Energy and Water Development: FY2013 Appropriations

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October 23, 2012

Congressional Research Service
7-5700
www.crs.gov
R42498

CRS Report for Congress
Prepared for Members and Committees of Congress

Summary

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

President Obama's FY2013 budget request for Energy and Water Development was released in February 2012.

For FY2013 the level of overall spending will be a major issue. The Budget Control Act of 2011 (BCA, P.L. 112-25) contained an overall discretionary spending cap for FY2013 of $1.047 trillion. On March 29, 2012, the House passed a budget resolution (H.Con.Res. 112) that caps spending at a lower level, $1.028 trillion. The Senate has not passed a budget resolution, but on April 19 the Senate Appropriations Committee allotted subcommittee funding levels that totaled the $1.047 trillion cap in the BCA.

The difference between overall spending caps is reflected in differences in spending proposals for Energy and Water Development programs. The Administration's request for FY2013 was $33.684 billion. On April 25, the House Appropriations Committee reported out H.R. 5325 (H.Rept. 112-462), with a total of $32.156 billion. The Senate Appropriations Committee reported out S. 2465 (S.Rept. 112-164) on April 26, funding Energy and Water Development programs at $33.432 billion. On June 6 the House passed H.R. 5325 by a vote of 255-165, with some amendments.

On September 28, 2012, President Obama signed into law the Continuing Appropriations Resolution, 2013 (P.L. 112-175). The act continues appropriations until March 27, 2013, for Energy and Water Development programs at 0.612% above the FY2012-enacted levels, with two exceptions: DOE's Nuclear Weapons Activities program is funded at an annual rate of $7.577 billion, the amount requested for FY2013, instead of the FY2012 rate of $7.214 billion, and the Nuclear Nonproliferation program was increased by $100 million over the FY2012 level of $2.296 billion to fund domestic uranium enrichment R&D.

In addition, issues specific to Energy and Water Development programs included

- the distribution of appropriations for Corps (Title I) and Reclamation (Title II) projects that have historically received congressional appropriations above Administration requests;
- alternatives to the proposed national nuclear waste repository at Yucca Mountain, Nevada, which the Administration has abandoned (Title III: Nuclear Waste Disposal); and
- proposed FY2013 spending levels for Energy Efficiency and Renewable Energy (EERE) programs (Title III) that are 25% higher in the Administration's request than the amount appropriated for FY2012.

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President Obama's FY2013 budget request for Energy and Water Development was released in February 2012. The request totaled $33.7 billion, compared to the FY2012 appropriation of $32.7 billion (plus $1.7 billion for disaster relief).

On April 25, 2012, the House Appropriations Committee reported out H.R. 5325 (H.Rept. 112-462), with a total of $32.2 billion. The Senate Appropriations Committee reported out S. 2465 (S.Rept. 112-164) on April 26, funding Energy and Water Development programs at $33.4 billion. The House passed H.R. 5325 with some amendments on June 6.

The Continuing Appropriations Resolution, 2013 (P.L. 112-175), signed into law September 28, continues appropriations until March 27, 2013, for Energy and Water Development programs at 0.612% above the FY2012-enacted levels, with two exceptions: DOE's Nuclear Weapons Activities program is funded at an annual rate of $7.577 billion, the amount requested for FY2013, instead of the FY2012 rate of $7.214 billion, and the Nuclear Nonproliferation program was increased by $100 million over the FY2012 level of $2.296 billion to fund domestic uranium enrichment R&D. (See Nuclear Weapons Stockpile Stewardship and Nonproliferation and National Security Programs, below.)

Status

Table 1 indicates the status of the FY2013 funding legislation. Cells will be filled in as the appropriations cycle progresses.

Table 1. Status of Energy and Water Development Appropriations, FY2013

Subcommittee Markup							Final Approval		
House	Senate	House Report	House Passage	Senate Report	Senate Passage	Conf. Report	House	Senate	Public Law
4/18/12	4/24/12	H.Rept. 112-462	6/6/12	S.Rept. 112-164					

Overview

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

The Budget Control Act and Energy and Water Development Appropriations

FY2013 discretionary appropriations will be considered in the context of the Budget Control Act of 2011 (BCA, P.L. 112-25), which established discretionary spending limits for FY2012-FY2021. The BCA also tasked a Joint Select Committee on Deficit Reduction to develop a federal deficit reduction plan for Congress and the President to enact by January 15, 2012. The failure of Congress and the President to enact deficit reduction legislation by that date triggered an automatic spending reduction process established by the BCA, consisting of a combination of sequestration and lower discretionary spending caps, to begin on January 2, 2013. The sequestration process for FY2013 requires across-the-board spending cuts at the account and program level to achieve equal budget reductions from both defense and nondefense funding at a percentage to be announced by the Office of Management and Budget. As a result, the FY2013 Energy and Water Development appropriation will be considered by Congress with the understanding that enacted funding levels will likely be subject to significant cuts in the nondefense category under the sequestration process unless legislation specifically repealing the sequestration provisions of the BCA is enacted by Congress before next January.

Table 2 includes budget totals for energy and water development appropriations enacted for FY2006 to FY2013.

Table 2. Energy and Water Development Appropriations, FY2006 to FY2013

(budget authority in billions of current dollars)

FY2006	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013[a]
36.7[b]	29.4	30.9	40.5[c]	33.4	31.7	34.4[d]	34.0

Source: Compiled by CRS.

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

a. Requested budget authority.

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

c. Includes $7.5 billion for Advanced Technology Vehicle Manufacturing Loan Program.

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

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

Table 3. Energy and Water Development Appropriations Summary

($ millions)

Title	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Title I: Corps of Engineers	6,726.0[a]	4,731.0	4824.2	5,007.0	
Title II: CUP & Reclamation	1,076.4	1,034.0	987.5	1,049.0	
Title III: Department of Energy	26,748.1	27,667.7	26,048.4	27,127.6	
Title IV: Independent Agencies	254.5	252.2	271.3	248.9	
E&W Total	**34,382.0**[a]	**33,684.0**	**32,131.4**	**33,432.5**	

Source: FY2013 budget request, H.Rept. 112-462, H.R. 5325 as passed, S.Rept. 112-164.

a. Includes $1.724 billion in supplemental funding for the Corps of Engineers under the FY2012 Disaster Relief Appropriations Act (P.L. 112-77).

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 FY2012-FY2013. Accompanying these tables is a discussion of the key issues involved in the major programs in the four titles.

Title I: Army Corps of Engineers[1]

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 and reductions for some projects and classes of projects compared to previous years. Additionally, 2011 flooding events on the Mississippi and Missouri rivers and in the northeastern United States affected a number of Corps projects and required reprogramming of Corps funds. In addition to the regular Corps appropriation for FY2012, Congress appropriated $1.724 billion in supplemental funding for response and recovery related to these events. (See **Table 4**.)

In most years, the President's budget request for the Army Corps of Engineers is below the agency's enacted appropriation.[2] Enacted appropriations for FY2012 continued this trend. In contrast to most other agencies, the Corps received an increase in total funding compared to the President's request. The FY2012 enacted appropriation for the Corps was $5.002 billion, or approximately $500 million more than the President's FY2012 request. The President's FY2013 budget requested $4.731 billion for the Corps, a decrease of $271 million from the FY2012 enacted level. In its markup, the House Appropriations Committee recommended $4.814 billion for the Corps, or $83 million more than the President's request. The Senate Appropriations Committee recommended $5.007 billion, or $276 million more than the President's budget request and $193 million more than the House.

Earmarks and the Corps of Engineers

Corps funding is part of the debate over congressionally directed spending, or "earmarks." Unlike highways and municipal water infrastructure programs, federal funds for the Corps are not distributed to states or projects based on a formula or delivered via competitive grants. Generally about 85% of the appropriations for Corps civil works activities are directed to specific projects. In addition to specific projects identified for funding in the President's budget, in past years many Corps projects have received additional funding from Congress in the appropriations process.[3] In

[1] This section was prepared by Charles V. Stern.

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

[3] While congressional 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 construction or operational expenditures.

the 112th Congress, site-specific project line items added by Congress (i.e., earmarks) have been among those projects subject to House and Senate earmark moratoriums. Thus, additional congressional funding at the project level was not provided in FY2011 and FY2012 enacted appropriations. In lieu of the traditional project-based increases, Congress in FY2012 included additional funding for broad categories of Corps projects (e.g., "ongoing navigation work"), and provided limited directions to the Corps for allocation of these funds.[4]

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

($ millions)

Program	FY2012 Approp.	FY2012 Supplemental[a]	FY2013 Request	House	Senate	Conf.
Investigations and Planning	117.0	-	102.0	102.0	125.0	
Construction	1,617.0	-	1,471.0	1,488.3	1,700.0	
Mississippi River & Tributaries (MR&T)	252.0	802.0	234.0	224.0	253.0	
Operation and Maintenance (O&M)	2,412.0	534.0	2,398.0	2,508.4	2,404.0	
Regulatory	193.0	-	205.0	190.0	199.0	
General Expenses	185.0	-	182.0	172.5	182.0	
FUSRAP[b]	109.0	-	104.0	104.0	109.0	
Flood Control & Coastal Emergencies (FC&CE)	112.0	388.0	30.0	30.0	30.0	
Office of the Asst. Secretary of the Army	5.0	-	5.0	5.0	5.0	
Total Title I	**5,002.0**	**1,724.0**	**4,731.0**	**4,824.2**	**5,007.0**	

Source: FY2013 budget request, H.Rept. 112-462, H.R. 5325 as passed, S.Rept. 112-164.

a. $1.724 billion was in supplemental funding was provided under the FY2012 Disaster Relief Appropriations Act (P.L. 112-77).

b. Formerly Utilized Sites Remedial Action Program.

Key Policy Issues—Corps of Engineers

Project Backlog

The large number of authorized Corps projects that have not received appropriations to date, or that are authorized and have received funding but are incomplete, is often referred to as the

[4] While Congress did not add funding at the project level in FY2012 appropriations, it provided additional funding and guidance for several broad categories of projects in the FY2012 conference report, with instructions for the Corps to make project level allocations based on these instructions in a "work plan" and report back to Congress. These FY2012 Work Plan allocations are available at http://www.usace.army.mil/Missions/CivilWorks/Budget.aspx.

"backlog" of authorized projects. Estimates of the backlog range 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]

Recent budget requests by the Administration have included few new studies and construction starts, and enacted appropriations for FY2011 and FY2012 barred any funding for these project types (defined as projects or studies that have not received appropriations previously). For FY2013, the Administration requested funding for three new construction starts and six new studies.

Navigation Trust Funds

In addition to regular appropriations, two congressionally authorized "trust funds" are administered by the Corps and require annual appropriations: the Harbor Maintenance Trust Fund and the Inland Waterway Trust Fund. Both trust funds received attention in the FY2012 appropriations process. While the Harbor Maintenance Trust Fund has a surplus balance, the Inland Waterway Trust Fund currently faces a shortfall and a curtailment 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.[6] 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 (see H.R. 104 and S. 412). 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.

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

The Administration's FY2013 budget requested $848 million from the HMTF, leaving an estimated-end-of-year balance of more than $8 billion. The House Appropriations Committee provided $1.0 billion in HMTF appropriations. The Senate Appropriations Committee report commented on the Administration's funding level but did not name a specific HMTF amount. (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).[7] IWTF monies derive from a fuel tax on commercial vessels on designated waterways, plus investment interest on the balance.[8] Since FY2007, there has been a potential shortfall in the IWTF. In the past, Congress has taken measures to ensure temporary solvency of the IWTF, either by appropriating federal funds beyond the aforementioned 50% federal requirement (FY2009 and FY2010), or by limiting IWTF expenditures to the amount available under current year fuel tax revenues (FY2011 and FY2012). The IWTF is expected to have a balance of approximately $55 million at the end of FY2012, and without changes to the current system, needed funding for eligible work is expected to continue to exceed available funding for the foreseeable future.

In the past multiple Administrations have proposed fees (e.g., lock user fees, congestion fees) that would have increased IWTF revenues. These fees have been opposed by users and rejected by Congress. In 2011, users endorsed a plan of their own that would increase the current fuel tax by $0.06-$0.08 per gallon and alter the cost-share arrangement for some IWTF projects to increase the portion paid for by the federal government. H.R. 5325 would authorize this proposal, which has been opposed by the Obama Administration.

Changes to IWTF policies have historically been under the jurisdiction of the authorizing committees, but in recent years appropriators have expressed frustration with the lack of action on this issue. Without a new source of revenue or some other change directed by Congress, the overall number of inland waterway projects is expected to be extremely limited. Currently one project (Olmsted Lock and Dam on the Ohio River) accounts for almost all IWTF appropriations. This past year, estimates for the Olmsted project increased by $872 million, bringing the total estimate for the project to $2.9 billion.[9] Based on the new estimates, the project is expected to continue to require the majority of IWTF revenues for at least 10 more years.

In FY2013, the Administration requested limited appropriations for IWTF projects based on current-year fuel tax revenues.[10] The FY2013 Administration budget requested approximately

[7] For more information on inland waterways, see CRS Report R41430, *Inland Waterways: Recent Proposals and Issues for Congress*, by Charles V. Stern.

[8] 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.

[9] The project was originally estimated at $775 million in 1986, plus inflation.

[10] This is the same approach that was proposed and enacted in FY2011 and FY2012. Assuming annual fuel tax revenues of approximately $95 million, spending on inland waterways construction for FY2013 would be approximately $190 million for each year (or approximately $60 million less than the average funding provided from FY1992-2010).

$94 million in inland waterway spending from the IWTF, with an equal amount to be drawn from the General Fund of the Treasury. The Administration also assumed an additional $80 million in new revenues from an unspecified user fee, presumably separate from the current fuel tax.

The majority of FY2013 IWTF funds were proposed for the Olmsted project. In appropriations action, the House Committee agreed with the requested IWTF funding, but mandated that a portion be restricted until a review of the Olmsted project's cost overruns is completed. The Senate Appropriations Committee also provided the funding for Olmsted, but provided that only 25% of the funding for Olmsted would have to be cost-shared with the IWTF (the rest would come from the General Fund). In effect, this change provides an extra $72 million for IWTF projects.

Ecosystem Restoration Projects

The Corps portion of the Energy and Water bill typically includes funding for ecosystem restoration projects, such as restoration of the Everglades in South Florida.[11] Some in Congress have criticized the fact that while the Corps has requested reductions for some "traditional" activities in recent budgets, funding for activities under its environmental business line (which includes ecosystem restoration projects) has largely remained the same. For FY2013, the Administration requested $511 million (approximately 11% of the FY2013 request) for ecosystem restoration projects, which are the largest component of the environmental business line. This amount is similar to the amount appropriated for these activities in recent years.

In its markup of the President's budget, the House Appropriations Committee decreased funding levels for several of the Administration's major ecosystem restoration initiatives, including Everglades (reduced from $153 million to $145 million) and Missouri River Fish and Wildlife Recovery (reduced from $90 million to $71 million). The Senate Appropriations Committee agreed with the Administration's request.

Continuing Authorities Program

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.[12] CAPs are referred to by the section number in the bill where the CAP was first authorized. The Administration's FY2013 budget requested $24 million in funding for five of the nine CAPs, or a decrease of approximately $19 million from the FY2012 enacted level. The Administration proposed no funding for four CAPs, including no funding for Section 14 (emergency streambank and shoreline protection), Section 103 (shore protection), Section 107 (navigation), and Section 208 (snagging and clearing for flood control). The House Appropriations Committee agreed with the Administration's overall request for CAPs, but shifted some of the funding within individual CAPs. The Senate Appropriations Committee provided $45 million in funding for eight of the nine CAPs.

[11] Along with the Department of the Interior, the Corps typically receives funding for the Comprehensive Everglades Restoration Program, or CERP. For more information, see CRS Report R42007, *Everglades Restoration: Federal Funding and Implementation Progress*, by Charles V. Stern.

[12] 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.

Title II: Department of the Interior[13]

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 FY2013 budget request for Title II funding for the Central Utah Project and Reclamation was approximately $1.034 billion, or a decrease of $42 million from the FY2012 enacted amount. The Obama Administration requested $21 million for the Central Utah Project (CUP) Completion Account in FY2013, or $7 million less than the amount appropriated in FY2012. Significantly, the Administration also proposed to make Reclamation responsible for oversight and implementation of CUP (these responsibilities are currently housed within a separate office in DOI). Both the House and the Senate appropriations committees disagreed with this recommendation.

The FY2013 request for the Bureau of Reclamation totaled $1.013 billion in gross current budget authority, or $34 million less than the amount enacted in FY2012. The FY2013 request for the Bureau of Reclamation included an "offset" of $39.9 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 $973 million. As in previous years, additional funding is estimated to be available for FY2013 via "permanent and other" funds.

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

($ millions)

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Central Utah Water Conservancy District	26.7	19.8	19.8	19.8	
Mitigation and Conservation Commission Activities	2.0	1.2	1.2	1.2	
Total, Central Utah Project	**28.7**	**21.0**	**21.0**	**21.0**	

Source: FY2013 budget request, H.Rept. 112-462, S.Rept. 112-164.

[13] This section was prepared by Charles V. Stern.

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

($ millions)

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Water and Related Resources	895.0	818.6	833.6	892.1	
Policy and Administration	60.0	60.0	57.0	60.0	
CVP Restoration Fund (CVPRF)	53.1	39.9	39.9	39.9	
Calif. Bay-Delta (CALFED)	39.7	36.0	36.0	36.0	
San Joaquin Restoration Fund[a]	—	12.0	—	—	
Indian Water Rights Settlement[a]	—	46.5	—	—	
Gross Current Reclamation Authority	**1,047.7**	**1,013.0**	**966.5**	**1,028.0**	
Total, Title II (CUP and Reclamation)	**1,076.4**	**1,034.0**	**987.5**	**1,049.0**	

Source: FY2013 budget request, H.Rept. 112-462, S.Rept. 112-164.

a. In FY2012 and FY2013 appropriations, the House and Senate Appropriations Committees disagreed with the Administration's request for new accounts for San Joaquin restoration and Indian water rights settlements and opted to retain funding levels 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 $818 million for the Water and Related Resources Account for FY2013, a reduction of $76 million from the FY2012 level. However most of this decrease is due to shifting of funds for Indian water rights settlements and San Joaquin restoration to two new accounts. Accounting for these changes, the proposed decrease from FY2012 to the FY2013 request was approximately $34 million.

In its markup, the House Appropriations Committee recommended $834 million in funding for Water and Related Resources, a decrease of $43.5 million from the Administration's request after allowing for the shifting/elimination of funding for the aforementioned two accounts proposed in the President's request. The Senate Appropriations Committee provided $892.1 million, which amounts to an increase of $15 million from the President's request after accounting for these same changes.

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. Operations of Reclamation facilities are often controversial, particularly for their effect on fish and wildlife species and conflicts among competing water users.

As with the Corps of Engineers, the Reclamation budget is made up largely of individual project funding lines and relatively few "programs." Also similar to the Corps, previously these Reclamation projects have often been subject to earmark disclosure rules. The current moratorium affects Congress's ability to steer money toward specific Reclamation projects, as it has done in the past.

Central Valley Project (CVP) Operations

The CVP in California is one of Reclamation's largest and most complex water projects, and limited deliveries to CVP contractors are often the subject of appropriations and authorization debates. In recent years, 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), some of which restrict CVP operations because of the project's potential effects on certain fish species.[14] Previous restrictions that would prevent implementation of BiOps in the CVP, including amendments to appropriations bills, have not been enacted. However, other measures to lessen the impact of these restrictions have been enacted, and related legislation is currently under consideration.[15]

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.[16] The Fund is supported through the combination of a reallocation of Central

[14] The two BiOps in question have found that continued operation of the projects under a plan developed and implemented in 2004 (known as the Operations Criteria and Plan, or 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. These and other restrictions have led to low water deliveries for certain water districts (e.g., those with junior water rights).

[15] Most prominently, H.R. 1837 would, among other things, alter the current regime for water deliveries in the Central Valley and repeal the San Joaquin River Restoration Act. H.R. 1837 passed the House on February 29, 2012. For more information, see CRS Report R42375, *H.R. 1837—The Sacramento-San Joaquin Valley Water Reliability Act*, by Betsy A. Cody.

[16] 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* (continued...)

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.

In recent years, funding for the San Joaquin River settlement has been controversial. Some have proposed repealing the settlement outright.[17] In lieu of repealing the settlement, some have proposed de-funding the most important components of the settlement that were authorized by Congress, including rescission of prior year mandatory appropriations for San Joaquin restoration. To date, none of these proposals have been enacted.

Previous funding for the San Joaquin River settlement included mandatory funds that were made available to Reclamation without further appropriation between FY2010 and FY2012. For FY2013, Reclamation proposed an allocation of $12 million in discretionary funding within a new account for San Joaquin River restoration activities. The House Appropriations Committee provided no funding for these activities. The Senate Appropriations Committee agreed with the Administration's request.

Klamath Basin Restoration Agreement[18]

The current Administration has undertaken efforts to avoid water allocation conflicts and restore the fisheries of the Klamath Basin in southern Oregon and Northern California. Two related agreements, the Klamath Basin Restoration Agreement (KBRA) and the Klamath Hydroelectric Settlement Agreement (KHSA), aim to achieve these goals through a mix of federal actions and non-federal dam removal. The agreements, which require authorization by Congress to move forward, would cost the federal government $800 million over 15 years, with additional costs for dam removal funded by nonfederal entities.

There are a number of ongoing federal activities in the Klamath, including some actions and studies under the KBRA and KHSA that are going forward under existing authorities. However in order to proceed with other activities, including most of the restoration actions in the KBRA and a secretarial determination related to dam removal under the KHSA, Congress must authorize the agreements.[19] In FY2013, in addition to base funds for the Klamath Project (approximately $18.6 million), Reclamation proposed $7.1 million in new funding for selected KBRA activities that are authorized under existing law. Both the House and the Senate appropriations committees agreed with the Administration's requested funding level.

WaterSMART Program

In recent years Reclamation has combined funding for several individual "bureau-wide" programs that promote water conservation into a single program—the WaterSMART (Sustain and Manage America's Resources for Tomorrow) Program. The program is part of an effort by

(...continued)

of H.R. 146: San Joaquin River Restoration, by Betsy A. Cody and Pervaze A. Sheikh.

[17] See footnote 15.

[18] For more information, see CRS Report R42157, *Klamath River Basin: Background and Issues*, coordinated by Charles V. Stern.

[19] Legislation currently before Congress (H.R. 3398 and S. 1851) would authorize the agreements.

the Department of the Interior to focus on water conservation, re-use, and planning. In the FY2013 request the WaterSMART program included five components: WaterSMART Grants, Basin Studies, Title XVI Projects, the Cooperative Watershed Management Program, and Water Conservation Field Services.[20] The FY2013 President's budget request for WaterSMART programs was $53.9 million. The House Appropriations Committee recommended $46.9 million for the program, and the Senate Appropriations Committee agreed with the President's request. Funding levels for WaterSMART programs are shown in **Table 7**.

Table 7. Reclamation WaterSMART Program

(selected programs, $ millions)

Program Name	FY2011	FY2012	FY2013 Request	House	Senate	Conf.
WaterSMART Grants	33.0	12.2	21.5	12.2	21.5	
Basin Studies	8.3	4.9	6.0	4.9	6.0	
Title XVI Projects	20.5	24.7	20.3	24.6	20.3	
Cooperative Watershed Management Program	—[a]	0.25	0.25	0.25	0.25	
Water Conservation Field Services	[7.8][a]	5.0	5.9	5.0	5.9	
Total	**61.9**	**47.1**	**53.9**	**46.9**	**53.9**	

Source: Bureau of Reclamation Congressional Justifications, FY2013, H.Rept. 112-462, S.Rept. 112-164.

a. Prior to FY2012, the Cooperative Watershed Management Program and Water Conservation Field Services programs were not part of WaterSMART.

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 FY2012 appropriations act, P.L. 112-74, funded DOE programs at $26.3 billion. For FY2013, the Obama Administration requested $27.7 billion for DOE programs. The House Appropriations Committee recommended $26.1 billion. The Senate Appropriations Committee recommended $27.1 billion.

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

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

($ millions)

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
ENERGY PROGRAMS					
Energy Efficiency and Renewable Energy	1,809.6	2,267.3	1,451.0	1,916.1	
Electricity Delivery and Energy Reliability	139.1	143.0	123.0	143.0	
Nuclear Energy	765.4	770.4	765.4	785.4	
Fossil Energy R&D	346.7	420.6	529.0	460.6	
Naval Petrol. and Oil Shale Reserves	14.9	14.9	14.9	14.9	
Elk Hills School Lands Fund	0.0	15.6	15.6	15.6	
Strategic Petroleum Reserve	192.7	195.6	195.6	195.6	
SPR Petroleum Account	-500.0	-291.0	—	—	
Northeast Home Heating Oil Reserve	-89.9	4.1	4.1	4.1	
Energy Information Administration	105.0	116.4	100.0	116.4	
Non-Defense Environmental Cleanup	235.3	198.5	235.0	228.5	
Uranium D&D Fund	472.2	442.5	425.0	442.5	
Science	4,873.6	4,992.1	4,801.4	4,909.0	
Energy Transformation Acceleration Fund (ARPA-E)	275.0	350.0	200.0	312.0	
Nuclear Waste Disposal	0.0	0.0	25.0	0.0	
Departmental Admin. (net)	126.0	122.6	85.0	112.6	
Office of Inspector General	42.0	43.5	43.5	43.5	
Adv. Tech. Vehicles Manuf. Loan	6.0	9.0	6.0	9.0	
Innovative Tech. Loan Guarantee	0.0	0.0	0.0	0.0	
TOTAL, ENERGY PROGRAMS	**8,813.7**	**9,815.1**	**8,949.8**	**9,708.7**	
DEFENSE ACTIVITIES					
National Nuclear Security Administration (NNSA)					
Weapons Activities	7,214.1	7,577.3	7,512.3	7,577.3	
Nuclear Nonproliferation	2,295.9	2,458.6	2,283.0	2,458.6	
Naval Reactors	1,080.0	1,088.6	1,086.6	1,088.6	
Office of Administrator	410.0	411.3	382.0	386.3	
Total, NNSA	**11,000.0**	**11,535.9**	**11,257.0**	**11,510.9**	
Defense Environmental Cleanup	5,003.0	5,472.0	4,920.0	5,064.0	
Other Defense Activities	823.4	735.7	813.4	735.7	

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Defense Nuclear Waste Disposal	0.0	0.0	0.0	0.0	
TOTAL, DEFENSE ACTIVITIES	**16,826.3**	**17,743.6**	**16,990.4**	**17,310.6**	
POWER MARKETING ADMINISTRATION (PMAs)					
Southeastern	0.0	0.0	0.0	0.0	
Southwestern	11.9	11.9	11.9	11.9	
Western	96.0	96.1	96.1	96.1	
Falcon & Amistad O&M	0.2	0.2	0.2	0.2	
TOTAL, PMAs	**108.1**	**108.2**	108.2	108.2	
Total, Title III	**25,748.1**	**27,666.9**	**26,048.4**	**27,127.6**	

Source: FY2013 budget request, H.Rept. 112-462, H.R. 5325 as passed, S.Rept. 112-164.

Key Policy Issues—Department of Energy

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

Energy Efficiency and Renewable Energy (EERE)[21]

President Obama has declared energy efficiency and renewable energy to be in a "Sputnik moment," comparable to the U.S.-Soviet space race that began in the 1950s. In his State of the Union address in February 2012 he reiterated their importance to jobs, economic growth, and U.S. manufacturing competitiveness. But the Congress has been reluctant to go along with his efforts to boost spending for these programs. His proposed FY2011 budget for EERE of $2.4 billion was reduced to $1.8 billion, and his FY2012 proposal of $3.2 billion was cut to $1.8 billion.

For FY2013, DOE requested $2.267 billion for the EERE programs. Compared with the FY2012 appropriation, the FY2013 request would increase EERE funding by $458 million, or 25%. The House bill would reduce the requested amount sharply, to $1.381 billion. The Senate bill would appropriate $1.916 billion.

DOE requested an additional $143.0 million for Electricity Delivery and Energy Reliability (EDER) programs. **Table 9** gives the programmatic breakdown for EERE and EDER.

[21] This section was prepared by Fred Sissine.

Table 9. Energy Efficiency and Renewable Energy Programs

($ millions)

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Hydrogen/Fuel Cell Technologies	103.6	80.0	82.0	104.0	
Biomass and Biorefinery Systems	199.3	270.0	203.0	200.0	
Solar Energy	289.0	310.0	155.0	293.0	
—Concentrating Solar Power (CSP)	*44.9*	*45.1*	—-	—-	
—Photovoltaic (PV) Power	*75.6*	*66.0*	—-	—-	
Wind Energy	93.3	95.0	70.0	95.0	
Geothermal Technology	37.9	65.0	30.0	65.0	
Water Power (Hydro/Ocean)	58.8	20.0	45.0	59.0	
Subtotal, Renewable and Hydrogen	781.8	840.0	585.0	820.0	
Vehicle Technologies	328.8	420.0	335.0	330.0	
Building Technologies	219.2	310.0	125.0	220.0	
Advanced Manufacturing	115.6	290.0	150.0	168.6	
Federal Energy Management	29.9	32.0	18.0	30.0	
Subtotal, Efficiency R&D	693.5	1,052.0	628.0	750.6	
Facilities and Infrastructure	26.3	26.4	26.4	26.4	
Program Direction	165.0	164.7	115.0	164.7	
Strategic Programs	25.0	58.9	10.0	25.0	
R&D Subtotal	1,691.5	2,142.0	1,364.4	1,786.7	
Renewables Deployment	10.0	7.0	7.0	10.0	
Subtotal, Demonstration and Deployment	10.0	7.0	7.0	10.0	
Weatherization Grants	68.0	139.0	54.6	145.0	
State Energy Grants	50.0	49.0	25.0	50.0	
Use of Prior Year Balances	-9.9	-69.7	-69.7	-69.7	
Total EERE Appropriation	1,809.6	2,267.3	1,381.3	1,916.1	
Electricity Delivery and Energy Reliability (EDER)	139.1	143.0	123.0	143.0	

Sources: FY2013 budget request, H.Rept. 112-462, S.Rept. 112-164.

New Subprogram Account Structure

For each major EERE technology program (e.g., Solar Technologies, Vehicle Technologies), DOE proposed changing the subprogram account structure from descriptions of technology-

specific activities (e.g., Photovoltaic R&D, Battery Technology) to a uniform sub-program structure that has four areas: Innovations, Emerging Technologies, Systems Integration, and Market Barriers. The four areas are sequential, following the technology development progression—research, development, demonstration, and deployment (RDD&D).

Each of the four new subprogram areas is identified with the concept of "technology readiness level (TRL)," a new element of its vocabulary for describing EERE technology programs. TRL is defined by a numerical scale that covers the RDD&D progression. The scale ranges from TRL1, for basic research, to TRL10, for commercial market penetration.

Thus, the Innovations subprogram encompasses activities traditionally defined as applied research, covering TRL levels 2 through 3. The Emerging Technologies subprogram captures activities traditionally defined as development, covering TRL levels 3 through 6. The Systems Integration subprogram embraces demonstration activities, associated with TRL levels 6 through 8. The Market Barriers subprogram is comprised of deployment-related activities, covering TRL levels 8 through 10.

Both the House and Senate reports rejected DOE's proposal for a new subprogram account structure, citing its inadequacy for budgeting purposes. For the FY2014 request, the Senate report directed DOE to provide more detail at the program, project, and activity level.

Hydrogen/Fuel Cell Program

For the Hydrogen/Fuel Cell Program, DOE requested $80 million, $24 million below FY2012. In general, activities would be reduced, but not eliminated. The House bill would go along with the cut, appropriating $82 million. The Senate bill would appropriate $104 million, the FY2012 level.

Biomass and Biorefinery Program Initiatives

This program aims to foster a domestic bioenergy industry that produces renewable biofuels, bioproducts, and biopower. The goals are to curb oil dependence, reduce greenhouse gas emissions, and stimulate economic and job development—especially in the farms and forests of rural areas. While biofuels and bioproducts may soon be price-competitive, swings in oil prices pose an ongoing challenge to achieve cost-competitiveness. The program strategy addresses a feedstock collection barrier by focusing on converting raw biomass to solid pellets or to "green crude" oil that is easy to transport at large scale. The program aims to help cellulosic biofuels (renewable gasoline, diesel, and jet fuel) reach a wholesale finished-fuel cost under $3 per gallon by 2017.

DOE requested $270 million for FY2013 for biomass and biorefinery programs, compared to $199 million appropriated for FY2012. Most of the increased funding would be used to complete pilot- and demonstration-scale biorefinery demonstration projects. The increase would support the construction and operation phases for biofuels, such as cellulosic ethanol and renewable diesel. Also, funds would support an innovative pilot program and deployment of a mobile feedstock process demonstration.

DOE also sought authority from Congress to transfer $100 million from the EERE appropriation to the Defense Production Act Fund. This money would be used in joint activities by DOE, the

Department of Defense, and the Department of Agriculture to develop pilot-scale demonstrations for production of renewable diesel and jet fuel to be used by the Navy.

The House and Senate bills, as reported by the Appropriations Committees, would not fund the increased activity. The House bill would appropriate $203 million, the Senate bill $200 million. The House Appropriations Committee did not agree to the proposed transfer to the Defense Production Act Fund; the Senate Appropriations Committee approved it.

Solar Energy

For the Solar Program, DOE requested $310 million, a net increase of $21 million over FY2012. Much of the increase would go to research on new data analysis capabilities to help cut time and permitting process costs for solar installation. The Senate Appropriations Committee recommended $293 million, and supported the increase for data analysis. The House bill would cut the Solar Program to $155 million. The House Appropriations report specified a minimum of $65 million for Innovations in Manufacturing, and $20 million for Photovoltaic Cell Development and Supply Chain activities.

Wind Energy

For the Wind Program, DOE requested $95 million, essentially no change over FY2012. The Senate Appropriations Committee recommended the full amount of the request, while the House report recommended $70 million. Both reports stressed support for offshore wind technology development.

Geothermal Technologies

For the Geothermal Program, DOE requested $65 million, an increase of $27.1 million over FY2012. Much of the increase would go to an Enhanced Geothermal Systems (EGS) Field Sites program. The Senate bill would fund the Geothermal Program at the requested level. The House bill would appropriate $30 million. The House Committee report specified no funding for the EGS program. Both the House and the Senate Appropriations Committees urged DOE to pursue the potential of low-temperature geothermal sources.

Water Power

For the Water Power Program, DOE requested $20 million, a cut of $38.8 million below FY2012. Water power technologies employ marine and hydrokinetic (wave, tidal, current, and ocean thermal) resources, and conventional hydropower resources, to generate electricity. The budget request would have allocated $15 million to water power technologies and $5 million to conventional hydropower.

The Senate Appropriations Committee recommended $59 million for water power, in the same proportion of 75% for water power technologies and 25% for conventional hydropower. The House Appropriations Committee recommended $25 million for technologies and $20 million for conventional hydropower.

Vehicle Technologies

The President announced a goal to put 1 million electric vehicles (EVs) on the road by 2015. To help achieve that goal, DOE requested an increase of $91 million for the Vehicle Technologies Program over the $329 million appropriated for FY2012. Most of the increase would support the Electric Vehicle (EV) Grand Challenge, with the goal of assuring U.S. leadership in the global market for next generation electric vehicle technology. The EV Challenge focuses on advanced battery technology, power electronics, and advanced charging technology. Neither the House nor the Senate Appropriations Committees agreed to the increase. The House bill would appropriate $335 million; the Senate bill $330 million.

Building Technologies

This program develops energy efficiency measures to curb building-related energy costs, with a goal of reducing energy use 50% by 2030. The program strategy is designed with three linked paths: improve building components (envelope/windows, HVAC, lighting, and sensors/controls), strengthen market pull (through cooperation with private industry), and raise energy efficiency for new equipment (via standards) and new buildings (via model codes).

DOE requested $310 million for FY2013, an increase of $90.8 million over FY2012. The funding increase would be spread over most building activities, with a special focus on accelerating currently scheduled rulemakings for equipment standards and on initiating standards for about six additional (new) products.

Both reports rejected DOE's proposed overall increase—yet both support another year of funding for the Building Innovation Hub. The Senate Appropriations Committee recommended $220 million, which is the same as FY2012. The House report recommended $125 million. Also, it directed DOE to (1) conduct a study of the benefits of an R&D program to improve the manufacturing of consumer electronics and (2) ensure that any proposed standards for manufactured housing account for both up-front costs and lifecycle operating costs.

Advanced Manufacturing

DOE proposes to restructure the Industrial Technologies Program into an Advanced Manufacturing Office (AMO). This reflects an effort to accelerate the program's evolution in response to national interests—especially concerns about jobs, critical materials, and international competitiveness. The general goal for AMO programs is to reduce the energy use of manufactured goods across targeted product life-cycles by 50% over 10 years. The manufacturing focus is a major theme of the EERE request, that follows from the President's Advanced Manufacturing Partnership initiative. Under EERE, the focus centers on the AMO and is also evidenced by manufacturing elements under several other technology programs.

To meet the above-noted goal, DOE requested $290 million, a net increase of $174.4 million. Nearly 80% of the increase would go Next Generation Manufacturing Processes, with the remainder split between Next Generation Materials and Industrial Technical Assistance. These proposed increases directly parallel the "Next Generation" manufacturing initiatives proposed in

the FY2012 request. The FY2013 proposals appear to involve less funding, more focus, and more specifics than those in the FY2012 request.[22]

The increase for Manufacturing Processes aims to develop new ways to reduce and/or integrate the number of steps in industrial processes (e.g. to reduce energy losses from industrial motors, steam, and process heating activities) and to discover alternate processes (e.g., bio-manufacturing to support the production of oil substitutes). Public-private partnerships would be expanded through manufacturing demonstration facilities (MDFs),[23] research/industry manufacturing awards,[24] and manufacturing challenges.[25] DOE expects that many projects funded through the Administration's Innovative Manufacturing Initiative (IMI) will advance into this phase, as technologies are scaled up and demonstrated for industrial applications.[26] Through these various activities, small- and medium-sized firms would gain access to specialized technology that would otherwise be cost-prohibitive. Also, the funding for Next Generation Materials aims to allow for energy savings in energy intensive processes, create new design opportunities for renewable energy generation in austere environments, and help bypass the need for critical materials while reducing cost.

The House Appropriations Committee recommended $150 million, which is $34 million more than FY2012. The Senate report recommended $168.6 million, which is $52.6 million more than FY2012. Both reports agreed to extend funding for the Critical Materials Hub for another year.

Federal Energy Management Program (FEMP)

FEMP provides expertise, training, and other services to help federal agencies achieve congressionally mandated energy efficiency and renewable energy goals. DOE requested $32 million, which would be $2 million more than FY2012. The Senate Appropriations Committee recommended $30 million and the House Appropriations Committee recommended $18 million.

Program Direction

This program funds federal employees, contract support, and operational costs. DOE requested $164.7 million, essentially level funding with FY2012. The Senate Appropriations Committee recommended the full amount of the request. The House report recommended $115 million.

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[22] The FY2013 funding increase sought for Advanced Manufacturing Office initiatives ($174.4 million) is about $38 million (18%) less than the increase that was requested for FY2012. For more details on the FY2012 request, see CRS Report R41908, *Energy and Water Development: FY2012 Appropriations*, coordinated by Carl E. Behrens, pages 22-23.

[23] MDFs promote development, integration, evaluation, and exploitation of advanced materials and energy-efficient, flexible manufacturing technologies to hasten dissemination of technology developments across the supply chain of manufacturers. The MDF provides physical and virtual tools—from design to evaluation and testing/verification—for rapidly prototyping new technologies and optimizing critical manufacturing processes.

[24] Laboratory and industry manufacturing awards provide incentives for collaboration between industry and researchers outside of the private sector, including National Laboratories.

[25] Manufacturing Challenges establish open competitions to address non-conventional solutions to pervasive large-scale problems.

[26] IMI public-private partnerships target core technical problems facing an industry or group of industries, that, if solved, hold the potential to produce large improvements in energy productivity, environmental performance, product yield, and economic benefits.

Strategic Programs

For Strategic Programs (formerly Program Support), DOE seeks $58.9 million, an increase of nearly $34 million over FY2012. Most of the increase would go for joint work with DOE's Office of Science on clean energy research and innovation. Also, the International subprogram would get a $3.5 million increase, from which $2 million would support exports to foreign markets. The Senate Appropriations Committee recommended $25 million, the FY2012 level, and the House Appropriations Committee recommended $10 million.

Weatherization Grant Program

This program addresses regulatory, financial, and planning barriers faced by state and local governments. The goal is to foster technologies, practices, and policies that support state and local governments in providing home energy services to low-income families that help them reduce energy costs and save money. DOE requested $139 million for FY2013, compared to $68 million appropriated for FY2012. Nearly all of the addition would increase the number of low-income households weatherized.[27] The Senate Appropriations Committee recommended $145 million. The House Appropriations report cited the availability of $810 million in unspent prior year funds in its recommendation for $54.6 million.

State Energy Grant Program

This program supports many state energy offices, both administration and activities. DOE requested $49 million, nearly level funding with FY2012. The Senate Appropriations Committee recommended $50 million, and the House report recommended $25 million.

Electricity Delivery and Energy Reliability (EDER) Program[28]

DOE requested $143 million, a net increase of $3.9 million, for EDER, which included $20.0 million for a new Electricity Systems Hub. The Hub would address the growing need for grid accommodation of renewables, the impact of electric vehicles and distributed generation, and the advent of smart grid equipment. Hub funding would be mostly offset by cuts to other programs. The Senate Appropriations Committee recommended the full amount of the request, including funding for the Hub. The House report recommended $123 million, specifying no funds for the Hub.

Nuclear Energy[29]

The Obama Administration's FY2013 funding request for nuclear energy research and development totaled $770.4 million. Including advanced reactors, fuel cycle technology, infrastructure support, and safeguards and security, the total nuclear energy request was $88.3

[27] Also, in FY2013, collection and analysis of data from ARRA projects would enable updated estimates of program energy savings, cost savings, leveraged funds, and other impacts. For more details about the program see CRS Report R42147, *DOE Weatherization Program: A Review of Funding, Performance, and Cost-Effectiveness Studies*, by Fred Sissine.

[28] This section was prepared by Fred Sissine.

[29] This section was prepared by Mark Holt.

million (10%) below the enacted FY2012 funding level. Funding for safeguards and security at DOE's Idaho facilities in FY2012 was provided under a separate appropriations account, Other Defense Activities, but it was included under the Nuclear Energy account in the FY2013 request. The largest proposed reductions for FY2013 were Reactor Concepts (36%), Radiological Facility Management (27%) and Nuclear Energy Enabling Technologies (13%).

Excluding funding for Idaho safeguards and security, the House Appropriations Committee recommended an increase of $89.9 million for the nuclear energy account, for a total of $765.4 million. The committee recommended that $93.4 million for Idaho safeguards and security be provided under the Other Defense Activities Account. The Senate Appropriations recommended a $20.1 million increase for nuclear energy, including Idaho safeguards and security and $17.7 million in prior-year balances.

Using reorganized budget categories established for FY2011, the Administration's FY2013 nuclear R&D budget request is consistent with DOE's *Nuclear Energy Research and Development Roadmap* issued in April 2010.[30] 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 water reactors. The total FY2013 funding request for this program was $73.7 million, a reduction of $41.2 million from FY2012. The House Appropriations Committee recommended an increase of $11.1 million from the FY2012 level, while the Senate panel's recommendation was the same as the request.

Most of the Administration's proposed reduction in Reactor Concepts would be for NGNP, a high-temperature gas-cooled reactor demonstration project authorized by the Energy Policy Act of 2005 (EPACT05, P.L. 109-58). 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 is requesting $21.2 million for the NGNP project for FY2013, down from $40 million provided in FY2012. 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

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

a demonstration plant design "at this time" but would continue research on the technology.[31] 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.[32] According to the DOE budget justification, the NGNP program in FY2013 will focus on fuels for very high temperature reactors, the graphite used in high-temperature reactor cores, and licensing issues. The House Appropriations Committee recommended $50 million for NGNP, to allow DOE to continue developing a licensing framework and continue working with industry on the program. The Senate panel restricted NGNP activities to ongoing fuel-related research.

Funding for the Advanced Reactor Concepts subprogram would also be reduced sharply by the Administration request, from $21.9 million in FY2012 to $12.4 million in FY2013. Reactor concepts being developed by this subprogram are generally classified as "Generation IV" reactors, as opposed to the existing fleet of commercial light water reactors, which are generally classified as generations II and III. Such advanced reactors "could dramatically improve nuclear power performance including sustainability, economics, and safety and proliferation resistance," according to the FY2013 justification. 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). The House Appropriations Committee recommended an increase $1.1 million over FY2012, while the Senate panel approved the Administration's proposed reduction.

DOE's FY2013 request for the Light Water Reactor Sustainability subprogram was $21.7 million, $3.3 million below the FY2012 appropriation. 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 radioactive leakage from nuclear fuel and increasing its accident tolerance, along with other "post-Fukushima lessons learned research needs," according to the budget justification. The House Appropriations Committee rejected the Administration's proposed reduction, while the Senate panel approved it.

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.

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

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

DOE requested $65 million for FY2013 to provide technical support for licensing small modular LWRs, $2 million below the FY2012 funding level. This program focuses on LWR designs because they are believed most likely to be deployed in the near term, according to DOE. Conferees on the FY2012 appropriations bill anticipated a five-year program totaling $452 million. The program is similar to DOE's support for larger commercial reactor designs under the Nuclear Power 2010 Program, which ended in FY2010. DOE will 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. The program will support two teams of reactor vendors and specific utilities or consortia who are interested in building the reactors at specific sites, according to the DOE justification. DOE announced a funding solicitation for the program on March 22, 2012.[33] The House Appropriations Committee recommended $114 million for the SMR licensing program, $47 million above FY2012. The committee report called the increase necessary to keep the program on track to receive $452 million over five years. The Senate panel provided the same funding as in the budget request.

An additional $18.5 million for FY2013 was requested by DOE under the Reactor Concepts program (described in the section above) for SMR advanced concepts R&D—$10.2 million below the FY2012 funding level. Unlike the SMR licensing support program, which focuses on conventional LWR technology, the SMR advanced concepts program would conduct research on technologies that might be deployed in the longer term, according to the budget justification. The House Appropriations Committee rejected the Administration's proposed reduction, while the Senate panel approved the budget request.

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 FY2013 funding request for this program is $175.4 million, $10.8 million below the FY2012 appropriation. The House Appropriations Committee recommended $138.7 million for Fuel Cycle R&D, $36.7 million below the request. The Senate panel recommended $193.1 million, $17.7 million above the request.

The range of fuel cycle technologies being studied by the program includes direct disposal of spent fuel (the "once through" cycle) and partial and full recycling, according to the budget justification. The Fuel Cycle R&D Program "will research and develop a suite of technology

[33] Department of Energy, "Obama Administration Announces $450 Million to Design and Commercialize U.S. Small Modular Nuclear Reactors," press release, March 22, 2012, http://www.ne.doe.gov/newsroom/2012PRs/nePR032212_print.html.

options that will enable future decision-makers to make informed decisions about how best to manage nuclear waste and used fuel from reactors," the budget justification says.

Much of the planned research on spent fuel management options will address the near-term recommendations of the Blue Ribbon Commission on America's Nuclear Future, which issued its final report on January 26, 2012.[34] The commission was chartered to develop alternatives to the planned Yucca Mountain, NV, spent fuel repository, which President Obama wants to terminate. The largest subprogram under Fuel Cycle Research and Development is Used Nuclear Fuel Disposition, with a request of $59.7 million, the same as the FY2012 funding level. Activities in that area include work toward the development and licensing of standardized spent fuel containers, studies of potential spent fuel disposal partnerships, and the accelerated characterization of potential geologic media for waste disposal.

The House report contended that much of the proposed research in the Used Fuel Disposition Program relates to waste program changes recommended by the Blue Ribbon Commission that have not been enacted by Congress. As a result, the panel reduced funding for Used Fuel Disposition to $38 million, $15 million of which would be for storage and transportation work related to the Yucca Mountain repository. The Senate panel's $17.7 million increase from the budget request consists of prior-year funds that would be used for a spent fuel storage pilot project (see the "Nuclear Waste Disposal" section for more details).

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

Nuclear Energy Enabling Technologies

The Nuclear Energy Enabling Technologies (NEET) program "is designed to conduct research and development (R&D) in crosscutting technologies that directly support and enable the development of new and advanced reactor designs and fuel cycle technologies," according to the FY2013 DOE budget justification. The DOE funding request for the program was $65.3 million, $9.4 million below the FY2012 level. The House Appropriations Committee recommended $75 million, nearly the same as in FY2012, while the Senate panel recommended the same funding as the request.

DOE's proposed funding cut would come entirely under the category of Crosscutting Technology Development, for which $26.2 million was requested, $9.7 million below FY2012. According to the budget justification, the cuts result from elimination of research on manufacturing methods and nonproliferation risk assessments. Continuing crosscutting research activities are to include development of innovative materials, advanced automation and information technologies, advanced sensors, and improved fuel performance. The Energy Innovation Hub for Modeling and Simulation, created in FY2010, had a request of $24.6 million, slightly above the FY2012 appropriation. The Modeling and Simulation Hub is creating a computer model of an operating

[34] Blue Ribbon Commission on America's Nuclear Future, "Blue Ribbon Commission on America's Nuclear Future Issues Final Report to Secretary of Energy," press release, January 26, 2012, http://brc.gov/index.php?q=announcement/brc-releases-their-final-report.

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 budget justification.

DOE requested $14.6 million for the National Scientific User Facility, the same as the FY2012 appropriation, to support partnerships by universities and other research organizations to conduct experiments "at facilities not normally accessible to these organizations," according to the justification. Up to five such partnerships are currently anticipated, and the FY2013 funding will allow up to three new long-term and five "rapid turnaround" projects to be awarded.

Fossil Energy Research and Development[35]

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 new structure was adopted in the final appropriations bill. The CCS program is intended 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 separating 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.

For FY2013 the budget structure remains unchanged, and the Administration requested $420.6 million and the use of $7.9 million in prior-year balances, bringing spending on Fossil Energy R&D to $428.5 million. The Administration had proposed eliminating spending on Natural Gas Technology, Unconventional Technologies, and Cooperative R&D for FY2011, but Congress insisted on continued spending on natural gas both in FY2011 and FY2012. For FY2013 the Administration requested $17 million for Natural Gas Technologies.

The House Committee recommended $554 million for Fossil Energy Research and Development, $207.3 million above FY2012 and $133.4 million above the budget request. After accounting for rescissions of $187.3 million in FY2012, the recommendation is $20 million above FY2012. The committee recommendation of $384.3 million for Carbon Capture and Sequestration (CCS) and Power Systems includes $68.9 million for Carbon Capture, $115.3 million for Carbon Storage ($16 million for enhanced oil recovery technologies), $110 million for Advanced Energy Systems ($25 million for solid oxide fuel systems research, development, and demonstration), $10 million for coal-biomass to liquids activities, $5 million for High Performance Materials, $55 million for Cross-Cutting Research, and $35 million for NETL Coal Research and Development. The committee also recommended $17 million for Natural Gas Technologies ($10 million for shale gas extraction, and $2 million for Risk Based Data Management Systems), and $115.7 million for Program Direction. With gasoline prices once again at record levels, the committee report says, it is more important than ever to use all means possible to increase the domestic oil supply, and recommended $25 million for a new program in Unconventional Fossil Energy Technologies.

[35] This section was prepared by Anthony Andrews.

The Senate Committee recommended $460.6 million for Fossil Energy Research and Development, $40 million more than the budget request. The committee recommendation of $301.6 million for Carbon Capture and Sequestration includes $60.4 million for Carbon Capture, $95.5 million for Carbon Storage, $80.9 million for Advanced Energy Systems, $29.7 million for Cross-Cutting Research, and $35.0 million for NETL Coal Research and Development. The committee also recommended $22 million for Natural Gas Technologies, $5 million for a new Unconventional Fossil Energy program, and $120 million for Program Direction.

Table 10. Fossil Energy Research and Development Program (FER&D)

($ millions)

	FY2011 Approp.	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Fuels and Power Systems	400.2	0.0	0.0			
CCS Demonstration						
Carbon Capture	0.0	68.9	60.4	68.9	60.4	
Carbon Storage	0.0	115.5	95.5	115.3	95.5	
Advanced Energy Systems	0.0	100.0	55.2	110.0	80.9	
Cross Cutting Research	0.0	49.2	29.8	55.0	29.7	
National Energy Tech. Lab Coal R&D	0.0	35.0	35.0	35.0	35.0	
CCS Subtotal	0.0	368.6	275.9	384.3	301.6	
Unconventional FE				25.0	5.0	
Natural Gas Technologies	2.0	15.0	17.0	17.0	22.0	
Program Direction	151.7	120.0	115.8	115.8	120.0	
Plant and Capital Equipment	20.0	16.8	13.3	13.3	13.3	
F E Environmental Restoration	10.0	7.9	5.9	5.9	5.9	
Special Recruitment Program	0.7	0.7	0.7	0.7	0.7	
Subtotal	**584.5**	**534.0**	**428.6**	**562.0**	**468.5**	
Prior-year balances	**0.0**	**0.0**	**-7.9**	**-7.9**	**-7.9**	
Rescission	**-140.0**	**-187.0**	**0**	**0**	**0**	
Total	**444.5**	**347.0**	**420.6**	**554.0**	**460.6**	

Source: FY2013 Budget Request, H.Rept. 112-462, and S.Rept. 112-164.

Strategic Petroleum Reserve[36]

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

[36] This section was prepared by Anthony Andrews.

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's maximum capacity reached 727 million barrels.[37]

The federal government has not purchased oil for the SPR since 1994. Beginning in 2000, additions to the SPR were made with royalty-in-kind (RIK) oil acquired by the Department of Energy in lieu of cash royalties paid on production from federal offshore leases. In September 2009 the Secretary of the Interior announced a transitional phasing out of the RIK Program.[38]

In its FY2012 request, the Obama Administration had 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. In summer 2011, the President ordered an SPR sale in coordination with an International Energy Administration sale under treaty obligation. The U.S. sale of 30.6 million barrels reduced the SPR inventory to 695.9 million barrels. For FY2013, the administration requested $195.6 million to operate the SPR, an increase from the $192.7 million enacted in for FY2012. The Administration also proposed rescinding $291 million in balances from the SPR account resulting from the emergency sale of SPR oil conducted in 2011.

The House and Senate Committees recommended $195.6 million for operation of the SPR, and opposed the Administrations proposed rescission of $291 million from the SPR Account.

Science[39]

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.[40] For FY2013, DOE requested $4.992 billion for the Office of Science, an increase of 2.4% from the FY2012 appropriation of $4.874 billion. The House committee recommended $4.801 billion. The Senate committee recommended $4.909 billion. (See **Table 11**.)

Table 11. Science

($ millions)

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Basic Energy Sciences	$1,688.1	$1,799.6	$1,657.1	$1,712.1	
High Energy Physics	790.9	776.5	776.5	781.5	
Biological and Environmental Research	609.6	625.3	542.0	625.3	

[37] 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.

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

[39] This section was prepared by Daniel Morgan.

[40] Based on preliminary FY2010 data from Tables 29 and 22 of National Science Foundation, Division of Science Resources Statistics, *Federal Funds for Research and Development: Fiscal Years 2008-10*, NSF 12-308 (April 2012).

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Nuclear Physics	547.4	526.9	547.9	539.9	
Advanced Scientific Computing Research	440.9	455.6	442.0	455.6	
Fusion Energy Sciences	401.0	398.3	474.6	398.3	
Science Program Direction	185.0	202.6	185.0	190.0	
Science Laboratories Infrastructure	111.8	117.8	112.3	117.8	
Safeguards and Security	80.6	84.0	82.0	83.0	
Workforce Development for Teachers and Scientists	18.5	14.5	14.5	14.5	
Use/Rescission of Prior-Year Balances	—	(9.1)	(32.6)	(9.1)	
Total	**4,873.6**	**4,992.1**	**4,801.4**	**4,909.0**	

Source: FY2013 budget request, draft House committee report, S.Rept. 112-164.

The Administration's stated goal is to double the funding of the Office of Science.[41] 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 Administration's current policy no longer specifies a completion date. The FY2013 request is 37% more than the FY2006 baseline. The House and Senate committee recommendations are respectively 32% and 35% more than the baseline.

The request for the largest Office of Science program, basic energy sciences, is $1.800 billion. This would be an increase of $111 million from FY2012 and accounts for nearly the entire increase requested for the Science account. The increase would fund science in support of clean energy, such as combustion research to improve simulation of advanced engines; research on materials and chemistry by design; and jointly funded R&D with the Office of Energy Efficiency and Renewable Energy. The request would also support increased utilization of existing scientific user facilities and the start of construction of the Linac Coherent Light Source-II, a new high-energy x-ray source. The House committee recommended $1.657 billion, including $33 million less than the request for facility operations, $20 million less than the request for energy frontier research centers, $76 million less than the request for other research activities, and $14 million less than the request for construction projects. The Senate committee recommended $1.712 billion, including $88 million less than the request for research activities but the full requested amount for construction. Both committee reports directed DOE not to engage the energy frontier research centers in joint work with the Office of Energy Efficiency and Renewable Energy; they stated that DOE had not adequately justified this proposal.

For high-energy physics, the request is $777 million, a decrease of $14 million from FY2012. Nonaccelerator physics projects would increase $12 million, in part to support engineering and design work on the Large-Scale Synoptic Telescope, a joint activity with the National Science Foundation. This increase would be more than offset, however, by reductions elsewhere in the program. Facilities funding at Fermilab would decrease $13 million because of a planned shutdown to perform accelerator upgrades. Accelerator development would decrease $23 million because of the completion of R&D on the International Linear Collider. Construction of the Long

[41] For more information, see CRS Report R41951, *An Analysis of Efforts to Double Federal Funding for Physical Sciences and Engineering Research*, by John F. Sargent Jr.

Baseline Neutrino Experiment (LBNE) would not be funded. The House committee recommended $16 million for LBNE, offset by a reduction of $16 million in other activities. The Senate committee also recommended $16 million for LBNE, partially offset by a reduction of $11 million for other activities.

The request for biological and environmental research is $625 million, an increase of $16 million from FY2012. Most of the increase ($12 million) would be for terrestrial ecosystem science. Funding for radiobiology would decrease $5 million. The House committee recommended $542 million and expressed support for the program's activities in biological systems science without mentioning its activities in climate and environmental sciences. The Senate committee recommended the requested amount.

For nuclear physics, the request is $527 million, down $20 million from FY2012. Funding for continued construction of an upgrade at the Continuous Electron Beam Accelerator Facility (CEBAF) would decrease $9 million. Utilization of existing nuclear physics user facilities would decrease: the Relativistic Heavy Ion Collider (RHIC) from 58% to 33%, and the Argonne Tandem Linac Accelerator System (ATLAS) from 95% to 80%. The House committee recommended $21 million more than the request to support facility operations and maintenance. The Senate committee recommended $13 million more than the request for the same purpose.

The request for advanced scientific computing research is $456 million, an increase of $15 million. Research funding would increase by $28 million, while facilities funding would decrease by $13 million. The House committee recommended $442 million and expressed concern that DOE had not yet provided a long-term plan for exascale computing that was mandated by prior appropriations reports. The Senate committee recommended the requested amount.

The request for fusion energy sciences is $398 million, a decrease of $3 million. The proposed U.S. contribution to the International Thermonuclear Experimental Reactor (ITER), a fusion research facility currently under construction in France, is $150 million, an increase of $45 million. As a consequence, funding for domestic fusion activities would decrease by $48 million. Among the affected domestic activities, the Alcator C-Mod fusion reactor would be permanently shut down. Policymakers and fusion researchers have long been concerned about the impact of ITER's funding needs on the availability of resources for the domestic fusion program. The House committee recommended $475 million, including $28 million more than the request for ITER and $48 million more than the request for the domestic program. The Senate committee recommended the requested amount.

ARPA-E[42]

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. 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 FY2013 is $350 million, an increase of $75 million from FY2012. The House committee recommended $200

[42] This section was prepared by Daniel Morgan.

million. The Senate committee recommended $312 million, which it noted is the amount authorized by the America COMPETES Reauthorization Act of 2010 (P.L. 111-358).

Nuclear Waste Disposal[43]

The Administration's FY2013 budget includes 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 at Yucca Mountain, NV, as specified by an NWPA amendment in 1987. Funding for OCWRM ended after FY2010, so the office has been closed and activities at the Yucca Mountain site halted.

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. To develop alternative waste management strategies, the Administration established the Blue Ribbon Commission on America's Nuclear Future, which issued its final report to the Secretary of Energy on January 26, 2012.[44] The Blue Ribbon Commission recommended that future efforts to develop nuclear waste facilities follow a "consent based" approach.

The House Appropriations Committee sharply criticized the Administration's nuclear waste policy and provided $25 million for FY2013 to resume work on the Yucca Mountain repository. The Senate Committee included language (§312) authorizing a pilot program to demonstrate one or more consolidated interim storage facilities for spent nuclear fuel and high level waste. Any proposed storage site would require the consent of the affected state governor, local government of jurisdiction, affected Indian tribes, and Congress. The Senate panel directed DOE to use $2 million of its program direction funding for the pilot program, along with $17.7 million in unobligated prior-year appropriations from the Nuclear Waste Fund.

DOE had filed a license application with the Nuclear Regulatory Commission (NRC) for the proposed Yucca Mountain repository in June 2008 but filed a motion to withdraw the application on March 3, 2010. An NRC licensing panel rejected DOE's withdrawal motion June 29, 2010, on the grounds that NWPA requires full consideration of the license application by NRC. The full NRC Commission deadlocked on the issue September 9, 2011, leaving the licensing panel's decision in place and prohibiting DOE from withdrawing the Yucca Mountain application. However, the commission ordered at the same time that the licensing process be halted because of "budgetary limitations."[45] No funding was provided in FY2012 or requested for FY2013 to continue Yucca Mountain licensing activities, although the issue is currently the subject of a federal appeals court case.[46]

[43] This section was prepared by Mark Holt.

[44] 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.

[45] 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.

[46] U.S. Circuit Court of Appeals for the District of Columbia Circuit, USCA Case #11-1271, Yucca Mountain Reply Brief of Petitioners Mandamus Action, February 13, 2012, http://www.naruc.org/policy.cfm?c=filings.

The final report of the Blue Ribbon Commission on America's Nuclear Future 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.

The commission's proposed "consent-based" approach called for the roles of local, state, and tribal governments to be negotiated for each potential site. The development of consolidated waste storage and disposal facilities should begin 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 to respond to the recommendations of the Blue Ribbon Commission (see "Nuclear Energy" section above for more details).

The House Appropriations Committee noted that many of the Blue Ribbon Commission's recommendations would require changes in law to implement and cautioned the Administration against efforts to "unilaterally develop or implement policy" on nuclear waste management. The Senate panel directed DOE to implement the waste storage pilot program in its bill "consistent with the recommendations in the Blue Ribbon Commission's final report."

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 exceed $20 billion if DOE were to begin removing waste from reactor sites by 2020, the previous target for opening Yucca Mountain.[47] (For more information, see CRS Report R42513, *U.S. Spent Nuclear Fuel Storage*, by James D. Werner; 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[48]

DOE's Loan Programs Office provides loan guarantees for projects that deploy specified energy technologies, as authorized by Title XVII of the Energy Policy Act of 2005 (EPACT05, P.L. 109-58), and direct loans for advanced vehicle manufacturing technologies. No funding for additional loans and loan guarantees was requested for FY2013. However, $38 million for loan guarantee administrative expenses would be offset by fees, and $9 million was requested for administrative

[47] *Ibid*., p. 80.

[48] This section was prepared by Mark Holt. For more details on loan guarantees, see CRS Report R42152, *Loan Guarantees for Clean Energy Technologies: Goals, Concerns, and Policy Options*, by Phillip Brown.

expenses for the vehicle manufacturing loan program, an increase of $3 million over FY2012. The House and Senate Appropriations Committees approved the $38 million request for the loan guarantee program. The House panel cut the vehicle manufacturing request to $6 million, while the Senate panel approved the full request.

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

Title XVII allows DOE to provide loan guarantees for up to 80% of construction costs for eligible energy projects. Under such loan guarantee agreements, the federal government would repay all covered loans if the borrower defaulted. This would reduce the risk to lenders and allow them to provide financing at below-market interest rates. DOE currently has two conditional loan guarantee commitments pending under Section 1703, totaling $10.33 billion for nuclear power and nuclear fuel projects. Under Section 1705, final loan guarantees have been issued for 26 projects, totaling $16 billion.[49]

DOE issued final rules for the program October 4, 2007.[50] 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 affected industries 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.

DOE's first loan guarantee under Section 1705 was issued in September 2009 to Solyndra Inc., a manufacturer of photovoltaic equipment. Solyndra's bankruptcy announcement on August 31, 2011, prompted strong congressional criticism of the Administration's management of the loan guarantee program.[51] Solyndra's DOE loan guarantee totaled $535 million, and the company's

[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. For a critique of the loan guarantee process, see U.S. Government Accountability Office, *DOE Loan Guarantees: Further Actions Are Needed to Improve Tracking and Review of Applications*, GAO-12-157, March 2012, http://www.gao.gov/products/GAO-12-157.

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

[51] Opening Statement of the Honorable Cliff Stearns, Chairman, Subcommittee on Oversight and Investigations. "Solyndra and the DOE Loan Guarantee Program," September 14, 2011,
(continued...)

bankruptcy placed most or all of that amount at risk. (For details, see CRS Report R42058, *Market Dynamics That May Have Contributed to Solyndra's Bankruptcy*, by Phillip Brown.)

Subsidy Costs

Title XVII requires the estimated future government costs resulting from defaults on guaranteed loans to be covered up-front by appropriations or by payments from project sponsors (borrowers). These "subsidy costs" are calculated as the present value of the average possible future net costs to the government for each loan guarantee, on a case-by-case basis. If those calculations are accurate, the subsidy cost payments for all the guaranteed projects together should cover the future costs of the program. However, the Congressional Budget Office has predicted that the up-front subsidy cost payments will prove too low by at least 1% and is scoring bills accordingly.[52] 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.[53]

Authorized Loan Guarantee Amounts

Under the Federal Credit Reform Act (FCRA), federal loan guarantees cannot be provided without an authorized level in an appropriations act or an appropriation for the subsidy costs. Pursuant to FCRA, the FY2007 continuing resolution (P.L. 110-5) established an initial cap of $4 billion on loan guarantees under the Section 1703 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 Section 1703 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.[54]

(...continued)

http://republicans.energycommerce.house.gov/Media/file/Hearings/Oversight/091411/Stearns.pdf.

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

[53] 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.

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

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 billion 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.

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

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

- $8.3 billion ceiling in 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.
- $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 billion in loan guarantees with final commitments under Section 1705, for which the deadline was September 30, 2011.[55]

Advanced Technology Vehicle Manufacturing Loans

DOE also administers the Advanced Technology Vehicles Manufacturing (ATVM) Loan Program established by the Energy Independence and Security Act of 2007 (P.L. 110-140).[56] 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.[57]

Nuclear Weapons Stockpile Stewardship[58]

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 Authorization Act, (P.L. 111-84, §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 12** presents Weapons Activities funding. NNSA manages two programs outside of that account: Defense Nuclear Nonproliferation, discussed later in this report, and Naval Reactors.

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

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

[56] 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.

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

[58] This section was prepared by Jonathan Medalia.

Table 12. Funding for Weapons Activities

($ millions)

Program	FY2011 Current	FY2012 Request	FY2012 Enacted	FY2013 Requested	H. Approp. Comm.	S. Approp. Comm.
DSW	1,905.1	1,963.6	1,873.7	2,088.3	2,069.1	2,078.3
Campaigns	1,691.6	1,796.7	1,696.9	1,690.8	1,735.7	1,710.8
RTBF	1,842.5	2,326.1	2,004.8	2,239.8	2,239.8	2,239.8
Other[a]	1,426.6	1,543.3	1,638.8	1,558.5	1,467.7	1,548.5
Total	**6,865.8**	**7,629.7**	**7,214.1**	**7,577.3**	**7,512.3**	**7,577.3**

Source: FY2013 Budget Request, H.Rept. 112-462, S.Rept. 112-164,

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

a. FY2011, FY2012, and FY2013 include Secure Transportation Asset, Nuclear Counterterrorism Incident Response, Site Stewardship, and Defense Nuclear Security; FY2011 and FY2012 include Facilities and Infrastructure Recapitalization Program and Cyber Security; FY2011 includes Science, Technology and Engineering Capability, a rescission, and use of prior year balances; FY2012 and FY2013 include National Security Applications and Legacy Contractor Pensions; and FY2013 includes NNSA CIO Activities.

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 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, greater efficiency, smaller footprint at each site, increased security, and the like. After numerous exchanges between DOE and the appropriating and authorizing committees, such issues still remain.

According to a White House document of May 2010, the President provided Congress with a classified report required by the FY2010 National Defense Authorization Act, Section 1251, "on the comprehensive plan to: (1) maintain delivery platforms [that is, bombers, missiles, and submarines that deliver nuclear weapons]; (2) sustain a safe, secure, and reliable U.S. nuclear weapons stockpile; and (3) modernize the nuclear weapons complex."[59] According to that document, "the Administration intends to invest $80 billion in the next decade to sustain and modernize the nuclear weapons complex." The Administration submitted a revised Section 1251 report in November 2010, projecting weapons stockpile and infrastructure costs for FY2011-FY2020 at between $85.4 billion and $86.2 billion. Its estimate for FY2013 was $7.9 billion.

For FY2013, the Administration requested $7,577.3 million for Weapons Activities. This would be a reduction compared to the amount set forth in the November 2010 1251 report. The budget made some cuts, deferrals, and stretch-outs in key programs, as discussed below, and declared it would present out-year figures "at a later date." These changes have generated controversy in Congress. Senator Jon Kyl reportedly said that the Administration "made an absolute commitment to me that the 2012 budget, 2013 budget, budgets thereafter, would contain the

[59] 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.

funding in the 1251 report and that commitment has now not been kept. It isn't because of a lack of support in the United States Congress. So rather than redouble their efforts to make up the difference, they basically threw in the towel. Perhaps they wanted to do that all along."[60] Representative Michael Turner, chairman of the Strategic Forces Subcommittee of House Armed Services Committee, said, "It is now clear [the President] will submit a budget next week that would be a significant reversal from the stated commitment, per his own section 1251 plan, to request at least $7.9 billion for the NNSA for FY13.… The ratification of the New START treaty was a package deal, and President Obama is now changing the terms of the Senate's ratification of the treaty."[61] Representative Turner introduced H.R. 4178, Maintaining the President's Commitment to Our Nuclear Deterrent and National Security Act of 2012. On the other hand, Representative Edward Markey introduced H.R. 3974, Smarter Approach to Nuclear Expenditures (SANE) Act of 2012, calling for further cuts in DOE and DOD nuclear weapons programs.

Despite such positions, the House Appropriations Committee recommended $7,512.3 million, or $65.0 million less than the request. The $65.0 million was the amount rescinded, so excluding the rescission, the committee recommended the amount requested. The Senate Appropriations Committee likewise recommended the amount requested. The fact that both appropriations committees in effect fully funded the Administration's Weapons Activities request makes it likely that the final appropriation will be close to the request, rather than significantly higher or lower as some in Congress prefer. The Continuing Appropriations Resolution, 2013 (P.L. 112-175), funding Energy and Water Development programs until March 27, 2013, funds Weapons Activities at a rate equivalent to an annual $7,577.3 million, the amount requested by the Administration for FY2013.

The changes to the FY2013 Weapons Activities budget, as compared to the projection in the 1251 report, raise several policy questions:

- If the 1251 report deemed key projects essential, why is it now acceptable to reduce or delay them?
- Given fiscal constraints and the Budget Control Act of 2011 (P.L. 112-25), was the lower funding requested for FY2013, as compared to the figure for FY2013 in the 1251 report plan, unavoidable?
- How can NNSA plan ahead given the changes from the 1251 plan made in the FY2012 appropriation and the FY2013 request?
- Might credibility problems resulting from cuts compared to the budget projections set forth in the 1251 plan affect Senate consideration of future arms control agreements?

The Senate Appropriations Committee, in its report on FY2013 energy and water development appropriations, expressed concern over NNSA's "inadequate project management." It noted that "all of NNSA's major construction projects exceed the initial cost estimates," including cost

[60] "Kyl Slams Decision to 'Throw in the Towel' on Modernization Budget," *Weapons Complex Monitor Morning Briefing,* February 17, 2012.

[61] "Turner to Introduce the Maintaining the President's Commitment to our Nuclear Deterrent and National Security Act of 2012," press release, February 8, 2012, http://turner.house.gov/News/DocumentSingle.aspx?DocumentID=278917.

growth for the Uranium Processing Facility (discussed below) by a factor of 10, and "most of NNSA's major construction projects are behind schedule," including a slippage of 14 years for the MOX Fuel Fabrication Facility. It pointed to "NNSA's inability to adequately assess alternatives." The committee directed five reports: (1) NNSA reports to GAO every six months on implementing certain management recommendations; (2) a GAO study on NNSA project management; (3) a report by NNSA to the committee, to be submitted every six months, on changes to cost, schedule, and scope of projects estimated to cost at least $750 million; (4) a JASON defense advisory group study on NNSA's stockpile surveillance program; and (5) a report by NNSA on a comprehensive plutonium strategy.

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. (A "mod" is a modification or version of a bomb or warhead type.) 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—combining them into a new mod, B61 mod 12—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 amount, the conference agreement withheld $134.1 million until NNSA provided the appropriations committees with results of a design definition and cost study.

  While the November 2010 1251 report stated that the W76 "LEP will be fully funded for the life of the program at $255 million annually," the FY2013 request was $174.9 million. Donald Cook, Deputy Administrator for Defense Programs, NNSA, reportedly said that the revised plan would meet the Navy's operational

needs for W76s by the end of 2018 but would delay completion of production for extra W76s as a hedge force until 2021. This approach, he said, would free up funds for the B61 LEP.[62] The House Appropriations Committee noted its deep concern about NNSA's "ability to deliver on its production requirements." It recommended adding $45.1 million above the request for the W76 LEP to raise the production rate beyond what NNSA had planned in the FY2013 request. The Senate Appropriations Committee expressed its concern about a "significant funding decrease" given that the W76 is "the largest share of our nuclear deterrent on the most survivable leg of the Triad." It noted that shifting funds to the B61 "is not fully justified" because the B61 LEP is behind schedule, it "will not be able to efficiently spend the requested amount," and there are carryover balances. Accordingly, it increased funds for the W76 LEP by $30 million and reduced funds for the B61 LEP by the same amount.

Regarding the B61 bomb, the 1251 report stated that NNSA "will accelerate" work "that is necessary to retain the schedule for the completion of the first production unit in FY 2017." However, the FY2013 request planned for the first production unit in FY2019. According to one report, "NNSA was able to delay the project by two years due to new assumptions about the need to replace limited life components in the bomb."[63] (These components have a service life shorter than that of the rest of the weapon, so must be replaced from time to time.) The FY2013 request for the B61 LEP was $369.0 million, an increase of more than 50%, compared to FY2012. The House Appropriations Committee recommended the amount requested. Noting its concern over funds spent on a higher-cost option for the B61 LEP even though a lower-cost option was subsequently chosen, the committee directed NNSA "to report the total amount of funding it has spent to date for development and experimental activity associated with the full option for the B61 life extension program." In addition to recommending a reduction in B61 LEP funds by $30 million, as noted, the Senate Appropriations Committee stressed that a validated cost, schedule, and scope baseline for this LEP is essential for evaluating life cycle costs, assessing the impact of this LEP on other programs, and determining if the proposed schedule meets military requirements, among other things. Accordingly, it "directs that no funding be used for B61 life extension program activities until NNSA submits to the Committee a validated cost, schedule, and scope baseline."

- Stockpile Systems. This program involves routine maintenance, replacement of limited-life components, surveillance, assessment, and the like for all weapon types in the stockpile. For FY2012, the request was $497.6 million and the final appropriation provided the same amount. Of these funds, it directed NNSA to use $175.0 million for surveillance and $99.5 million for W78 Stockpile Systems. The FY2013 request was $590.4 million, a 20% increase over FY2012. The House Appropriations Committee recommended $454.2 million for Stockpile Systems. The request included $76.6 million under W78 Stockpile Systems for studying the feasibility of a common W78/W88 warhead, and $59.7 million for a W88 program ("Alt 370") that included consideration of commonalities between

[62] "NNSA's Cook Clarifies Plans for the W76," *Weapons Complex Monitor Morning Briefing,* February 17, 2012.

[63] Todd Jacobson, "Administration Requests $7.58B for NNSA's Weapons Program," *Nuclear Weapons & Materials Monitor,* February 14, 2012, p. 2.

the two warheads. The House Appropriations Committee recommended fully funding these latter two amounts under a new category, Stockpile Assessment and Design, in order to help distinguish these costs from routine stockpile work. The Senate Appropriations Committee recommended funding Stockpile Systems as requested, with the requested amounts for the W78 LEP study and the W88 Alt 370 program, and at least $181.0 million for surveillance.

- 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 FY2012 request was $56.8 million and the appropriation provided that amount. The FY2103 request was $51.3 million. The House and Senate Appropriations Committees recommended fully funding this request; the latter committee commended NNSA for completing two dismantlements (W62 and B53) a year ahead of schedule.

  Stockpile Services. This category includes Production Support; R&D Support; R&D Certification and Safety; Management, Technology, and Production; and Plutonium Infrastructure Sustainment. NNSA states, "Stockpile Services provides the foundation for the production capability and capacity within the nuclear security enterprise. All enduring systems, LEPs, and dismantlements rely on Stockpile Services to provide the base development, production and logistics capability needed to meet program requirements. In addition, Stockpile Services funds research, development and production activities that support two or more weapons-types, and work that is not identified or allocated to a specific weapon-type." The FY2012 request was $928.6 million and the final appropriation provided $854.5 million, of which $64.0 million was to be used for surveillance. The FY2013 request was $902.7 million. The House Appropriations Committee recommended $838.5 million, including an increase of $25.0 million for Production Support "for investments needed to modernize manufacturing processes" and a reduction of $46.6 million to R&D Certification and Safety to deny funds for certain new development activities and limit future requests for this activity to annual assessments of the stockpile and investigating warhead problems. The Senate Appropriations Committee recommended $892.7 million, expressed its concern about significant recent increases for Production Support on grounds that it "is relatively insensitive to major shifts in activities," and "directs NNSA to provide additional information in future budget justifications to explain these increasing costs."

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 FY2013 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 FY2012 request was $405.9 million and the final appropriation provided $334.0 million. The FY2013 request was $350.1 million. Much of the increase was for increasing the rate at which a certain experiment is conducted, and developing "expanded predictive science capabilities needed for national security assessments motivated by intelligence community requirements for foreign nuclear weapon assessments." The House Appropriations Committee recommended $27.0 million above the request as a result of realigning funding from Directed Stockpile Work for certain experimental activities. The Senate Appropriations Committee recommended the requested amount.
- 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." For FY2012, the request was $143.1 million, and the appropriation provided that amount. The FY2013 request was $150.6 million; the subprogram with the largest dollar increase, of $4.9 million, was Enhanced Surety, the goal of which is to "modernize and enhance surety options" for LEPs and other changes to weapons. ("Surety" includes such characteristics as safety, security, and use control.) Enhanced Surveillance was reduced by $2.6 million. The House Appropriations Committee recommended $8.0 million above the request as a result of realigning funding for some surety technologies from Directed Stockpile Work. The Senate Appropriations Committee recommended the requested 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.[64] Between February 20, 2011, and March 20, 2011, NIF personnel conducted 34 "successful

[64] 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.

target shots … in support of HEDSS [High Energy Density Stockpile Stewardship]."[65] In 2011, personnel conducted a total of 283 NIF shots of all types.[66] For FY2012, the appropriation was $476.3 million. The FY2013 request was $460.0 million. The House Appropriations Committee noted the possibility that NIF will not achieve ignition in FY2012 and stated, "the considerable costs [for NIF] will not have been warranted if the only role the National Ignition Facility (NIF) serves is that of an expensive platform for routine high energy density physics experiments." Further, the committee noted that in past years NNSA had permitted Livermore to use a lower overhead rate for operating NIF. "This practice misrepresented the full costs of these activities and shifted those costs onto other programs at the laboratory." The committee recommended adding funds "to mitigate any unintended adverse impacts in fiscal year 2013." The Senate Appropriations Committee recommended the requested amount. It directed NNSA to use up to $140 million of Livermore's "internal additional direct purchasing power … to increase the level of the laboratory's Readiness in Technical Base and Facilities funds dedicated to supporting NIF," and recommended that NNSA move NIF's operating budget line to RTBF "consistent with the facility's transition to regular operations." The committee expressed its concern over the prospects of NIF achieving ignition by the end of FY2012 and directed NNSA to establish an advisory committee on this and related topics.

- 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 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. For FY2012, the request was $628.9 million and the final appropriation was $620.0 million. The FY2013 request was $600.0 million. The reduction was caused by completion of an academic alliance program and delay of its follow-on program to FY2014, lower funding for exascale computing (a new and controversial initiative intended to boost computing capability by a factor of a thousand), and completion of procurement of a supercomputer. The House Appropriations Committee recommended providing the funds requested. The Senate Appropriations Committee recommended $620.0 million, and within these funds recommended using $69.0 million for the exascale initiative.
- 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 FY2012 request was

[65] "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.

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

> $142.5 million, and the final appropriation was $128.6 million. The FY2013 request was $130.1 million. The House Appropriations Committee recommended $120.0 million; the Senate Appropriations Committee recommended the amount requested.

Readiness in Technical Base and Facilities (RTBF)

This program funds infrastructure and operations at Complex sites. For FY2012, the final appropriation was $2,009.2 million. The FY2013 request was $2,239.8 million. The House and Senate Appropriations Committees recommended providing the funds requested.

RTBF has several subprograms. The largest is Operations of Facilities (FY2012 appropriated, $1,285.6 million; FY2013 requested, $1,419.4 million; House Appropriations Committee, $1,369.4 million; Senate Appropriations Committee, $1,419.4 million). NNSA states that the increase "includes new sustainment initiatives, full operations of new and existing facilities, and addresses infrastructure deficiencies across the complex." Second largest is Construction (FY2012 appropriated, $511.1 million, FY2013 requested, $450.1 million; House Appropriations Committee, $480.8 million; Senate Appropriations Committee, $450.1 million). Two subprograms that consolidate previous budget categories are new for FY2013: Science, Technology, and Engineering Support ($166.9 million requested), and Nuclear Operations Capability Support ($203.3 million requested; House and Senate Appropriations Committees, the requested amount). The first is self-descriptive; the second "combine[s] activities that are focused on support of day-to-day nuclear operations (but are not program-specific) into a single subprogram." The House Appropriations Committee recommended no funding for Science, Technology, and Engineering Support, instead funding these activities within Program Readiness, Operations of Facilities, and Maintenance and Repair of Facilities. The committee recommended funding the NNSA's Capabilities-Based Facilities and Infrastructure program under Maintenance and Repair of Facilities "in order to provide more clarity into the purpose of this funding." The Senate Appropriations Committee recommended the requested amount and directed NNSA to "identify funds for maintenance and operations by site as separate line items" under RTBF in order to "increase transparency in NNSA's efforts to sustain existing physical infrastructure."

Perhaps the most controversial activity in the Weapons Activities account is the Chemistry and Metallurgy Research Facility Replacement (CMRR) at Los Alamos National Laboratory. 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. Since 2005, cost estimates for CMRR have doubled or tripled, and some critics have argued that it is not necessary. For FY2012, NNSA requested $300 million for CMRR but the conference report directed that "no construction activities are funded for the CMRR-Nuclear Facility during fiscal year 2012."

NNSA requested no funds for FY2013 for CMRR. According to the request justification,

> NNSA has determined, in consultation with the national laboratories, that existing infrastructure in the nuclear complex has the inherent capacity to provide adequate support for plutonium chemistry, plutonium physics, and special nuclear materials. NNSA proposes deferring CMRR Nuclear Facility construction for at least five years. Studies are ongoing to determine long-term requirements. Instead of the CMRR Nuclear Facility, NNSA will maximize use of existing facilities and relocate some nuclear materials. Estimated cost avoidance from FY 2013 to FY 2017 totals approximately $1.8 billion.

At the same time, another project, the Uranium Processing Facility (UPF), which will replace old facilities at the Y-12 National Security Complex, showed an increase from $160.2 million enacted for FY2012 to $340.0 million requested for FY2013; the increase was to accelerate UPF design and construction. UPF, if approved, would conduct operations involving enriched uranium for nuclear weapons and naval reactors. It would also conduct downblending of enriched uranium (i.e., reducing the fraction of fissile uranium-235 and increasing the fraction of non-fissile uranium-238) to make it unusable for weapons in support of nuclear nonproliferation. The House and Senate Appropriations Committees recommended the amount requested.

The House Appropriations Committee recommended no funds for CMRR-NF. Instead, it proposed rescinding $65.0 million in prior-year balances from this project and using these funds to offset costs of improving the plutonium infrastructure at Los Alamos, including $30.0 million "to accelerate the completion of safety-related infrastructure improvements needed at the existing Los Alamos Plutonium Facility-4 (PF-4) under the TA-55 Reinvestment Project" and $35.0 million "to begin characterization and cleanout of the PF-4 vault under Material Recycle Recovery." In addition, under Maintenance and Repair of Facilities, the committee's recommendation included $5.0 million to begin replacement of certain piping at the Device Assembly Facility (DAF) "which is needed to provide additional storage options for plutonium due to the delay of the CMRR-NF." (The DAF is a large structure at the Nevada National Security Site, formerly Nevada Test Site, that has capabilities similar to those of Pantex for handling, processing, and storing plutonium components of nuclear weapons.) The Senate Appropriations Committee also recommended no funds for CMRR-NF. It recommended that $35.0 million, as requested, within Nuclear Operations Capability Support be used to accelerate cleanout of the PF-4 vault. It expressed concern that "NNSA has failed to put forth an alternative plutonium strategy," instead focusing on stockpile requirements for plutonium and not fully considering other missions involving plutonium, such as nuclear nonproliferation and nuclear counterterrorism.

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. For FY2012, the appropriation provided $243.3 million. The FY2013 request was $219.4 million; much of the decrease was due to deferring production of special vehicles for this program, completion of upgrades to the program's aviation fleet, and anticipated savings from these upgrades. The House and Senate Appropriations Committees recommended the amount requested.
- 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." For FY2012, the appropriation was $222.1 million. The FY2013 request was $247.6 million. Much of the increase was to augment support for teams that would respond to a radiological or nuclear emergency, to accelerate "experimental activities in support of non-stockpile nuclear weapons assessments," and to develop tools and methods to render "nuclear threat devices" safe. The House Appropriations Committee

recommended $225.4 million. It stated that many activities of the newly established Office of Counterterrorism and Counterproliferation are closely linked to technologies being developed by Defense Nuclear Nonproliferation (DNN) and should, in the future, be integrated with the request for DNN. The Senate Appropriations Committee recommended the amount requested, but expressed its concern "that NNSA does not have a clear strategy in place that links the unique capabilities of the labs and supporting NNSA infrastructure to clear mission goals and funding requirements to support the Department of Defense and the intelligence community."

- 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." For FY2012, the appropriation was $96.4 million. No funds were requested for FIRP for FY2013 due to completion of the program. Some of the type of work it did will be continued by the Capability-Based Facilities and Infrastructure program, which NNSA describes as "an enterprise-wide, program-informed investment approach to ensure infrastructure is in place to execute program workload." The House Appropriations Committee recommended no funds for FIRP but stated that "Maintenance and Repair of Facilities [within RTBF] also includes additional funding requested for major multi-year operating expense recapitalization projects." The Senate Appropriations Committee also recommended no funds for FIRP but stated under Nuclear Operations Capability Support that it "believes it is important that NNSA continue to reduce deferred maintenance on aging infrastructure and reduce the size of its footprint."
- 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. For FY2012, the appropriation was $78.7 million. The FY2013 request was $90.0 million. The main increases were in the Energy Modernization and Investment Program and Corporate Project Management. The main decrease, in Nuclear Materials Integration, reflected completion of removal of certain nuclear materials from Livermore, slowing the removal of certain radioactive waste from Livermore, and deferring disposition of nuclear materials at several sites. The House Appropriations Committee recommended $79.6 million and provided no funds for the Energy Modernization and Investment Program. The Senate Appropriations Committee recommended $88.2 million and "encourages NNSA to report on cost savings and cost avoidances related to its energy modernization and investment program."
- 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." For FY2012, the appropriated amount was $698.0 million. The FY2013 request was $643.3 million. The decrease was largely due to removal of certain nuclear materials from Livermore, which permits a reduction in protective forces, and the projected completion of the Nuclear Materials Safeguards and Security Upgrades Project in FY2013. The main increases were in physical security systems and program management. The

House Appropriations Committee recommended $663.3 million. "While efforts to reduce costs are encouraged, the NNSA has not performed a new multi-site security assessment that would justify the five percent reduction in protective forces proposed in the budget request and it is not clear how those proposed reductions would impact the security posture of NNSA facilities." The Senate Appropriations Committee recommended the requested amount. "The Committee is encouraged by NNSA's efforts to find cost efficiencies while still meeting security requirements." (2) Cyber Security "provides the requisite guidance needed to ensure that sufficient information management security safeguards are implemented throughout the NNSA enterprise." For FY2012, the appropriation was $126.6 million. No funds were requested for this program for FY2013, as discussed next.

- NNSA CIO [Chief Information Officer] Activities is a new program for FY2013; the request was $155.0 million. It will consolidate cyber security and information technology programs. Of the requested amount, $111.0 million was for cyber security, $14.0 million was for enterprise secure computing, and $30.0 million was for federal unclassified information technology. The latter will provide "commodity computing infrastructure" that will support a "shift from a traditional, costly desktop support model to a cloud-provisioned virtualized desktop-based solution." This shift is intended to facilitate collaboration, save money, aid recruiting, and improve security. The House Appropriations Committee recommended renaming NNSA CIO Activities as Information Technology and Security, and recommended adding $5.0 million above the request "in order to restore funding for Technology Application Development to the fiscal year 2012 level." The Senate Appropriations Committee recommended the requested funds.
- 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, which cost more than the current plan. Payment to UC's retirement plan to compensate for the added cost is a legacy cost of the UC-Los Alamos and UC-Livermore contracts. The final appropriation for FY2012 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." The FY2013 request for this item within Weapons Activities was $185.0 million; NNSA stated that "the amount of the annual payment is determined by actuarial valuation." Another $62.0 million was requested for FY2013 for this item within Defense Nuclear Nonproliferation. The House and Senate Appropriations Committees recommended providing funding for this purpose in both programs in the amounts requested.

National Security Applications: NNSA says this program "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." The FY2012 appropriation was $10.0 million. The FY2013 request was $18.2 million. Part of the

increase will be used for R&D on standoff detection of highly enriched uranium (HEU) and HEU-based nuclear weapons. HEU is particularly difficult to detect, yet it is the type of fission fuel that could be used to make the simplest type of nuclear weapon. The House Appropriations Committee recommended providing no funds for this program on grounds that the requested funding is for "nonproliferation-related activities." The Senate Appropriations Committee recommended $10.0 million.

Nonproliferation and National Security Programs[67]

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	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Nonproliferation and Verification R&D	$354.2	$548.2	$528.2	$418.2	
Nonproliferation and International Security	153.6	150.1	134.5	150.1	
International Materials Protection and Control (IMPC)	569.9	311.0	311.0	368.0	
Fissile Materials Disposition	685.4	921.3	764.7	921.3	
Global Threat Reduction Initiative	498.0	466.0	482.7	539.0	
Legacy Contractor Pensions	55.0	62.0	62.0	62.0	
Rescissions	-21.0	—	—	—	
Total	**2,295.9**	**2,458.6**	**2,276.0**	**2,458.6**	

Source: FY2013 budget request, H.Rept. 112-462, S.Rept. 112-164.

Note: Numbers may not add due to rounding.

Funding for these programs in FY2012 was $2,295.9 million. The request for FY2013 was $2,458.6 million. The House Appropriations Committee recommended $2,276.0 million; the Senate Appropriations Committee recommended $2,458.6 million.

The Nonproliferation and Verification R&D program was funded at $354.2 million for FY2012. The request for FY2013 was $548.2 million. The proposed increase includes a one-year $150 million initiative to fund domestic uranium enrichment RD&D. The House bill would appropriate $528.2 million, including $100 million for the uranium enrichment initiative. The Senate Appropriations Committee recommended $418.2 million, with no funding in the R&D program for uranium enrichment. The Senate report stated: "Rather, the Committee recommends transfer authority to the Secretary of Energy of up to $150,000,000 from NNSA to fund this project." The Continuing Appropriations Resolution, 2013 (P.L. 112-175), funding Energy and Water

[67] This section was prepared by Carl E. Behrens.

Development programs until March 27, 2013, funds nonproliferation programs at 0.612% above the FY2012-enacted levels, but adds $100 million to that amount for the uranium enrichment initiative.

Nonproliferation and International Security programs include international safeguards, export controls, and treaties and agreements. The FY2013 request for these programs was $150.1 million, compared with $153.6 million appropriated for FY2012. The House Appropriations Committee recommended $134.5 million; the Senate Committee recommended the requested amount.

International Materials Protection and Control (IMP&C), which is concerned with reducing the threat posed by unsecured Russian weapons and weapons-usable material, was funded at $569.9 million in FY2012; the FY2013 request was $311.0 million. The decrease, according to DOE's budget justification document, reflects completion of several major programs, including the installation of detection equipment in 45 sites in the Megaports initiative. The House bill would appropriate the requested amount. The Senate Appropriations Committee, however, noted that DOE's proposed budget would reduce so-called Second Line of Defense Activities, mostly border and port detection programs, by $171 million, while the programs were under a strategic review. The committee objected to the curtailment and recommended $368.0 million for IMP&C.

The goal of the Fissile Materials Disposition (FMD) program is disposal of U.S. surplus weapons plutonium by converting it into fuel for commercial power reactors, and a similar program in Russia. 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, controversy 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 but the final bill appropriated $685.4 million for the program, and included no funding for the PDCF project, because, the conference report stated, "NNSA has not completed a study of alternatives or a conceptual design report with a cost and schedule estimate."

The FY2013 request for FMD programs was $921.3 million. The major cause of the increase was the planned cold start-up of the MOX facility. No funding was asked for the PDCF; NNSA said it would use existing facilities for pit disassembly. The waste solidification facility was completed and no further funding was requested.

The House Appropriations Committee recommended $764.7 million for FMD programs. It fully funded ongoing construction of the MOX facility but "delays funding for the MOX facility early startup options until the actual costs and schedules for completing and operating the MOX facility are better known." The Senate bill would fund FMD programs at the requested amount.

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 FY2012 appropriation for this program was $498.0 million. The FY2013 request was $466.0 million. The House Appropriations Committee recommended $482.7 million. The Senate Committee recommended $539.0 million.

Cleanup of Former Nuclear Weapons Production Facilities and Civilian Nuclear Energy Research Facilities[68]

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 its responsibilities for the cleanup of former nuclear weapons production facilities that had been administered under multiple offices.[69] 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. The Office of Environmental Management also is responsible for the cleanup of DOE facilities that were involved in civilian nuclear energy research, which generated wastes and contamination. These research facilities add a non-defense component to the office's mission, albeit smaller in terms of the scope of their cleanup and associated funding.[70]

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

DOE has identified in excess of 100 facilities in over 30 states that historically were involved in the production of nuclear weapons and nuclear energy research for civilian purposes.[71] The geographic scope of these facilities is substantial, collectively encompassing a land area of approximately 2 million acres. Cleanup remedies are in place and operational at the majority of these facilities. The responsibility for their long-term stewardship has been transferred to the Office of Legacy Management and other offices within DOE for the operation and maintenance of cleanup remedies and monitoring.[72] See the "Office of Legacy Management" section of this

[68] This section was prepared by David Bearden.

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

[70] 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.

[71] For an interactive map and listing of each facility, see DOE's Office of Environmental Management website: http://www.em.doe.gov/Pages/siteslocations.aspx.

[72] The Office of Legacy Management administers the long-stewardship of DOE facilities that do not have a continuing (continued...)

report. Some of the smaller sites for which DOE initially was responsible were transferred to the Army Corps of Engineers in 1997 under the Formerly Utilized Sites Remedial Action Program (FUSRAP). The cleanup of these sites is funded within the civil works budget of the Corps.[73] (See **Table 4**.) Once the Corps completes the cleanup of a FUSRAP site, it is transferred back to DOE for long-term stewardship under the Office of Legacy Management.

Much work remains to be done at the 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 to fulfill the cleanup liability of the United States. As of the beginning of FY2012, the Office of Environmental Management administered 17 facilities in 11 states at which cleanup was not yet complete.[74] Although cleanup is scheduled to be complete at some of these facilities over the next several years, cleanup is expected to continue at some of the larger and more complex facilities for decades. The Hanford site in the state of Washington has the lengthiest estimated time frame, with cleanup scheduled to continue possibly as late as 2062 based on more conservative assumptions.[75] DOE estimates that the costs to complete the cleanup of these 17 facilities could range between $174 billion and $209 billion, exceeding the past costs already incurred across the entire inventory of facilities.[76]

DOE periodically revises its 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 excluded from the above estimates. Long-term stewardship entails an even greater degree of uncertainty considering the lengthy time frames of maintenance and monitoring once cleanup remedies are in place and operational, especially at sites where the cleanup method entails the permanent containment of radioactive wastes.

(...continued)

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.

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

[74] For a listing of these 11 facilities, see Department of Energy, Office of Chief Financial Officer, *FY2013 Congressional Budget Request*, February 2012, Volume 5, Environmental Management, p. 82. One of these 11 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.

[75] Ibid.

[76] Ibid., p. 9. Including the $100 billion in past costs incurred from FY1997 through FY2011, DOE estimated total "life-cycle" costs ranging from $274 billion to $309 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 $135 billion in past costs incurred through FY2010. Comprehensive information on past costs incurred for managing wastes and contamination prior to the establishment of the Office of Environmental Management is not readily available.

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 account funds the cleanup of wastes and contamination resulting from civilian nuclear energy research, and the Uranium Enrichment D&D Fund account finances the cleanup of facilities that enriched uranium for national defense and civilian purposes.

For FY2013, the Senate Appropriations Committee recommended $5.74 billion for these three accounts combined. The House Appropriations Committee recommended $5.54 billion, nearly $200 million less overall, distributed among multiple facilities. The President requested $5.65 billion, and Congress enacted $5.71 billion for FY2012. Neither the House nor Senate Appropriations Committee included the $463 million that the President requested within the Defense Environmental Cleanup account to resume the federal payment to the Uranium Enrichment D&D Fund. Congress ceased this payment in FY2012. This payment historically has been treated as an offset to the total funding for the Office of Environmental Management because the payment actually does not become available to DOE until Congress subsequently appropriates it out of the Uranium Enrichment D&D Fund. The President has proposed to resume this federal payment, contingent upon the enactment of legislation to reauthorize appropriations for the payment and the collection of assessments against nuclear utilities that also once contributed revenues to the Uranium Enrichment D&D Fund until the authority expired in 2007. See the "Uranium Enrichment Facilities" section of this report for further discussion.

Table 14 presents a breakout of the amounts reported by the House and Senate Appropriations Committees for FY2013, compared to the President's FY2013 request and the FY2012 enacted appropriations, among each of the three appropriations accounts that fund DOE's Office of Environmental Management (and line-items within those accounts for specific facilities and supporting program activities). As noted in the table, the FY2012 enacted amounts reflect DOE's allocation of a $21.2 million contractor pay freeze rescission distributed among each of the three accounts, as directed in P.L. 112-74. The table also presents the net total program funding level for the Office of Environmental Management for the three accounts combined, accounting for offsets including the use of prior year balances and the federal payment to the Uranium Enrichment D&D Fund that the President proposed for FY2013. A discussion of perennial issues in the debate over the adequacy of funding for the Office of Environmental Management follows.

Table 14. Appropriations for the Office of Environmental Management

($ millions)

Account/Site or Program Activity	FY2012 Approp.[a]	FY2013 Request	House	Senate	Conf.
Defense Environmental Cleanup					
Closure Sites	5.4	2.0	2.0	2.0	
Hanford	2,138.3	2,135.4	2,116.3	2,147.5	
Richland Operations	*953.3*	*963.3*	*953.3*	*975.4*	
Office of River Protection	*1,185.0*	*1,172.1*	*1,163.0*	*1,172.1*	

Account/Site or Program Activity	FY2012 Approp.[a]	FY2013 Request	House	Senate	Conf.
Idaho National Laboratory	386.9	399.6	399.6	399.6	
NNSA Sites	282.4	334.3	312.4	334.3	
Oak Ridge Reservation	199.5	181.5	179.5	213.5	
Savannah River Site	1,193.8	1,181.5	1,148.6	1,181.5	
Waste Isolation Pilot Plant	215.1	198.0	203.0	208.9	
Program Direction	321.6	323.5	315.6	323.5	
Program Support	20.4	18.3	18.3	18.3	
Safeguards and Security	252.0	237.0	237.0	237.0	
Technology Development	11.0	20.0	10.0	20.0	
Federal Payment to Uranium Enrichment D&D Fund	0.0	463.0	0.0	0.0	
Use of Prior Year Uncosted Balances	-3.4	-12.1	-12.1	-12.1	
Use of Prior Year Unobligated Balances	0.0	-10.0	0.0	-10.0	
Contractor Pay Freeze Rescission	-20.1	0.0	0.0	0.0	
Rescission	0.0	0.0	-10.0	0.0	
Defense Environmental Cleanup Subtotal	**5,003.0**	**5,472.0[b]**	**4,920.1**	**5,064.0**	
Non-Defense Environmental Cleanup					
Fast Flux Test Reactor	2.7	2.7	2.7	2.7	
Gaseous Diffusion Plants	100.6	90.1	90.1	90.1	
Small Sites	67.4	57.8	57.8	87.8	
West Valley Demonstration Project	65.0	47.9	47.9	47.9	
Contractor Pay Freeze Rescission	-0.4	0.0	0.0	0.0	
Non-Defense Environmental Cleanup Subtotal	**235.3**	**198.5**	**198.5**	**228.5**	
Uranium Enrichment D&D Fund					
Gaseous Diffusion Plants	472.2	425.0	425.5	425.0	
Oak Ridge	*200.9*	*207.8*	203.9	207.8	
Paducah	*81.8*	*90.1*	92.7	90.1	
Portsmouth	*190.3*	*127.0*	128.8	127.0	
Pension, Community, and Regulatory Support[c]	0.0	17.5	0.0	17.5	
Contractor Pay Freeze Rescission	-0.8	0.0	0.0	0.0	
Uranium Enrichment D&D Fund Subtotal	**472.2**	**442.5**	**425.5**	**442.5**	
Offset for Federal Payment to Uranium Enrichment D&D Fund[d]	0.0	-463.0	0.0	0.0	
Office of Environmental Management Total	**5,710.5**	**5,650.0**	**5,544.1**	**5,735.0**	

Source: Prepared by the Congressional Research Service using information from the House Appropriations Committee report on H.R. 5325 (H.Rept. 112-462), the Senate Appropriations Committee report on S. 2465 (S.Rept. 112-164), and the Department of Energy, Office of Chief Financial Officer, *FY2013 Congressional Budget Request*, February 2012, Volume 5, Environmental Management. Numbers may not add due to rounding.

a. Section 309, Title III, Division B of the Consolidated Appropriations Act for FY2012 (P.L. 112-74) rescinded a total of $73.3 million from the appropriations provided in that law for DOE due to a contractor pay freeze rescission, and directed DOE to allocate the rescission among its accounts. DOE subsequently distributed $21.2 million of the rescission among the three accounts (and line-items within those accounts)

that fund the Office of Environmental Management. Both the House and Senate reports reflected the FY2012 contractor pay freeze rescission as a separate line-item within each of the three accounts, whereas DOE had presented this rescission distributed among individual line-items in its budget justification, resulting in differing presentations among the line-items within each account.

b. In its report on H.R. 5325, the House Appropriations Committee did not reflect the President's FY2013 budget request of $463 million within the total request that it presented for the Defense Environmental Cleanup account. These funds would be used to resume the federal payment to the Uranium Enrichment Decontamination and Decommissioning Fund. The Administration requested the $463 million, subject to reauthorizing legislation. In its report on S. 2465, the Senate Appropriations Committee did not recommend any funding for this item, but did present the $463 million within the total that the President requested for the Defense Environmental Cleanup account. This variance in accounting may result in differing comparisons of the President's request and the amounts reported by the House and Senate Appropriations Committees.

c. Pension, Community, and Regulatory Support is broken out separately within the Uranium Enrichment D&D Fund in the President's FY2013 request, but was not separated in the FY2012 enacted appropriations.

d. The President's FY2013 proposal to resume the federal payment to the Uranium Enrichment D&D Fund is contingent upon the enactment of reauthorizing legislation. Historically, the federal payment has been executed as a transfer from the Defense Environmental Cleanup account to the Uranium Enrichment D&D Fund. This transfer 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.

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.[77] 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 formal compliance agreements negotiated among DOE, the Environmental Protection Agency (EPA), and the states in which the facilities are located.[78] EPA and the states are responsible for overseeing DOE's performance of the cleanup of each facility under these agreements and enforcing the milestones.

Although the 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 needed for safeguarding, securing, and maintaining facilities while cleanup is underway.

According to DOE, the President's FY2013 request for the Office of Environmental Management would support the completion of all enforceable cleanup milestones with deadlines that fall

[77] 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.

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

within the fiscal year.[79] Although the House Appropriations Committee recommended less than the President requested for certain facilities, the committee observed in its report on H.R. 5325 that many schedules in existing compliance agreements were not realistic in terms of the availability of funding and technical and management challenges. The committee expressed its support for DOE to update its estimates of the completion of cleanup to provide an "accurate accounting to all stakeholders" for a basis to negotiate a "clear, affordable, and attainable path forward" at "sites where the current schedule for cleanup will not be met."[80]

As discussed above, terms of the compliance agreements are binding and enforceable, and revisions must be negotiated among the parties to avoid potential violations if milestones or schedules cannot be met. DOE has negotiated revisions to many of its compliance agreements on multiple occasions in past years, as the challenges have become better understood over time.

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. Under existing law, these wastes eventually are 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 where high-level tank wastes are stored and managed include the Hanford site in Washington, the Savannah River site in South Carolina, and the Idaho National Laboratory. DOE reports that there are approximately 88 million gallons of high-level wastes stored in tanks at these three locations combined.[81] Of this inventory, 54 million gallons are 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.[82] DOE reports that funding for the construction of facilities at each location that would process and treat these wastes for permanent disposal represents "one of the primary risk and cost drivers" for the Office of Environmental Management.[83] The most recent estimate to complete the construction of these high-level waste treatment facilities alone is $14.2 billion.[84] Once they are operational, additional funding and time

[79] Department of Energy, Office of Chief Financial Officer, *FY2013 Congressional Budget Request*, February 2012, Volume 5, Environmental Management, p. 10.

[80] See H.Rept. 112-462, p. 129-130.

[81] Ibid.

[82] 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.

[83] Department of Energy, Office of Chief Financial Officer, *FY2013 Congressional Budget Request*, February 2012, Volume 5, Environmental Management, p. 10.

[84] Ibid.

would be needed to remove the wastes from the tanks and to process the wastes into a more stabilized form for permanent disposal.

Because of these substantial challenges, long-term funding needs for the cleanup of Hanford, the Savannah River site, and the Idaho National Laboratory are expected to continue 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.[85] These lengthy time frames 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 the additional time necessary for the long-term stewardship of these sites, once the initial cleanup is completed under the Office of Environmental Management, likely resulting in even lengthier horizons for total federal responsibilities at these sites.

Uranium Enrichment Facilities

The source and availability of funding for the cleanup of three DOE uranium enrichment facilities 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, KY; Piketon, OH (Portsmouth plant); and Oak Ridge, TN. 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.[86]

The House Appropriations Committee recommended $425.5 million in appropriations for FY2013 from the available balance in the Uranium Enrichment D&D Fund. The Senate Appropriations Committee recommended $442.5 million, the same amount that the President requested. Each of these amounts is less than the appropriations of $472.2 million enacted for FY2012. The overall decrease among each proposal is attributed to a reduction in funding for the Portsmouth facility, whereas funding for the Oak Ridge and Paducah facilities would increase. See **Table 14** for a breakout of funds for each facility. (The Paducah and Portsmouth facilities also receive funds within the Non-Defense Environmental Cleanup account.) Neither the House nor Senate Appropriations Committee, nor the President's request, included any dedicated funding within the Uranium Enrichment D&D Fund for reimbursement payments to uranium and thorium licensees in FY2013. However, the House Appropriations Committee highlighted the importance of the cleanup of the uranium and thorium sites to affected communities, the outstanding claim balances and total liabilities, and the need for progress in remediation.[87]

To finance the Uranium Enrichment D&D 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.[88] 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.[89] The original requirement for both the federal government, and

[85] Ibid., p. 82.

[86] 42 U.S.C. §2297g.

[87] See H.Rept. 112-462, p. 101-102.

[88] 42 U.S.C. §2297g-1(c).

[89] 42 U.S.C. §2297g-1(d).

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 the liability for the 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 to the Uranium Enrichment D&D Fund. The federal payment is not available to DOE for obligation until it is appropriated out of the Uranium Enrichment D&D Fund. Congress ceased the federal payment in FY2012, with no funds provided for it in P.L. 112-74. The last federal payment of $33.6 million in FY2011 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.[90]

Whether to reauthorize the utility assessments and the federal payment has been an issue, as repeated DOE estimates continue to suggest that the remaining balance of the Uranium Enrichment Decontamination and Decommissioning Fund does not appear sufficient to pay for the completion of the cleanup of the three federal uranium enrichment facilities over the long-term. The Office of Management and Budget (OMB) estimates that $3.85 billion will remain available in the Uranium Enrichment D&D Fund for appropriation by Congress, as of the beginning of FY2013.[91] 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 FY2020 without additional deposits.[92]

Similar to prior years, the President's FY2013 request includes a proposal to reauthorize appropriations to resume the federal payment and to reauthorize the collection of the nuclear utility assessments. The President's proposal is intended to increase resources in the Uranium Enrichment D&D Fund that would be available for appropriation by Congress.[93] The President's FY2013 request states the Administration's position that reauthorization is necessary "due to higher-than-expected cleanup costs."[94] OMB estimates that reauthorization of the nuclear utility assessments would generate $200 million in revenues in FY2013, and the President's FY2013 request included $463 million within the Defense Environmental Cleanup account to resume the federal payment, subject to reauthorizing legislation.[95] Neither the House nor the Senate Appropriations Committee proposed appropriations to resume the federal payment in FY2013.

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[90] 42 U.S.C. §2297g-1.

[91] Office of Management and Budget, *Budget of the U.S. Government for Fiscal Year 2013*, February 2012, Appendix, p. 448, available on OMB's website, http://www.whitehouse.gov/sites/default/files/omb/budget/fy2013/assets/doe.pdfhttp://www.whitehouse.gov/sites/default/files/omb/budget/fy2012/assets/doe.pdf.

[92] 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 (i.e., once every three years).

[93] Office of Management and Budget, *Budget of the U.S. Government for Fiscal Year 2013*, February 2012, Analytical Perspectives, p. 214 and p. 238, available on OMB's website: http://www.whitehouse.gov/omb/budget/Analytical_Perspectives.

[94] Ibid.

[95] Office of Management and Budget, *Budget of the U.S. Government for Fiscal Year 2013*, February 2012, Appendix, (continued...)

In this debate, the nuclear utilities have asserted that they have fulfilled their share of the cleanup liability, as originally authorized in the Energy Policy Act of 1992. However, the amounts envisioned in the statute were based upon estimates of funding needs at that time. As waste disposal and remediation challenges have become more defined in the intervening years, DOE estimates that greater funding is needed to complete the cleanup of the uranium enrichment facilities than initially thought. Whether the remaining cleanup liability should be shared by the nuclear utilities and the federal government continues to be an issue. If the available balance of the Uranium Enrichment D&D Fund is expended, the Energy Policy Act of 1992 still requires DOE to pay the costs of cleanup, subject to annual appropriations.[96] If the Uranium Enrichment D&D Fund is not reauthorized and becomes fully expended, the remaining cleanup costs could be borne at the expense of the federal taxpayer alone.

To augment the existing balance of the fund and extend its availability for appropriations, DOE has transferred portions of excess federal uranium inventories in exchange for cleanup services performed by private parties. The President's FY2013 request includes a plan to transfer up to 1,750 metric tons of excess uranium within that fiscal year.[97] The value of this material in terms of offsetting the need for appropriations would depend on the actual amounts that are transferred and the market value at the time of transfer. Although DOE has relied upon these transfers to accomplish certain aspects of cleanup efforts in recent years, the department's authority for the contracting mechanisms that are used to execute the transfers, and the potential impact on uranium markets, have received heightened attention within Congress.

The House Appropriations Committee addressed some of the above issues in its report on H.R. 5325, expressing its concern about the costs of reinstating the nuclear utility assessments on industry and ultimately on electricity consumers at a time of rising energy prices. The committee also questioned the reliability of DOE's estimates of long-term funding needs to complete the cleanup of the three federal uranium enrichment facilities as the basis for the President's proposal to reinstate the nuclear utility assessments and to resume the federal payment. Regarding the transfer of excess federal uranium inventories, the committee voiced its concern that this mechanism has focused on enhancing cleanup at the Portsmouth facility and has not included the Paducah facility so far. The committee also questioned the lack of congressional oversight in the use of these transfers in exchange for cleanup services, observed the uncertainty these exchanges raise in terms of Congress determining the annual funding level that is needed to augment them, and directed DOE to "clearly outline all potential impacts" on the domestic uranium mining industry in the update of its excess federal uranium inventory management plan.[98]

In the first session of the 112th Congress, related legislation (H.R. 2054 and S. 1135) was introduced to authorize the re-enrichment of excess federal inventories of depleted uranium for sale. 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. The quantity that could be sold would be limited to minimize the impact on domestic markets. These proceeds would be authorized as

(...continued)

p. 448, available on OMB's website, http://www.whitehouse.gov/sites/default/files/omb/budget/fy2013/assets/doe.pdf.

[96] 42 U.S.C. §2297g-2(c).

[97] Department of Energy, Office of Chief Financial Officer, *FY2013 Congressional Budget Request*, February 2012, Volume 5, Environmental Management, p. 11.

[98] See H.Rept. 112-462, p. 101.

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 in the First Session 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 perform cleanup activities.[99]

Office of Legacy Management

Once cleanup remedies are in place under the Office of Environmental Management, DOE's Office of Legacy Management administers the long-term stewardship of the facilities that do not have a continuing mission. The Office of Legacy Management also is responsible for the long-term stewardship of sites that had been transferred from DOE to the Army Corps of Engineers under the FUSRAP program in 1997. Once the Corps completes the cleanup of a site under this program, it is responsible for the initial two years of operation and maintenance, after which time the site is transferred back to DOE's Office of Legacy Management for long-term stewardship. The Office of Legacy Management also manages the payment of pensions and retirement benefits of former contractor personnel who worked at DOE facilities that do not have a continuing mission,[100] among other supporting activities.[101] The federal role in the management of these former contractor pensions and benefits stems from the long-term nature of the projects and the associated length of employment for the personnel who performed the work for DOE. These pensions and benefits are earned and accrued by contractor employees while in active employment at DOE facilities and are payable after their employment ends.[102]

The Office of Legacy Management is funded within DOE's Other Defense Activities account.[103] The House Appropriations Committee recommended $173.9 million within this account for DOE's Office of Legacy Management in FY2013. The Senate Appropriations Committee recommended the President's FY2013 full request of $177.9 million. Each of these proposed amounts is an increase above the $169.6 million in appropriations enacted for FY2012. Accounting for an additional $12 million in prior year unobligated balances, DOE reports that the total budget authority for the office in FY2012 was $181.6 million.[104] In its report on H.R. 5325, the House Appropriations Committee noted that additional prior year unobligated balances should

[99] 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.

[100] 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.

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

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

[103] 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.

[104] Department of Energy, Office of Chief Financial Officer, *FY2013 Congressional Budget Request*, February 2012, Volume 2, Other Defense Activities, p. 41.

be available to meet funding need in FY2013, to offset the decrease of $4 million in new appropriations it recommended below the President's request.[105]

Funding needs for the Office of Legacy Management are likely to increase beyond current levels over time, as more facilities are cleaned up and transferred from the Office of Environmental Management and the FUSRAP program of the Corps for long-term stewardship. Over the next 10 years, DOE projects that the total number of facilities administered by the Office of Legacy Management will rise from 91 in FY2011 to 129 in FY2020.[106] In FY2012 alone, the Office of Legacy Management assumed two new responsibilities: long-term stewardship of the Mound site in Miamisburg, OH, once the cleanup was complete under the Office of Environmental Management, and the management of records and former contractor pensions and benefits for the terminated Yucca Mountain project.

Estimating the long-term funding needs for the Office of Legacy Management is inherently challenging because of the lengthy time horizons that are involved. For example, actions may be necessary for many decades to operate and maintain cleanup remedies and monitor contaminant levels to ensure the effectiveness of the remedies over time. At sites where the cleanup entails the permanent containment of radioactive wastes, long-term stewardship may continue indefinitely because of the time needed for radioactivity to decay to acceptable levels. Enforcement of land use restrictions or other institutional controls also may be necessary in perpetuity at facilities that are not 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 of the United States for long-term stewardship of sites contaminated from the historic production of nuclear weapons and civilian nuclear energy research in the 20th century.[107]

Power Marketing Administrations[108]

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

[105] See H.Rept. 112-462, p. 133.

[106] 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.

[107] 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.

[108] This section was prepared by Charles V. Stern.

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 FY2013 request for the PMAs was $85 million. This is the same level as the FY2012 appropriation. The FY2013 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 $96.1 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. Both the House and the Senate Appropriations Committees recommended funding PMAs at the requested amount, but did not include the $23 million collections from Colorado River basins in the total.

BPA is a self-funded agency under authority granted by P.L. 93-454 (16 U.S.C. §838), the Federal Columbia River Transmission System Act of 1974, and receives no appropriations. However, it funds some of its activities from permanent borrowing authority with the Treasury, which was increased in FY2003 from $3.75 billion to $4.45 billion (a $700 million increase). 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 not to exceed $3.25 billion.[109]

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.

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

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

($ millions)

Program	FY2012 Approp.	FY2013 Request	House	Senate	Conf.
Appalachian Regional Commission	$68.3	64.9	75.3	64.9	
Nuclear Regulatory Commission	*1,038.1*	*1053.2*	*1,059.8*	*1,0541*	
(Revenues)	*-909.5*	*-924.7*	*-921.7*	*-924.8*	
Net NRC (including Inspector General)	128.6	128.5	138.1	129.3	
Defense Nuclear Facilities Safety Board	29.1	29.4	29.4	27.4	
Nuclear Waste Technical Review Board	3.4	3.4	3.4	3.4	
Denali Commission	10.7	10.2	10.7	10.2	
Delta Regional Authority	11.7	11.3	11.7	11.3	
Northern Border Regional Commission	1.5	1.4	1.4	1.4	
Southern Crescent Regional Commission	0.3	0.0	0.3	0.0	
Fed. Coord. Alaska Gas Projects	1.0	3.1	1.0	1.0	
Total	**254.5**	**252.2**	**271.3**	**248.9**	

Source: FY2013 budget request, H.Rept. 112-462, H.R. 5325 as passed, S.Rept. 112-164.

Note: Figures may not add due to rounding.

Key Policy Issues—Independent Agencies

Nuclear Regulatory Commission[110]

The Nuclear Regulatory Commission (NRC) requested $1.053 billion for FY2013 (including $11 million for the inspector general's office), $15 million above FY2012 funding level. Major activities conducted by NRC include safety regulation and licensing of commercial nuclear reactors and oversight of nuclear materials users.[111] The House and Senate Appropriations Committees recommended relatively small changes from the budget request (see **Table 15**).

The NRC budget request includes $264.8 million for new reactor activities, nearly the same as the FY2012 level. Until 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 issued combined construction and operating licenses for four new reactors at two sites in Georgia and South Carolina in early 2012.

[110] This section was prepared by Mark Holt.

[111] U.S. Nuclear Regulatory Commission, *FY 2013 Congressional Budget Justification*, NUREG-1100, Vol. 28, February 2012, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1100/v28/fy2013-cbj.pdf.

NRC's proposed FY2013 budget includes 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 House Appropriations Committee directed NRC to resume consideration of the Yucca Mountain application with prior-year funds. The panel also cut $3.4 million for NRC's Waste Confidence Rulemaking on the safety of on-site waste storage for up to 300 years, an effort that the committee said was designed "to provide cover for the Administration's Yucca Mountain policy."

In response to controversy over actions by NRC Chairman Gregory Jaczko to halt the Yucca Mountain licensing process, the enacted FY2012 funding 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. That language is continued in the House Appropriations Committee's FY2013 bill.

For regulation of operating reactors, NRC's FY2013 budget request includes $545.1 million, $10.4 million above the FY2012 level. Those activities include reactor safety inspections, license renewals and modifications, collection and analysis of reactor performance data, and oversight of security exercises. The Fukushima nuclear disaster in Japan increased congressional and public concern about the safety of U.S. nuclear power plants. NRC established a task force 10 days after the accident to review NRC's regulatory system, and NRC issued the first regulatory orders resulting from that review on March 12, 2012.[112]

The Energy Policy Act of 2005 permanently extended a requirement that 90% of NRC's budget be offset by fees on licensees. Not subject to the offset are expenditures from the Nuclear Waste Fund to pay for waste repository licensing, spending on general homeland security, and DOE defense waste oversight. The offsets in the FY2013 request would result in a net appropriation of $128.5 million, nearly the same as ($100,000 below) the FY2012 enacted level.

[112] U.S. Nuclear Regulatory Commission, "Actions in Response to the Japan Nuclear Accident," http://www.nrc.gov/japan/japan-info.html.

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