3) modernize the nuclear weapons complex."[56]

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[51] U.S. Department of Energy. National Nuclear Security Administration. "NNSA Releases Draft Plan to Transform Nuclear Weapons Complex." Press release, December 18, 2007, at http://www.nnsa.doe.gov/docs/newsreleases/2007/PR_2007-12-18_NA-07-64.htm; National Nuclear Security Administration, "Nuclear Weapons Complex Transformation," with links to plans for each site, at http://www.nnsa.doe.gov/complextransformation.htm; and Walter Pincus, "Administration Plans to Shrink U.S. Nuclear Arms Program," *Washington Post,* December 19, 2007, p. 1.

[52] For the full text of the supplemental programmatic environmental impact statement (SPEIS) and supporting documents, see U.S. Department of Energy. National Nuclear Security Administration. "Complex Transformation SPEIS," at http://www.complextransformationspeis.com/project.html.

[53] U.S. Congress. House. Committee on Appropriations. *Energy and Water Development Appropriations Bill, 2009,* unnumbered committee print, June 2008, pp. 123-124.

[54] U.S. Executive Office of the President. Office of Management and Budget, *Terminations, Reductions, and Savings: Budget of the U.S. Government, Fiscal Year 2010*, 2009, p. 55, http://www.whitehouse.gov/omb/budget/fy2010/assets/trs.pdf.

[55] U.S. Department of Defense. *Nuclear Posture Review Report,* April 2010, http://www.defense.gov/npr/docs/2010%20nuclear%20posture%20review%20report.pdf.

[56] 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.

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 1251 report in November 2010; its projections for weapons stockpile and infrastructure costs (billions of dollars) were: FY2011, 7.0; FY2012, 7.6; FY2013, 7.9; FY2014, 8.4; FY2015, 8.7; FY2016, 8.9; FY2017, 8.9-9.0; FY2018, 9.2-9.3; FY2019, 9.4-9.6; and FY2020, 9.4-9.8. NNSA issued a new strategic plan in May 2011.[57] NNSA also issued a detailed stockpile stewardship and management plan in April 2011.[58] The FY2011 enacted figure, as presented in the FY2012 House Appropriations Committee report on energy-water appropriations, was $6,896.4 million.

For FY2012, the Administration requested $7,589.4 million for Weapons Activities. The House Appropriations Committee recommended $7,091.7 million for this account, and the House provided this amount. The Senate Appropriations Committee recommended $7,190.0 million. The final appropriation was $7,234.0 million.

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. 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 B61 mods 7 and 11 bombs was completed in FY2009. An LEP for the W76 warhead for the Trident II submarine-launched ballistic missile is ongoing; its FY2010 actual appropriation was $231.9 million and the FY2011 enacted figure was $248.2 million. The FY2012 request was $257.0 million for the W76 LEP and $223.6 million for the B61 LEP. The latter represents a shift "from a feasibility study to a full LEP"; no funds were requested in FY2010 or FY2011 for the B61 LEP. This LEP is intended to extend the service life of B61 mods 3, 4, and 7 nuclear bombs for another 30 years, with the first production unit to be completed in FY2017. The House Appropriations Committee recommended $278.6 million for the B61 for FY2012 in order to begin the LEP. It allowed NNSA to spend up to half that amount until it meets certain reporting requirements, such as "a cost-benefit analysis of any warhead enhancements." For the W76 LEP, the committee recommended $255.0 million. The Senate Appropriations Committee recommended $180.0 million for the B61 LEP and $257.0 million for the W76 LEP. The committee called the B61 LEP "the most ambitious and extensive refurbishment of a weapon system to date." Further, "NNSA plans to incorporate untried technologies and design features to improve the safety and security of the nuclear stockpile. The Committee supports enhanced surety of weapon systems … but it should not come at the expense of long-term weapon reliability." The committee directed the submission of two reports and a certification on this LEP. The final appropriation was $257.0 million for the W76 LEP and $223.6 million for the B61 LEP. Of the latter

[57] U.S. Department of Energy. National Nuclear Security Administration. *The National Nuclear Security Administration Strategic Plan*, May 2011, http://nnsa.energy.gov/sites/default/files/nnsa/inlinefiles/2011_NNSA_Strat_Plan.pdf.

[58] U.S. Department of Energy. National Nuclear Security Administration. *FY 2012 Stockpile Stewardship and Management Plan.* Report to Congress, April 15, 2011, http://www.ucsusa.org/assets/documents/nwgs/SSMP-FY12-041511.pdf.

amount, the conference agreement withheld $134.1 million until NNSA provided the appropriations committees with results of a design definition and cost study.

- Stockpile Systems. This program involves routine maintenance, replacement of limited-life components, ongoing assessment, and the like for all weapon types in the stockpile. The FY2010 actual appropriation was $385.2 million. The FY2011 enacted figure was $646.2 million. For FY2012, the request was $497.6 million and the House Appropriations Committee recommended $487.6 million to fully support "core maintenance activities of the stockpile" while including "an adjustment to account for delays in starting the W78 conceptual study." The Senate Appropriations Committee recommended $472.1 million for this program. It specified that at least $175.0 million be used for surveillance of the stockpile, and recommended reducing funds for the W78 LEP from $51.1 million to $26.0 million because of delays in a study for this LEP. The final appropriation provided $487.6 million for Stockpile Systems. Of these funds, it directed NNSA to use $175.0 million for surveillance and $99.5 million for W78 Stockpile Systems.
- Weapons Dismantlement and Disposition (WDD). The President and Congress have agreed on the desirability of reducing the stockpile to the lowest level consistent with national security, and numbers of warheads have fallen sharply since the end of the Cold War. Because of the large number of warheads being retired, there is a need to dismantle some warheads and to further break down some components to "prevent storage problems across the [nuclear weapons] enterprise." WDD involves interim storage of warheads to be dismantled; dismantlement; and disposition (i.e., storing or eliminating warhead components and materials). The FY2010 actual appropriation was $95.8 million and the FY2011 enacted figure was $57.9 million. The FY2012 request was $56.8 million; the House and Senate Appropriations Committees recommended providing that amount, and the appropriation provided that amount.

  Several components of WDD have been moved to different organizations within DOE or to different budget categories within Weapons Activities in the last several years. Within WDD, the major activity for FY2009 was the Pit Disassembly and Conversion Facility (PDCF), which was moved to the Readiness in Technical Base and Facilities account for FY2010. The "pit" is the fissile component (usually plutonium) of a nuclear warhead that initiates a thermonuclear explosion. As warheads are dismantled, pits may be stored, but for permanent disposition PDCF would convert the plutonium in pits to plutonium oxide for use in a Mixed Oxide Fuel Fabrication Facility (MFFF), where it would become fuel for commercial light-water nuclear reactors. In FY2008, MFFF was transferred from NNSA to DOE's Office of Nuclear Energy. WDD includes a Waste Solidification Building (WSB) to convert liquid wastes from PDCF and MFFF into solids for disposal off-site. For FY2010, the WSB account was moved to the Fissile Materials Disposition Program within Defense Nuclear Nonproliferation.

- Stockpile Services. This category includes Production Support; R&D Support; R&D Certification and Safety; Management, Technology, and Production; and Plutonium 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 FY2010 actual appropriation was $851.4 million and the FY2011 enacted figure was $933.0 million. The FY2012 request was $928.6 million and the House Appropriations Committee recommended $831.8 million. The latter figure includes a reduction of $54.1 million to Production Support on grounds that that category provides base manufacturing capabilities for weapons production, and that these costs "are relatively insensitive to reductions in the stockpile." Since the Nuclear Posture Review (NPR) did not specify "a large growth in the base production support overhead ... the recommendation provides funding consistent with the pre-NPR level." The Senate Appropriations Committee recommended $839.0 million, with at least $64.0 million of that amount to be used for stockpile surveillance. The final appropriation provided $854.5 million, of which $64.0 million is to be used for surveillance.

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. The FY2012 request included five campaigns:

- Science Campaign. According to NNSA, this campaign "develops our nation's scientific capabilities and experimental infrastructure used to assess the safety, security, reliability, and performance of the nuclear explosives package (NEP) [the explosive component of a nuclear weapon] without reliance on further underground testing." The FY2010 actual appropriation was $294.5 million; the FY2011 enacted figure was $362.5 million; and the FY2012 request was $405.9 million. Advanced Certification, the element showing the largest increase in this campaign, would go from $19.3 million actual appropriation in FY2010 to $94.9 million requested for FY2012. This program "integrates scientific and technological advances from stockpile stewardship with input from continuing studies in order to: improve the weapons certification process; refine computational tools and methods; advance the physical understanding of surety mechanisms; understand failure modes; assess new manufacturing processes; and anticipate technological surprise." The proposed FY2012 program would include experiments to address weapon failure modes, examining options to modernize surety (sometimes defined as safety, security, and use control), and study of factors that affect the ability to certify a warhead's surety and performance. The House Appropriations Committee recommended $312.1 million for the Science Campaign. The largest reduction was $75.5 million to Advanced Certification, for a total of $19.4 million. The committee stated that this subprogram had originally focused on addressing concerns about the ability to certify the Reliable Replacement Warhead. However, the latter program has been canceled and the Administration does not intend to produce a new warhead, so "it is unclear why such large increases are being requested." The Senate Appropriations Committee recommended $347.1 million for this campaign. It specified that no funds would

be used for scaled experiments, "a type of subcritical experiment that uses plutonium pit-like designs," on grounds that such experiments would cost hundreds of millions of dollars and "may not be needed for annual assessments of the current stockpile." The committee recommended $40.0 million for Advanced Certification. The final appropriation provided $334.0 million for the Science Campaign, including $40.0 million for Advanced Certification.

- Engineering Campaign. This campaign "provides the modern tools and capabilities needed to ensure the safety, security, reliability and performance of the United States nuclear weapons stockpile … [It] funds activities that assess and improve fielded nuclear and non-nuclear engineering components without further underground testing." The FY2010 actual appropriation was $149.7 million and the FY2011 enacted figure was $140.9 million. For FY2012, the request was $143.1 million; the House and Senate Appropriations Committees recommended the requested amount, and the appropriation provided that amount.
- Inertial Confinement Fusion Ignition and High Yield Campaign. This campaign is developing the tools to create extremely high temperatures and pressures in the laboratory—approaching those of a nuclear explosion—to support weapons-related research and to attract scientific talent to the Stockpile Stewardship Program. NNSA states, "Virtually all of the energy from a nuclear weapon is generated while in the high energy density (HED) state. High-energy density physics (HEDP) experiments conducted at ICF facilities are required to validate the advanced theoretical models used to assess and certify the stockpile without nuclear testing. The National Ignition Facility (NIF) extends HEDP experiments to include access to thermonuclear burn conditions in the laboratory, a unique and unprecedented scientific achievement." The centerpiece of this campaign is NIF, the world's largest laser. While NIF was controversial in Congress for many years and had significant cost growth and technical problems, controversy waned as the program progressed. The facility was dedicated in May 2009.[59] Between February 20, 2011, and March 20, 2011, NIF personnel conducted 34 "successful target shots … in support of HEDSS [High Energy Density Stockpile Stewardship]."[60] In 2011, personnel conducted a total of 283 NIF shots of all types.[61] The FY2010 actual appropriation was $457.5 million and the FY2011 enacted figure was $477.6 million. For FY2012, the request was $476.3 million. The House Appropriations Committee recommended providing $471.2 million, while the Senate Appropriations Committee recommended providing the requested amount. The committee noted that NIF made an important contribution to "resolving a critical stockpile stewardship issue" but expressed concern about whether NIF could achieve ignition by the end of FY2012. The appropriation provided the requested amount.
- 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, and elsewhere to create what

[59] 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.

[60] "A Banner Month for NIF High Energy Density (HED) Experiments," *Project Status—2011, March,* Lawrence Livermore National Laboratory, https://lasers.llnl.gov/newsroom/project_status/2011/march.php.

[61] Lawrence Livermore National Laboratory, "Project Status—2011, December," https://lasers.llnl.gov/newsroom/project_status/2011/december.php.

NNSA calls "the computational surrogate for nuclear testing to determine weapon behavior." In addition, "ASC plays an important role in supporting nonproliferation, emergency response, nuclear forensics and attribution activities." 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. The campaign includes funds for hardware and operations as well as for software. The FY2010 actual appropriation was $566.1 million; the FY2011 enacted figure was $611.0 million. For FY2012, the request was $628.9 million and the House Appropriations Committee recommended $616.0 million. The reduction concerned a new initiative, "exascale" computing, a thousand-fold increase above current capability. The committee stated that "undertaking such a major initiative will require considerable funding, and the NNSA has yet to tie the need for this level of computing to any specific requirements of the stockpile in its 20-year plan." The Senate Appropriations Committee recommended $625.0 million, noted the importance of exascale computing for stockpile stewardship, and recommended the requested amount, $36.0 million, for the exascale initiative within ASC Campaign funds. The final appropriation was $620.0 million.

- Readiness Campaign. This campaign "operates the capability for producing tritium to maintain the national inventory needed for the nuclear weapons stockpile and selects and matures production technologies that are required for manufacturing components to meet … requirements." The FY2010 actual appropriation was $106.7 million and the FY2011 enacted figure was $98.6 million. The FY2012 request was $142.5 million; the House Appropriations Committee recommended $63.6 million. The major reduction, $65.0 million, was to eliminate funds for the B61 bomb "and has provided the funding requested for these activities within the B61 Life Extension Program." The Senate Appropriations Committee recommended $125.0 million for this campaign. The final appropriation was $128.6 million.

Readiness in Technical Base and Facilities (RTBF)

This program funds infrastructure and operations at Complex sites. The FY2010 actual appropriation was $1,810.3 million and the FY2011 enacted figure was $1,837.3 million. For FY2012, the request was $2,326.1 million, the House Appropriations Committee recommended $2,011.3 million, the Senate Appropriations Committee recommended $2,170.5 million, and the final appropriation was $2,009.2 million. RTBF has six subprograms. The largest is Operations of Facilities (FY2010 actual appropriation, $1,336.4.million; FY2011 enacted, $1,248.2 million; FY2012 request, $1,485.3 million; FY2012 appropriated, $1,285.6 million). Others include Program Readiness, which supports activities at multiple sites or in multiple programs (FY2010 actual appropriation, $72.9 million; FY2011 enacted, $69.2 million; FY2012 request and appropriation, $74.2 million); Material Recycle and Recovery, which recovers plutonium, enriched uranium, and tritium from weapons production and disassembly (FY2010 actual appropriation, $69.2 million; FY2011 enacted, $69.9 million; FY2012 request, $85.9 million; FY2012 appropriation, $78.0 million); and Construction (FY2010 actual appropriation, $283.9 million; FY2011 enacted, $398.2 million; FY2012 request, $620.5 million; FY2012 appropriation, $511.1 million).

The most costly item in Construction, and among the most controversial in the Weapons Activities account, is the Chemistry and Metallurgy Research Facility Replacement (CMRR) at Los Alamos National Laboratory (FY2010 actual appropriation, $97.0 million; FY2011 enacted

figure, $224.6 million; FY2012 request, $300.0 million; FY2012 appropriation, $200.0 million). It would replace the Chemistry and Metallurgy Research (CMR) building, which was built in 1952. Among other things, CMR houses research into plutonium and supports pit production at Los Alamos. In considering the FY2008 budget, the House Appropriations Committee stated, "Proceeding with the CMRR project as currently designed will strongly prejudice any nuclear complex transformation plan. The CMRR facility has no coherent mission to justify it unless the decision is made to begin an aggressive new nuclear warhead design and pit production mission at Los Alamos National Laboratory." The Senate Appropriations Committee stated, "The current authorization basis for the existing CMR [facility] lasts only through 2010, as it does not provide adequate worker safety or containment precautions. However, deep spending cuts ... will likely result in delays that will require the laboratory to continue operations in the existing CMR facility."

In its FY2009 report, the House Appropriations Committee stated, regarding CMRR and another facility at Los Alamos (the Radioactive Liquid Waste Treatment Facility), "In the absence of critical decisions on the nature and size of the stockpile, which in turn generate requirements for the nature and capacity of the nuclear weapons complex, it is impossible to determine the capacity required of either of these facilities. It would be imprudent to design and construct on the basis of a guess at their required capacity." It recommended no funds for either project. The Senate Appropriations Committee recommended $125.0 million, an increase of $24.8 million, for CMRR "to make up for [previous] funding shortfalls."

Several documents supported CMRR. In 2009, a congressional commission found conditions at the existing CMR to be "genuinely decrepit" and recommended proceeding with CMRR to replace it.[62] The 2010 Nuclear Posture Review (NPR) recommended proceeding with CMRR as one of several "key investments … required to sustain a safe, secure, and effective nuclear arsenal."[63] An Administration report to Congress of November 2010 said that CMRR and another facility, the Uranium Processing Facility, "are required to ensure the United States can maintain a safe, secure and effective arsenal over the long-term. The NPR concluded that the United States needed to build these facilities; the Administration remains committed to their construction."[64] And the resolution of ratification for the New START Treaty required the President to certify to the Senate that the President intends to "accelerate to the extent possible the design and engineering phase of" CMRR and to request full funding for it when the design and engineering phase is complete.[65] On the other hand, critics argue that CMRR is not needed for its stated purposes, is very expensive, is "managerially risky," and lacks clarity regarding purpose, need, design concept, cost, safety performance standards, etc.[66]

For FY2012, the House Appropriations Committee recommended $200.0 million, a $100.0 million reduction from the request. The committee stated that it is "seriously concerned with the recent cost growth reported for construction" of CMRR and another facility, the Uranium

[62] Congressional Commission on the Strategic Posture of the United States, *America's Strategic Posture,* Washington, United States Institute of Peace Press, 2009, pp. 50-51.

[63] U.S. Department of Defense. *Nuclear Posture Review Report,* April 2010, p. 42.

[64] U.S. "November 2010 Update to the National Defense Authorization Act of FY 2010 Section 1251 Report: New START Treaty Framework and Nuclear Force Structure Plans," p. 5. http://www.lasg.org/CMRR/Sect1251_update_17Nov2010.pdf.

[65] "Treaty with Russia on Measures for Further Reduction and Limitation of Strategic Offensive Arms," U.S. Congress. *Congressional Record,* December 22, 2010, p. S10984.

[66] Memorandum from Greg Mello with help from Trish Williams-Mello, Los Alamos Study Group, to interested parties, "The Chemistry and Metallurgy Research Replacement Nuclear Facility (CMRR-NF) at Los Alamos National Laboratory (LANL) should not be built …," May 22, 2011, pp. 1-4.

Processing Facility (UPF), planned for Y-12 National Security Complex. Further, "Modernization will take several years and the considerable number of variables still at play argues against an excessively aggressive funding curve. The construction of the new major facilities must not force out available modernization funding for the rest of the nuclear security enterprise. Therefore, the Committee supports the adoption of cost reduction strategies to make construction more affordable and to curb continued cost escalation." The Senate Appropriations Committee recommended $240.0 million for CMRR. It noted that new cost estimates for CMRR and UPF "are two to three times more than previous estimates" and directed NNSA to submit a plan by February 1, 2012, identifying "consequences to cost, scope, and schedule of delaying project implementation and the impact of sequencing construction of these two major facilities [i.e., as opposed to building them concurrently] on stockpile requirements." The conference report stated, "No construction activities are funded for the CMRR-Nuclear Facility during fiscal year 2012."

Other Programs

Weapons Activities includes several smaller programs in addition to DSW, Campaigns, and RTBF. Among them:

- 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. The FY2010 actual appropriation was $240.7 million and the FY2011 enacted figure was $247.5 million. For FY2012, the request was $251.3 million and the House Appropriations Committee recommended $243.3 million. "The recommendation recoups savings from the federal employee pay freeze and the modernization of federal aircraft." The Senate Appropriations Committee recommended providing the requested amount. The appropriation provided $243.3 million.
- Nuclear Counterterrorism Incident Response "responds to and mitigates nuclear and radiological incidents worldwide and has a lead role in defending the Nation from the threat of nuclear terrorism." The FY2010 actual appropriation was $223.4 million and the FY2011 enacted figure was $231.0 million. For FY2012, the request was $222.1 million, the House and Senate Appropriations Committees recommended providing that amount, and the appropriation provided that amount.
- Facilities and Infrastructure Recapitalization Program (FIRP) "continues its mission to restore, rebuild and revitalize the physical infrastructure of the nuclear security enterprise." It focuses on "elimination of legacy deferred maintenance." The FY2010 actual appropriation was $95.6 million and the FY2011 enacted figure was $93.3 million. For FY2012, the request was $96.4 million and the House and Senate Appropriations Committees recommended providing that amount. The latter expressed concern "about an increasing backlog of deferred maintenance costs" in the Complex and directed NNSA "to identify funds for maintenance and operations by site as separate line items under [RTBF] starting with the fiscal year 2014 budget submission." The budget request is to include the deferred maintenance backlog. The appropriation provided the requested amount.
- Site Stewardship seeks to "ensure environmental compliance and energy and operational efficiency throughout the nuclear security enterprise." It was a new program for FY2010, consolidating several earlier programs. The FY2010 actual appropriation was $63.3 million and the FY2011 enacted figure was $104.6

million. For FY2012, the request was $104.0 million and the House Appropriations Committee recommended $78.7 million. The Committee eliminated funds for the Energy Modernization and Investment Program: "NNSA should integrate its sustainability and energy conservation goals into its overall infrastructure recapitalization efforts." The Committee found the Site Stewardship mission to be "unfocused" and the five-year plan to show "a large and unjustified growth for this activity." The Senate Appropriations Committee recommended $90.0 million and noted its support for "NNSA's efforts to consolidate and dispose of NNSA special nuclear material that is no longer required for the nuclear weapons mission." The final appropriation was $78.7 million.

- Safeguards and Security consists of two elements: (1) 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." Its FY2010 actual appropriation was $769.8 million and the FY2011 enacted figure was $713.5 million. For FY2012, the request was $722.9 million and the House Appropriations Committee recommended $690.9 million. Savings result from "completion of major construction funding requirements." The committee asked NNSA for "a multi-year plan for upgrading the physical security infrastructure." The Senate Appropriations Committee recommended $701.8 million. The appropriated amount was $698.0 million. (2) Cyber Security "provides the requisite guidance needed to ensure that sufficient information management security safeguards are implemented throughout the NNSA enterprise." The FY2010 actual appropriation was $123.3 million and the FY2011 enacted figure was $123.3 million. For FY2012, the request was $126.6 million, the House and Senate Appropriations Committees recommended providing that amount, and that amount was appropriated.
- Legacy contractor pensions: Certain employees at Los Alamos and Lawrence Livermore National Laboratories had defined-benefit pension plans through the University of California (UC), which had been the contractor for these laboratories. However, the current contracts for the laboratories are between DOE and a consortium of contractors, one of which is UC. The current contracts (one for each laboratory) gave employees hired while UC was the sole contractor a choice between the equivalent of the UC pension plan and another plan. Many employees chose the former. The House Appropriations Committee noted that "the pensions of legacy national laboratory employees are an ongoing stewardship cost of the nuclear weapons complex"; that funding for these pensions was requested through RTBF and a program within Defense Nuclear Nonproliferation, another component of NNSA; and that its recommendation "provides funding for these multiple requests in a single funding line as a simplified and more transparent solution to managing these costs." This is a new line item in the budget, for which the House Appropriations Committee recommended $147.0 million for FY2012. The Senate Appropriations Committee provided no funds for this line item. The appropriation was $168.2 million; the conference report stated, "NNSA requested these funds within Readiness in Technical Base and Facilities and a separate line is provided to improve transparency."

- National Security Applications: For FY2012, NNSA requested $20.0 million for this program, which the agency said "makes strategic investments in the national security science, technology and engineering capabilities and infrastructure base that are necessary to address current and future global security issues." For FY2011, the enacted figure (labeled Science, Technology, and Engineering Capability) was $19.8 million. The House Appropriations Committee recommended eliminating funds for this program: "There is no clear requirement for these investments and no criteria provided whereby technologies would be considered appropriate for funding under this program. No performance measures have been developed to support a particular investment strategy." The Senate Appropriations Committee recommended $10.0 million. It "supports NNSA's efforts to leverage its science, engineering, and technological expertise to work with the Defense Threat Reduction Agency and intelligence agencies to improve the Nation's counterterrorism capabilities." The appropriation was $10.0 million.

Rescissions: For FY2011, the enacted figure was a rescission of $50.0 million. For FY2012, the Administration's request included a rescission of $40.3 million of prior year balances. The House Appropriations Committee recommended rescinding that amount. The Senate Appropriations Committee recommended against rescinding any funds. The appropriation rescinded no funds.

Nonproliferation and National Security Programs

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 included in the National Nuclear Security Administration (NNSA).

Table 13. DOE Defense Nuclear Nonproliferation Programs

($ millions)

Program	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
Nonproliferation and Verification R&D	$391.0	$417.6	$346.2	$417.6	$356.2
Nonproliferation and International Security	147.5	161.8	161.8	155.3	155.3
International Materials Protection, Control and Accounting (MPC&A)	572.0	571.6	496.5	571.6	571.6
Fissile Materials Disposition	802.2	890.2	694.1	751.4	685.4
Global Threat Reduction Initiative	436.0	508.3	423.2[a]	508.3	500.0
Legacy Contractor Pensions	—	—	—	—	55.8
Rescissions	-45.0	-30.0	-30.0	-21.0	-21.0
Total	**2,273.7**	**2,519.5**	**2,091.8**[a]	**2,383.3**	**2,303.3**

Source: FY2012 budget request, H.Rept. 112-118, S.Rept. 112-75, H.Rept. 112-331.

Note: Numbers may not add due to rounding.

a. The House-passed version of H.R. 2354 was amended on the floor to increase the Global Threat Reduction Initiative program funding by $35 million.

Funding for these programs in FY2011 was $2.274 billion, up from $2.137 billion for FY2010. The request for FY2012 was $2,519.5 million. The bill as passed appropriated $2,303.3 million.

The Nonproliferation and Verification R&D program was funded at $391.0 million for FY2011. The request for FY2012 was $417.6 million; the House bill would have funded it at $346.2 million. The Senate Appropriations Committee recommended the requested amount, but the conference bill appropriated $356.2 million.

Nonproliferation and International Security programs include international safeguards, export controls, and treaties and agreements. The FY2012 request for these programs was $161.8 million, compared with $147.5 million appropriated for FY2011. The House bill, and the Senate Appropriations Committee, recommended the requested amount, and the final bill appropriated it.

International Materials Protection, Control, and Accounting (MPC&A), which is concerned with reducing the threat posed by unsecured Russian weapons and weapons-usable material, was funded at $572.0 million in FY2011; the FY2012 request was $571.6 million. The House bill would have appropriated $496.5 million; the Senate Appropriations Committee recommended the requested amount, which the final bill included.

The goal of the Fissile Materials Disposition program is disposal of U.S. surplus weapons plutonium by converting it into fuel for commercial power reactors, and a similar program in Russia. Funding for the U.S. program was controversial for several years, because of lack of progress on the program to dispose of Russian plutonium. However, for FY2010 the Obama Administration requested and got a total of $701.9 million for Fissile Materials Disposition, noting that "DOE and its Russian counterpart agency, Rosatom, agreed on a financially and technically credible program to dispose of Russian surplus weapon-grade plutonium in November 2007." The program would rely on Russian fast reactors "operating under certain nonproliferation restrictions," according to the budget document.

The U.S. side of the program includes 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, some controversy has developed over whether the pit disassembly project is necessary. The FY2012 request for the Fissile Materials Disposition program was $892.2 million, including $172 million for the PDCF. The House bill would have appropriated $694.1 million, with only $20 million for the PDCF; the Senate Appropriations Committee recommended $751.4 million, including $47.3 million for the PDCF. 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 Global Threat Reduction Initiative 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 FY2011 appropriation for this program was $436.0 million. The FY2012 request was $508.3 million. The House Appropriations Committee recommended $386.8 million, but a floor amendment at the time of passage of H.R. 2354 increased the funding to $423.2 million. The Senate Appropriations Committee recommended the requested amount. The final bill appropriated $500.0 million.

Cleanup of Former Nuclear Weapons Production Facilities and Civilian Nuclear Energy Research Facilities

The development and production of nuclear weapons for national defense purposes for over 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 what is now the Office of Environmental Management to consolidate the cleanup of former

nuclear weapons production facilities that had been administered under multiple offices.[67] 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. Some facilities also were involved in civilian nuclear energy research, which generated wastes and contamination. The Office of Environmental Management administers the cleanup of these research facilities, adding a non-defense component to its mission, albeit smaller in terms of scope and funding.[68]

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 to clean up nuclear weapons production and nuclear energy research facilities has generated ongoing 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 facilities in over 30 states[69] that historically were involved in the production of nuclear weapons and nuclear energy research, covering approximately 2 million acres of land combined.[70] Cleanup remedies are in place at the majority of these facilities, and they have been transferred to the Office of Legacy Management and other offices within DOE for long-term stewardship to maintain and monitor them.[71] See the "Office of Legacy Management" section of this report. Some of the smaller facilities also have been transferred to the Army Corps of Engineers under the Formerly Utilized Sites Remedial Action Program (FUSRAP), and are now funded within the civil works budget of the Corps.[72] (See **Table 4**.) Once the Corps completes the cleanup of these sites, they are transferred back to DOE for long-term stewardship under the Office of Legacy Management. Much work remains to be done at the larger and more complex facilities 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 facilities, necessitating billions of dollars.

As of the beginning of FY2011, the Office of Environmental Management administered 18 facilities in 11 states at which planned cleanup actions were not yet complete.[73] DOE estimated

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

[68] For additional information on the history, mission, and scope of the Office of Environmental Management, see DOE's website: http://www.em.doe.gov/Pages/EMHome.aspx.

[69] For a geographic listing of each facility, see DOE's Office of Environmental Management website: http://www.em.doe.gov/Pages/siteslocations.aspx.

[70] Department of Energy, Office of Chief Financial Officer, *FY2012 Congressional Budget Request*, February 2011, Volume 5, Environmental Management, p. 10: http://www.cfo.doe.gov/budget/12budget/Content/Volume5.pdf.

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

[72] 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. DOE is responsible for the long-term stewardship of FUSRAP sites once the Corps completes the cleanup.

[73] For a listing of each facility, see Department of Energy, Office of Chief Financial Officer, *FY2012 Congressional*

that the costs to complete these actions could range between $185 billion and $218 billion, exceeding past costs already incurred.[74] DOE periodically revises these estimates as project baselines and assumptions change. The estimates have varied widely over time 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 facilities 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 also are uncertain, considering the lengthy time frames of maintenance and monitoring once cleanup remedies are in place.

Office of Environmental Management

Three appropriations accounts fund the Office of Environmental Management: Defense Environmental Cleanup, Non-Defense Environmental Cleanup, and the Uranium Enrichment Decontamination and Decommissioning (D&D) Fund. The Defense Environmental Cleanup account constitutes the vast majority of the funding for the Office of Environmental Management and is devoted to the cleanup of former nuclear weapons production facilities. The Non-Defense Environmental Cleanup accounts funds the cleanup of wastes and contamination resulting from civilian nuclear energy research, and the Uranium Enrichment D&D Fund account funds the cleanup of facilities that enriched uranium for national defense and civilian purposes.

P.L. 112-74 provided $5.73 billion in FY2012 for the net total of these three accounts combined, a decrease of $398.5 million below the $6.13 billion that the President had requested, but an increase of $64.9 million above the FY2011 enacted appropriation of $5.67 billion. The House had approved $5.64 billion in passing H.R. 2354, and the Senate Appropriations Committee had recommended $5.65 billion in reporting its version of the bill. As the President proposed, P.L. 112-74 did not provide any funding within the Defense Environmental Cleanup account to continue the federal payment to the Uranium Enrichment D&D Fund. This payment historically has been treated as an offset to the total program funding for the Office of Environmental Management because the funding actually does not become available to DOE until Congress subsequently appropriates it out of the Uranium Enrichment D&D Fund.[75] The amount of the federal payment has been an issue in the debate over the reauthorization of receipts to support this fund. See the "Uranium Enrichment Facilities" section of this report

Congress highlighted numerous issues in the FY2012 appropriations debate, such as challenges in constructing facilities to process high-level radioactive wastes at the Hanford site in Washington state, readiness and disposal capabilities of the H-Canyon facility at the Savannah River site in South Carolina, efficiencies learned from projects funded under the American Recovery and Reinvestment Act (P.L. 111-5), cleanup progress and remaining liabilities at designated "small"

Budget Request, February 2011, Volume 5, Environmental Management, p. 18. One of the facilities, the Waste Isolation Pilot Plant in New Mexico, is not a cleanup site, but is a permanent, geologic repository for "transuranic" wastes that are removed from other DOE facilities for disposal.

[74] Ibid., p. 10. Including the $90 billion in past costs incurred from FY1997 through FY2010, DOE estimated total "life-cycle" costs ranging from $275 billion to $308 billion. DOE consistently has used FY1997 as the baseline, or starting point, for the time frame of these life-cycle estimates. DOE also has reported $35 billion in past costs incurred since the establishment of the Office of Environmental Management in 1989 through FY1996, for a total of $125 billion in past costs incurred through FY2010. Comprehensive information on past costs incurred prior to the establishment of the Office of Environmental Management is not readily available.

[75] However, the House Appropriations Committee's comparison of its recommendation for the Office of Environmental Management program total in FY2012 to the FY2011 enacted level did not appear to treat the FY2011 federal payment of $33.6 million as an offset, stating its recommendation as being $100.5 million below FY2011, instead of $66.9 million when accounting for the offset. See H.Rept. 112-118, p. 5.

non-defense sites, the use of proceeds from the transfer or sale of excess federal uranium inventories to augment cleanup resources, and DOE's internal reorganization of the Office of Environmental Management.

Table 14 presents a breakout of funding for each of the three appropriations accounts that fund DOE's Office of Environmental Management, comparing the amounts enacted for FY2012 in P.L. 112-74 to the House-passed bill, the Senate Appropriations Committee-reported bill, the President's FY2012 request, and prior year appropriations enacted for FY2011. The table also presents the net total program funding level for the Office of Environmental Management. A discussion of selected issues that received attention in the FY2012 appropriations debate follows.

Table 14. Appropriations for the Office of Environmental Management

($ millions)

Account/Site or Activity	FY2011 Enacted	FY2012 Request	FY2012 House-Passed	FY2012 Senate-Reported	FY2012 P.L. 112-74
Defense Environmental Cleanup					
Closure Sites	0.2	5.4	5.4	5.4	5.4
Hanford					
Richland Operations	*966.0*	*913.7*	*933.7*	*953.3*	*953.3*
Office of River Protection	*1,135.6*	*1,361.4*	*1,148.0*	*1,207.0*	*1,185.0*
Hanford Subtotal	2,101.6	2,275.1	2,081.7	2,160.3	2,138.3
Idaho National Laboratory	398.7	382.8	382.8	384.5	386.9
NNSA Sites and Nevada Off-Sites	309.0	423.7	248.8	253.8	282.4
Oak Ridge Reservation	152.1	176.1	156.1	202.5	199.5
Savannah River Site	1,172.4	1,224.1	1,180.7	1,190.9	1,193.8
Waste Isolation Pilot Plant	215.7	228.9	220.0	200.0	215.1
Program Direction	320.0	321.6	316.9	321.6	321.6
Program Support	21.1	0.0	0.0	20.4	20.4
Community, Regulatory, and Program Support	0.0	91.3	89.8	0.0	0.0
Safeguards and Security	247.8	248.8	248.8	252.0	252.0
Technology Development	19.4	32.3	10.0	11.0	11.0
Federal Payment to Uranium Enrichment D&D Fund	33.6	0.0	0.0	0	0.0
Use of Prior Year Balances	0.0	-3.4	-3.4	0.0	-3.4
Rescission	-11.9	0.0	0.0	0.0	0.0
Defense Environmental Cleanup Subtotal	**4,979.7**	**5,406.8**	**4,937.6**	**5,002.3**	**5,023.0**
Non-Defense Environmental Cleanup					
Fast Flux Test Reactor	3.7	2.7	2.7	2.7	2.7
Gaseous Diffusion Plants	99.3	100.6	97.6	100.6	100.6
Small Sites	63.7	57.4	55.9	57.4	67.4
West Valley Demonstration Project	57.7	58.4	56.9	58.4	65.0
House Floor Amendment[a]	—	—	41.0	—	—
Rescission	-0.9	0.0	0.0	0.0	0.0
Non-Defense Environmental Cleanup Subtotal	**223.5**	**219.1**	**254.1**	**219.1**	**235.7**
Uranium Enrichment D&D Fund					
Oak Ridge Gaseous Diffusion Plant	0.0	182.7	182.7	162.7	200.9
Paducah Gaseous Diffusion Plant	0.0	77.8	77.8	77.8	81.8
Portsmouth Gaseous Diffusion Plant	0.0	243.6	188.5	188.5	190.3
Undistributed Funds[b]	507.0	0.0	0.0	0.0	0.0
Rescission	-9.9	0.0	0.0	0.0	0.0
Uranium Enrichment D&D Fund Subtotal	**497.1**	**504.2**	**449.0**[c]	**429.0**	**472.9**

Account/Site or Activity	FY2011 Enacted	FY2012 Request	FY2012 House-Passed	FY2012 Senate-Reported	FY2012 P.L. 112-74
Offset for Federal Payment to Uranium Enrichment D&D Fund[d]	-33.6	0.0	0.0	0.0	0.0
Office of Environmental Management Total	**5,666.7**	**6,130.1**	**5,640.7**	**5,650.4**	**5,731.6**

Source: Prepared by the Congressional Research Service using information from the House Appropriations Committee report on the Energy and Water Development Appropriations Bill, 2012, H.R. 2354 (H.Rept. 112-118), p. 159-160, p. 176-180; H.R. 2354, as amended by the full House; and the Senate Appropriations Committee report on its version of H.R. 2354 (S.Rept. 112-75), p. 123-124, p. 135-138. Numbers may not add due to rounding.

a. As passed during floor debate, H.Amdt. 640 to H.R. 2354 increased funding for the Non-Defense Environmental Cleanup account by $41 million, from $213.1 million to a total of $254.1 million.

b. For FY2012, a breakout is presented within the Uranium Enrichment D&D Fund account for the individual uranium enrichment facilities (gaseous diffusion plants). The amounts for FY2011 were not broken out, but were presented in terms of the total "undistributed" funds for all of these facilities combined.

c. As passed by the House, H.R. 2354 also appropriated up to $150 million to be derived from the barter, transfer, or sale of excess federal uranium inventories, in addition to the $449 million appropriation derived from the Uranium Enrichment D&D Fund. Combined, these funds would provide $599 million for cleanup.

d. The federal payment transferred from the Defense Environmental Cleanup account to the Uranium Enrichment D&D Fund historically has been treated as an offset to the total program funding for the Office of Environmental Management, because the funding is not actually available to DOE for obligation until Congress subsequently appropriates it out of the Uranium Enrichment D&D Fund. The House Appropriations Committee's comparison of its recommendation for the program total in FY2012 to the FY2011 enacted level did not appear to treat the FY2011 federal payment of $33.6 million as an offset, stating its recommendation as being $100.5 million below FY2011, instead of a $66.9 million reduction when accounting for the offset. See H.Rept. 112-118, p. 5.

Cleanup Milestones

The adequacy of funding for the Office of Environmental Management to ensure compliance with cleanup "milestones" has been a recurring issue in the appropriations debate.[76] DOE's attainment of these milestones often is used as a measure to gauge overall cleanup progress at individual facilities. Cleanup milestones establish time frames for the completion of specific actions or steps within the cleanup process. Compliance with these milestones is intended to satisfy applicable statutory and regulatory requirements. Each milestone is identified in written agreements negotiated among DOE, the Environmental Protection Agency (EPA), and the states in which the facilities are located.[77]

Although cleanup milestones are legally binding, the ability to meet deadlines depends upon the availability of funding to carry out necessary actions, the technical feasibility of those actions, and in some cases, the resolution of other regulatory issues upon which a milestone may be based. Consequently, the availability of funds is not the sole factor that may determine whether DOE is capable of attaining a cleanup deadline. Furthermore, not all of the Office of Environmental Management's annual budget is available for attaining cleanup milestones, as funding also is

[76] Most federal environmental laws specify the applicability of the requirements of those laws to federal facilities. However, the Anti-Deficiency Act generally prohibits federal agencies from obligating or expending funds in excess of appropriations, unless authorized by law. The prohibition under this act may limit an agency's ability to comply with an environmental requirement if appropriations are insufficient. However, the act allows exceptions for emergencies involving the safety of human life or the protection of property.

[77] Compliance agreements for individual facilities are available on DOE's Office of Environmental Management website: http://www.em.doe.gov/Pages/compagreements.aspx.

needed for safeguarding, securing, and maintaining facilities while cleanup is underway. According to DOE, the President's FY2012 request for the Office of Environmental Management would support the completion of all enforceable cleanup milestones with deadlines that fall within the fiscal year.[78] At this early juncture, it is unclear to what extent, if any, the $398.5 million reduction below the President's request in P.L. 112-74 for the Office of Environmental Management as a whole may affect the attainment of cleanup milestones at individual sites in FY2012.

Disposal of High-Level Radioactive Tank Wastes

Cleanup progress especially has been a concern at DOE's largest nuclear weapons production facilities where high-level radioactive wastes are stored in hundreds of tanks. These wastes are intended to be permanently disposed of in a geologic repository. However, the need to first remove the wastes from the tanks and treat them in a manner that would be suitable for permanent disposal has presented many technical difficulties. The availability of a geologic repository to dispose of the tank wastes once they are removed and treated could present challenges that may delay permanent disposal and thereby lengthen cleanup time frames and affect costs. The availability of such a repository also could present challenges for the permanent disposal of DOE's inventory of high-level wastes that are in the form of spent nuclear fuel. See the "Nuclear Waste Disposal" section of this report for a discussion of a geologic repository.

DOE facilities that manage the high-level tank wastes include the Hanford site in Washington, the Savannah River site in South Carolina, and the Idaho National Laboratory. According to a DOE estimate in 2009, there are 54 million gallons of high-level wastes stored in 177 tanks at Hanford, 33 million gallons in 49 tanks at the Savannah River site, and nearly 1 million gallons in 4 tanks at the Idaho National Laboratory.[79] Although efforts to manage the high-level wastes have raised various issues at each of these sites, there have been particular concerns about the timing, planning, cost, and safety issues involved in the construction of the Waste Treatment and Immobilization Plant at Hanford, which would process the high-level wastes that would be removed from the tanks to prepare them for permanent disposal. The adequacy and pace of the construction of this facility has been a long-standing issue at Hanford. As both the House and Senate proposed, P.L. 112-74 provided $740.0 million for the Hanford tank waste plant, $100 million less than the President's request of $840.0 million, but an increase of $1.3 million above the FY2011 enacted appropriation of $738.7 million.

Long-term funding needs are expected to continue at these three large facilities for decades. DOE estimates that cleanup may not be complete at Hanford until as late as 2062, at the Savannah River site until 2040, and at the Idaho National Laboratory until 2044.[80] These lengthy horizons in part are due to the time estimated for the treatment and disposal of the substantial volumes of high-level wastes stored at these facilities. However, these estimated dates do not reflect long-term stewardship of these sites, once the initial cleanup is completed under the Office of Environmental Management, likely resulting in even lengthier time frames for total federal responsibilities at these facilities.

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[78] Department of Energy, Office of Chief Financial Officer, *FY2012 Congressional Budget Request*, February 2011, Volume 5, Environmental Management, p. 12.

[79] Department of Energy, Office of Environmental Management, Report to Congress: Status of Environmental Management Initiatives to Accelerate the Reduction of Environmental Risks and Challenges Posed by the Legacy of the Cold War, January 2009, p. 23-24, available on DOE's Office of Environmental Management website: http://www.em.doe.gov/pdfs/NDAA%20Report-(01-15-09)a.pdf.

[80] Department of Energy, Office of Chief Financial Officer, *FY2012 Congressional Budget Request*, February 2011, Volume 5, Environmental Management, p. 18.

Uranium Enrichment Facilities

The source and availability of funding for the cleanup of three DOE uranium enrichment facilities also has been a recurring issue in the appropriations debate. These facilities enriched uranium both for national defense purposes and the generation of electricity by commercial nuclear utilities. These facilities are located in Paducah, Kentucky; Piketon, Ohio (Portsmouth plant); and Oak Ridge, Tennessee. Title XI of the Energy Policy Act of 1992 (P.L. 102-486) established the Uranium Enrichment D&D Fund to pay for the cleanup of these facilities, and to reimburse uranium and thorium licensees for their costs of cleaning up sites that supported the enrichment facilities.[81] To finance this fund, Congress originally authorized the collection of special assessments from nuclear utilities based on the portion of enrichment services each utility purchased from the federal government.[82] Congress also authorized payments by the federal government to the Uranium Enrichment D&D Fund out of the General Fund of the U.S. Treasury, subject to annual appropriations.[83]

The original requirement for both the federal government, and the nuclear utilities that purchased enrichment services, to contribute to the Uranium Enrichment D&D Fund was based on the premise that both the United States and the nuclear utilities benefitted from the production of enriched uranium and therefore should share in the liability for cleanup of facilities involved in these activities. The authority to collect the utility assessments, and the authorization of appropriations for the federal payment, expired on October 24, 2007. Since that time, Congress had continued federal payments to the Uranium Enrichment D&D Fund through the annual appropriations process, without enacting separate reauthorizing legislation. The federal payment had been made through a transfer from the Defense Environmental Cleanup account.

Whether to reauthorize the utility assessments and the federal payment has been an issue, as the balance of the fund does not appear sufficient to pay the total estimated costs to complete the cleanup of DOE's uranium enrichment facilities over the long term. The Office of Management and Budget (OMB) reported that $4.5 billion remained available in the Uranium Enrichment D&D Fund for appropriation by Congress, as of the beginning of FY2011.[84] In December 2010, DOE had estimated an $11.8 billion shortfall over the long term to meet all remaining cleanup needs, and projected that the fund would be exhausted by 2020 without additional deposits.[85]

The President's FY2012 budget request included a proposal to reinstate the nuclear utility assessments to increase resources in the Uranium Enrichment D&D Fund that would be available for appropriation by Congress.[86] The proposal would cap the assessments at $200 million for the first fiscal year in which the assessments are reinstated, and the $200 million initial cap would be annually adjusted for inflation thereafter. The authority for the federal government to resume

[81] 42 U.S.C. §2297g.

[82] 42 U.S.C. §2297g-1(c).

[83] 42 U.S.C. §2297g-1(d).

[84] Office of Management and Budget, *Budget of the U.S. Government for Fiscal Year 2012*, February 2011, Appendix, p. 415, available on OMB's website, http://www.whitehouse.gov/sites/default/files/omb/budget/fy2012/assets/doe.pdf.

[85] Department of Energy, *Uranium Enrichment Decontamination and Decommissioning Report to Congress*, December 2010, available on DOE's website, http://www.em.doe.gov/pdfs/UEDD%20Report%20December%202010.pdf. This report is the most recent DOE update on the status of the fund. The Energy Policy Act of 1992 requires DOE to prepare this report on a triennial basis.

[86] Office of Management and Budget, *Budget of the U.S. Government for Fiscal Year 2012*, February 2011, Analytical Perspectives, p. 230-231, available on OMB's website, http://www.whitehouse.gov/omb/budget/Analytical_Perspectives.

collection of the assessments would be subject to the enactment of reauthorizing legislation by Congress. Reauthorization legislation has been considered (but not enacted) in previous Congresses, but has not been introduced in the 112th Congress to date.

P.L. 112-74 provided $472.9 million for the Uranium Enrichment D&D Fund in FY2012, a reduction of $31.3 million below the President's request of $504.2 million and $24.2 million below the FY2011 enacted appropriation of $497.1 million. The House had proposed $449.0 million in passing H.R. 2354, and the Senate Appropriations Committee had recommended $429.0 million in reporting its version of the bill. See **Table 14**. As the President had proposed, P.L. 112-74 did not continue the federal payment into the Uranium D&D Enrichment Fund in FY2012. The FY2011 payment of $33.6 million was intended to fulfill the remaining balance of the required federal contribution to the fund, as originally authorized in the Energy Policy Act of 1992.[87] However, the 1992 law still requires DOE to pay the costs of cleanup even if the remaining balance of the Uranium Enrichment D&D Fund is expended, subject to annual appropriations.[88] In effect, federal monies in excess of the remaining balance in the fund still may be necessary in the future to ensure that the cleanup of federal uranium enrichment facilities is completed in accordance with existing law.

P.L. 112-74 did not include the House provision in H.R. 2354 that would have limited the availability of receipts from the transfer or sale of excess federal uranium inventories to $150 million in FY2012. These receipts would be used to augment appropriations provided from the existing balance of the Uranium Enrichment D&D Fund to finance cleanup actions. The President had proposed the use of $200 million in uranium receipts for this purpose in FY2012. Although P.L. 112-74 did not limit the use of such receipts, the conferees on H.R. 2055 stated their concerns about the contracting mechanism that DOE has used to transfer excess uranium in exchange for cleanup services, specifically at the Portsmouth Plant. The conferees also noted findings by the Government Accountability Office (GAO) of legal violations regarding certain aspects of DOE's contracting mechanism,[89] the "off-budget" nature of these transactions, and their concern that the amount of transferred uranium "could destabilize the uranium market and thereby adversely impact our domestic uranium mining industry."[90]

Section 312 of P.L. 112-74 also included several other requirements to address these concerns, which are similar to those the Senate had proposed in reporting H.R. 2354.

- DOE determinations about the potential market and industry impacts of transferring or selling excess uranium are to be limited to a period of no more than two years, to ensure that more recent economic conditions are considered.[91]
- DOE is required to provide at least 30 days notification to the House and Senate Appropriations Committees prior to the transfer, sale, barter, distribution, or other provision of uranium in any form for the purpose of accelerating cleanup.

[87] 42 U.S.C. §2297g-1.

[88] 42 U.S.C. §2297g-2(c).

[89] Government Accountability Office, *Excess Uranium Inventories: Clarifying DOE's Disposition Options Could Help Avoid Further Legal Violations*, GAO-11-846, September 2011, available on GAO's website, http://www.gao.gov/products/GAO-11-846.

[90] See H.Rept. 112-331, p. 853.

[91] As a condition for the transfer or sale of excess uranium, §3112(d)(2) of the USEC Privatization Act of 1996 (P.L. 104-134) explicitly prohibits the transfer or sale of excess federal uranium inventories unless DOE determines that the transaction will not have an adverse impact on the domestic uranium mining, conversion, or enrichment industry, that the uranium is not needed for national security, and that the price of the excess uranium would not be less than the fair market value. See 42 U.S.C. §2297h-10(d)(2).

- DOE is required to submit a report to the House and Senate Appropriations Committees no later than June 30, 2012, providing a revised uranium inventory management plan for FY2013 through FY2018.
- DOE is required to submit a report to the House and Senate Appropriations Committees no later than December 31, 2011, providing an evaluation of the economic feasibility of re-enriching federal inventories of depleted uranium.

Relevant legislation has been introduced in the 112th Congress to authorize a pilot re-enrichment program (H.R. 2054 and S. 1135). The proceeds that would be gained from re-enrichment of federal depleted uranium inventories would be intended to increase resources for the cleanup of federal uranium enrichment facilities. As introduced, both bills would authorize a pilot program to re-enrich depleted uranium owned by the federal government, and would direct proceeds from the sale of the re-enriched uranium into the Uranium Enrichment D&D Fund. These proceeds would be authorized as mandatory funds that would be available directly to DOE for cleanup purposes, without being subject to discretionary appropriations. A substitute amendment to H.R. 2054, approved in a House Subcommittee markup on July 27, 2011, would make the proceeds deposited into the Uranium Enrichment D&D Fund subject to discretionary appropriations prior to being made available to DOE for obligation to carry out cleanup activities.[92]

DOE Internal Reorganization

DOE's plan to reorganize the Office of Environmental Management also received attention in the FY2012 appropriations debate. On July 8, 2011, DOE had announced a plan to reorganize the reporting structure of the Office of Environmental Management, Office of Legacy Management, and Office of the Chief of Nuclear Safety to provide that these offices would report directly to the Under Secretary of Nuclear Security. The conference report on H.R. 2055 noted that the final bill did not include the House provision in H.R. 2354 that would have prohibited the availability of funding in FY2012 for DOE to execute the reorganization.[93]

The House Appropriations Committee had reported H.R. 2354 on June 24, 2011, prior to DOE's July 8, 2011, announcement of the reorganization. In subsequent floor debate on July 14, 2011, the House passed an amendment (H.Amdt. 659) that would have prohibited the use of any funding in the bill to move the Office of Environmental Management under the authority of the Under Secretary of Nuclear Security.[94] However, the dependency of a mere change in internal DOE reporting structure on funding, and therefore the potential effect of a funding prohibition, was unclear. In House floor debate, Members cited concerns about DOE's reorganization proposal and raised questions about the potential for environmental cleanup to become secondary in priority under a management structure that historically has focused on nuclear security as its primary mission.[95] The House amendment did not address aspects of the reorganization involving the Office of Legacy Management and Office of the Chief of Nuclear Safety.

In its report on H.R. 2354, the Senate Appropriations Committee had noted that DOE's intent in proposing the reorganization was to capitalize upon the department's expertise among the

[92] The Subcommittee on Energy and Power of the House Committee on Energy and Commerce approved a substitute amendment to H.R. 2054 on July 27, 2011. The text of the substitute amendment is available on the Majority's website, http://republicans.energycommerce.house.gov/Media/file/Markups/Energy/072711/AINS.pdf.

[93] See H.Rept. 112-331, p. 883.

[94] See §612 of H.R. 2354, as passed by the House.

[95] See *Congressional Record*, July 14, 2011, p. H5060.

affected offices, but the committee expressed its concern about how this new structure may affect day-to-day operations and project management. The committee also stated its concerns about the lack of advance notice and rationale for the reorganization, the reactions of stakeholders, and whether the missions of the Office of Environmental Management and other DOE offices would detract from the nuclear security mission that has been the primary responsibility of the Under Secretary of Nuclear Security. Citing these concerns, the committee had directed DOE to prepare a plan within 30 days of the enactment of H.R. 2354 that would describe how the reorganization would be implemented.[96] Neither P.L. 112-74 nor the conference report on H.R. 2055 included a similar reporting requirement.

Office of Legacy Management

The Office of Legacy Management administers the long-term stewardship of DOE facilities that do not have a continuing mission once cleanup remedies are in place, including facilities that had been transferred from DOE to the Army Corps of Engineers under the FUSRAP program. Once the Corps completes the cleanup of a facility under this program, it is responsible for the initial two years of operations and maintenance, after which time the facility is transferred back to DOE for long-term stewardship. The Office of Legacy Management also manages the payment of pensions and post-retirement benefits of former contractor personnel who worked at DOE facilities that do not have a continuing mission,[97] among other supporting activities.[98] The Office of Legacy Management is funded within DOE's Other Defense Activities Account.[99] The President requested $170.1 million within this account for the Office of Legacy Management in FY2012, somewhat less than the FY2011 enacted appropriation of $171.6 million. As passed by the House, H.R. 2354 would have provided $167.1 million for FY2012, and the Senate Appropriations Committee has recommended $169.7 million in reporting its version of the bill. P.L. 112-74 provided $169.6 million for the account.

Funding needs for the Office of Legacy Management are likely to rise over time, as more facilities are cleaned up and transferred for long-term stewardship. Over the next 10 years, DOE projects that the number of facilities administered by the Office of Legacy Management will rise from 91 in FY2011 to 129 in FY2020.[100] Estimating the funding needs is 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 required for radioactivity to decay to acceptable levels. Enforcement of land use restrictions or other institutional controls may be necessary in perpetuity at facilities that are not

[96] See S.Rept. 112-75, p. 114.

[97] Similar to long-term stewardship responsibilities, the payment of pensions and post-retirement benefits of workers at facilities 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.

[98] For more information on the history, mission, and scope of the Office of Legacy Management, see DOE's website, http://www.lm.doe.gov.

[99] Congress began to fund the Office of Legacy Management entirely within the Other Defense Activities Account in FY2009. The majority of the facilities administered by this office were involved in the U.S. nuclear weapons program, but some of the facilities were contaminated by civilian nuclear energy research activities. Prior to FY2009, Congress appropriated funding for the relatively small number of non-defense facilities administered by the Office of Legacy Management within a stand-alone account.

[100] Department of Energy, Office of Legacy Management, *2011-2020 Strategic Plan*, DOE/LM-0512, January 2011, p. 5, available on DOE's Office of Legacy Management website, http://www.lm.doe.gov.

cleaned up for unrestricted use, in order to prevent potentially harmful exposure. These and other factors make it difficult to reliably estimate the financial liability for long-term stewardship.[101]

Power Marketing Administrations

DOE's four Power Marketing Administrations (PMAs)—Bonneville Power Administration (BPA), Southeastern Power Administration (SEPA), Southwestern Power Administration (SWPA), and Western Area Power Administration (WAPA)—were established to sell the power generated by the dams operated by the Bureau of Reclamation and the Army Corps of Engineers. In many cases, conservation and management of water resources—including irrigation, flood control, recreation or other objectives—were the primary purpose of federal projects. (For more information, see CRS Report RS22564, *Power Marketing Administrations: Background and Current Issues*, by Richard J. Campbell.)

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 FY2012 request for the PMAs was $108 million. This is an overall decrease of $10 million (4%) compared with the FY2011 appropriation. The FY2012 budget request continues 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 requests $11.8 million and WAPA requests $95.9 million. Receipts for SEPA are expected to offset all operating costs in FY2011. In addition, $220,000 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. In FY2012 appropriations markups, the House and Senate agreed to these amounts, and the final bill, P.L. 112-74, appropriated them.

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, which was increased in FY2003 from $3.75 billion to $4.45 billion (a $700 million increase). ARRA 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 United States Treasury had not previously been available to WAPA. It is now available on a permanent, indefinite basis, with the amount of borrowing outstanding

[101] 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 alone. 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 2011 Agency Financial Report*, November 2011, "Environmental Cleanup and Disposal Liabilities," p. 60-63, available on DOE's website, http://www.cfo.doe.gov/cf12/2011parAFR.pdf.

not to exceed $3.25 billion.[102] WAPA has established a new Transmission Infrastructure Program for this purpose and through FY2010 reported spending $333 million on these projects.

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.

Table 15. Energy and Water Development Appropriations Title IV: Independent Agencies

($ millions)

Program	FY2011 Approp.	FY2012 Request	House	Senate	P.L. 112-74
Appalachian Regional Commission	$68.2	$76.0	$68.4	$58.0	$68.3
Nuclear Regulatory Commission	1,041.4	1,038.1	1,048.1	1,038.1	1,038.1
(Revenues)	-904.5	-909.5	-900.5	-909.5	-909.5
Net NRC (including Inspector General)	137.0	128.6	147.6	128.6	128.6
Defense Nuclear Facilities Safety Board	23.2	29.1	29.1	29.1	29.1
Nuclear Waste Technical Review Board	3.9	3.4	3.4	3.4	3.4
Denali Commission	-4.3	12.0	10.7	9.1	10.7
Delta Regional Authority	11.7	13.0	11.7	9.9	11.7
Northern Border Regional Commission	1.5	1.5	1.4	1.3	1.5
Southern Crescent Regional Commission	0.3	0.0	0.3	0.2	0.3
Fed. Coord. Alaska Gas Projects	4.5	4.0	4.0	1.0	1.0
Total	**247.0**	**267.6**	**276.5**	**240.6**	**254.5**

Source: FY2012 budget request, H.Rept. 112-118, H.R. 2354 as passed, S.Rept. 112-75, H.Rept. 112-331.

Note: Figures may not add due to rounding.

Key Policy Issues—Independent Agencies

Nuclear Regulatory Commission

The Nuclear Regulatory Commission (NRC) requested $1.038 billion for FY2012 (including $10.9 million for the inspector general's office), nearly the same as the FY2011 funding level. The House FY2012 energy and water bill would have provided an additional $10 million, while the Senate Appropriations Committee approved the full request. The final bill also provided the full request of $1.038 billion, without the extra $10 million approved by the House. Major activities conducted by NRC include safety regulation and licensing of commercial nuclear reactors and oversight of nuclear materials users.

The NRC budget request included $279.5 million for new reactor activities, a $12.5 million increase from FY2010, largely to handle new nuclear power plant license applications. Until

[102] A bill in the 112th Congress, H.R. 2915, proposes to repeal this borrowing authority.

2007, no new commercial reactor construction applications had been 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, although several license applicants have suspended work on their projects.

NRC's proposed FY2012 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. The FY2012 House bill included $20 million (including $10 million added in a floor amendment) for NRC "to continue the Yucca Mountain license application" and would have prohibited NRC funds from being used to halt the licensing process unless NRC approved DOE's license withdrawal motion. No funding for Yucca Mountain licensing was included in the Senate Appropriations Committee bill or in the final bill.

In response to controversy over actions by NRC Chairman Gregory Jaczko to halt the Yucca Mountain licensing process, the final bill included a provision (§401) that prohibits the NRC Chairman from terminating "any program, project, or activity" without a majority vote by the NRC Commission. A majority Commission vote would also be required to reprogram funds that were specifically included in the bill.

For regulation of operating reactors, NRC's FY2012 budget request included $521.3 million, $20.5 million below the FY2010 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 accident, which occurred about a month after the FY2012 budget request was submitted, 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 conduct short- and long-term reviews of NRC's regulatory system and report to the commission every 30 days for three months with recommendations for improvement.[103]

The Senate Appropriations Committee directed NRC to contract with the National Academy of Sciences (NAS) to conduct a study of lessons learned from the Fukushima accident, including the safety and security of spent fuel storage. The conferees directed NRC to transfer $2 million to NAS for the Fukushima study. The Senate Committee had also urged NRC to determine whether stronger preparations are needed for severe accidents, "especially with regard to seismic and flooding events." The final bill included a provision (§402) requiring NRC to order nuclear power plants to re-evaluate seismic, flooding, and other external hazards at each site to determine whether the plants could adequately handle such events. The conferees also directed that post-Fukushima safety recommendations by the NRC task force be implemented "consistent with, or more expeditiously than, the 'schedules and milestones' proposed by NRC staff on October 3, 2011."

The final bill included $15 million for university education programs related to NRC's mission, including $5 million for general support of nuclear science and engineering research.

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

[103] Written Statement by Gregory B. Jaczko, Chairman, U.S. Nuclear Regulatory Commission, to the Senate Appropriations Committee, Subcommittee on Energy and Water, March 30, 2011, p. 9, http://www.nrc.gov/japan/japan-testimony.html.

defense waste oversight. The offsets in the FY2012 request would result in a net appropriation of $128.6 million, an $8.4 million decrease from FY2011. Offsets in the House bill would have resulted in a net appropriation of $147.6 million. The final bill approved the net appropriation in the Administration's budget request.

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